for what it's worth

Edited by Don Dewey

A COLLECTION OF HINTS AND KINKS COMPILED BY SUBJECT CATEGORY.

RCM ANTHOLOGY
LIBRARY SERIES

For What It's Worth

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Edited By Don Dewey

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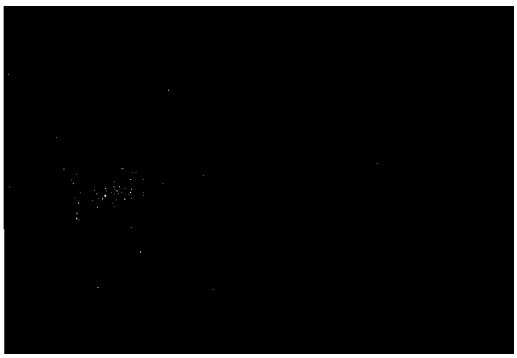
A COLLECTION OF HINTS AND KINKS FOR THE R/C ENTHUSIAST COMPILED BY SUBJECT CATEGORIES



CONTENTS

I SHOP TOOLS AND ACCESSORIES

RCM WING JIG

Here is a wing jig that you can make in 30 minutes at a cost of under $2.00, and which will allow you to build perfect wings in half the time of conventional construction.

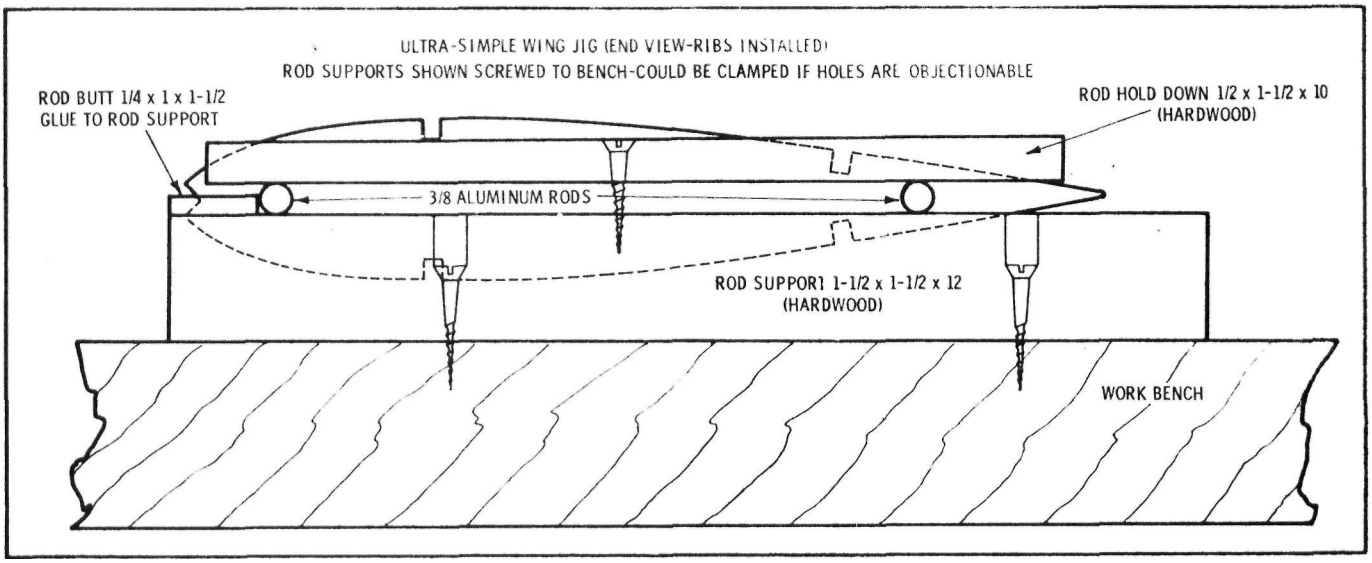
Like everyone else that builds model aircraft, I enjoy it to a point but have always dreaded building wings, particularly the elliptical airfoil types. A couple of years ago, I set out to devise a system of wing construction that would be inexpensive, provide accurate assembly, and allow the builder to work on either surface without disturbing the alignment. Several butchered wings later, the system shown evolved and has produced many wings, each straight as an arrow. What's more, I don't dread building wings any more but, rather, enjoy it. Admittedly, only wings of the constant chord variety have been built but I can see no reason why the jig would not work equally as well on tapered wings, swept wings, delta wings, stabilizers, or what have you.

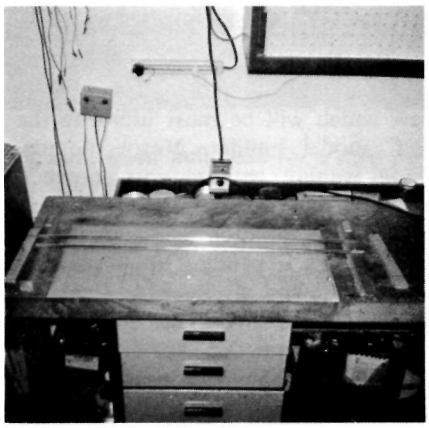
To make this jig you will need one (1) six-foot length of 3/8" Reynolds aluminum rod, available from any good hardware store for about $1.40, a couple of pieces of square 1-1/2 x 1-1/2 x 12" hard wood for the rod supports and some scrap hardwood for the rod hold downs and front rod butts. Cut your aluminum rod into two (2) three-foot lengths, round the ends with a file and polish them lightly with steel wool. The hardwood rod hold downs should be cut to approximately 1/2" x 1/2" x 10". Dimensions are not at all critical. A scrap of wood approximately 1/4" thick and an inch long should be glued to the top front edge of each rod support. This will serve as an alignment key later. Jig construction is now complete.

Build your wing a panel at a time. Secure the jig rod supports to a flat surface about 34" apart; sufficient for even the largest wings. 1 screw mine right to my work bench. Be sure the blocks are parallel to each other. Center your wing plan between the blocks and tape or tack it down. Fore and aft location of the plan is unimportant. We are interested only in the spacing of the ribs and parallelism between them.

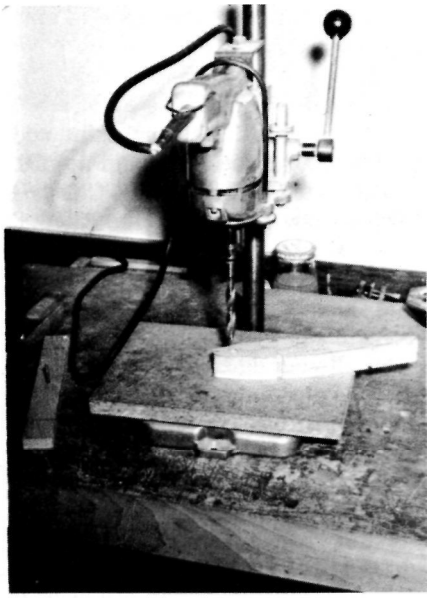
Prepare your ribs for installation on the jig. I make my ribs in a stack and sand them to shape from an aluminum template which insures uniformity. All spar notches and gear block cut outs should be made at this time. Next drill two 3/8" holes squarely through the entire stack. One hole should be on the rib center line about an inch behind the leading edge, the other on the center line about an inch in front of the trailing edge. The location of the holes may be adjusted for easy assembly with the type rib you are using but all holes should be in the identical place on each rib. A drill press is recommended for this job as inaccurately drilled holes could cause you to build a twist into the wing. Number your ribs in the order in which they come off the stack, and keep them in sequence when installing them on jig. The effect of drilling errors will be minimized if this procedure is followed.

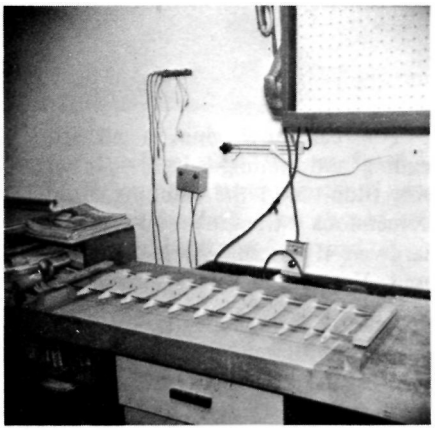
Slide the rib stack onto the aluminum rods. If you are going to install gear blocks, start with the ribs upside down. Position the rods on the support block and butt the leading edge rod up against the stop block on each side. Position the rod hold downs over the rods and screw them down tight. This clamps the rods in position and prevents any tendency for the rods to sag. Slide each rib to its respective



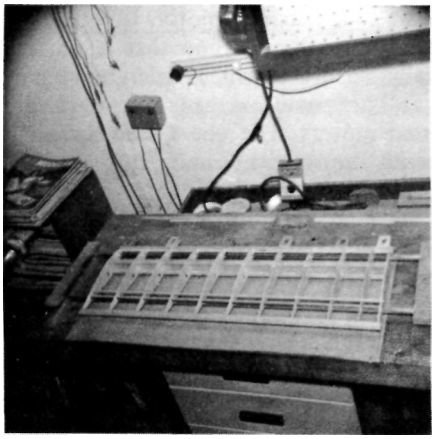


The entire jig — ready for use

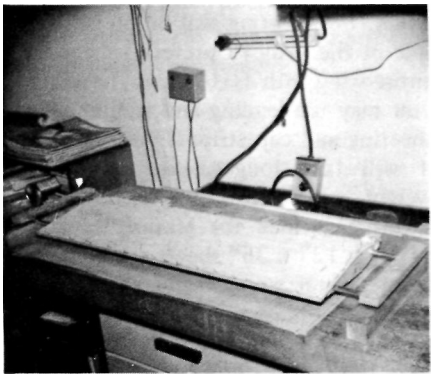




Ribs in place on the jig and positioned over the wing plan. Notice that nothing touches the plans.

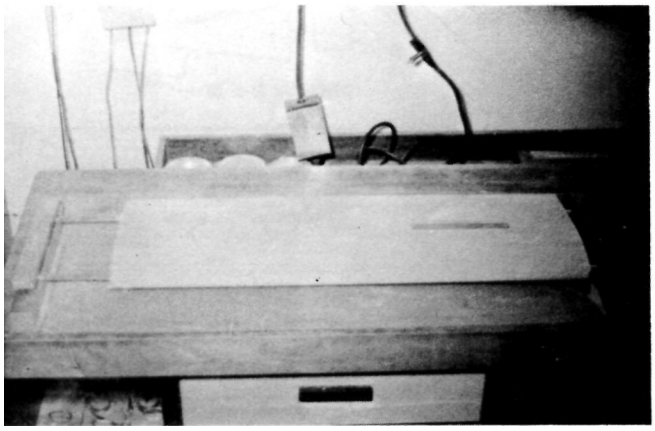


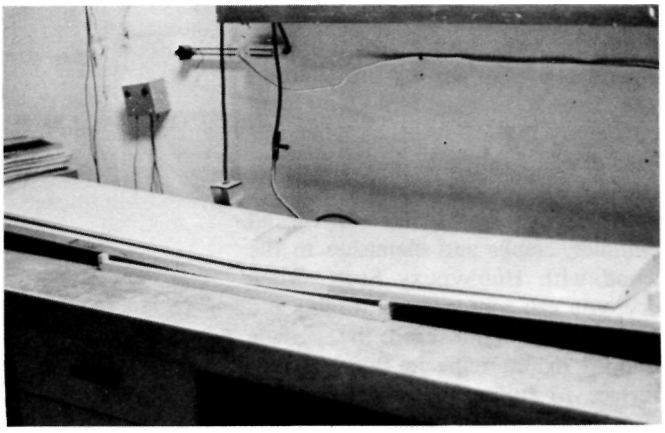
Ribs for each panel are stacked and pinned together. Two 3/8" holes must be drilled thru the entire stack to accept the jig rods.



Above: Spars, leading and trailing edges and spar webbing in place. Don't leave out the spar webbing. Right: Sheeting installed. Since the ribs were placed on the jig upside down, this is the bottom sheeting. Far right: The entire assembly turned over, ready for installation of landing gear mounts and top sheeting.

Below, Left: The panel complete, pin holds filled, completely finish sanded and ready for removal from the jig. Below: Panels joined at the desired dihedral angle. Install tip blocks, fiber glass the center section and your wing is ready for MonoKote or your favorite finish.





position over the plan. Stand back and take a last check. Your ribs should be properly spaced, parallel to the support blocks, square to the rods and square to the bench.

You can now glue in all spars, leading and trailing edges, spar webbing (don't skip the webbing, it adds tremendous strength) and bellcrank hardware if notched ailerons are to be used. Notice how nice everything fits. No zigs or sags or bends. Everything will be absolutely straight. You can even use warped stock for spars with no ill effects. I prefer not to install landing gear mounts at this point but you may do so if you desire. Allow time for existing structure to dry thoroughly.

You may now apply the sheeting to the exposed surface of the wing. (If you are building the wing upside down, the sheeting will be on bottom side of the wing.) I prefer to sheet the entire wing with 1/16" sheet, however, you may use leading and trailing edge sheeting and cap strips if you wish but it will take longer, save very little weight and distort the airfoil. Full sheeting is nice for MonoKote also. 1/16" x 12" x 36" sheets are available from several sources and work beautifully in conjunction with this jig. Use white or Titebond glue to insure you have time to get the entire skin pinned down prior to the glue setting. Allow the structure to dry.

Remove the rod hold downs and flip the wing over. Mark the cut out for your hardwood landing gear mount from the top. I puncture a hole in the skin with a number eleven X-acto blade at each corner of the block. Flip the wing to its original position. Using the gear mount as a guide, cut out the area to be occupied by the mount. Install the mount flush with the wing skin and flip the wing over. Generously fillet the gear mount with epoxy from the top. Install the rod hold downs and make any last installations you may have forgotten. You may now apply the top sheeting. When this has dried, you will have a light, straight, warp proof structure.

At this point, I like to fill all pinholes, cracks and blemishes in the wood with Hobbypoxy Stuff. When dry, you can contour your leading and trailing edges and sand the surface smooth right on the jig flipping from surface to surface as required. Make your servo cut out and you are ready to remove the panel from the jig. Remove the rod hold downs and slide the aluminum rods out of the wing with a twisting action. Lay the completed panel aside and repeat the procedure for your second panel.

Sand or saw the wing skins and spars flush with the center and tip ribs. I do this on a radial arm saw. One pass with the saw and I have the dihedral angle, skins and spars trimmed to shape. This can be done readily by hand however, if you do not have access to a power saw.

Install your dihedral braces and join the wing at the desired dihedral angle. If you plan to fiberglass the center section to at least the width of the fuselage, you could eliminate the dihedral braces. The resulting bonded structure will be strong enough to withstand all the flight stress you care to apply. The dihedral braces will, if nothing else, help you avoid any mental anxiety you may have in this regard to use your own judgement.

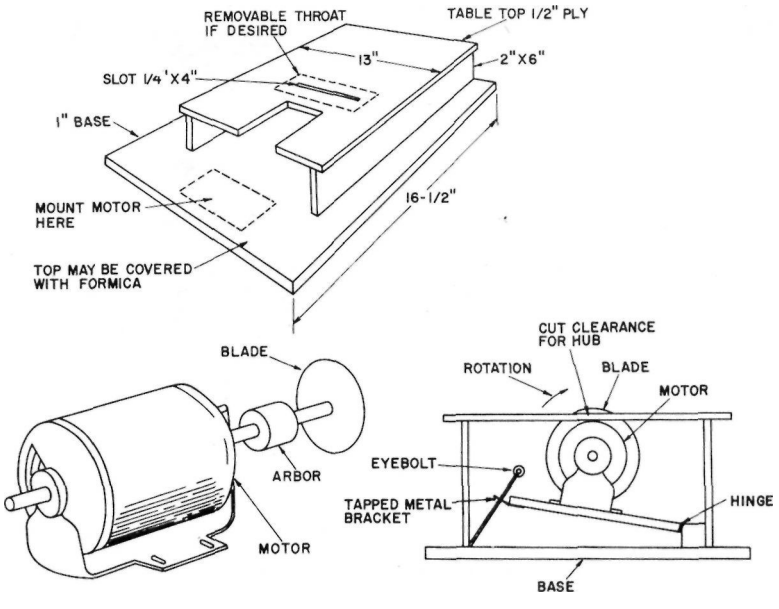
Glue on your tip blocks, sand them to shape and your wing is ready to apply your favorite finish. Even if you choose to sheet the entire wing as I do, cover the structure with silk or silkspan. Failure to do so may result in your finish cracking with age.

I believe that wings built on this jig in the manner described are as straight and warp free as any foam wings, have skins that will not loosen with age and are significantly lighter, with no sacrifice to strength. §

MODEL BUILDERS TABLE SAW

Here is a basic idea for a small table saw which will be most useful to the R/C model builder. Motor mounts, wing landing gear mounts, notched sections, and such are a snap with this tool. Many variations and refinements are possible depending upon your requirements and imagination. The basic dimensions in this article are given as an example, but none are critical, and are mainly dependent upon the size and shape of the motor used. Depending on the number of items you have on hand, the cost of this small table saw can be quite low. A one tenth to one quarter horsepower motor, such as a washing machine motor, is perfectly adequate. Choose one that is physically small. Appliance dealers and junk yards are good sources for inexpensive, used motors. The one I used is a one tenth horsepower unit and it has proved to be quite adequate.

A Craftsman work arbor, number 9M21641 for half-inch shafts is attached to the motor shaft with two set screws. A four inch circular saw blade, such as number 9M32401 or 9M32441, is most satisfactory. I prefer the latter. The blade is held in the work arbor near the end of the thread, thus giving the greatest clearance between the blade and the motor body. Check for absolutely true, wobble-free running. Paper shims placed on the motor shaft, under the arbor, can take up any tendency to wobble. The top of the table saw may be covered with



Formica. A removable throat may be installed if desired. The blade height adjustment can be accomplished in one of two ways. I chose to mount the motor on a hinged sub-table, as shown on the sketch. Here, the motor is raised by adjusting the eye-bolt, the motor weight being sufficient to hold the motor steady and down. Alternately, the table top may be hinged, and raised or lowered on one end.

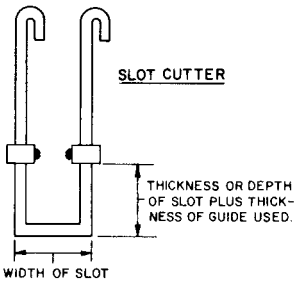
A simple rip fence can be made of any convenient straight piece of wood, C-clamped at each end. I chose to measure the setting directly between the blade and the fence, but a scale may be marked on the table top if desired. It is very important to have the fence parallel to the blade, for if it is not, the work is apt to jam the blade. The maximum depth of cut is about one inch, which is more than adequate.

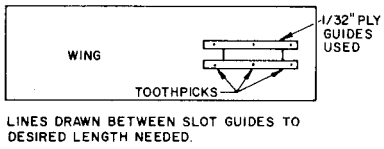
Use only the blade height necessary to cut through the wood. This will aid in keeping your fingers full length! Locate an off-on switch convenient for easy access. §

FOAM WING CORING DEVICES

Looking for a quickly built hot wire cutter for foam wing cores? Dennis Vollrath, So. Milwaukee, Wisconsin, uses either .015 or 1/32" music wire of the type commonly found in your local hobby shop. A tension of 25-30 pounds can be applied to the music wire which will reach its breaking point at 40 pounds. The spring used requires 30 lbs./inch to stretch it and can be adjusted by means of the nuts on the eyebolts. This hot wire cutter requires approximately 2.6 amperes at 6 volts for the .015 wire, and 10 amperes at 6 volts for the 1/32" wire. Although Dennis uses an adjustable DC supply, a resistor of 5 or 10 ohms, 100 watts, can be used for the .015 wire. The adjustable slide wire type resistors must be used and are available from Allied Electronics for under $3. This, and the cutting bow, can be connected in series with a car battery charger, or 12 volt car battery. The 10 ohm resistor would probably be used with the battery charger. Ruler-straight leading edges can easily be obtained because of the extra tension on the wire. Few, if any, lag grooves will be found on a core cut with this unit. §

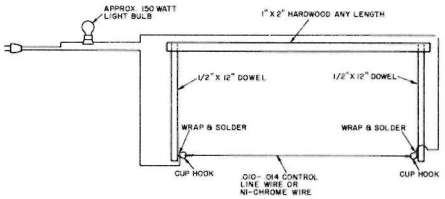
Gene DeCook of Canandaigua, New York, suggested an adjustable foam wing slot cutter. No. 10 copper wire, flattened before making bends in order to provide square corners, is used to fabricate the unit. The wire length is approximately 7 inches. Wheel collars are used to adjust the depth of the cut. 4-40 bolts were used to secure the cutter to the electric soldering gun.





LINES DRAWN BETWEEN SLOT GUIDES TO DESIRED LENGTH NEEDED.

Desiring to cut his own foam wing cores, but not having access to a model train transformer of Nichrome wire, Bill Schultz of Postville, Iowa, used the method shown in the accompanying sketch. With this set-up you must match the light bulb (in series) to the diameter of the cutting wire. Plug it in and if the wire is too hot, replace with a smaller bulb. If the wire is too cool, use a larger bulb. In hooking up the control line wire, bow the dowels together since the wire expands when it is hot and will otherwise sag. The only difficulty encountered with this cutter is that control line wire will "burn off after about four to six wings. With the bulb resistance you will not get a shock from the cutting wire but keep your hands off since the other end will be hot if the control line wire is removed or broken and the plug is in the outlet. §



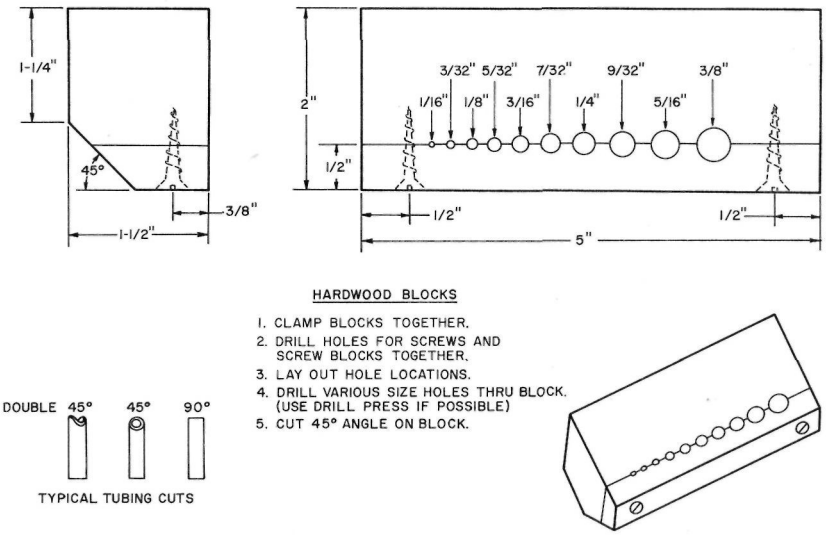
MOTOR-TOOL DISC SANDER

The Memphis RC Club "Monitor" stated in a recent issue that the Dremel Moto Tool is certainly the most valuable friend a model builder can have, but suggested the need for a small disc sander for many shop uses. The large 1/4" drill sander with a 5" to 7" disc is too large and heavy for many applications. The "Barrel" sander provided with the Moto Tool causes low spots when trying to sand certain places. An easy, quick, cheap solution is to purchase a flat bottom, rubber sink stopper of at least 2" in diameter. Cut it to the exact diameter you want, then cut out and contact cement a piece of medium or fine grit sandpaper to it; punch a hole in the middle (this part is usually thicker than the rest of the stopper); insert a 6/32 bolt with a washer in the center; tighten down the nut on the opposite side (the twist of the drill will loosen the nut if it isn't extremely tight); then the entire assembly will fit into the chuck of your Moto Tool. It can be built in 15 minutes and still be extremely useful.

TOOL AND PARTS HOLDER

The excess foam that comes with wing kits can serve several useful roles: 1) keep a block about 12" sq. on the workbench to hold loose, small parts, such as bolts, servo screws, clevises, and the like. These can simply be pressed into the foam and will not roll and fall from the work surface, 2) line a drawer with the foam material and press in small tools, and mark the name of the tool above the depression with a felt tip pen. Save the plastic or aluminum containers from chip dips, cut holes to fit in the foam, and use the containers for small parts storage. The containers won't move around and they can be placed close together. Submitted by Frank Morosky of Hoffman Estates, Ill.

Merle Miller of Pasadena, California, submitted this versatile tube and wire holding block which insures accurate tubing cuts as well as being a good holding fixture for wire, tubes, landing gears, etc., while soldering washers to them. Simply insert the rough cut tube into the proper hole and tighten the screws in the block. Hold the block in a vice, or by hand, and file the tube end with a flat file. Next, deburr the inside diameter of the tube and remove, then deburr the outside diameter. To build this jig fixture, clamp blocks together, then drill holes for screws and screw blocks together. Lay out hole locations, then drill various size holes through the block, using a drill press if possible. Finally, cut a 45 degree angle on the block. §

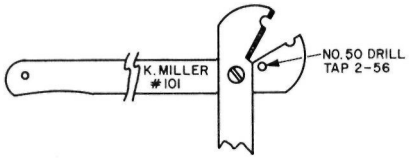


SHOP BUILDING BOARD

I built two building boards using a material that has been around for a long time that fills all of my requirements — a material that you could push a pin into without breaking your fingers, and once in, would hold tightly and yet be easily removed. The material that will make your building life a little easier is cork! However, cork, by itself, is very flexible and must be mounted on a good flat surface. You can purchase a 24" x 36" sheet of cork 1/4" thick from your local hardware supply dealer. For a good base, I also purchased two sheets of the pressed hardboard measuring 12" x 48" x 3/4". Cut your sheet of cork in half along the 24" dimension and glue to the hardboard base using Pliobond. D

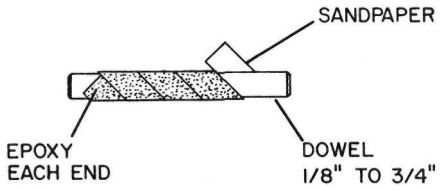
3-48 AND 2-56 BOLT CUTTER

H.D. Apgar of Frenchtown, New Jersey, found that most makes of bolt cutters do not cut bolts smaller than 4-40, while in many cases modelers have a need to cut the popular 2-56 and still have a usable starting thread. By drilling and tapping a standard pair of K. Miller No. 101 wire strippers, a very handy pair of bolt cutters is obtained. Start by holding one of the stripper handles in a small vise and heating the cutting end until it is cherry red in order to remove the temper. Allow the end to cool naturally. Center punch and drill with a No. 50 drill and then tap for 2-56 thread. Re-heat to almost cherry red and quench in cold water to restore the temper. Other sizes can be had but it is best to stay under a 440 unless used on brass screws only. §



ROUND SANDING STICKS

For round sanding sticks, Bill Morrison, of Owen Sound, Ontario, uses maple dowels in diameters from 1/8" to 3/4". First, cut 1/2" wide strips of sandpaper from medium to fine depending on what grade you want to use. Fasten one end on a 45 degree angle to the dowel with a tack and roll the sandpaper around the dowel to the opposite end, then epoxy each end. §

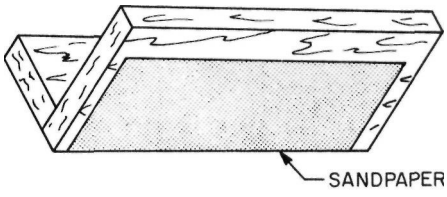


DISCARDED DENTAL DRILLS

S/Sgt. Henry A. Loos, of Tampa, Florida, suggests that the next time you have to cut a broken tap out of a hole and save the piece of work, or if you modify your engine, ask your dentist for a few of his old dental drills. They fit a Dremel Moto Tool perfectly and cut crankshafts and cylinder liners almost like cheese. The dentist throws them out when they are dull, but they are still sharp and hard enough for model work. They also come in all sizes and shapes, as well as different shank lengths. They cut balsa and leave a machined cut with no ragged edges. They also provide a smooth finished cut even on the hardest steel on a model engine. They are also very good for routing if you have a routing attachment. §

SANDING SQUARES

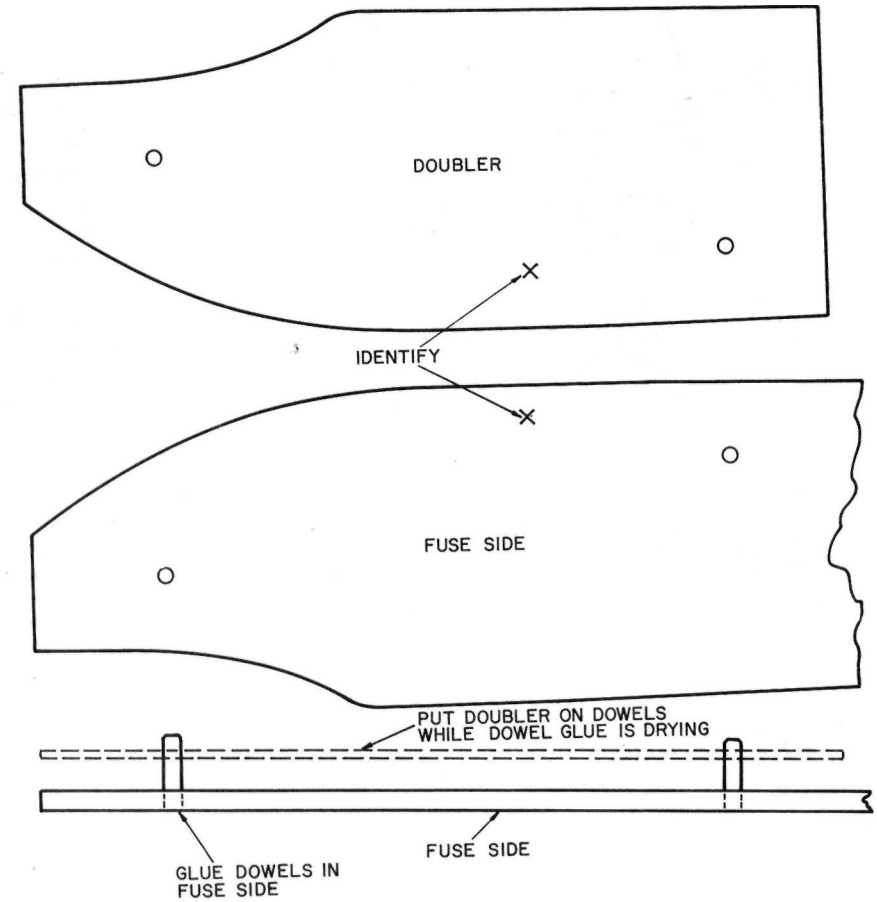
One of the handiest tools you can have in your workshop is a "sanding square." This is simply a sanding block as shown in the sketch. The garnet paper is glued directly on the face of the block. Several are useful but the handiest one is one with 80 grit garnet paper on it. The best use for this tool is for squaring the ends of stock in order to be truly square. It is difficult to cut a piece of balsa over 1/4" thick on the square in all directions, so usually a couple of strokes with the "squaring block" will make the end true. John Hancock of Rhodesia, Africa, who suggested this idea, usually puts the piece of balsa to be sanded on a cutting block thus getting it up off the table. One can vary the height of the block on which the balsa is placed as the paper begins to wear.



II CONSTRUCTION HINTS

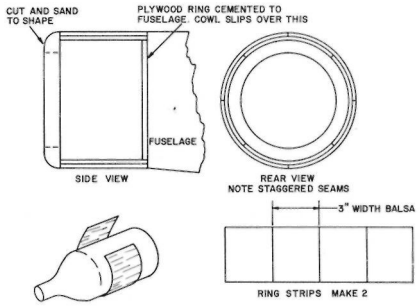
FUSELAGE DOUBLERS

Have you ever cut fuselage doublers to exactly match the fuselage sides, coated the parts with contact cement, then tried to match the doublers to the fuselage sides? Or have you used glue such as epoxy, Tite-Bond, Ambroid, etc., slid the parts around till they matched, then weighted the whole mess down to dry, only to find out after the weights are removed that the parts have skidded out of alignment and dried that way? Or, after sticking the parts together, find you have two right hand or two left hand assemblies? On the other hand, what if you want to insert the doublers from the ends of the fuselage sides to allow for mounting the firewall straight, or maybe offset for the engine, and after the parts are set aside to dry, find you've made one correctly and the other incorrectly? To eliminate this problem, cut your doublers to match the fuselage sides. Mark each doubler and fuselage sides in pairs for identification. Line up each doubler and fuselage side in pairs exactly as you want them to be, then drill two 1/8" holes at **random** through each pair (one fuselage and one doubler). Drill holes, one towards the front of the doubler and one towards the rear. By drilling holes at **random,** the holes in one pair will not match up with the holes in the other pair, thus on final assembly, you can't get the wrong parts together. Cut four short lengths of 1/8" diameter dowel 3/4" long. Working with each matched pair of fuselage sides and doublers, glue the dowels in either the fuselage side or the doubler (the fuselage side is usually balsa and thicker than the doubler so gluing the dowels in the sides is preferable), with dowel extending toward the side on which the other part is to be glued. Slide the matching part (fuselage or doubler) a little way on the dowel extension and set aside to dry. When dry, pull the matching part off the dowel extension, apply any type glue you prefer, and put the matching part back on over the dowel extension and press together. The parts will match as precisely as you made them. Weights will not cause the parts to slide out of alignment and will have one right hand and one left hand assembly. After all is dried, trim off the excess dowel and sand flush. §



COWLINGS

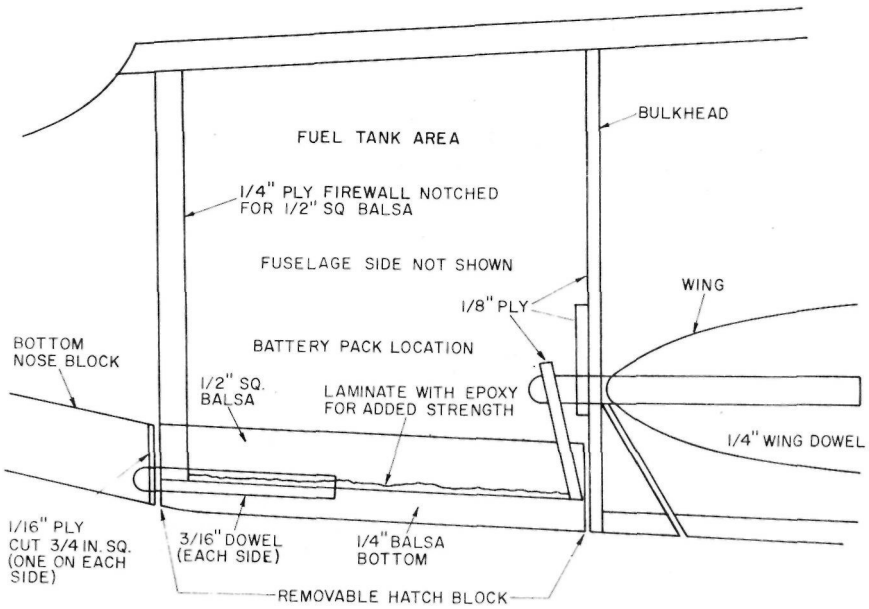
Did you ever need a round cowling for your favorite model but hated to start it because it meant using cloth and fiberglass or, alternately, making it from balsa blocks only to lose valuable engine space? The following method from the 'Minitalk' of the Mini Air Modelers, Beaver Dam, Wisconsin, then, is for you. These cowls are light, rigid, and strong, as well as neat looking. The drawings are completely self-explanatory. One note, however — when the first sheet is glued around the form, let it dry overnight. Then glue on the second sheet. Hold this in place with rubber bands. Use 1/16" sheet balsa for large cowls and 1/32" balsa for small ones. §



REMOVABLE BOTTOM HATCH

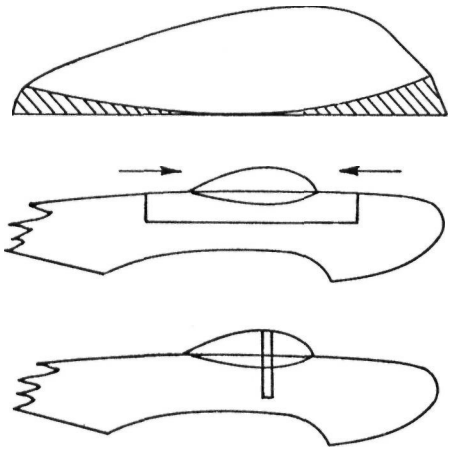
How many times have you cussed a blue streak trying to get to your steerable nose gear, or tried to get a

fuel tank properly placed behind the firewall, or tried to squeeze your hand into the nose area for other linkage adjustments? Here's a simple solution from Lyn Gallup of Mankato, Minnesota. With a little bit of minor alteration in construction, a removable bottom hatch block, secured by dowels, can easily be added to your plane. This system is neat with no bolts, screws, or rubber bands, and is strong. It is also hardly noticeable since the hatch is on the bottom. Of course, this method can only be used on planes employing wing bolts to fasten the wing, which adds another good reason for throwing away those rubber bands! The diagram is self-explanatory, but in brief, this is how it works: The dowels secure the front of the hatch to the balsa block under the engine (using 1/16" plywood cut 1/2" to 3/4" square for bearings into the balsa for the dowels.) The rear of the hatch is secured by the wing dowels, and the wing bolts keep the entire assembly in place. §

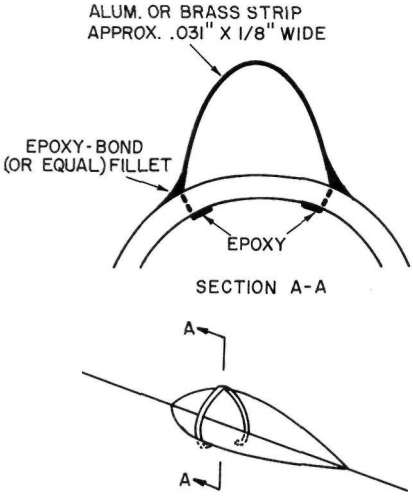


CANOPIES

How to fit a canopy — First, it is necessary to remove excess material from the front and back areas of the canopy, trimming to fit the fuselage. Next, tape a sheet of #180 sandpaper over the top of your low wing aircraft where the canopy is to be placed. Now slide the canopy back and forth on the sandpaper until the desired fit is obtained. Remove the sandpaper and check for proper fit. When properly sanded, all edges will show sanding marks. Finally, hold the canopy in place with Scotch tape or masking tape. Use clear model airplane cement to glue down. Use a small hole in tube to control flow for a clean fillet. From DuBro Products. §



A.T. Knight, Jr., of Woodbury, N.J., suggests the following method of holding that slippery molded canopy on your fuselage. Using the metal strip in the appropriate location not only securely fastens the canopy to the fuselage but also adds to its overall appearance. §



Canopies can be secured neatly by positioning the canopy with a piece of masking tape over the top, and then brushing several thin coats of clear Ambroid thinned with acetone around the bottom edge. §

From Ken Curtis, writing in the DCRC Newsletter, comes a method of attaching a canopy so it will stay on permanently and still look good. First glue the canopy to the fuselage with HobbyPoxy II. Next, run a strip of Celastic, about 1/4" wide, over the joint, equally overlapping the canopy and the fuselage. This should be applied with dope thinner in the normal procedure. The thinner bonds to the the plastic canopy. Next, use Epoxylite to fill in the Celastic and to form a smooth fillet between the canopy and the fuselage. §

The cockpit area of Gus Morfis' last scale design gave him a lot of trouble. No matter how hard he tried, he couldn't seem to get the panel and the pilot's seat to "look right." Once, however, he realized that his basic proportions were "off," the problem quickly reduced in magnitude. It was simply a case of "if the real plane had a real man sitting so that he could look out of the canopy without hitting his head, where would the control stick, rudder pedals, control panel, throttle quadrant, and pilot's seat **have** to be?"

Gus's model was being designed to 1-1/2" to the foot scale so what he needed was a scale pilot to this scale. The Air Force has a standard dummy which they use to check out equipment arrangement, and which engineers can use to lay out cockpit components in the most efficient manner. The drawing provided by Gus simplifies the standard Air Force dummy a bit, but not where it counts. The parts are shown full size for 1-1/2" = 1 ft. scale, but he has included conversion scales for 3/4" = 1', 1" = 1', and 2" = 1' scales. The patterns should be used to transfer the dummy to thin plastic cardboard, or plywood, fixing the joints so they will pivot. This allows the dummy to be "bent"

around to fit the cockpit area as required. Designers of scale models will find this dummy quite useful when they are laying out their cockpit area. Goodyear designers will find the dummy equally helpful in order to lay out their fuselages with an idea toward maintaining scale-like appearance. §

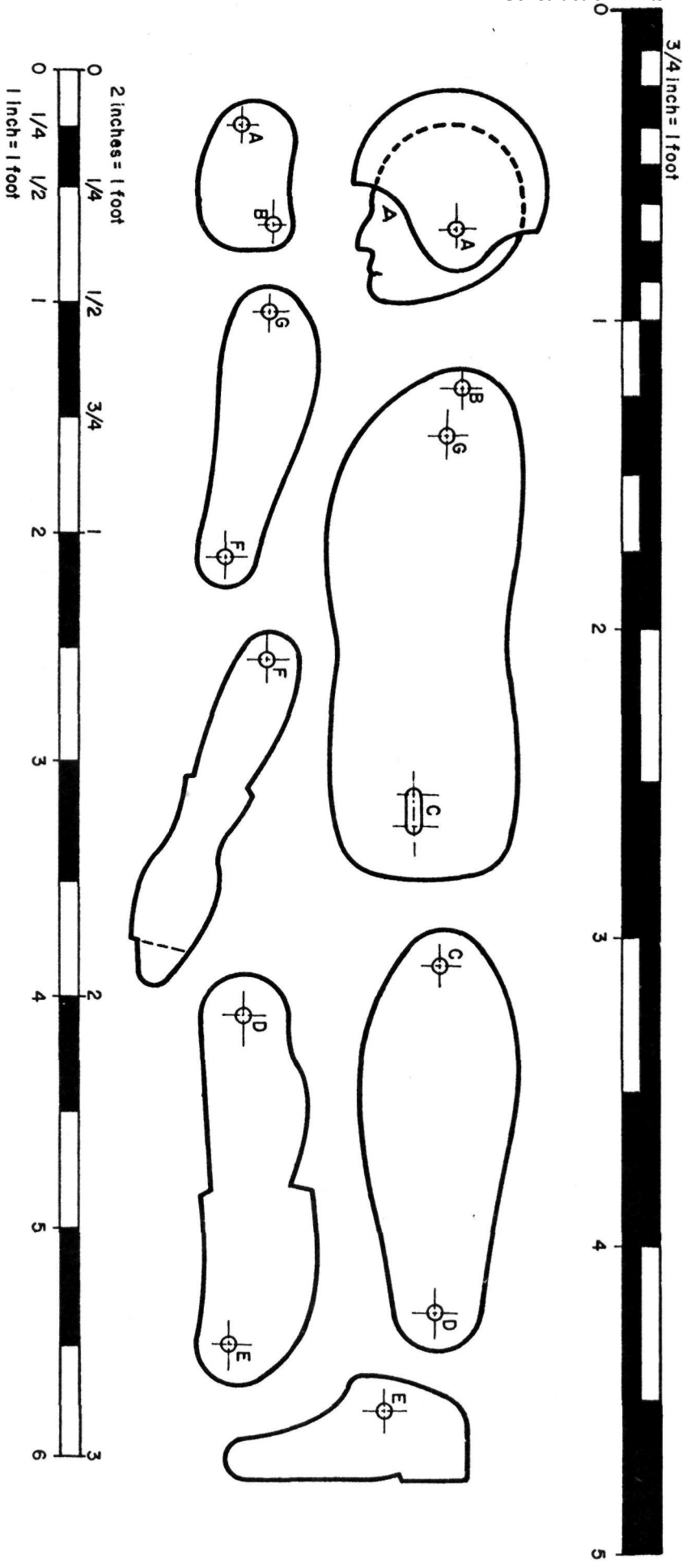
Do you want a sharp profile pilot for that new sport ship? James Raney of Elm Grove, Wisconsin, suggests taking two profile shots of yourself, or another subject, with a Polaroid camera; cut them both out, glue one to a 1/16" balsa sheet with contact cement and cut it out, then glue the other picture to the other side. Measure the distance from the lens to the subject so that the images are the same size. Use a light background and place the subject some distance in front of it or the dark shadow will make the image hard to cut out. Varying the distance from the camera to the subject will give a pilot the perfect size to fit any canopy. D

From the Port Arthur R/C Club (Oily Birds) Squawk Sheet, comes an idea for a "scale" pilot. First, you locate some neighborhood urchin, or perhaps one of your own, who has a Mattel Thingmaker set. Bribe him with a few well placed "love pats." Next, find a Creeple Peeple set to use in the Thingmaker. Then you find the mold that matches the face of your favorite Contest Director, and using a color to match his humor, mold his head. There are several sizes of. heads and many colors to pick from, and you can even make polka dotted or striped heads to match the model. They are designed to mount on a pencil, but a dowel, cemented in to the fuselage, should do as well.

Be sure to tell your Jolly CD that it is his head in the model. This will guarantee a 0 on the best 10 point maneuver you ever do. It's the little, finer points like this that will turn you into a consistent loser. §

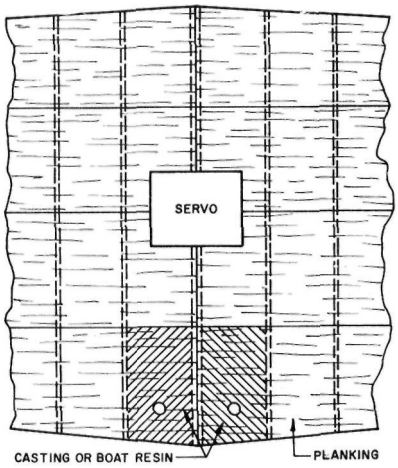
WING HOLD-DOWNS

Skip Hirschman, writing in the Lincoln Sky Knights "Clanking Armor" offers the following method for installing hardwood mounts for nylon wing bolts, usually a tedious, trial-and-error chore. First, cut the hardwood bearers to desired length, usually one to one-and-a-half inches,



using 3/8" x 3/4" engine bearer material. Second, place the hardwood in a vise and drill 5/32" hole in the center of the 3/8" side of the material. Then, while still in the vise, use a 1/4-20 tap. (Wood will cut easily using a 5/32" starter hole, yet leave sufficient thread for the bolt.) Finally, glue the hardwood blocks in place in the plane so that the tapped hole is 1" or 1-1/2" forward of the trailing edge. Use epoxy. After the glue is dry, cut off a 1/4" bolt to 1-1/2" length. File one end to a sharp point and insert the other end into the hardwood blocks, leaving approximately 1/4" to 3/8" of the sharpened end extending above the wing saddle. Naturally you will have previously installed 1/4" dowels into the leading edge of the wing and drilled corresponding holes for them in the fuselage bulkhead. Simply place the wing in the saddle, with the forward keying dowels in their holes, then check alignment carefully and press down firmly. The sharpened screws will indent the wing in the exact spot for the nylon hold down bolt. Drill 1/4" holes through the wing at these indentations and your bolts are lined up with the hardwood bearers. Place 1" squares of 1/16" plywood over the hole in the wing, on the bottom, to take up the stress of the bolt. §

Here's a quick, strong, and easy way to prep your wing for accepting nylon mounting bolts, suggested by Jim Schneider of Palmdale, California. After the trailing edge planking is installed on the top and bottom of the wing, stand the wing upright on the trailing edge. Fill the spaces between the trailing edge sheeting to the first rib on each side of the center with casting resin or polyester boat resin. When dry, drill holes for your wing bolts. This method not only greatly strengthens this area of the wing, but you can cinch down tight on the bolts without crushing wing structure.

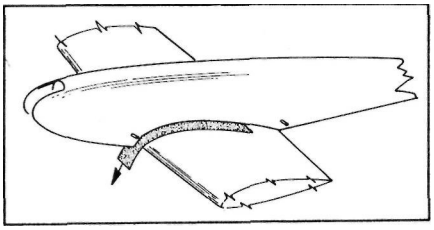


If you're tired of "dinging" the bottom of your wing and fuselage due to your screwdriver slipping out of the slot of the 1/4 x 20 nylon wing hold-down screws, one solution is to make the slot fit your screwdriver. First, heat up the screwdriver that you use over an open flame and then push it into the slot in the screw. Now, according to Dan Reiss of Marina Del Rey, California, you'll have no more scratches and gouges on the bottom of your wings. §

WING SEATING

A quick and easy method for achieving that perfect fit between wing and fuselage is suggested by W.A. Sandham, Central Ohio R/C Society.

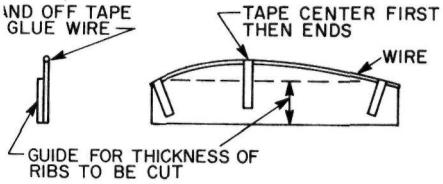
First, cut the fuselage to rough contour using a cardboard template (make from contour of wing main rib), then set the fuselage on the finished wing with a strip of sandpaper sandwiched between them. Apply a small amount of pressure and draw the sandpaper out towards the nose. After a few pulls with the sandpaper, the exact wing contour will be transferred to the fuselage. This method also works quite well on stabilizers. §



Having a problem keeping that wing in place? Obtain a tube of Metal Seal by General Electric, available at local hardware and auto supply stores. This material is silicon rubber, aluminum coated. Place a continuous bead of this on an area where the wing contacts the fuselage, place some wax paper on top of the bead, then set the wing gently in place. Do not pull the wing down tightly, but apply just enough pressure to hold it in place. Allow to dry, then remove waxed paper. You have a seat that is molded to the contour of your wing, aiding in keeping out dust, dirt, and fuel. From N.J.R.C.C. 'Printed Circuit.' §

WING RIB TEMPLATES

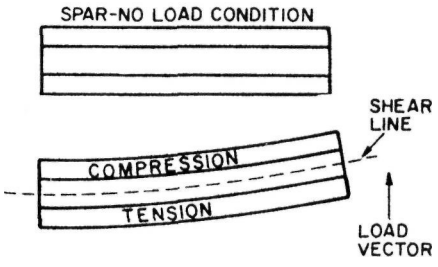
You have probably noticed that many construction articles in this and other model publications suggest cutting your rib pattern from plywood or aluminum. Both have the disadvantage of being soft so that you have to be very careful that your knife does not cut into or catch on the edge of the pattern. Instead, Ray Golden of Lincoln, Nebraska, cuts a pattern, minus the thickness of 1/32" diameter music wire, from medium hard balsa. Then, roughly pre-bending the wire to the shape of the rib curve, he tapes and epoxy's this length of wire in place. After the epoxy dries, he sands off the tape and excess glue on the edge, then glues a guide the thickness of the balsa from which the ribs will



be cut to the bottom of the pattern. For more complex curves, such as symmetrical ribs, Ray uses a softer wire, such as stovepipe wire, that will bend easily. This idea can be used not only for rib patterns but for any pattern where you have to cut out several duplicates. §

WING WEBBING

On many designs, the wing spar consists of two square lengths of balsa on top and bottom of the wing. Some designers let it go at that, but many will call for webbing in between the ribs, and those who know their business will call for vertical grain webbing. Many builders feel there is no need for running the grain vertically, but if they understood the engineering reason, they would always use vertical grain webbing. A spar under load assumes a tension load on the lower, and a compression load on the upper, spar member, in between there is a

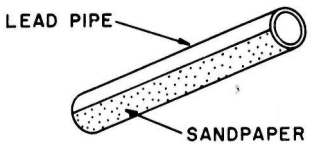


shear load and, of course, vertical webs resist this best. The accompanying sketch illustrates this principle. This suggestion comes from Stan Lyons. §

WING SHEETING

Hal Humphrey of Illinois, suggests a simple and efficient means of weighting down the sheeting on a wing, stab, or fin. First, lay the wing panel to be sheeted on a flat surface. Next, using balsa strips, support the front and rear of the ribs, placing them so that the wing is true. Now you are ready to put your pre-cut sheet in position. You can use masking tape along the entire leading edge to hold the panel in position. Then apply glue to all the ribs, etc., with the panel folded back. Now lay the panel down over the ribs and pin along the entire leading edge. Lastly, lay piles of old RCM's on top of the entire section. The magazines conform to the rib shape and a sufficient number of them will hold down the panel in the proper position until the glue sets up hard. §

The best construction job on a wing can often be ruined by gouging the leading and trailing edge sheeting, tearing capstrips, etc,, during sanding. For a smooth, continuously even sanding job on that next wing structure, cement your sandpaper to a length of lead pipe about three feet long. According to Mike Jones of Greensboro, N.C., this will provide an even surfacing of the structure sans nicks and gouges. §

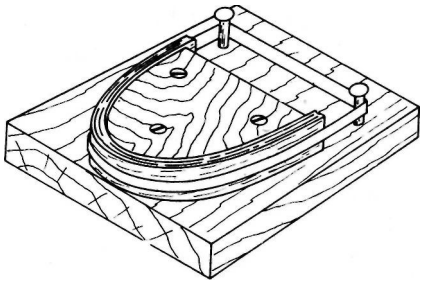


WING CONSTRUCTION JIG

A highly successful jig-assembly for symmetrical wing and stabilizer sections was devised by modifying the construction techniques used in Lloyd Sager's Nationals-winning Mac-17. As illustrated below, two oversize strips of balsa are used for the leading and trailing edges. Down the center of each a slot is cut on a table saw. The horizontal leading and trailing edges are then glued into these slots. Put all ribs in place, then add spars. Sheet one side, holding sheeting in place with 1/8" square "wedges" secured to the leading and trailing edges with straight pins. This prevents pinholes in the sheeted surfaces. Now, turn entire assembly over A-D. Repeat the sheeting steps for the remaining side. When dry, remove pins and wedges. Then carve and sand leading and trailing edges to finished shape. You will find that you have completed the assembly in far less time, plus having a truer wing or stab than by conventional methods. This suggestion comes from Chuck Waas. §

WING LAMINATED TIPS

The sketch shows an excellent way to make laminated wing tips. The pattern should be slightly longer to give added stock for trimming. This is mounted on a wood mounting block. The nail shown should be in line with the edge of the last lamination and are used to secure the wide rubber bands which will retain the laminations until they are dry. The pattern is made from 3/4" plywood allowing for lamination thickness. To form a rough tip, six laminations of 1/16" balsa work best. Wax the pattern and mounting block to keep the glue from sticking. Cut the desired number of laminations to width and slightly longer than the periphery of the pattern. Soak the laminations in a solution of 90% water and 10% ammonia for 15 minutes. The ammonia helps break down the fibers for easier bending. Dry off the excess water from the laminations and coat with Titebond or white glue. Wrap the laminations around the patterns and secure with rubber bands. Allow overnight drying time and the next day you will pick up the strongest wing tip you have ever made. This idea comes from Robert Hensler of the St. Louis RC Club. §



FOAM WINGS

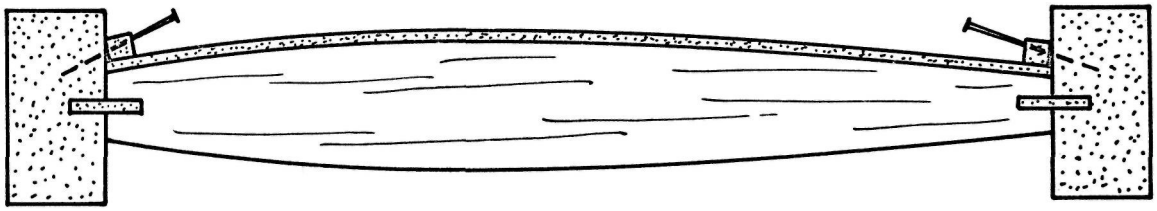
Clyde Harris of Pittsburg, California, suggests the use of No. 14 — No. 16 copper wire, bent to any shape necessary, and inserted in the end of a Weller Soldering Gun for making perfect cutouts in foam wing cores or for general carving in foam. §

Kemp Bunting of Munster, Indiana, uses a strip of monofilament packaging tape running from tip to tip on the bottom of his Midwest foam wing, located at the thickest part of the chord. This acts as a spar with tremendous tensile strength. A 3/4" width is actually stronger than needed. A wing, so taped, cannot be broken in the air. A similar strip of tape on top of the wing prevents breakage due to cartwheels, etc. Kemp also uses another strip at the T.E. to hold a length of music wire in place so that hold-down bands cannot cut into the foam. Wrapping the center section further prevents damage from rubber bands and contact with the fuselage. To cover the tape from sight, cover the wing and stab with vinyl, adhesive backed shelf paper for a quick, cheap, durable, and attractive finish. §

WING ALIGNMENT

The Birmingham Association R/C Newsletter passes on a few tips on wing and stab alignment that most of you old-timers already know, but may prove of value to the newcomers.

A wing with as little as one degree tilt can cause the model to bank and turn. You can correct the turn by offsetting the rudder up to a point, but why not get to the root of the trouble with a few simple alignment



checks that will make your first flight with that new model a pleasure rather than an ordeal. All that is needed is a pin and a piece of linen fishing line. Simply locate the pin in the exact middle of the fuselage just ahead of the vertical stab (Fig. 1). Swivel the wing in its saddle until the line tied to this pin shows the distances from the pin to the wing tips to be equal. Similarly, align the stab by moving the pin to a point on the fuselage center line as far forward as possible and repeat the process. Once these positions are located, the wing and stab can be blocked so that they cannot shift.

Horizontal alignment is equally important as the exaggerated sketch will show (Fig. 2). This is easily checked by placing the model on a large flat surface and measuring from this surface to the wing tips. Adjust the landing gear so that these distances are the same. Then measure from the flat surface to the stabilizer tips. Any difference between X and Y must be eliminated by shimming the stab saddle. §

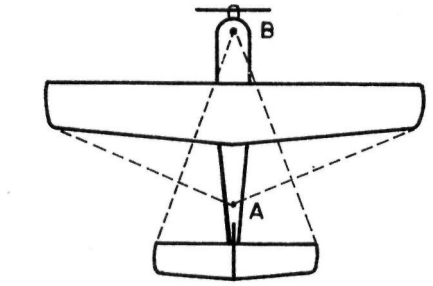


FIG. 1

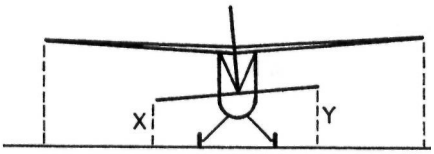


FIG. 2

Have you ever steered clear of scale or scale-like airplanes simply because you didn't want to tackle the wing fillet? Have you just overlooked (usually on purpose) the fuselage fairing across the bottom of the wing because you couldn't make one fit?

Take heart — here is a method that is economical, easy, fast, hard-as-nails and guarantees a perfect fit every time. Interested? Then read on. If you follow this step by step method and **don't ad lib,** you'll surprise yourself with the professional results you can turn out.

Step 1. Cut a piece of 1/32" veneer, or 1/32" plywood, large enough to fit the wing opening and extend outside the fuselage far enough to complete the fillet to its extreme limits.

Step 2. Bond a piece of closely woven cloth, such as bed sheet, to it using contact cement. Be sure the cloth is bonded over the entire surface and that any lumps of glue under the cloth are smoothed out with a small roller, your fingernail, or any other suitable round-edged tool.

Step 3. Place the veneer or ply side against the wing saddle and draw the fuselage outline on the wood. Remove the laminate from the fuselage and draw the fillet outline on the wood, using the fuselage outline for a guide in order to determine the width and shape of the fillet. Cut out with a knife. (See drawing A.)

Step 4. Score the wood side along "A" and "B" and bend slightly. Apply HobbyPoxy Formula 1 glue to the wing saddle and tape along dotted lines A-C and A-D. This will hold the laminate tightly against the wing saddle. Place some plastic wrap over the wing to keep it from being inadvertently glued down and put the wing in place in the saddle. Tape the outer edge of the wing fillet to the surface of the wing so that it will assume the correct contour while the epoxy cures. When it sets, go on to Step 5.

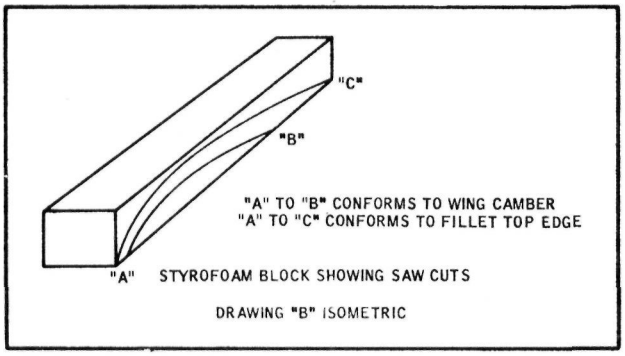
Step 5. Cut a piece of styrofoam large enough to make the fillet. Do not use the beaded foam because it is too soft for this application and does not give the proper rigidity to a wing fillet. Cut one edge of this piece straight so the wing saddle outline can be cut on a jigsaw. The top and bottom outline of the wing fillet can be cut at this time, again using the saw. If your wing has a lot of dihedral, you must take this into account when cutting out the saddle. (See Drawing B.) Cut "A" to "B" then "A" to "C." Glue this to the fuselage with white glue before cutting the styrofoam to the plan form of the fillet. Allow to dry thoroughly.

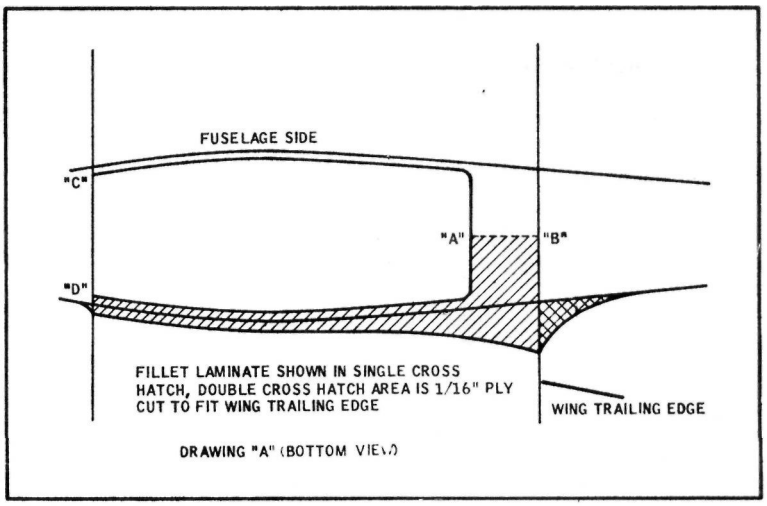
Step 6. When the white glue is dry, cut the styrofoam to the plan form outline of the fillet and sand as desired, using the various size dowels to obtain the desired curvature of the fillet.

Step 7. Obtain a large desk blotter and cut a pattern from a strip of the blotter that has first been dampened to allow it to follow the exact contour of the fillet. Use this pattern to cut the two fillet covers — one for each side.

Step 8. Dampen the covers and glue to the fillet, using white glue, and allowing to dry thoroughly. Do not rub on the damp blotter material to make it conform to the fillet because the paper will roll up and peel off. If you want to make it adhere or conform better, press it with your fingers, or alternately, roll it with a short piece of dowel of suitable diameter. You will be amazed at how easily the blotter can be worked, and just how

WING FILLETS





well it conforms to the surface contours.

Step 9. When the blotter is completely dry, feather the edges with medium sandpaper (#150 works quite well), both at the junction with the fuselage and the edge that meets the wing. Sand **away** from the blotter, not **into** it, since it still tends to roll up. Sand carefully.

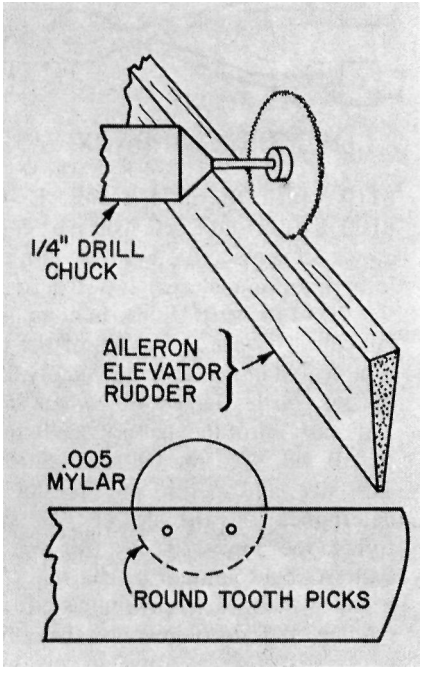
Step 10. Rub HobbyPoxy Formula 2 glue into the blotter with your finger or any suitable tool that will allow you to work the glue into the fibers.

That's it! The result will be the best fitting, hardest fillet you can imagine! The final method of finishing is up to you, but the HobbyPoxy Easy-Does-It method is probably the best. The latter can be adapted to upper and lower wing fillets, fuselage fairing, wing tips, and even those hard to make compound curve fuselage tops and bottoms for that next dream ship of yours.

Try it — you'll even surprise yourself with the results you obtain! §

HINGES

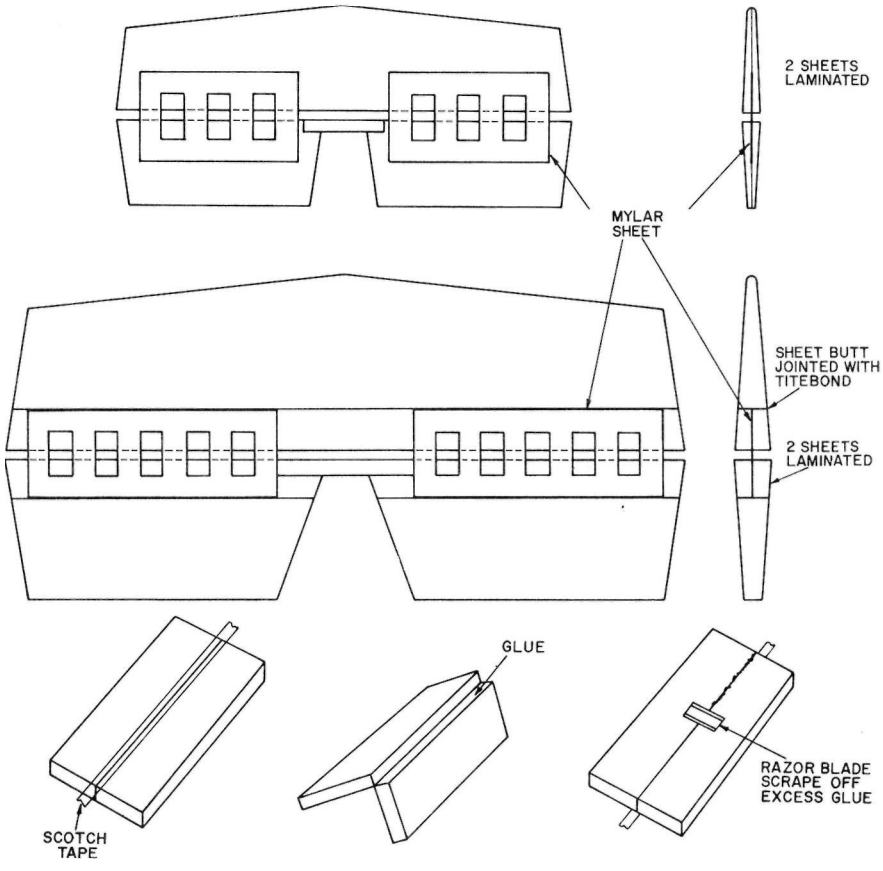
There are numerous commercial makes of hinges for all types of R/C aircraft which are used throughout the country. One of the biggest problems is in accurately slotting the control surfaces to accept these commercial hinges. One excellent method is to use the small circular saw that is commonly used with a Dremel Moto Tool. The circular saw is 1-1/4" in diameter, .009 thick, and has a 1/4" hub. This makes it possible for you to cut 1 inch diameter circular hinges from .005 inch thick Mylar material. A common household washer can be used as a template to mark off the circles, cutting them out with scissors. Be sure you don't leave any rough edges around these hinges where they might possible tear. There really isn't any glue on the market that will adhere to nylon or Mylar, but the use of glue does fill up the gap in the control surface prior to inserting the hinge. Once all the hinges are inserted, drill two 1/32" diameter holes in each side of each hinge, fill the holes with glue, and drive in round wooden toothpicks, and then cut the toothpicks off flush with the surface with a pair of toenail clippers. From the NJRCC "Printed Circuit." §

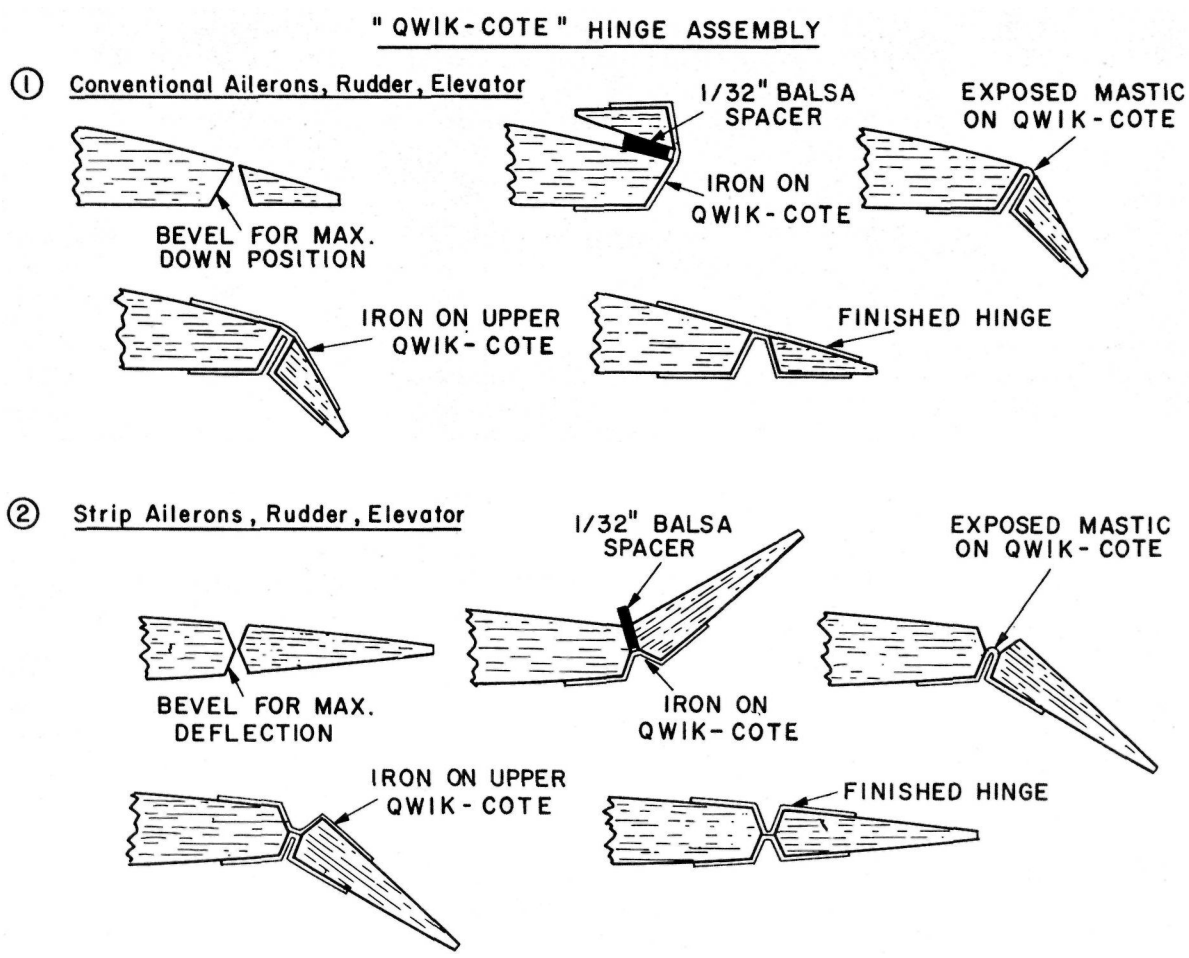


Dan Gregory, of Quebec, Montreal, uses 'invisible hinges' with a great deal of success. The hinge material is Mylar drafting material that is rough on both sides. The best adhesive is contact cement, but if sandwiched with Titebond the results are equally satisfactory. One portion of the illustration shows a small stab, one which may be a maximum of 1/4" thick. The Mylar is cut to the shape shown and sprayed with 3M77 contact cement. The stab and elevators are cut out from sheets that are one-half the final thickness and sprayed with contact cement. The entire **unit** is then assembled in jig time. The result is a stronger stab, quickly built, with perfect hinges. The other portion of the illustration shows a larger stab where the hinges are constructed using strips of hard balsa to sandwich the hinges. The gluing method can be either contact cement or Titebond. The remainder of the stab and elevators is butt jointed to the hinge strips with Titebond. This provides an almost invisible hinge joint. §

Joe Ziomek submitted the artwork and details on what we feel is one of the finest hinges yet developed. Along with the artwork were two sample control surfaces, hinged per his instructions. We were invited to pull the hinges apart — if we could. We couldn't! The balsa broke, but the hinges held!

Either Qwik-Cote or Super Mono-

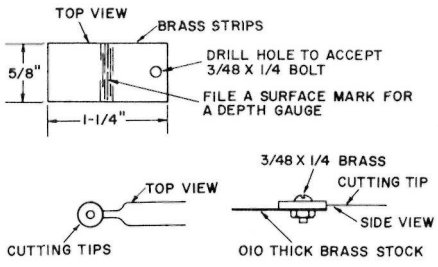




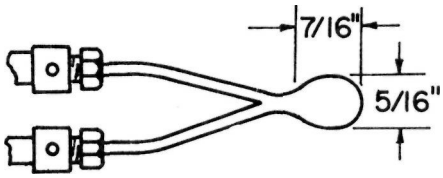
Kote can be used for this process. The regular MonoKote is not recommended for this purpose since the latter has a sticky external adhesive and is, consequently, thicker and more difficult to handle in this application.

These hinges are self-aligning, inexpensive, quick, and provide for low leakage across the control surface. They are suitable for pulse proportional as well as the larger ships since they are very flexible and offer no binding of any kind. Two seasons of flying with these hinges have proved their superiority. Try them! §

From Robert Greenall of Tamaqua, Pa., we received an excellent hint for cutting slots in foam wings and stabilizers in order to insert hinges. First, drill a hole in the tip of a Weller soldering gun, or whatever type soldering gun you may use, in order to accept a 3/48" x 1/4" brass bolt. Next, cut out a brass strip to the size hinge you use — the dimensions given being for a standard DuBro hinge. Finally, bolt this brass strip to the cutting tip and turn on the gun. With one quick touch of the brass extension plate to the foam and you have a perfect hinge slot. §

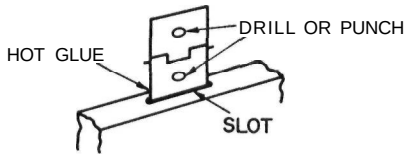


Here's two ideas on better hinging from John Blohn of Whitestown, N.Y. One of the easiest ways to slot a balsa surface for controlled hinge is to use your Weller 100-140 watt soldering gun to do the job. Simply replace the standard tip with the Weller tip No. 6110 which fits models Nos. D440, 8100, 8100B and 8200. This part costs about 50 cents and is available at most local hardware stores. It will also fit the 100-140 watt Millers Falls soldering gun. The size and shape of the tip is indicated in the drawing. Simply line up the spade shaped tip, when hot, and push into the balsa. You'll find that it will slice the balsa like butter. The size and depth of the slot is determined by the degree of heat, trying the lowest heat (100 watts) first. A slight amount of charring will occur which is easily removed by sanding. It is recommended that slots be made before painting or covering.

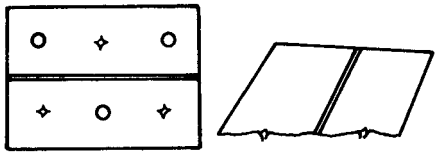


THICKNESS APPROX. 1/32

This is not recommended for foam surfaces without balsa reinforcements at the hinge line. Now, when inserting your hinges, instead of using epoxy, Silastic, etc., to glue try using an electric glue gun which is also useful for many other building chores as well. Partially insert the hinge (approximately 1/16" into the slot) and lay a bead of hot glue on both sides of the hinge. Push the hinge into the slot while the glue is still hot and soft. This works beautifully on both balsa and foam surfaces. The glue will set up in 60 seconds and any excess which squeezes out can be easily removed, when cool, with a knife or razor blade. An added benefit of this glue is that it will not bind the hinges like epoxy often does if you're not careful. An extra hole or two in the hinge surfaces will aid the holding power of the hot glue. §

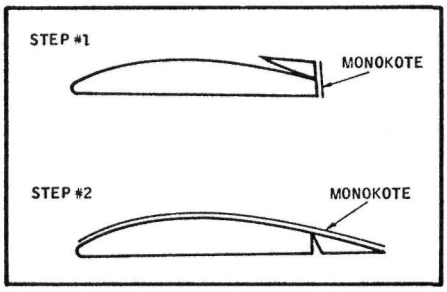


Walt Staff of Salt Lake City, Utah, suggests that if you use the strip nylon hinges, use a 4 penny nail and drive in three holes from each side. The nail leaves a burr at each hole which should not be removed. The hinges can now be epoxied in the hinge slots without the necessity for pinning and no fear of them pulling out in flight. §

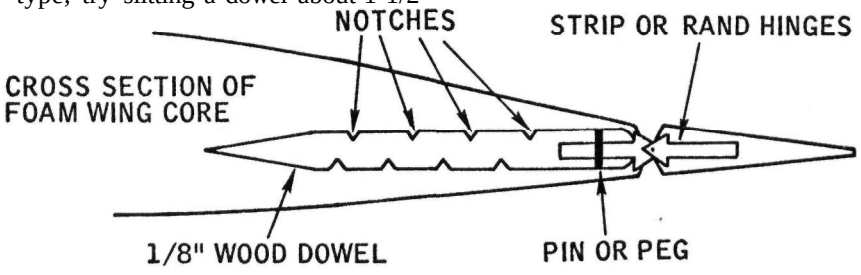


Slitting balsa with your knife to install hinges in fins, rudders, stabs, and elevators, can be done more accurately and prevent coming through the sides of the stock if you lay a magazine on a flat surface & open it up to approximately the height where you will want to slit the balsa. Lay your stock on the magazine and your knife on the flat surface with the blade parallel to the stock. Now, by turning a page at a time, you can get micro adjustments of about .016 of an inch until your stock is centered perfectly. By making short sliding strokes with your knife, you will get a perfectly centered slit for your hinge. A wafer thin piece of balsa can also be removed this way, a necessity with the thicker hinges such as DuBro, by just flipping a page or two which will allow for the thickness of the hinge and make a neater installation. Submitted , by Gerald Wilson of Warren, Michigan. §

Chris Olsen's 'Upset,' an outstanding entry at the 1967 Internats, used MonoKote for the hinges as well as the general covering. This technique worked extremely well, and the aileron hinging is shown in the drawings. This hinge is very free in operation, with little slop, and permits no aileron through the hinge line. From Jim Martin. §



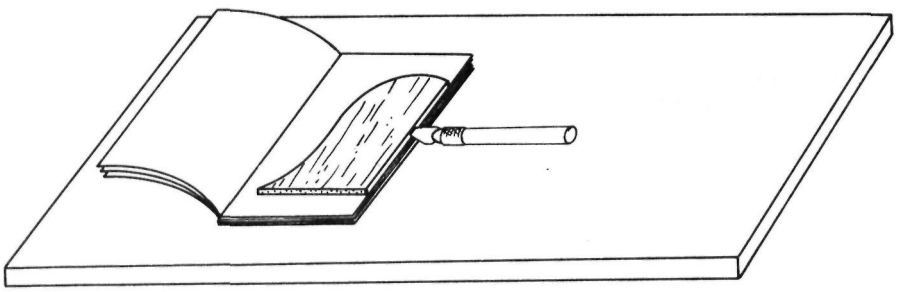
When installing hinges for ailerons in a foam wing, such as the Lanier type, try slitting a dowel about 1-1/2" long, pointing it, notching it, and slipping the slotted end over the hinge, then pegging it. Plug this assembly into the wing using epoxy glue. This spreads the strain on the hinge over a wider area of foam and makes for a strong hinge joint. §



Wally Hurley of Fremont, California, has come up with the finest, most economical hinge that we have yet seen. The sticky sides of two short strips on monofilament wrapping tape are pressed together forming an absolutely indestructible hinge. This double strip is cut to the desired length for your hinge, then a simple paper punch is used to place a hole in each end. Cut a slot in your control surface with your X-Acto knife, smear epoxy over the end of the hinge, making sure that the hole is filled with epoxy, then slip into place in the surface. You will find that these hinges are completely flexible, durable, and unaffected by any type of paint or dope. G.E. Bathtub Caulk is also excellent for adhering these hinges to the control surface. §

The following is a step-by-step instruction article on how to install the new Rand Nylon Hinges. These hinges have been engineered with a new outlook on the hinging problems in our hobby. They are engineered so that they become a structural part of the airframe and should be installed during the construction, i.e., before covering and doping. This means that once doping is completed, the surfaces will fit together with no additional cutting, digging and touching-up. The advantages of these nylon hinges over other types are tremendous:

(l)They are wear-proof.
(2)Unharmed by fuel.
(3)Seal the wing completely.
(4)Extremely strong — unbreakable.
(5)Friction-free, yet without flutter.
(6)No electrical noise at all.
(7)Easily dismantled for surface



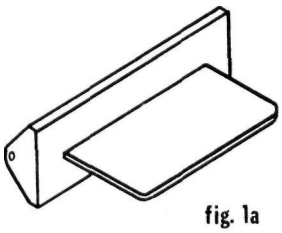


fig. 1a

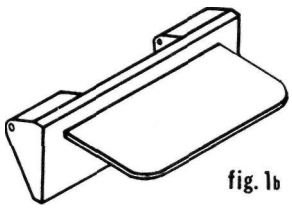


fig. 1b

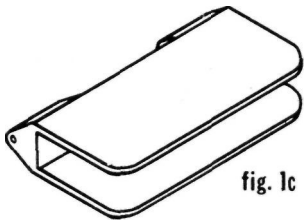


fig. 1c

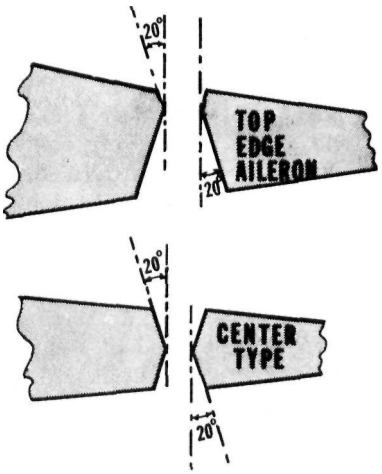


fig. 2

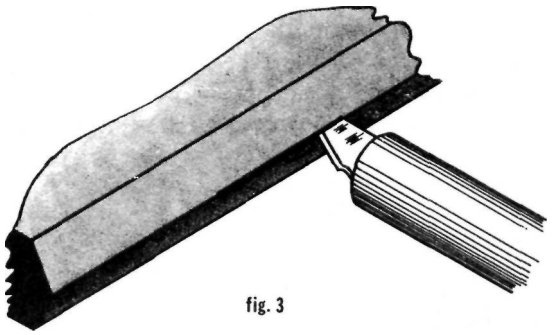


fig. 3

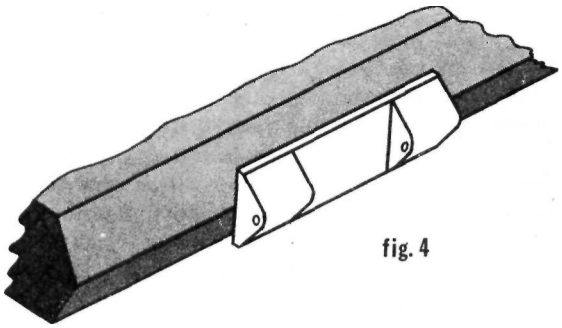


fig. 4

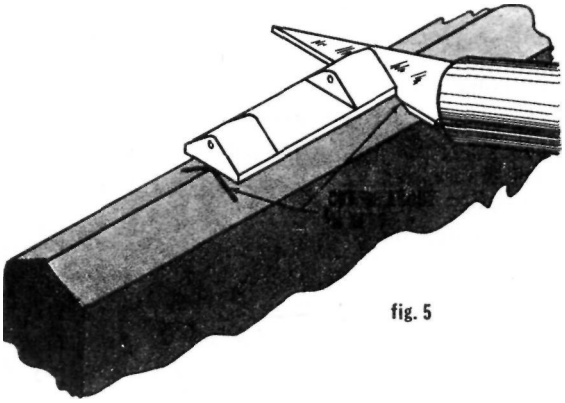


fig. 5

maintenance.

(8)Quickly built-in, forming part of the structure.

There are three (3) types available for different hinged areas:

Fig. la. Center Flanged in two width sizes: 5/32" & 1/4".

Fig. lb. Top Edge Flanged for ailerons & flaps.

Fig. lc. Double-Flanged for 1/8" thick sheet surfaces.

I shall deal with the first type in detail, but much of the instructions apply to the other types as well.

Step 1. The hinge-joint is a pin type. The edges of the surfaces must be shaped into a VEE with a plane and/or sandpaper. Make the angle about 20 degrees. (Fig. 2)

Step 2. Slit each edge where you want the- hinges to be inserted. Use a thin bladed modeling knife. Slit along the centerline. (Fig. 3)

Step 3. Work on one hinged part only. Push the hinge into the slip up to its flange. (Fig. 4)

Step 4. Use your knife again and mark the ends of the hinge onto the edge, cutting in about 1/16". (Fig. 5)

Step 5. Cut out the 1/16" triangular strips from the VEE'd edge on each side of the hinge web. (Fig. 6)

Step 6. You can now push the hinge right into its seat. Check that the hole for the hinge wire is on center with the apex of the VEE'd edge. (Fig. 7)

Step 7. After installing both halves, take the opposite surface to be hinged and insert the other hinge halves as on Fig. 4. Check the position of these against the mating halves and adjust their fit by sliding the hinge in the knife slots. (Fig. 8)

Step 8. When it is positioned correctly, repeat steps 5, 6, & 7.

Step 9. Remove the hinge pieces and drill or punch 3 to 5-1/16" holes in the webs for better glue adhesion. (Fig. 9)

Step 10. Glue the halves into place with epoxy and when dry, trim off any surplus.

Step 11. Cut off the head of the pin

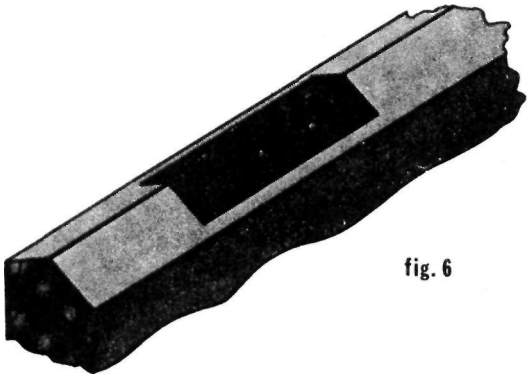


fig. 6

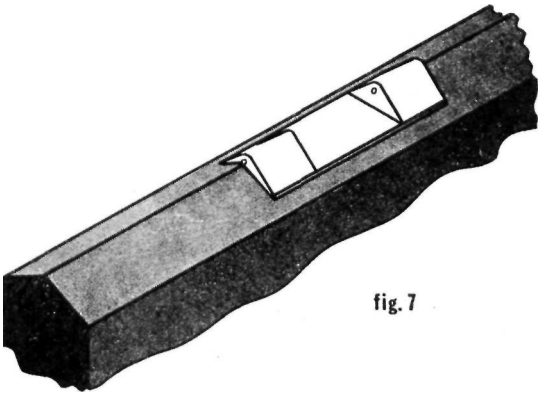


fig. 7

& bend it as shown. (Fig. 10). Now mate the hinged surfaces and slip the pin into the holes. Check for easy movement. Then disassemble for painting.

Step 12. Dope the model and when complete, remove any surplus dope from the hinges.

Step 13. Reassemble. Lastly, make a small knife cut alongside the end of the female hinge part, bury the wire in it and cover it with a drop of cement. This makes it easy to remove at a future time. (Fig. 11) §

Jerry Smith, Wishawaka, Indiana, writing in the Tri-Valley RC News suggests an idea that will eliminate that problem of digging slots for control hinges and will also guarantee accurate alignment. Simply determine the location of your hinges, laminate 3 pieces of balsa to the approximate size shown, but leave out the center lamination where each hinge is to be located. Epoxy the laminated assembly to the stabilizer and the mating laminated assembly to the elevator. Block sand flush with the matching surface. The hinges will fit snugly with perfect alignment. This idea may also be used on the vertical fin and rudder. §

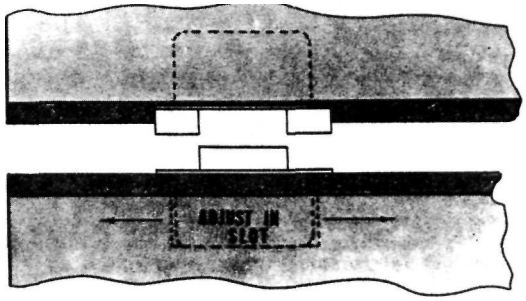


fig. 8

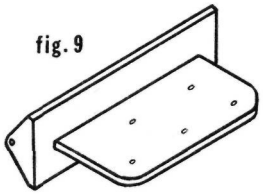


fig. 9

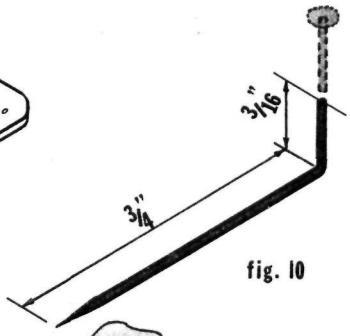


fig. 10

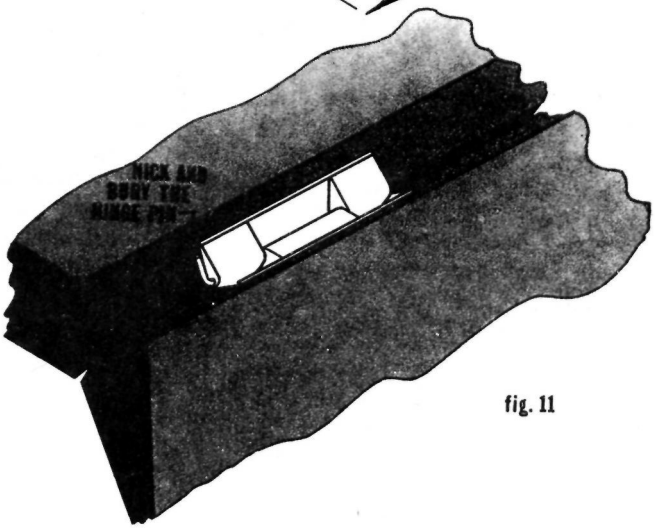
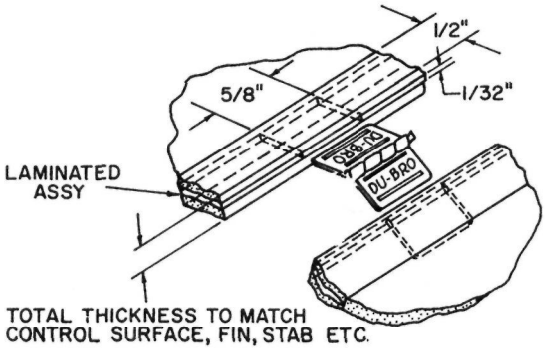
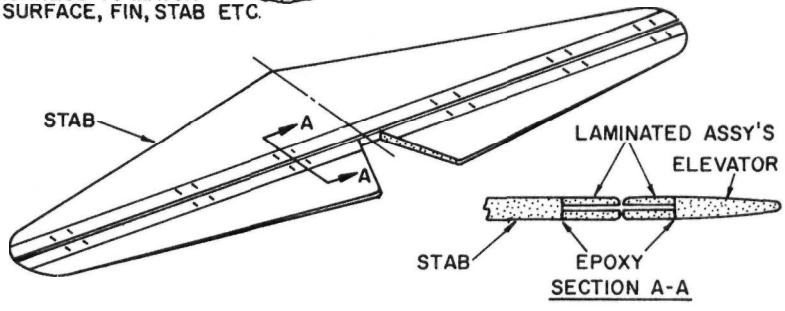


fig. 11

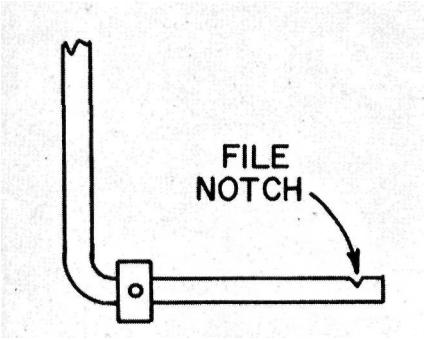




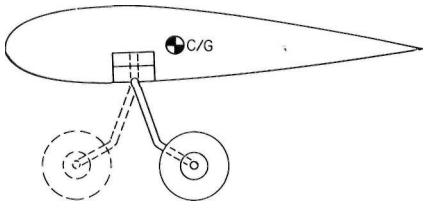
MAIN LANDING GEAR

From the NJRCC "Printed Circuit," comes this suggestion.

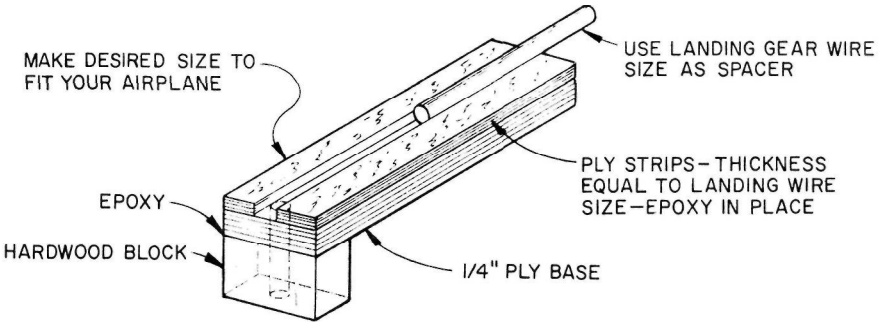
If you have had the unfortunate experience of having your wheel come off your landing gear on a rough landing, file a small notch in the wire landing gear leg at the point where the set screw of a DuBro wheel collar will be installed. The inside retaining collar can then be adjusted to take up any excess side play in the wheel. §



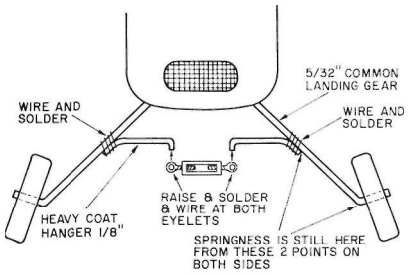
Here's an idea from Roy Adolfson of Firth, Idaho, which can be helpful if you want to change from conventional to trike gear, or vice versa, on the same model, due to different flying field conditions. This amounts to placing the main gear mounts over the C.G. of the model, or slightly forward of it, then slanting the gear accordingly. All that is necessary, then, is to change sides with the main gear and remove, or replace the nose gear, as required. Roy flies with trike gear during the summer months and converts to conventional gear and skiis during the winter. D



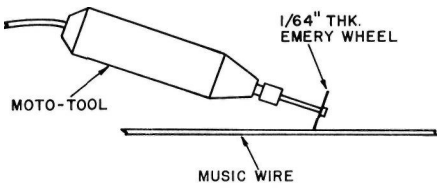
Dan Reiss of Encino, California, has had trouble locating landing gear clamps for 5/32" wire. To remedy this, he takes Midwest landing gear clamps for 1/8" wire and drills them out with a 9/64" drill. Clamp, or screw down, the tabs against a sheet of steel and run the drill in and out once, and quickly. Use your 4-40 mounting screws to tighten the clamp around the wire as tightly as desired. §



Being a newcomer to R/C, Chuck Anderson of Staten Island, N.Y., found that he had a weak landing gear and a heavy model, and when he taxied the plane on the rough runway, the nose kept bouncing up and down. To remedy this situation, Chuck found an old coat hanger measuring 1/8" diameter and cut two pieces which he wired and soldered as shown in the sketch. Then he used a metal screen adjuster having a left and right hand thread. This was soldered to both ends of the clothes hanger wires which gives him an adjustable landing gear. Now, he can move the wheels further apart or bring them closer together. This does not make the landing gear rigid, as one might suppose. As the plane gets older, a turn or two will bring the longitudinal setting back to the proper level. §

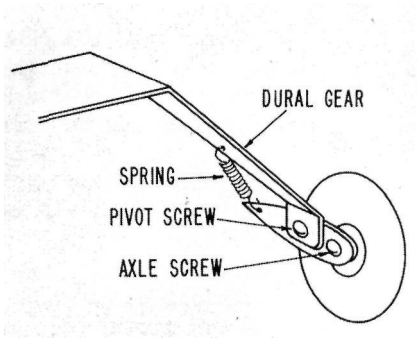


Bob Peck of San Diego, California has been using the 1/64" emery disc accessory for the Dremel Moto-Tool for years to cut and trim music wire for landing gears and other parts. This is one of the most useful accessories for the Moto-Tool, since it will cut even tough music wire with complete ease — almost like slicing through butter. §



Landing gear mounts for low wing aircraft are usually purchased as commercial units. If you happen to have some scrap wood on hand they can also be built-up quite economically. The assembly shown by Jerry Smith of Mishawaka, Indiana, may be quickly built and installed in either foam or built-up wings. §

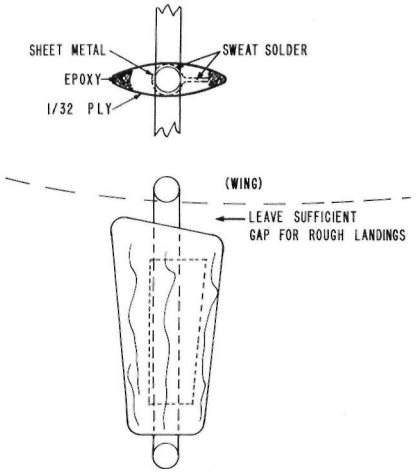
Have you ever wondered how to make a simple shock absorbing landing gear when using a dural aluminum landing gear blank? Here's a quick answer from the I.M.A.C. utilizing a small spring, pivot screw, and an additional scrap of aluminum. From the Isthmian "Buzzerd." §



WHEEL PANTS & FAIRINGS

Bror Faber of Westminster, California, has tried most types of landing gear fairings on his Goodyear racers, and has become thoroughly disgusted with them! The ideal solution, he found, consists of first tinning the strut with acid core solder, then washing to prevent corrosion. Next, bend a piece of sheet metal from an old fuel can into a U-shape and tin it on the inside. Using regular pliers, form it around the strut with the excess metal forming a tab on the back of the strut. When it is perfectly aligned, fore and aft, sweat solder the strut and tab together. Cut two identical pieces of 1/32" plywood to the shape of your fairing and bend around the strut and

tab after liberally coating the inside of both pieces with epoxy. Wrap tightly with a long rubber band until it is dry. You will find that this is one fairing that won't rotate or come loose even on the hardest landings. §

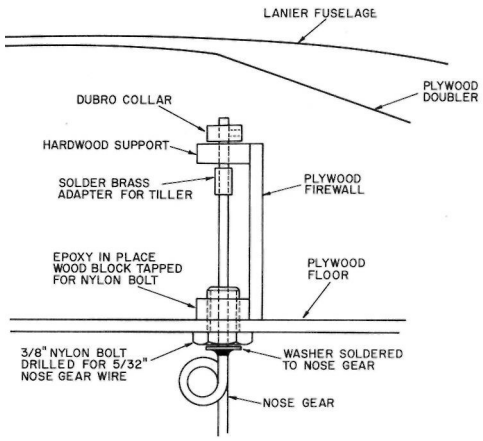


Dave Katagari of Seattle, Washington, suggests that you give your next RC model some dress-up for those bare 5/32" or 1/8" music wire landing gear legs. To match the chrome hubs on your wheels, use "chrome" plastic auto door edge protecting strip. Simply cut the length and slip over the strut. This material is available in most auto accessory shops. Install the rest of the protective strip on your car — assuming you can afford both RC and a car! §

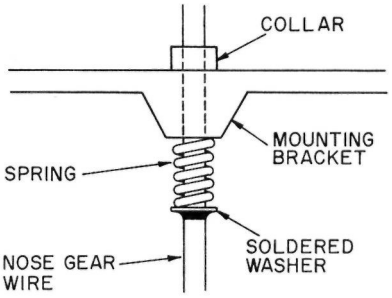
NOSE GEAR

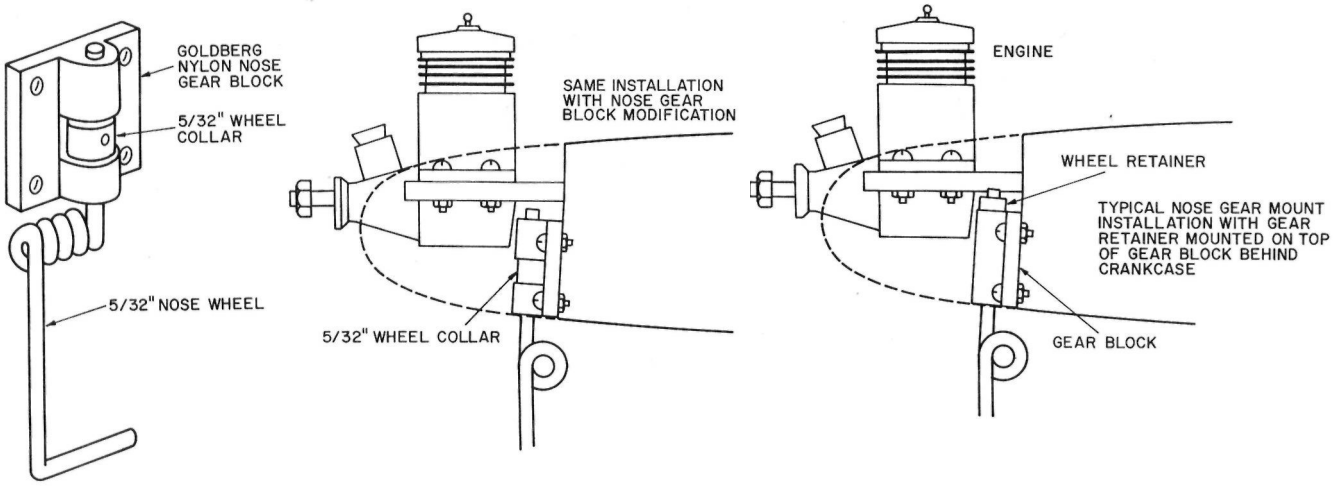
James S. Miura, of Honolulu, Hawaii, submits this idea concerning the Goldberg nylon nosegear block. Modelers using this gear block usually utilize a retainer collar at the top of the block to hold the nosegear in the gear block. Unfortunately, many times this is in the rear of the crankcase of the engine where removing the nosegear necessitates removing the engine first. This can be bothersome, especially when adjustments must be made to the nose gear, such as adjustments in height, or straightening a bent gear, or a simple need for replacement. To remedy this, cut a hole in the nosegear block and place the retainer in the block itself. This can be easily done by heating an X-Acto blade. See the sketches. §

If you're having problems on hard landings with the set screw coming loose on your nose wheel steering arm, try this idea from Albert F. Niessner, Jr., R.D. No. 1, Box 398, Boalsburg, Pa. The R/C Craft non-slip nose gear steering arm can be used on Lanier and similar type fuselage installations where the brass anchor block cannot be easily installed because of the inaccessibility of the nose gear. The advantage of Al's method is that a nylon bearing is provided for the nose gear so that it will have better shock-absorbing qualities on those hard landings. A nylon bolt, typically 3/8" in diameter, is drilled through the center so that it fits the 5/32" nose gear wire. A wood block is drilled and tapped to accept the nylon bolt. The nose wheel hole in the fuselage is then enlarged so that the nylon bolt will fit as shown in the figure. The wood block is then epoxied in place. A flat washer is soldered to the nose gear for vertical positioning. The nylon bolt is put in place and the brass anchor block is then soldered in place. This unit is then fitted into the hole in the fuselage. §

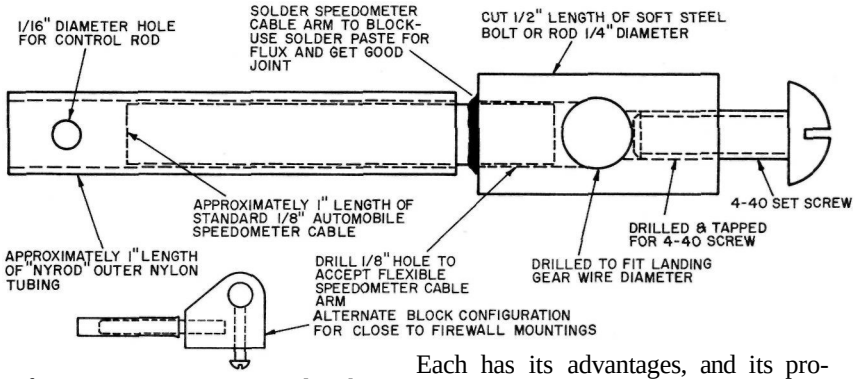


A shock-absorbing nose gear on a trike-geared ship can help keep the nosewheel on the ground for improved steering when using rough runways. A very simple method of fabricating such a gear is to put a washer and spring over the top end of the nose gear wire before inserting up into the retaining bracket. The plane is then leveled and the washer soldered to the wire. Choose the strength of the spring based upon the weight of your plane. This idea was submitted by Max D. Klotz, Hutchinson, Kansas. §

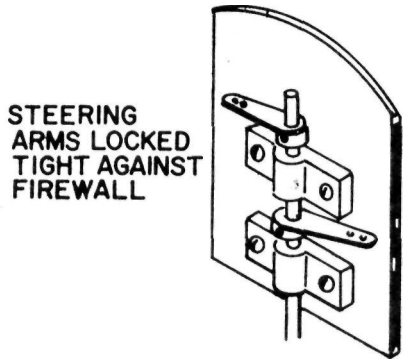




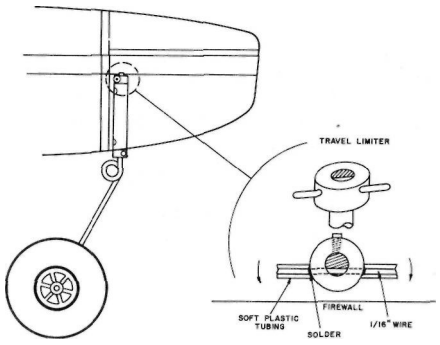
Garth Hess, 881 Emory Ct., Upland, California, uses the following method of linking a steerable nose wheel to the actuating NyRod or pushrod. There are several advantages to this method, including a natural slip joint between the outer NyRod tube and the inner speedometer cable allowing a linear pushrod motion. This prevents binding of the pushrod in a closely coupled system such as the one illustrated. The use of the speedometer cable results in a flexible coupling that provides adequate torque to the nose wheel shaft, yet hard landings or shocks will be absorbed and not change the nose wheel set screw adjustments or strip servo gears. Nose wheel adjustment can easily be accomplished by either readjustment of the set screw or slipping off the NyRod tube (easily done without any other disassembly) and adding or subtracting turns to the threaded NyRod pushrod. The complete link is constructed with readily available materials and requires only cutting, drilling, tapping, and soldering. 4-40 taps are available for approximately 60 cents. §



If your kit provides a steerable nose gear, and you wish to make it a fixed type of gear, John Steinkamp of Rensselaer, Indiana, suggests this method. By the use of two nose gear tiller arms, the wheel can be adjusted without making it permanent. The horns are opposite each other with the arms up against the firewall. §



Having enough trouble learning to stay airborne without fighting a steerable nose wheel, Andy Woitowicz of Ontario, Canada, devised a self-centering nosegear for his RCM Trainer which allowed him to take off and land without worrying about ground control. With this unit, all you have to do is point the nose down the runway and you're off to an arrow straight take off. Landings are a breeze, and even if you come in at an angle, the nose gear will straighten out the model on roll out. Here's how it works: The coil on your gear is bent back to provide the self-centering effect and a nylon nose bracket is used to provide a friction-free bearing. The DuBro retainer is drilled out for 1/16" wire and the wire soldered on with care being taken to keep solder out of the inside of the retainer. A notch will have to be filed into the top of the gear wire to let the retainer slip in place. Soft plastic tubing is slipped onto the wire to keep it from digging into the firewall. §



BRAKES

Wheel brakes are the most inexpensive single control that can be installed in an R/C craft. This fact, alone, should merit the installation of a braking system on your latest creation. Picture if you will, this beautiful craft taxiing to the take-off position coming to a complete stop, then holding steady while you proceed with engine run-up and control check-out. This slight pause will actually give you a chance to calm your nerves before sending your goldplated balsa block into the blue!

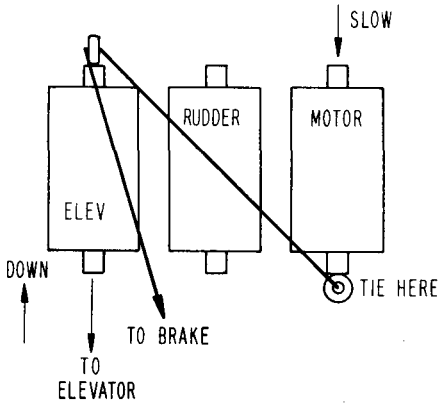
The first step in installing this tranquilizer-type control is to determine whether you wish to brake the nose wheel or the two main wheels. Each has its advantages, and its problems. Nosewheel braking is the simplest and the cheapest as it requires only one braking unit. However, too much braking action could cause the nose-wheel strut to flex to the rear, causing prop damage, or at least, a re-start. The problem of flexing could be remedied by using a stiffer strut, such as the new BK or Lakin nose gear, when using the mechanical type of brake. A more preferable solution is to go electric — the cost is higher, but the advantage of simple installation and the possibility of proportional braking easily offsets the additional cost.

Dual braking units on the main wheels will allow better and more precise braking action, a feature that is very useful in ground handling. I am using two Wag electrics on my current airplane with good results. My new swept-wing job will be equipped with the new DuBro coil spring units, which do not appear to place an excessive load on the elevator servo. The Rocket City brake is by far the least expensive, however, the spring is wound of extremely sturdy wire, and it limits down elevator movement when connected directly to the elevator servo. For those of you who wish to install the DuBro type of brake, I have devised a system that will apply braking action only at low throttle and down elevator. This hook-up (as per the sketch) will relieve the load on the elevator servo when down elevator is applied during aerobatics, such as outside loops, inverted flight, and inverted spins, etc. Some adjustment of the brake thread will be necessary during installation to obtain optimum braking action. (See sketch.)

A major problem when hooking up electrical brakes is the possibility of shorting out the receiver power supply. The simplest solution is to use a separate nine volt transistor radio

battery for the brakes. This will give enough power for two electric brakes for an entire flying season with very little additional weight.

One "brake" system which is simple and inexpensive to install is the drag brake. This system works best on the nose gear and simply applies a constant drag to the wheel hub at all times, which will stop the craft on landing, or hold it while the engine is at idle. (See sketch.) §



MECHANICAL BRAKE HOOK-UP GIVES BRAKING AT LOW MOTOR.

FIG. 1

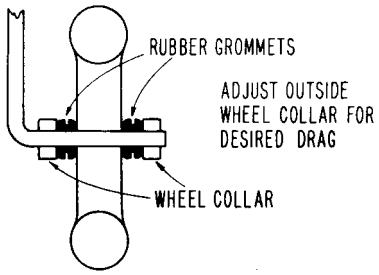
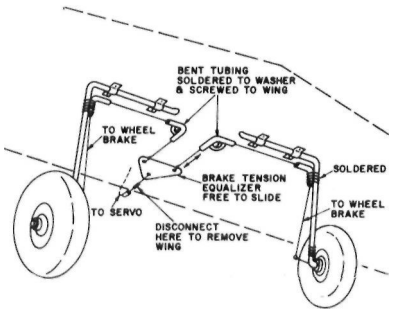


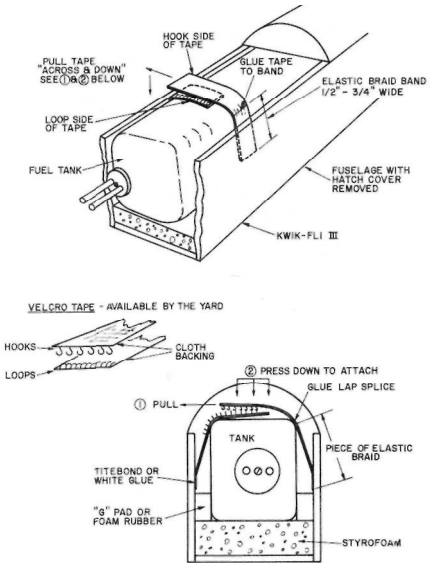
FIG. 2

A sketch by M.H. Dailey of Edmonds, Washington, shows his method of installing mechanical brakes. He uses a small nylon bellcrank to equalize braking on both right and left wheels. By using the tubing assembled to the wing you get full mechanical advantage to each wheel. This method has been used for over a year, and provides better braking action than a single nose wheel brake without the disadvantage of brakes pulling unequally to the right or left. §



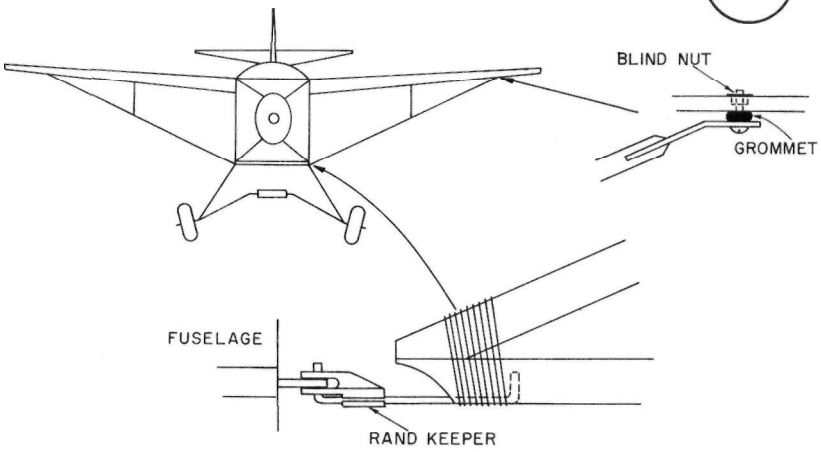
TANK HOLD-DOWN

Here is a convenient way to hold down your fuel tank: Use Velcro tape with an elastic braid band glued on one end. Pull on the free end of the tape that has the elastic section on it to the desired tension. Lap the tape over the mating tape and press together firmly. Peel open like a Band-Aid to remove fuel tank and/or battery pack. Velcro tape will work for thousands of cycles and can be purchased at the sewing section of department stores. Idea submitted by John J. Haskin of Seattle, Washington.



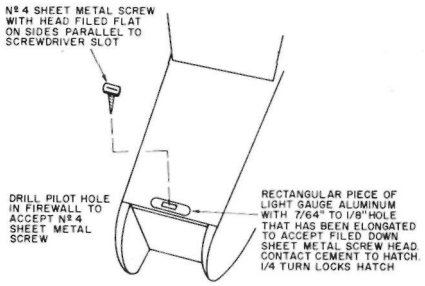
WING STRUTS

Dick Franco of Freemont, California, was tired of having the wing struts come loose on his J-3 Cub so resolved to remedy the problem so that it would never happen again. The attached diagram shows his clever solution. §

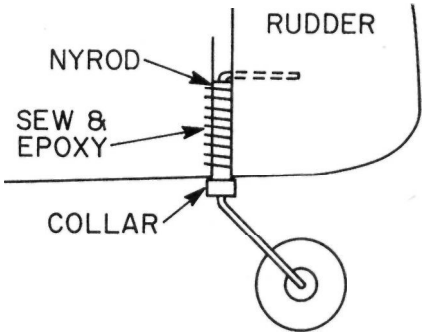


HATCH HOLD-DOWN

Jack Lang of Decatur, Ill., not being satisfied with rubber bands, dowels, hooks, for hatch hold-downs, came up with the following idea which is quite simple and efficient and is self-explanatory in the accompanying drawing. §



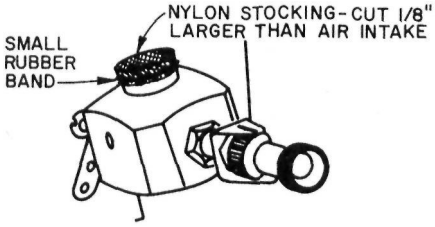
From the Contrails, official publication of the Charleston Radio Control Society, conies an easy and inexpensive way to make a tail wheel assembly which requires only about 5¢ worth of scrap material. Simply follow the diagram and you can't go wrong.



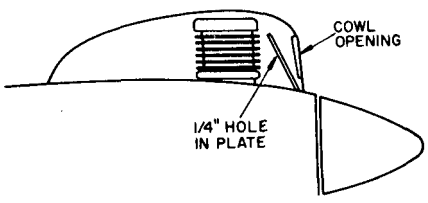
III ENGINES AND FUEL SUPPLY

ENGINES

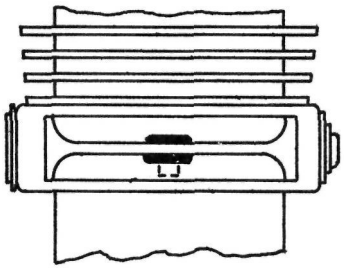
If you have flown from grass strips for any length of time you have probably noticed the grass seeds and small flakes of grass that accumulate in the air intake of your engine. John Black, of Humphrey, Washington, cut a circle of nylon stocking, stretched it over the air intake, and held it in place with a small rubber band over the top and against the side of the venturi. The circle of nylon should be 1/8" larger than the diameter of the venturi. John has used this on engines from .19 to .60 with complete success. §



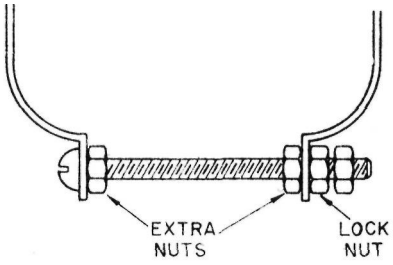
Jim Nightingale has come up with an idea for cooling that is a little different and presently being used by some of the top competitors. His idea is to place a plate directly in front of the engine fins, behind the cowl opening. The incoming air is directed up and over the head which is the hottest part of the engine. A very small hole, or slot, is cut in the center of the plate to let a small amount of air to the fins. A 1/4" dia. hole seems to be ample. Engines that are presently using this system run very cool, even on the ground. A cool running engine will have a much longer life, be easier on glow plugs, and will permit the use of higher nitro fuels. You Formula One and Open Pylon fliers might give Jim's idea a try. The results will pay off. §



When we received an idea from Fort Worth Thunderbird Club member Helmer Johnson, we expected it to be a treatise on 1001 uses for old beer cans. Instead, it was a method of lowering the idle speed of an Enya 60 even more. Helmer and the "Birds" remove the rotating exhaust barrel and insert an aluminum nail in the hole. The nail is cut off about 3/32" over length and flattened like a rivet closing the hole completely. This keeps the heat inside, and quiets the engine somewhat. Tachometer readings indicated a lower RPM on the idle side.



If you have experienced difficulty in holding that Super Tigre muffler in place here is an idea that is guaranteed not to allow it to loosen under vibration. The extra nuts prevent the metal strap from stretching, but must be tightened "just right." — Reprinted from 'Hear Ye,' Valley Forge Signal Seekers RC Club. §



Did you ever think that your engine starts much better at idle? With your throttle closed in the normal idling position, fill the tank in the normal way. If you're using a 3 tube fuel tank, and the overflow tube shows a full tank, pinch the tubing so that fuel will flow to the carburetor and allow the equivalent of five to six drops for a .49 to .61 engine. Turn over propeller five to six times, then connect the battery to the glow plug. Once familiar with this method, you will find that your engine usually starts on the first flip, and almost always on the second. If you're using a two tube tank, connect tubing to carburetor when the tank is filled, add a few drops to the open carb, then close to idling before turning over. In both cases, leave the glow plug on the engine long enough for it to "warm up," then disconnect, throttle up to clear motor, and away you go. An added bonus is the realism of idle starts. — Ray Gareau, MARS.

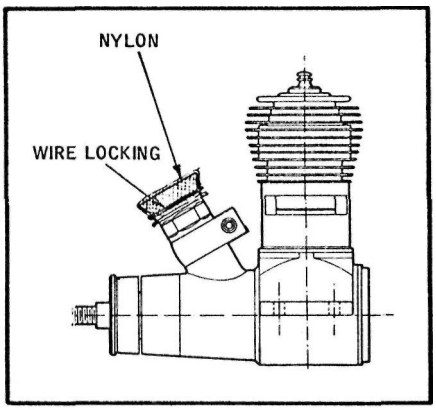
Nick Ziroli, well known contributor to model magazines, and head of Major Model and Manufacturing, Hauppauge, N.Y., has been using exhaust pressurization on his engines for some time. Simply turn the priming port around so the tube is on the outside. Next, run a piece of fuel line to the tank vent and fuselage and the tiller arm put in place on the brass anchor block. The nylon bolt screws into the wood block and the DuBro collar is put in place on the top of the nose gear to hold the latter in position.

Bill Morrison, of Owen Sound, Ontario, Canada, uses the following method for adjusting the air bleed screw on his engine while the latter is running. Bill uses a screwdriver that is longer than the diameter of his propeller blades, and on the end of the driver he solders a short piece of brass tubing over which he slips a piece of plastic tube so that the driver head won't slip out of the slot. §

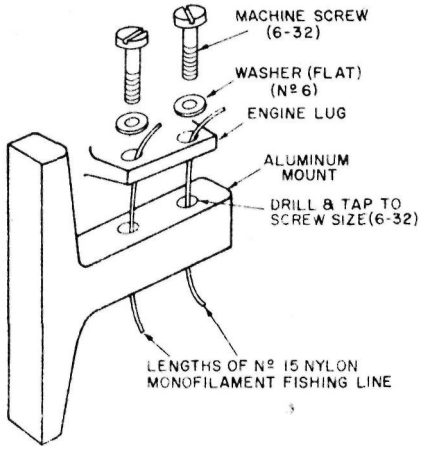
H.R. Braunlich, Poughkeepsie, N.Y., suggests the following method to prevent the loss of prop, nut, and washers on R/C engines — cut two discs from emery cloth that are the same size as your prop washer. Install one behind the prop washer and another in front of the drive washer. To date, no propellers have been lost while using these simple emery paper discs. §

How about covering the carburetor on your engine with a piece of nylon

stocking to keep dirt out of the "works?" A wire lock strip secures it in place. From Dwane Sales, 'Norair Modeler.' §



Having experienced difficulties in keeping his .60 size engine bolts tight, and not having any stop nuts on hand, Dave Katagiri of Seattle, Washington, used short lengths of nylon monofilament fishing line to create sufficient friction to retain the torqued engine mount screws. Pre-tapped 4-40 or 6-32 holes allow enough clearance to permit the nylon lines to bind just enough to retain the screw and not be cut off by the threads. §

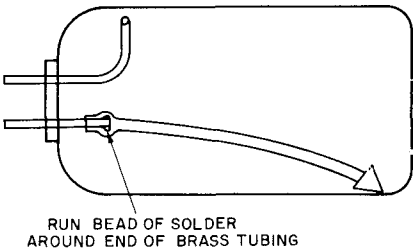


Here is a mixture control method for your throttle that will allow you to do the fine trimming of your engine after the ship has attained flying speed. The original prototype was made up from Super Tigre parts and was used on a ST .40 R/C. Any other spray bar of similar construction should work just as well. As can be seen in the drawing, the slotted tip of the spray bar is cut off and soldered to a small arm. This joint should be silver soldered. Next, the needle valve is run through the tip and arm assembly and threaded into the rest of the spray bar. Now it is possible to set the needle as before and then the locking nut is tightened. Thereafter, the servo can give you about 1/2 turn of adjustment. This is found to be adequate and prevents the engine from being run too lean by a radio failure. From William F. Young. §

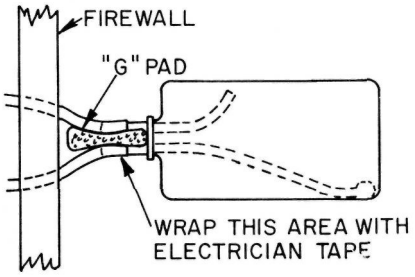
Have you ever had your motor mount holes enlarged so that the engine forever is vibrating loose. The 'Clanking Armor' suggests you take an old toothpaste tube and cut 1/8" strips about 1/2" longer than the screw hole is deep. Place in hole and replace engine with wood screws. §

FUEL LINES

How many times have you had the fuel pick-up line slip off inside your gas tank? Noble Hider, of Greve Coeur, Mo., simply runs a bead of solder around the end of the brass tubing to form a lip and the tubing has yet to come off. §

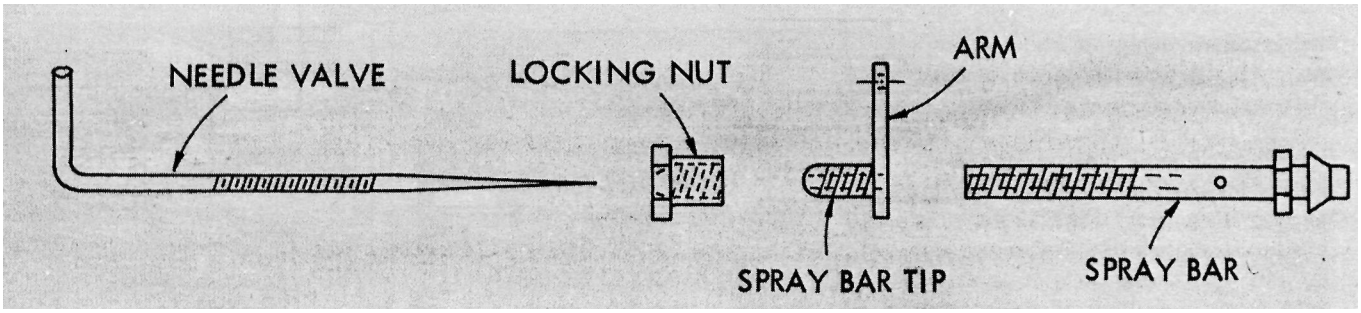


Monty Davis of Redstone Arsenal, Alabama, experienced recurring difficulty with his fuel tanks sliding forward in the nose of his plane, resulting more often than not, in the fuel line being cut by the brass tubes extending from the fuel tanks when they struck the firewall. He found that by placing a piece of G-Pad between the two brass tubes which extend from the tank with the fuel line already attached, and wrapping the brass tubes and the G-Pad with black plastic electrical tape, it provided a good buffer for the tank. Now, on those rough landings, the fuel lines are protected from being cut or pinched against the firewall. §



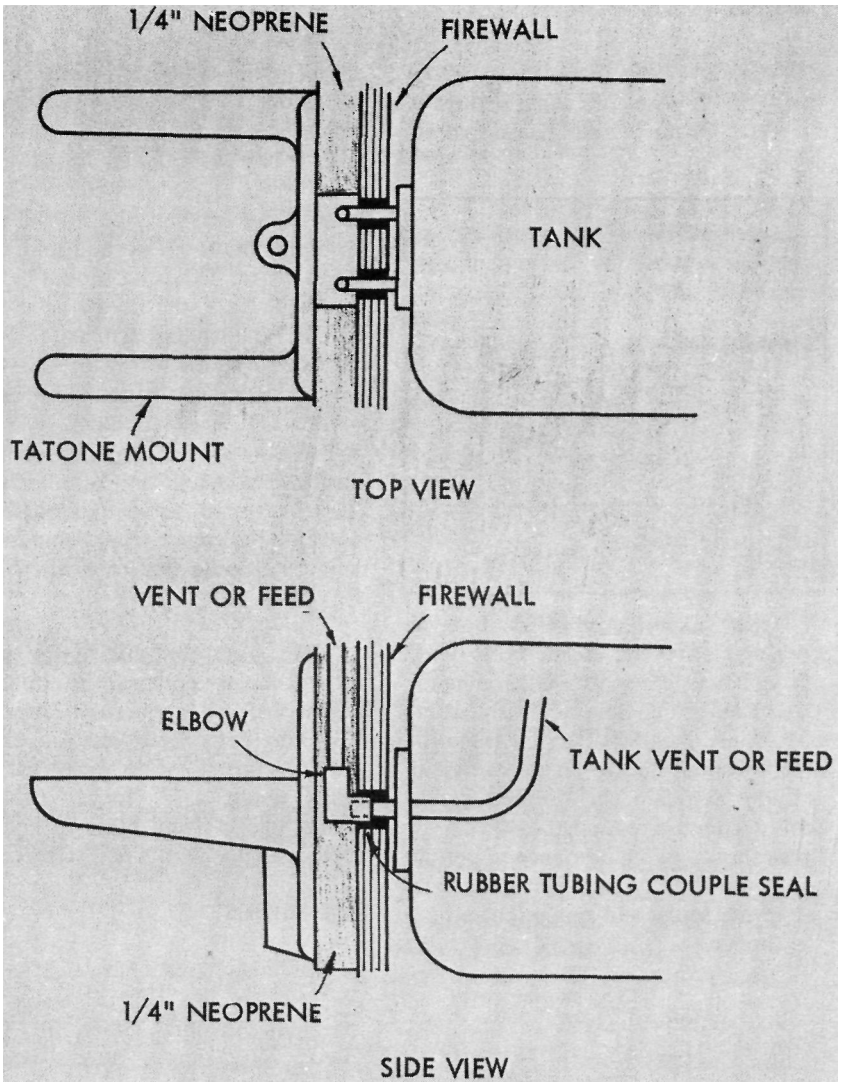
Now and again, in installing a clunk type fuel tank, one must form tubing in quite tight radii in order to clear the engine, engine mount, or other obstacles. One method to simplify this problem is to heat some nylon tubing, such as the Midwest motor control tubing, or the smaller inside tubing of Nyrods, and it can be formed into very nice vents. There is no need to run out for some metal tubing and no need for a tube bender. This is a good way to use up those little scrap pieces of nylon tubing and Nyrods. — source unknown. §

If you have encountered difficulty in passing your fuel line through the firewall from one of the conventional clunk tanks to the engine when using a Tatone radial mount, here's a suggestion; clamp your engine mount in a drill press vise and drill out an oversized hole in the center of the back plate in line with where the fuel tubing



comes through the firewall. Be sure to carefully de-burr this hole to prevent knicking or slicing the flexible fuel line. This will enable you to run your fuel line straight through the firewall and the motor mount to the engine. — Don Dewey. §

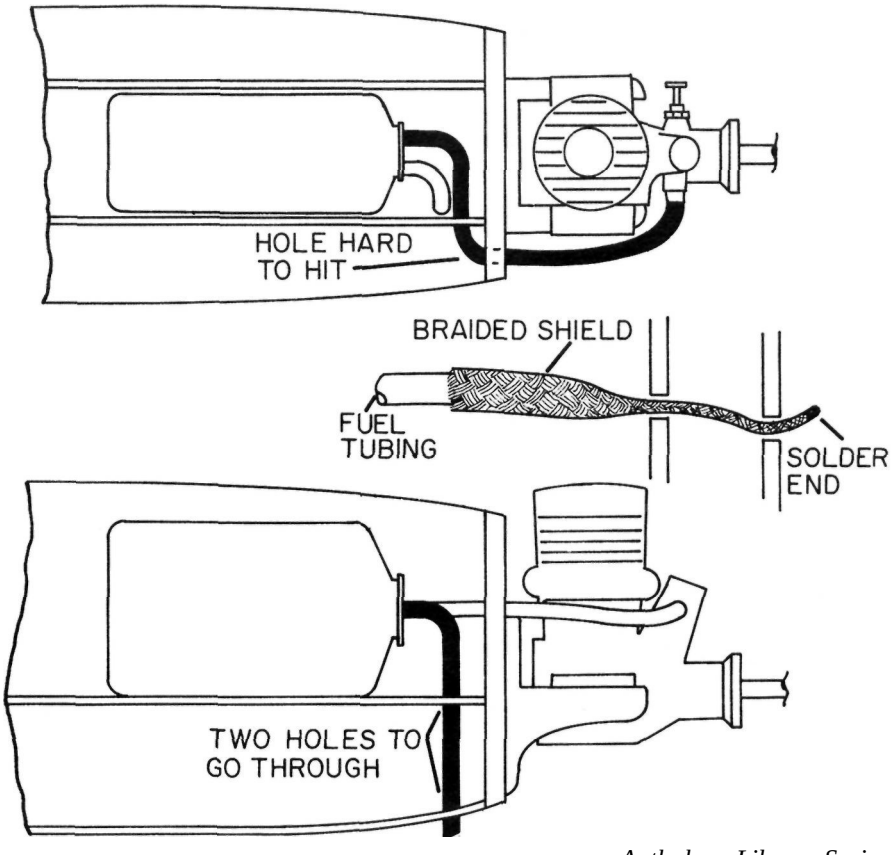
Here is a fuel tank arrangement that is very useful when using Tatone motor mounts in conjunction with a rear rotor engine. This idea facilitates locating the fuel tank at any position on the firewall for feed height in relationship to the needle valve. This is also very convenient for front rotor engines. The elbows used are Aristocraft boat fittings No. R12:20T-F, which are silver soldered and can be adapted to the elbow shown in the sketch. They will also slip-fit over 1/8" tubing. The 1/4" neoprene shown in the sketch absorbs all vibrations from the engine and acts as a spacer for the feed lines. This suggestion is from William E. Wallace. §



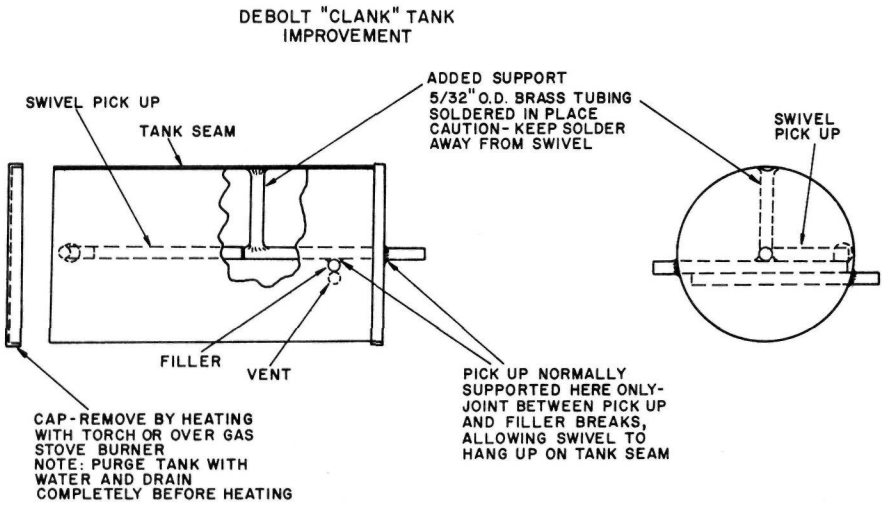
Jack Blanner of Pittsburgh, Pa., has solved the problem of trying to feed the fuel line through the same size holes in the firewall. Simply use a piece of the braided shield, or coaxial microphone cable used in electronics work. Just expand the braid to accept the tubing and then pull it through the hole with little or no effort. §

FUEL TANKS

Zel Ritchie suggests using white glue for coating engine and fuel tank compartment instead of the usual fiberglass epoxy resin. According to Zel, the white glue protects the wood from fuel and is not as brittle as the epoxy. From L.A.R.K.S. Lark. §

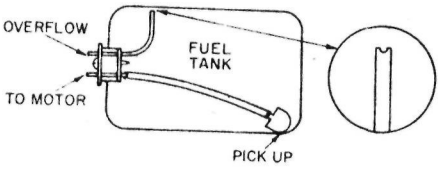


According to Rod Taylor, Van Nuys, California, the deBolt "clank" tank, being metal, is superior to plastic bottle tanks, since they have much less tendency to split or pop a plug with the resultant deluge of "glue-eating" fuel. The deBolt tank has a long, swiveling pick-up line which is cantilevered from a solder joint to the filler/vent tubes. This solder joint breaks, causing the swivel to hang up on the tank seam. The problem is readily solved by the following procedure: (1) purge tank completely with water, (2) drain all water from



tank, (3) remove aft cover using butane torch or by holding end of tank in flame of gas stove (camp stoves work fine), (4) re-solder joint between pick-up tube and filler/vent line, using pencil tip iron, (5) cut 1/8" or 5/32" O.D. tube support to length for slight force fit between tank seam and pick-up tube, (6) clean oil from inside tank wall and pick-up tube, (7) tin ends of support tube, (8) solder support tube in place, (9) resolder end cap, (10) leak check by closing filler and vent line with fingers. Submerge tank in water and blow through pick-up line. Any bubbles indicate leaks. Rod has flown a tank with this modification for several months with no further problems. §

If you've been worried about the curved overflow vent in your fuel tank becoming sealed off by press fitting against the top of the tank, Q.T. Hickman of Raytown, Missouri, suggests filing a notch across the end of the tubing that is nearest to the top of the tank. This is much simpler than cutting the overflow vent to a shorter dimension. §



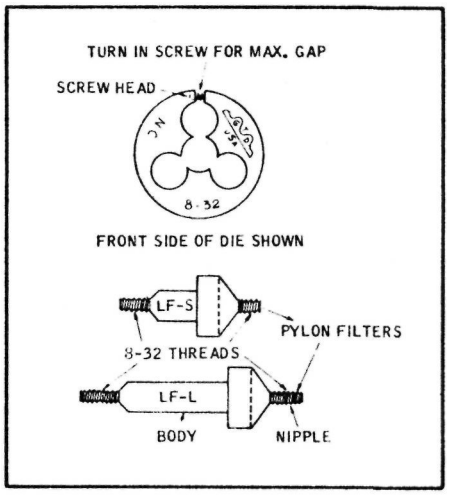
Ernest L. DeBardeleben, a pharmacist in Orlando, Florida, suggests a source for 1 to 12 oz. gas tanks that will cost you absolutely nothing. As a pharmacist, Ernie throws away between 15 and 20 plastic bottles a day .. . these bottles being the containers from which pills and tablets are dispensed by the pharmacist. The RC flier can go down to his friendly neighborhood pharmacist and tell him what he wants the bottles for and get him to save the various sizes for him. In about a week he would have enough different size bottles to make gas tanks to last for a lifetime. All that is necessary to do is to solder the gas overflow tube and pickup tubes into the metal cap on these plastic bottles. Or, if you prefer, a Tatone Stick-A-Tube set can be used. §

Want to keep fuel seepage from getting to the battery pack and foam rubber used in the nose compartment? Save those plastic bags in which model accessories are packaged. Place your foam in these bags and use another for the battery pack. You won't sacrifice any of the "give" from the foam, but will keep it from acting like a sponge. Batteries will be kept dry and the fuel simply wiped off the outside of the plastic bag. - Bill O'Brien. §

Here is a convenient way to hold down your fuel tank: Use Velcro tape with an elastic braid band glued on one end. Pull on the free end of the tape that has the elastic section on it to the desired tension. Put the tape over the mating tape and press together firmly. Peel open like a Band-Aid to remove fuel tank and/or battery pack. Velcro tape will work for thousands of cycles and can be purchased at the sewing section of department stores. Idea submitted by John Haskin, Seattle, Washington. §

FUEL FILTER

Have you ever checked your plane's fuel filter for obstructions and then after checking you find the fuel line slips off of the filter nipple each time you slip it on??? This problem exists only **after** the system has been fueled. A quick solution to this problem is to thread a well gapped 8-32 die upon the filter nipple until it touches the filter body. The filter and die can both be held in the fingers for this threading operation. **Thread the back side of the die on first** (side with least amount of thread taper) for ease of threading and clean threads. This method is also easier and more effective than trying to form a bead with a soldering iron. Try it and see for yourself. This suggestion comes from Ralph Sawyer.



SPRAY BAR

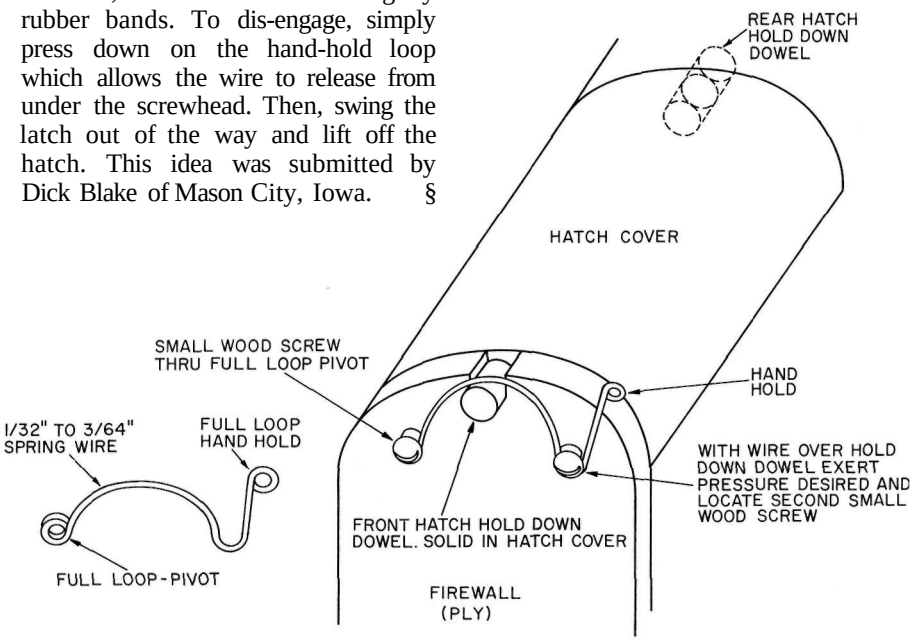
James Petro of Carey, Indiana, mentions that an idea, presented in an earlier 'For What It's Worth' column, consisting of fitting a Teflon sleeve in a spray bar body to stop wear, air-bleed, and needle movement, is perfectly satisfactory if you have access to a machine shop and the Teflon. However, as Jim points out for those of us who only have a corner to build in and a Sunday to fly on, an easier way to do the job is to take about 1/2" of Teflon pipe thread sealing tape, found in most hardware stores, and wrap a couple of turns tightly around the clean, dry threads of the needle. Screw into the spray bar, and it is now well sealed. §

PROPELLERS

The 'Carrier Wave,' published by the McDonnell RC Club, recommends that all nylon props should be stress-relieved before installing on big RC engines such as the .56-.80's to preclude the possibility of slinging the prop apart. This is easily accomplished by boiling the prop in water for about thirty minutes. Coloring your nylon props is an easy job and can be accomplished at the same time the stress relieving is being done. The trick, however, is in using the proper amount of Rit Dye to do the job. From experience, it looks like one quarter of a package of Rit Dye to a quart of water is satisfactory for coloring. It is not necessary to use a pan large enough to immerse the entire propeller, however it is desirable. If the complete prop cannot be submerged in one operation, adjust the water level so that one half of the propeller gets dyed, then the other, rotating evenly. The dye process is permanent and fuel-proof. Any color shade can be produced by just varying the strength of the solution or the amount of boiling time. Coloring more propellers at one time lowers the cost of the dying operation. §

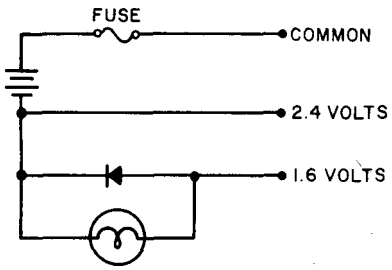
FUEL COMPARTMENT HATCH

In the "perplexing problem" department is the battery and fuel compartment hatch. The following hatch cover latch is very effective and simple to make, and eliminates the unsightly rubber bands. To dis-engage, simply press down on the hand-hold loop which allows the wire to release from under the screwhead. Then, swing the latch out of the way and lift off the hatch. This idea was submitted by Dick Blake of Mason City, Iowa. §



ENGINE STARTING

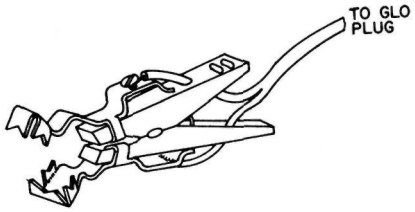
Gerald Reinhard of Beloit, Wisconsin, points out that Clarence Lee advised against the use of the 1.2 volt nickel cadmium battery for starting engines, giving low voltage after a few starts as the reason (Engine Clinic, p. 10, 2/69). Since this can be overcome, Gerald submitted the following schematic. The 2.4 volt portion is a direct connection, while the 1.6 volt lead is the result of the 0.8 volt drop across the diode. The voltage across the diode lights the No. 43 bulb (dimly) automatically showing a complete plug circuit. The fuse protects the battery in case the leads are shorted for an undue period. Normal clip contact by banding together will not cause a burn out. The 34" heat sink will provide a safety margin when used to fire two plugs simultaneously and when properly shaped it can provide an assembly base. This simple unit features rechargeability, dual voltage output, automatic plug check on low voltage, and delayed short period protection for the battery. There are eight of these presently being used by the Tri-City RC'ers, the original prototypes using the 4 AH surplus cells, and having been used continuously for over two years. The latest versions use 1.2 AH "C" cells. The one drawback? "Who borrowed my battery?" §



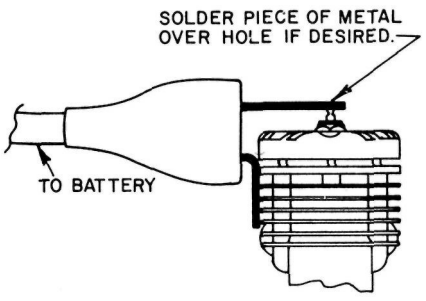
FUSE 10-15 amp slo-blow
CELLS 2-1.2 volt nickel cadmium
DIODE 1N3491
BULB No. 43
HEAT SINK ¼" aluminum (about 1 x 1½" min)

GLOW PLUG CLIPS

If you're looking for an easily obtainable and inexpensive glow plug clip, this little gadget costs about 25 cents and is used as a quick disconnect for television antenna. Dan Harrison of Palmdale, California, has been using one for a starter cell connector for over a year and has had no problems with it. It connects to most two post, nickel cadmium or dry starting cells. If unobtainable locally, try Radio Shack.



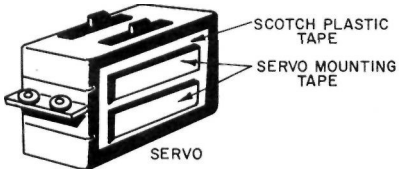
Phillip P. Catanzaro of Oakdale, Pa., submitted an idea that he and Wayne Dempler developed. This is to simply take the cord from a lamp or other appliance, providing it has the molded male end on it, and bend one of the ends as shown in the sketch to make your own glow plug hang-on switch. The cords are also available as replacements for lamps from most hardware stores. §



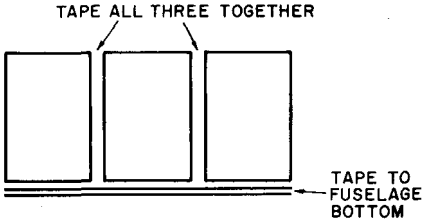
IV EQUIPMENT INSTALLATION

SERVO MOUNTING

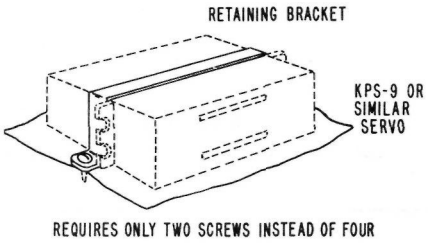
If, like most RC'ers, you mount servos with servo mounting tape, you have undoubtedly discovered some problems in peeling the old tape off the servo when it is removed from the aircraft. To overcome this James S. Miura places a piece of Scotch plastic tape (or scotch monofilament tape) onto the servo. He then sticks the servo mounting tape onto the plastic tape and the servo is then mounted in the plane. In the event that you have to remove the servo, the servo mounting tape will separate cleanly from the servo by simply peeling off the Scotch plastic tape. By mounting in this fashion you keep the surface of the servo clean. This has been thoroughly flight tested and proven quite successful. §



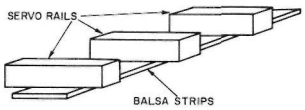
Donald Hansen, of Wichita, Kansas, uses Velco Hook and Pile (Cockleburr) tape for mounting servos, as shown in the accompanying sketch. This also provides some cushioning effect. It is much stronger than double backed tape and can be separated 100,000 times. The cost of this material is $1.38 per yard in 1" width from the Hartwell Corp., 9035 Venice Blvd., Los Angeles, California. Don also uses it to secure hatch covers by contact cementing small pieces to the fuselage side and then locking the Velco tape together to hold the hatch in a closed position. §

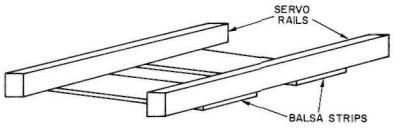


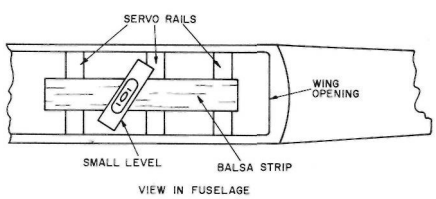
From the East Bay Radio Controllers newsletter, the 'Carrier,' comes a method of mounting a KPS-9, or similar, aileron servo. A simple retaining bracket is used which requires only two screws instead of four. The accompanying drawing is completely self explanatory. §



Installing servo mounts in a fibreglass fuselage so that they line up squarely can be a time consuming problem. Here's a fast, accurate solution from Frank Morosky of Hoffman Estates, Illinois. On rails for longitudinally mounted servos, take a scrap piece of balsa 1/8" or 1/4" thick by 1" wide and mark it for rail locations. After sizing a rail for fuselage fit, spot glue the top side of the rail to its location on the balsa strip. Next, apply adhesive to the rail ends, turn the unit over, and slip into the fuselage, making sure it's the correct location. Take a small level such as used for phonograph turntables and place it on top of the balsa strip. Use the level to make sure the rails are perpendicular to the fuselage sides. For rails on horizontally mounted servos, use two pieces of balsa about an inch apart. After the adhesive has dried, just pull the balsa strips from the rails. §

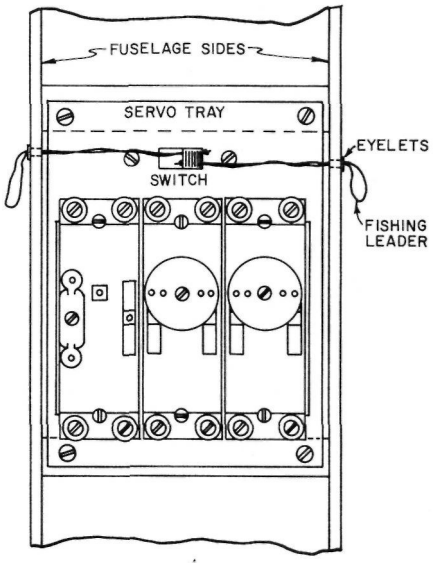






AIRBORNE SWITCH

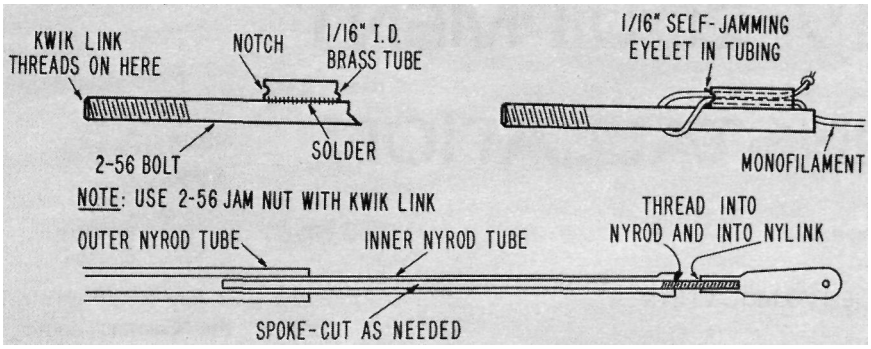
Here is a simple, yet fool-proof, method of operating a tray-mounted on-off switch in your model. Attach flexible string (fish line leader works quite well) as shown in the sketch. Then simply pull the string from the appropriate side of the model to perform the desired function, either on or off. This method has two distinct advantages; in a crash, servo trays go forward and rigid push-pull linkage often breaks the switch. The string will simply be pulled though the holes in the fuselage side without damaging the switch. The second benefit is in transferring the servos and tray to another model, all you need to do is pull the strip through the eyelets to remove the tray and thread them through eyelets in the next model. This idea was submitted by Cliff Shelor of Covington, Virginia. §



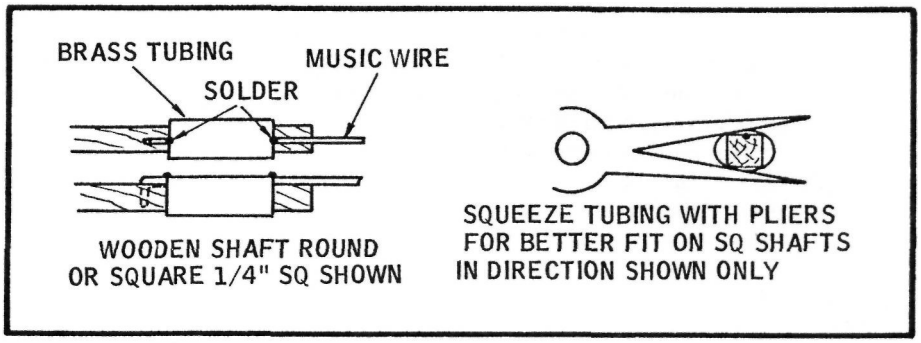
PUSHRODS

Although nylon pushrods such as Nyrods, are becoming more and more prevalent, and are to be preferred in R/C installations, there may be times when cable control installations may be preferred or necessary. In such cases, one of the things to watch carefully is obtaining a concentration of stress at the fittings, and the enclosed sketch will illustrate a method

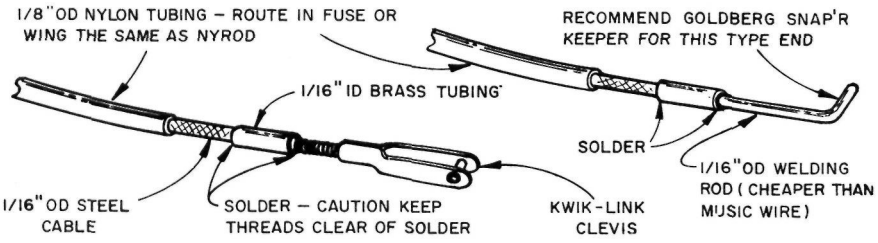
which has been used with no failures whatsoever. This method utilizes a small length of 1/16" i.d. brass tubing which is soldered to a 2-56 bolt. The end of the bolt utilizes a 2-56 jam nut and Kwik Link. The monofilament control cable is passed through the brass tubing, looped over the bolt and returned back through the brass tubing. A 1/16" self-jamming eyelet is inserted into the forward end of the tubing. As a safety feature, a small knot is tied in the end of the monofilament cable to prevent it slipping back through the brass tubing. §



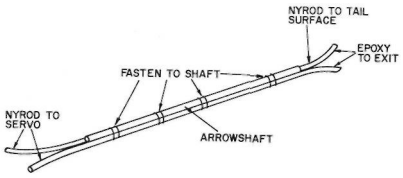
Still making pushrods by bending a 90° bend in a piece of wire and securing it to a balsa shaft with thread and glue? Try replacing the thread with a piece of brass tubing and solder. A piece of tubing about 1/2" long is placed over the wire and balsa shaft and soldered to the piece of music wire. One other advantage is that the tubing need not be soldered until the torque rod is fitted to the plane. Thus, in case of a mistake, the wire is easily removed and replaced. From Jay Stargel of the 'DC/RC Newsletter.' §



For the past couple of years, Loren Pratt of Mishawaka, Indiana, has been using a rather inexpensive and efficient push-pull cable system for control surfaces. Quite simply, it is a 1/16" diameter cable inside a piece of nylon tubing. The cable is the common 7 x 19, .062 O.D. steel variety used on small overhead garage doors. This is available at a cost of about 2¢ per foot. The nylon tubing is 1/8" O.D. high pressure hydraulic tubing at a cost of about 12¢ per foot. Polyethylene tubing will also work and at a cost somewhat less but is not readily available. You use this system just as you would the typical NyRod system. The big difference is in the freedom of movement of the cable inside the nylon tubing, especially around small radius curves. Loren has used it on l"radii bends with no appreciable increase in drag. Attach your clevis end as shown in the sketch. §

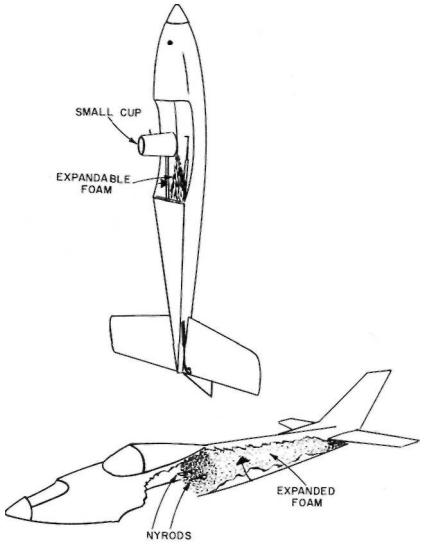


If you're encountering difficulties in installing pushrods in a glider which has a built-up glass fuselage, the rear section of which is very narrow, and you want to use NyRod, try this method by Carl B. Reynolds, Fremont, California. One piece of arrow shaft, or a straight piece of dowel was used, to which were fastened two pieces of NyRod which were extended



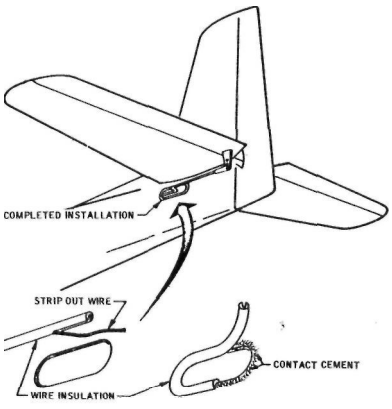
approximately three inches longer than the shaft. The NyRod was fastened with glass cloth, but any adhesive could be used, wrapping in at least four locations. The rear NyRod extension is then epoxied in place at the proper pushrod exit location. The front sections of NyRod are extended to whatever distance is required to reach the servo installation. In Carl's glider, the arrow shaft with NyRod's attached was glassed to the wing tongue for a very rigid installation. This method could be used on any model with very little weight increase.

Jerry D. Chopp, Tinley Park, Illinois, suggests that if you want to improve the strength of the aft section of your Lanier model, as well as facilitate the installation of NyRods, here is a method for using expandable foam. The first step is to make your normal NyRod installation. Then mix

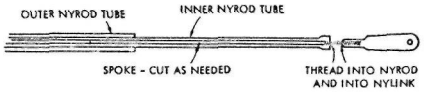


the foam as per the manufacturers instructions. Hold your fuselage in a vertical position, such as shown in the illustration, mix, and pour in, through the wing saddle, as shown in the cut-away illustration. The last step is to remove the inner tubing of NyRod and trim off the excess material from the larger tubing. By using this method only about 1-1/2 ounces is gained in weight. On the plus side, the tail cones are sturdy and the NyRods are securely anchored. Expandable liquid styrofoam is available at most local hobby shops. §

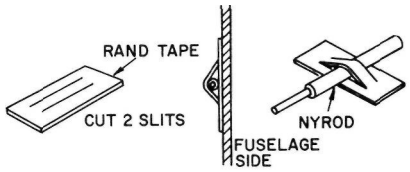
One way to finish off pushrod openings is to cover the rough edges of the pushrod cut out with insulation from electrical wire. In addition to enhancing the model's appearance, this "combing" will tend to strenghthen the area, and prevent splitting of the wood surfaces. The size of the insulation used would depend on the size of the model and the thickness of wood used in the structure. For the average 6 to 10 channel multi, standard 100 volt line wiring is about right. Use contact cement for installation. By the way, instead of rubber insulation, black neoprene tubing or electrical spaghetti can be used. — Dave Kovensky in the McDonnell 'Carrier Wave.'



Here's another hint if you use Nyrod for your control linkages: if the inner tube extends unsupported for some length, a piece of music wire or tubing can be slipped inside with a little epoxy to stiffen that area. This idea refers to the unsupported length where the inner Nyrod exits from the plane's fuselage to the control horn. This method seldom should be necessary, but the idea has been used and it works. To simplify and improve this idea, use an appropriate length of bicycle spoke, the unthreaded end going into the inner Nyrod tube first. Then thread the threaded end into the Nyrod for a distance of 1/8"-the remainder of the threaded portion attaching to the control horn on the movable control surface. This idea comes from Stan Lyons. §

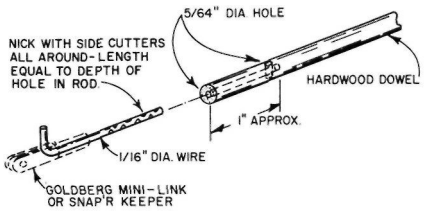


Bill Freiwald of Downers Grove, Ill., suggests using a length of Rand Servo Mounting Tape to secure Ny-Rods, pushrods, etc. The accompanying sketch is self-explanatory. D

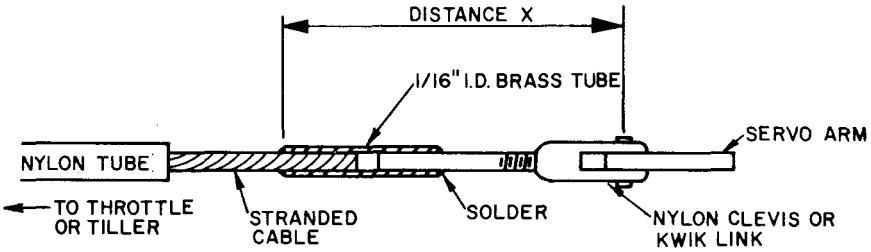


Joe Perez of San Antonio, Texas, submitted an idea dealing with tapping up the control from the tiller arm of your nose wheel to the rudder servo, or the carburetor arm to the throttle servo. The idea is particularly adaptable to the racer type or smaller size model where space is at a premium. Notice how much shorter the X distance is in the suggested method. The heart of the idea centers around using a larger I.D. brass tube for the joiner. §

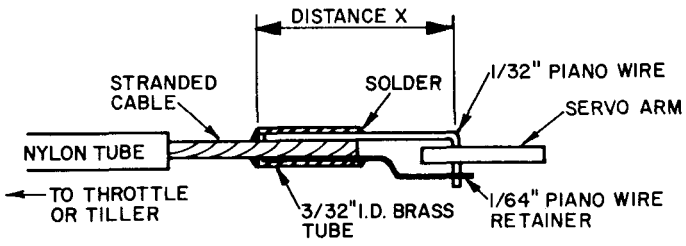
In this day and age of fancy control cables, Phil Johnson feels that there are a few who still prefer the old standby to operate the elevator and rudder. The push-pull rod is very simply made by using a hardwood dowel and a length of 1/16" diameter wire or welding rod. Poke the epoxy into the hole in the dowel, using 1/16" wire as a poker, until the epoxy squirts out of the cross hole. Push the pre-nicked wire into the hole until it is bottomed. Allow the normal cure time for your brand of epoxy. You will find that the wire cannot be pulled out by normal hand force. §



One method of making pushrods is to first drill a piece of 1/4" birch dowel directly down the end with a 1/16" drill. This is best accomplished by center punching the dowel, and as you drill, keep turning the dowel to keep it centered. Rough up the end of your Kwik Link wire, or 1/16" music wire, with a file. Next, heat the wire over an open flame until hot then roll in a stick of hot glue and push in the end of the dowel. To make a neater installation, sharpen the drilled dowel end in a pencil sharpener after drilling. Submitted by Richard Slye of Washington. §

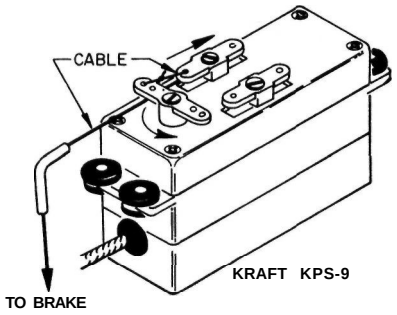


PRESENT METHOD

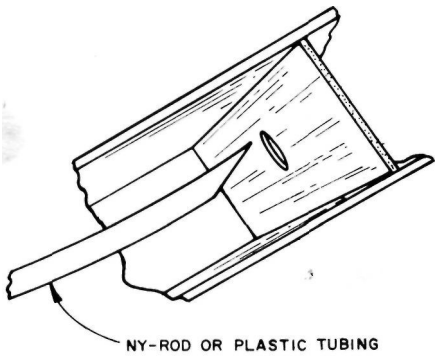


SUGGESTED METHOD

G.P. Walker, Jr., of Monroe, Louisiana suggests that if you have one of the combination push-pull and rotary output servos such as a Kraft KP9, this can be used as a mechanical brake. For more throw on the brake cable, thread the cable through the linear arm and to the rotating arm that moves opposite from each other. Be sure to rig it so that the pressure is not applied until extreme movement is reached. §



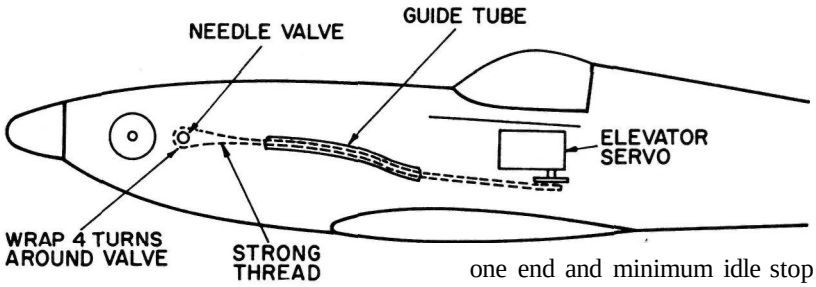
Phil Johnson of South Bend. Indiana, writing in the Tri-Valley RC Club Newsletter, wonders if you have ever tried to insert a long piece of NyRod tubing into the same diameter hole in an inaccessible place in the fuselage? Next time, try cutting the end of the tubing at a long slant, creating a point which can be readily inserted into the hole, facilitating an easy installation of your NyRod. D



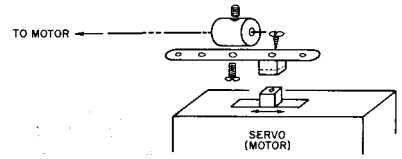
Here's another hint when using Nyrod pushrods: If the inner tube extends unsupported for some length, a piece of music wire or tubing can be slipped inside with a little epoxy to stiffen that area. This idea refers to the unsupported length where it exits from the plan's fuselage to the control horn. To simplify and improve this idea, use an appropriate length of bicycle spoke, the unthreaded end going into the inner Nyrod tube first, then threading the threaded end into the Nyrod for 1/8", the remainder of the threaded portion attaching to the control horn on the moving surface. From the Soo Modelers "Glitch." §

THROTTLE LINKAGE

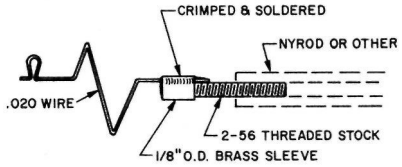
As Goodyear pilots know, one of the problems of pylon racing is the leaning-out effect of high speed turns, which is caused by high G-loadings. This can be overcome by pressure feed, but this, in turn, can cause problems with idle end plumbing. Using a KB .40, C.W. Peake of New South Wales, Australia has solved the problem by running a strong thread from elevator servo, through a nylon guide tube, to the needle valve. The thread is wrapped four times around the head of the needle just behind the knurled portion then back to the other side of the servo via the same guide tube. This richens the needle slightly with application of up-elevator. With Chuck's installation, full up-elevator gives l/8th of a turn of the needle. This seems to suit the K&B, and he can pull a full elevator turn with no sag whatsoever. The amount of needle movement can be adjusted on a rotary servo output in the same way as control surface throw. The four turns of thread provide enough friction to hold the needle in place while still permitting normal tuning. The thread should be inspected and, if necessary, replaced at fairly frequent intervals to avoid breakage in flight. The whole installation is extremely simple and seems to work quite well. §



Dr. Jacques Metford of Hyde Park, Ontario, Canada, while not professing to be the neatest of builders at any time, found that connecting the flexible throttle cable to his Orbit servo usually resulted in a remarkably untidy installation. The following sketch illustrates Jacques' solution to the problem. Items needed are one each 1/16" wheel retainer, Orbit-type linkage fitting, 4-40 bolt. Secure the retainer to the fitting with the 4-40 bolt, drilling out any protruding excess in the center hole of the retainer. Remove enough of the base of fitting to insure it does not jam up on top of the servo case when snugged up. Feed the flexible cable through the center of the retainer and secure with the Allen-head bolt provided. Retainer may be swiveled left or right if the servo has to be mounted off center. §



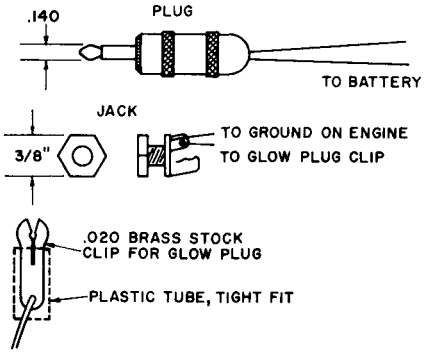
G.J. Thompson of Arlington, Texas, suggested the following throttle over-ride linkage. He has built and used three such linkages and has over a hundred flights with no difficulties encountered. First, bend a length of .020 spring steel wire as shown in the sketch. The loop at the end should be a snap fit into the carburetor throttle arm. Make a 1/8" O.D. sleeve from a brass tubing and slip onto a piece of 2-56 threaded stock or Kwik-Link shaft. Slightly "egg-shape" the brass tubing by crimping with pliers. This will allow the .020 wire to snug-fit under the brass sleeve. Solder the wire, sleeve, and threaded shaft together. Silver solder will make a stronger joint. Thread the assembled link onto NyRod or your favorite pushrod end. Adjust the servo throw to exceed the carburetor throttle arm throw by 1/32" on either end. If the carburetor is set so that it stops at full open at one end and minimum idle stop at the other, the linkage will insure that both these positions are reached at all times without placing undue strain on the throttle servo. D



THROTTLE OVERRIDE LINKAGE

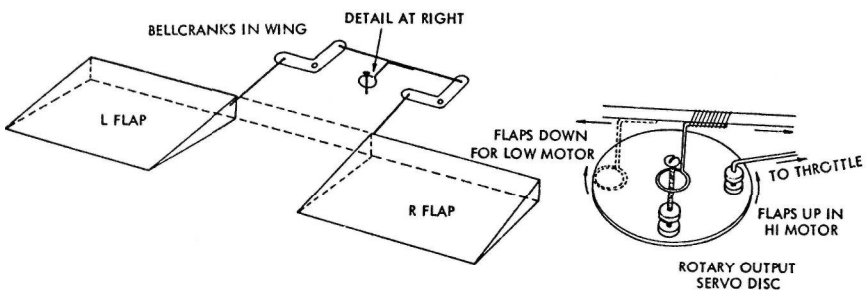
GLOW PLUG ACCESS

Having just purchased a VK Nieuport, Walter Perrin Jr., of Granada Hills, California, didn't like the 5/8" hole in the cowl for glow plug access. Instead, he uses a telephone plug and jack for battery hook-up with only a single 1/8" hole needed to be drilled for the jack position. This can be located in the bottom of the fuselage or other location of your choice. Recess the inside to clear the 3/8" nut. Bolt the jack to a 3/4" square by 1/8" piece of plywood. Solder on wires long enough to reach the engine and glue to the inside of the fuselage. Be sure to insert your plug to check alignment of the jack to the hole. If your fuselage is made of fiberglass or plastic, drill a 9/64" hole and add a second piece of plywood with a hole in it large enough to fit over the nut. Epoxy this to the inside of the fuselage. This simple plug-in battery connection provides an added measure of safety for the fingers and also eliminates spoiling the looks of scale models which otherwise have to provide an access hole in order to connect the glow plug clip. §

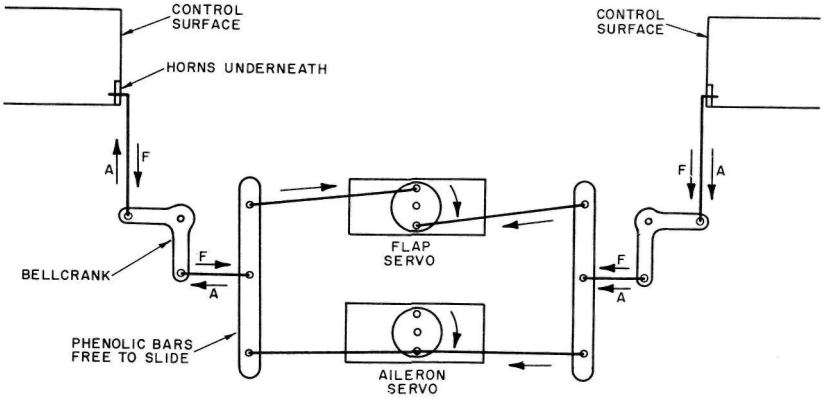


FLAP LINKAGES

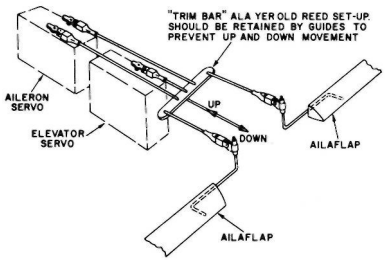
Lou Goldberg says the following technique for flap operation on your model plane works quite well. This method requires the wheel type output servo, such as Orbit or Micro-Avionics but could probably be adapted to work with a linear type servo as well. Adjust the linkage for no flaps at full throttle and full flaps at approximately half throttle. Do not set flaps for too much throw until you are familiar with the flight effect of flaps on your particular aircraft. - From DC/RC Newsletter. §



Our own Contributing Editor, Dave Piatt, suggested this successful method for coupled flaps and ailerons. Make absolutely certain that the phenolic bars move easily in their slides. §

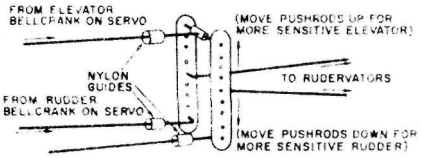


Aldon Annis, Streator, Illinois, submits a method of converting any existing full-span aileron wing to "flap-erons" or "ailaflaps." The sketch is self-explanatory, and up-elevator will give down-flap, etc. The connecting bar is a "trim bar" ala the old reed set-up. This bar should be retained by side rail guides to prevent unwanted up and down movement. §



V-TAIL LINKAGE

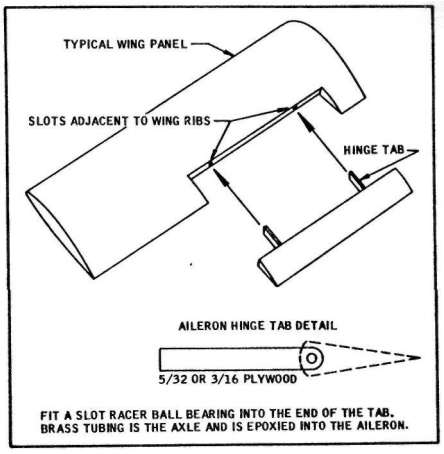
Here is a linkage to accomplish GG on a Vee-tail model. §



In addition, you could also accomplish GG on a Vee-tail with only two pushrods if you were to spring load the elevators to the 'Down' position; this would be something similar to the old 'Tee Dee Bee' linkage in the March '66 issue of RCM.

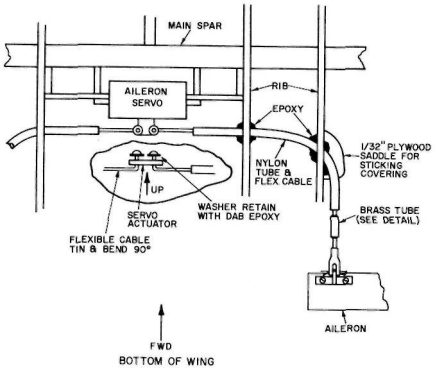
AILERON LINKAGE

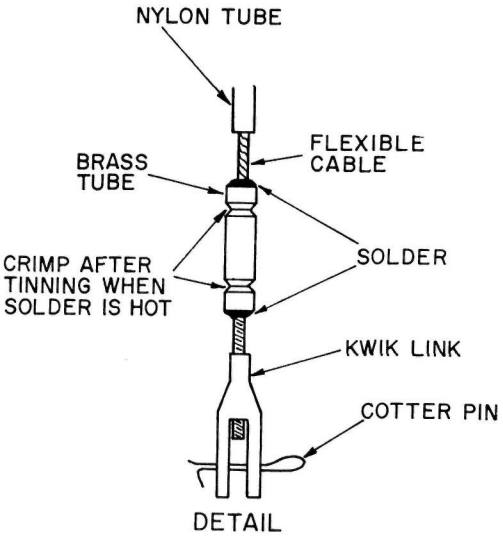
Frank Baker developed this system of aileron installation which will enable the modeler to achieve a better finish. The tabs, as illustrated, are not glued until after painting. From Norm Rick in the MARCS 'Sparks.' §



Joe Perez, editor of the 'Condenser,' of San Antonio, Texas, suggests this method of installing internal aileron linkages. This is one of the

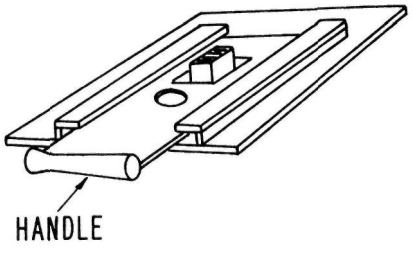
fastest and easiest methods and has been thoroughly flight tested. §





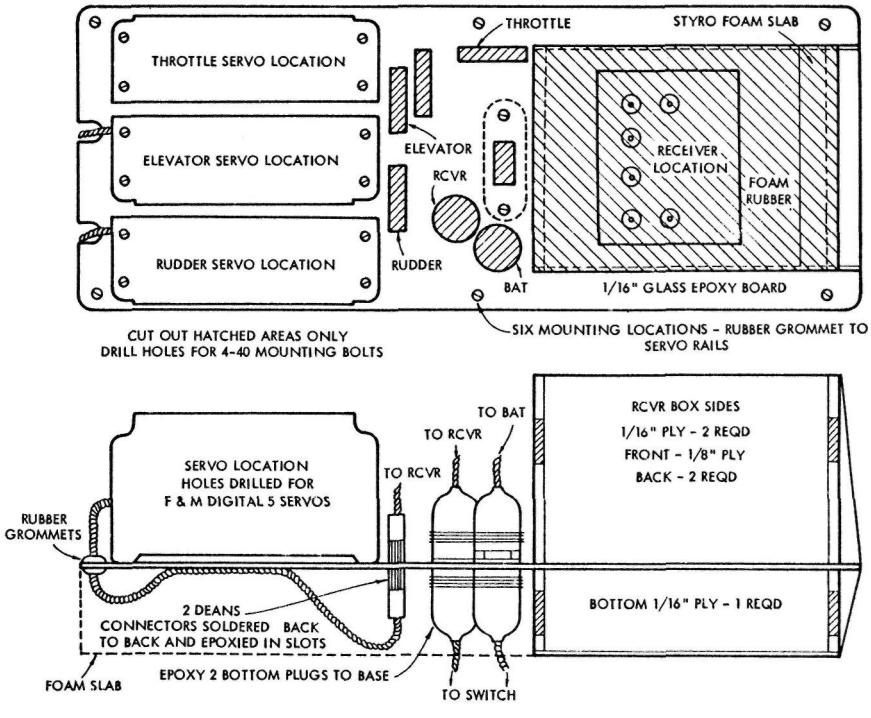
SWITCH MOUNTING

Here is an excellent method of mounting your switch inside the fuselage, away from the exhaust residue. The switch, along with the 1/32" plywood plunger, is easily removable, since only the guides on the switch plate keep them connected. The "handle" on the end of the plunger is just a piece of dowel shaped to resemble a venturi tube, used on some full scale airplanes to power vacuum driven gyro instruments when the engine doesn't have a vacuum pump. This suggestion comes from Ralph Jones, Fairborn, Ohio. §



SERVO MOUNTING BOARD

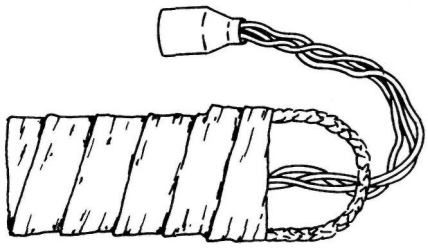
Ever since getting into proportional I have been annoyed at the methods of installing the equipment. Recent articles in RCM concerning vibration and crash protection prompted me to build a servo mounting board which I like to think is a little different. The glass epoxy board is 9" long by 3-1/2" wide and will fit most multi jobs. As an alternate, the board may be made from good 5-ply 1/8" plywood. The six mounting holes should be large enough to take rubber grommets and this is mounted to full length servo rails. The switch harness is bolted in place from underneath the board and the two plugs epoxied in place very lightly. The three servo plugs are made up from Deans Connectors, soldered together back-to-back and epoxied heavily in place. The fourth slot is to allow the throttle servo cable and plug to go through the board. The receiver box must be put together carefully, assembled on the board and glued securely with epoxy. Use strips of fiberglass cloth to reinforce the corners on the outside. The area beneath the servos, up to the edge of the receiver box, could be covered by a removable slab of foam to protect the wiring. Servos may be plugged out and removed for maintenance or replacement. — Pete Branday, Georgetown, Ont. §



BATTERY PACKS

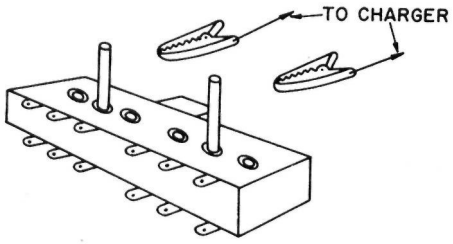
When using a cylindrical battery pack in your model, a good method of installation is to use the inside tube of an old paint roller cut to proper length. This is slipped through a hole cut in the bulkhead and glued in place. The battery is held inside this tube. Glue foam padding in the ends with a pull strap wrapped around the battery so it can be removed without pulling on the leads. A bit of foam wrapped around the battery is also a good idea in order to keep it from rotating inside the tube and possibly twisting the leads to a fracture. — From the Soo Modelers "Glitch." §

Ray Gareau of Montreal suggests a battery lead preserver — when wrapping the batteries in polyvinyl for fuel protection, it is very simple to add a piece of shoe lace before the last turn



of the tape, letting a loop of about 1 inch of slack in order to pass a thumb or few fingers through in order to pull out from box. Now, instead of pulling on the battery wire, or trying to shake them loose, the battery can simply be removed without allowing stress to the battery wires. §

Sidney Kauffman of Durham, No. Carolina, suggests a quick and easy way to charge your airborne battery pack where it is impractical to unplug the battery connector from the receiver. Simply solder two 3/8" stubs of number 20 solid wire to the appropriate switch eyelets. Aligator clips can then be used for charger connections. Be sure to watch your polarity when charging. §



Albert Niessner, Jr., of Boalsburg, Pa., says that in order to relieve the necessity for disconnecting the receiver battery when charging your proportional rig, a connector can be added to the receiver switch. The normal system hook-up is shown by the solid lines in the sketch. The extra connector is added as shown by the dotted lines. The charging cable from the transmitter plugs into the charging connector. The receiver switch must be off before the battery can be charged. When wired as shown, the charging indicator in the transmitter will not light when the receiver is on and the charger cannot be connected to the receiver. §

Here's a hint that may prevent a possible crash caused by one of those many small unknown factors so often blamed on interference. Corrosion often builds up on the pins of the servo plugs and battery switch harnesses. This problem is more prevalent around coastal areas, but also can be a factor farther inland where the corrosion takes longer. The characteristics of this malfunction are so similar to interference that they are hard to tell apart, symptomized by erratic or nervous servo motion and possibly complete loss of one or all of the functions. To prevent it with new equipment, carefully coat each pin with a light coating of Garcia Reel Lube and plug each connector into its socket several times to coat the inside. Wipe off the excess, but do not clean the silicone lube completely off. If your equipment is not new and you suspect corrosion or can see a whitish-gray coating on the pins, carefully scrape them on all sides with a No. 11 X-Acto blade, then coat as indicated above. It will help clean the socket if you will plug and unplug several more times than with the new equipment. Do not use oil or any lubricant that is not a silicone type. This will cause intermittent operation, or no operation immediately. Silicone lubricants on the other hand, are conductors and will not cause this problem. Submitted by Major John D. Woods.

Duie Matenkosky of McDonald, Pa., suggests that a very effective sealer/covering for home-made battery packs can be obtained by buying a can of Scotch (3M) "Skotchkote" electrical coating. This is a liquid vinyl material, and is available in 1/2 pint cans at most electrical supply houses for about $1.50. To use, wrap the completed battery pack with vinyl plastic electrical tape, and dip the pack into the can of Skotchkote, let dry, and dip again. The result is a one-piece, moisture and fuel resistant flexible covering — it works great! §

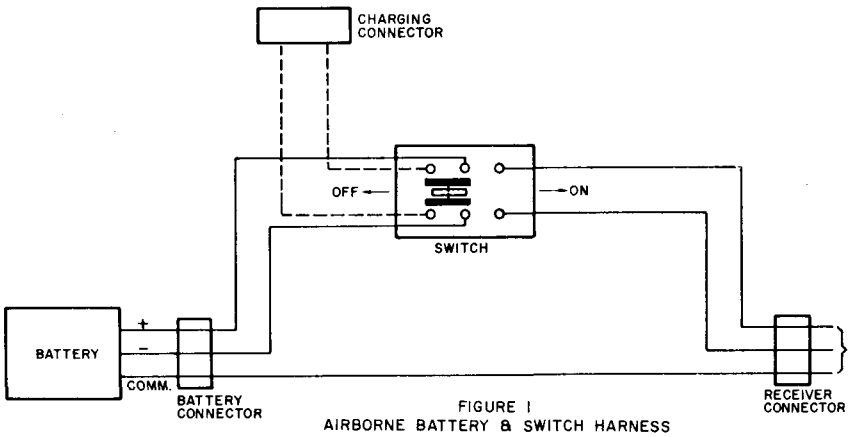


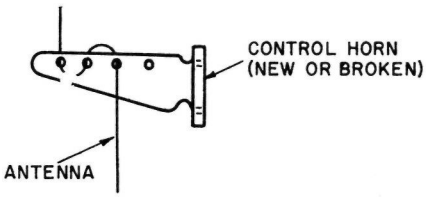
FIGURE 1
AIRBORNE BATTERY & SWITCH HARNESS

ANTENNA

Since no RC model, especially scale model, looks well with the kink antenna wire draped along the fuselage like a piece of baling wire and then rubber banded to the tail, most modelers hide this eyesore before taking pictures of their models. E. Milliron, Jr., solves this problem by feeding the antenna wire through the fuselage via a spare length of NyRod glued inside the framework. If the antenna is longer than the fuselage, have the NyRod terminate at the tail post and allow the excess wire to trail out behind the aircraft. A soft balsa wedge shoved into the NyRod at the receiver end will secure the antenna wire from sliding forward into the receiver compartment in the event of sudden stop.

Here's an idea from Ernest Stumpf. Most RC'ers tie a knot in the antenna wire where it goes through the fuselage. Here is an easy and quick way of securely fastening the antenna wire on our models. Tie a clove hitch around 1/8" wood dowel which should be approximately 1/2" long. It can be easily tied and untied and places no strain on the wire or the knot. On the rudder end of the wire, cut 2 pieces of 1/8" nylon tubing about 5/16" long. Slip this on the antenna wire and then loop the loose end back through the tubing. You will just barely pass through and you then have a nice neat loop. There is no need to tie a string around the antenna wire. §

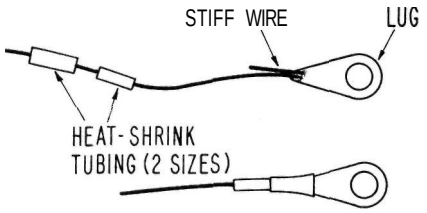
Walter Still, suggests using a clevis horn as a strain relief device for your receiver antenna. Simply thread the receiver antenna through the holes in



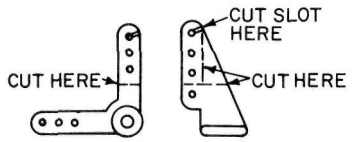
the horn as shown. In addition, you have a spare horn available just in case one should break while making trim adjustments, and you can use the broken one in the same manner as a

strain relief while using the new one on the control surface. This method also eliminates tying a knot in the antenna wire. §

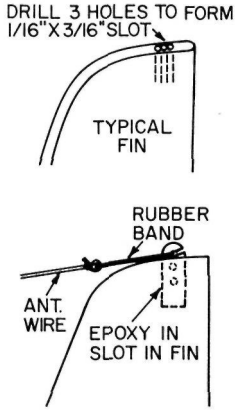
Here is a reliable, fatigue-free method of attaching a terminal to a single, loose wire. It can also be used for attaching the receiver antenna wire to a vertical whip antenna. It involves soldering a piece of stiff wire to the lug, then sleeving the whole assembly with heat-shrink tubing. This gives a smooth transition from the free part of the wire to the rigid solder joint, and avoids stress concentration at the edge of the solder. From Ralph Jones, Fairborn, Ohio. §

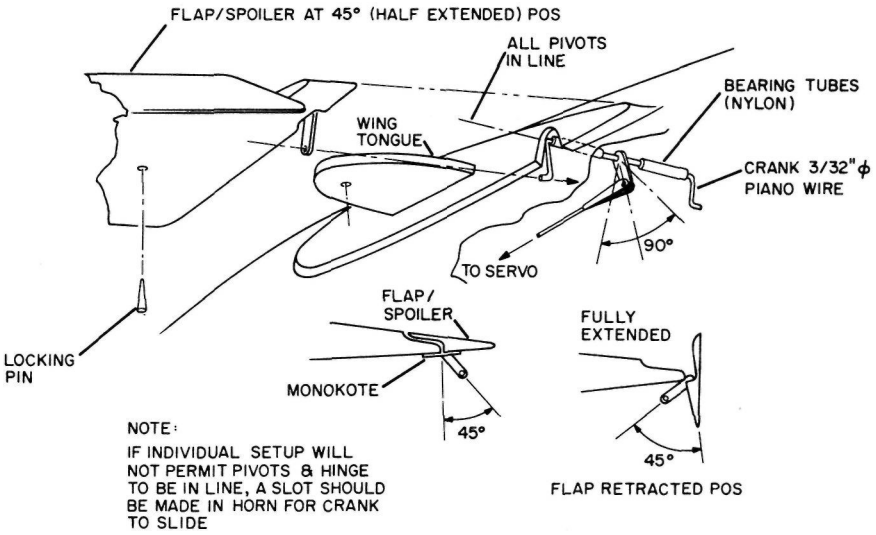


From the Middle Tennessee Radio Control Society of Nashville, Tenn., comes an excellent method for hooking your radio antenna up to your vertical fin. If you have an antenna "dangiliosis", you will appreciate this method which is completely self explanatory from the accompanying sketch. §



ANTENNA CAN BE TIED IN THE HOLE OR A SMALL RUBBER BAND CAN BE SLIPPED IN THE SLOT AND THE ANTENNA TIED TO IT. THIS KEEPS ANTENNA TAUT.



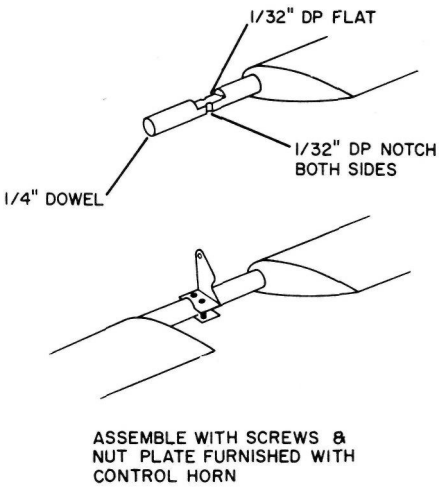


GLIDER SPOILERS

From R.A. Chernich in Brisbane, Australia, comes an idea for a simple but efficient, and quite effective, spoiler linkage for knock-off type glider wing panels. The sketch is self-explanatory, however, if individual set-ups will not permit the pivots in hinge to be in-line, a slot should be made in the horn to permit the crank to slide. §

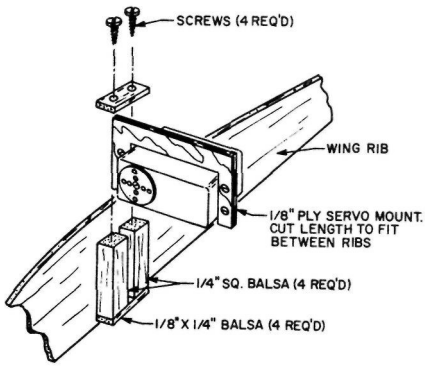
CONCEALED HORNS

When it is desirable to conceal surface control horns such as for elevator and rudder, or flaps, and there is no flat place to install the horn, simply connect the surfaces on the hinge line with 1/4" hardwood dowel that has been prepared beforehand in the manner illustrated in the sketch. This idea was submitted by Richard Valentine, of San Antonio, Texas. §



REMOVABLE WING SERVO

Jerry Hamelman, of Rochester, Indiana, submitted the diagram on how to mount a servo in a wing so that it can be easily removed for use in another plane. Jerry used 1/8" plywood to fabricate the servo board



shown in the sketch. This should be cut to the length between your center section ribs. The servo should then be mounted as shown in the drawing. Glue four 1/4" square balsa strips to the sides of the ribs as indicated. After this has been completed, insert the board with the servo mounted, and cut 1/4" x 1/8" balsa and screw on the bottom as shown. If the top sheeting is not in place on the wing it will be necessary to glue a strip on top of the 1/4" x 1/4" balsa stringers. To remove the servo all that is required is to remove the four screws and the linkage to the aileron. §

V FINISHING

FILLETS & SPOT FILLERS

If you're tired of expensive balsa fillers, Douglas Williams, of Cucamonga, California, suggests that you try 3M Brand Acryl-Blue Glazing Putty, available at most automotive paint stores. Used directly from the tube, it makes an excellent, easy sanding, lightweight, flexible filler for minor low area. Thin with lacquer thinner for covering large areas. The putty dries in 30-45 minutes and will prepare four or more large aircraft. Rough sand with #120-240 and finish sand with #400. Cover with Super MonoKote, dope, or any automotive paint for a beautiful finish for your model. §

J. Crawford of Hamilton, Ont., Canada, suggests that Devcon Aluminum Plastic, available in tubes in most local hardware stores, when dissolved in acetone, makes the best and lightest filler he has ever used. Simply brush it on, and sand off. It is also excellent for forming fillets. §

Balsa filler. AMT Advanced Customizing Body Putty, manufactured for model car builders, is an excellent balsa filler. A gray material, it applies easily and can be worked and sanded readily. It seems vastly superior to Plastic Balsa in that is does not pit after sanding and only a minimum of dope is needed for covering and touch up. Get a tube and give it a try — you'll be pleasantly surprised. From the Pioneer R/C Club. §

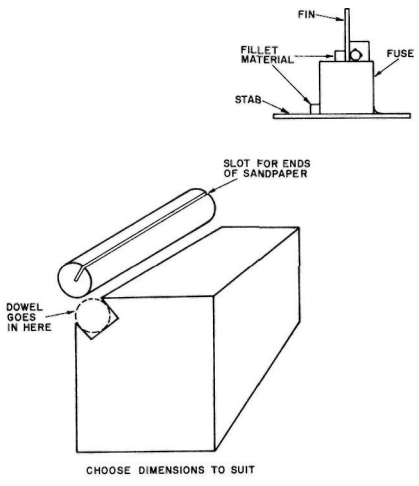
SANDING

An excellent, low-cost building aid is a metal "last forever" sanding device that sells under the name of 'Dragonskin.' For less than one buck you get the holder and a sheet of abrasive metal, the latter a stamped metal sheet much like a household cheese grater. Its advantages over conventional sandpaper is that it will remove material fast, yet not leave an excessively rough finish; it won't pack or clog up with sawdust; and when used on balsa, or other soft materials commonly employed on models, the sander will last a lifetime. Next time you have to sand a wing tip or engine cowling, try this tool. I think you'll be glad to have this dragon in your workshop. This idea by Dave Kovensky in the Carrier Wave. §

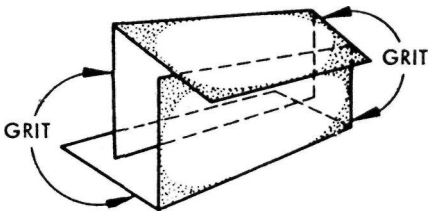
From the NAA Flightmasters comes this idea.

Ever wonder how to sand the top of a wing without going through the silk to the ribs? Simple — don't use sandpaper. Use a fine grade of steel wool, about 00 or 000 grade. Use it before and after all coats of dope, clear or color. It removes all those fine little bumps that create so much parasitic drag or skin friction, as well as marring an otherwise fine finish. §

The next time you have to sand a tail fillet, take a piece of pine of the right size and cut a slot similar to the one shown in the illustration (it can also be round or a deep V). Slot a dowel (or a piece of rounded wood that fits your slot) for the ends of your sandpaper. Submitted by John Dillon, 8448 E. Elkhorn Avenue, Selma, California 93662. §



Having trouble holding sandpaper when working with balsa forming? Try this idea of interleaving two sheets of sandpaper for a firm grip. It works! This idea submitted by Jerry Burpee.



GRAIN FILLER

Sanding sealer? Try mixing corn starch with your clear dope for an excellent sealer. It may be mixed to any consistency you wish. Submitted by Earl Farasy in the Sky Knights 'Roundtable.' §

Tom Alden of Vancouver, B.C., Canada, suggests what he considers the best method for filling balsa grain and smoothing the surface prior to covering or painting. The first step is to sand the surface flat and smooth with a block using 120 or 180 paper. Second, brush on a coat of Hobbypoxy Clear, or color; 30 minutes later brush on a second coat. Allow this to harden a minimum of 24 hours. The third step is to mix 1 part talcum powder with 1 part clear dope and 1 part thinner — Tom uses nitrate dope thinner. Brush on two coats, and again, let dry 24 hours. Finally, sand off all the powder with 180 or 240 grit paper used dry. Now you will see the advantage of the Hobbypoxy — it hardens the surface so that you can't break through to the bare wood unless you really work at it. If you used colored Hobbypoxy, a disappearance of color is evidence that you are sanding too much, but clear is satisfactory and is also a bit lighter than the pigmented enamel. A final coat of clear will seal the powder left in the grain pores. §

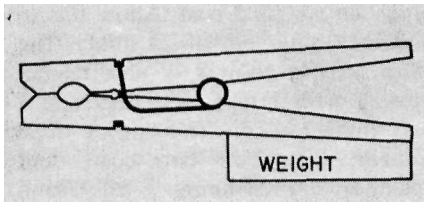
CUTTING SILK

Cutting silk has always been somewhat of a problem for Ted Pratt of Torrance, California. Cutting a straight line is not easy even with the

sharpest of scissors. Now these problems are solved by the use of a pair of battery operated vibrator-type scissors designed for cutting out dress materials. Ted bought a Japanese made unit (Spizors No. 600) that cost $2.88. The results of this inexpensive unit are quite fantastic since they cut through the silk like a hot knife through butter. Straight lines and small patches with beveled corners are easily cut with these electric scissors. Every modeler who uses silk and every hobby shop owner selling bulk silk should have a pair. They work equally well on Silron, nylon, etc. §

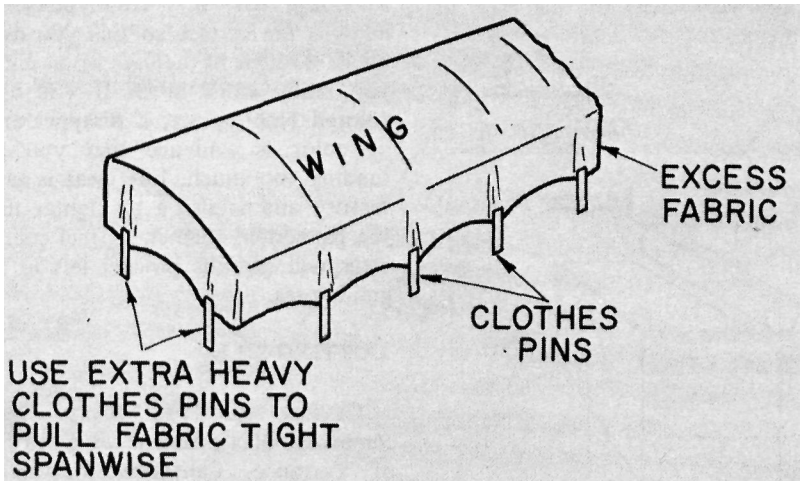
SILKING

If you're all thumbs when it comes to covering a wing, and you're tired of those areas where the silk seems to sag no matter what you do, this covering method from Dick Hill may help out. Simply obtain several household clothespin's and glue a weight to each shown in the sketch. The long rectangular automotive tire balancing weights are excellent for this purpose. Bar solder, cut the length, is also suitable. Dick finds that a dozen or so of these modified clothespins with at least two of them weighing 2 or 3 ozs. each, are a big aid when covering a wing. All you need to do is to lay the covering over the open framework and use the clothespin's to pull the fabric smooth. Believe it or not, even undercambered wings are a cinch. Once you have the wet fabric smoothed out over the entire framework, dope the material to the material in the conventional method. This idea from Dick Hill, "South Jersey Flyaways." §



SILKSPAN

D.C.G.C? Double Cross Grain Covering, the conventional covering of an aircraft structure with silkspan, plus an additional layer of the same material applied with the grain of the paper at right angles to the initial covering. In order to cut down the number of coats of dope and filler needed to fill the grain on porous materials such as silk and nylon while retaining the same strength factor, try covering your wing with GM weight silkspan with the grain running spanwise in the conventional method. Apply this first layer dry, then apply water to shrink the silkspan. Apply two coats of thinned dope to seal. Now cover the wing with a second layer of silkspan, the grain running chord-wise. This time, apply the silkspan wet. Apply one coat of dope and allow to dry. Finish off with one or more coats of clear dope. This method provides a wing structure that is as strong, or stronger, than the conventional silk covered wing, while eliminating much of the tedious work in clear doping and filing. In addition, weight is kept to a minimum, and repairs are much easier than with silk. From the McDonnell M.A.C. 'Carrier Wave.' §



MIXING DOPE & PAINT

One sure method of ascertaining that your dope is thoroughly mixed, or your two part epoxy paints are thoroughly stirred, is to take an 8" length of 1/16" music wire and make a one inch right angle bend in one end. This is then inserted into your electric drill. This handy stirrer can either be used manually, or in your shop drill press. Whichever way you prefer, it will thoroughly mix your paint in a fraction of the time that it would take to do by hand. This idea comes from Bill O'Brien of the RCM Staff. §

Pouring dope or paint from their containers is usually a mess, particularly in attempting to keep the paint out of the lid lip. Dan Corbett of Cincinnati, Ohio, suggests packing Kleenex-type tissue in the lip, which is discarded after you pour the necessary material from the can. §

SPRAY GUNS

Want to use a large spray outfit but only have a small quantity of paint or spray? Follow the suggestion of Major John D. Woods, of Mountain Home AFB, Idaho, and use a baby food jar small enough to slip into the mouth of the sprayer's cup. Punch a hole in the jar lid to accept the paint pick-up tube, fill the baby food jar with paint, and place it inside of the cup with the sprayers pick up tube in the baby food jar. Screw the cup on the gun and have at it! A rag under the baby food jar will help hold it up so that all but the very last drop or two of paint will be used. Clean-up is a snap — throw the baby food jar away and spray thinner through the gun. §

DOPE FINISHES

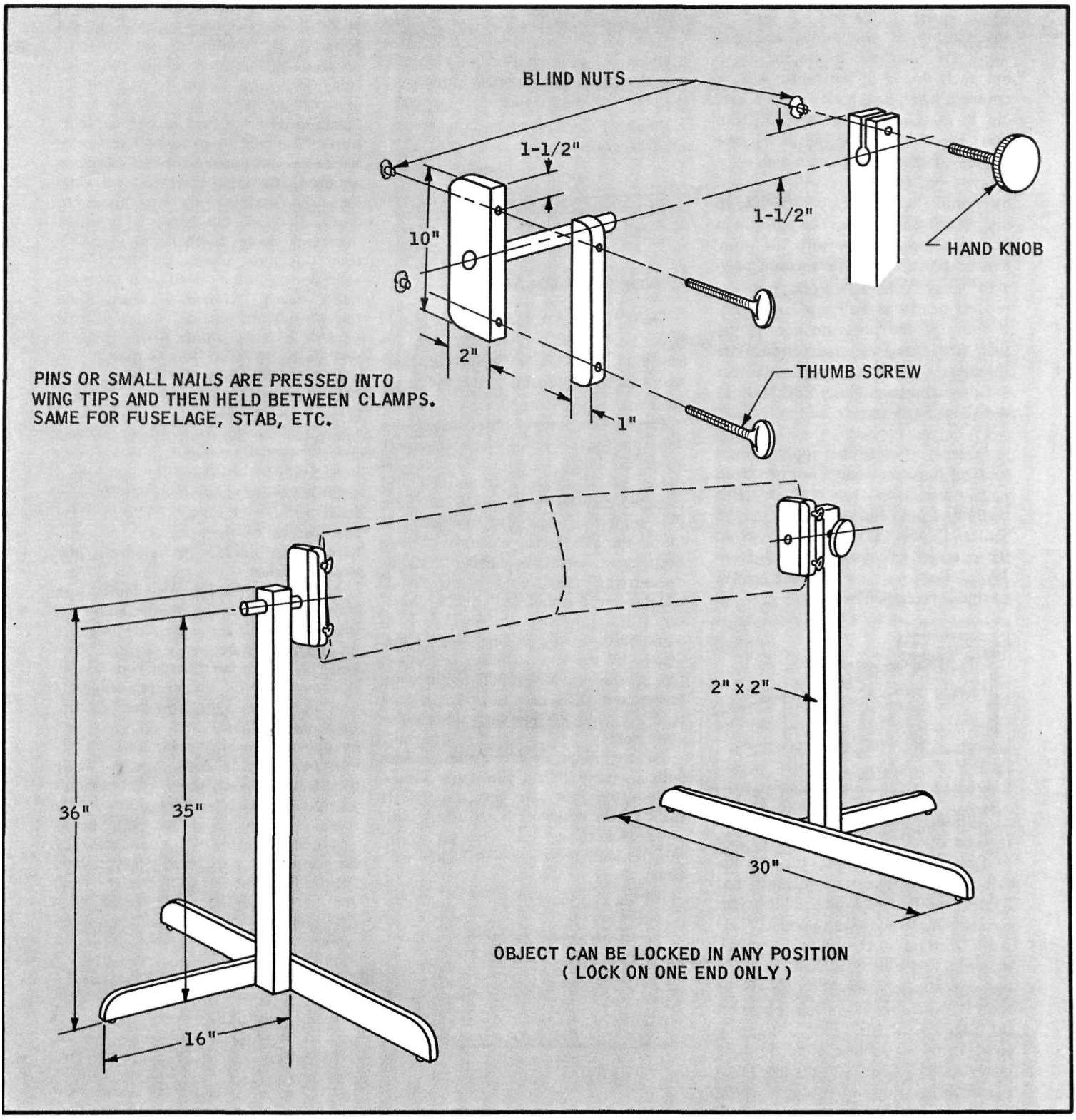
A few nail holes around the lip of your dope can will prevent the butyrate from building up and overflowing the sides. Make the holes large enough to allow the dope to drain back into the can. While on the subject of dope, you can give your paint job a deeper shine, as well as reducing the odor, by adding six drops of Oil of Wintergreen to every 4 ounces of color dope. This is available at most drugstores. From the Valley Forge Signal Seekers. §

PAINTING JIG

The drawings show the construction details for a simple, quickly built painting fixture, designed to simplify and speed up the painting of you R/C aircraft.

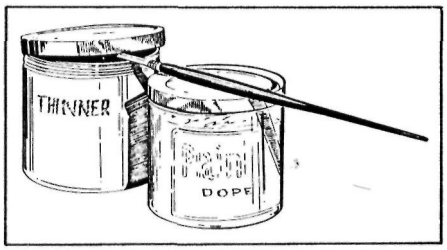
No special tools are required for this project since all parts can be cut to exact size by your local lumber yard for a nominal mill charge. If you have access to a table saw, the entire project can be built in an afternoon's time. All hardware items are readily available at local hardware stores.

When completed, straight pins or small nails are driven into wing tips, or front and rear of the fuselage, and then clamped between the revolving blocks mounted on the tripods. The fixture enables you to paint an object in one session instead of waiting for one side to dry before being able to turn it over and paint the other side. An additional bonus is that the angle of the item to be painted can be adjusted to the desired deflection for proper spray application. The lock insures that the object will not rotate while being painted. §

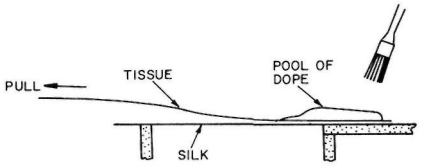


In the past there have been numerous suggestions concerning doping silk and nylon so that the initial coats of dope will not run through and spoil a smooth finish by building up on the inside surface of the fabric. The method described here was discovered by accident when I first began to use my spray gun for doping. Using a spray gun, or aerosol dope can, give the surface four or five quick, thin coats of dope. This will not produce any closing of the pores, and you won't even be able to see the dope, but each thread in the fabric will be covered. Now, take a clean soft brush, dip it in thinner, and rapidly brush over the fabric. The result is like magic — if there has been enough dope sprayed on, every pore will be closed by a thin film of dope which is soon dry. The finish may now be built up in your usual way either with the spray gun or brush. The little vacuum powered spray gun will work for this process nearly as well as a larger gun. If some of the pores do not fill the first time, spray the area a little more and then apply thinner again. Perfect results guaranteed. From Carl Mohs in the Marcs Sparks. §

When you need to apply several coats of dope and don't want to clean your brush after each coat, try this method from Jerry Burpee in the Central Illinois 'Sirs.' The fumes from the open jar will keep the brush from drying. Dope or thinner in the jar will be fine — no home brew! §



Although we haven't tried this method ourselves, Capt. Will Mitchell of Oklahoma City, Okla., suggests the following as the easiest, quickest, and lightest method of doping silk; it also covers completely with one thin coat! Will's method is to tear off approximately 8" of toilet tissue of the single ply, cheap variety. Lay it on the silk so that the torn edge extends just beyond the edge of the silk towards the wing root. Using unthinned dope, brush a heavy pool of dope onto the last 1" of the tissue right up to the edge near the wing root. Now, gently start pulling the tissue forward toward the wing tips, leaving a trail of dope behind. Replenish the pool of dope as it is depleted, being most careful not to let the brush touch the silk or the dope will run through the silk at that point. The idea is not to brush the dope through the paper but rather to let the tissue paper work as a brush. According to Will, you'll find you can even repair 1/4" wide splits in silk this way without using a silk patch! The weight is about 1/3 of a barely filled piece of silk that was simply brush doped in the conventional manner. §



MONOKOTE & SOLARFILM

Based on the number of questions I have been asked after covering my Sunfli IV with Super MonoKote, there seems to be quite a bit of interest in the stuff.

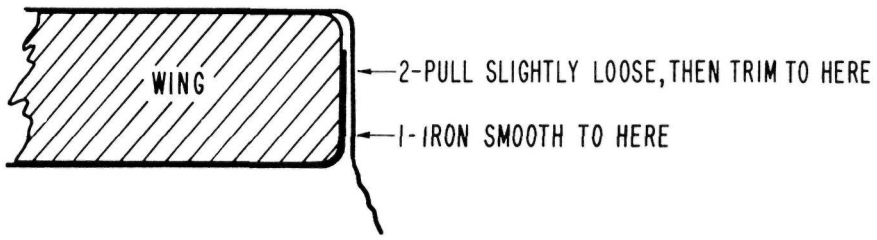
First a few general observations and opinions. Super MonoKote is *extremely light;* the total weight difference between bar structure and finished and trimmed airplane is 4 to 4-1/2 oz. Yes, it is somewhat expensive, the job cost me about $16.00 for a shiny, easy to keep clean, attractive finish. It stands up extremely well, even in the 98° F weather we encountered at Cal- Western. It is highly superior, particularly in workability, to the original MonoKote, which, by the way, still has it's place. No, it's not too difficult to work with, however it does take a *little* patience to get a good job but then what finish does not?

Do NOT dope or prime the surfaces with anything. When you apply MonoKote using heat, air gets trapped. If the surfaces underneath are sealed, this air cannot escape and you get a bad job. Besides, the dope will blister with heat.

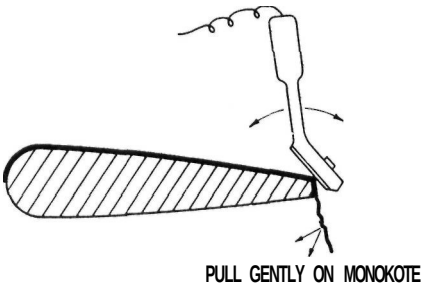
First, READ THE INSTRUCTIONS that come with the Super MonoKote (ask for a copy if you don't see it on the roll). Second, FOLLOW THOSE INSTRUCTIONS. I know of several wonderful friends and fliers (one in particular, but I'm not going to mention names) who, either out of habit or contrary nature, insist on ignoring these two items!

Do the primary flight surfaces first, such as the rudder and elevator, in order to get the hang of it. I do not recommend "wrapping" the material around, but use one chunk on each side. Two irons seem to work best: one regular "wife-type", and one small "tacking iron" as used in photography, also in Butcher Shops to heat seal meat packages. Cut out a piece of MonoKote about 1" to 1-1/2" larger on all sides than the surface you are about to cover. Peel off the backing, position, then tack down (with small iron) all four sides, or edges, just as if you were doping down the edges of silkspan when covering an open structure. Since the MonoKote shrinks when heat is applied, it takes a little patience to do this neatly. Try to gently tighten the material as you do this operation, get into it as smooth as possible, using the small iron. Remember, you are using one piece for the top surface and one for the bottom, which means the two will have to overlap. For minimum seam visibility cover the bottom surfaces first. (By the way, I like to cover the surface of the iron with a handkerchief or similar thin cloth to prevent scratches.)

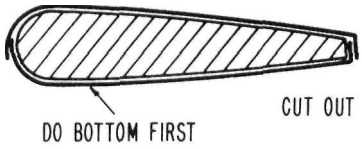
Now, then, apply the large iron slowly, starting in the middle and moving out towards the edges. No pressure on the iron is necessary, except when you get a large air bubble you "press" this out towards the nearest edge. If you have the right iron temperature (see instructions!) the material will change to a darker color (which disappears when it cools again). Since the MonoKote only shrinks and adheres where the heat is applied, you will see some very interesting, soft wrinkles as you complete this step, however they do come out, particularly if you help them a little bit out by the edges (pull gently). Now switch back to the small iron and work the material around the



edges. (See sketches). When working

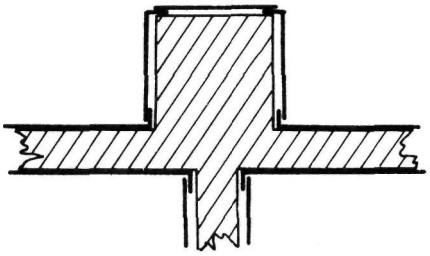


these edges (and tips), *roll* the iron over the edge while you pull. Unless you have cut the MonoKote generously, blisters on the fingertips are somewhat unavoidable at this point. If you don't get them, you are either: (a) wasting a lot of material, (b) don't have the iron hot enough, or (c) a heck of a lot better at it than I am!

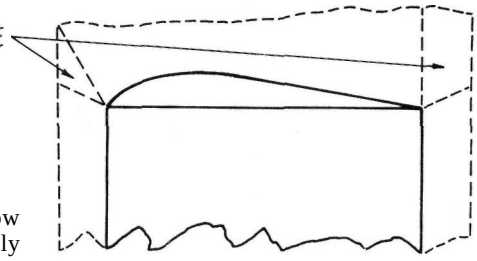


At the tips I really found out how great the new stuff is. By patiently heating, pulling and reheating, it actually does go around compound curves. Miraculously the adhesive (and color) does NOT separate from the mylar base even with repeated "reheatings". There is also very little bleed of the gooey stuff. You can get a smoother tip by working the material further around than intended, then pulling slightly loose and trimming where originally planned, followed by sealing the edge down again. (See sketch.) By the way, when sealing overlapped edges (with the small iron), use a little pressure. The tiny little bit of goo that seeps out can later be removed with a rag DAMPENED with dope thinner. Seams are almost invisible. I also found that trimming off the excess was easier with a razor blade than an Xacto knife or scalpel.

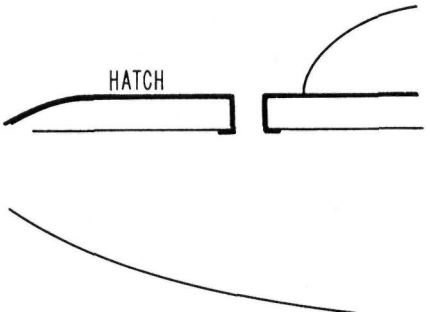
After you have finished the rudder, elevator, etc., do the wing next. Even if you have a perfectly straight wing (no dihedral, no sweep or taper), use FOUR pieces of MonoKote: a top and a bottom piece for each wing half with a lap in the dihedral joint. Follow instructions! I have only covered a fully planked wing, but I recently saw an open bay structure that looked quite good. I managed to get the large iron a little too hot while covering the bottom of the wing resulting in a dime sized hole. After uttering appropriate unprintable words, I found that a small patch applied with the small iron worked out great. Sure, it's visible as a patch (just), but so? Obviously after covering the bottom of a wing half, you trim off all excess MonoKote and reseal the edges before proceeding to cover the top. *Always* reseal any edge after a trim cut has been made.



When covering the fuselage, follow instructions! First do the bottom, then the top of the stab with an overlap on

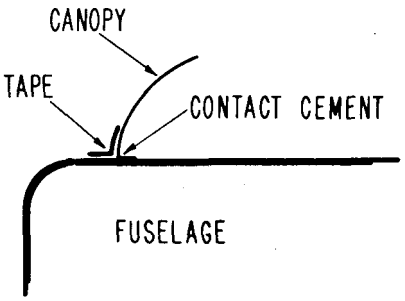


fuselage and rudder. (See sketch) As for the fuselage proper, follow instructions! (Anyone care for a broken phone record?!) I obtained good results by using two pieces with a joint down the center on the top of the fuselage subsequently covering the joint with a contrasting piece of trim. If there is a hatch, cover separately as shown in the sketch, otherwise the edges would



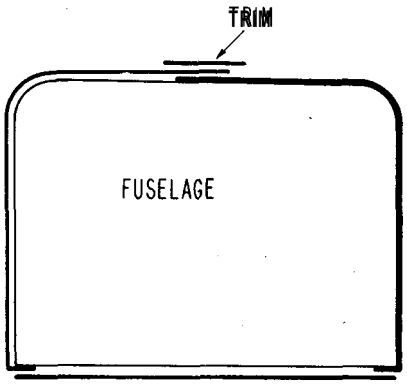
eventually lift. Inside the engine compartment where it could be almost impossible to do a neat job, finish (and fuel proof) with either matching color dope or HobbyPoxy paint. (HobbyPoxy stock color matches MonoKote almost perfectly).

For installation of the canopy the only glue I found that would stick was contact cement. After the standard

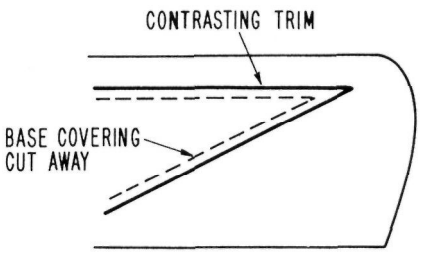


technique of fitting the canopy to fuselage, trace the outline of the canopy on the MonoKote with a sharp pencil. Lay a thin bead of cement on the line and on the canopy, wait till dry, then set on the fuselage and hope you're right the first time! Next cut a long strip of electrical tape in half, lengthwise and apply to the joint as per the sketch. Note: Do not stretch tape! Must lay it in the joint.

The final step is putting on the trim. Yep, that's right, follow instructions! I use both techniques, one on the wing and one on the stab. For large areas



I prefer to remove the base covering, then apply contrasting trim about 1/2" larger all the way around than the hole. If you do not cut this away, the air trapped between the two layers cannot escape, result: big bubble and wrinkles. Be sure to tack down all the edges FIRST before you "glue" the rest of the patch down. On the stab and fin make a sieve of the base covering where the trim is to go by pricking a lot of holes with a large pin. Narrow strips, stripes, etc. is easier to handle if cut from regular "old fashioned" MonoKote. §



For What It's Worth

Laird Stanton, Beeville, Texas, has come up with an excellent method for the application of Super MonoKote to either open, or sheeted balsa structures. First tack the MonoKote snugly around the edges with an iron according to standard instructions. Then, slowly go over the entire surface with a photographic reflector floodlamp using 1/2" to 1/4" clearance between the rim of the flood and the MonoKoted surface. As well as giving even shrinkage, this method solves three other problems normally encountered in this type of covering: (1) it doesn't cause scratches on the MonoKote, as usually happens with an iron, (2) it cannot press the covering material into the grain of unfinished sheeting or spars, and (3) it does not cause any bubbling between the MonoKote and fully sheeted areas. Laird has been using a 150 watt indoor type reflector flood bulb mounted in a spring clip socket which gives a four inch effective width on each pass, and is currently looking for a 250-300 watt reflector flood or infrared heat bulb to speed up the process by increasing the effective width and allowing a greater clearance from the material. The reflector floods are available for less than five dollars at any camera store. §

Howard Hupe, Mountain View, California, suggests using butyrate thinner to remove the excess adhesive that squeezes out along the seams on Super MonoKote, as well as that which adheres to the iron. The thinner will not hurt the MonoKote but should be used very sparingly, applied with a clean rag, and wiped dry immediately to avoid softening the adhesive on exposed edges. Do not wipe the iron with thinner until it has cooled sufficiently. §

Having used Super MonoKote on all sorts of planes with great success, we still have come up with one problem with this material in the hot weather experienced in Tucson, Arizona, according to Roger Claude. After a wing is properly covered it is virtually air-tight. The hot air, trapped inside open bays, expands and they look as though they will burst. Rogers solution is this; stack all your wing ribs and drill a small hole through the entire pile. Once the wing is covered, pin prick the bay closest to the wing tip and the wing can then "breathe."

HOBBYPOXY ENAMEL

There are three basic factors that aid the builder in gathering more appearance points: **1) Craftsmanship 2) Design and trim 3) The Paint job.** The **NMPRA** encourages modelers **NOT** to trim their models like the real ones. Each model can be painted and trimmed to suit the modelers preference. At contests, many models are seen that are well finished with only a simple one-color paint job. Perhaps a well-built and well-trimmed plane would add to the owners pride even if the additional points gathered would be hardly evident. In this article, an attempt is made to cover the finishing of the plane, although the paint job will never be any better than the basic building job.

MATERIALS: Starcast resin, Hobypoxy (colored and White), Auto primer and paste, lacquer thinner, tac-rag, 320 garnet paper, 400 and 600 wet-or-dry paper, 1/2 and 3/4 inch width masking tape, and degreaser.

EQUIPMENT: Compressor, diaphram or piston type capable of producing 2-1/2 to 3 cubic ft. per minute at 30 to 40 lbs. pressure. Spray gun, DeVilbiss model EGA-502 with 390F nozzle.

WOOD PREPARATION: After sanding, coat the balsa with two coats of "Starcast" coating resin. Allow the first coat to dry well before the application of the second coat. Be sure to stir the wax that has settled and shake the can to mix well. Sand the resin with the garnet paper, avoid sanding through the resin.

FIBERGLASS PREPARATION: Fiber-glass needs to be roughened with 400 wet-or-dry prior to painting.

PRIMING: Mask off the windshield and spray on a coat of auto body grey primer. This will reveal all your "boo boos". Fill the holes with auto primer paste over the primer coat. Sand the entire plane free of any primer with the 400 and 600 wet-or-dry paper. Repeat this process until all the holes are filled with either primer or paste. CAUTION — do not leave any unnecessary primer on the plane as it is very heavy. The paint will stick without the primer base. If by accident, you have sanded through the primer and resin (very obvious at this point) it can be corrected.

CLEANING THE MODEL: Using your compressor, blow air into all open parts of your plane. All dust needs to be removed now so that it won't be imbedded in your paint later. Wipe your plane with a degreaser solution and allow it to hang and dry. Just before painting, the final cleaning is done with a "tack" rag. Don't underestimate the value of this 35c item.

MIXING THE HOBBYPOXY PAINT: Mix the two parts and allow to settle for 1 hour prior to thinning. This can be rushed by placing the container (lid off) in boiling water for several minutes. THIN the mixture to suit your gun. I use an equal amount of thinner to my mixed Hobbypoxy because my gun shoots a finely atomized spray. Experiment with the combination until your gun "whistles" when spraying. Avoid "orange peel" by adding thinner.

SPRAYING: If you spray outside, pick the best time of day, to avoid wind, dust, and excessive moisture. You may find this hard to believe, but I spray mostly after dark with light coming through the glass doors. When you get used to the sound of your gun, good light isn't always necessary. Of course, it is preferable to have a spray booth and good lighting.

"Fog" your first coat and hang each part to dry where the smallest surface is exposed to catching dust. All drying should occur in the room where the least dust exists. The second coat can be applied almost immediately after the previous part has been hung to dry. Continue to apply the necessary coats until a nice "rich" color appears. Allow each coat to dry to a "tacky" touch before the next coat is applied. Best colors are obtained by always having a white base before applying the color.

MASKING: I like to design and mask my planes for several colors. Designs should be well thought-out prior to the masking operation. Use good clean masking tape. Run your fingernail along the edge exposed to paint to make it seal. Use a light first coat and let dry. A good building job is worth a good paint job with good equipment.

After six weeks of repairing and finishing operations the Square Hawk

IV is airborne once again. The finish was a bit unusual, but it does look good if I do say so myself. Used Hobbypoxy - BRUSHED! It can be done, relatively simply. Here's my technique.

Two coats butyrate clear over balsa, with light sanding between coats. Layer of Silkspan, two coats clear, sanding between coats, followed by another layer of Silkspan 90 degrees to the original layer. Two more coats clear with usual sanding. Incidentally, I wait 24 hours between coats of dope. Now the filling operation.

Thin Hobbypoxy Stuff with acetone (yes it is compatible) and brush on. Let dry a day then sand to a grain-free surface with Sears extra fine no-load silicon carbide paper. Now wait 72 hours before using Hobbypoxy color.

Mix color as directed, use tack cloth on surface. I did the underside of the wing one day, topside the next, and so on. One brushed coat of the light colors isn't sufficient to give a deep full coverage so plan on three coats of white or yellow. Don't worry about the dust you pick up on the surface. After allowing 48 hours drying time at room temperature give the surface a light extra fine sanding before applying succeeding coat. After the final coat drys for 48 hours use automobile rubbing compound to take down the sheen and eliminate dust particles.

For trim, use low stick masks and apply color as before (my green trim stripes were only one coat applications). After the trim is dry give it the rubbing compound treatment also. Use Shell Furniture Polish to impart a satin depth to the surface. And that's it. May sound like a lot of work, but it really isn't, especially considering use of a brush. Spraying would be much better of course, since only one spray coat of even the lightest color will give adequate coverage. Hobbypoxy can be brushed — successfully — and relatively simply. Why don't you give it a try once yourself. — Lou Guerrieri in the Pioneer R/C Club 'Modulator.' §

Unless proper procedures are followed, adhesion problems may occur when using Hobbypoxy over clear doped areas. Be sure to remove high gloss from the doped surface before applying Hobbypoxy. Make sure that the dope has been allowed to dry 72 hours before application of this material. Mix the Hobbypoxy 45 minutes prior to application and be sure that temperature and humidity are reasonable. When masking, keep the cellophane and masking tape which adheres to the Hobbypoxy surface to a minimum — never more than 1/4 inch. Remove the tape while the trim colors are still wet by pulling back over the tape and not lifting straight up. You will find that black electricians plastic tape works extremely well and will permit masking for curves. From the Twin City Whirlwinds. §

ACRYLIC LACQUER

Fellas, this may sound like a helluva long method to achieve a beautiful finish on your aircraft, but time-wise it takes about 8 days overall. While you're out in the boondocks flying your No. 1 Pride and Joy and making like the hottest Pattern man in the world, you can be thinking about dashing madly home and getting your hot little hands on the job you have sitting in the cellar waiting to be completed. That is, if you don't bash the one that is now cavorting around like an angry bee over your head!!! Naturally you will repair it, you will repaint it, you will re-equip same, should you make like a mole with a 100 ft. loop from 90 feet!

But now back to how to do what we started out to do. Your P & J is completed, silked and approximately 5 coats of clear dope have been applied. **(Easy, Wasn't it? Only took 4 months, 3 weeks, 7 hours, 15 minutes & 11 seconds to get this far!!)**

Patience guys — the next week will drive you out of your tree. OK, here we go:

1) Sand the entire aircraft with 320 grit paper — **like, keep it soaking wet.**

2) Brush or spray 2 coats of thinned DuPont lacquer primer on your P & J after making certain the bird is thoroughly dry. Allow **1 hour** between each coat.

3) Wet sand again with 320 grit paper — finish so it's glass smooth.

4) Wipe entire bird with "DuPont Prep-Sol". This removes oil, grease, fingerprints & probably part of your finger meat!

5) Now get on it with your "Tac Rag" available from automotive supply houses or from your friendly hobby dealer.

6) Now grab your DuPont lacquer, (color choice is yours) and add two (2) tablespoons of castor **oil (Yup the same kind as you know what)** per **pint** of lacquer. **Dissolve the castor oil in the thinner first, then add this glop to your color lacquer. Strain same thru a piece of cheese cloth. It makes the spraying or brushing much easier.**

7) Spray about 12" away from your bird **(the aircraft ya dope, not your girlfriend)** very lightly, just wetting the surface. Apply about 4 or 5 coats, **a** little heavier each time. Allow about 10 minutes between each coat.

8) Now go upstairs, neck with your wife or girlfriend, mix a bowlful of strong martinis, and you may have a wonderful evening from here on in, because you are going to let what you have just done **on** your aircraft **dry thoroughly for the next 24 to 48 hours.**

9) **A** day or two later, depending on how anxious you are to get to your bird, darn it, aircraft, get on it with the 600 paper — **wet, wet, wet!!!**

10) Now make sure the aircraft is really dry, even in all those small nooks & corners. Blow it off with the vacuum cleaner hose. **(The other end ya meathead).**

11) Now you can mask off to your hearts content for the trim color. Make certain you seal all the masking tape edges with clear lacquer sprayed on.

12) Now spray the trim color on & once again **leave the whole mess as it is overnight (24 hours, man).**

13) Yep, as usual, a bad luck number. **Slowly, but slowly remove the masking tape by peeling it back over itself so as not to destroy the edges of your trim color.**

14) Back to good luck #s. **Wet sand the trimmed area very lightly with 600 paper, wipe down with your tac rag again to eliminate any dust still hanging in there, and spray one coat of clear lacquer, medium to** heavy, **over entire aircraft.** (That time I called it right, tonight I forgot about "Birds" almost). Now go upstairs and do the same routine with your wife or GF as you did 3 nights ago (same routine, but it can be a different "bird"). This whole smear is going to have to dry for another 24 to 48 hours.

15) On your way home from work, pick up a can of DuPont White Rubbing compound, a bouquet of flowers for you know who, or whom,

or whatever, cause you are gonna be in that cellar for a couple of hours making with the muscles while you rub down your P & J (your B.W. should be so lucky). Get on it with the muscles you will now find out you haven't used for a heck of a long time. Boy, are you gonna be sore armed tomorrow!! Rub that aircraft with a soft cloth you swiped from your wife, until every bit of rubbing compound is on the cloth and not the bird. Rub it over with your sweaty fingertips to check for smoothness. **Not satisfied??** Rub it all over again with the compound. Now go upstairs again and leave the P & J buried on the workbench. You will now need an arm rubdown to get you in shape to go to bed, and to work tomorrow morning!!

16) The next night, if you have recuperated from last night, go bury yourself in the cellar again with a can of DuPont Paste Wax which you have purchased on your way home from that so-called job. Rub the aircraft gently but firmly, until she sparkles like you can't stand it!! Now back up to admire your handiwork, crunch that spare wing you had on the floor and forgot about, with your size 12.

17) And get the devil out of that Black Hole Of Calcutta (unless it happens to be the Calcutta preceded by OH in which case stay!) known as the cellar, and upstairs to the couch. Lie down quickly, phone your head shrink quickly and make an appointment (or 3 or 4) and try to figure out why you ever got into this hobby in the first place! §

DOPE-ACRYLIC

Another method of finishing your model aircraft was gleaned from the Imperial Aces Newsletter. As reported in that publication, two club members finished their last aircraft with the dope-acrylic methods recently outlined, but varying in several points. For those interested in following the procedures used to obtain an excellent finish, here is one method: (1) models were prepared with regular dope-silk finish with a coat of Sig Superfill (2) DuPont Acrylic Filler-Primer sprayed on (3) Acrylic dope was the next step and can be mixed either 50 percent dope to 50 percent acrylic lacquer, or two thirds dope and 1/3 acrylic lacquer. There appeared to be little difference in appearance by using either method. (4) 400 & 600 wet-or-dry sandpaper was used to smooth down the paint. (5) Go over the entire paint job with DuPont 101 lacquer rubbing compound to cap off a beautiful finish.

Note: Do not **brush** pure dope over acrylic lacquer. Dope can be carefully sprayed over acrylic, however. §

DECALS

In case you are wondering how to get your decals to stick well on Super MonoKote, the trick is to put a slight amount of acetone on a cloth and rub well into the area into which you are going to place your decal. Make sure that there are no droplets of acetone left on the MonoKote; then place your decal on in the usual way, rubbing out the air bubbles. According to Wally Hurley of Fremont, California, who uses this method, the acetone vapors under the decal dissolves the decal just enough to make it really bond to the MonoKote. Wally has used this method on his scale Nieuport since May of 1969 with almost weekly cleanings of about 50 flights worth and it's still as strong as ever. §

Fuelproofing decals. For those of you that want to seal a decal comes this suggestion from the Illinois R/C Association. Try a product called Styrene Spray paint, manufactured by 410M with a code number of S-50, Clear Gloss. This product was made for the model train enthusiasts and can be found in most hobby shops for 89¢ Dope your plane in the usual fashion, add decals, then spray with Styrene Spray — you will find that it seals the decal from hot fuel, etc. §

Since RCM has been giving away its decals, we've noticed a great number have been applied improperly. The "sticking power" of any decal is only as good as its initial application. Here's the proper way to apply any decal:

Soak the decal until it slides easily on its backing sheet. Next, slide one end until it extends a slight distance beyond the backing sheet. Now, hold this end down in place on the surface to which it is to be applied, then lower the decal into final position by sliding the backing sheet away from the decal. When it is in place, smooth it down and remove all trapped water bubbles by using a small piece of blotter material, such as a scrap of desk blotter. The latter will insure a good, smooth bond. Be sure to thoroughly rub all edges with the piece of blotter. Idea by Bill O'Brien, RCM Staff. §

CONTACT SHELF PAPER

While wondering how to paint his AMA numbers on a recently finished Kwik-Fli III, Gene DeCook of Canandaigua, New York, decided to make a mask from some unused contact shelf paper. Using a commercial lettering guide or stencil, Gene traced the numbers onto the contact paper, then cut the number^ out with a small X-Acto knife, saving the centers of the 8 and the 4 in his AMA number. The guideline used for tracing and spacing the numbers can also be used for aligning the stencil on the wing. Gene then pressed the stencil on the wing and placed the center portions of the 4 and 8 in place and used clear dope to seal the edges before spraying on his color. The whole operation took about thirty minutes from tracing to peeling the stencil from the wing. Thus, he arrived at an easy way of masking off accurate numbers without using decals. §

While on the subject of covering materials, John Whitney of Reno, Nevada, finds that contact shelf paper cannot be sealed with an iron as the melting point is too low. The best solution is the hot air provided from a hand held hair dryer. After heating the plastic, smooth it over the balsa with your hand. Heat applied in this manner will also sufficiently shrink the plastic covering over open framework. On planking, such as fuselage sides, the plastic will actually fuse itself into the grain of the wood. John has used this method on an all-foam ARF plane with excellent results. §

MASKING FINISHES

If you have ever masked off over a fresh painted model only to have the tape destroy your paint job when removed, you will appreciate this suggestion from Tom Mitchell of So. Charleston, W. Virginia. Tom uses Johnson & Johnson Dermicel Tape. This holds tightly to any clean surface but will not damage the finish when it is removed. This is also an excellent material for holding parts together for gluing or repairing. §

VI FIELD EQUIPMENT AND ACCESSORIES

BUILDING A FIELD BOX

Most of us have flown RC for many years and have never had a field box specifically constructed for our usage. I spent some time researching field boxes for both size and shape as well as a study on what should be carried in them. The goal was to design an easily constructed field box that would take care of the requirements of the average RC flyer. After making notes and observations, here are my recommendations.

All wood parts should be cut on a power saw for accuracy and assembled in the order of the index numbers down in the illustrations. Assemble the plywood with white glue and 1-1/4 inch finishing nails. After assembly, drive the nail heads below the surface of the wood with a nail punch, fill the holes with plastic wood, and sand. Fill the holes in the edges of the plywood with plastic wood and sand smooth.

Support block (7) and lid mount (8) are centered from the outside dimensions of the box. Lids (12) are attached to lid mount (8) with 6 each 1-1/2 inch brass hinges (3 per lid). Door (13) is attached to door mount (6) with one continuous hinge. Excellent attachment hardware for lid and door hinges are 4-40 countersunk brass bolts with 4-40 model aircraft blind nuts. Lids (12) do not require latches. Door latch assembly (15) may be substituted with any standard external type latch. Remove all hardware, sand, and spray paint box, door, and lids with 5 coats of enamel. Sand between coats. Folding legs may be added to the box so that the door (13) can be used as a field work bench.

LIST OF PARTS

(1) Dividers (2 ea.) 11-3/8 x 7-1/2 x 3/8 plywood
(2) Floors (2 ea.) - 17 x 7-1/2 x 3/8 plywood
(3) Ends (2 ea.) - 14-1/2 x 7-1/2 x 3/8 plywood
(4) Back - 17-3/4 x 14-1/2 x 1/4 plywood
(5) Front Piece - 17-3/4 x 2-3/4 x 3/8 plywood
(6) Door Mount - 17-3/4 x 1-1/8 x 3/8 plywood
(7) Support Block - 4-5/8 x 2-3/8 x 3/4 maple (see Detail A)
(8) Lid Mount - 17-3/4 x 1 x 1/4 plywood
(9) Gussets (2ea.) - 1/2 *x 1/2* x 1 (glue in place)
(10) Plastic Folding Handle (see Detail A) (available Central Hardware)
(11) Shelf - 4-1/4 x 7-1/2 x 1/4 plywood
(12) Lids (2 ea.) - 17-3/4 x 3-17/32 x 1/4 plywood
(13) Door - 17-3/4 x 10-9/16 x 3/8 plywood
(14) Door Support Chains (2 ea.) 10-3/4 length (4 ea. 3/8 inch attach screws)
(15) Door Latch Assembly (see Detail B)

Note: Use a good grade of unwarped plywood.

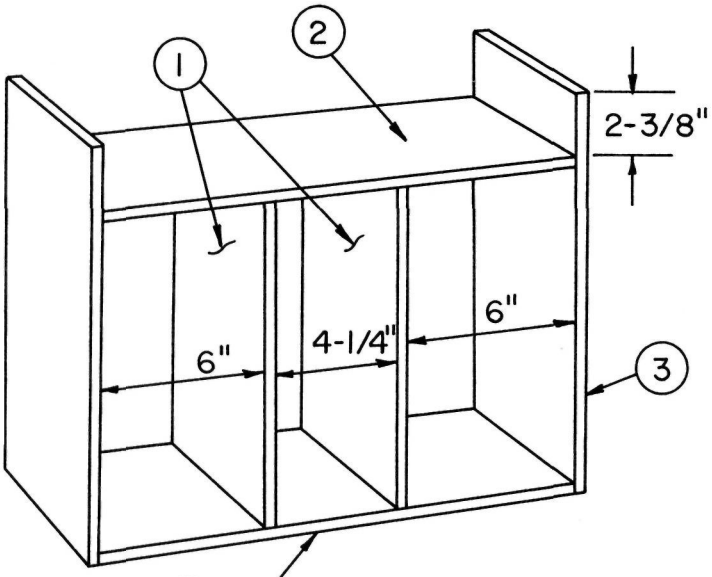
FIELD BOX EQUIPMENT

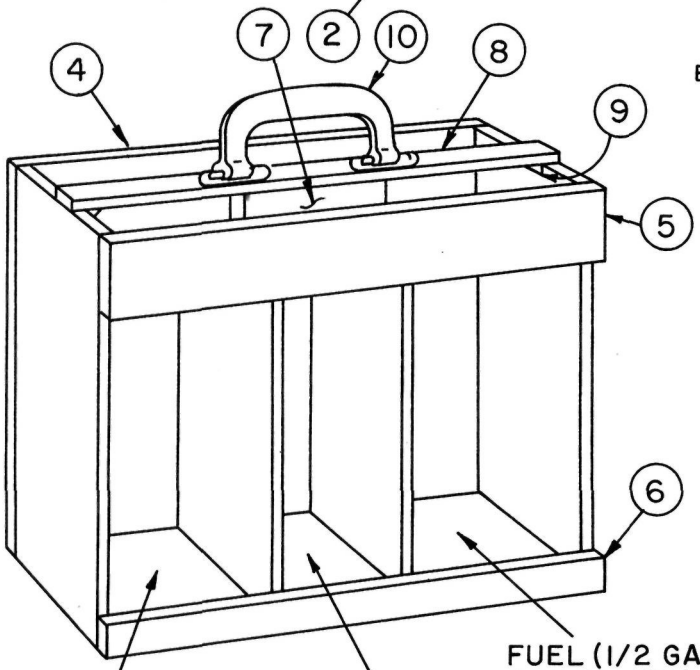
The following is a list of recommended articles to be carried in a RC field box. The list can be altered to fit the specific needs of each flyer. The equipment listed for Trouble and Limited Field Repair is intended for use during overnight trips away from home base or attending a contest. Also, certain items in the list may be carried as standard operating equipment.

Standard Operating Equipment
Transmitter
Transmitter Antenna
Starting Battery and Clip Lead
Fuel
Fuel Filling Equipment
Fuel Primer Squirt Bottle
Attachment Rubber Bands or Nylon Screws
Spare Props
Spare Prop Nuts
Prop Nut Wrench
Chicken Finger
Spare Glo Plugs
Glo Plug Wrench
Flight Log Book
Pencil
Spray Cleaner
Package of Handi-Wipes
Mosquito Repellent
Simple First Aid Kit
AMA Rule Book & Membership Card

Trouble and Limited Field Repair Equipment
6 **in.** Standard Screwdriver
4 in. Standard Screwdriver
6 in. Phillips Screwdriver
6 in. Flat File
6 in. Rat Tail File
4 in. Crescent Wrench
Long Nose Pliers
Tweezers
Scissors
Small Awl
Small Ball Peen Hammer (2 oz.)
Yankee Screwdriver with Assorted Drill Bits (or eggbeater type)
12 Volt Soldering Iron
Solder
Assorted Size Insulated Wire
Assorted Size Solid Bare Wire
Plastic Electrical Tape
Double Sided Mounting Tape
X-Acto Knife or Pocket Knife
Razor Blades
Field Strength Meter
Multimeter and Test Leads
Battery Charger
Spare Engine Gasket Set
Spare Fuel Filter
Spare Engine Mounting Bolts
Assorted Small Brass Tubing
Fuel Line Tubing
Assorted Linkage Hardware
Straight Pins
Spool of Button Thread
Assorted Small Washers
Assorted Small Sheet Metal Screws
Assorted Small Nuts and Bolts
Assorted Music Wire
Assorted Scrap Balsa
Assorted Scrap Plywood
Small Bottle White Glue
Small Bottle Contact Cement
Scrap Silk or MonoKote
Small Bottle Dope (Clear or Colored)
Dope Brush
Small Bottle Dope Thinner
Small Bottle Cleaning Alcohol
Sandpaper
Spare Hardware Peculiar to your Model §

FOLLOW THIS STEP-BY-STEP, NUMBERED CONSTRUCTION SEQUENCE IN BUILDING A FIELD BOX DESIGNED TO MEET YOUR REQUIREMENTS.

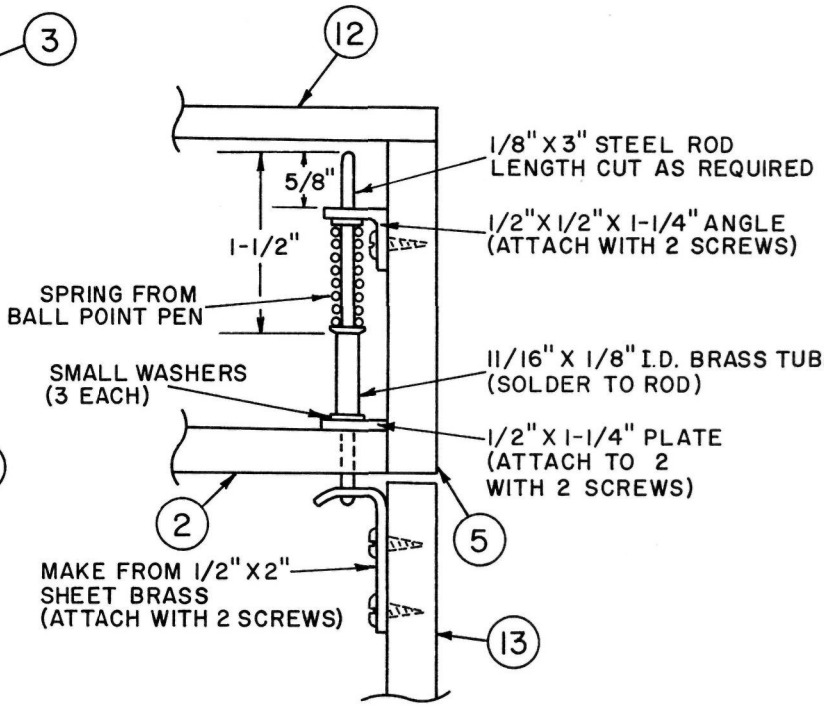




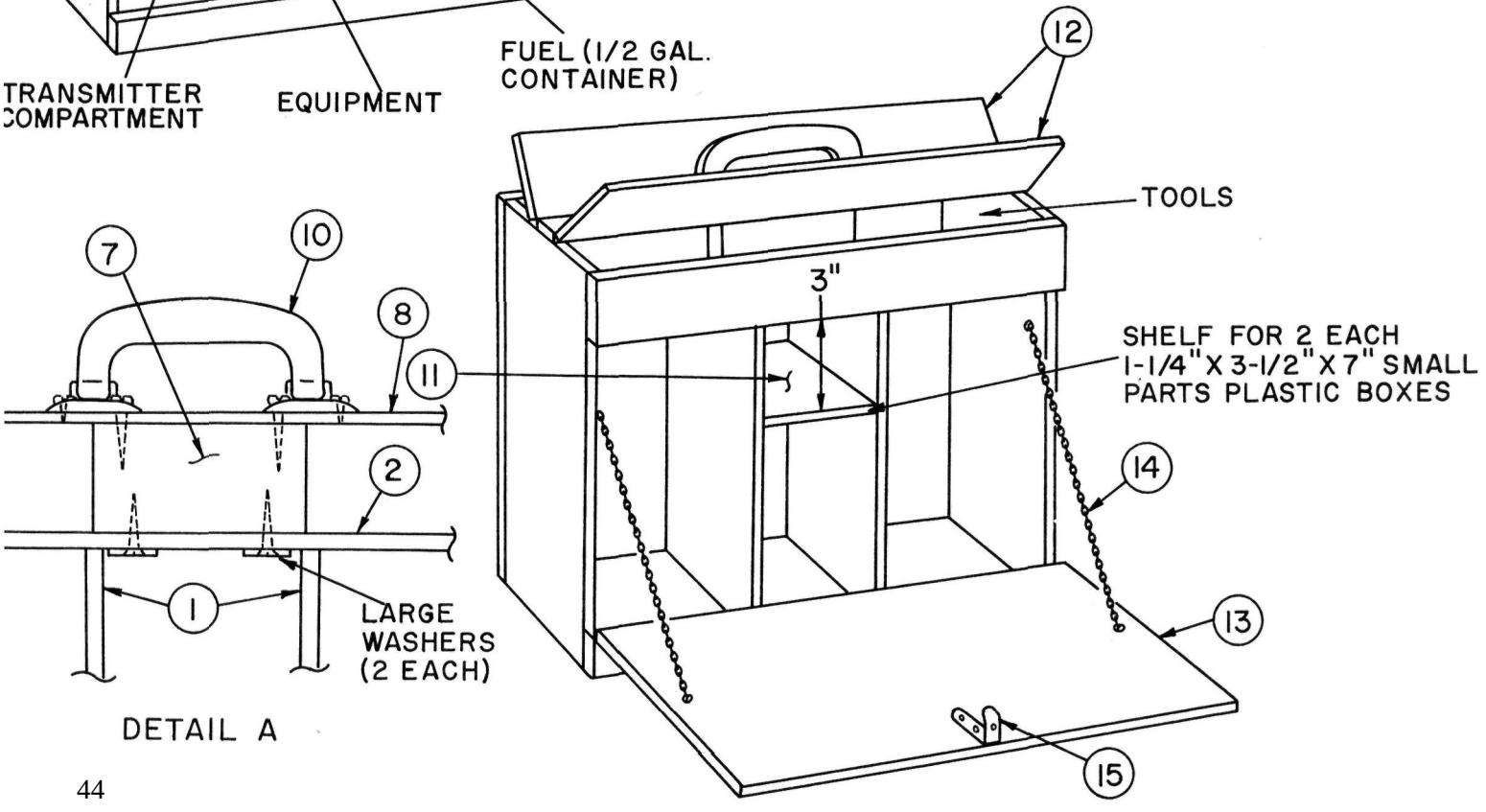
TRANSMITTER COMPARTMENT

EQUIPMENT

FUEL (1/2 GAL. CONTAINER)



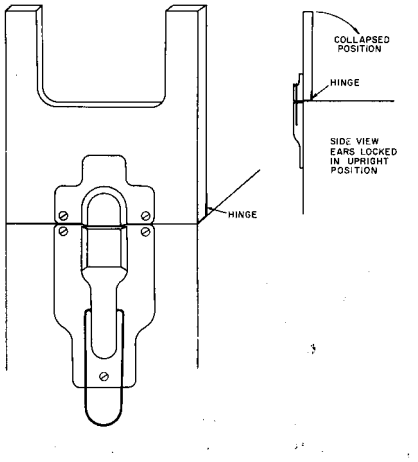
DETAIL B
DOOR LATCH ASSEMBLY

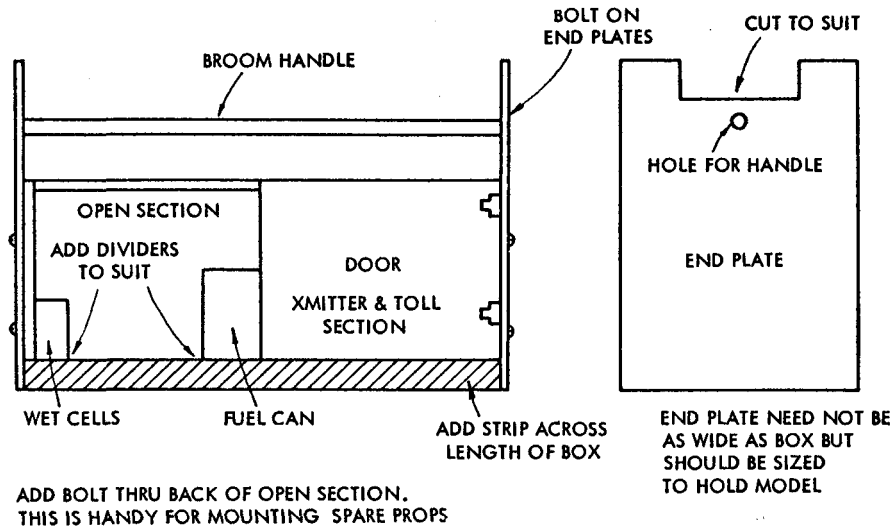


DETAIL A

A very nice field box can be made from an empty whiskey box. These boxes or cases come with a partition, so all that is required of the intrepid modeler when he sobers up is to add a door and two end plates, the latter to cradle his latest pride and joy. The total cost of this unit is about 25¢ for hinges, 5¢ for aspirin, and $25 for the booze that the case is wrapped around. Of course, if your local liquor store is benevolent, they will just give you an empty case for free. From Dick Hill, South Jersey Fly-Aways. §

H.J. Vandiver of Carmel, Indiana, didn't care too much for the fuselage carrier available on most commercial field boxes, wanting to have the carrier fold flat on top of the flight box so that it could be used as a seat or carried without the ears of the carrier upright. As pictured, he uses a suitcase locking device, available at most hardware stores, to lock the carrier in the upright position. This makes a sturdy, compact, and inexpensive method of locking the carrier in this position, as well as being fast to erect and collapse without the need for tightening wing nuts, etc. In addition, by filling in the spaces between the ears with the same thickness wood, it becomes a seat when collapsed. §

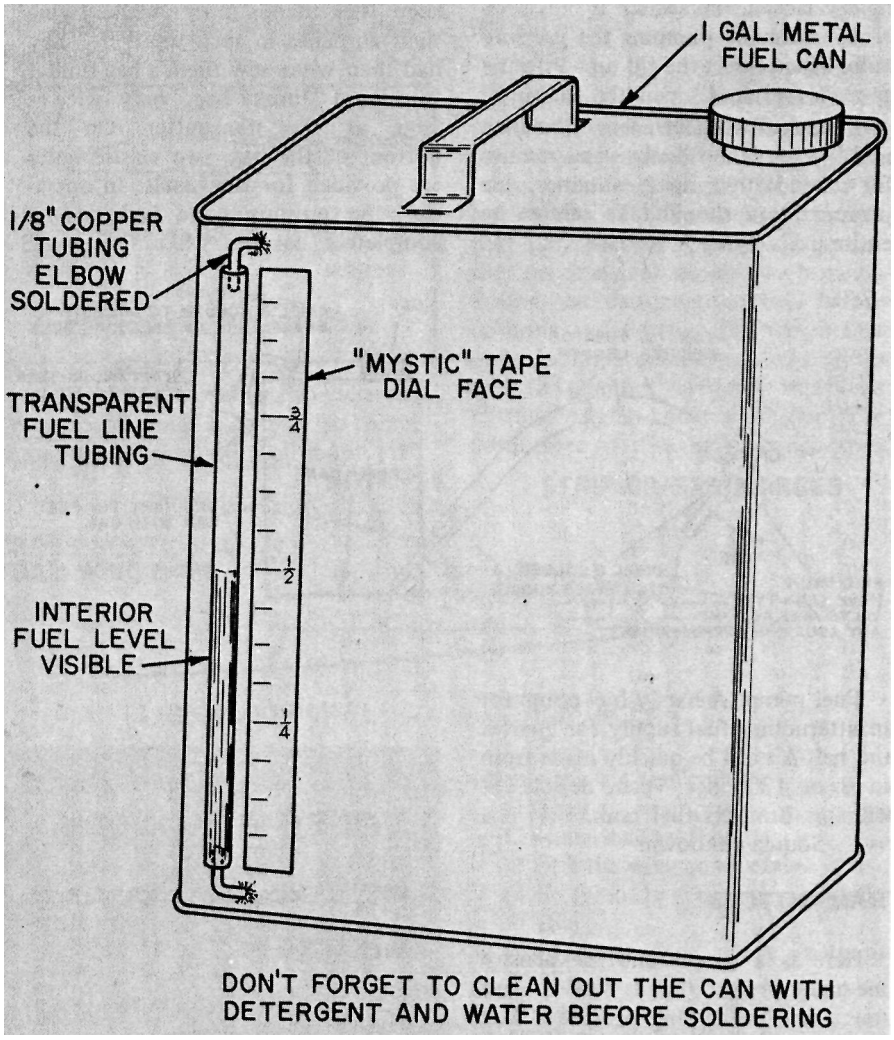




FUEL PUMPS

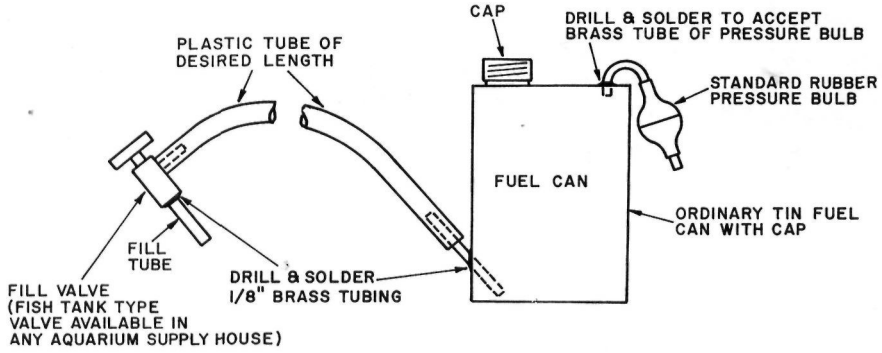
If you've been looking for magnets to hold that Andy Wright electric fuel pump to your gallon fuel can, the Montreal R/C Club 'F.B.I.' Newsletter suggests that you look for the magnetic type used on refrigerators to hold the door shut. These are made of flat polyethelyne with a magnetic lager imbedded in the plastic. On a refrigerator, it is often slipped inside a white plastic envelope which, in turn, is fastened to the refrigerator door. The magnet material can be cut easily into required strips and held with 1/16" servo mounting tape. §

Many of us like to use a one gallon fuel can in conjunction with some automatic fueling system, whether it be an electric fuel pump strapped to the side of the can, or the more



common bulb pressure system. One of the main problems with the metal can is that you can't determine the amount of fuel remaining in the container. Here is a method for making an infallible fuel lever gauge. Wash your can thoroughly with detergent and water, over and over again to eliminate the possibility of any fuel or fuel fumes remaining in the can. Then simply solder a copper tubing elbow to the face of the can right at the top, and another similar elbow at the bottom of the can. Connect these elbows with a piece of transparent tubing, and presto; an instant fuel lever gauge. A piece of white Mystic tape can be placed between the transparent tubing and graduated appropriately to act as a dial face. With careful measuring this tape can even be calibrated in ounces. §

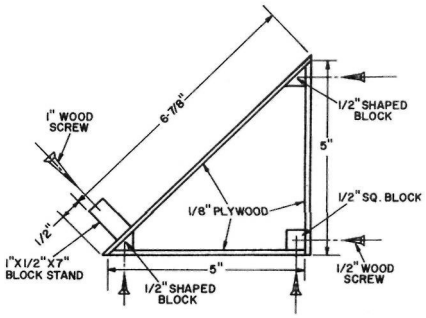
Joe Beshar of the North Jersey R/C Club developed the following pressurized fuel fill system without battery power. With the fuel can cap and fill tightly closed, the system is pressurized by manually pumping the pressure bulb. Then, insert the fill tube into the aircraft fuel line, open the fill valve, and the fuel will flow. When the tank is full, close the fill valve and remove fill tube. With a tight container, one pressurization should take care of an entire day's flying. §

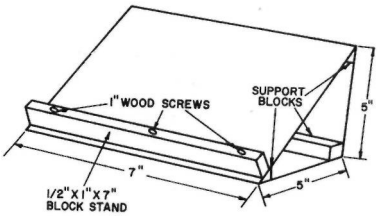


Fuel pump. A handy fuel pump for an afternoon's fuel supply for quarter and half-A's can be quickly made from an 8 or 12 ounce Veco, deBolt, or Williams Brothers fuel tank. Give it a try. —Source unknown. §

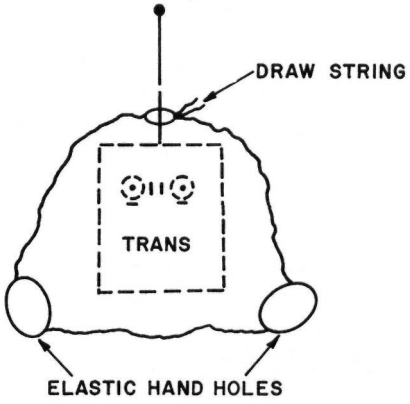
TRANSMITTERS

Here is a simple and inexpensive one-night project that is sure to save you a few bucks, and provide a well needed piece of field equipment. The enclosed diagram of the transmitter stand from Leo J. Borrello of St. Clair Shores, Michigan, is self-explanatory, although it should be remembered that all dimensions should be modified to meet the requirements of a specific transmitter. The one presented in the sketch is for Leo's Kraft KP-4. The economy of this unit lies in the fact that scrap plywood may be used, either 1/8" or 1/4", whatever you may have accumulated in your work area. For added strength, the blocks and touching edges (cut at 45 degree angles) should be glued with Elmer's White Glue before securing with wood screws. For added appearance sake, all edges and exposed screw heads may be covered with 1" black tape and the entire stand covered with a coat of enamel. §

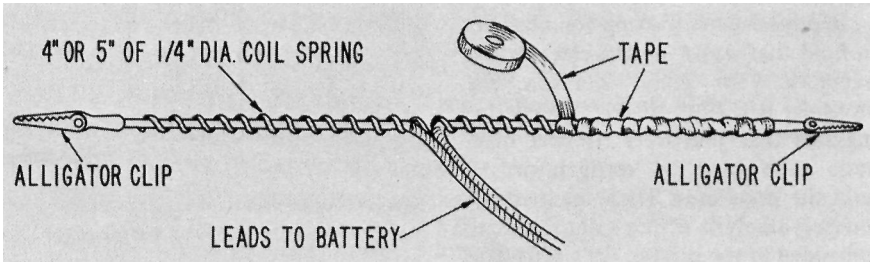




While extremely cold weather is not a problem in California, it is definitely a problem in Chicago. Jim Delia Rocco, Jr., and several of his club members are using a unique method to keep their hands warm while flying their airplanes in such weather. They had their wives sew them a bag similar to a Rand "Jimmy Bag," only twice as large as the transmitter. On the bottom of the bag, two elastic holes are provided for the hands. In operation, the transmitter and the hands are completely covered while flying §



Did you ever start your engine, pull the clips off, and short-out a good battery when the clips fell across each other? If so, maybe this idea from the Isthmian Model Airplane Club is for you. It consists of inserting the ends of each of the starting battery leads in a four or five inch length of 1/4" diameter coil spring. This holds the leads in opposing directions where they cannot come in contact with each other even if inadvertently dropped. The leads with springs in place are protected by a wrapping of plastic electrical tape. From the Isthmian "Buzzerd." §



VII CLEAN-UP AND REPAIRING

CLEAN-UP

If you're always rummaging through your house in a constant search for 'wiping rags' to take along to the flying field, you will appreciate Duie Matenkosky's suggestion. Visit your local barber and beauty shop supply store and buy a box of barber's paper towels — the kind big enough to use at the flying field, of course. A box of 500, which is more than enough for an entire flying season, should set you back $5.00, plus tax. This is a small price, considering no more frantic pre-flight searches, or messy take home rags. §

Dick Hill of Laurel Springs, New Jersey, noticed an excellent idea in use at a neighboring club field. It consists simply of a small coffee can which is filled half full of cat litter, a material which is also used to absorb spilled oil and grease at gas stations. When you're finished flying for the day, don't throw those sloppy rubber bands away, but simply put them in the can and shake. You then have clean rubber bands for the next trip to the flying field. §

Have you ever come back from a session of flying and wondered how to clean the glop off of those rubber bands used to hold on the wings? Well don't reach for the liquid cleaners, instead just shake those messy elastics in a container of cornstarch, remove, and snap clean. While on the subject of cleaning, Jack Irey, of the San Diego Drones, recommends plain old gasoline for removing the mess from your plane. It works well, and we know you're smart enough not to do this in a closed garage with the water heater nearby! From the 'Static Sheet,' San Diego Drones RC Club. §

INSPECTION

In his training flights in RC, Meric Murphy of China Lake, California, found that his wing got banged around quite a bit. This caused him to wonder if the dent on the outside damaged any of the spars, ribs, etc., on the inside of the wing. To find out, he used a high intensity lamp and pressed it against the back of the wing, which showed an outline of the inside of the wing. By moving the lamp around he was able to check the leading and trailing edges, the wing spars, and the ribs. One should be careful when doing this to MonoKote because of the heat given off by the lamp. For best results during your inspection this should be all accomplished in a darkened room.

FIELD REPAIRS

If you should tear a hole in your wing at the flying field, take a piece of the clear plastic material used for laminating identification and credit cards, and press it in place over the hole. It will stick by itself. Simply cut it to shape. It has been found that the thinner plastic works the best. From Jonathan Sedran. §

GENERAL REPAIR

How often have you observed the following scene? A modeler's airplane crashes, the pieces are carried back to the pit area, the verdict of "unrepairable" is reached, reusuable parts are removed from the wreckage and the model is burned on the spot. This happens far too often. Many of those "irrepairable" airplanes can be made to fly as good as new.

I won't try to argue with those who will say, "You can't get the thing back together the way it was and besides a repair job always looks lousy." I will say that none of my airplanes has experienced less than one crash and it takes a good search to discover where they suffered damage. If my airplanes don't fly perfectly, most of the time it's me and not the airplane.

I can't tell you how to make every conceivable repair, but I can give you some guidelines to follow in making a good looking repair job after almost any crash. The important thing to have in doing such a job is — PATIENCE. I imagine that some people who started reading this article have already gone on to something else because they don't have the patience to learn how to do a good job and also because they just "can't" repair an airplane.

The first thing that should be done following a crash is to clean the remains. Even the small pieces can be fitted together like a jigsaw puzzle if you save them, so clean them, too. Do the best job you can right at the flying field because the castor oil can go a long way into raw wood during a trip home. I always clean my airplanes after normal flying with Dow Bathroom Cleaner, and after a crash, I also use it. Each piece should be cleaned as well as possible since the major enemy of a good repair job is the oil. If there is a trace left on any surface, I guarantee that the dope will bubble up or not dry properly. If you use enamel or one of the epoxy paints, the oil will hinder their proper adhesion and drying. When you get the airplane home clean it thoroughly again with alcohol. I use ordinary rubbing alcohol. After the two cleanings, the surfaces should be dry and oil-free.

Trim back the silk or tissue in the vicinity of a break so that a good joint can be made. Where there are breaks with lots of little jagged edges, trim off the ends of the edges because they will tend to bend when the two pieces are joined together and leave a gap between the pieces. If there are some fuel soaked edges of raw wood, cut these out because the adhesive won't do any good on an oily surface. If the damage is extensive, think of the order in which you must replace the pieces; it's embarrassing to discover that you left out the firewall bulkhead or another such piece after the fuselage is back together.

Glue the pieces back together using makeshift jigs to keep parts in line if necessary. I use a lot of C clamps, pins, rubber bands and scraps of wood to do this. Since most repair jobs do require some jigging I use a slow drying or slow curing adhesive. The "one minute" adhesives are great for field

repairs, but they don't give you sufficient time to align pieces when you're making an extensive repair. After the adhesive is dry, observe the job that's ahead of you. Invariably there will be pieces missing. You must decide whether to replace them with pieces of balsa, plywood, etc., or with glue. I use a lot of epoxy in this stage. Wherever there is a joint between two pieces I put on epoxy with a spatula so that I'm reasonably sure that the epoxy is higher than the original surface. When the epoxy has cured, you must sand the surface smooth. Since the length of the sanding job depends on the kind of epoxy that's used, use an epoxy that is strong, tough and relatively easy to sand. The two best epoxy glues I've found are the Sears' Filled Epoxy and Black Magic (or Black Knight) epoxy. The Sears epoxy is an overnight epoxy which sands very well. The Black Magic epoxy cures in 7-10 minutes, but tends to load up the sandpaper. Both are tough and strong.

I tack my sandpaper to various sizes of wood and use the size that's compatible with the job. Sand with both straight and circular motions to keep the surface smooth. When the surface is smooth put on two or three coats of clear dope with light sanding between coats and then put on patches of silk or tissue (depending on what the original covering was). Make the patches slightly oversize and stick them down by smoothing the patch on the surface, lightly spray with water, resmooth the patch and put on a coat of half dope and half thinner. When the surface has dried, put on a coat of ordinary thinner followed by a couple of coats of clear dope. After a light sanding finish the surface with the original color scheme. My airplanes have rather simple decorations which are relatively easy to replace.

After repairing the outside of the fuselage you must decide whether it has sufficient strength. If you decide it doesn't, pieces of 1/32 inch plywood and bulkhead fillets (using epoxy) will add amazing strength without taking up much space.

Foam wings can be repaired if they aren't too badly mashed. If a wing is broken near the tip, the tip can be glued back on and the edges repaired with epxoy since the area near the tip doesn't carry much load. If the wing is broken at the center section, you may often glue it back together and put a patch of celastic around the center. You may consider adding a full depth spar by cutting right through the wing for four to eight inches on either side of the center and sliding in a plywood spar (using a generous coat of epoxy on the spar and the foam). If a piece of foam is missing you can make up a replacement piece, stick it in and recover the area. Rebalance the wing by adding weight to one wing tip.

All of the above sounds like a lot of work, but I've found that I can have a repaired airplane back in the air a lot faster than building a new one from scratch. For those of you who still aren't convinced, don't chuck out your next bashed airplane, give it to me and I'll have it flying in a week or so.

Maybe I'll even sell it back to you!

REPAIRING ARF's

From the Capital Propduster Newsletter, here is a method for repairing a Lanier that has been flown through a grove of trees! Since there were several dents in the leading edge of the wing, the plastic tips were broken, and the ailerons have pulled up, taking the trailing edge with it some places, as well as the wing being broken in two in the center section, the first job was to strip the wings of ailerons, tips, center reinforcements, then peel the covering off. Since it seemed impossible to remove the spar splicers, epoxy was simply smeared in place and they were butt-joined together. After the center section had set,1/2 inch was sawed off of the leading and trailing edges, and3/4" off the tips, using a table saw for this operation. This pretty well cleaned up dents and tears. With no spar splicers left, the next step was to fit in a piece of 1/2" thick by 6" long balsa in the leading edge of the wing. Due to the taper, or sweep-back, of the leading edge of the wing, this splicer then had to be sanded or planed to taper on the edge to match the wing. Next, 1/2" thick balsa strips of the proper width were glued to the leading and trailing edge of the foam wing core using Titebond glue. This was then sanded to shape, with any remaining dents being filled with Epoxylite. Then a 5" wide piece of fiberglass was wrapped around the center section and epoxied in place as added assurance that the wing halves would not part.

Since the foam wing has to be recovered, Contact shelf paper, available at your local hardware and dime stores, can be used as a substitute covering material. This material sticks fairly well and has a good stretching ability, but does lose some of its adhesion qualities if stretched too far. The wing tips on the rebuilt Lanier wing were covered with Super MonoKote.

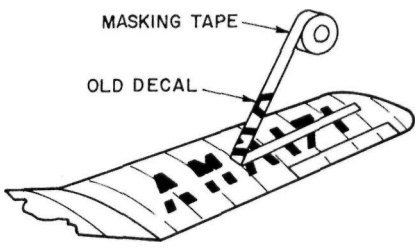
From the same newsletter, we obtained some information on the weights of the covering materials commonly used. The Contact shelf paper weighs 3.9 ounces/sq. yd., regular MonoKote, 3.75 ounces/sq. yd., Super MonoKote, 2.3 ounces/sq. yd. With the amount of covering you would use on a conventional size radio control plane, Super MonoKote would save about 4 ounces in weight. §

PAINT & DOPE REMOVAL

From the Whirlwind's 'Breeze' of Southwestern Michigan, comes a hint for refinishing your model for the next season of flying. Instead of sanding the old finish off, try some commercial paint remover called Zip-Strip. This stuff will peel the dope or enamel finish down to the bare wood. Don't use it on fiberglass, though, and be sure it doesn't get to foam cores — it attacks both. §

REMOVING DECALS

If you have ever had the necessity for removing decals, in order to facilitate repairs or repainting of your aircraft, you will agree that it is definitely a problem. Charles Baley of Fremont, California, found a solution for this situation which consists of placing masking tape over the decals and pressing down firmly. Then, simply by removing the tape briskly, the decal is also removed. Bear in mind that some decals have a clear film between the letters which will have to be removed in the same manner with a second application of tape. §

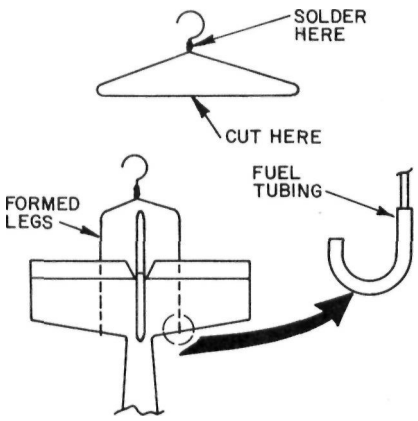


VIII STORAGE AND TRANSPORTATION

STORAGE

Hung up on finding a method to store your planes in the shop? Max Blose of Hamilton, Texas purchases shelf standards and shelf brackets at the hardware store or lumber yard. These adjustable units, designed for adjustable bookshelves in the home, provide an excellent storage rack for fuselages and wings. To avoid scratching your aircraft, run a coat of Dow Silicone Rubber on the top of each bracket. §

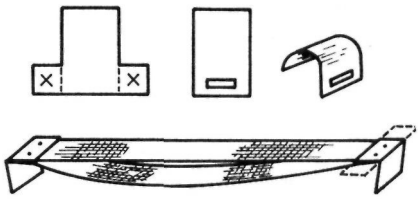
Doug Mielenz of Milwaukee, Wisconsin, stores his model aircraft fuselages by using modified wire coat hangers. He takes an ordinary wire coat hanger, wire brushes the paint from the twisted area below the hook, solders this area, then repaints it. He then cuts the horizontal member of the hanger in the middle and forms the two legs as shown in the sketch. A short length of plastic fuel tubing is slipped onto the end of each leg, and then the ends are formed into hooks to cradle the stabilizer (the fuel tubing protects the stabilizer finish). Now all that is required is to pound a nail in a floor joist and hang up the aircraft. §



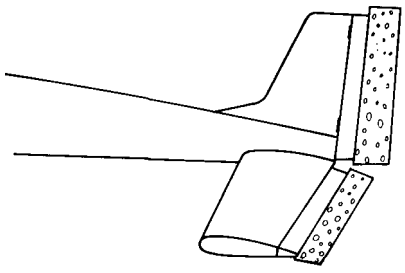
Howard McHenry of Wheelersburg, Ohio, uses the following method for protecting the finish on his aircraft. First, he purchases four mil plastic film from his local building dealer from which he makes plastic covering bags for both the wing and the fuselage. For the wing bag, Howard uses a sheet of plastic 6" longer than the wing, itself, and a little more than twice as wide after folding lengthwise. He then seals one end inside of the plastic by running a hot iron over a cloth placed over the edge of the plastic, leaving one end open. This same method can be used for the fuselage bag as well, providing excellent protection for your newly finished model. §

Stan Andrews, of the Centreville Cadets R/C Club, suggests this simple and inexpensive method of storing a number of model wings in an out-of-the-way place. Bent coat hangers provide the basic material for constructing the wing rack. These are straightened out, and depending on the size of your wings, pieces from 16" to 24" are cut off. A loop is made on each end of these pieces (be sure to make matching pairs since there are two "chains" to be made of these links), and then a 90 degree bend is made approximately three inches in from each end. By making the lengths progresively smaller, or larger, depending on whether you want your larger wings on the top or bottom, a chain of link can be fashioned. To attach these to the wall, use pegboard and two 12" pegboard rods at the top on which to hang the links. Stan places his links about three feet apart, the wings sliding into these links, which act like shelves. These links can also be hung from the ceiling by using eye hooks. §

George McGinnis of New York has made two sets of canvas straps (aluminum chair webbing can be used) which he hooks onto the upper metal strips in the headliner of his station wagon in order to carry all of his wings up near the top of the car and out of the passengers' way. To utilize this system make four clips from sheet aluminum and bend them as shown in the sketch. Fit into the upper metal strip that holds the headliner in place in your car — two on each side of the car about 3 feet apart. Usually the screws that are already there can be used to hold these clips in place. Secondly, make four clips, as shown in the sketch, from sheet aluminum and bend the tabs around the ends of two pieces of webbing. Drill holes and rivet these on to the ends of the webbing. Use double strips of webbing to slip the wings in place. Bend the ends to form a hook which will catch into the slots of the clips in the roof. In this fashion the webbing can be removed whenever it is not needed. Slide the wings in place between the webbing using spring clothespins to hold the webbing together between each wing, if so desired. §



Many hours of labor are spent building and finishing model airplanes, but little thought is put into the transportation of these aircraft to 'and from the flying field. Did you ever take one out of the trunk of your car and find the trailing edge of your rudder and/or elevators looking like a saw blade from nicks? To make a long story short, John Steinkamp of Rensselaer, Indiana, took scraps of styrofoam and made slits in them and installed them on the trailing edges. Just don't forget to take them off before you fly! . §



IX MISCELLANEOUS

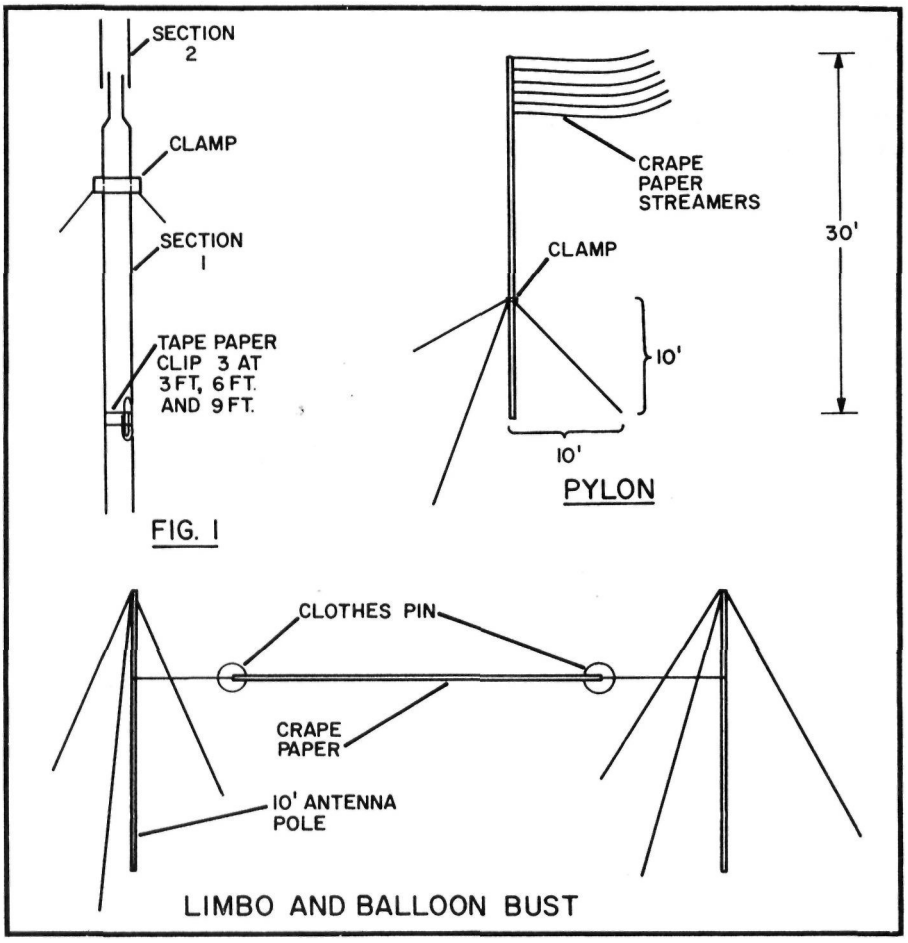
Here is a simple, light, portable, and inexpensive set of pylons that your club can build for Goodyear, Limbo, and Balloon Busting events.

The pylons, themselves, are made up of gold anodized aluminum antenna mast. Their dimensions are 1-1/2" in diameter and 10' in length, a standard size available at most television stores. These units are telescoped together as shown in figure 1 without the use of any additional hardware. Three sections are required for each 30' pylon. One clamp is attached at the top end of the lowest section to secure the guide lines. The latter consists of three 20' lengths of 1/8" sash cord with one stake required for each guideline.

The aluminum mast sections and clamps may be purchased from Lafayette Electronics or your local TV dealer. The Lafayette part numbers and prices are as follows: mast section (3 required per pylon) #18F56145WX at $2.49 each; clamp (1 required per pylon) #18F63216 at 35¢ each. Attached to the top three feet of the pylons are red, white and blue crepe paper streamers that are 48" long. These make the pylons visible and also indicate the wind direction for the pilots. Masking tape is used to fix the streamers to the pylons. The pylon sections are assembled and lifted into place while the guide wires are made fast to the stakes. The latter are sent 10' out from the pylon base before the pylon is erected into position. The first section of the pylon is also fitted out with paper clips taped to the mast at desired heights. These are used to support the crepe streamer for the Limbo events. A clothespin, string, and six ounce fishing weight are fastened to the streamer, passed over the paper clip, and adjusted to keep the streamer taut. The weight should not touch the ground. For use in Limbo events, the adjusted distance between two pylons is 60'.

These pylons also find a use in the Balloon Breaking events by suspending a balloon between the tops of the two 10' poles by a thread in the same manner as the crepe paper was used in the Limbo event.

A set of the two 30' pylons cost our club less than $20.00 and were used successfully in all three events during the flying season. §



If you want an easily constructed wing jig that is accurate, simple to use, and one that can be built for under $2.00, then we suggest you study the sketches accompanying this article.

This jig is simply built from 1/8" thick illustration board, available in 30" x 40" size from any art supply wing panel and approximately 6" wide. Draw a centerline the length of the 6" wide section of your illustration board. With a straight edge mark the location of your wing ribs, then store for approximately $2.00 per sheet. Start by cutting a piece of board slightly longer than the length of one

cut slots in the board with a mat knife or sharp X-Acto #11 blade. Score cut your centerline mark and then fold your board up about 45^{c} to your work table and then tack glue the jig to your work board.

After cutting out your individual wing ribs, draw a centerline on each

rib. Measure the depth from the centerline to the base of the rib, and make a horizontal pencil guide line along your jig, adding pieces of scrap balsa at each rib station in order to level the ribs. Use a scrap balsa height gauge from your work table to the centerline of each rib at the leading edge position to make sure that each rib is positioned accurately.

The majority of your wing construction can be carried out in the jig, then the partially finished wing can be removed and reinserted in the jig if necessary. This is an advantage over the rod type of jig where the rods pass through rib holes.

If, like most RC'ers, you dislike building wings, try this simple illustration board wing jig and find out how quickly and easily your next wing can be made. As an added bonus, if you did a careful job on constructing the jig, you'll have one of the most accurate wings you have ever built. §

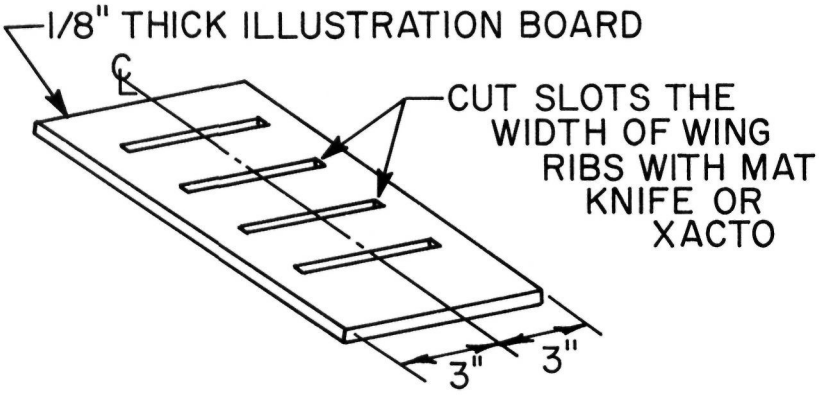


FIG. 1

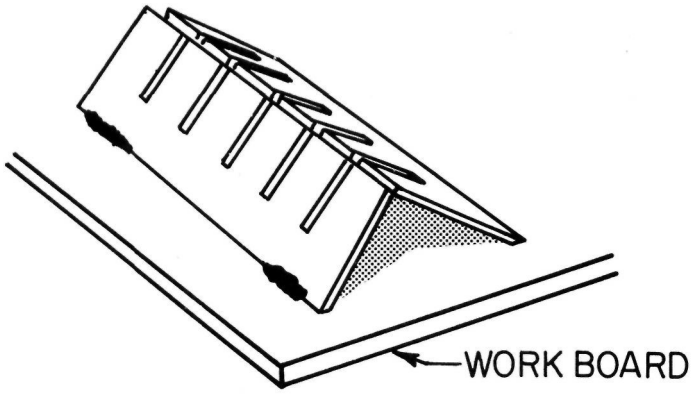


FIG. 2

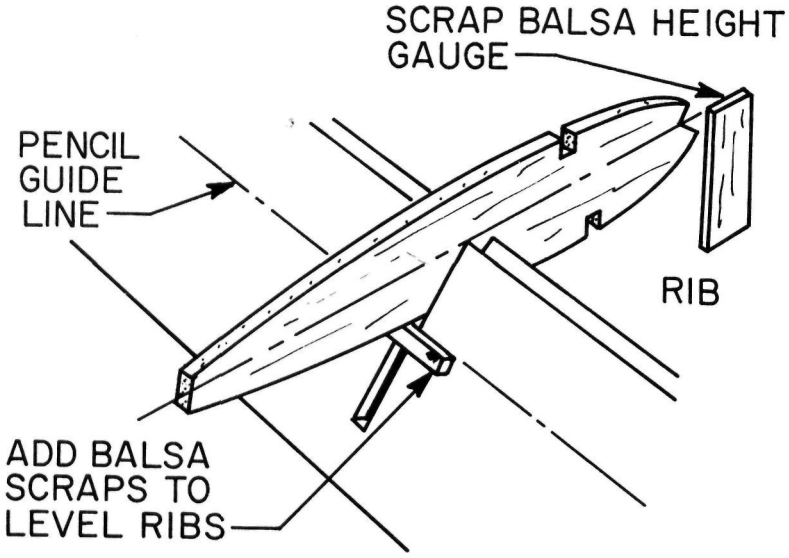


FIG. 3

For proper flight characteristics, a good balance is essential for your model aircraft. Generally, a slight nose down, or nose heavy attitude, when balancing around the center of gravity location, is desirable. To achieve this frequently requires the addition of weight to the nose or tail section. Philip Gabler of Winter Park, Florida, suggests the use of an easily obtained hardware, drug store, and hobby shop product known as Liquid Steel. This product is packaged by the Woodhill Chemical Corp., of Ohio, and is made of atomized steel particles held in an air hardening, self adhesive, vinyl plastic putty binder. The weight per volume is high and it is sold in tubes or cans of various sizes and will stick firmly to balsa, plywood, screwheads, etc. Simply squeeze the amount needed into the appropriate spot to achieve the proper balance. Additional amounts may be added at any time and small amounts may be removed by grinding, filing, sanding, etc., after it has completely hardened. §

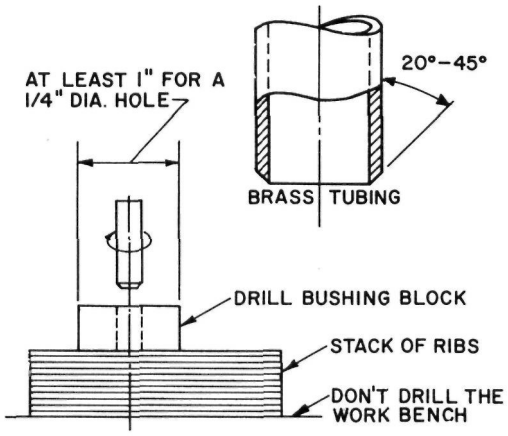
When using polyester or epoxy resin, a much better penetration on balsa can be obtained if you add a small amount of acetone to the resin while mixing. The acetone evaporates, the resin sets up, and there is little, if any, loss of strength. This suggestion comes from Ed Lowe. §

An excellent idea for making your own dispenser for white glue or model cement comes from Darrell Yonker in the Valley Flyers. Use a Miss Clairol bottle, a product obtainable in most drugstores. Cut the long, tapered bottle tip to the desired opening and use a 1/16" wire stopper in the end. No more broken or squeezed glue tubes. In addition, you can see how much cement is left in the bottle. §

Have you had problems when it was necessary to put a sheet metal screw or wood screw into soft balsa? Try this: Turn the screw into the wood and then take it out. Mix a small amount of white glue 50-50 with water and put several drops into the hole. Let

soak for five or ten minutes. Then apply a thin film of oil or vaseline to the screw and put the screw into the hole. The screw can now be removed easily at will, yet will not pull out the previously soft wood. From Whirlwind's 'Breeze.' §

As many modelers have found out, brass tubing makes an excellent drill for rib alignment or control holes. The end should be sharpened as shown in the sketch from Thomas Markland of Cincinnati, Ohio. This is easily accomplished with only a sanding block. The drill can be quickly made extra sharp with a few passes of a hone. The major advantage of this type of drill is that there is no tearing of the balsa wood. The hole that results is beautiful and true. For alignment of jig holes it is best to make a "drill bushing block" to square up the drill. Although the latter can be hard balsa it will not last as long, or be as accurate, as one made from harder wood and drilled with a conventional drill. These "tubing drills" can be soldered inside, or outside, of other sizes of brass tubing in telescope style to accomodate drill chuck sizes. §

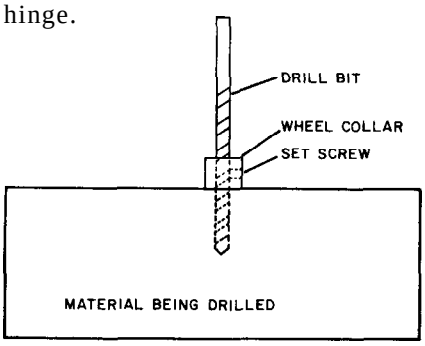


Jack Menzies of Owensboro, Kentucky, suggests that Derusto Clear Silicon Spray, manufactured by Master Bronze Powder Co., Inc., Chicago Heights, Illinois, and available at most hardware stores, is a most useful item for the RC shop. Available in one pound aerosol cans, and designated Clear No. 1011, this material is suggested for use wherever you want to minimize friction. Suggested areas are on axles and the inside of wheel hubs; on control surface hinge pins, etc. Be sure to follow the directions on the can carefully. §

Using the new fast-cure epoxies can be simplified by mixing on a small memo or scratch pad, using a toothpick for stirring and application, Gordon Gould of Breckenridge, Michigan, found that many small batches can be mixed before a 10¢ pad and a box of toothpicks are depleted.

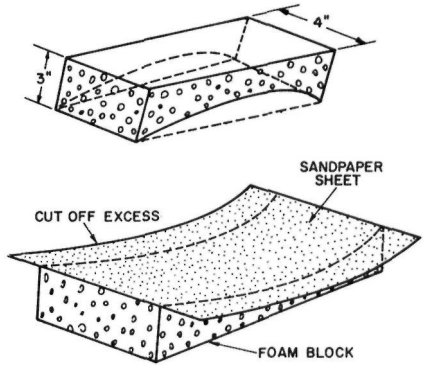
The following suggestion is from the Illinois R/C Society. If you should have occasion to bond one piece of nylon to another, use a small quantity of carbolic acid, available at most drug stores. §

Eight year old Kurt Hurley, of Fremont, California, suggests two strips of Coverite stuck together back to back with a hole punched in each end for an outstanding, durable and flexible hinge.



If you need to drill holes to a measured depth, try using a wheel and collar on your bit — this keeps the drill from going too deep. This sketch from Dale Stambaugh, of Modesto, California, will explain how it works.

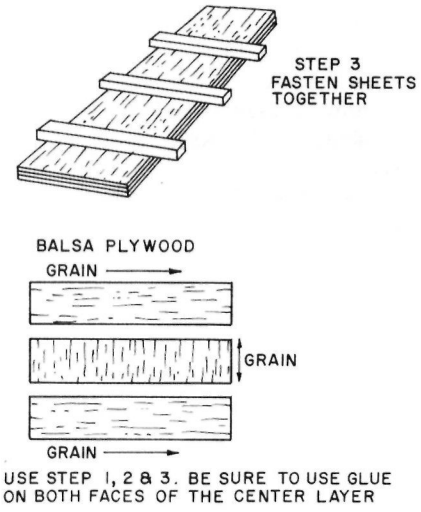
Harvey Mitchell of Lubbock, Texas, submitted a solution for sanding down foam wing cores prior to covering. One of the drawbacks of hand sanding these cores are that if you are not careful, flat spots develop and a generally uneven surface is produced. This can occur with sanding blocks, or without, and even when the greatest of care is exerted. Harvey took a block of foam 4 inches wide by 2 or 3 inches thick and slightly longer than his wings chord and cut a "wing core" out of it as shown in the sketch, using the same templates used to cut out the wing. He discarded the "core," leaving a block as shown. The next step is to take the block, sand the edges out of it, and lay a piece of sandpaper inside and measure and cut to the proper dimensions as shown. Now, after cutting the sandpaper to shape, Harvey sprays contact cement on the foam and the sandpaper and carefully aligns the block with the paper. This process takes a total time of about 5 minutes and results in a perfectly contoured sanding block for the wing. You will find that only six or eight strokes with this block prepares the wing perfectly for covering with no distortion. Try it using full span stroked with light pressure. §



Do you want a use for little tiny scraps of MonoKote left over from your last covering job? Wayne Tilse of Seattle, Washington, wraps one or two layers of the material around a heated screw. Stretch the MonoKote so that it forms on the threads. Overlap the end and wrap counterclockwise looking from the screw head end. This will give you an excellent homemade self-locking screw. §

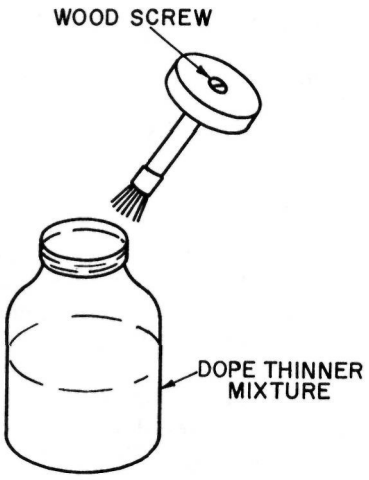
Have you ever had laminated balsa break apart or separate? Dick Hill, of Laurel Springs, N.J. has, and here's a sure-fire cure for it. Take your favorite glue — Dick's happens to be Ambroid — and add thinner until it is thin enough to dry tack free in thirty seconds or so. Coat both pieces to be joined twice, using a brush. Let this set for a few minutes while you add enough glue to the leftover thinned batch so that it just brushes evenly. This would be almost the same consistency as thick dope. Now paint this mixture onto the surfaces to be joined. Work quickly and spread the glue thinly and evenly. Next, join the two surfaces and clamp or weight the two

pieces together. That's it — the strongest, lightest "balsa plywood" you could ever imagine, and you will not be able to separate the surfaces. By the way — it's a dandy way to make three ply balsa plywood. Make up some when you have nothing to do and toss it into a corner until you're ready to cut out a slab sided model. You'll be surprised at the results. §



Bill Davidson of Montebello, California, uses Mayply or Italian Poplar Plywood which is lightened as shown in the sketch, then covered with Super MonoKote, or Solarfilm, or 1/16" balsa, for light, strong, warp-resistant tail surfaces or ailerons. A word of caution, however, and that is don't use silk, Silron, etc., as it will warp the open framework. §

Tom Francis of Aurora, Colorado, uses a paint jar, such as a standard mayonnaise jar, and screws to it a dope brush that has been cut to fit the lid. When covering airplanes with silk, Silron, etc., it's almost like having a third hand. You can set the brush back in the jar and your mixture doesn't dry out while you are trying to smooth out the material. By using a pint jar you can fill it about 1/3 full and it doesn't drip off the brush handle. Another advantage of this method is that the dope brush does not touch the bottom of the jar and cause a semi-permanent curvature of the bristles. §

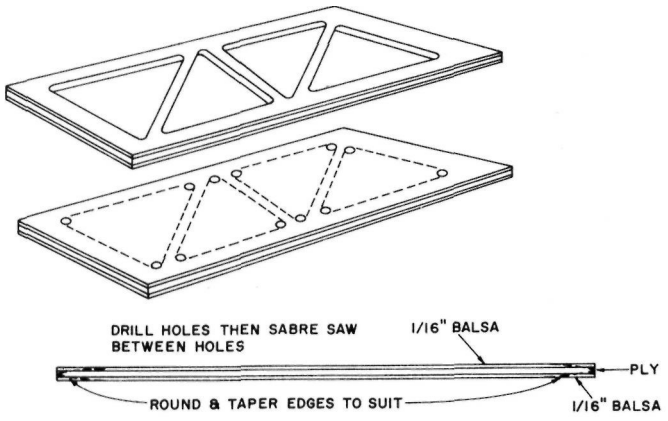


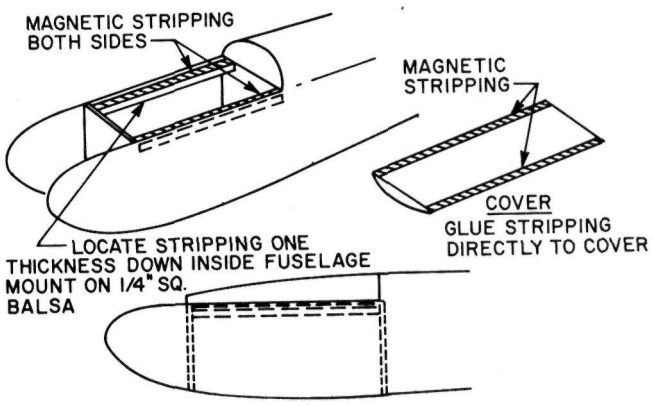
If you've been bothered by all those creases and wrinkles in the folded plans that you bought from one of the magazines, here is an easy method to remove them, suggested by SM/Sgt. Bob Knowles, USAF. Grab your wife's iron and can of spray fabric finish. Invert your plans and spray fabric finish lightly on the creases and wrinkles, then press them with the iron set on low heat. If some of the creases and wrinkles persist, repeat the process. Your plans will now lay flat and bothersome wrinkles and creases will hardly be noticeable.

If you need to bend brass tubing, as is usually the case when installing vent and fuel lines, try heating the tubing until it is red and then plunge it into water. This is the standard accepted procedure for softening brass tubing, softening it enough to bend easily with your fingers, as pointed out in the San Diego Drones 'Static Sheet.' Once the shape is determined the tubing is re-heated to hold the final shape. To prevent collapsing the inner wall of the tubing when making sharp radii, melt some lead and fill the tubing before bending. When the bend is accomplished, and the tubing reheated to hold the curve, the lead will readily flow out of the tubing. The 'Static Sheet' also points out that after heating tool steel — as when soldering washers around the axles on landing gear wire — cool slowly to keep the metal from getting too hard. You don't want the sudden strain of a landing to break a brittle wire. As you can see, to plunge steel into water will tend to harden it, while brass or copper will soften with the same treatment. §

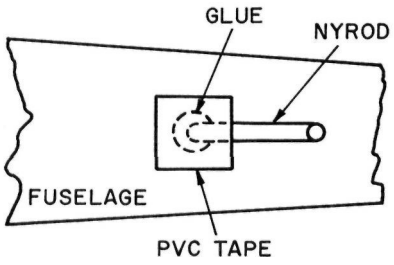
Most RC'ers have made their own balsa filler coat using such materials as balsa dust, chalk, and talc. Corn starch, manufactured for food, is recommended and is only 23 cents for a one pound package. §

Francis E. Pou, of Bogalusa, Louisiana, found that magnetic stripping, such as that found on refrigerator doors, makes an ideal hold-down for cowlings and hatches. It can be easily cut, is flexible to a degree, and has flat surfaces. It can be installed in small sections or in one continuous length, depending upon how much "holding power" is required. White glue or epoxy glue has proven to be best for this purpose. §





If you are tired of epoxy, or other types of glue, dripping while you attempt to affix your NyRod to the fuselage side, simply stick a piece of PVC tape on top of the glue and form to the shape you want. After having dried, simply peel the tape off and you will have a nice and neat fitting, with no glue dripping down the sides of your fuselage. This idea was submitted by Mr. C.K. Tse of Kowloon, Hong Kong. §

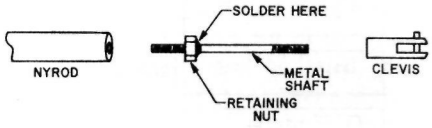


Do you dread carving that plug for a fiberglass cowl, fuselage, etc? A surefire "painless" way is to use construction grade two inch thick blue styrofoam. Cut two sides, spot contact in three or four places so they can be easily reached with a thin blade when sanding is finished. Join, and draw the top view. Sand to shape in the square. This material sands easily with little or no flaking. Do not bear down too hard when you first start. Use a medium wood rasp to bring the material to the desired shape. Then, round off all corners and sand to final shape. When the sanding is complete, separate the halves and cover with two heavy coats of Titebond glue, allowing 24 hours drying time between applications. Also, coat the backside of plugs about 1" wide near the edges which will stop erosion from primer, etc. Do not sand after the glue application, but approximately ten to fifteen minutes after each coat of glue has been applied you can wet your fingertips slightly and smooth the high ridges of glue. Next, apply a heavy coat of acrylic auto body primer to the styrofoam plug. When dry, wet sand very lightly with No. 600 wet or dry. Again, you will find it sands easily, so go easy on the pressure. Apply a second coat of primer and let dry thoroughly. Wet sand to polished finish. (A third coat of primer may be needed.) You can now spray with acrylic paint and mount to a suitable base, preparatory to molding the female mould. Follow the standard moulding procedure from here, such as releases, wax, etc. One word of caution: Make sure the styrofoam is well sealed with Titebond, otherwise the solvents in the primer will attack the foam. These spots can be repaired by cleaning out and recoating with Titebond. This idea was submitted by Jerry Mickley of Moorhead, Minnesota. §

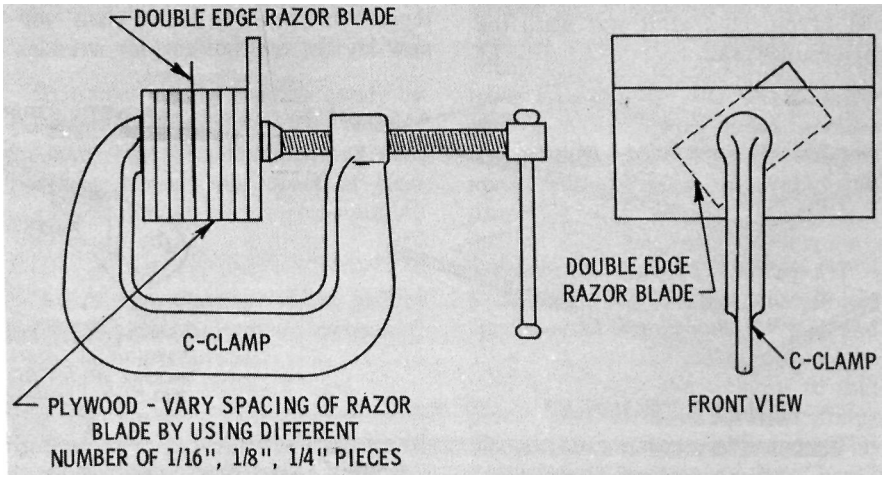
Scale builders are continually confronted with the problem of simulating small full scale details. For example, many biplanes had no plywood or metal covering on the leading edge of the wings, and used metal tubing in the nose of the ribs as a leading edge. A wooden dowel can be used to simulate the tubing, or use aluminum tube if you like, and bend it around the wing tips. This is full scale type construction on some wings. Metal covered wings, as on military type aircraft, should show rivet and panel joint, or lap, to look proper. This can be done before the final coat of paint is applied by scribing lines in the paint with a sharp metal scribe. Flush-head rivets can be simulated with the sharpened end of a metal tube of proper size. Use a straight edge and twist the tube between thumb and fingers as you press down on the paint. Follow the straight edge with proper rivet spacing. The final coat of paint will allow rivet and panel lines to show through. §

Are you one of those model airplane builders that get out the razor blade and ruler when you need that balsa strip to make an odd size stringer or longeron? When you get through with cutting your strip with your razor and ruler, it probably looks wider at one end than at the other and with a bevel that you really didn't need! Here is a simple balsa stripper made from plywood scraps. It doesn't take anytime to put together and you probably have the equipment right on hand. Just clamp the double edged razor blade between the plywood scraps, allowing the spacing that you want for the particular width of the strip. Then run your sheet balsa of appropriate thickness through the tool just like you would run a piece of wood through a tablesaw. This homemade balsa stripper turns out excellent strips and you don't have the problem of a slipping ruler and beveled edges. — Stanley Andrews. §

On the subject of NyRods, you may have discovered that it is quite difficult to thread the metal shaft into this material. However, if the retaining nut supplied with the NyRod package is first soldered to the shaft, a wrench can now be used as an aid in installing the shaft in the NyRod tubing. For maximum strength, use a high-melt type of solder. This idea was submitted by Frank Toch of Urbana, Illinois. §



A. Walker of Derby, England, suggests this method of preventing glass cloth from fraying, and all of those annoying strands sticking to the resin brush, fingers, etc., after being cut. First, mask off the area to be cut out, then simply rub a bead of model airplane cement into the edges. Wait a

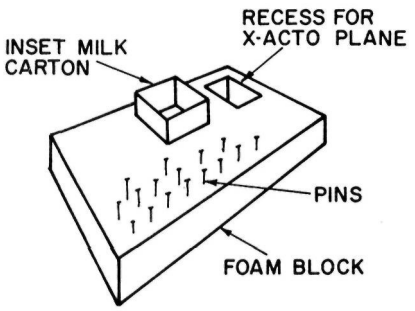


couple of minutes before cutting out with scissors. This gives a perfectly clean edge that will not fray. §

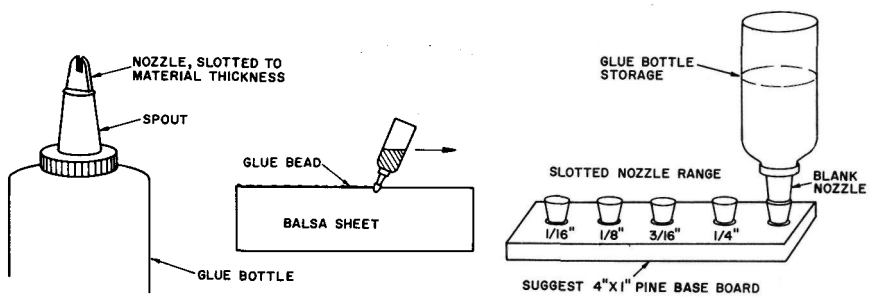
One of the most frustrating experiences is that of having your final color coats of dope pull away from your rudder and stab fillets, leaving colored "air pockets." One of the best ways to make neat, clean fillets without encountering this problem is to cover the fin and stab with silk, but leave a margin of approximately 1/4" of balsa around the joints — in other words, leave this narrow area uncovered. Now, make your fillets from AeroGloss Balsa Filler Coat (plastic balsa), then coat with four coats of AeroGloss C-77 model airplane cement to seal the fillet. Since both of these products are made by AeroGloss to be compatible with their butyrate dope, you will encounter no further problems with "lifting" fillets. §

Instant fabric patch? Save the painted fabric from your old models. The next time you incur a puncture, cut a piece of old fabric of the same color to the size of the repair. Mark the size of the patch on the area to be repaired, then coat both it and patch with contact cement. Touch up edges with fresh dope. - St. Paul Model R/C Club 'Pulse.' §

A table "caddy" for pins, rulers, glue gun, X-Acto knife, and other items that usually clutter up your shop table, can be made easily from a 2" x 8" x 10" pice of styrofoam and the bottom 4" of a half gallon milk carton. A hole is cut through the foam to hold the milk carton snugly in place. Placing this toward the edge of the block of foam gives ample room for pins and other small, items. The glue gun, etc., goes in the milk carton.



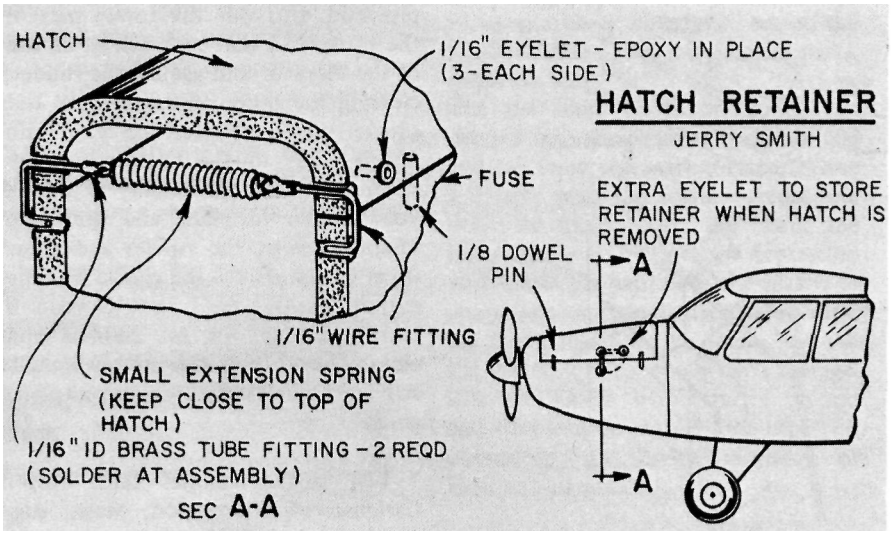
From Chris Baynes in Auckland, New Zealand, comes a combined workshop and building hint. The first part is for butt gluing sheet balsa more

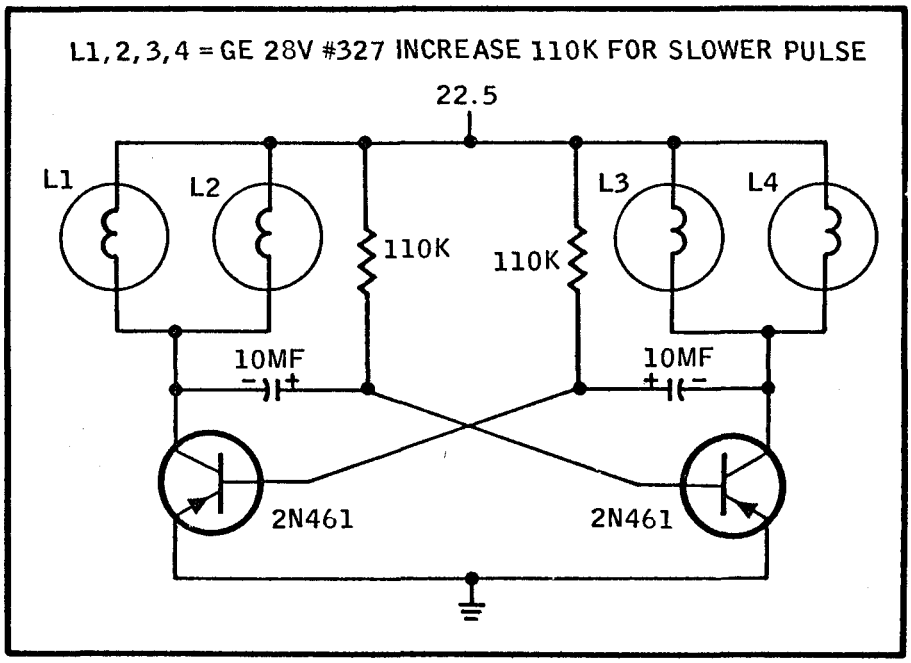


quickly, evenly, and cleanly. Butt jointed sheets for foam wing covering and fuselage side building are made a lot easier by this method, while general handling of glue in the workshop is achieved more economically. First, take a nozzle cap of a glue bottle and slot the end with a sharp knife to the thickness of the sheet you want to glue, say 3/16", as per the illustration. Place the slotted nozzle back on the glue bottle spout, invert bottle, and feed the edge requiring glue through the slot, squeezing glue out at the same time. The result is an even, accurate, and economical spread of glue. Part two of the same tip involves mounting a range of nozzles, slotted to popular thicknesses, on a base board in the holes drilled to take them. The end nozzle can be a blank one, with no slot at all, for storing the glue bottle inverted. In this fashion, the glue won't run out, but will be at the outlet end of the bottle ready for instant use. Thus, there is no waiting for the glue to travel from the bottom of the bottle to the nozzle, as commonly occurs. §

Robert J. Urban of Lebanon, Connecticut, has found that, by tinting printed circuit boards (especially small receiver decoder boards), he can speed up parts mounting and also transfer less heat to the components. Prior to drilling the board, Bob polishes the copper with steel wool. Next, he coats the board with a very thin coat of a good non-corrosive flux such as Nokorode soldering paste. Applying a small amount of solder to the tip of the soldering iron, he then draws the iron across the copper lands of the board. A very thin layer of solder, approximately 1/64", is all that is needed. Be careful not to cover any drill holes. Next, clean the board and drill the holes. Apply another thin layer of flux, then mount the components and solder. Afterwards, clean off all flux and resin using dope thinner or the equivalent. By using this method Bob has found that less heat is needed because the solder flows more readily to the board and the mounted components. §

If you have ever encountered difficulties in attempting to figure out a suitable fuel compartment hatch retainer, you will appreciate this idea from Jerry Smith of the Tri-Valley R/C Club. This method consists of two small wire fittings, a small extension spring, a pair of keying dowels, and six small brass eyelets. §

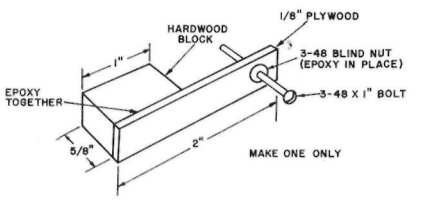


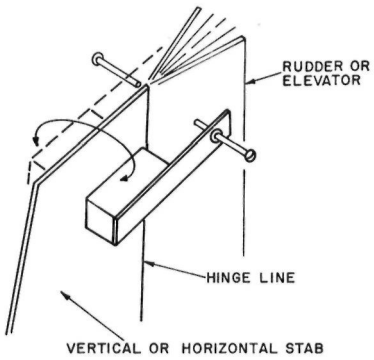


Want to try a little night flying? The diagram shows a method of setting up blinking, colored running lights that will let you know which way you're going. From the LVRC News Letter. §

It is often quite difficult to be visually sure that the movable surfaces of Galloping Ghost aircraft are centering, or moving in equal distances when they are in motion. If the movement is not equidistant from center, it could cause a difficult flight or disaster right after the plane becomes airborne. A few minutes spent with this GG movement gauge, submitted by LeRoy J. Simon of Chicago, Illinois, could eliminate this old problem.

First, set all control surfaces and equipment as close to center as possible. Then, turn all equipment on so that all surfaces are moving. While the surfaces are in motion, hold the block of the movement gauge at hinge points (as shown) and adjust bolt until the movable surface just "taps" it. Then move the gauge to the opposite side in approximately the same position. If it "taps" as it did on the first side, the centering is correct. If it does not touch the bolt or hits the bolt hard enough to cause the block to bounce, then adjust the clevis and the bolt until both sides "tap" evenly. §

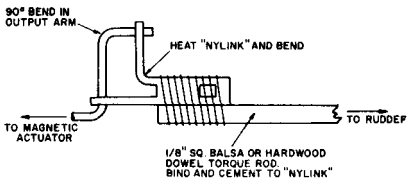




In order to make sure that your rudder lines up to a true 90 degrees to the stabilizer, W.C. Morrison of Owen Sound, Ontario, Canada, suggests two 90 degree squares made of masonite or plywood. Cut out the lower part of the squares so that each will fit on top of the elevator and against the rudder, clearing the body of the aircraft. Use square pieces of lead or steel and fasten these to the bottom of each square. All that is necessary is to glue your rudder in place and press the squares against the rudder and allow them to stand until the glue is set. The author of this idea uses Devcon 5 Minute Epoxy for his rudders and elevators and finds this adhesive much stronger than normal model airplane glues. §

For single channel fans, Roger Carignan of Wilmington, Mass., suggests this method of coupling an Adams magnetic actuator, used in small models, to the rudder torque rod. A common NyLink fitting is used, after modification, to make this coupling. A large degree of misalignment can be tolerated due to the universal joint type of action it provides. An additional bearing at the actuator end of the torque rod is not needed due to the freedom at the coupling. Installing or removing the unit is very simple due to the snap-in feature. The bend in the NyLink clevis is easlily accomplished by heating the section to be bent with a soldering iron, being careful not to overheat and subsequently melt through. Most magnetic actuators have just a single bend in the output arm. The latter will have to be bent to form a crank as shown in the sketch. This bend should be located so that with the NyLink coupling attached, the torque rod is approximately centered on the output shaft of the actuator. The notch cut in the end of the unbent arm of the NyLink is tapered so that the end can be pushed onto the shaft and snapped in place. The bent-over 'crank-handle' section of the output arm fits into the existing hole in the NyLink clevis arm. Roger has used this coupling in Ken Willard's 'Good Neighbor' (.020 powered) published in RCM a few years back. The model is still flying and there have been no problems with the coupling.

§



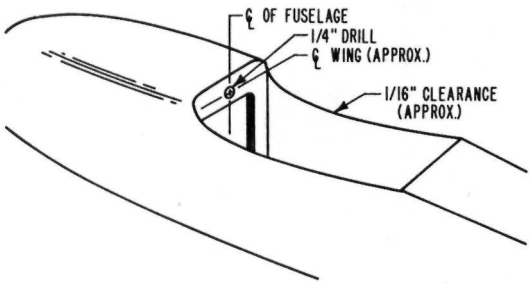
Having previously had a problem with the lines that actuate mechanical brakes, such as the Rocket City or DuBro, stretching and changing the tension and adjustment of the brakes, Terry Edmonds, of Iowa City, Iowa, solved the problem completely by using dial cord. This is sold in electronic stores for use in radios that have a tuner driven by a cord and pulley arrangement. It is constructed of a nylon cord with a fiberglass core and treated to prevent stretching. §

EASY METHOD OF ATTACHING WING HOLD-DOWNS

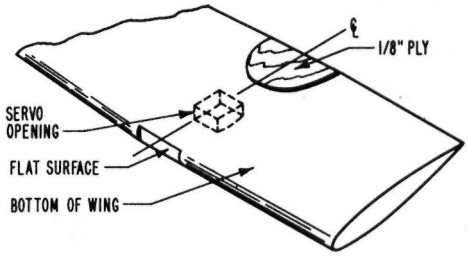
It seems that most construction articles handle the attaching of the wing with a sentence like "Attach wing using your favorite method." If you don't have a favorite method, try this one that works every time.

By DARRELL DALY

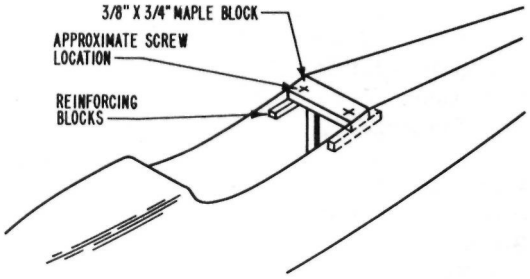
(1) Drill front bulkhead for a nice slip fit on 1/4" dowel. Back up bulkhead so you have at least 1/4" thickness. Cut out rough opening for wing. 1/16" oversize is just right. One dowel is plenty, but if you're nervous, use two.



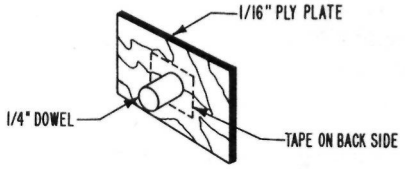
(2) Trial fit wing in fuselage. Cut flat at front, if necessary. Glue 1/8" ply on bottom rear center of wing. Make about 1/4" wider than fuselage. You should have 1/16" to 1/8" clearance between flat & bulkhead.



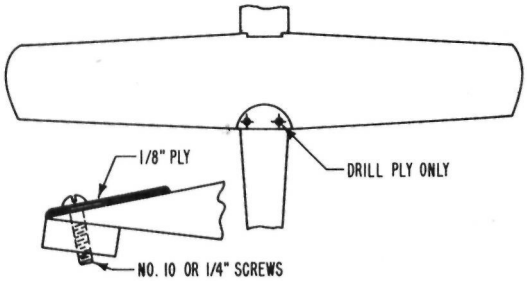
(3) Install 3/8" X 3/4" maple motor mount stock at rear of fuselage. Use epoxy and reinforce so it's plenty strong.

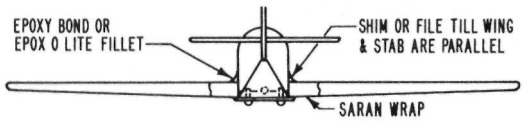


(4) Make a small piece of 1/16" ply and assemble with 1/4" dowel and tape as shown. The tape should just cover the dowel so that later on you can remove it.



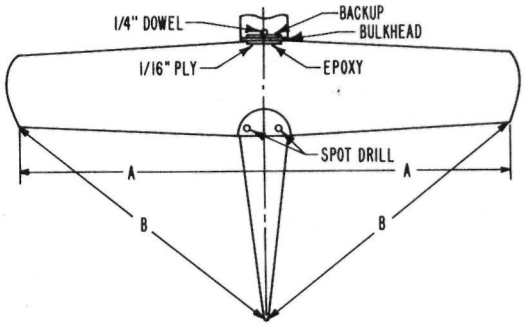
(5) Assemble wing & fuselage and align. Mark wing reinforcement for two screw holes in location shown. Remove the wing & drill thru for snug fit on #10 or 1/4" screws. Keep holes square with ply.





(7) Remove short 1/4" dowel and drill into servo compartment and install long dowel. Spot glue only so you can get it out in event of breakage. Cover top of wing with Saran Wrap. Re-assemble. Viewing from rear, shim wing till aligned. Install epoxy fillet.

(6) Assemble wing & fuselage & ply/dowel piece. Measure from wing tips to center of tail and make equal. Also centralize wing on fuselage. Epoxy 1/16" ply to wing. After curing, spot drill holes to 3/8" maple, making sure wing is still aligned. Remove wing, drill & tap maple.



INDEX