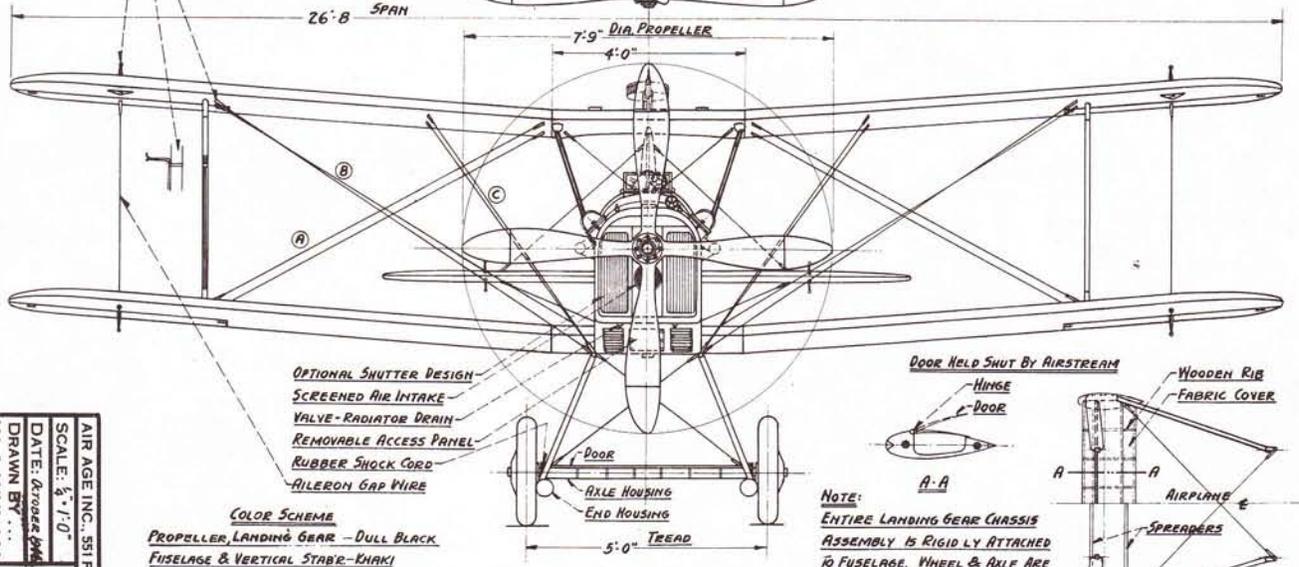
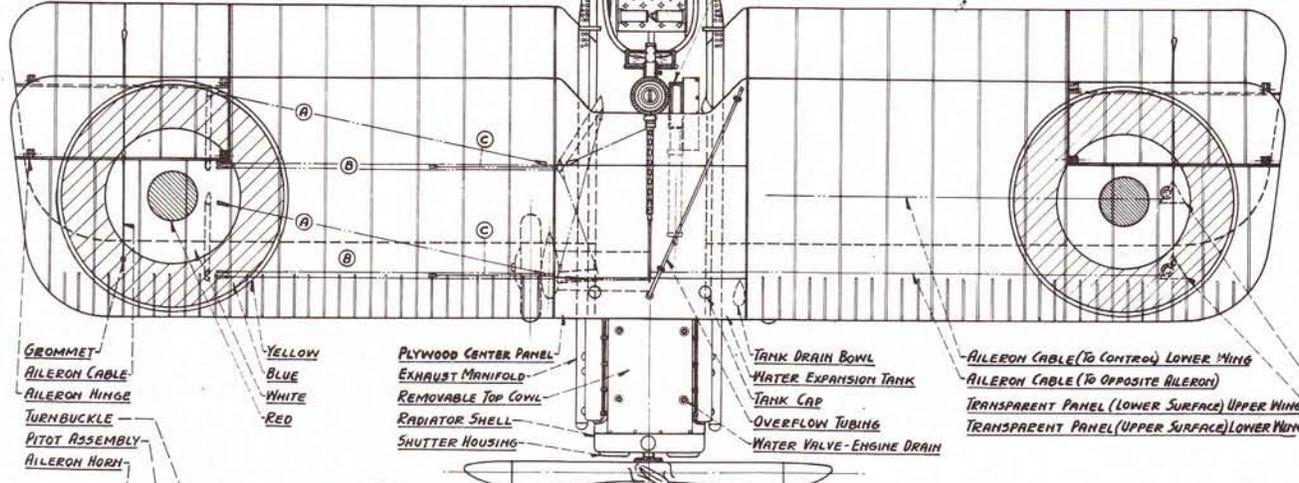
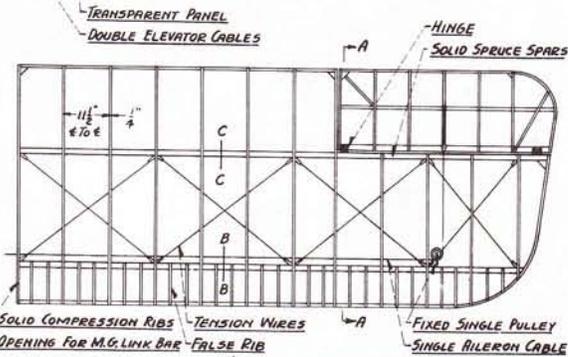
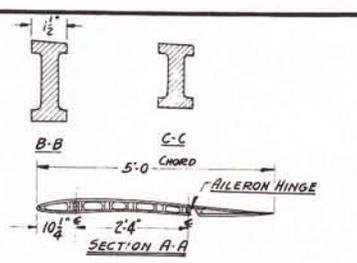
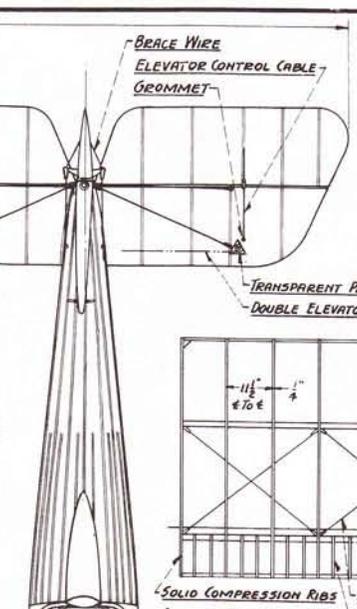
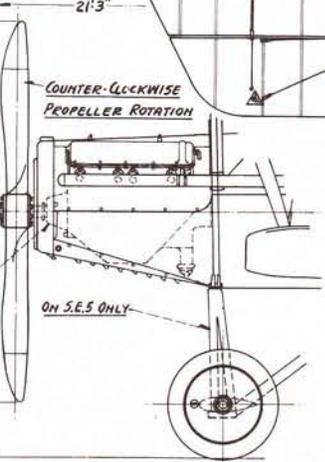
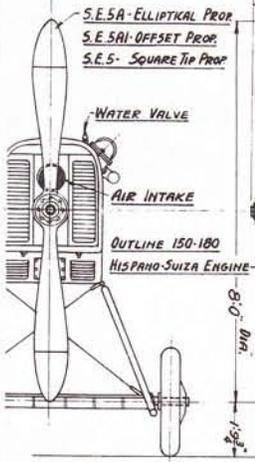


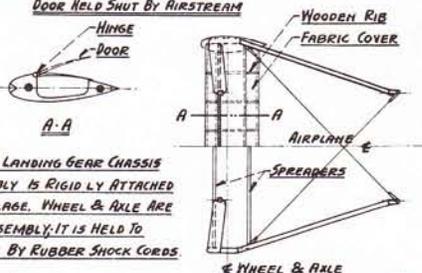
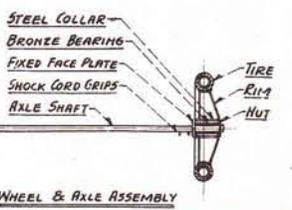
MODEL	ENGINE	H.P.	GEARING	PROPELLER
S.E.5	HISPANO-SUIZA	150	DIRECT	2 BLADED
S.E.5A	HISPANO-SUIZA	180	DIRECT	2 BLADED
S.E.5A1	WOOLSEY "VIPER"	180	DIRECT	2 BLADED
S.E.5A2	HISPANO-SUIZA	220	REDUCTION	4 BLADED



- OPTIONAL SHUTTER DESIGN
- SCREENED AIR INTAKE
- VALVE-RADIATOR DRAIN
- REMOVABLE ACCESS PANEL
- RUBBER SHOCK CORD
- AILERON GAP WIRE

**COLOR SCHEME**

- PROPELLER, LANDING GEAR - DULL BLACK
- FUSELAGE & VERTICAL STABILIZER - KHAKI
- WINGS & HORIZONTAL STABILIZER - BUFF
- WING STRUTS, FUSELAGE FRAME - VARNISH
- TENSION WIRES, FITTINGS, ETC. - ALUMINUM



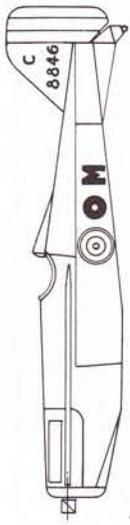
**NOTE:**  
ENTIRE LANDING GEAR CHASSIS ASSEMBLY IS RIGIDLY ATTACHED TO FUSELAGE. WHEEL & AXLE ARE ONE ASSEMBLY. IT IS HELD TO CHASSIS BY RUBBER SHOCK CORDS.



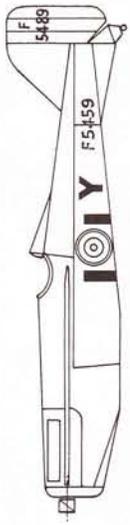
AIR AGE INC., 551 FIFTH AVE., NEW YORK 17, N.Y.  
SCALE: 3/8" = 1'-0"  
DATE: 6/19/35  
DRAWN BY: ...  
W.A. WYLAM  
**S.E.5A**  
GENERAL REARRANGEMENT



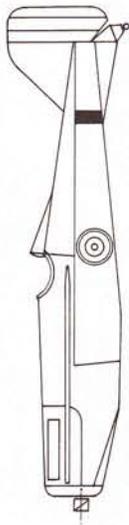




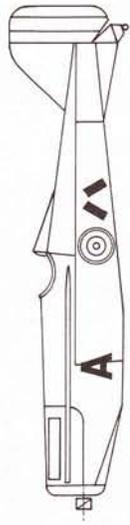
No. 1 Squadron



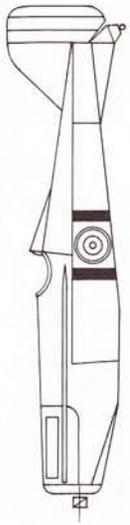
No. 24 Squadron



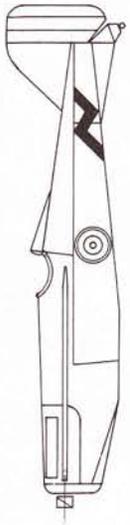
No. 29 Squadron



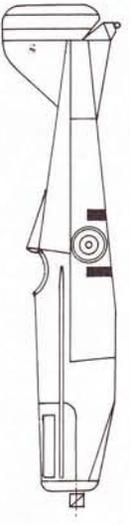
No. 32 Squadron



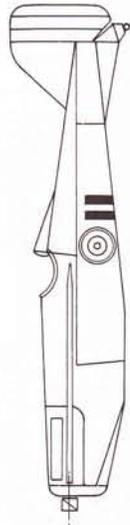
No. 40 Squadron



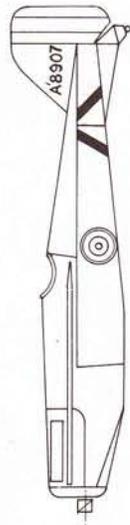
No. 40 Squadron



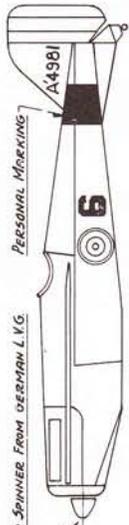
No. 41 Squadron



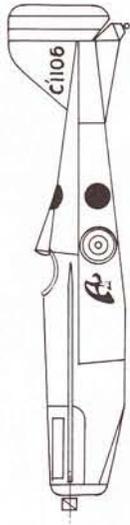
No. 41 Squadron



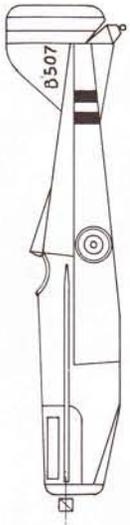
No. 56 Squadron



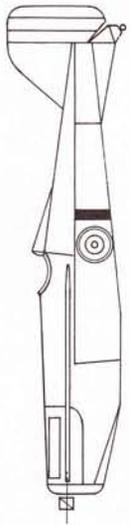
No. 56 Squadron



No. 60 Squadron



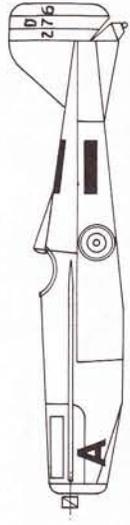
No. 60 Squadron



No. 64 Squadron

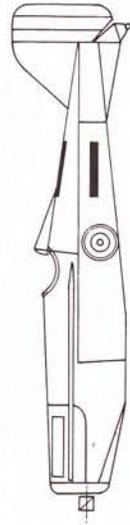


No. 68 Squadron

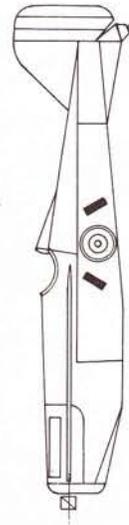


CAPTAIN MANNOCK'S S.E.-5A

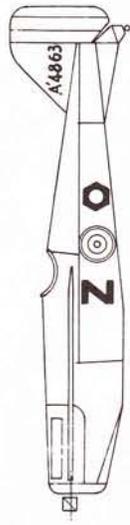
No. 74 Squadron



No. 84 Squadron



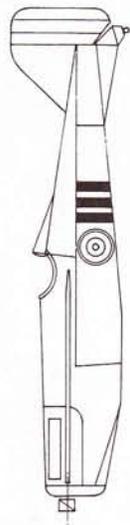
No. 84 Squadron



No. 85 Squadron



No. 92 Squadron



No. 94 Squadron

FULL CREDIT IS GIVEN TO MR. OWEN THEYFORD OF PROBERT, ENGLAND, FOR THIS THIRTIETH WORK

AIR AGE INC., 551 FIFTH AVE., NEW YORK 17, N.Y.

SCALE: \_\_\_\_\_

DATE: \_\_\_\_\_

DRAWN BY ...

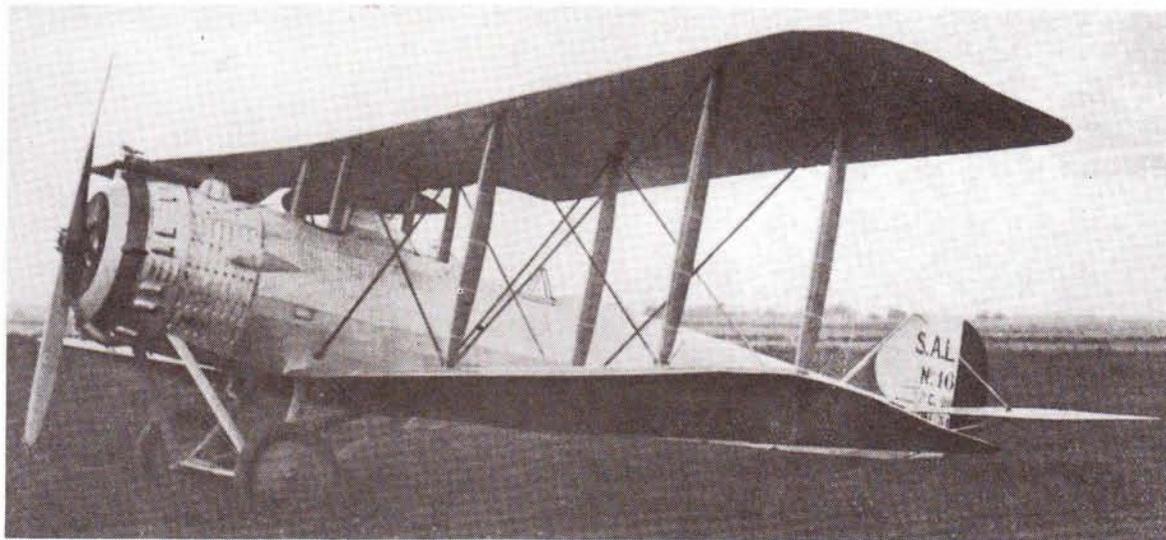
W.A. WYLAM

Squadron Markings  
ROYAL AIR FORCE

S.E.-5

# Salmson Bomber 2 A.2

drawings by RICHARD ANDERSON



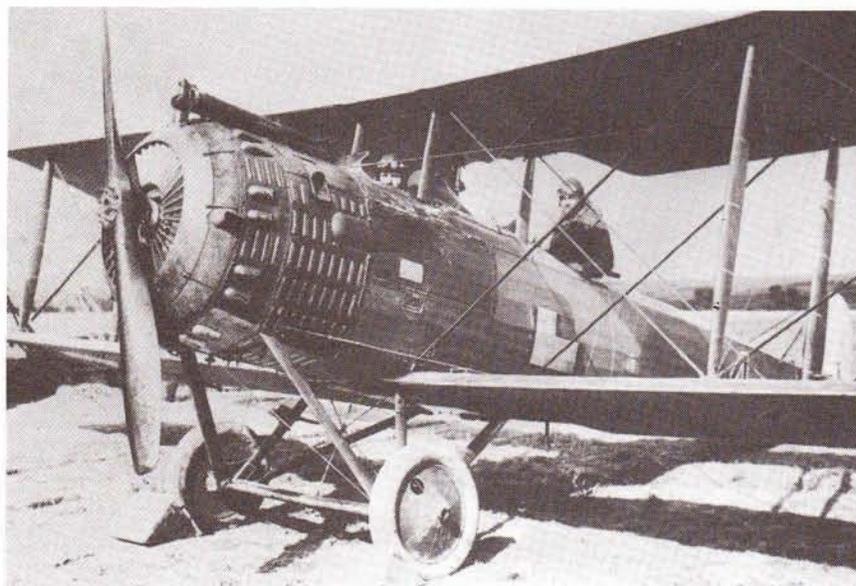
*A brute in appearance, yet very maneuverable, the 2.A2 was known for its ability to fly and fly well. "A.A.H.S. Journal" photo.*

**B**UILT by the French firm Societe des Moteurs Salmson, the 2 A.2 was considered by many to be one of the best two-seat fighters developed by any nation during the last half of WW I.

The aircraft featured dive-brakes between the landing gear legs under the fuselage, but the most unusual feature was the 9-cylinder water-cooled radial, the Salmson 9Z. When confronted by this new mechanical apparition, the French Air Ministry was somewhat taken aback, but still supported it, particularly because financing was accomplished entirely through private channels.

The 2 A.2 was intended for use as an Army cooperation type, to carry out any one of several jobs as required. In this respect it was intended to take up where the Sopwith 1½ Strutter left off and to carry on to meet advanced specifications.

The vast majority of pilots who flew it during WW I agree that it was a first-class airplane with few faults and lots of "flyability." Takeoff was relatively short, and the ship landed at about 45 mph tail high and at 40 mph, three-point. What

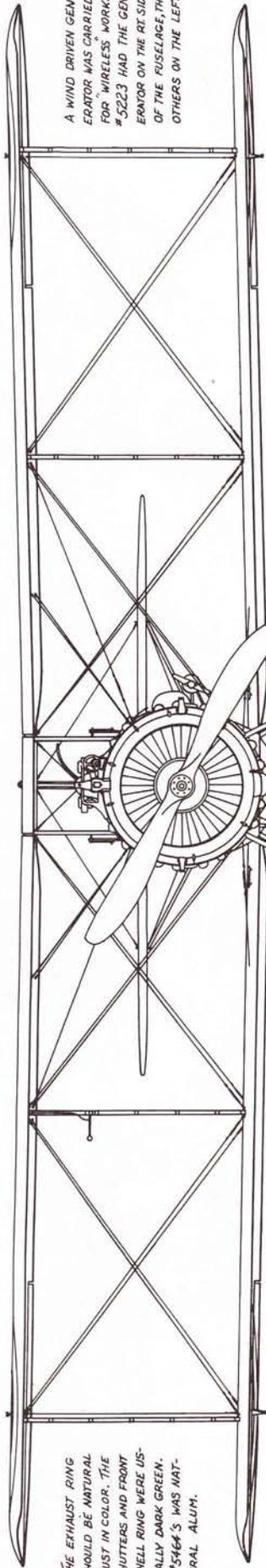


endeared it most to pilots was its long, flat glide, which saved many a crew who lost an engine far out over the lines.

Two survive; one in Belgium, the other in Japan. □

*The Salmson 2A.2 was a large airplane that proved a favorite due to its good handling qualities. "A.A.H.S. Journal" photograph.*

THE AMERICANIZED SALMSONS SHOWN HERE WERE IDENTIFIED WITH U.S. ROUNDELS, I.E. OUTER CIRCLE RED, THEN MEDIUM BLUE, AND A WHITE CENTER. THE FORWARD RUDDER STRIPE WAS RED, CENTER WHITE, AND TRAILING STRIPE BLUE. CABANE AND INTERPLANE STRUTS WERE OF WOOD & DARKLY VARNISHED.



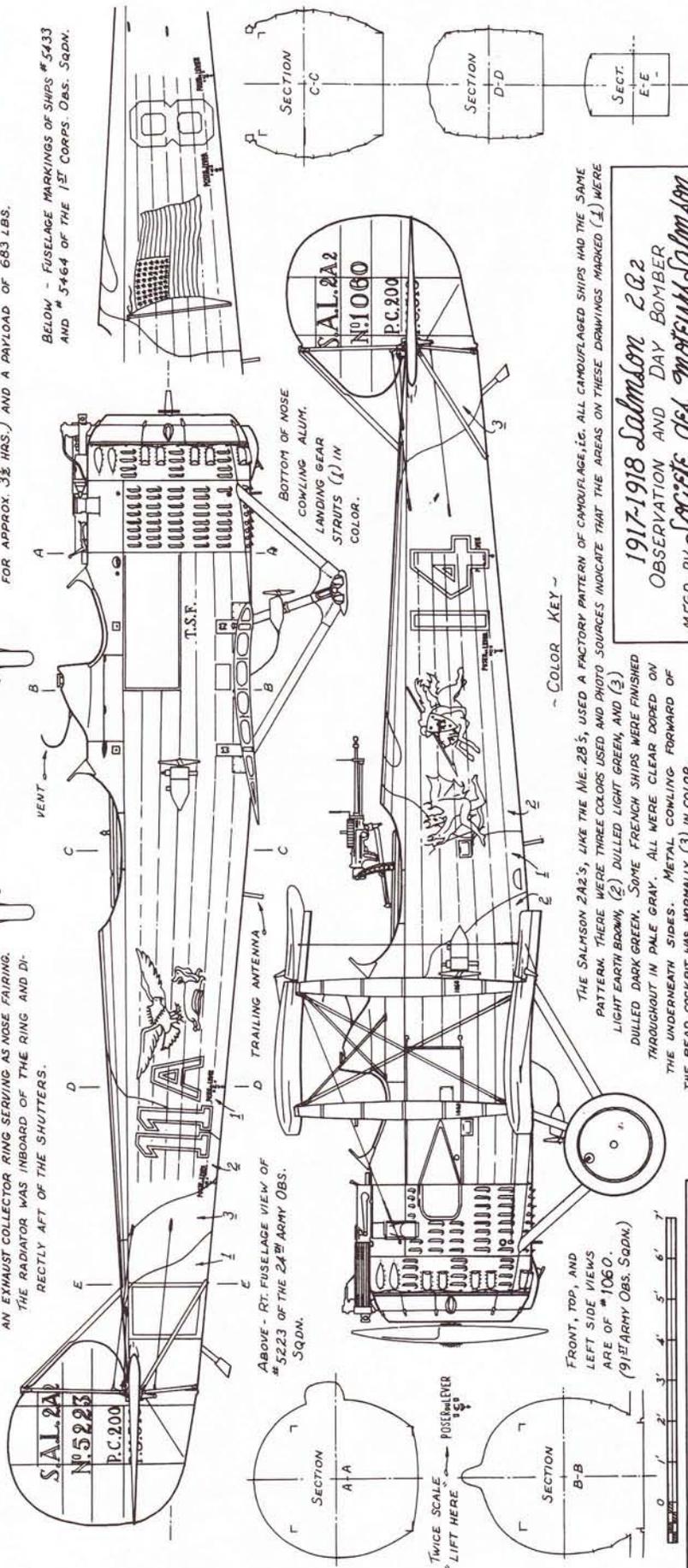
THE EXHAUST RING SHOULD BE NATURAL RUST IN COLOR. THE SHUTTERS AND FRONT SHELL RING WERE USUALLY DARK GREEN. #5464'S WAS NATURAL ALUM.

A WIND DRIVEN GENERATOR WAS CARRIED FOR WIRELESS WORK. #5223 HAD THE GENERATOR ON THE REAR SIDE OF THE FUSELAGE, THE OTHERS ON THE LEFT.

THE SALMSON 2A2 WAS DESIGNED AROUND ITS POWER PLANT. IT WAS A WATER COOLED 9-CYL. RADIAL DEVELOPING 260 H.P. AT 1600 RPM. FROM A CUR. DISR. OF 1146. THE SALMSON Z-9 ENGINE INSTALLATION WAS UNIQUE IN HAVING AN EXHAUST COLLECTOR RING SERVING AS NOSE FAIRING. THE RADIATOR WAS INBOARD OF THE RING AND DIRECTLY AFT OF THE SHUTTERS.

PERFORMANCE : MAX. SPEED - 116 M.P.H. CRUISING SPEED - 103 M.P.H. RATE OF CLIMB - 6560' IN 8 MIN. 13,120' IN 21 MIN. THE RUDDER MARKINGS 'PC.200' AND 'BU.310' INDICATE THAT THE 2A2 HAD A 441 LB. FUEL AND OIL SUPPLY (ENOUGH FOR APPROX. 3 1/2 HRS.) AND A PAYLOAD OF 683 LBS.

BELOW - FUSELAGE MARKINGS OF SHIPS #5433 AND #5464 OF THE 1ST CORPS OBS. SQDN.



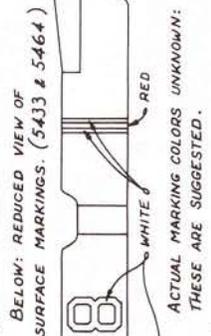
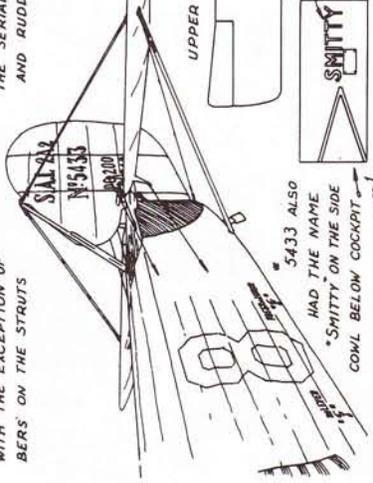
~ COLOR KEY ~

THE SALMSON 2A2'S, LIKE THE ME. 28'S, USED A FACTORY PATTERN OF CAMOUFLAGE, I.E. ALL CAMOUFLAGED SHIPS HAD THE SAME PATTERN. THERE WERE THREE COLORS USED AND PHOTO SOURCES INDICATE THAT THE AREAS ON THESE DRAWINGS MARKED (1) WERE LIGHT EARTH BROWN, (2) DULLED LIGHT GREEN, AND (3) DULLED DARK GREEN. SOME FRENCH SHIPS WERE FINISHED THROUGHOUT IN PALE GRAY. ALL WERE CLEAR DOPED ON THE UNDERNEATH SIDES. METAL COWLING FORWARD OF THE REAR COCKPIT WAS NORMALLY (3) IN COLOR.

1917-1918 Salmson 2A2  
OBSERVATION AND DAY BOMBER  
MFG. BY SOCIÉTÉ DES MOTEURS Salmson  
OF Billancourt (Seine)

PLATE 1 OF 2 DRAWN BY R. Anderson

PERSPECTIVE VIEW OF STABILIZERLESS TAIL ASSY OF SHIP #5433 OF THE 1<sup>ST</sup> CORPS. OBS. SQDN. THERE WAS ANOTHER SHIP (#5464) THAT USED IDENTICAL MARKINGS THROUGHOUT WITH THE EXCEPTION OF THE SERIAL NUMBERS ON THE STRUTS AND RUDDER.



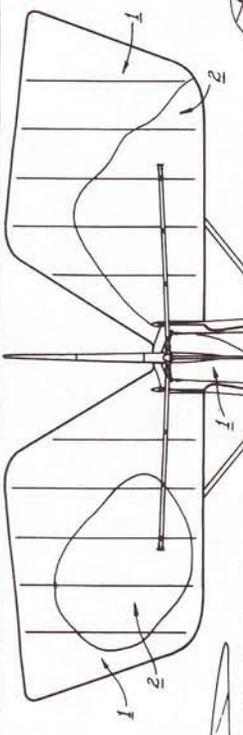
BELOW: REDUCED VIEW OF UPPER SURFACE MARKINGS. (5433 & 5464)

ACTUAL MARKING COLORS UNKNOWN: THESE ARE SUGGESTED.

RED

WHITE

#5433 ALSO HAD THE NAME "SMITTY" ON THE SIDE OF THE COCKPIT



THE NUMERALS "11" AND "11A" APPEAR TO BE BLACK WITH A WHITE PIN STRIPE. RUDDER IDENTIFICATION AND DATA NUMERALS AND LETTERS WERE BLACK.

THE LETTERS "T.S.F." LOCATED ON THE RT. SIDE OF THE FUSELAGE, LEFT LOWER WING NEAR FUSELAGE, AND UPPER RT. WING NEAR OBSERVERS POSITION. THE CENTER SECTION CABLES WERE SEPARATED AND STREAMLINED WITH A 1" (APPROX.) STRIP OF WOOD AND TAPE AT ABOUT 10" INTERVALS.

ON SHIP #1060 THE NUMERALS "14" APPEAR TO BE BLACK WITH A WHITE EDGE. THE WING IDENT. STRIPES; BLACK, WHITE, BLACK, (ETC.). THIS PATTERN WAS USUALLY REVERSED ON BOTTOM SURFACE OF THE LOWER WINGS, THAT IS, THE SAME MARKINGS BUT ON OPPOSITE WINGS.

MOST SALSOMSON PHOTOGRAPHS SHOW A CONSIDERABLE AMOUNT OF "WASHOUT" INCORPORATED IN THE OUTER THREE RIB BAYS OF ALL FOUR AILERONS AS ILLUSTRATED IN THE OTHER VIEWS.

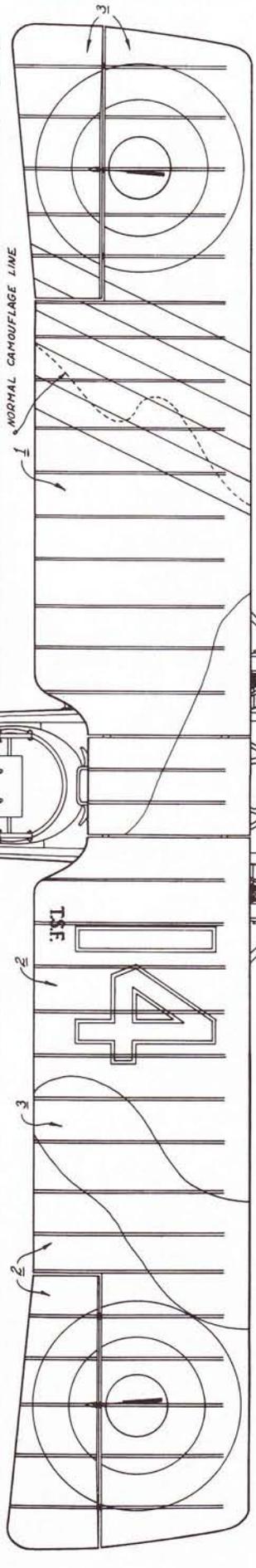


PERSPECTIVE VIEW OF SHIP #3223 OF THE 24<sup>TH</sup> ARMY OBS. SQDN. THE DIAGONAL MARKINGS ON THE LEFT UPPER WING WERE PROBABLY BLACK, RED, AND BLACK.

ALL FLYING AND LANDING WIRES INCLUDING CENTER SECTION AND TAIL BRACE WIRES WERE DOUBLE CABLES.

THE INNER BAY FLYING WIRES (FROM LOWER CABANE STRUT ENDS TO UPPER SPARS MIDWAY TO INBOARD INTERPLANE STRUTS) WERE SINGLE CABLES. DRAG CONTROL, STABBER, AND LANDING GEAR WIRES WERE ALSO SINGLE CABLES.

ALL DOUBLE CABLES WITH THE EXCEPTION OF THE CENTER SECTION CABLES WERE SEPARATED AND STREAMLINED WITH A 1" (APPROX.) STRIP OF WOOD AND TAPE AT ABOUT 10" INTERVALS.



VIEW OF LOWER WING PANEL. CAMOUFLAGE PATTERN AND THE "T.S.F." LOCATION ON THE LEFT LOWER WING ARE SHOWN IN THIS VIEW WITH DOTTED LINES.

PRINCIPAL DIMENSIONS

WINGSPAN	38'-7"	WHEEL TREAD	6'-3"
CHORD	5'-6"	PROPELLER DIA.	9'-1"
GAP	5'-7"	WING AREA	403 sq.
LENGTH	27'-8 1/2"	GROSS WEIGHT (APPROX.)	2840 LBS.
HEIGHT	9'-6 1/2"		
ELEVATOR SPAN	14'-4"		
ELEVATOR CHORD	4'-2"		

1917-1918 Salsomson 2A2  
 PLATE 2 OF 2 DRAWN BY R. Anderson

OVER 700 SALSOMSON 2A2'S WERE PROCURED FROM FRANCE BY THE A.E.F. MAKING THE TYPE SECOND ONLY TO THE SPAD XIII IN NUMBERS USED BY AMERICANS. THE 2A2 ENJOYED A GOOD REPUTATION. IT HELD TOGETHER WELL AND WAS VERY RUGGED AND DEPENDABLE. AVERAGE IN SPEED, THE 2A2 WAS A WORK HORSE BUT HAS NOT EXPERIENCED THE FICTIONAL GLAMOUR OF SOME OF THE OTHER TYPES SUCH AS THE DH-4. IT HAD A SIMILARLY LONG POSTWAR EXISTENCE.

# Siemens-Schuckert

drawings by WILLIAM WYLAM

## D.IV

AS A FIGHTING machine, the SS D.IV was as potent as anything developed by the warring nations of WWI. By skillful and sometimes ingenious methods, Siemens engineers produced an airplane weighing no more than its predecessor, the D.III, but with a reduced wing area and a much higher combat performance, mostly due to a new engine, the 200-hp Siemens Halske SH.IIIa. Many experts believe that without this engine the D.IV would have been just another airplane. The engine was unique among rotaries in that the crankshaft revolved in one direction and the cylinders and crankcase revolved in the opposite direction, thus giving an equivalent engine speed of 1,800 rpm with a propeller speed of 900 rpm, a direct 2-1 reduction. This feature allowed the use of a huge four-bladed propeller that was streamlined with a spun aluminum spinner.

From the pilot's standpoint, the Siemens-Schuckert D.IV was an excellent airplane in which to go to war. Its ability to climb rapidly at high altitudes where other aircraft were sluggish was one of its best attributes. It was easily controlled



and very responsive, although according to pilot reports it had a nasty stall.

Because it was produced in the last stages of WWI, it was too late arriving to have much influence over the fate of the Germans.

An Albatros-built experimental model with long wings for high-altitude flight is stored in Poland. □

*Utilizing a rotary engine and a huge reverse rotating propeller, the D.IV could out-climb its adversaries.*

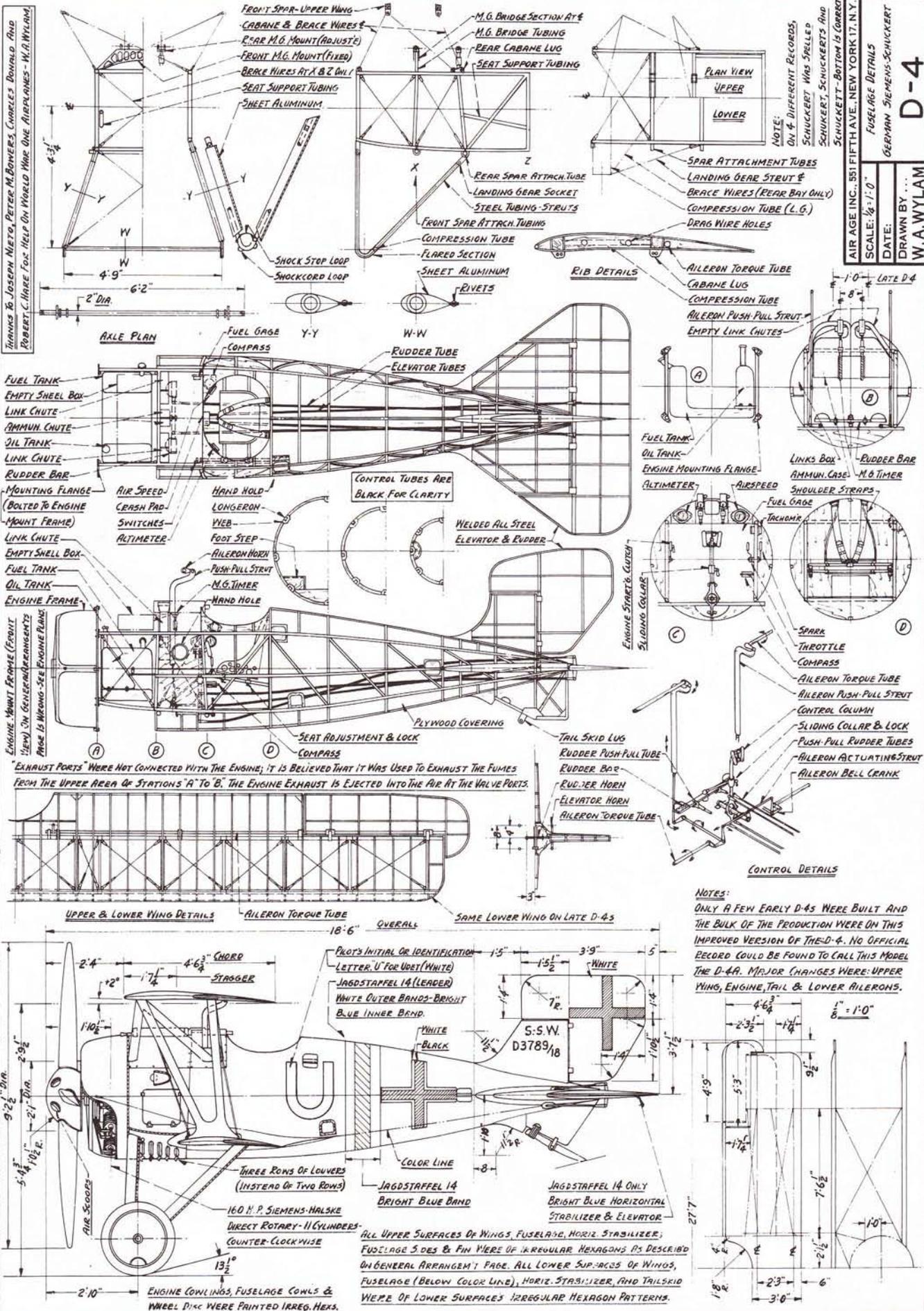


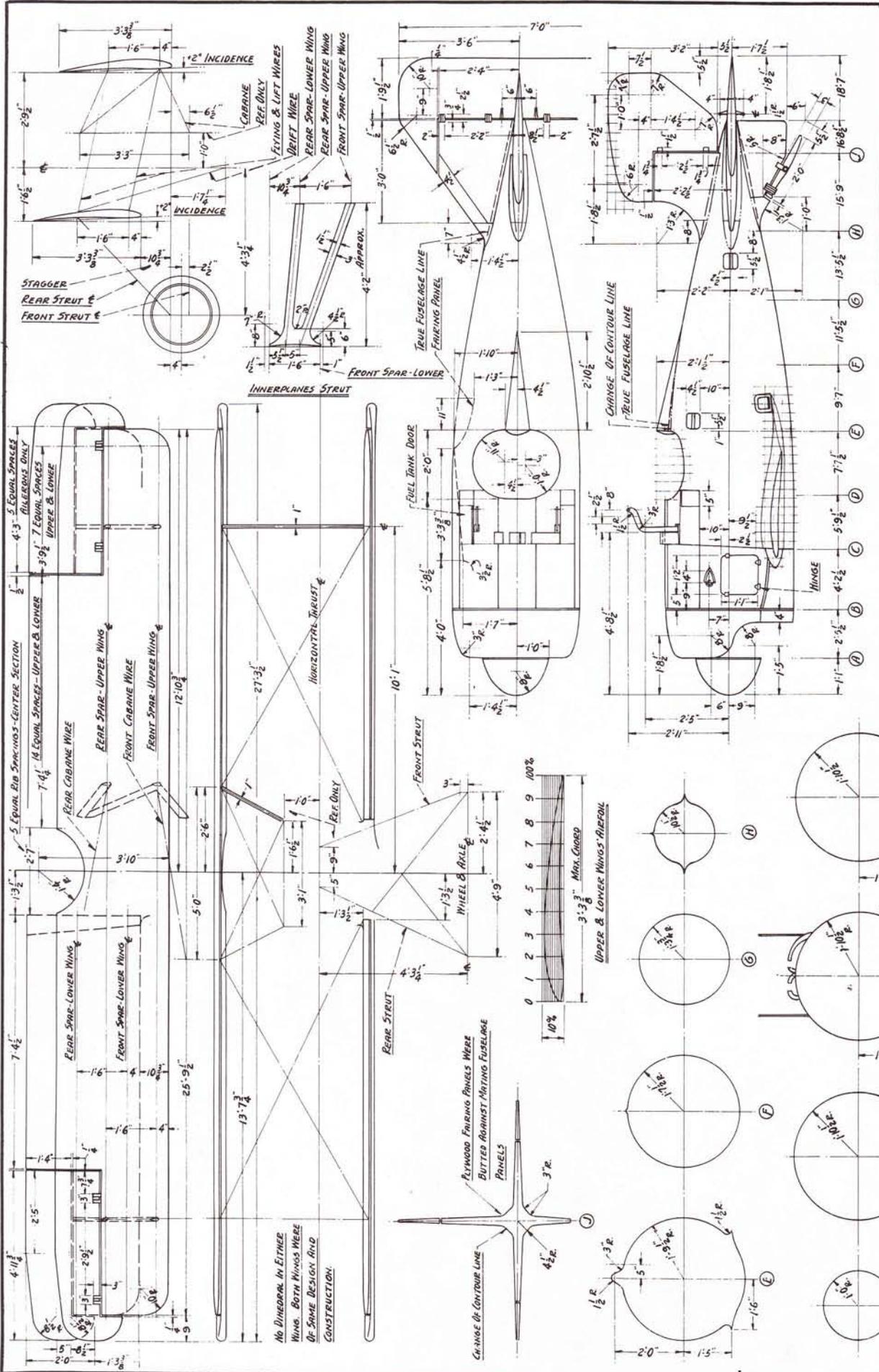
*Profile view of the D.IV shows the stubbiness of the design, almost bulldog-like. "Jane's All the World's Aircraft" photos.*



THANKS TO JOSEPH NIETO, PETER M. BOWERS, CHARLES DONALD, AND ROBERT C. HARE FOR HELP ON WORLD WAR ONE AIRPLANES - W.A. WYLAM

NOTE:  
ON 4 DIFFERENT RECORDS  
SCHUCKERT WAS SPELLLED  
SCHUCKERT, SCHUCKERTS AND  
SCHUCKETT - BOTTOM IS CORRECT  
AIR AGE INC., 551 FIFTH AVE., NEW YORK 17, N.Y.  
SCALE: 1/8" = 1'-0"  
DATE: ...  
DRAWN BY: ...  
GERHARD SIEMENS-SCHUCKERT  
D-4





AIR AGE INC., 551 FIFTH AVE., NEW YORK 17, N.Y.  
 SCALE:  $\frac{1}{4}'' = 1'-0''$   
 LAYOUT PLANS & DATA  
 DRAWN BY ...  
 W.A. WYLAM  
 GERHARD SIEMENS-SCHUKERT  
 D-4

# Sopwith Camel

drawings by WILLIAM WYLAM

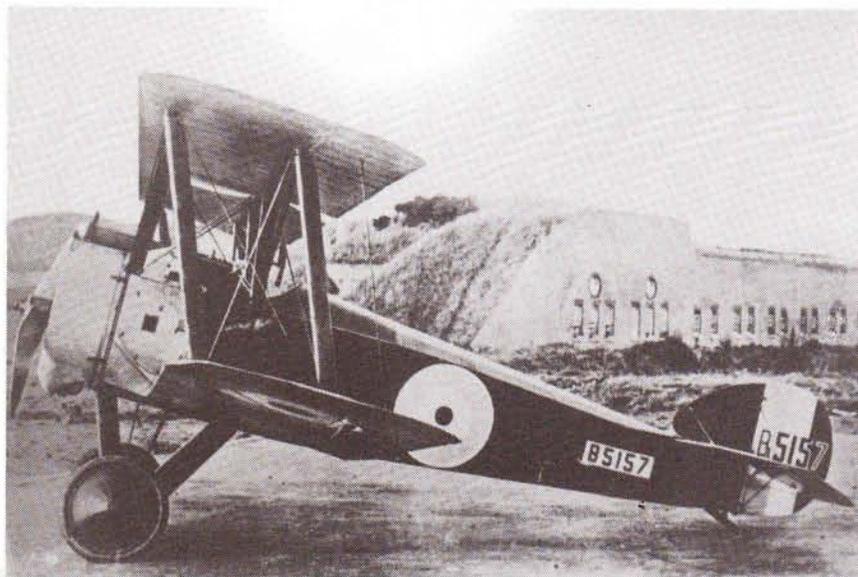
**T**HE SOPWITH Camel was the most widely and most numerous produced aircraft of WW I. A total of 5,490 Camels were constructed by at least nine manufacturers and the design was considered to be one of the best dog fighters of the 1914-1918 conflict. The Camel was responsible for the destruction of more German aircraft than any other design and was the first British aircraft designed for two forward-firing machine guns. Two versions, the F.1 and the 2F.1, were produced, the latter for the Royal Navy with shorter wings, smaller tail surfaces, and a larger engine. It changed the course of Naval aviation. Needing a weapon to counter the activities of German dirigibles that had previously exercised surveillance of British Naval activities without jeopardy, the Camel was to become the first successful attempt to counter the high-flying Germans. On August 11, 1918, Sub-Lieutenant Stuart D. Culley, an American-born member of the British Royal Air Force, took off from a platform in tow by a British destroyer and climbed to 18,000 feet in pursuit of the German dirigible L.53.

Finding the dirigible in his sights at 19,000 feet, Culley's Camel staggered and strained to maintain flight as he emptied his guns upward and directly at the dirigible. The L.53 seemed unaffected until suddenly it burst into flames and dropped into the sea. This was the first aerial victory by a shipboard aircraft.

Culley's Camel is now exhibited at London's Imperial War Museum: there are five other Camels in other museums. □

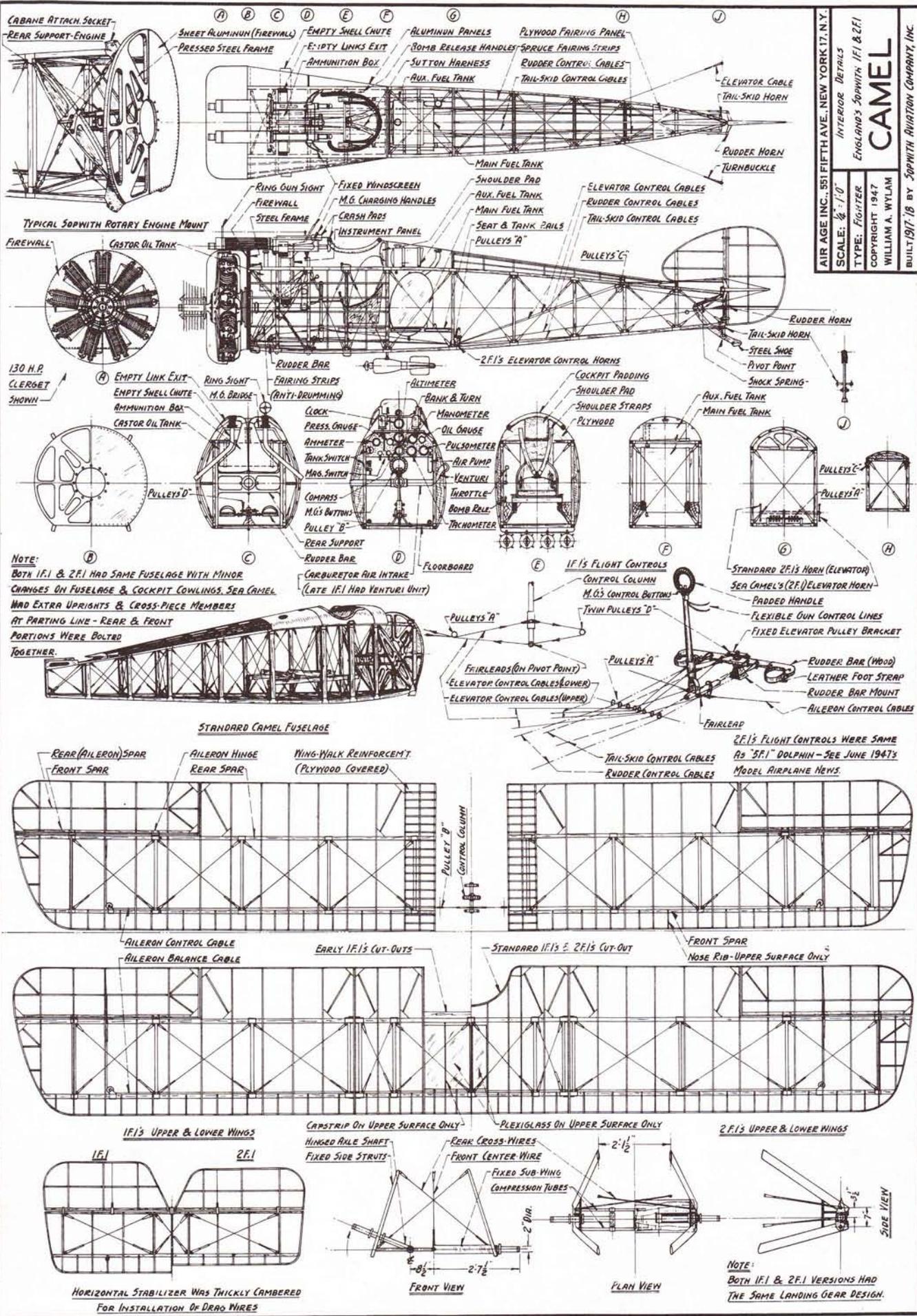


*The Sopwith Camel was produced in large quantities during WW I. Air Age file photo.*



*Responsible for the destruction of more German aircraft than any other Allied design, the Sopwith Camel was also adapted for use by the Royal Navy. Photo courtesy of Leonard Opdycke, WW I Aeroplanes.*





AIR AGE INC., 551 FIFTH AVE., NEW YORK 17, N.Y.  
 INTERIOR DETAILS  
 ENGLAND'S SOPWITH: IF.1 & 2F.1  
 TYPE: FIGHTER  
 COPYRIGHT 1947  
 WILLIAM A. WYLAND  
 BUILT BY SOPWITH AVIATION COMPANY, INC.



# Sopwith Dolphin 5F.1

drawings by WILLIAM WYLAM



**T**HE DESIGN of the Dolphin began as a scratch-pad doodle in the engineering rooms of Sopwith Aviation during the summer of 1916. The doodling engineers pointed with pride at their thumbnail sketches of what might be, if only a 190-hp water-cooled engine were available.

Then, like a bolt from the blue, word came that Wolsley Motors had obtained a license from Hispano-Suiza to manufacture their new 200-hp geared engine. With the promise of an appropriate powerplant, the doodle soon became an engineering project and the forces of Sopwith immediately went to work on Model 5F.1. It was nicknamed "Dolphin" in accordance with Sopwith's custom of naming their products after animals, fish, or fowl.

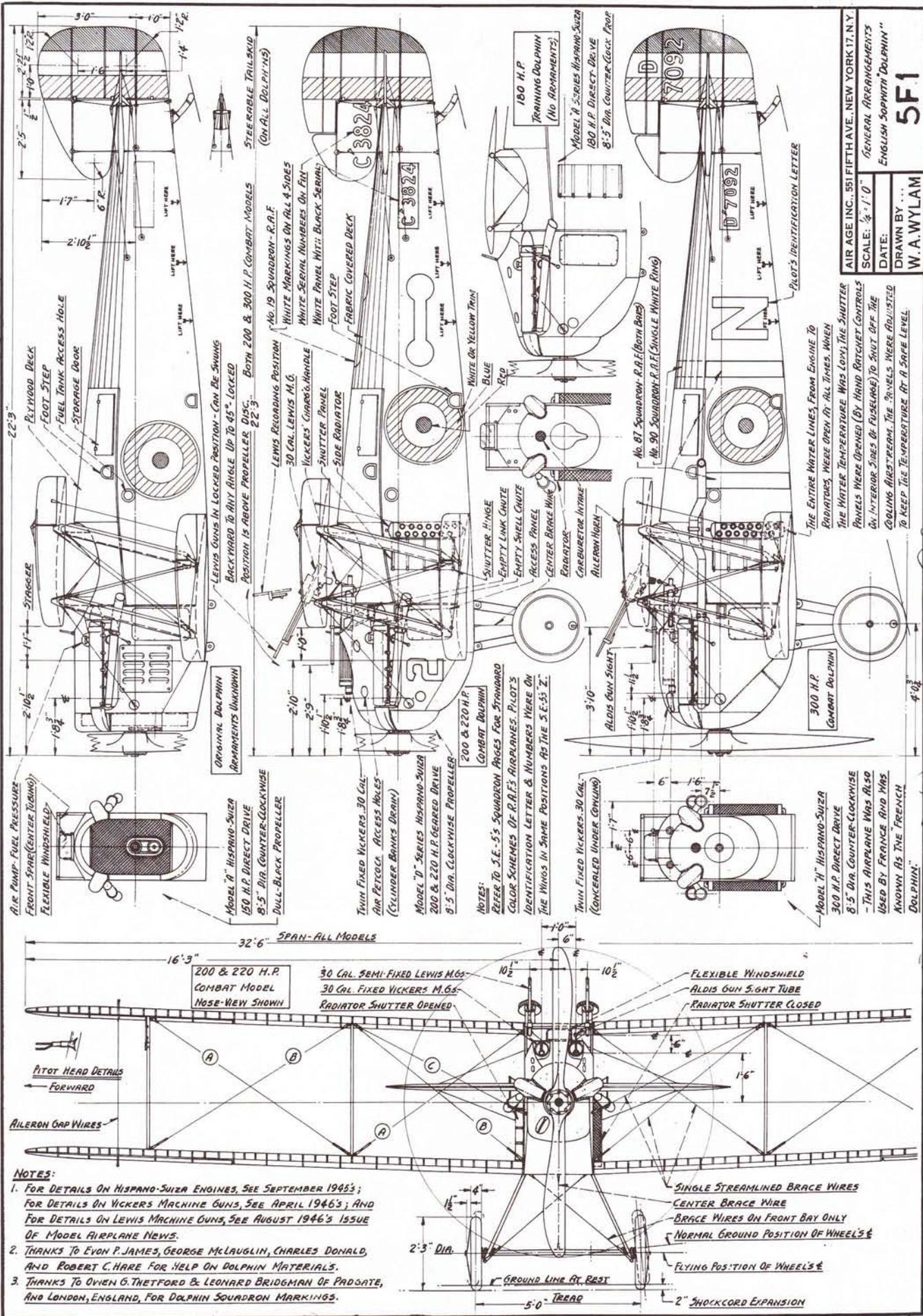
In performance, the production Dolphins left little to be desired for a 1918 service type. The first operational models

officially weighed in at 1,406 pounds empty and grossed 1,881 pounds. Fuel, weighing 194 pounds and sufficient for a 230-mile range, was included in this gross figure. The top speed was 136 mph at sea level and it had a landing speed of 40 mph.

As an all-around single-seater, the Dolphin exceeded anything the British manufacturers were able to put out in squadron quantities before WWI ended. Other types perhaps bettered it in specific items of performance, but as a package the 5F.1 was hard to beat. It possessed enough good characteristics that a 300-hp version was built and tested for production in 1919 and which the U.S. and French air services were contracting at the time of the Armistice.

One Dolphin lives in the RAF Museum in London. □

*Conceived in 1916 as an answer to Allied air squadrons' requirements for air superiority, the Sopwith Dolphin 5F.1 was slow in coming and hardly fulfilled its combat credentials. Air Age file photo.*

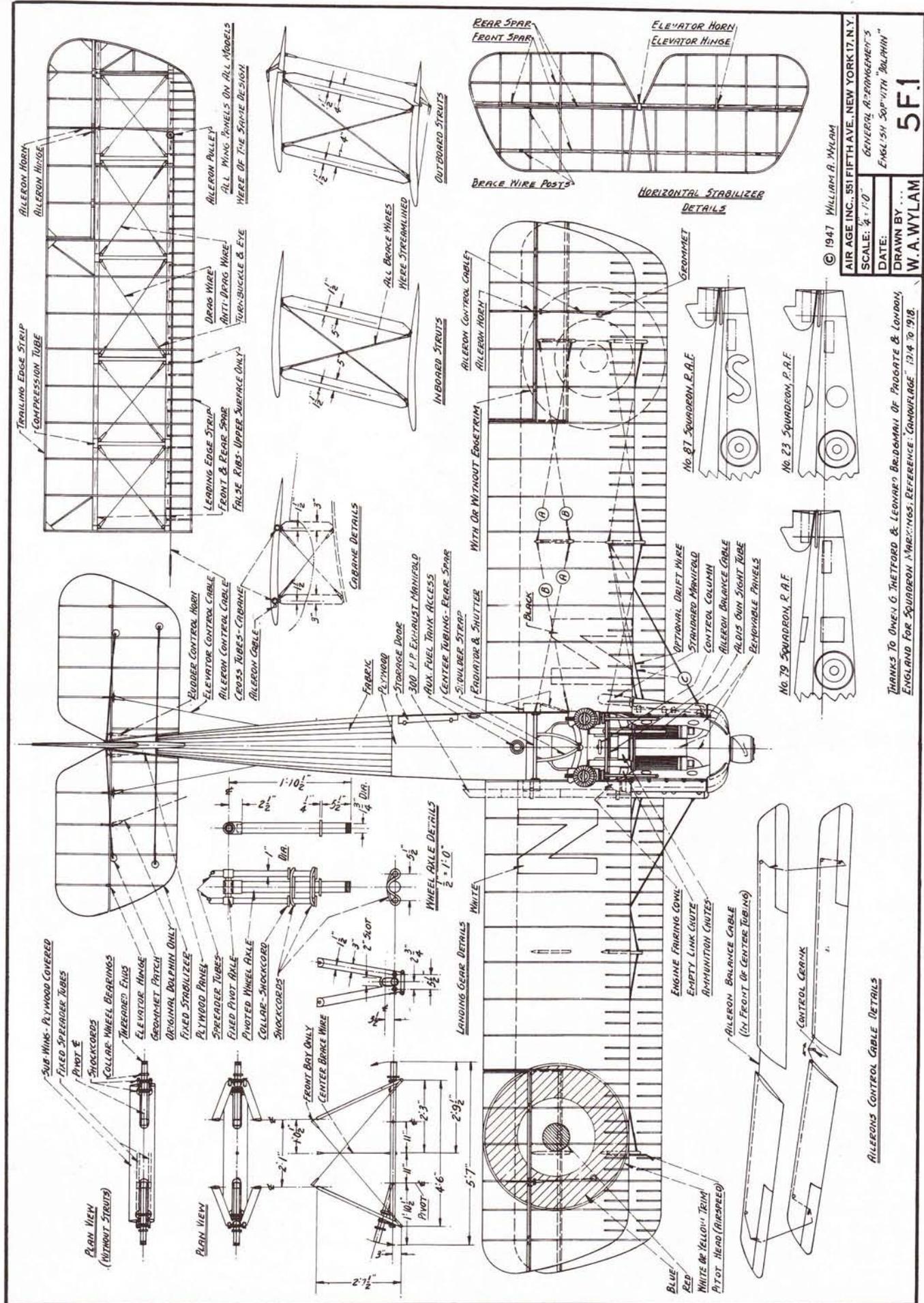


AIR AGE INC., 581 FIFTH AVE., NEW YORK 17, N.Y.  
 GENERAL ARRANGEMENTS  
 SCALE: 3/4" = 1'-0"  
 DATE: ...  
 DRAWN BY: W.A. WYLAM

5F1

ENGLISH SOPHIA DOLPHIN

- NOTES:**
- FOR DETAILS ON HISPANO-SUIZA ENGINES, SEE SEPTEMBER 1945; FOR DETAILS ON VICKERS MACHINE GUNS, SEE APRIL 1946; AND FOR DETAILS ON LEWIS MACHINE GUNS, SEE AUGUST 1946'S ISSUE OF MODEL AIRPLANE NEWS.
  - THANKS TO EYON P. JAMES, GEORGE MCLAUGHLIN, CHARLES DONALD, AND ROBERT C. HARE FOR HELP ON DOLPHIN MATERIALS.
  - THANKS TO OWEN G. THETFORD & LEONARD BRIDGMAN OF PADGATE, AND LONDON, ENGLAND, FOR DOLPHIN SQUADRON MARKINGS.



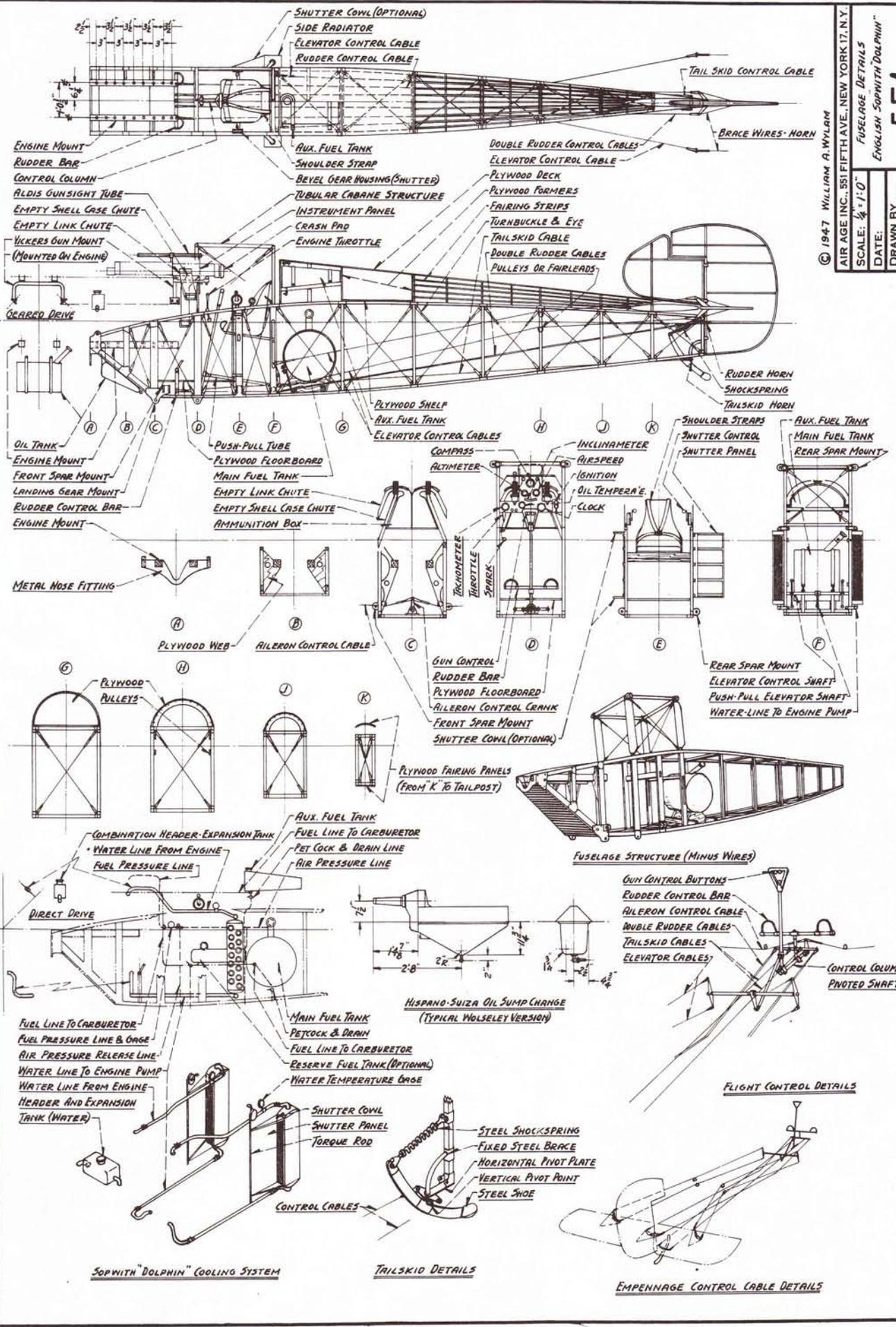
© 1947 WILLIAM A. WYLAM  
 AIR AGE INC., 551 FIFTH AVE., NEW YORK 17, N.Y.  
 GENERAL ARRANGEMENTS  
 SCALE: 1/4" = 1'-0"  
 DATE:  
 DRAWN BY  
 W. A. WYLAM

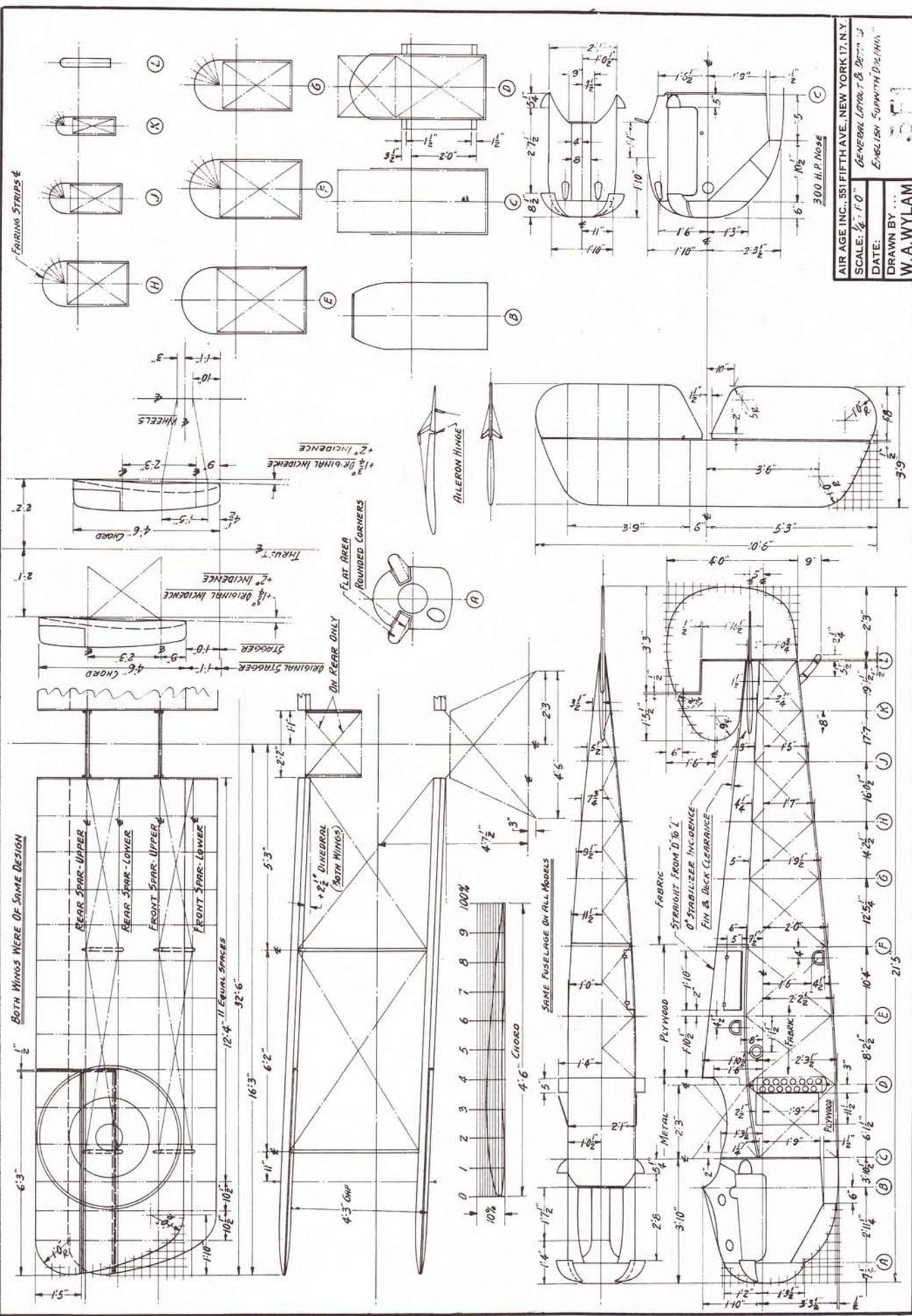
THANKS TO OWEN G. THETFORD & LEONARD BEDSMAN OF PRADGATE & LONDON, ENGLAND FOR SQUADRON MARKINGS. REFERENCE: "CAMOUFLAGE" 13.4 TO 19.8.

5F.1

© 1947 WILLIAM A. WYLAM  
 AIR AGE INC. 551 FIFTH AVE., NEW YORK 17, N.Y.  
 FUSELAGE DETAILS  
 SCALE: 1/2" = 1'-0"  
 DATE: ...  
 DRAWN BY ...  
 W. A. WYLAM

5F.1



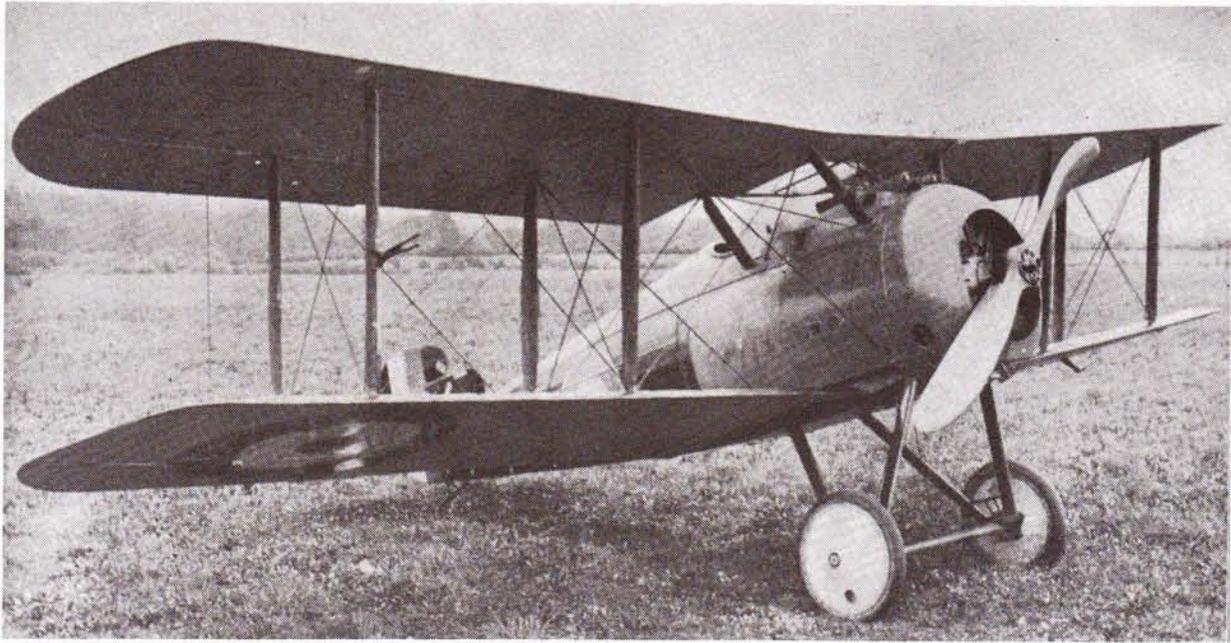


AIR AGE INC. 551 FIFTH AVE., NEW YORK 17, N.Y.  
 SCALE: 1/4" = 1'-0"  
 DATE: ...  
 DRAWN BY ...  
 W.A. WYLAM

GENEAL LAYOUT & DESIGN BY  
 ENGLISH SUPPLY DELPHI

# Sopwith Snipe 7F.1

drawings by JOSEPH NIETO



*The Sopwith Snipe 7F.1 followed the successful Sopwith Camel and was used by the British until 1926. Air Age file photo.*

**I**NTRODUCED as a successor to the famous Sopwith Camel, the Snipe first reached the Western Front in September 1918. In the three months before the war's end it proved the best of the Allied fighters, though less than a hundred were in action. It was while flying a Snipe that Major W.G. Barker of No. 201 Squadron fought his celebrated single-handed engagement with 15 Fokker D.VIIIs on October 27, 1918, for which he was awarded the Victorian Cross. The fuselage of Barker's aircraft is to be seen at the Canadian War Museum in Ottawa.



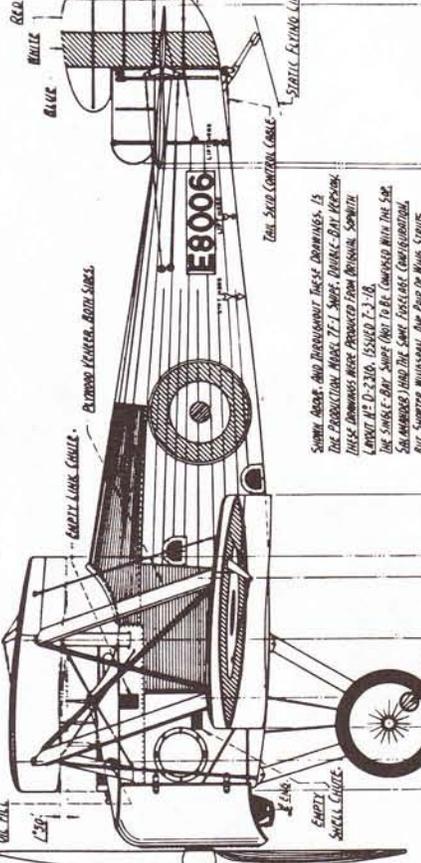
*The prototype Snipe had single-bay wings. Photo courtesy of Leonard Opdycke, WW I Aeroplanes.*

Of a wooden structure and fabric covering, the makers' designation of the aircraft was the Sopwith 7F.1. Powered by a Bentley B.R.2 engine that developed 230 hp, the Snipe was able to achieve a maximum speed of 121 mph at 10,000 feet and had a rate of climb of 970 fpm.

Due to financial stringencies applied to the British air services, the Snipe remained active with fighter squadrons until as late as 1926.

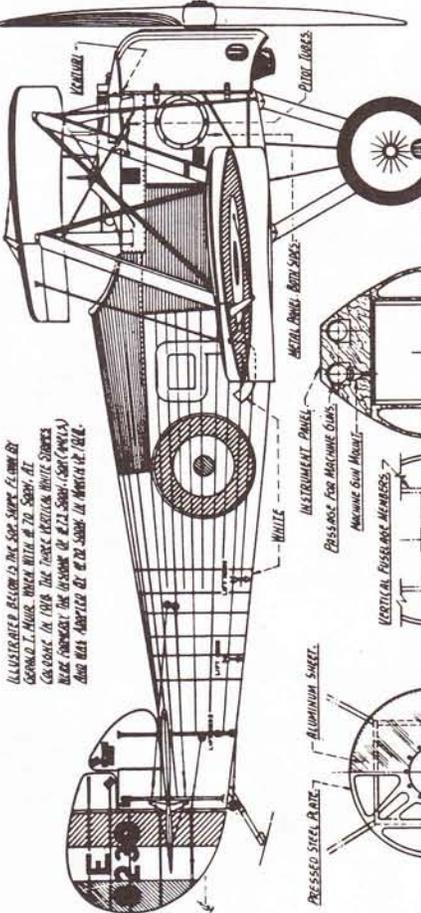
Four other Snipes can be seen in other museums. □

OVERALL LENGTH 12'-6"

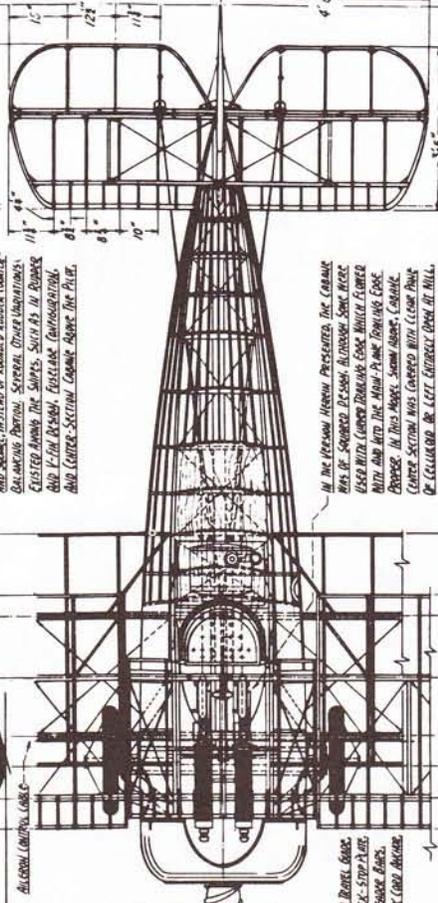


SOME BEAMS AND DIMENSIONS THESE DRAWINGS IS THE PRODUCTION DRAWING. IF ANY DIMENSIONS OR PARTS DIFFER FROM THESE DIMENSIONS WERE PROVIDED FROM ORIGINAL DRAWING, CHECK THE D-2016, ISSUED 7-1-38.

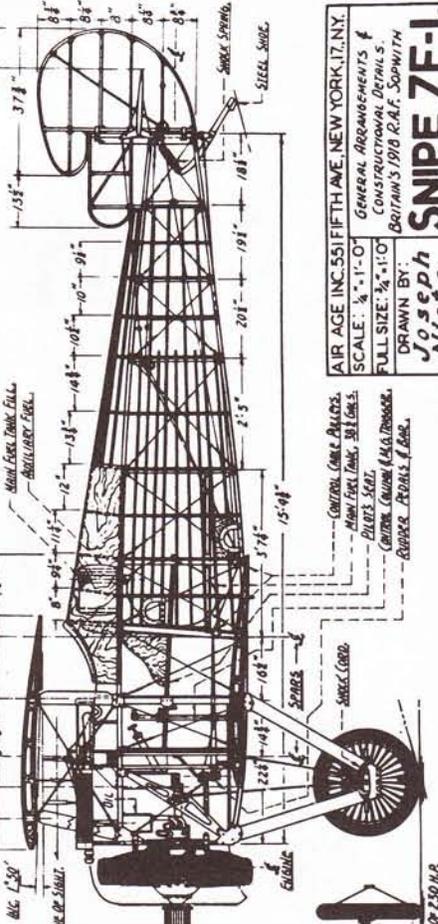
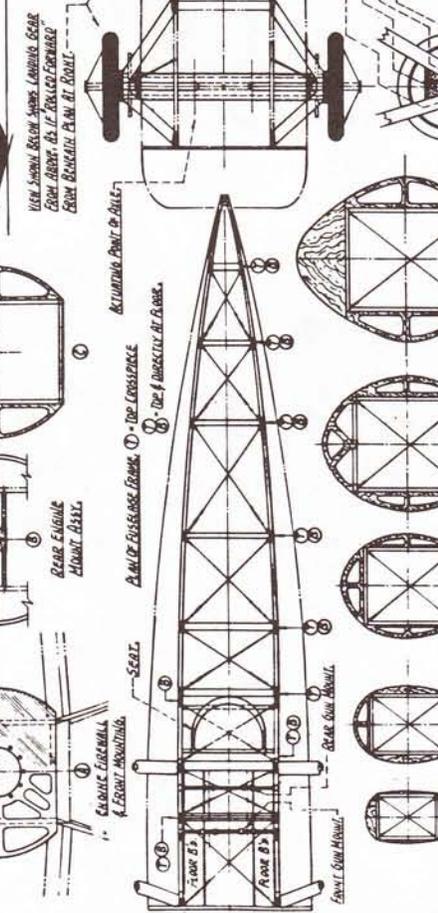
THE SNIPER-BUTT SHOTS (AND TO BE COVERED WITH THE SNIPER-ROOF) HAD THE SAME TIGHTNESS (CONSTRUCTIONAL BUT SHORTER) THAN THE SNIPER-BUTT STRIPS AND SPACES, INSTEAD OF ROUND BLOWER COUPLERS, CUSTOMER ASKING THE SNIPER, SUCH AS IN BLOWER AND UP IN FRONT, BETWEEN CONSTRUCTIONAL AND CENTER SECTION, COVERING SHIP IN PLACE.



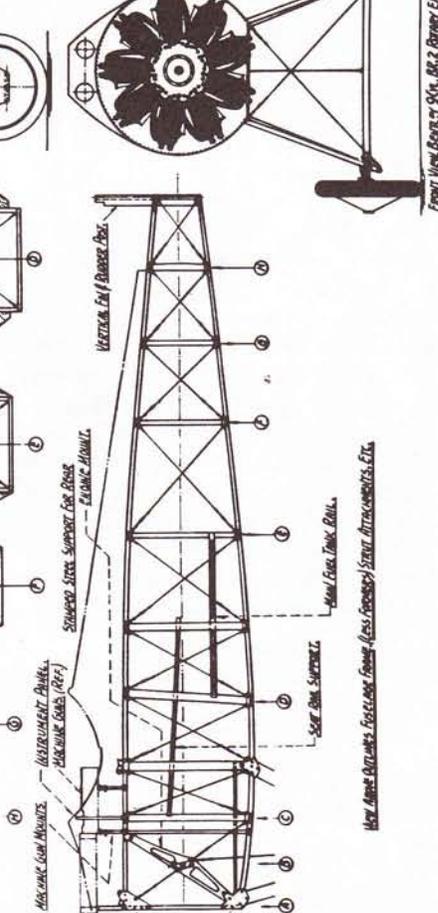
ILLUSTRATED BELOW IS THE SNIPER'S VIEW OF GENERAL VIEW WHEN WITH THE SNIPER AT COULD IN THE SNIPER SECTION OF THE SNIPER. THE SNIPER SECTION OF THE SNIPER (PART A) AND WAS ADAPTED BY THE SNIPER IN PART OF THE...



IN THE FUSELAGE AREAS PRESENTED THE FRAME RIGS OF SQUARE TUBES, ALTHOUGH SOME ARE USED WITH CORNER TUBES AND WELLS PLACED WITH THEM AND THE MAIN LINE WORKING CASE. CHANGE IN THIS MAP, SOME BEAMS, CANALS, CENTER SECTION WAS COVERED WITH CORNER PIPE OF GALVANIZED OR LECT. ALTHOUGH OPEN AT WALL.



CONTROL PANEL, ALTHOUGH MAIN FUEL TANK, 30 GALS. FUEL TANK, 30 GALS. CONTROL PANEL, ALTHOUGH MAIN FUEL TANK, 30 GALS. CONTROL PANEL, ALTHOUGH MAIN FUEL TANK, 30 GALS. CONTROL PANEL, ALTHOUGH MAIN FUEL TANK, 30 GALS.

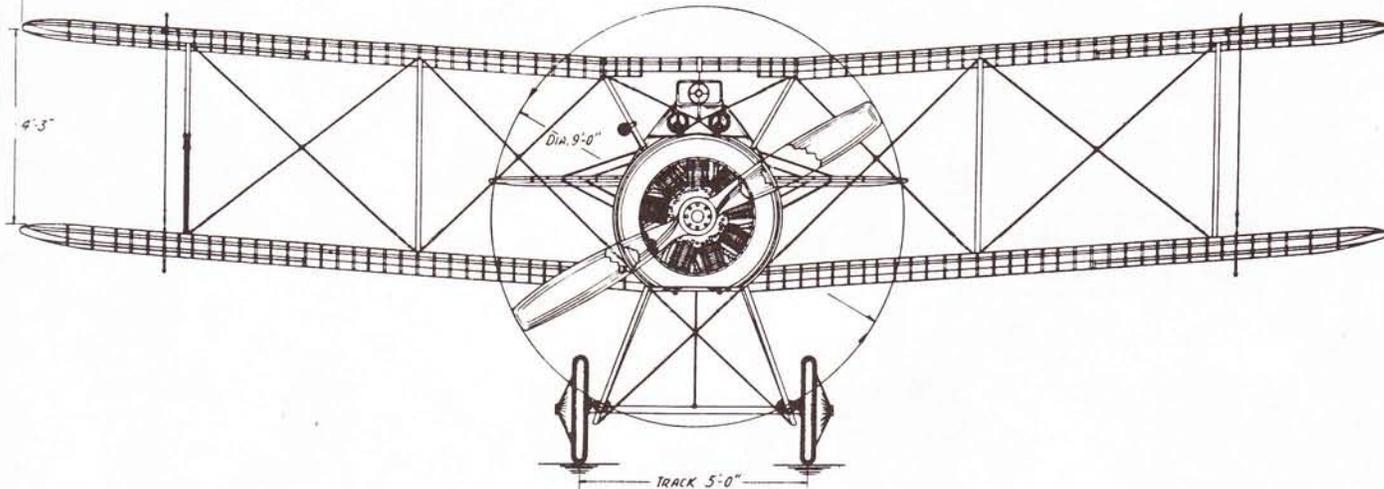


VIEW ABOVE BUT WITH THE SNIPER'S VIEW (PART A) AND WAS ADAPTED BY THE SNIPER IN PART OF THE... (This text is partially obscured and partially overlaps with the diagram above it).

CONTROL PANEL, ALTHOUGH MAIN FUEL TANK, 30 GALS. FUEL TANK, 30 GALS. CONTROL PANEL, ALTHOUGH MAIN FUEL TANK, 30 GALS. CONTROL PANEL, ALTHOUGH MAIN FUEL TANK, 30 GALS.

**AIR AGE INC. 55 FIFTH AVE. NEW YORK 17, N.Y.**  
**SCALE: 1/4" = 1'-0"**  
**GENERAL ARRANGEMENTS & CONSTRUCTIONAL DETAILS**  
**FULL SIZE: 3/4" = 1'-0"**  
**DRAWN BY: Joseph Nieto**  
**BRITAIN'S 1918 R.A.F. SOPWITH**  
**SNIPER 7F-I**

SPAN, BOTH PLANES, 30'-0"

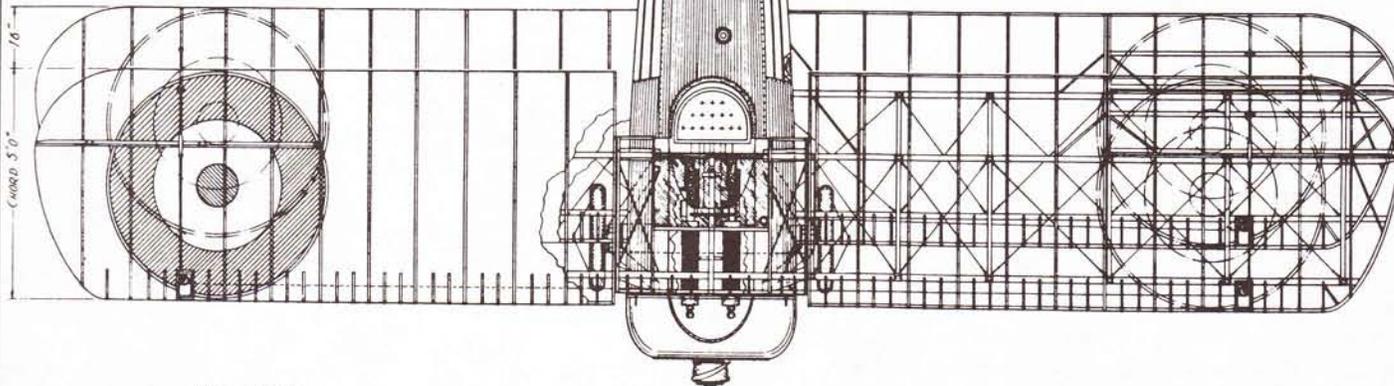
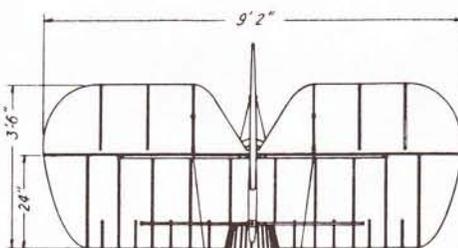


THE BRITISH SOPWITH "SNIPES" SINGLE SEATER FIGHTER TYPE 77-1 OF 1918, WAS BUILT BY SOPWITH AVIATION CO. LTD., KINGSTON ON THAMES, ENGLAND, AND IS REPUTED TO HAVE BEEN THE BEST ALL-ROUND FIGHTING SCOUT PRODUCED BY ANY NATION DURING THE FIRST WORLD WAR. IN DEFINING ITS APPROPRIATE NICKNAME, "TO SHOOT FROM A CONCEALED PLACE AT THOSE WHO BECAME DETACHED FROM A MAIN BODY OF FORCE", THE SNIPES WAS FIRST ATTACHED TO THE BRITISH R.F.C., FEB. 9, 1918, SERVING CONTINUOUSLY THROUGH NOV. 11, AND SUBSEQUENTLY CARRIED ON WITH K.R.F. FIGHTER SQUADRONS UNTIL THE MIDDLE THIRTIES. MASS PRODUCTION ON THE SNIPES WAS STARTED IN THE LATTER HALF OF 1918, AND BY DECEMBER OF THAT YEAR, 500 HAD BEEN BUILT. OF THAT NUMBER, 79 OF THEM WENT TO NO. 43 SQDN. AT BOURNVCOURT, IN SEPT. 1918, REPLACING CAMELS, NO. 71 SQDN. (NO. 4 AUSTRALIAN, A.F.C.) AT ENNETIERES, IN NOVEMBER, IN PLACE OF CAMELS, NO. 81 SQDN. (ARRIVING AT THE WESTERN FRONT IN SEPT. 1918 WITH SNIPES) NO. 201 & 208 (8 NAVAL) BOTH REPLACING BENTLEY CAMELS. PROBABLY THE MOST FAMED SNIPES WAS THAT FLOWN BY MAJOR W. G. BARKER, WHILE C.O. OF NO. 201, WHICH REPLACED CAMELS WITH SNIPES IN SEPT. 1918. BARKER RECEIVED THE LANCET VICTORIA CROSS AFTER BEING ATTACKED BY 60 GERMAN PLANES. HE FIGHT BACK, DOWNING 4 FOKKERS IN FLAMES AND PUT 10 OTHERS OUT OF CONTROL. HIS OFFICIAL RECORD FOR THE DAY WAS 4 VICTORIES, WHICH BROUGHT UP THE TOTAL TO 32. (BARKER'S SNIPES WAS IDENTIFIED BY A SINGLE WHITE, VERTICAL BAR JUST AFT OF THE FUSELAGE COCKPIT.) A SINGLE SNIPES SQUADRON ACCOUNTED FOR 36 ENEMY PLANES IN 4 DAYS, DOWNING 13 OF THESE IN ONE DAY. IN THE SHORT TIME OF ACTION WHICH THE SOPWITH SNIPES HAD AT ITS DISPOSAL IN 1918, IT MADE AN ENVIABLE REPUTATION FOR ITSELF WHICH BORE NO JOY FOR THE EXHAUSTED PILOTS OF THE GERMAN AIR SERVICE.

UNDOUBTEDLY, THE SNIPES SAW SERVICE IN OTHER SQUADRONS NOT RECORDED HERewith, AMONG THESE PERHAPS WERE NO. 70 SQDN. FIRST TO GET CAMELS IN JULY, 1917, IN WHICH SERVED GERALD I. MUIR OF AUSTRALIA, A WAR I AVIATION PILOT, ILLUSTRATOR, PHOTOGRAPHER-COLLECTOR AND FRIEND OF THE AUTHOR, WHOSE SNIPES IS SHOWN IN THESE DRAWINGS WHILE NO. 70 WAS CAMPED AT COLOGNE IN 1918. (NOTE: A SOP SNIPES, FITTED WITH AN A.B.C. ENGINE, ATTAINED A SPEED OF 156 M.P.H. AND CLIMBED TO 10,000 FT. IN 4 1/2 MIN.)

SPECIFICATIONS. (DOUBLE BAY VERSION.)

SPAN (BOTH WINGS) VARIATIONS EXISTED.	30'-0"
OVERALL LENGTH.	19'-6"
HEIGHT AT CENTER SECTION.	8'-9"
WING TIPS.	9'-7"
WING SURFACE INCLUDING AILERONS.	256 sq
DIHEDRAL ANGLE, BOTH WINGS.	4°
INCIDENCE.	1° 50'
CHORD.	5'-0"
GAP.	9'-9"
STABBER (POSITIVE)	1'-9"
HORIZONTAL TAIL PLANE AREA, TOTAL.	26 sq
VERTICAL.	11.75 sq
WING LOADING. (IN POUNDS)	7.5 sq
POWER LOADING. (IN POUNDS PER H.P.)	8.86
WEIGHT EMPTY.	1312 LBS.
OF FUEL & OIL. (38% PETROL & 7% GALS. OIL)	343
MILITARY LOAD & CREW.	365
GROSS WEIGHT OF SHIP.	2020
ENGINE: 9 CYL. BENTLEY BR. 2 ROTARY OF 200-230 H.P.	



- PERFORMANCE -

NORMAL TAKE OFF & R.P.M. @ GROUND LEVEL.		228 AT 13000'S.	
SPEED	TAKE OFF.	AT 6500 FT.	AT 10000 -
	00 M.P.H.	- 10000 -	- 15000 -
	116 -	- 16500 -	
	121 -	- LANDING -	
	11.5 -		
	108.5 -		
	40 -		
CLIMB.	6500 FT. IN 5.2 MIN.	AT 970 FT. PER MIN.	
	10000 - 9.4	- 710 -	
	15000 - 18.5	- 190 -	
	16500 - 23.6	- 260 -	
		- 285.5 FT.	
PERFECT SERVICE		3 HRS.	
MAX. ENDURANCE		3.5 HRS.	
ARMAMENT		200 LBS.	
WEIGHT		2020 LBS.	

MANY, MOST SINCERE THANKS TO KENNY ERNST, INDIANAPOLIS, IND., PAUL R. MATT, CINCINNATI, OHIO, DAKE WILLIAMS, IOWA CITY, IOWA, & TO BOB LUK, BILL KEE, BERGEN HARDESTY, & PETER L. GREY, (LITTON BEDS ENG.) AND ALL OTHER SUCH AVID ENTHUSIASTS WHO HAVE SO GENEROUSLY COLLABORATED WITH ME IN THIS AND WORKS THAT FOLLOW. J. TRAG.

- CONSTRUCTION -

ENTIRE PLANE WAS FABRIC COVERED WOOD CONSTRUCTION. METAL NOSE CONE & SIDE ENGINE PANELS. PLY VENEER SIDES & REAR OF COCKPIT. EXTERNAL WING BRACING & TAIL, STREAMLINED STEEL CABLES (TIERODS).

- COLOR SCHEME -

ENTIRE PLANE COLOURED OLIVE-DRAB (BRITISH KHAKI-GREEN.) METAL PARTS WERE EITHER POLISHED OR PAINTED LIGHT GRAY. LOWER SURFACE OF WINGS EITHER LEFT OLIVE-DRAB OR PAINTED LIGHT IVORY, CREAM, OR SKY BLUE, INSIGNIA COLOURING NOTED, NUMERALS BLACK & WHITE OUTLINE WHERE SO REQUIRED AS SHOWN. COST OF SOPWITH SNIPES TO R.A.F. £ 945.17s.

ADDITIONAL DATA (CHECKED AGAINST SOME DIMENSIONS AS ON SE-5, (MORD BEING 00), LITERAL DIA OF COCKPIT, 59" WITH 2" CLEARANCE AT LOADING & TA. EDGES. WARRIOR ENCIRCLING WHITE RING, 3/4" WIDE, BLUE, WHITE & RED SECTIONS, EQUAL WIDTH OR 113". COCKPIT IN FUSELAGE SIDES WERE ROUGHLY HALVED.

# Spad S.VII C.1

drawings by WILLIAM WYLAM



*A very famous airplane, the French-built Spad VII had an excellent performance capability for WW I pilots. Air Age file photo.*

IT WAS A nervous group of men that stood on Bleriot Field one morning in July 1916, when the first S.VII was about to demonstrate the theories of its engineers.

After successfully producing the Spad A.I to the order of the Russian government in early 1915, the designers rushed to their boards to reconfigure the platform for the then-radical engine designed by Marc Birkigt, the brilliant designer of engines for Hispano-Suiza motor car company. In addition, the youthful M. Bechereau, designer of Deperdussin's record-breaking racing monoplanes of 1912 and 1913 fame, and Louis Bleriot, famed Channel flier and aerodynamic progressive, were among the firm's design staff.

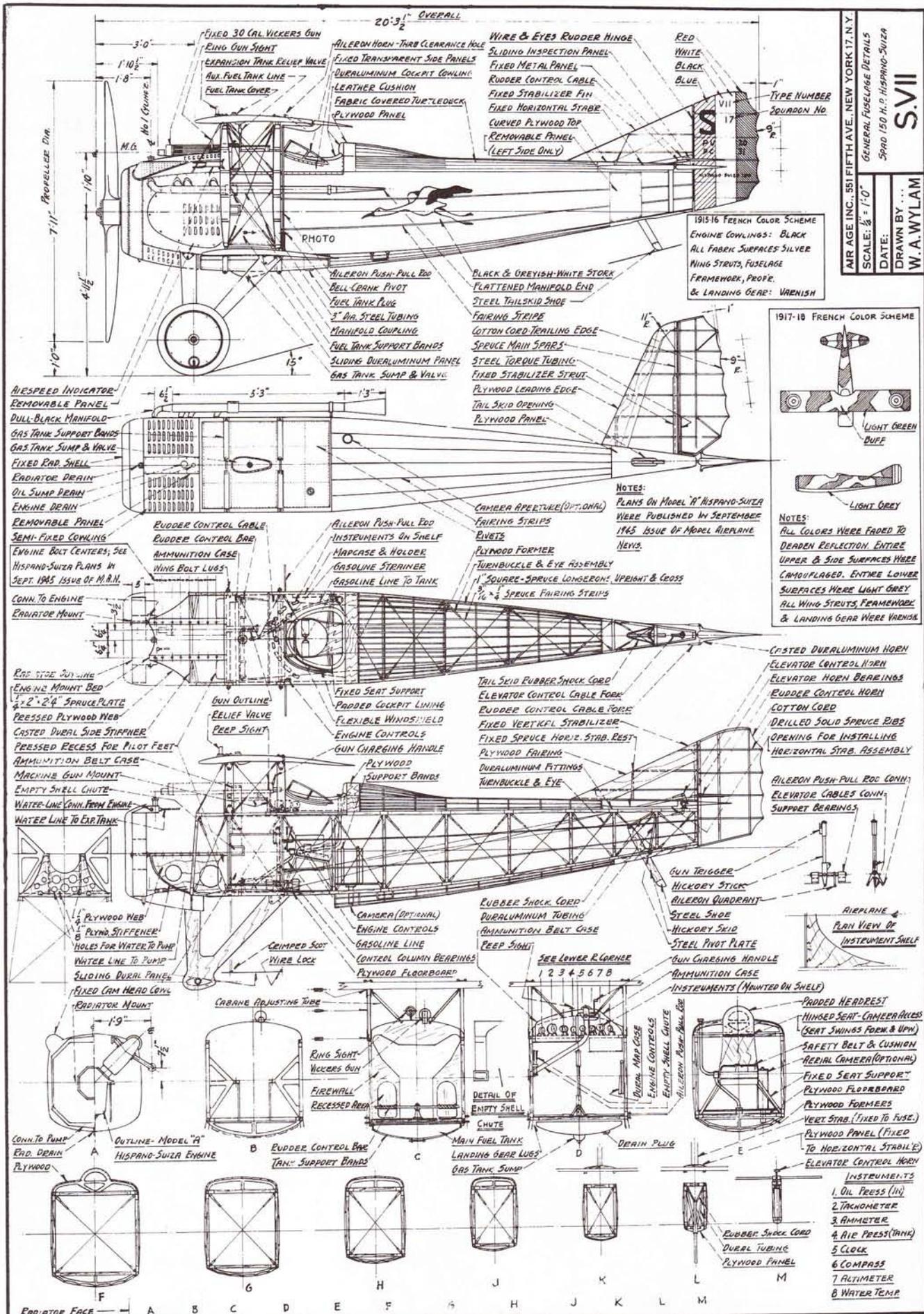
Bechereau was made chief engineer with a free hand as far as designs were concerned. The result was the Spad (Societe Pour Aviation et ses Derives)

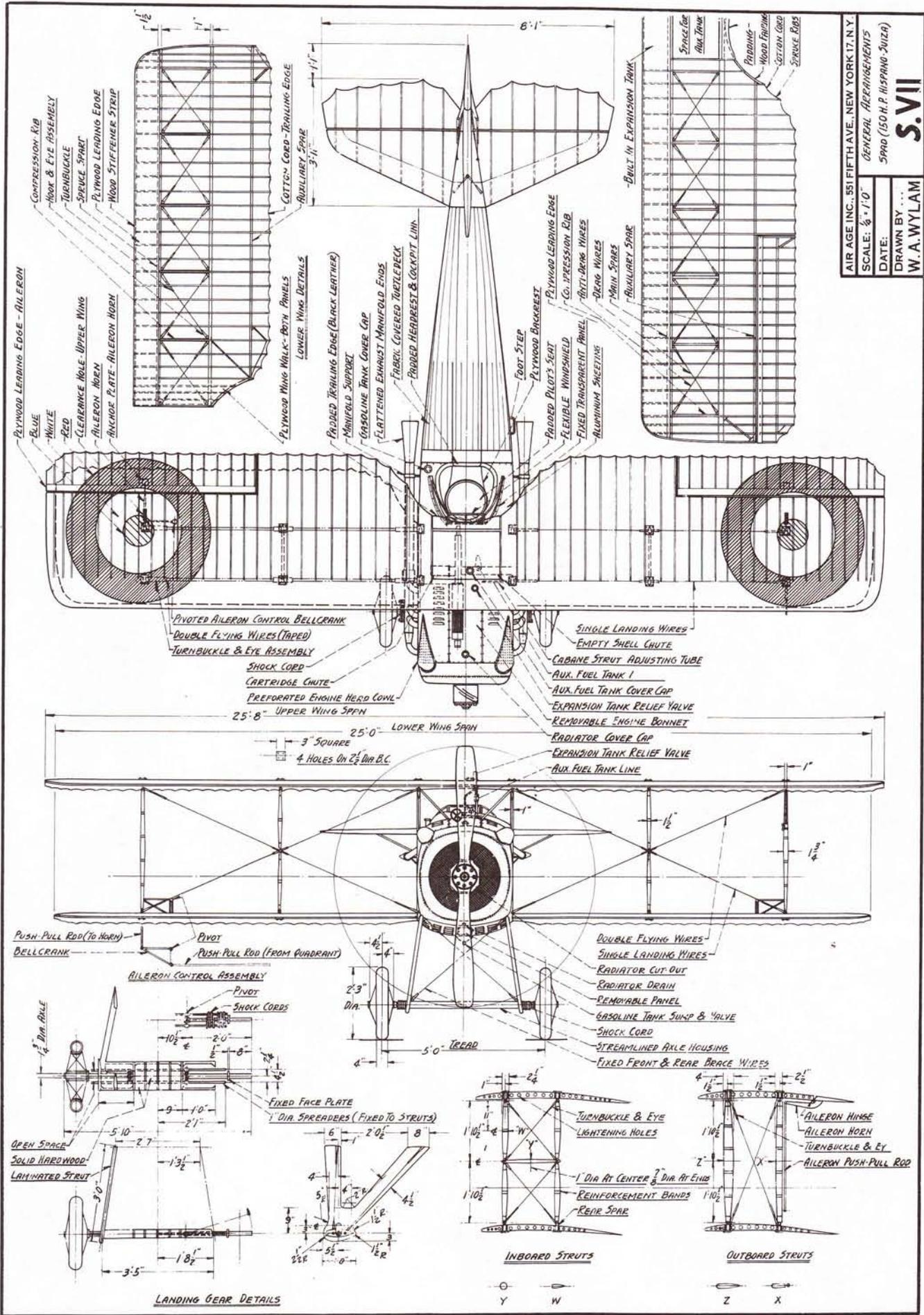
## S.VII.

At the conclusion of the first test flight the fears of the designers were dismissed. Sea-level speed proved to be 123.5 mph, about 5 mph more than anticipated. The rate of climb was quite good, as it attained an altitude of 10,000 feet in 9 minutes 50 seconds, and it found a service ceiling of 15,000 feet.

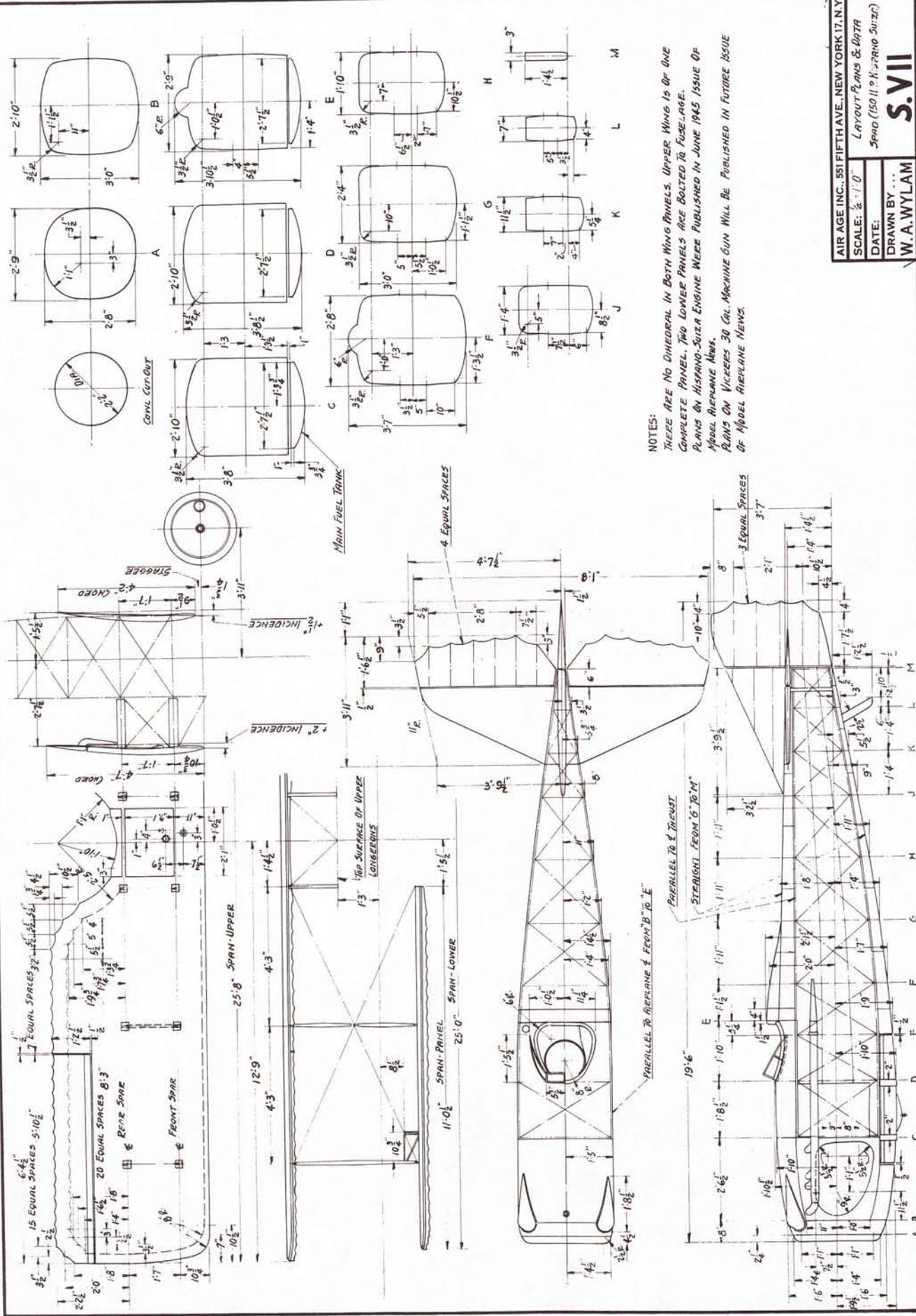
The Spad was retired from replacement stores early in 1918, although several squadrons continued to operate right up to the Armistice. Several hundred S.VIIs were constructed in England for the RAF and they were supplied in large numbers to other Allied forces.

Ten Spad VII's still exist. □





AIR AGE INC., 551 FIFTH AVE., NEW YORK 17, N. Y.  
 SCALE:  $\frac{1}{8} = 1' 0''$  GENERAL ARRANGEMENT'S  
 DATE: 5/24/34 (150 H. P. HISPANO-SUIZA)  
 DRAWN BY: W. A. WYLAM  
**S.VII**

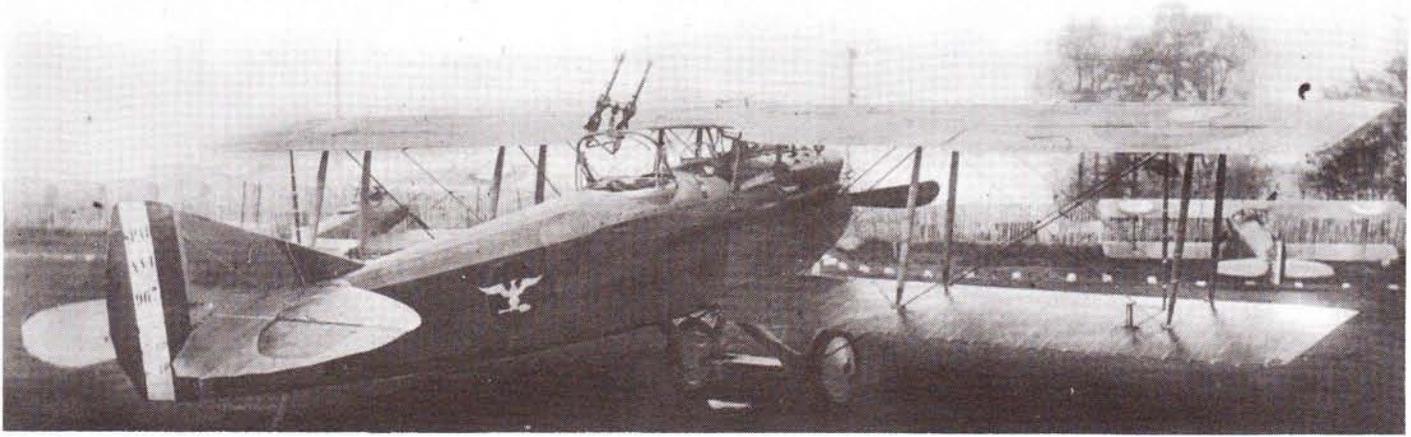


AIR AGE INC., 35 FIFTH AVE., NEW YORK 17, N.Y.  
 SCALE: 1/10"  
 LAYOUT PLANS & DATA  
 DATE: SPAD (150 II) P. H. SPANO 541-27  
 DRAWN BY: W. A. WYLAM  
 S.VII

NOTES:  
 THESE ARE NO DIHEDRAL IN BOTH WING PANELS. UPPER WING IS OF ONE COMPLETE PANEL. TWO LOWER PANELS ARE BOLTED TO FUSELAGE. PLANS ON HISPANO-SUIZA ENGINE WERE PUBLISHED IN JUNE 1945 ISSUE OF MODEL AIRPLANE NEWS. PLANS ON VICKERS 30 CAL. MACHINE GUN WILL BE PUBLISHED IN FUTURE ISSUE OF MODEL AIRPLANE NEWS.

# Spad S.XIA-2

drawings by WILLIAM WYLAM



**F**OLLOWING the great success of the Spad S.VII, French engineers developed from it a two-place reconnaissance version that was to fill a number of operational requirements, such as observation and light bombing. Powered by a 235-hp Hispano-Suiza engine, it entered service from 1917 with French, Belgian, and eventually AEF squadrons. Because of the additional weight gained with the increased size of the fuselage and the

addition of bombs, more armament, etc., performance suffered. It was no match for the German fighters and was an easy target, leading to a re-evaluation of its use.

The Hispano-Suiza engine was changed to a more powerful Lorraine-Dietrich type 8Bb which delivered 250 hp at only 1,650 rpm and redesignated as Spad XVIA-2, but retained the same construction and appearance of the type

XI.

Because it had a proven airframe, the uses and adaptations were many. Although generally disliked by pilots because of its vulnerability, the Spad XI and XVI gave good results in action.

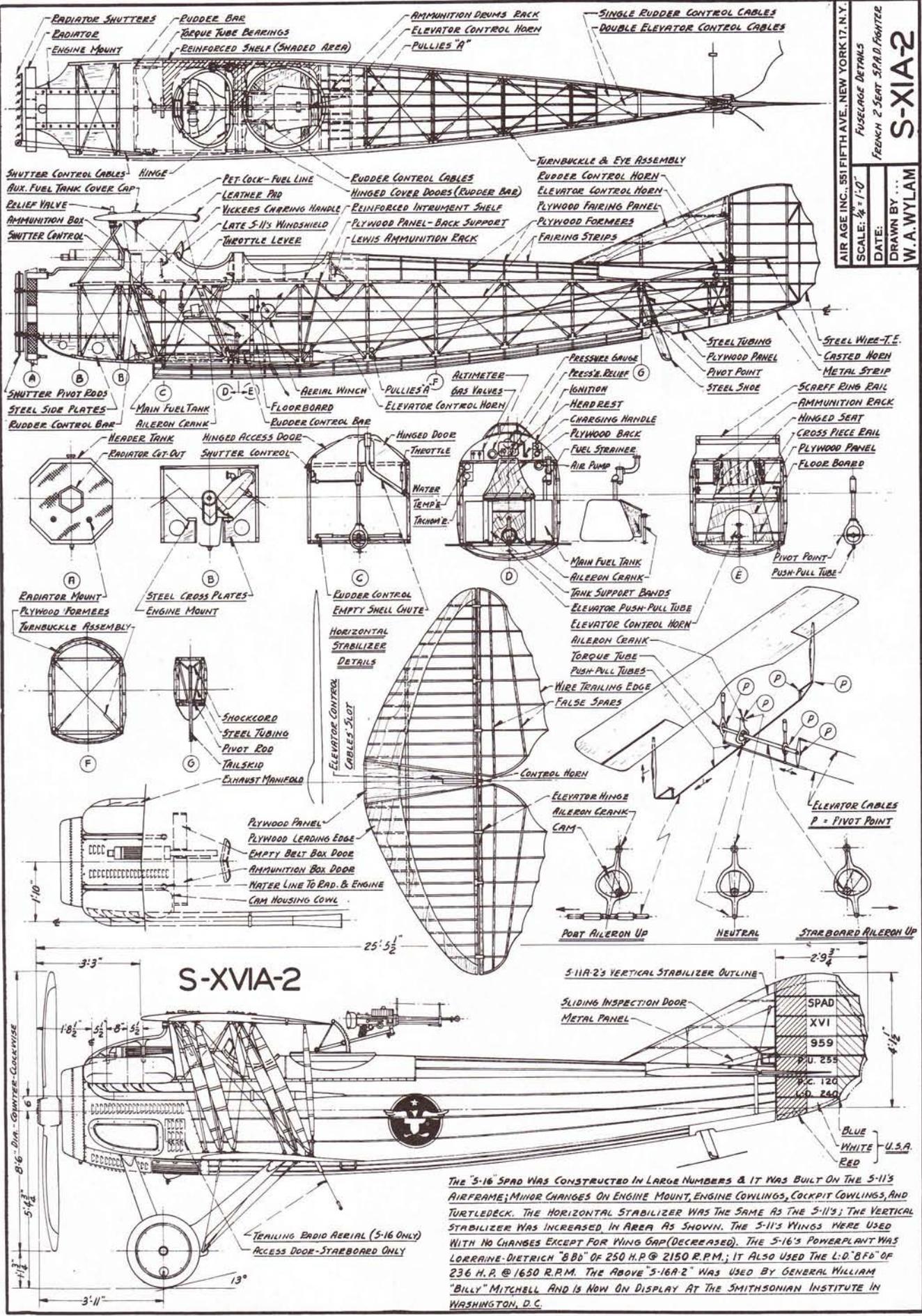
Billy Mitchell's S.XVIA-2 is on show at the National Air & Space Museum in Washington, DC. □



*The Spad S.XIA-2 was a two-place airplane used for observation and light bombing by the Allies. Air Age file photo.*

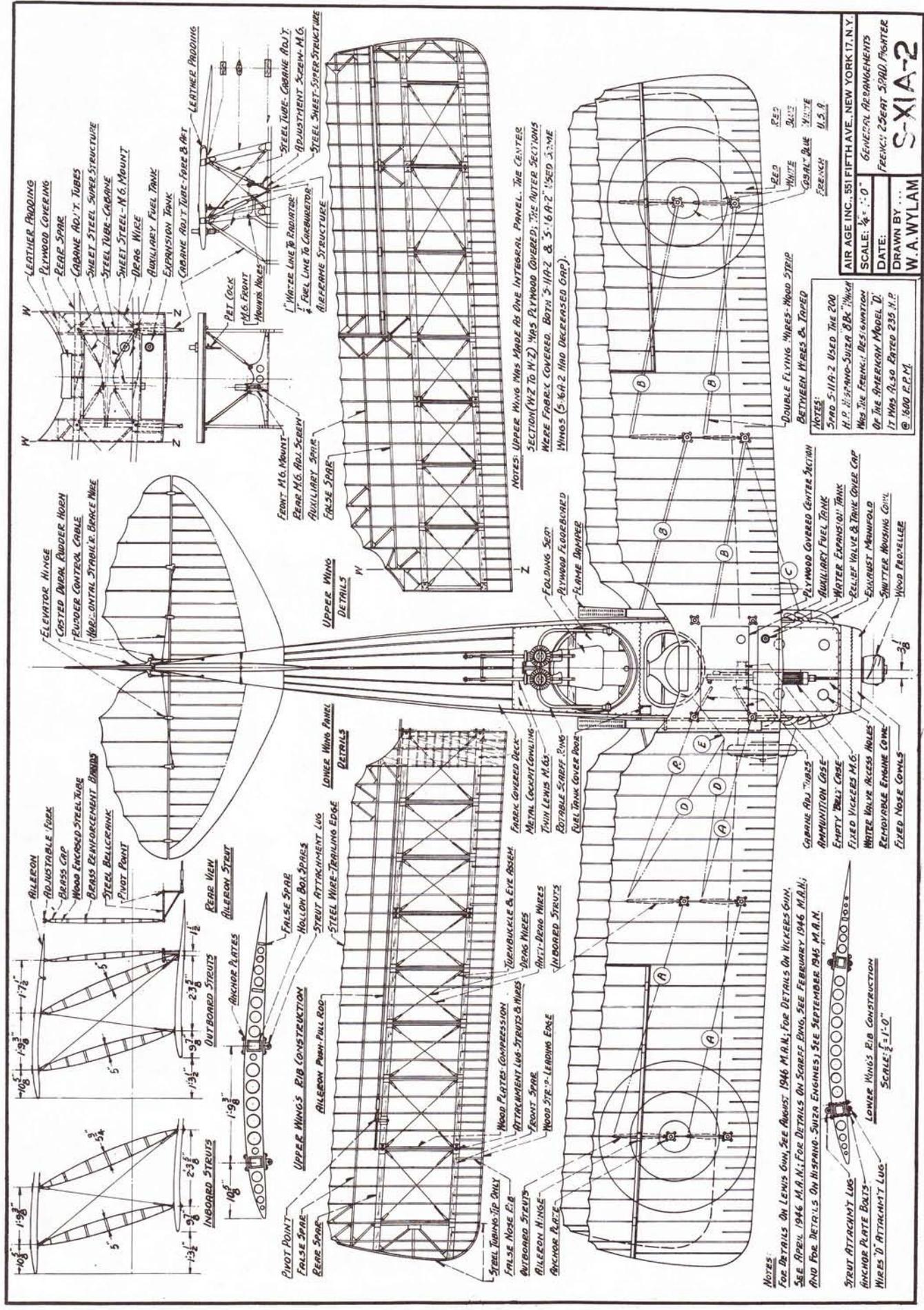
AIR AGE INC. 351 FIFTH AVE., NEW YORK 17, N.Y.  
 SCALE: 1/2" = 1'-0"  
 DATE: ...  
 DRAWN BY: W.A. WYLAM

**S-XIA-2**  
 FUSELAGE DETAILS  
 FRENCH 2 SEAT SPAD FIGHTER



**S-XVIA-2**

The S-16 SPAD WAS CONSTRUCTED IN LARGE NUMBERS & IT WAS BUILT ON THE S-11'S AIRFRAME; MINOR CHANGES ON ENGINE MOUNT, ENGINE COWLINGS, COCKPIT COWLINGS, AND TURTLEDECK. THE HORIZONTAL STABILIZER WAS THE SAME AS THE S-11'S; THE VERTICAL STABILIZER WAS INCREASED IN AREA AS SHOWN. THE S-11'S WINGS WERE USED WITH NO CHANGES EXCEPT FOR WING GAP (DECREASED). THE S-16'S POWERPLANT WAS LORRAINE-DIETRICH "8 Bb" OF 250 H.P. @ 2150 R.P.M.; IT ALSO USED THE L.D. "8 Fd" OF 236 H.P. @ 1650 R.P.M. THE ABOVE "S-16A-2" WAS USED BY GENERAL WILLIAM "BILLY" MITCHELL AND IS NOW ON DISPLAY AT THE SMITHSONIAN INSTITUTE IN WASHINGTON, D.C.

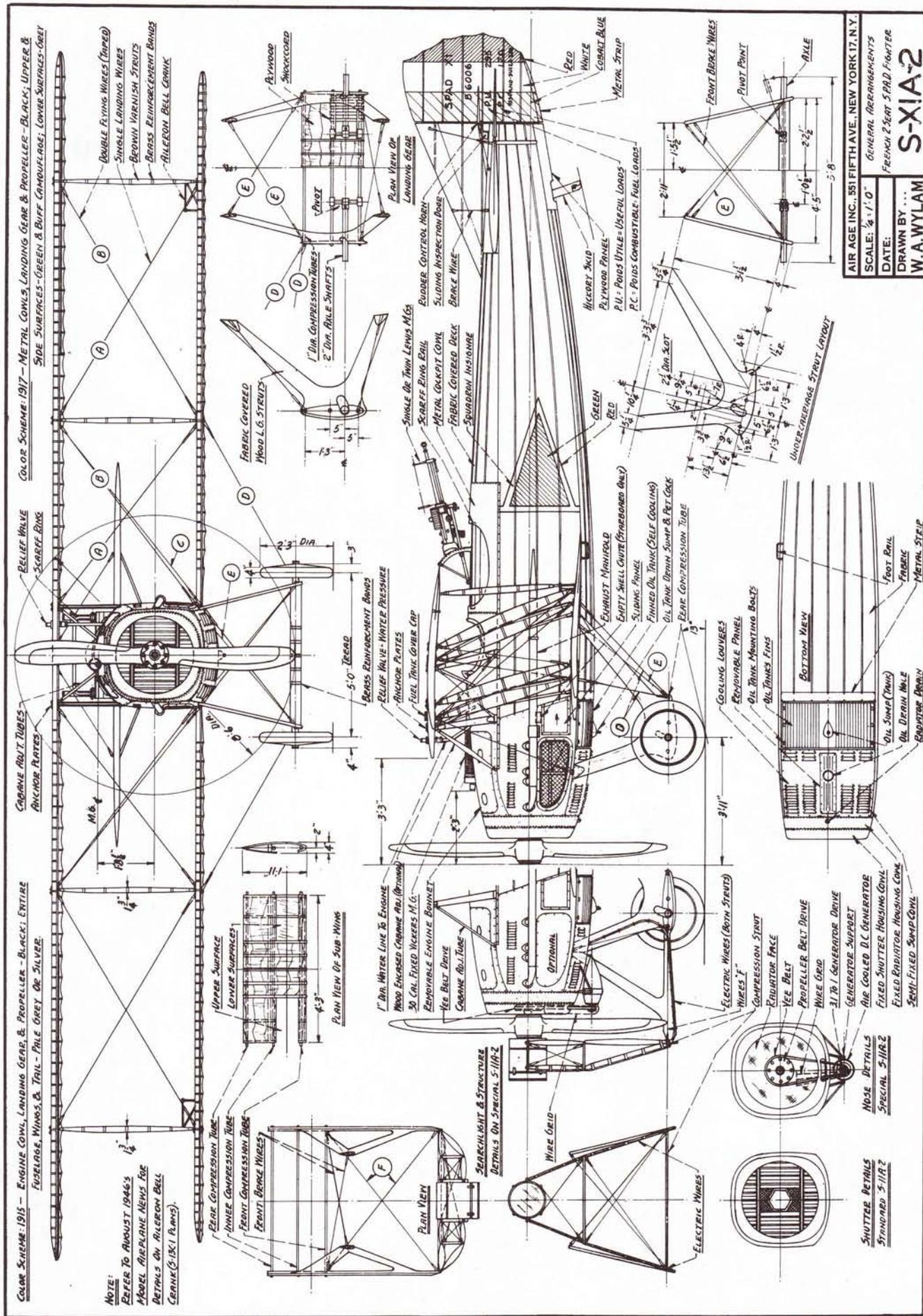


NOTES:  
 SPAD S-11A-2 USED THE 200  
 H.P. HISPANO-SUIZA 8BK. WHICH  
 WAS THE FRENCH DESIGNATION  
 OF THE AMERICAN MODEL D.  
 IT WAS BUILT ENTERED 230 H.P.  
 © 1900 P.P.M.

SCALE:  $\frac{1}{8}'' = 1'-0''$   
 DATE: ...  
 DRAWN BY ...  
 W. A. WYLAM

GENERAL ARRANGEMENTS  
 FRENCH: SEAT SPAD FIGHTER  
 AIR AGE INC., 551 FIFTH AVE., NEW YORK 17, N.Y.  
**S-XIA-2**

Notes:  
 For Details On Lewis Gun, See AUGUST, 1946, M.A.N.; For Details On Vickers Gun,  
 SEE APRIL 1946, M.A.N.; For Details On Scarff Ring, See FEBRUARY, 1946, M.A.N.;  
 AND For DETAILS ON HISPANO-SUIZER ENGINES, SEE SEPTEMBER, 1945, M.A.N.



COLOR SCHEME: 1915 - ENGINE CONYL, LANDING GEAR & PROPELLER - BLACK; ENTIRE FUSELAGE, WINGS, & TAIL - PALE GREY OR SILVER.

COLOR SCHEME: 1917 - METAL CONYL, LANDING GEAR & PROPELLER - BLACK; UPPER & SIDE SURFACES - GREEN & BUFF CAMOUFLAGE; LOWER SURFACES - GREY

NOTE: PREFER TO AUGUST 1946'S MODEL AIRPLANE NEWS FOR DETAILS ON AILERON BELL CRANK (S-1351 PLANS).

AIR AGE INC., 35 FIFTH AVE., NEW YORK 17, N. Y.  
SCALE: 1/16"  
GENERAL ARRANGEMENTS  
DATE: FRENCH 2 SEAT SPAD FIGHTER  
DRAWN BY: W. A. WYLAM  
S-XIA-2

SHUTTER DETAILS  
STANDARD 5-11B2

NOSE DETAILS  
SPECIAL 5-11A2

ELECTRIC WIRES (BOTH STRUTS)  
COMPRESSION STRUT  
RADIATOR FACE  
VEE BELT  
PROPELLER BELT DRIVE  
WIRE GRID  
3 TO 1 GENERATOR DRIVE  
GENERATOR SUPPORT  
AIR COOLED D.C. GENERATOR  
FIXED SHUTTER HOUSING CONYL  
FIXED RADIATOR HOUSING CONYL  
SEMI-FIXED SUMP CONYL

SEARCHLIGHT & STRUCTURE  
DETAILS ON SPECIAL 5-11A2

WIRE GRID  
WIRE OIL

WIRE OIL  
OPTIONAL

1" DIA. WATER LINE TO ENGINE  
WOOD ENHANCED CRANKING AIR (OPTIONAL)  
30 CAL. FIXED VICKERS M.G.  
REMOVABLE ENGINE BURNER  
ICE BELT DRIVE  
CRANKING AIR TUBE

ENGINE COMPRESSOR TUBE  
INNER COMPRESSOR TUBE  
FRONT COMPRESSOR TUBE  
FRONT BRACE WIRES

1" DIA. WATER LINE TO ENGINE  
WOOD ENHANCED CRANKING AIR (OPTIONAL)  
30 CAL. FIXED VICKERS M.G.  
REMOVABLE ENGINE BURNER  
ICE BELT DRIVE  
CRANKING AIR TUBE

EXHAUST MANIFOLD  
EMPTY SHELL CHUTE (STRENGTHENED ONLY)  
SLIDING PANEL  
FINNED OIL TANK (SELF-COOLING)  
OIL TANK DRAIN SUMP & PET COCK  
BONE COMPRESSOR TUBE

GREEN  
RED  
ALCOHOL SPAD  
PLYWOOD PANEL  
P.U. - PAILS UTILE = USEFUL LOADS  
P.C. - PAILS COMBUSTIBLE = FUEL LOADS

ALCOHOL SPAD  
PLYWOOD PANEL  
P.U. - PAILS UTILE = USEFUL LOADS  
P.C. - PAILS COMBUSTIBLE = FUEL LOADS

ALCOHOL SPAD  
PLYWOOD PANEL  
P.U. - PAILS UTILE = USEFUL LOADS  
P.C. - PAILS COMBUSTIBLE = FUEL LOADS

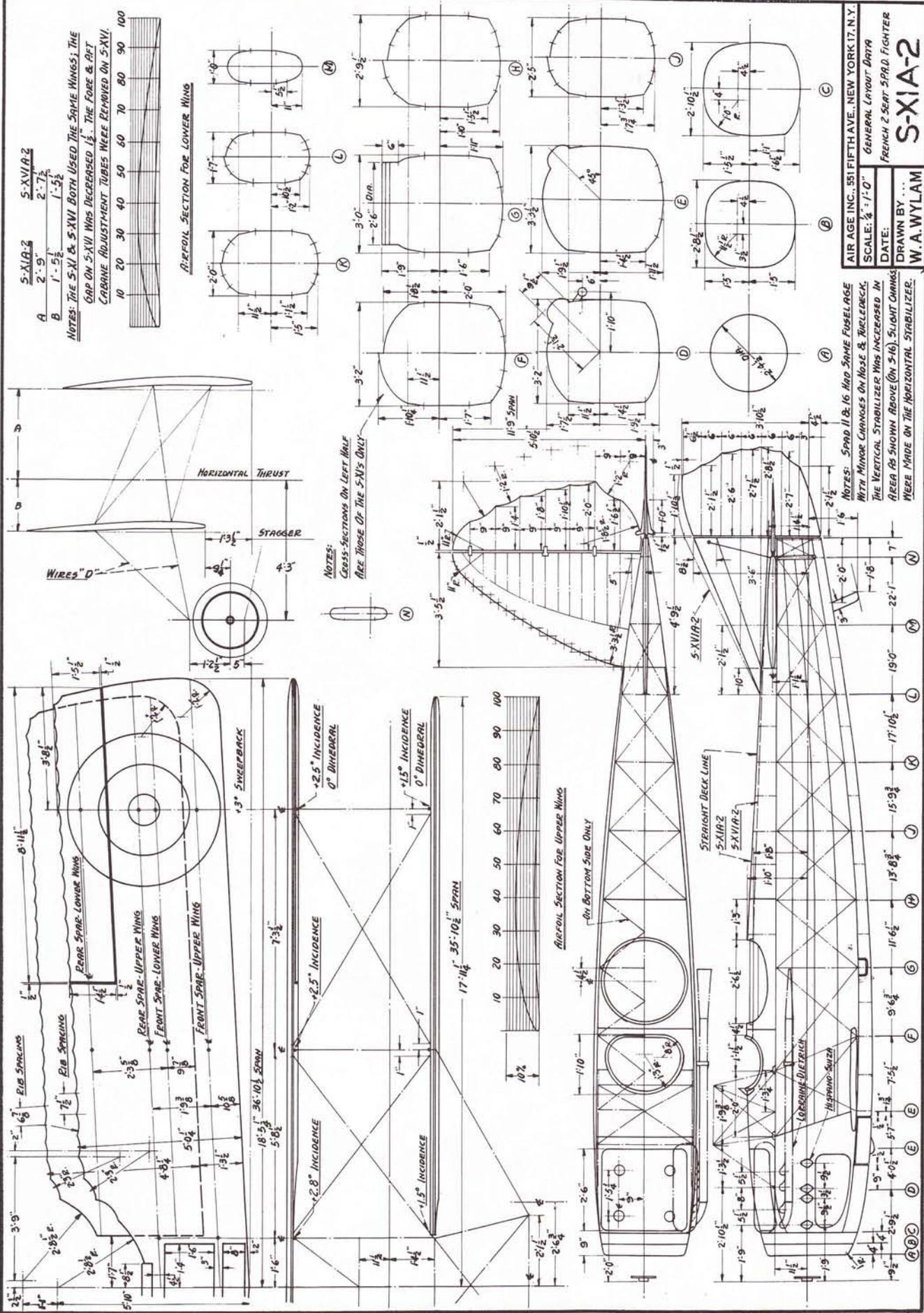
ALCOHOL SPAD  
PLYWOOD PANEL  
P.U. - PAILS UTILE = USEFUL LOADS  
P.C. - PAILS COMBUSTIBLE = FUEL LOADS

RED  
WHITE  
LORANT BLUE  
METAL STRIP

FRONT BRACE WIRES  
PIVOT POINT  
WIRE  
4.5" - 1.0" - 2.2" - 5.8"

UNDER CRANKING STRUT LAYOUT  
3.3" - 2.1" - 4.5" - 5.8"

COOLING LOUVERS  
REMOVABLE PANEL  
OIL TANK MOUNTING BOLTS  
OIL TANK FINS  
BOTTOM VIEW  
OIL JUMP (TANK)  
OIL DRAIN WALE  
EXHAUST BURNER  
FOOT RAIL  
FABRIC  
METAL STRIP

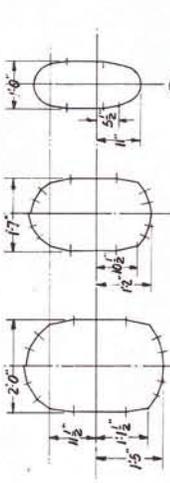


S-XIA-2		S-XVIA-2	
A	2'-9"		
B	1'-5 1/2"		
			1'-5 1/2"

NOTES: THE S-XI & S-XVI BOTH USED THE SAME WINGS; THE GAP ON S-XVI WAS DECREASED 1/2". THE FORE & AFT CARABINE ADJUSTMENT TUBES WERE REMOVED ON S-XVI.

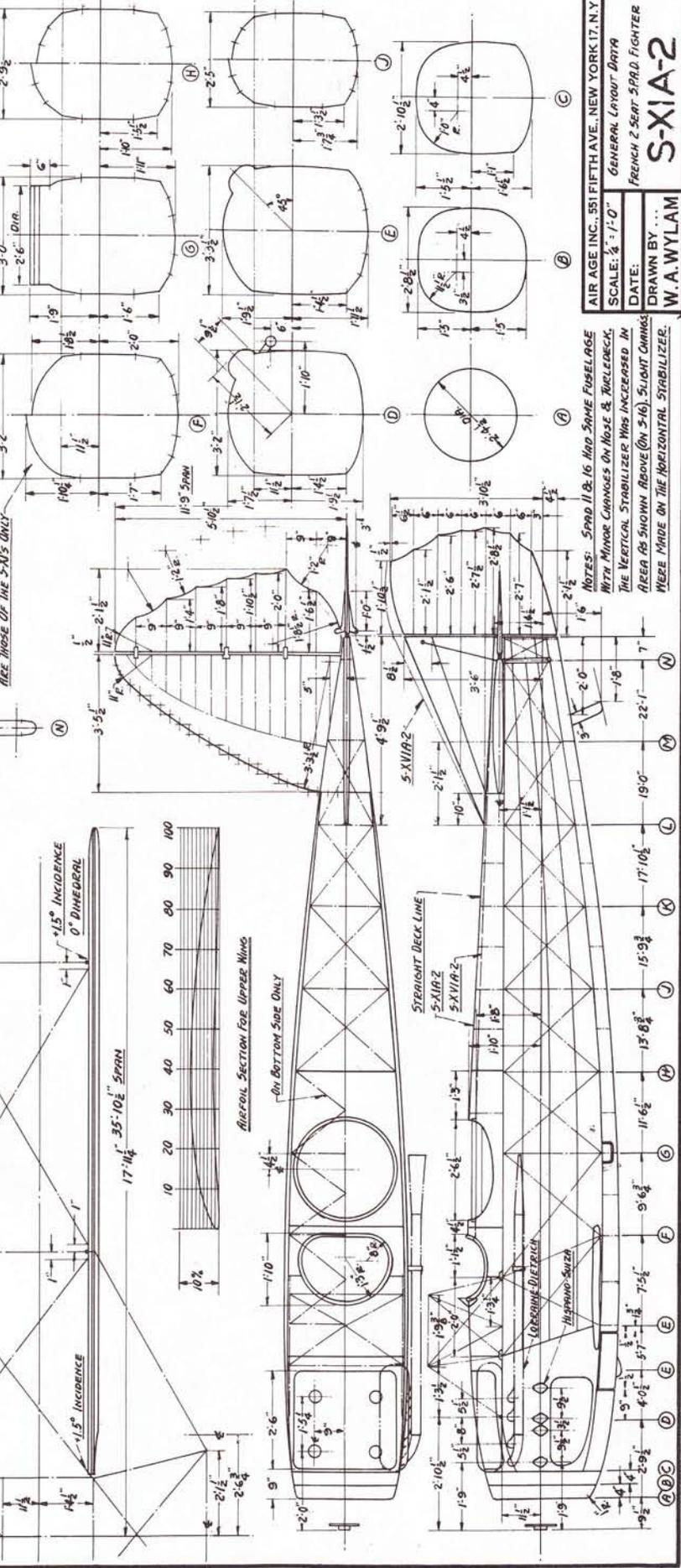


AIRFOIL SECTION FOR LOWER WING



NOTES: CROSS-SECTIONS ON LEFT HALF ARE THOSE OF THE S-XI'S ONLY

AIRFOIL SECTION FOR UPPER WING



AIR AGE INC. 55 FIFTH AVE., NEW YORK 17, N.Y.  
 SCALE: 1/4" = 1'-0"  
 DATE: FRENCH 2 SEAT SPAD FIGHTER  
 DRAWN BY: W.A. WYLAM

NOTES: SPAD II B-16 HAD SAME FUSELAGE WITH MINOR CHANGES ON NOSE & WINGLEADS. THE VERTICAL STABILIZER WAS INCREASED IN AREA AS SHOWN ABOVE (ON S-16) SLIGHT CHANGES WERE MADE ON THE HORIZONTAL STABILIZER.

# Spad S.XIII C.1

drawings by WILLIAM WYLAM



**MORE NOTED** for its speed and strength than for its maneuverability or climb, the Spad XIII was a definite favorite because of one other very important characteristic—it was easy to fly. The Spad XIII was one of the best-liked Allied aircraft to see service in 1917-1918.

Like all other good fighting ships, it was a compromise between climb, speed, maneuverability, ease of construction, and maintenance. But the airplane proved itself over and over again where it counted—in the air and in battle. The first French squadron to be completely equipped with the new XIII was the Escadrille S.3 “Les Cigognes” (The Storks) of which the great French Ace Georges Guynemer was top ranking member. Killed in the XIII under mysterious circumstances, Guynemer never achieved a victory in the plane and an omen of bad luck was to prevail, although no basis in fact was ever established to substantiate it. In fact, the war records of the Spad XIII speak well for themselves.

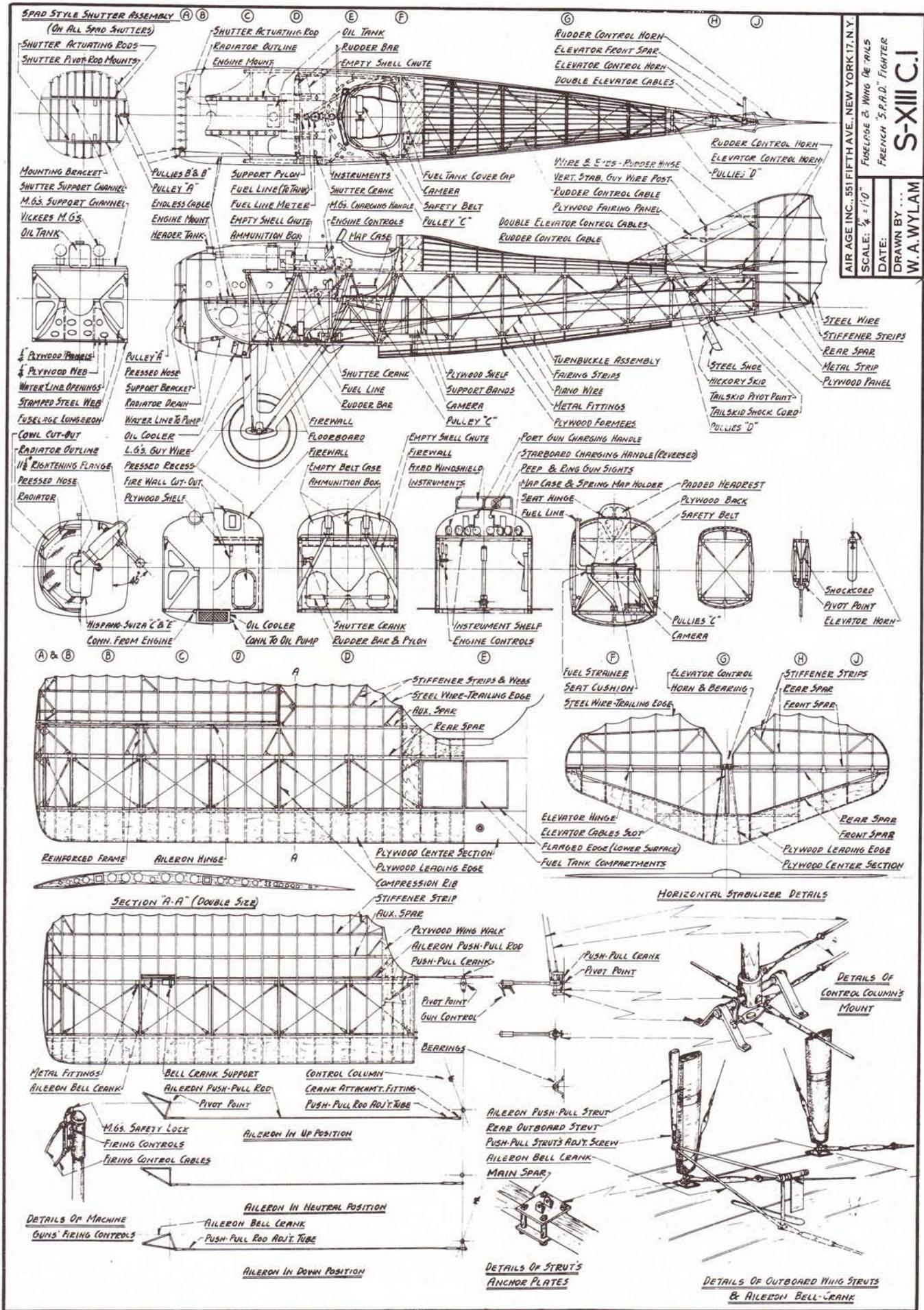
The original models were powered by Hispano-Suiza type 8Ba eight-cylinder



V-type engines which at first delivered 200 hp and were soon improved to 220 hp at sea level. Among the most streamlined of WW I airplanes, it had a top speed of 134.5 mph. It could climb to 6,500 feet in 5 minutes 17 seconds and could reach a ceiling of slightly over 22,000 feet.

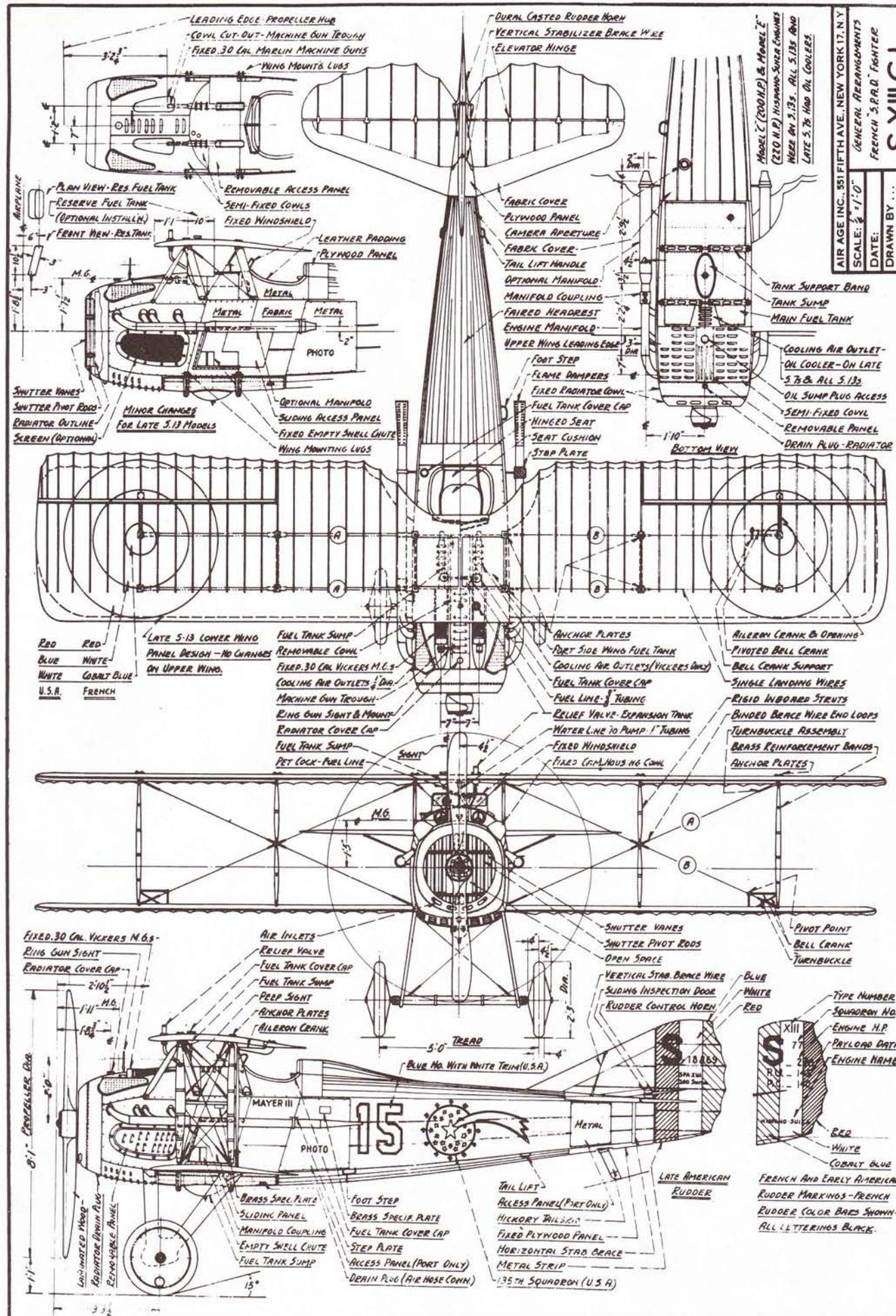
Six XIII C.1's still survive, one of them Guynemer's in Paris, another Ray Brooks' in Washington D.C. □

*Considered easy to fly, the Spad S.XIII C.1 was a favorite mount for Allied pilots. It was a fighter that could take a hard punch and still remain air-worthy. Air Age file photos.*



AIR AGE INC., 551 FIFTH AVE., NEW YORK 17, N.Y.  
 SCALE: 1/4" = 1'-0"  
 DATE: \_\_\_\_\_  
 DRAWN BY: \_\_\_\_\_  
 W. A. WYLAM  
 S-131C.1  
 FUSELAGE & WING DETAILS  
 FRENCH "SPAD" FIGHTER

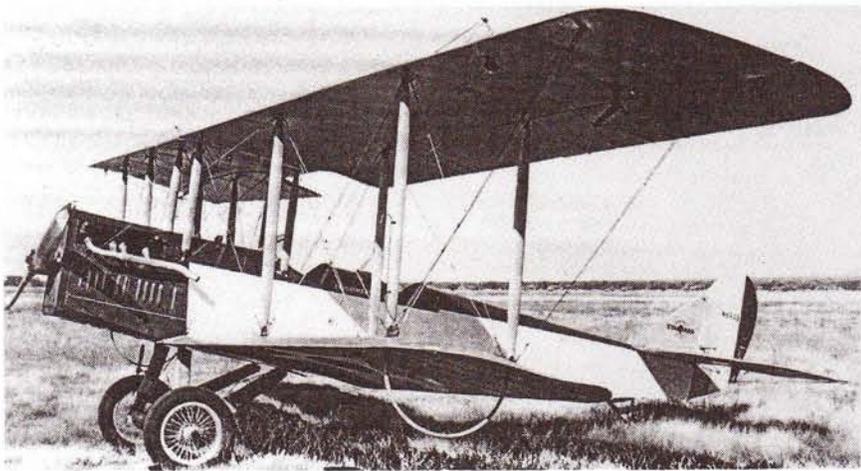
AIR AGE INC. 551 FIFTH AVE., NEW YORK 17, N.Y.  
 GENERAL REARRANGEMENTS  
 SCALE: 1/16" = 1'-0"  
 DATE: \_\_\_\_\_  
 DRAWN BY: \_\_\_\_\_  
**S-XIII.C.1**  
 W.A. WYLAM





# Standard Model J

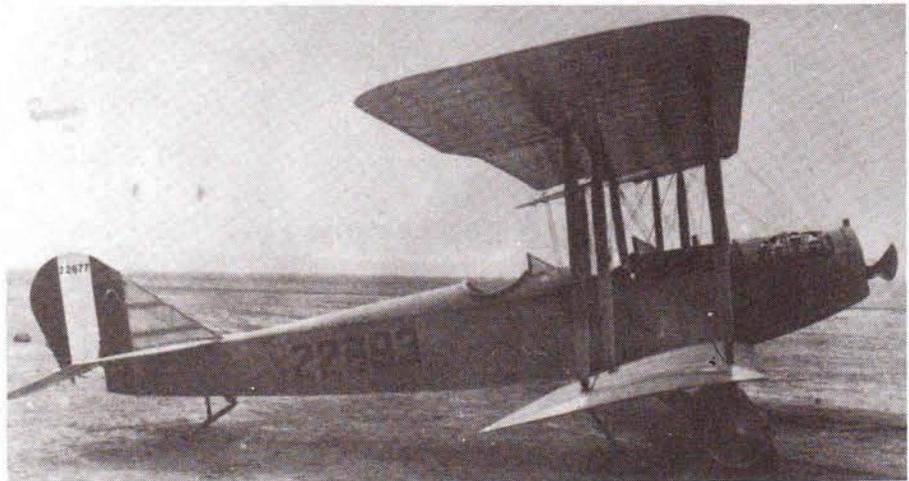
drawings by WILLIS NYE



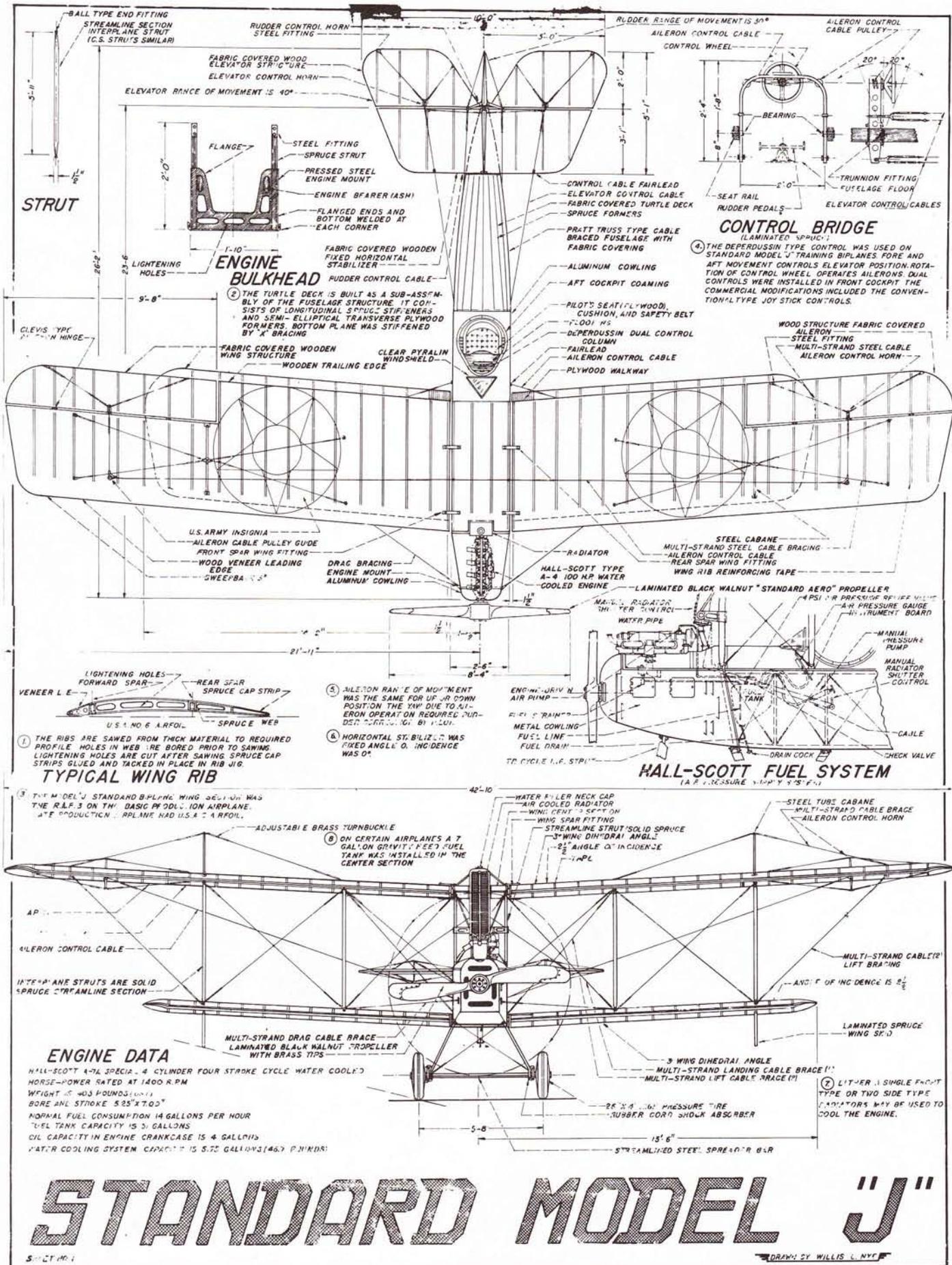
*Standard J-1 with 180-hp Hisso engine.*

**D**EVELOPED from the Standard H series biplanes designed in 1916, the J series aircraft were part of the USA's effort to produce machines as trainers for the war in Europe. A tandem two-seater, it was initially powered by the Hall-Scott 100-hp A-7A engine. It proved to be somewhat underpowered and so the J-1 was introduced, powered by a 175-hp engine, also from Hall-Scott. The H-S A-5A engine gave the airplane a maximum speed of 95 mph and was used for training and barnstorming as long after the war as the Jenny was.

Many J-1s are still flying or are in museums. □



*Standard J-1 with Curtiss OX5 engine.  
Photos courtesy of Leonard Opdycke, WW I  
Aeroplanes.*



**STRUT**

**ENGINE BULKHEAD**

**CONTROL BRIDGE**

**HALL-SCOTT FUEL SYSTEM**

**TYPICAL WING RIB**

**ENGINE DATA**

HALL-SCOTT 4-74 SPECIAL 4 CYLINDER FOUR STROKE CYCLE WATER COOLED  
 HORSE-POWER RATED AT 1400 R.P.M.  
 WEIGHT IS 403 POUNDS (146.7)  
 BORE AND STROKE 5.25" X 7.00"  
 NORMAL FUEL CONSUMPTION 14 GALLONS PER HOUR  
 FUEL TANK CAPACITY IS 3 GALLONS  
 OIL CAPACITY IN ENGINE CRANKCASE IS 4 GALLONS  
 WATER COOLING SYSTEM CAPACITY IS 5.75 GALLONS (46.7 POUNDS)

② THE TURTLE DECK IS BUILT AS A SUB-ASSEMBLY OF THE FUSELAGE STRUCTURE. IT CONSISTS OF LONGITUDINAL SPRUCE STIFFENERS AND SEMI-ELLIPTICAL TRANSVERSE PLYWOOD FORMERS. BOTTOM PLANE WAS STIFFENED BY "X" BRACING.

④ THE DEPERDUSSIN TYPE CONTROL WAS USED ON STANDARD MODEL "J" TRAINING BIPLANES. FORWARD AND AFT MOVEMENT CONTROLS ELEVATOR POSITION. ROTATION OF CONTROL WHEEL OPERATES AILERONS. DUAL CONTROLS WERE INSTALLED IN FRONT COCKPIT. THE COMMERCIAL MODIFICATIONS INCLUDED THE CONVENTIONAL TYPE JOY STICK CONTROLS.

⑤ AILERON RANGE OF MOVEMENT WAS THE SAME FOR UP OR DOWN POSITION ON THE YMP DUE TO AILERON OPERATION REQUIRED. TURNED THROUGH 100° BY 1/2 IN.

⑥ HORIZONTAL STABILIZER WAS FIXED ANGLE OF INCIDENCE WAS 0°.

⑧ ON CERTAIN AIRPLANES A 7 GALLON DRIVITY TANK FUEL TANK WAS INSTALLED IN THE CENTER SECTION.

① THE RIBS ARE SAWS FROM THICK MATERIAL TO REQUIRED PROFILE. HOLES IN WEB ARE BORED PRIOR TO SAWING. LIGHTENING HOLES ARE CUT AFTER SAWING SPRUCE CAP STRIPS GLUED AND TACKED IN PLACE IN RIB JIG.

③ THE MODEL "J" STANDARD BIPLANE WING SECTION WAS THE R.A.P. 3 ON THE BASIC MODEL "J" AIRPLANE. THE PRODUCTION AIRPLANE HAD U.S.A. 4 AIRFOIL.

INTERPLANE STRUTS ARE SOLID SPRUCE STREAMLINE SECTION

⑦ EITHER A SINGLE FRONT TYPE OR TWO SIDE TYPE EXHAUSTORS MAY BE USED TO COOL THE ENGINE.

# STANDARD MODEL "J"



# Thomas Morse S-4C & E

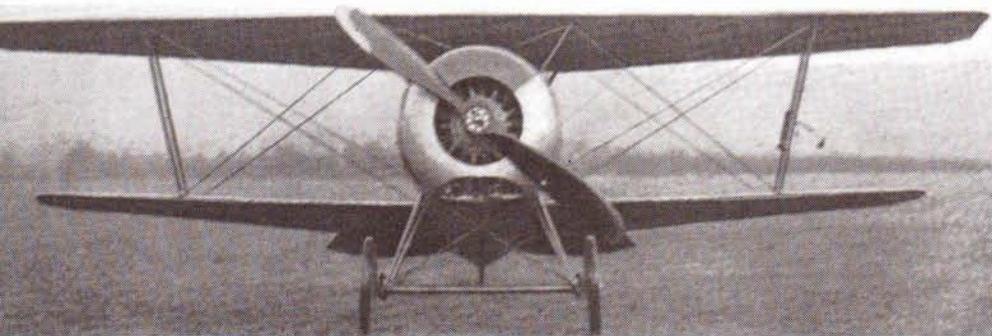
drawings by WILLIS NYE

**T**HE THOMAS Morse S-4C was a single-seat advanced trainer of which about 600 were built. Most went to the U.S. Army Air Service but a few also went to the U.S. Navy from 1917. They were powered by the 80-hp LeRhone rotary engine and also used the 100-hp Gnome rotary in some models.

Nicknamed "Tommy," the S-4C represented to student pursuit pilots all that was to be expected of a single-seat fighter by way of feel and appearance, plus a lot of gentleness that some combat types of WW I lacked. It was not considered



*Designed as an advanced single-seat trainer for WW I fighter pilots, over 1,000 "Tommys" were built. This is the S-4B. Photo courtesy of Leonard Opdycke, WW I Aeroplanes.*



*The S-4E above and the S-4C below were to be seen by thousands of movie buffs when Hollywood used the airplane in their celluloid wars. "Jane's All the World's Aircraft" photos.*

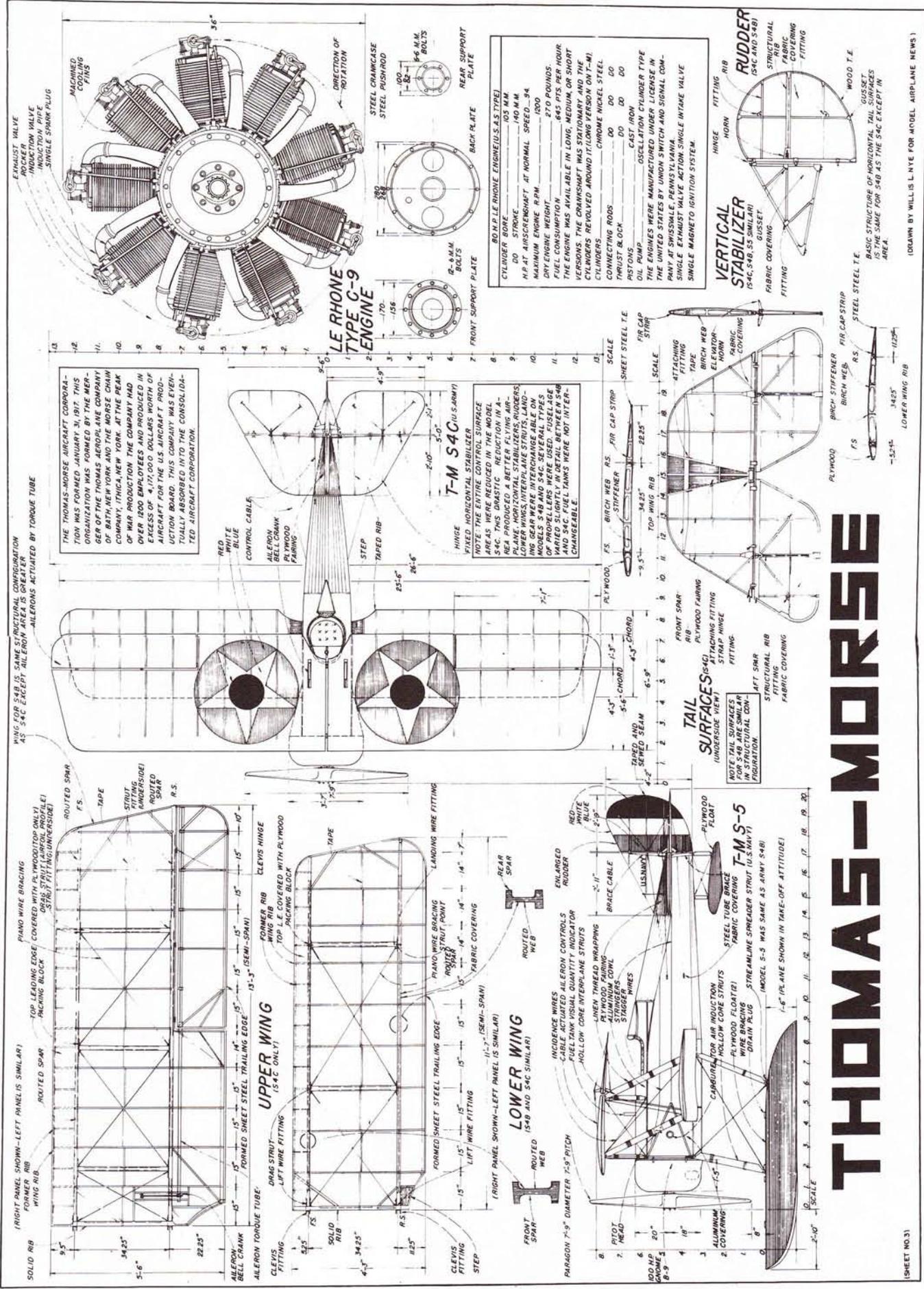


good enough, either in performance or handling qualities to be used as a fighter. It never went overseas and was relegated to training fields during WW I.

Over 1,000 were built and, following the Armistice, were declared surplus and purchased by sportsman pilots and barnstormers during the early '20s. The busy roar of its rotary engine that had echoed from dozens of training fields all over the country during the war continued to be heard until about 1930. The motion picture industry used a great many Tommys after that in Hollywood air epics.

Only one S-4B is left, at Cole Palen's Old Rhinebeck Aerodrome; four -C's are in museums, and there are no more -E's. □





# THOMAS-MORSE

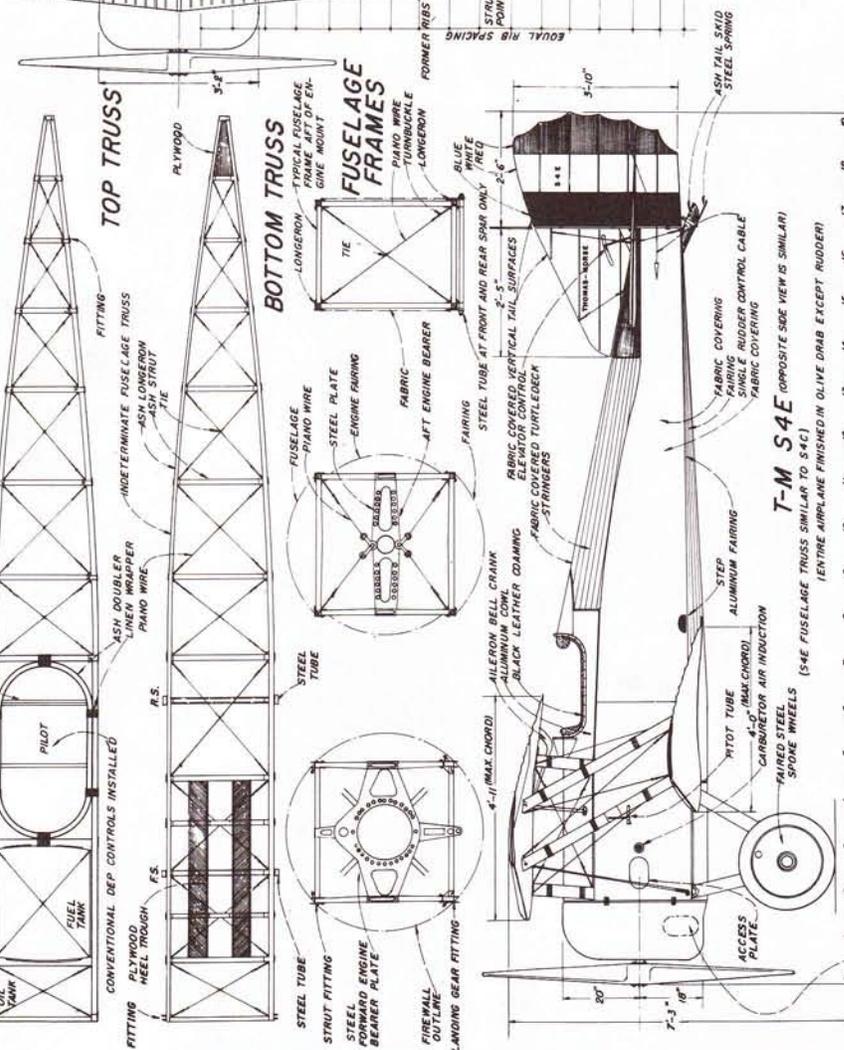
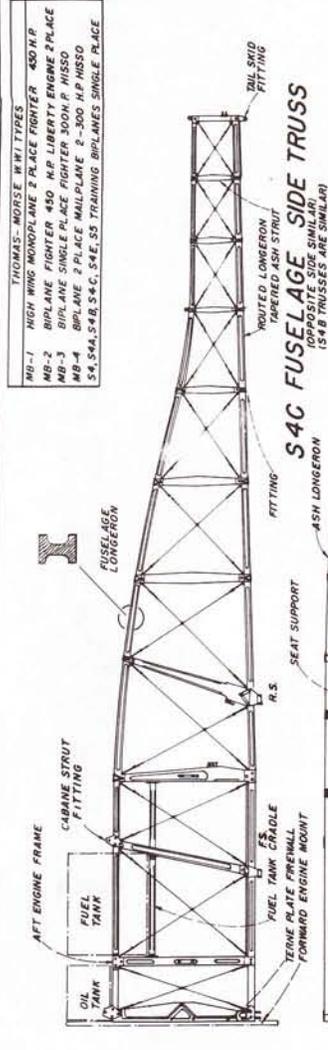
(DRAWN BY WILLIS L. NYTE FOR MODEL AIRPLANE NEWS)

(SHEET NO. 3)



**THOMAS-MORSE W.W.I. TYPES**

MB-1 HIGH WING MONOPLANE 2 PLACE FIGHTER 450 H.P.  
 MB-2 BIPLANE FIGHTER 450 H.P. LIBERTY ENGINE 2 PLACE  
 MB-3 BIPLANE SINGLE PLACE FIGHTER 300H.P. HISSO  
 MB-4 BIPLANE 2 PLACE MAILPLANE 2-300 H.P. HISSO  
 S4, S4A, S4B, S4C, S4E, S5 TRAINING BIPLANES SINGLE PLACE

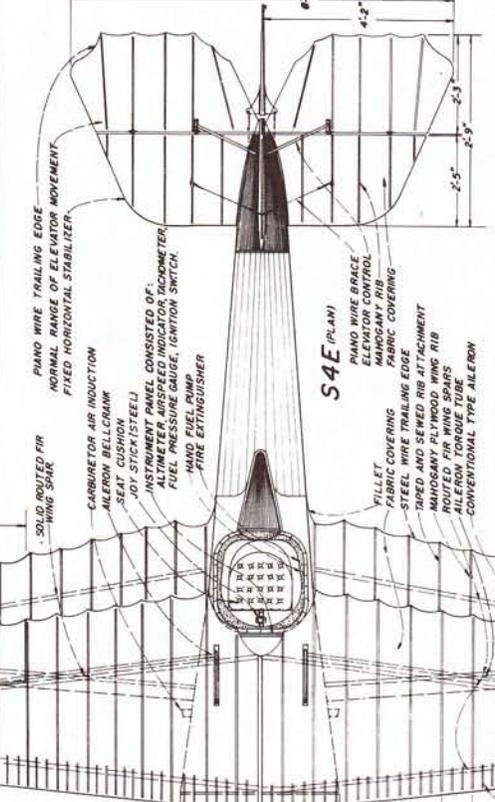


**THOMAS-MORSE S4E**

THE INITIAL DESIGN OF THIS AIRPLANE STARTED MAY 1918. THIS PLANE WAS PRODUCED TOO LATE FOR W.W.I. TRAINING. NO PROVISIONS WERE MADE FOR MACHINING GUN ARMAMENT. THE UPPER WING WAS COVERED WITH FABRIC. A RATED 40 H.P. AT 875 R.P.M. ENGINE WAS INSTALLED. A RATED 40 H.P. AT 875 R.P.M. DEVELOPED A HIGH SPEED OF 103 M.P.H. AND A CLIMB OF 8500 FT. IN 10 MINUTES.

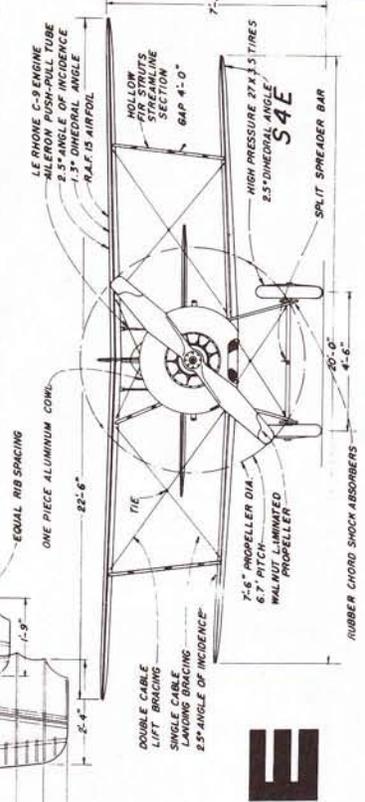
THE BREAKDOWN OF WEIGHTS IS AS FOLLOWS:

WING STRUCTURE	125 LBS.
FUSELAGE	208 "
ENGINE	25 "
ENGINE INST.	540 "
PILOT	180 "
MISCELLANEOUS	70 "
<b>TOTAL</b>	<b>1133 LBS. LOADED</b>



**THOMAS-MORSE MODEL S4E**

THIS AIRPLANE WAS BUILT IN AUGUST, 1918, AS AN EXPERIMENTAL PROJECT. IT WAS NOT PRODUCED IN QUANTITY. A SINGLE PLANE OF THIS TYPE SURVIVED IN POST W.W.I. AND WAS MODIFIED TO TAKE A CURTISS 6-6 50 H.P. WATER-COOLED ENGINE AND WAS FLOWN IN AIR SHOWS. THE S4E WAS THE ONLY PAPER-ENGINE BIPLANE BUILT IN THE U.S.A. DURING W.W.I. THE FUSELAGE TYPE, LANDING GEAR, AND ENGINE INSTALLATION WERE SIMILAR TO THE TYPE S4C. THE ELEVATORS WERE OPERATED BY A PUSH-PULL TUBE. RUDDER CONTROLS WERE CONVENTIONAL TYPE ALERON.



# THOMAS-MORSE

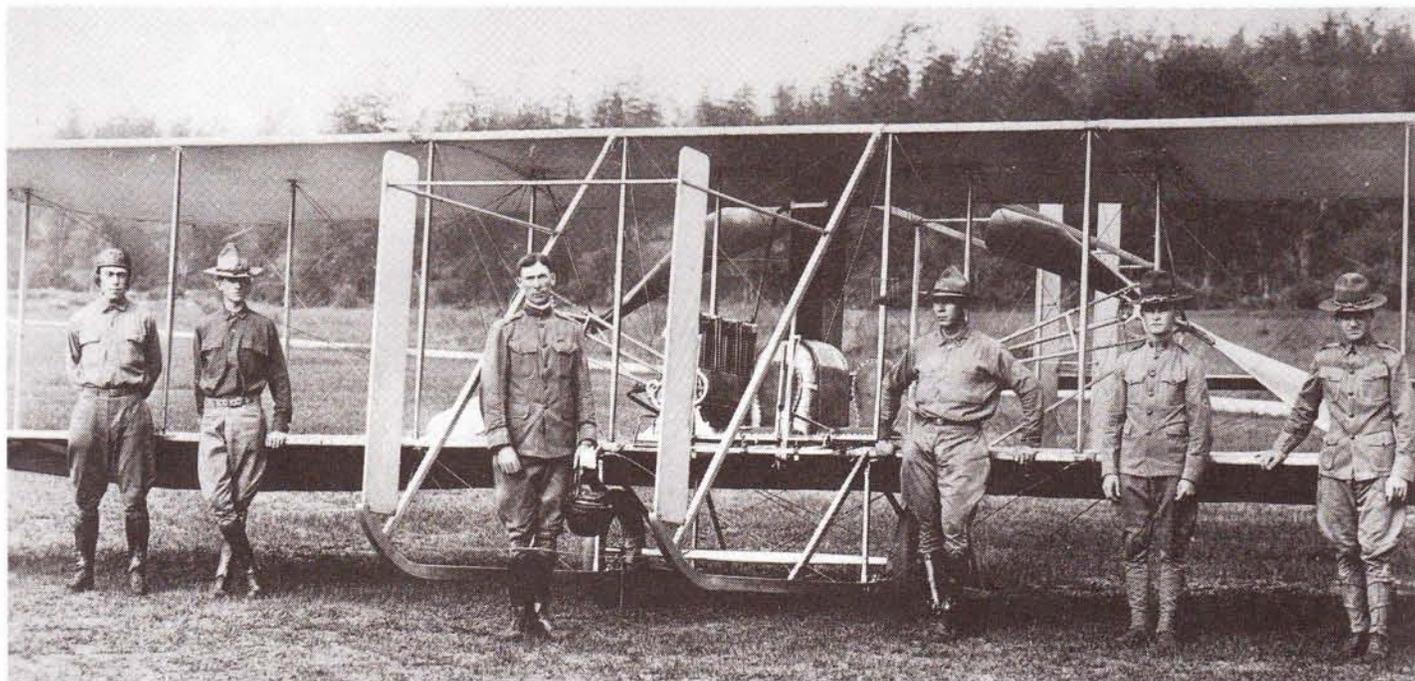
(DRAWN BY WILLIS L. NYE FOR MODEL AIRPLANE NEWS)

(SHEET NO. 4)

# Wright Brothers

drawings by WILLIAM WYLAM

## 1903 Flyer, Model A, Model B



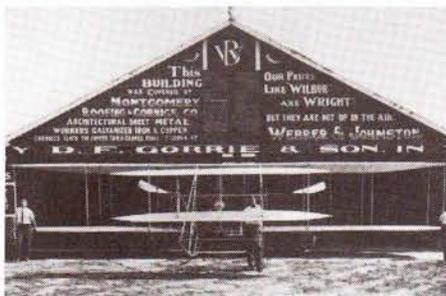
*The Wright Brothers airplane was the first man-carrying aircraft in which the Army Signal Corp expressed an interest. Air Age file photo.*

**A**T 10:35 a.m. on Thursday, December 17, 1903, at Kill Devil Hills in Kitty Hawk, North Carolina, Orville Wright piloted the Flyer on a flight that lasted just 12 seconds and covered about 120 feet. In doing so, the world's first powered, sustained, and controllable flight of a man-carrying airplane was recorded. The 12-hp engine and airframe were of Orville and Wilbur Wright's design and manufacture. The fourth and last flight that day—and of the Flyer ever—covered over 800 feet.

The use of wing warping, and the connection between it and the rudders, was the secret of the Flyer's controllability—the Wright's secret.

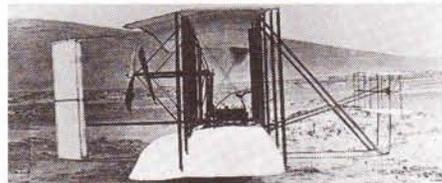
Not satisfied, the brothers set about modifying their design and thus developed the Wright Model A.

The Model A was similar to the original Flyer, the most noticeable dif-



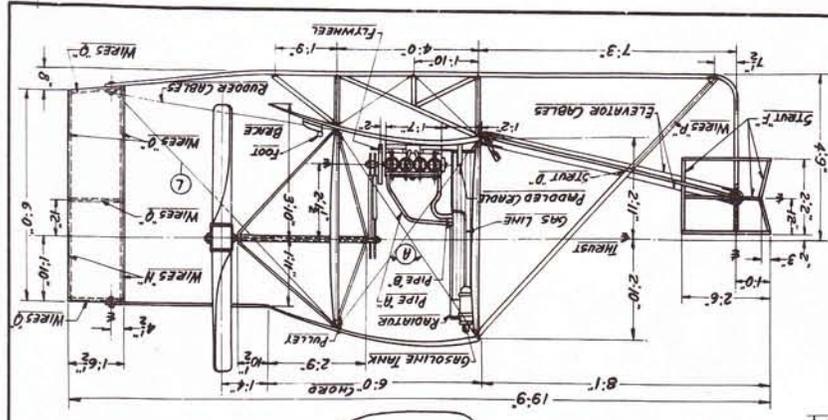
ference being the addition of seats for pilot and passenger. This airplane paved the way for the Model B, which was accepted as a flying machine for the Army Signal Corps.

The 1903 Flyer has just been restored at the National Air & Space Museum in Washington, DC; seven other powered Wrights are on exhibit in various museums. □



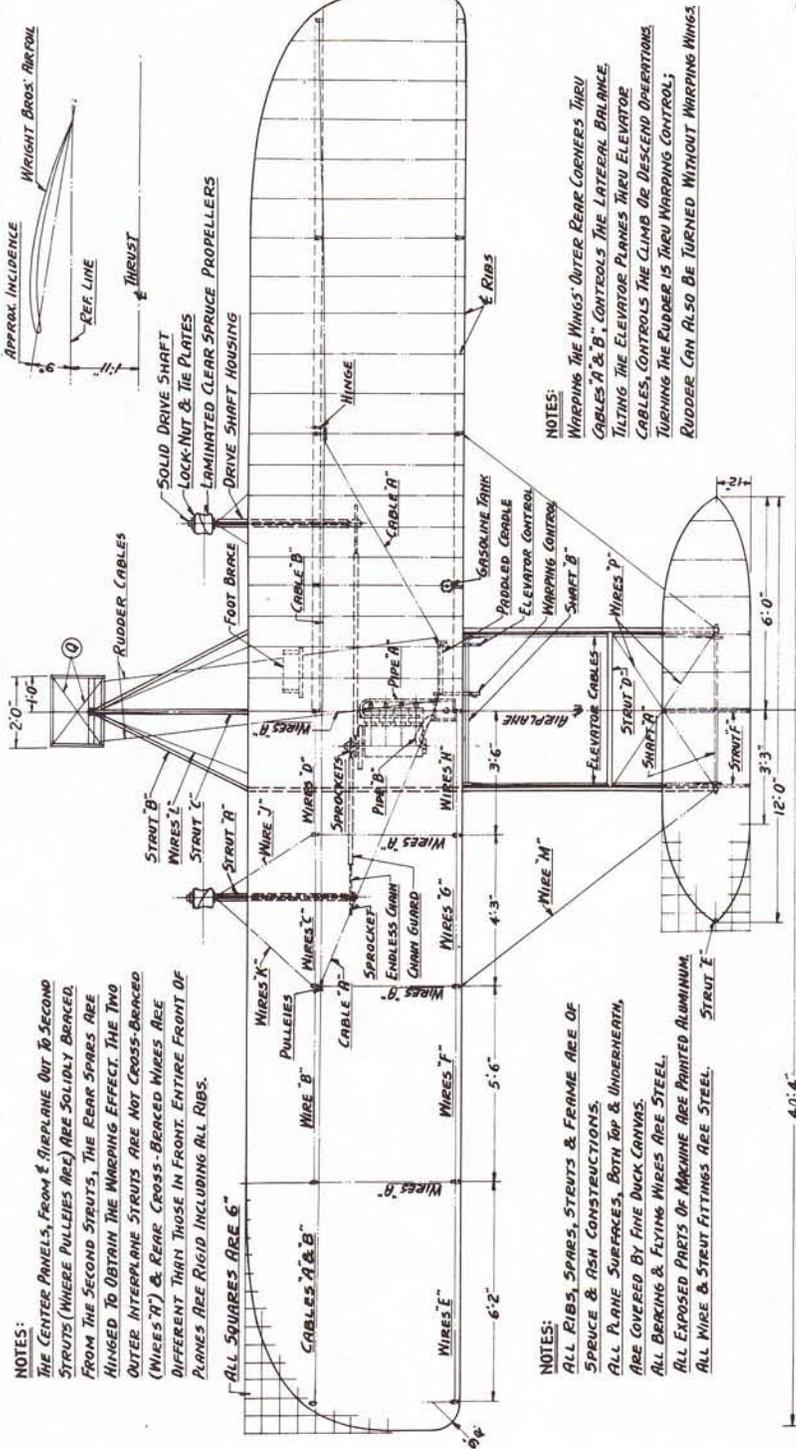
*Left: The Wright Brothers assembled their famous aircraft with little fanfare in this building. Smithsonian photo. Above: Side view of the original Wright airplane, 1903, at Kitty Hawk. Photo courtesy of Leonard Opdycke, WW I Aeroplanes.*





NOTES:  
 ENGINE IS 4 CYLINDER WATER COOLED &  
 MADE BY WRIGHT BROTHERS. IT IS RATED  
 16 H.P. @ 400 R.P.M. IT IS MOUNTED ON THE  
 SIDE & IT DRIVES TWO PROPELLERS  
 IN OPPOSITE DIRECTIONS.

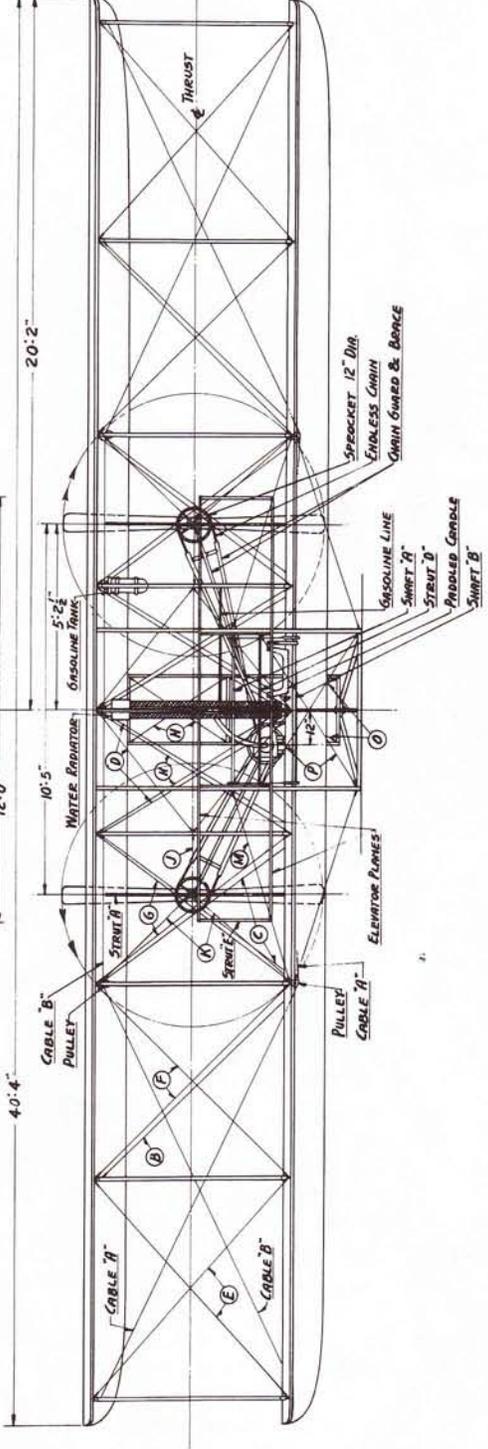
SCALE: 1/8" = 1'-0"  
 GENERAL ARRANGEMENT  
 DATE: NOV. 1943  
 WRIGHT BROTHERS ORIGINAL  
 DRAWN BY...  
 W. A. WYLAN

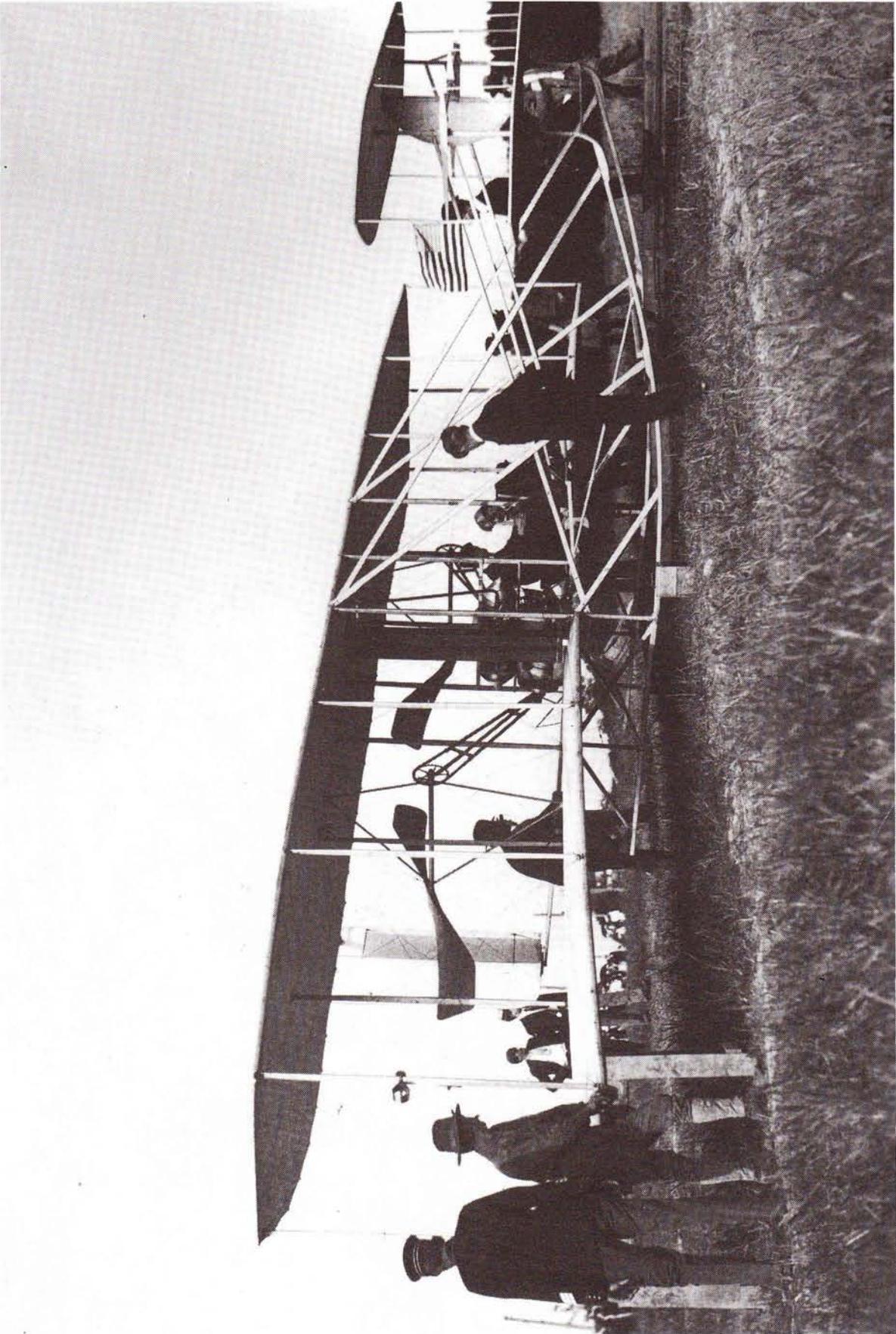


NOTES:  
 THE CENTER PANELS, FROM 1 AIRPLANE OUT TO SECOND  
 STRUTS (WHERE PULLEYS ARE) ARE SOLIDLY BRACED.  
 FROM THE SECOND STRUTS, THE REAR SPARS ARE  
 HINGED TO OBTAIN THE WARPING EFFECT. THE TWO  
 OUTER INTERPLANE STRUTS ARE NOT CROSS-BRACED  
 (WIRES 'A' & 'B', REAR CROSS-BRACED WIRES ARE  
 DIFFERENT THAN THOSE IN FRONT. ENTIRE FRONT OF  
 PLANES ARE RIGID INCLUDING ALL RIBS.  
 ALL SQUARES ARE 6"

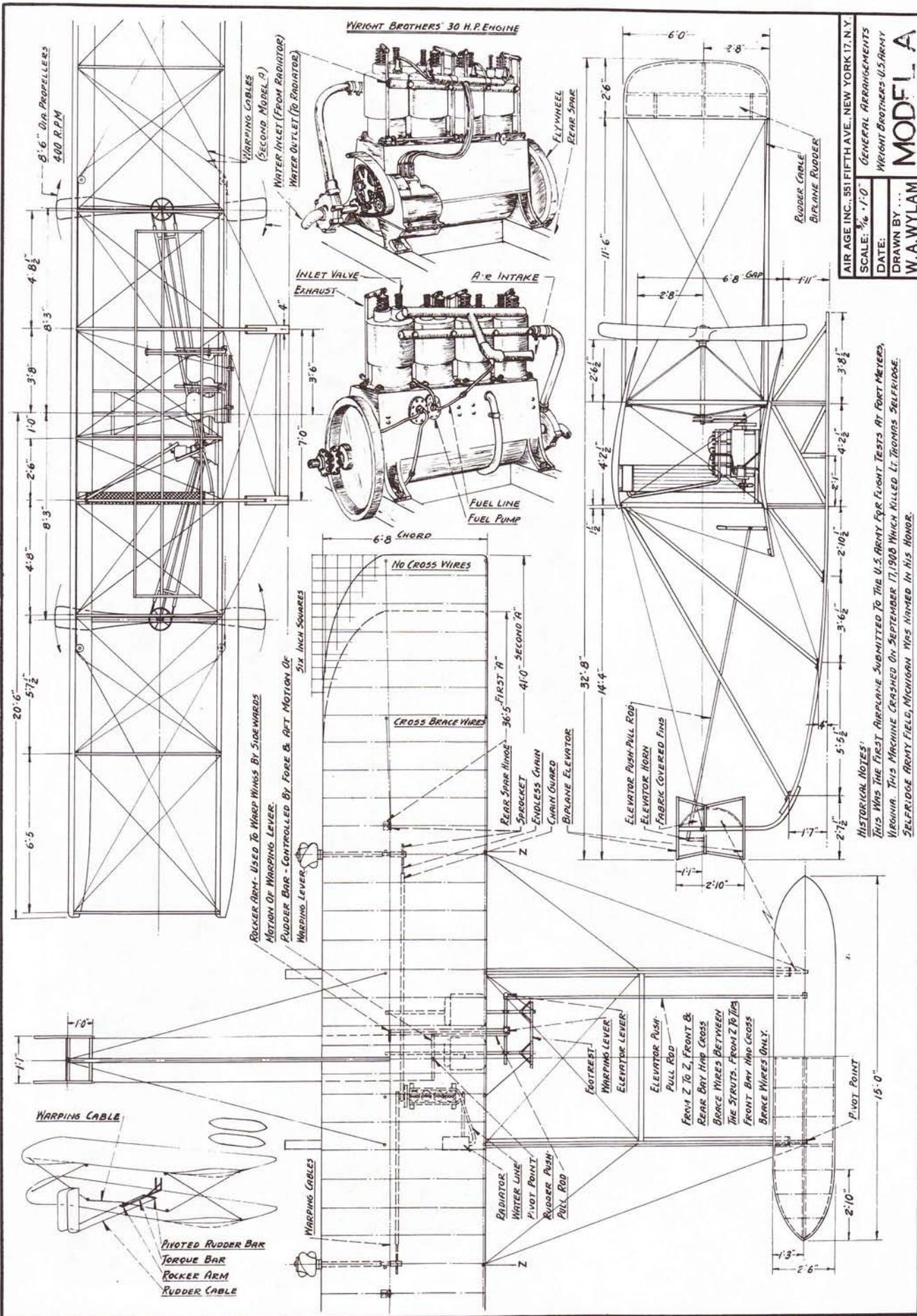
NOTES:  
 ALL RIBS, SPARS, STRUTS & FRAME ARE OF  
 SPRUCE & ASH CONSTRUCTIONS.  
 ALL PLANE SURFACES, BOTH TOP & UNDERNEATH,  
 ARE COVERED BY FINE DUCK CANVAS.  
 ALL BRACING & FLYING WIRES ARE STEEL.  
 ALL EXPOSED PARTS OF MACHINE ARE PAINTED ALUMINUM.  
 ALL WIRE & STRUT FITTINGS ARE STEEL.

NOTES:  
 WRAPPING THE WINGS OUTER REAR CORNERS THRU  
 CABLES 'A' & 'B', CONTROLS THE LATERAL BALANCE.  
 TILTING THE ELEVATOR PLANES THRU ELEVATOR  
 CABLES, CONTROLS THE CLIMB OR DESCEND OPERATIONS.  
 TURNING THE RUDDER IS THRU WARPING CONTROL;  
 RUDDER CAN ALSO BE TURNED WITHOUT WARPING WINGS.





*Wright Brothers 1908 Military. Orville Wright leaning over pilot's seat. Photo courtesy of the Smithsonian Institution.*

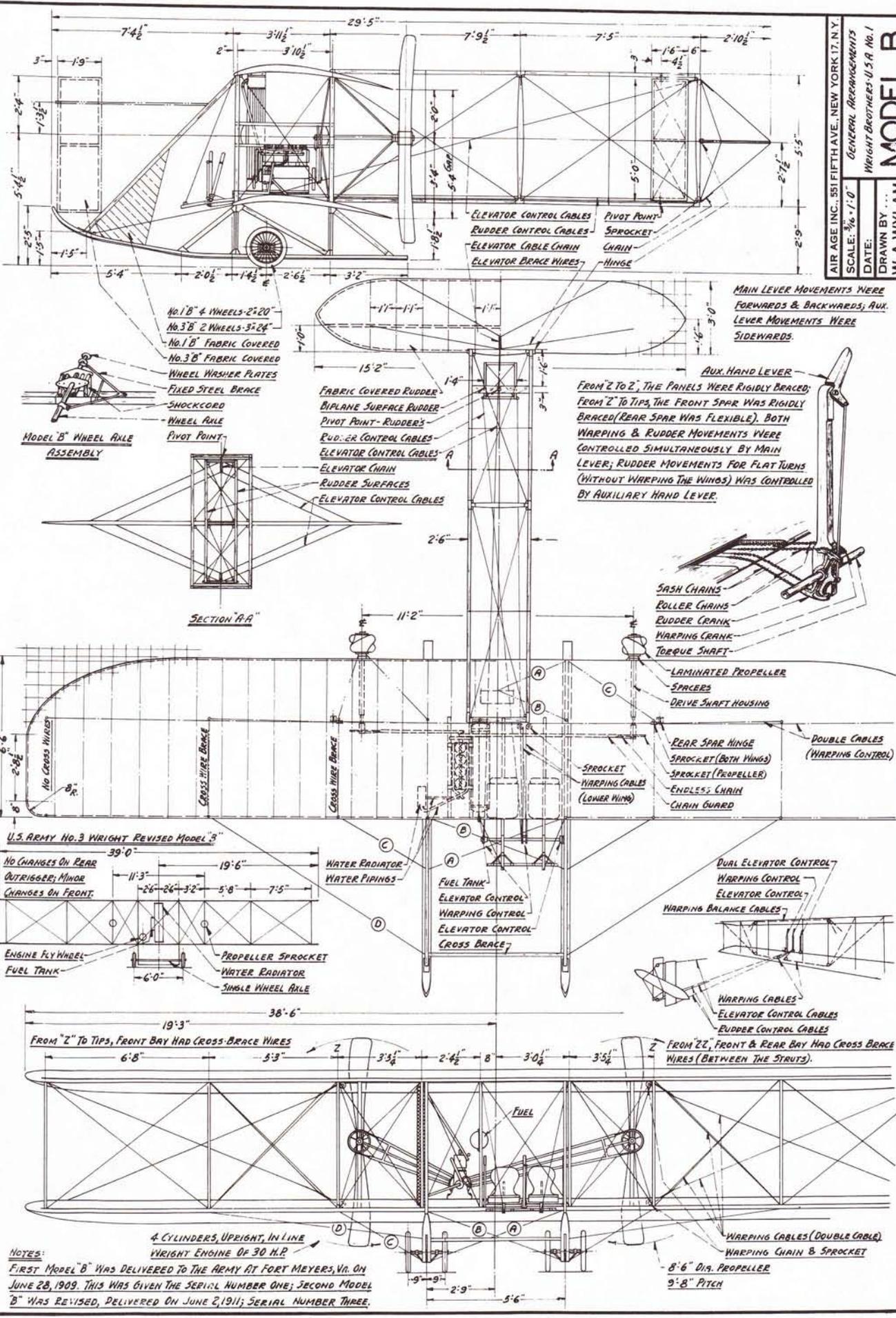


AIR AGE INC., 55 FIFTH AVE., NEW YORK 17, N.Y.  
 GENERAL ARRANGEMENTS  
 SCALE: 3/16" = 1'-0"  
 DATE: ...  
 DRAWN BY ...  
 W. A. WYLAM

**HISTORICAL NOTES:**  
 THIS WAS THE FIRST AIRPLANE SUBMITTED TO THE U.S. ARMY FOR FLIGHT TESTS AT FORT MEYER, VIRGINIA. THIS MACHINE CRASHED ON SEPTEMBER 17, 1908 WHICH KILLED LT. THOMAS SELFORS. SELFORS, ARMY FIELD, MICHIGAN WAS NAMED IN HIS HONOR.

**MODEL L A**

AIR AGE INC., 551 FIFTH AVE., NEW YORK 17, N.Y.  
 GENERAL ARRANGEMENTS  
 SCALE:  $\frac{3}{8}$ " = 1'-0"  
 DATE: ...  
 DRAWN BY ...  
**MODEL B**  
 W.A. WYLAN



**NOTES:**  
 FIRST MODEL "B" WAS DELIVERED TO THE ARMY AT FORT MEYERS, VA. ON JUNE 28, 1909. THIS WAS GIVEN THE SERIAL NUMBER ONE; SECOND MODEL "B" WAS REVISED, DELIVERED ON JUNE 2, 1911; SERIAL NUMBER THREE.

## Engines

# Clerget

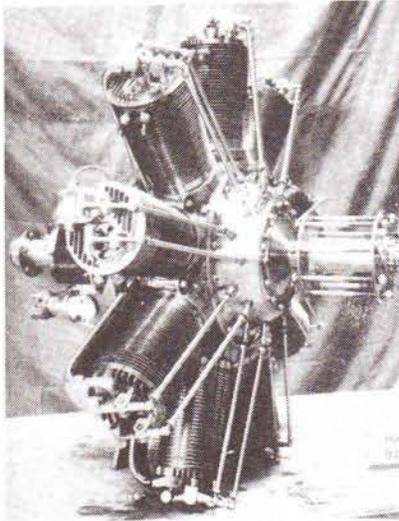
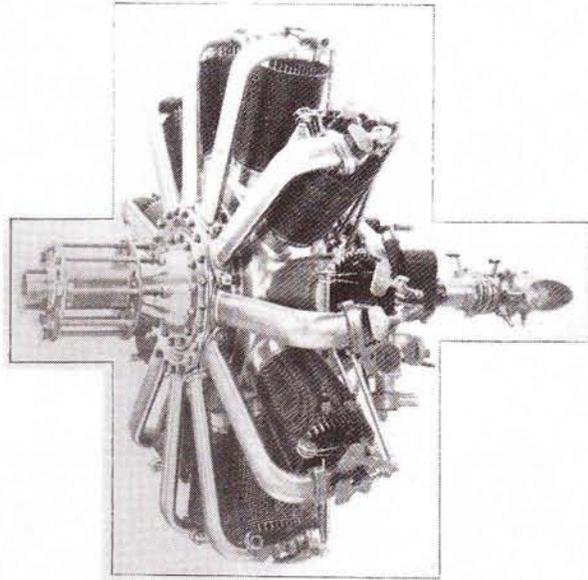
drawing by WILLIAM WYLAM

**O**NE OF THE most successful engines of WW I was the rotary Clerget. The crankshaft remained fixed during operation and the entire engine rotated around it. This feature provided a number of advantages, one being easy maintenance. Another was the relatively light weight of the engines. Produced in 7- and 9-cylinder versions, the Clerget Company also produced limited quantities of 11- and even 16-cylinder rotary engines, the latter producing as much as 420 hp at 1,600 rpm with a weight of only 750 pounds. The Type 11EB of 11-cylinder configuration weighed 507 pounds and produced 210 hp at 1,300 rpm and the Type 9BF with 9 cylinders weighed 381 pounds and put out 153 hp at 1,250 rpm, according to *Jane's All the World's Aircraft* of 1919.

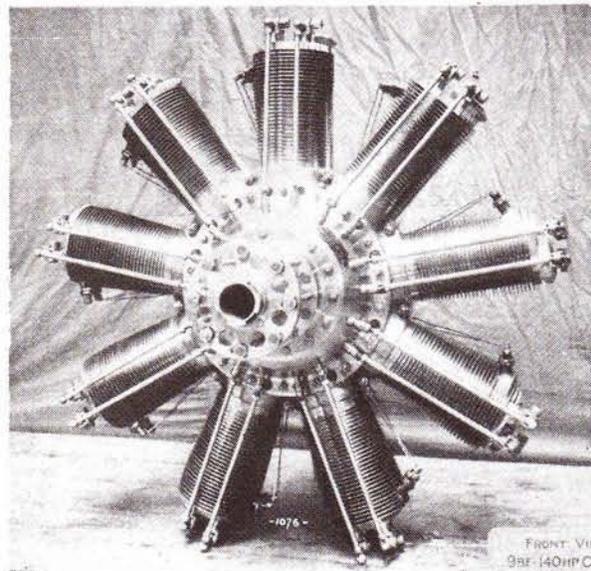
Manufactured in France by Clerget Blin Et Cie, it was also manufactured under a license agreement by Gwynnes Ltd. of London and was used in many different Allied aircraft, such as the Sopwith Camel, Beardmore, and others.

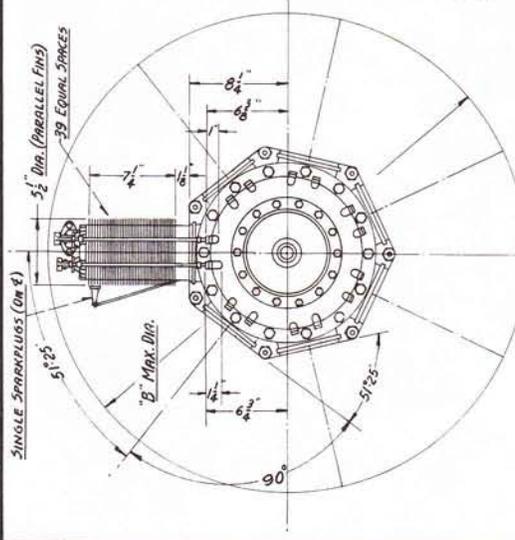
The rotary engine was little-used after WW I. Following the development of more powerful, liquid-cooled, rotating crankshaft style engines by Mercedes, Rolls Royce, Liberty, and Hispano-Suiza, the rotary engine became obsolete and production halted around 1925. A few were rebuilt as stationary radial engines after the war. □

*The Type 9B.F. weighed 381 pounds and developed 140 hp at 1,250 rpm.*

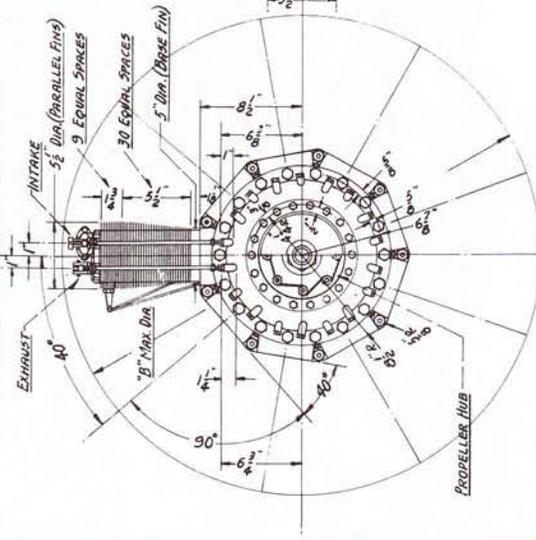


*Above: Type 11E.B. developed 200 hp at 1,300 rpm. Left: Type 9Z. was rated at 110 hp at 1,180 rpm.*





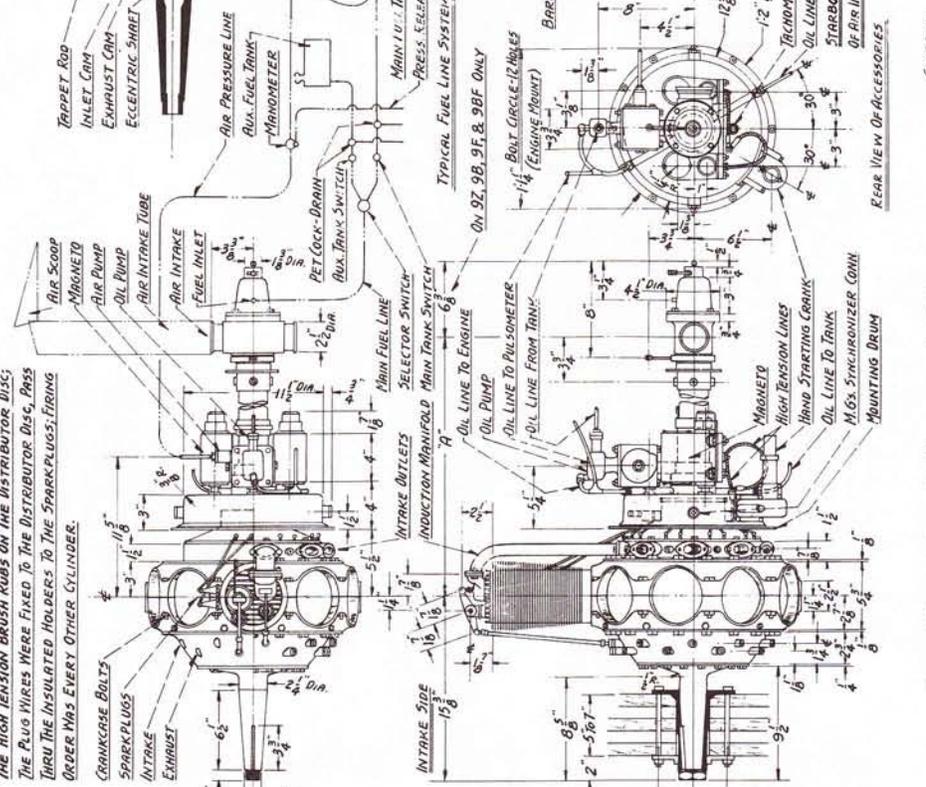
MODEL 7Y, 8Z, 9Y, 9B, 9F, 9BF CLEGGET-SEVEN CYLINDERS



MODEL 9Y, 9Z, 9B, 9F, 9BF CLEGGET-NINE CYLINDERS (MODEL 9Y HAS SAME FINES ON CYLINDERS AS 7Y)

NOTES:  
 CYLINDER DIMENSIONS & OTHER MAIN DIMENSIONS ARE THOSE OF THE POPULAR 130 H.P. VERSION. OTHER VERSIONS HAD MINOR ALTERATIONS ON DIMENSIONS, DESIGN, AND PLACEMENT OF THE FIXED REAR ACCESSORIES. SOME VERSIONS OF THE SAME MODEL HAD VARIATIONS ON THE REAR ACCESSORIES ARRANGEMENT - (PART 12 - SOME 9B'S HAD SHORTER LENGTHS THAN THE STANDARD 9B'S) A LENGTH

NOTES ON SECTIONAL DRAWINGS:  
 THE HEAVY BLACK OUTLINES ARE THOSE OF THE ASSEMBLY WHICH ROTATES ON THE FIXED HOLLOWED CRANKSHAFT. THE CRANKCASE WAS MOUNTED ON FRONT & REAR BALL BEARINGS; THE CRANKSHAFT WAS FIXED TO THE AIRFRAME AT THE DRUM AND THE REAR SUPPORT. THE ECCENTRIC SHAFT PROVIDES THE CAM MOVEMENTS. THE GAS VAPOR ENTERS THE CRANKCASE THRU THE HOLLOWED CRANKSHAFT; IT ENTERS THE CYLINDERS THRU THE INDUCTION PORTS. THE HIGH TENSION BRUSH RUBS ON THE DISTRIBUTOR DISC; THE PLUG WIRES WERE FIXED TO THE DISTRIBUTOR DISC, PASS THRU THE INSULATED HOLDERS TO THE SPARKPLUGS; FIRING ORDER WAS EVERY OTHER CYLINDER.



THANKS TO GLENN D. ANGLE; REF: 'AEROSPHERE OF 1939'

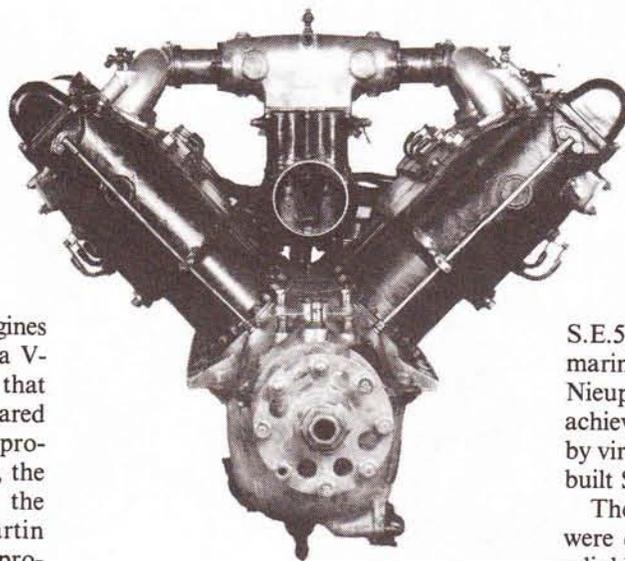
MODEL	I.L.P. @ R.P.M.		BORE	STROKE	FUEL RATE	WEIGHT	CLEGGET HANDBOOK	
	H.P.	R.P.M.					WEIGHT (LBS)	H.P.
7Y	60	1200	4.72	4.72	63 LBS/Hour	198 LBS	3.3	35.5
7Z	85	1200	4.72	5.91	665	216	2.7	16.625
9Y	110	1200	4.72	5.91	675	395	3.6	20.625
9Z	121	1200	4.72	6.3	79	367	3.03	27.625
9B	130	1250	4.72	6.3	665	381	2.93	28.0
9F	200	1325	4.72	6.69	687	374	1.87	29.25
9BF	140	1250	4.72	6.77	656	381	2.72	28.0
9J	180	1300	4.13	5.51	156	250	2.5	20.625

AIR AGE INC., 551 FIFTH AVE., NEW YORK 17, N.Y.  
 SCALE: 3/4" = 1"  
 GENERAL ARRANGEMENTS  
 FRENCH AIR-COOLED ENGINE  
 TYPE: ROTARY  
 COPYRIGHT 1947  
 WILLIAM A. WYLM  
 BUILT 5/15/18 BY CLEGGET, BLIN & Co., Paris, FRANCE  
**CLEGGET**

# Hispano-Suiza

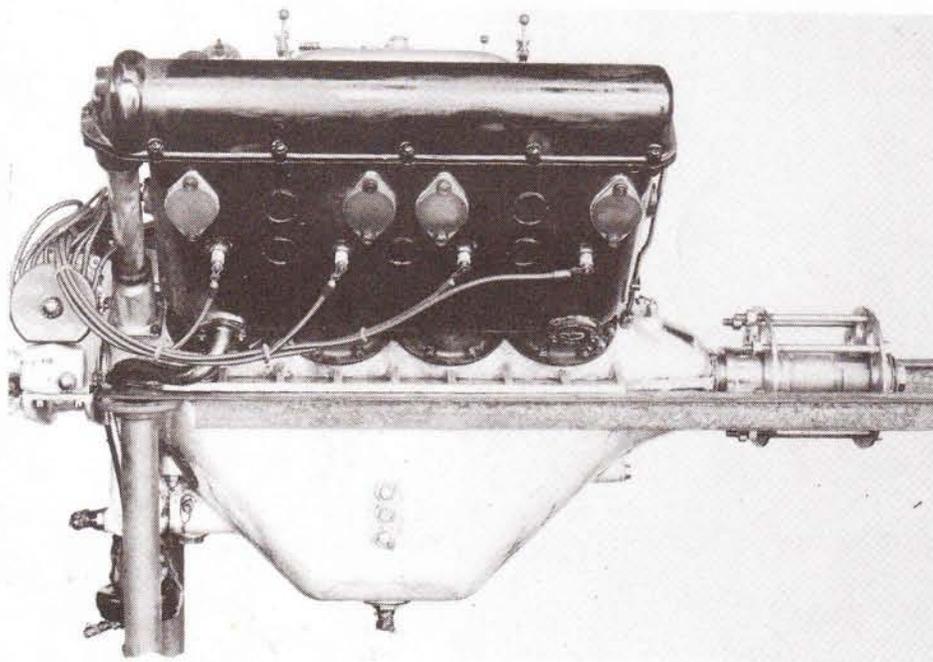
drawings by WILLIAM WYLAM

ONE OF THE MOST successful engines of its time, the Hispano-Suiza was a V-type 8 cylinder, liquid-cooled engine that was produced in both direct and geared drive configurations. With the main production facility in Barcelona, Spain, the engine was also manufactured in the United States by the Wright-Martin Company and versions were also produced in France and England. Eight models were made with the M version producing as much as 400 hp. Used in such aircraft as the British Beardmore,

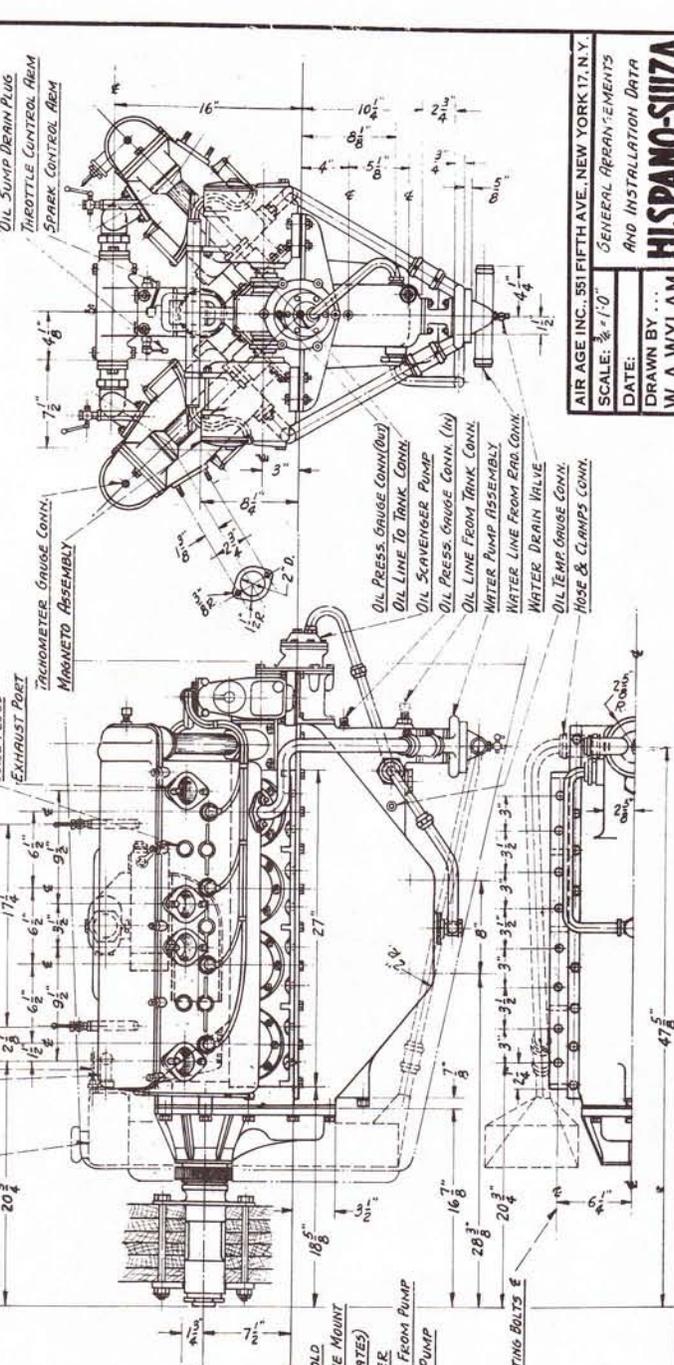
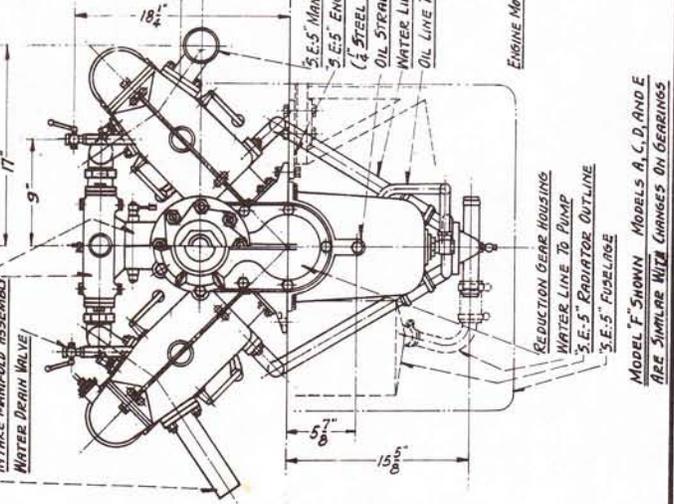
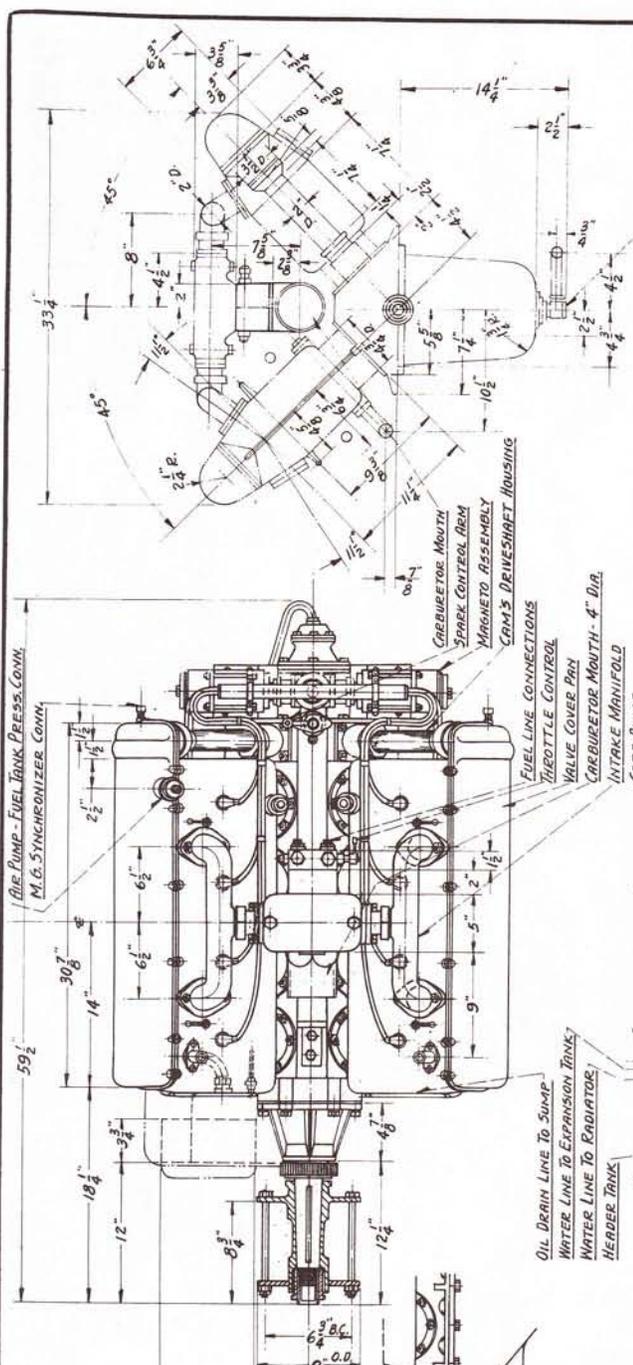
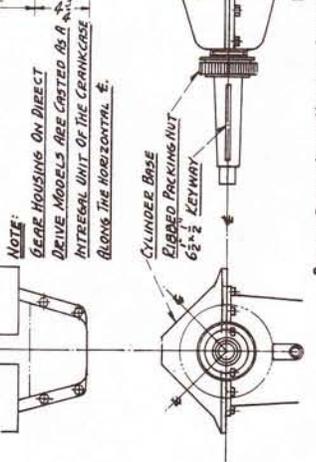


S.E.5, Sage, Sopwith Dolphin, Supermarine, the French-built DeMarcay, and Nieuport variants, the engine probably achieved more recognition than any other by virtue of its use in the famous French-built Spad fighter plane.

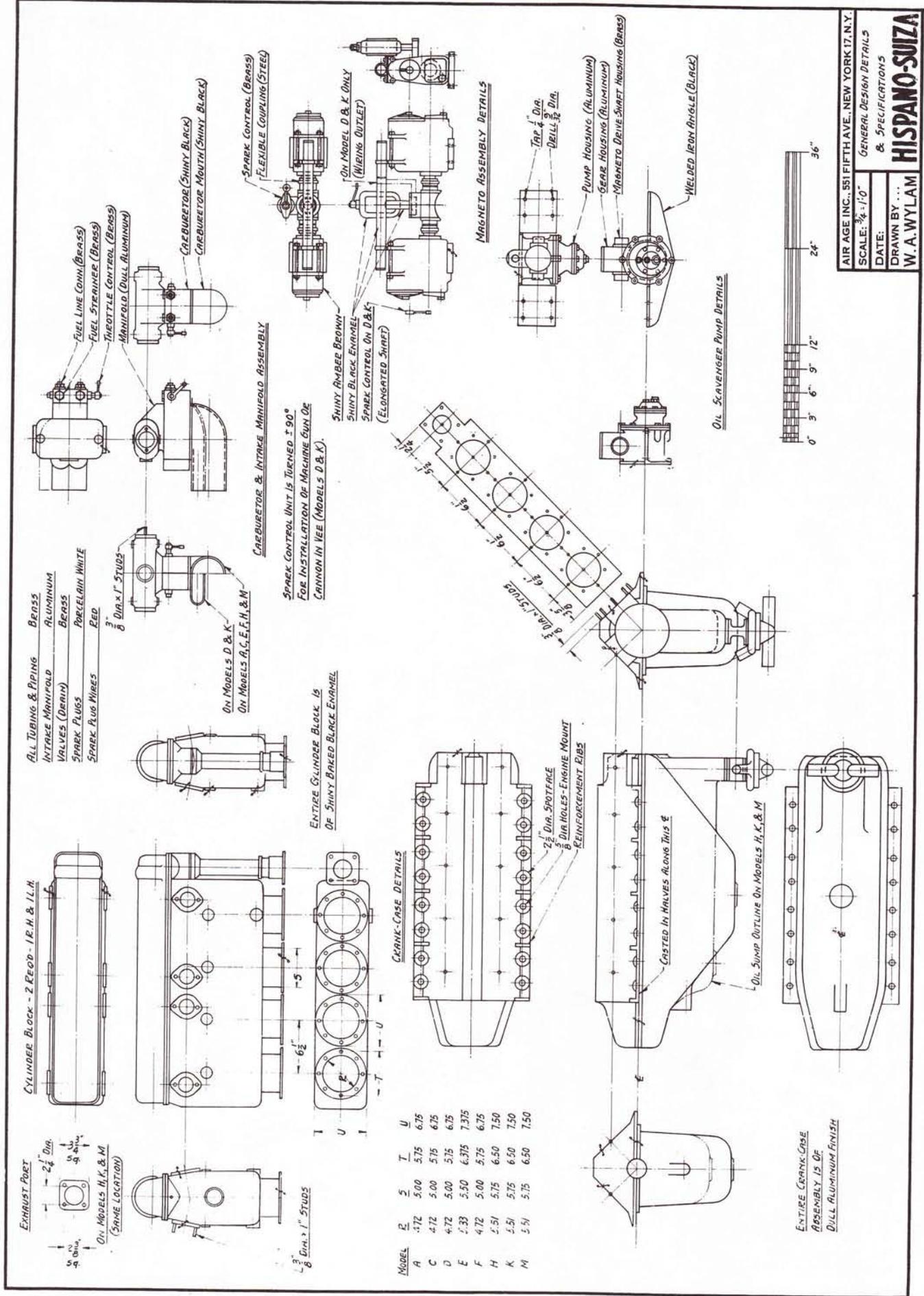
The Hispano-Suiza engines, which were developed as early as 1916, had a reliable design and provided a sound basis for the company which is still in business producing jet engines under the name of SNECMA in Paris, France. □



MODEL	H.P.	GEARING	BORE	DESIGN CHANGES
A	150	DIRECT DRIVE	4.72"	SAME AS MODELS T AND D*
C	200	PROP. RED. GEAR	4.72"	MODEL SHOWN - SAME AS A, P
D	220	PROP. RED. GEAR	4.72"	PROVISION FOR M.G. IN VEE
E	180	DIRECT DRIVE	5.33"	LARGER CARBURETOR
F	220	PROP. RED. GEAR	4.72"	NO PROVISION FOR GUN IN VEE
H	300	DIRECT DRIVE	5.51"	RECTANGULAR OIL SUMP & CRANK'S
K	300	PROP. RED. GEAR	5.51"	FOR 37mm. CANNON IN VEE
M	300	DIRECT DRIVE	5.51"	NO PROVISION FOR 37mm. CANNON



AIR AGE INC., 551 FIFTH AVE., NEW YORK 17, N.Y.  
 SCALE: 3/8" = 1"  
 GENERAL ARRANGEMENTS  
 AND INSTALLATION DATA  
 DRAWN BY: W. A. WYLAM  
**HISPANO-SUIZA**



AIR AGE INC., 351 FIFTH AVE., NEW YORK 17, N.Y.  
 SCALE: 3/4" = 1'-0" GENERAL DESIGN DETAILS & SPECIFICATIONS  
 DATE: \_\_\_\_\_  
 DRAWN BY: ...  
**W. A. WYLAM**  
**HISPANO-SUIZA**

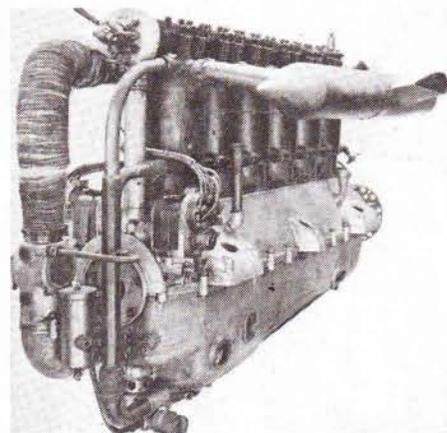
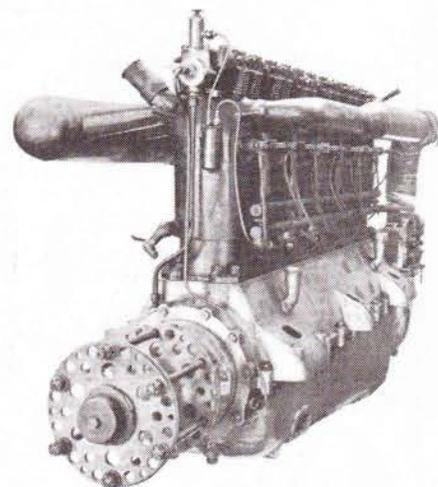
MODEL	E	S	T	U
A	4.72	5.00	5.75	6.75
C	4.72	5.00	5.75	6.75
D	4.72	5.00	5.75	6.75
E	4.33	5.50	6.375	7.375
F	4.72	5.00	5.75	6.75
H	4.51	5.75	6.50	7.50
K	4.51	5.75	6.50	7.50
M	4.51	5.75	6.50	7.50

# Mercedes 160 hp & 180 hp

drawings by WILLIAM WYLAM

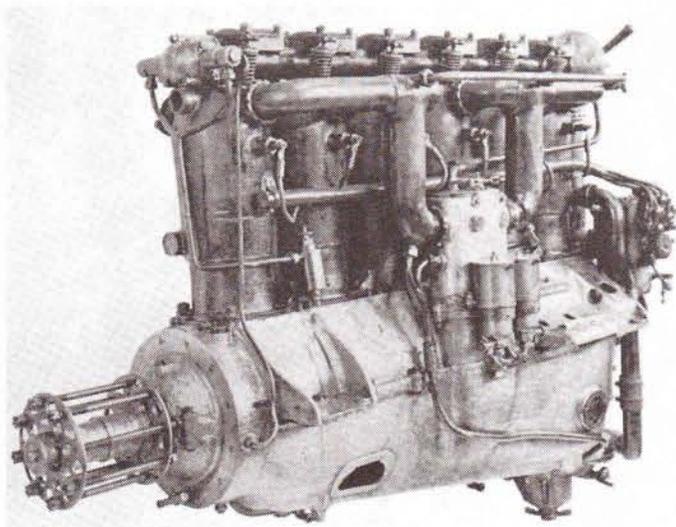
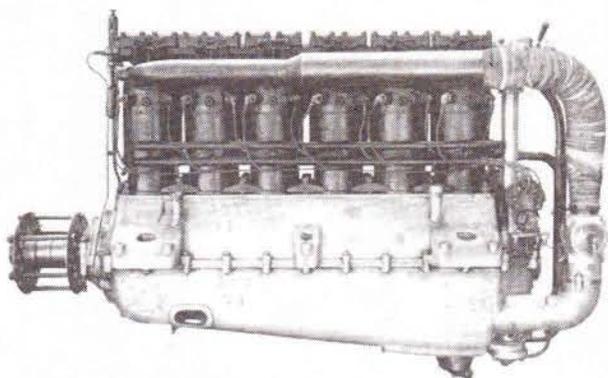
**D**ESCRIBED as very reliable, the Mercedes engine was developed for the Automobile Technical Society prize of 5,000 pounds sterling during 1911. The 100-hp model won the chief prize in the Kaiser engine competition in 1912 and the Mercedes-Daimler Motoren Gesellschaft, Stuttgart, Germany, firm went on to produce even larger engines and automobiles. Produced between 1914 and 1918, the 160- and 180-hp versions were

used in a wide variety of German aircraft, such as the Albatros D.III and the Fokker D.VII. The F-1466 engine had a rating of 160 hp at 1,400 rpm and the F-1466D-3A was rated at 180 hp at 1,400 rpm. These were liquid-cooled engines and were known for their reliability and excellent durability due to the fine craftsmanship insisted upon by the company, a feature that is still held to modern times. □



*Above: Front and rear views of the Mercedes demonstrate the thin profile which allowed for streamlining of the airframe design. "Jane's All the World's Aircraft" photos.*

*Left and below: Mercedes engines were known for their ruggedness and low maintenance requirements.*



# F-1466

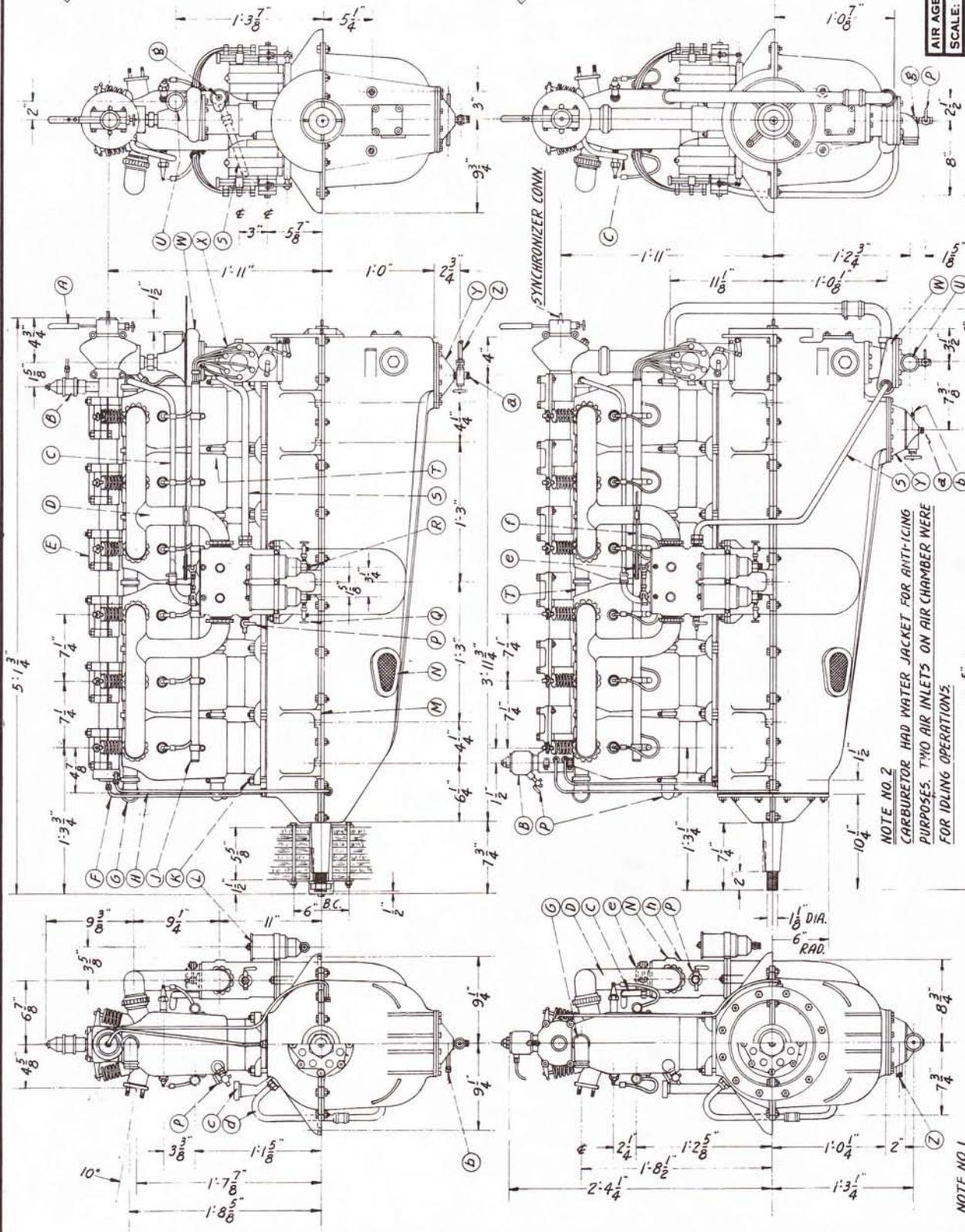
BORE 5.51"  
STROKE 6.3"  
160 H.P. @ 1400 R.P.M.

- (A) DE-COMPRESSION LEVER
- (B) AIR PUMP (FUEL PRESSURE)
- (C) CARBURETOR HEAT (WATER)
- (D) INTAKE MANIFOLD
- (E) CAMSHAFT & ROCKER CASING
- (F) OIL LINE TO OIL PUMP
- (G) WATER INLET ELBOW
- (H) OIL LINE FROM OIL PUMP
- (J) FIBER SUPPORT TUBE (WIRES)
- (K) CYLINDER HOLD-DOWN BOLTS
- (L) TWIN JET CARBURETORS
- (M) ENGINE MOUNT
- (N) CARBURETOR AIR INTAKE
- (P) PET COCK - WATER DRAIN
- (Q) PET COCK - CARBURETOR DRAIN
- (R) FUEL LINE CONNECTIONS

# F-1466D-3A

BORE 5.51"  
STROKE 6.3"  
160 H.P. @ 1400 R.P.M.

- (S) CARBURETOR HEAT (TO PUMP)
- (T) WATER INLET CONNECTIONS
- (U) WATER OUTLET (TO RADIATORS)
- (W) WATER PUMP
- (X) TWIN MAGNETS
- (Y) OIL PUMP
- (Z) OIL LINE CONN. (FROM TANK)
- (a) OIL DRAIN
- (b) OIL TEMPERATURE GAGE CONN.
- (c) OIL 50% FILL
- (d) OIL BYPASS LINE
- (e) THROTTLE PULLEY
- (f) T-ROTTLE CONTROL CABLES
- (g) WATER TEMP GAGE CONN.
- (h) AIR CHAMBER



AIR AGE INC., 35 FIFTH AVE., NEW YORK 17, N.Y.  
SCALE: 3/4" = 1"  
TYPE: IN LINE  
COPYRIGHT 1948  
WILLIAM A. WYLAN

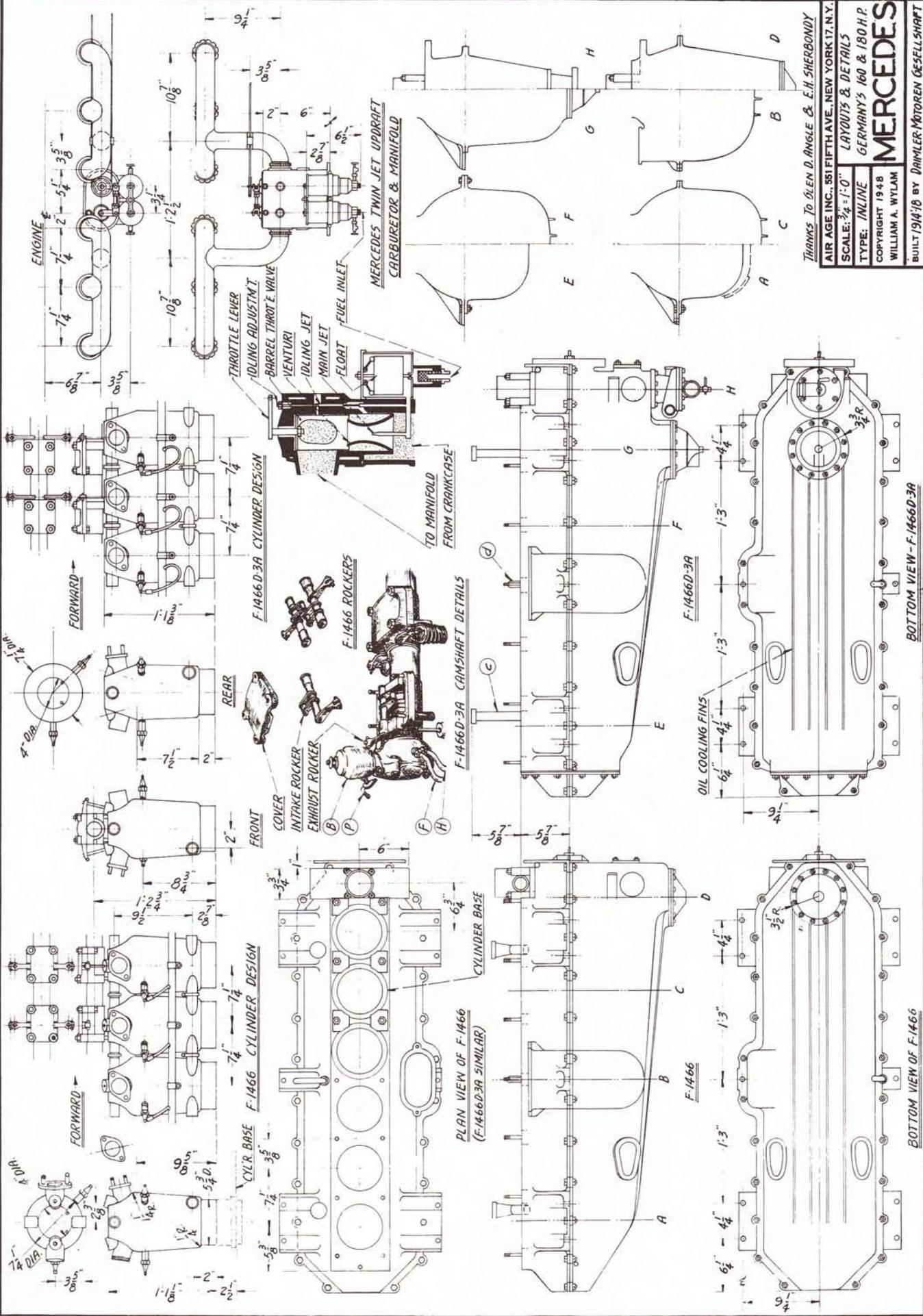
GENERAL ARRANGEMENT  
GERMANY'S 160 & 180 H.P.  
**MERCEDES**  
BUILT 1914-18 BY DAIMLER-MOTOREN-GESELLSCHAFT

NOTE NO. 1  
AIR SUPPLY PASS THRU PASSAGE INSIDE OF  
CRANKCASE TO AIR CHAMBER. INTERNAL OIL COOLING  
FINS WARMED THE INRUSHING AIR SUPPLY.

NOTE NO. 2  
CARBURETOR HAD WATER JACKET FOR ANTI-ICING  
PURPOSES. TWO AIR INLETS ON AIR CHAMBER WERE  
FOR IDLING OPERATIONS.

NOTE NO. 3  
DE-COMPRESSION LEVER WAS USED TO REDUCE  
COMPRESSION DURING STARTING OPERATIONS.

NOTE NO. 4  
MACHINE 6 IN SYNCHRONIZER UNIT WAS ATTACHED TO THE  
REAR END OF THE CAMSHAFT.

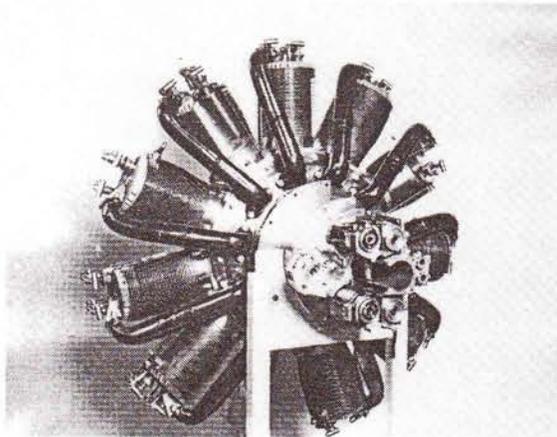
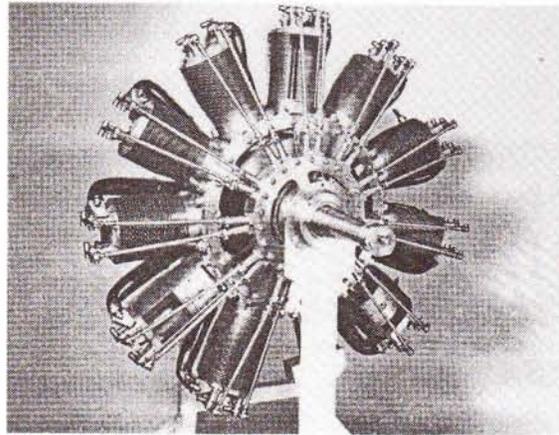


THANKS TO GLEN D. ANGLE & E.H. SHERBONDY  
 AIR AGE INC., 351 FIFTH AVE., NEW YORK 17, N.Y.  
 SCALE: 3/4" = 1" 0"  
 TYPE: INLINE  
 GERMANY'S 160 & 180 H.P.  
**MERCEDES**  
 COPYRIGHT 1948  
 WILLIAM A. WYLAN  
 BUILT 1948 BY DAIMLER-MOTOREN-GESELLSCHAFT

# Siemens-Halske

drawing by WILLIAM WYLAM

**T**HE SIEMENS & HALSKE Aero Engine Department, Berliner Chausse, Berlin-Spandau, engaged in the manufacturing of aero-engines before WW I. Toward the end of the war, they designed and manufactured rotary engines in which the crankcase and the crankshaft were geared together, so that each rotated at half-engine speed in opposite directions. For the time, this engine made some very remarkable climbs to high altitudes. For high-altitude performance, the engine was fitted with high-compression cylinders. Used in such airplanes as the Roland Parasol and the Siemens-Schuckert bi-planes, the engine had the capability of turning huge, four-bladed props due to the unique nature of the engine gearing, giving the aircraft equipped with them some very powerful and maneuverable machines. □



*The Siemens-Halske Sh.III contra-rotary, on exhibit at the Science Museum in S. Kensington, England. Science Museum photo.*



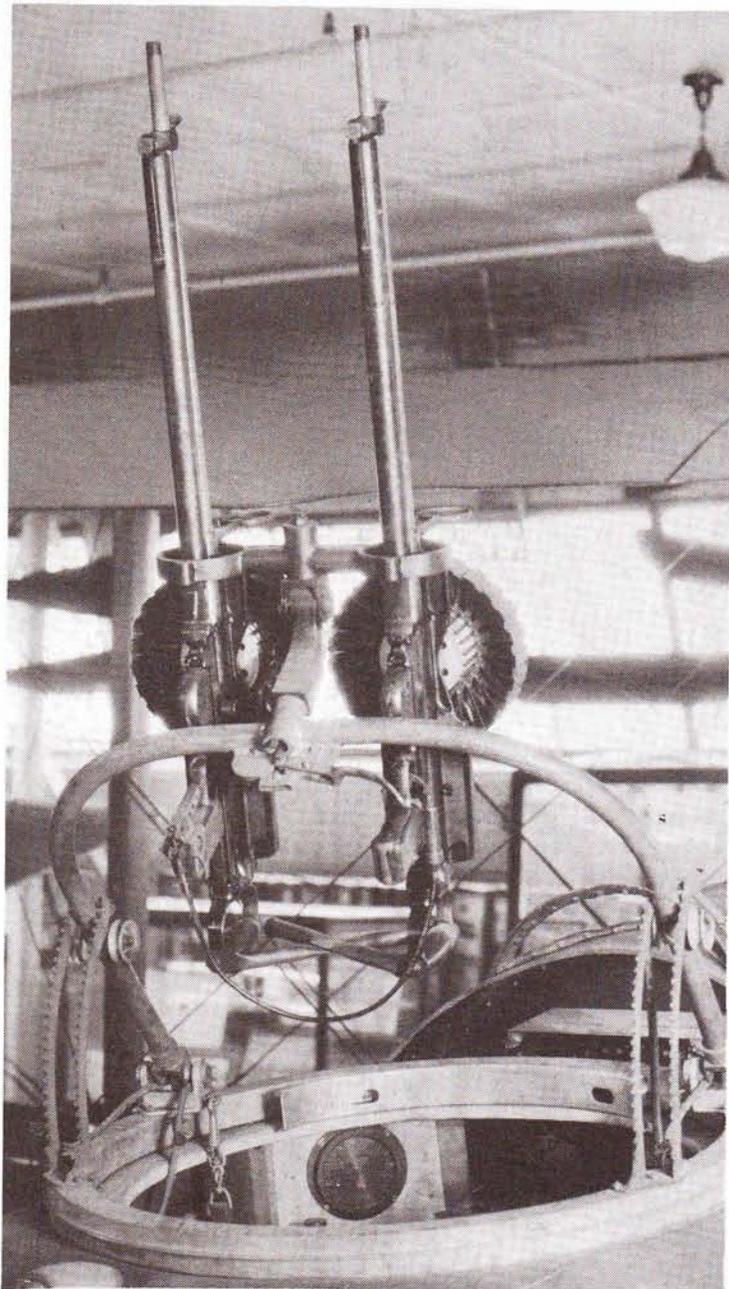
## Armament

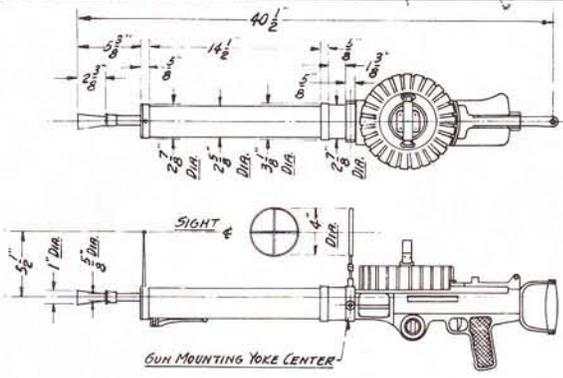
# Lewis Machine Gun

drawing by WILLIAM WYLAM

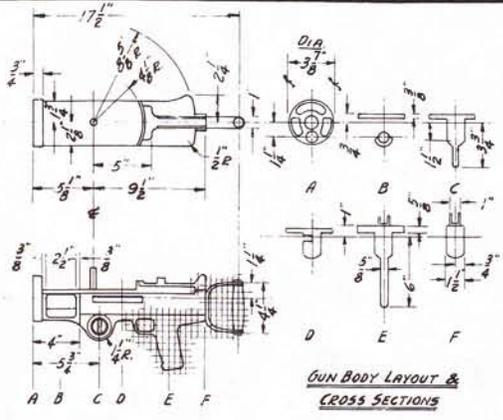
**AS IN ANY WAR**, the unfortunate method of force comes from firepower or killing power. Early pilots of WW I observation aircraft soon discovered that they were sitting ducks for ground fire. Following a number of casualties, pilots began to carry side-arm weapons and even rifles. The concept of fixed guns on aircraft came as a result of the pilot's inability to fly his aircraft and fire his weapon with any authority by leaning over the side of his airplane. As this approach to aircraft weaponry developed, so did the need for faster firing guns. The Lewis Machine Gun, Model 1918, was an outgrowth of the infantry type machine gun used by ground personnel, and was attached with a flexible mount atop the wings of many Allied aircraft, as well as being located in the rear of the aircraft for use by an aerial gunner. Being fully automatic and gas-operated, the Lewis provided a formidable new fighting tool for the Allies in the air. □

*A pair of Lewises mounted on a Scarff ring in the rear cockpit. It is the same mounting as the one in the drawing.*

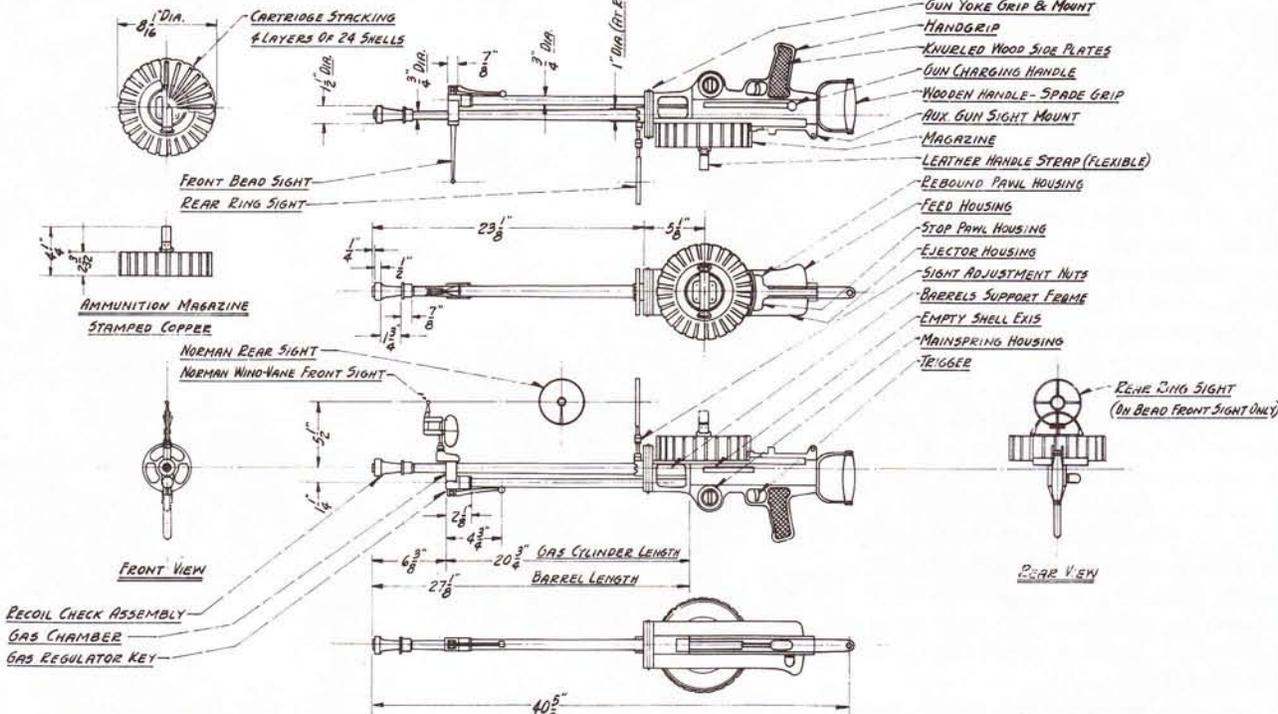




1915 LEWIS .30 CAL. AIRCRAFT MACHINE GUN



GUN BODY LAYOUT & CROSS SECTIONS

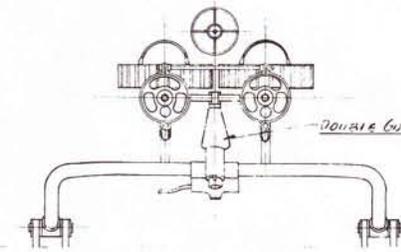


M1918 LEWIS .30 CAL. AIRCRAFT FLEXIBLE MACHINE GUN

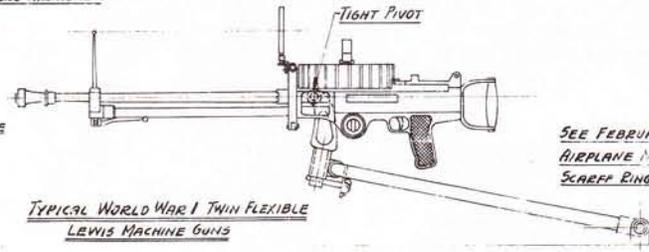
**NOTES ON LEWIS OPERATIONS**  
 THIS TYPE OF MACHINE GUN WAS GAS OPERATED, FULLY AUTOMATIC, AND AIR COOLED. IT FUNCTIONS ON THE POWER PRODUCED BY THE EXPANSION OF GAS. THIS GAS WAS CREATED BY THE FIRING OF THE CARTRIDGE WHICH DRIVES THE BULLET OUT THRU THE BARREL. WHEN THE BULLET PASSED THE PORTHOLE IN THE GAS CHAMBER, THE GAS IS EXPANDED INTO A DRIVING FORCE. THIS DRIVES THE PISTON & SHAFT BACK TOWARD THE REAR. THIS BACKWARD MOVEMENT IN THE GAS CYLINDER CAUSED THE CARTRIDGE TO UNLOCK & TO DROP INTO THE HOLD, EXTRACT THE EMPTY SHELL CASE AND TO THROW IT OUT THRU THE EMPTY SHELL EXIS, ROTATE THE MAGAZINE, AND TO WIND UP THE MAINSPRING. THE FORWARD MOVEMENT OF THE PISTON & SHAFT WAS CAUSED BY THE MAINSPRING PRESSURE WHICH FEEDS AND LOCKS THE CARTRIDGE IN THE FIRING CHAMBER; AND FIRES THE CARTRIDGE WHEN THE TRIGGER IS PRESSED.

**NOTE:**  
 LEWIS GUNS CAN NOT BE SYNCHRONIZED FOR FIRING THRU PROPELLER. IT CAN BE USED ONLY FOR FREE OR FLEXIBLE MOUNTINGS.

ENTIRE GUN WITH EXCEPTION OF MAGAZINES, WOOD HANDLES, & MOVING PARTS WERE OF NON-EUST DULL BLACK. MAGAZINES WERE COPPER FINISHED, LEATHER STRAPS WERE BROWN; AND WOOD PARTS WERE VARNISHED.



DOUBLE GUN YOKE



TYPICAL WORLD WAR I TWIN FLEXIBLE LEWIS MACHINE GUNS

SEE FEBRUARY 1946 MODEL AIRPLANE NEWS FOR DETAILS ON SCARF RING MOUNT & YOKE.

AIR AGE INC., 551 FIFTH AVE., NEW YORK 17, N. Y.  
 SCALE: 3/8" = 1'-0"  
 GENERAL ARRANGEMENTS  
 30 CAL. AIRCRAFT MACHINE GUN  
 DRAWN BY...  
 W. A. WYLLAM

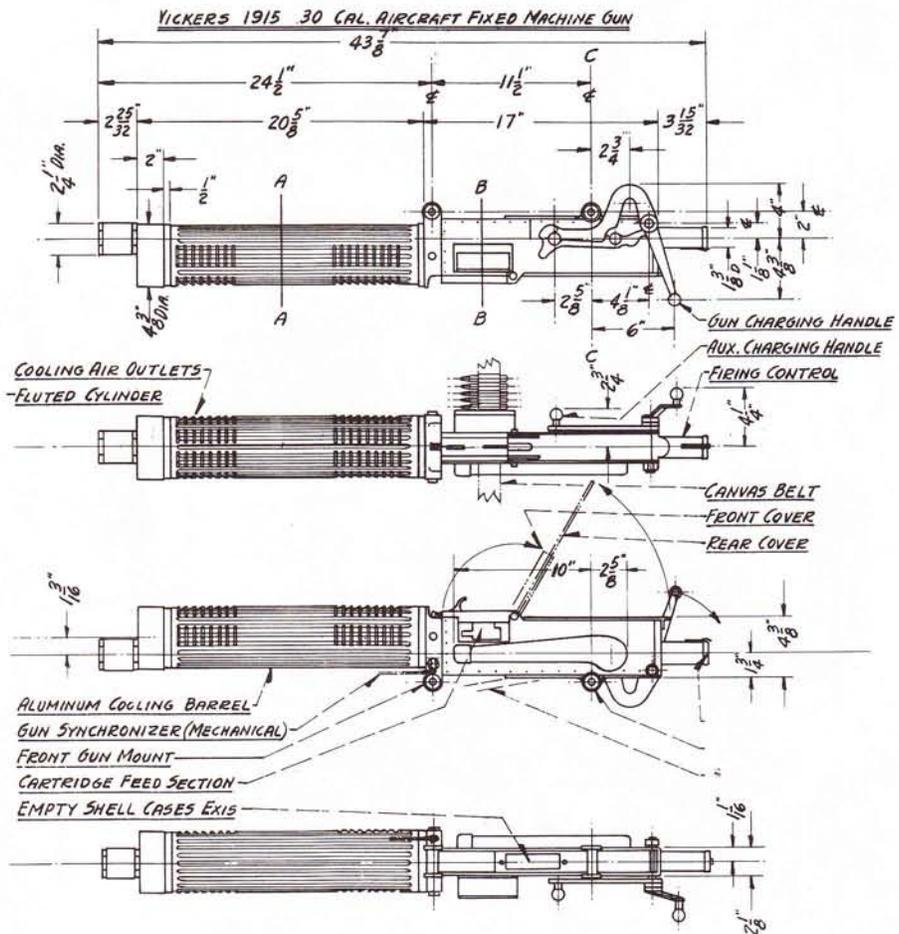
# Vickers Machine Gun

drawing by WILLIAM WYLAM

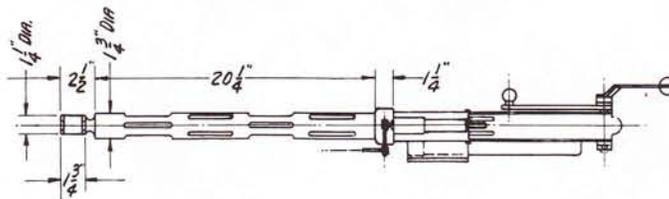
**T**HE FIRST experiments in arming an aircraft consisted of firing hand-held pistols and carbines. Machine guns were attached to the upper wings of scout biplanes, mounted at angles on the sides, pivoting on mountings in rear cockpits, or on pusher scouts like the D.H.2, fixed in front of the pilot. All these were awkward or dangerous: the obvious best location was in front of the pilot firing through the propeller of a tractor design.

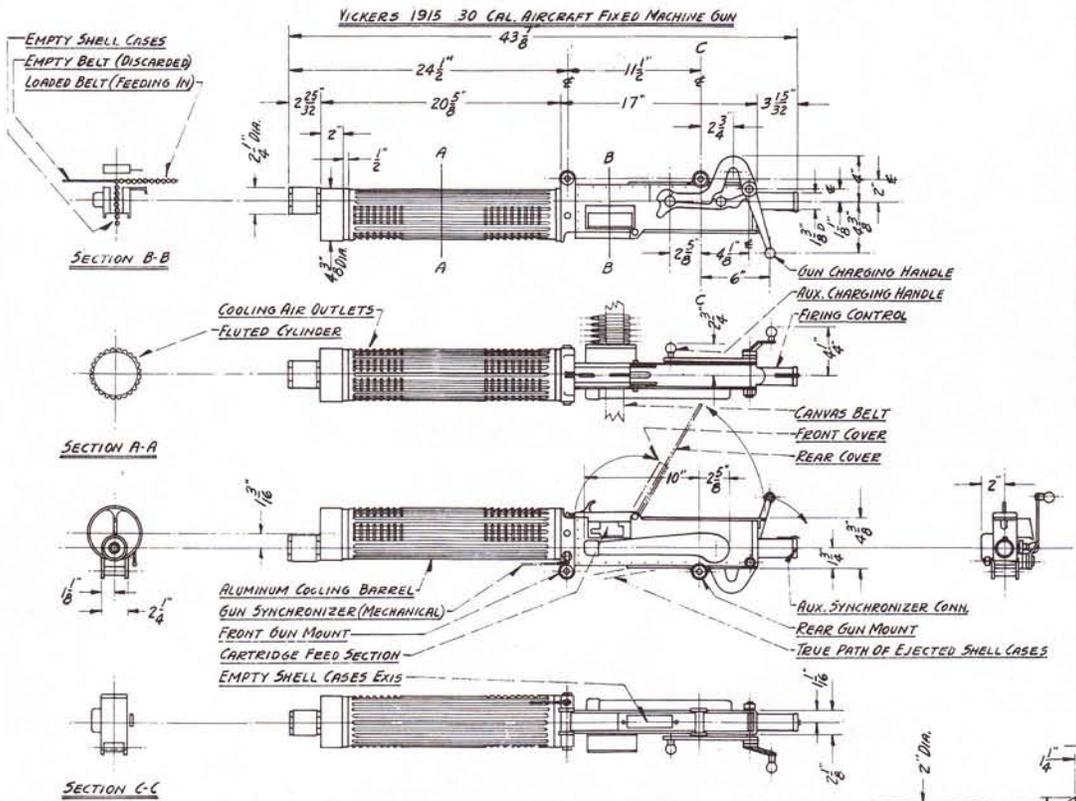
At first, pilots tried mounting a single gun on the cowling and firing through the turning propeller, making holes in it occasionally. A surprising number of holes could be made before the propeller disintegrated!

Roland Garros put iron wedges around the base of his blades to deflect the bullets, but the vibration eventually destroyed the propeller. Fokker developed a mechanical synchronizer which interrupted the operation of the gun when the blade was in front of it, and soon after a better hydraulic system appeared. The Vickers took its place, first one only and then in pairs, on the cowls of most Allied aircraft.



*The Vickers, like the Lewis and the German Spandau, was developed from the earlier gun designed by Hiram Maxim.*

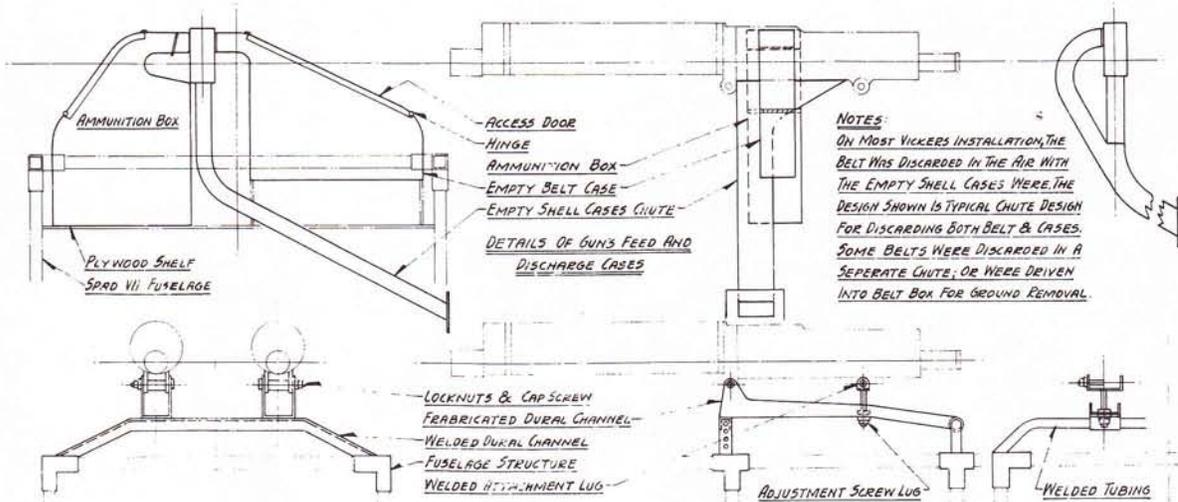
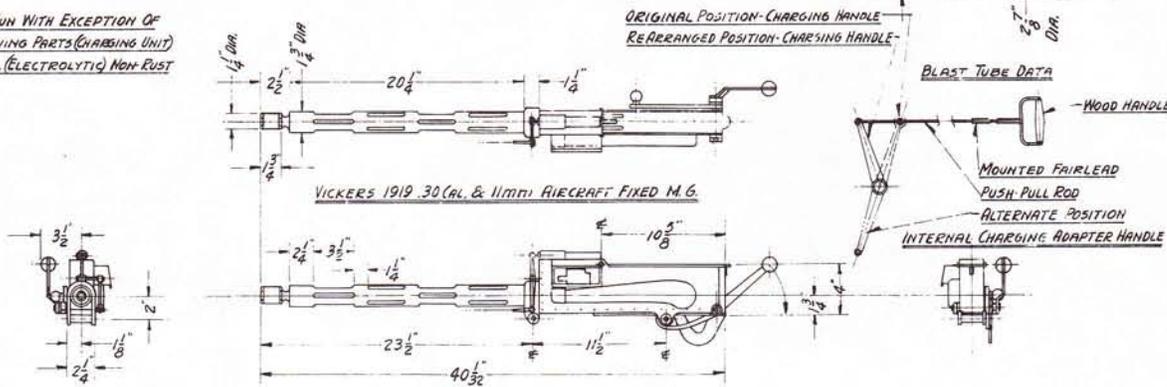




AIR AGE INC. 551 FIFTH AVE., NEW YORK 17, N.Y.  
 SCALE:  $\frac{3}{8}$ " = 1'-0"  
 GENERAL ARRANGEMENTS  
 .30 & 11mm Cal. Machine Guns  
 DATE: \_\_\_\_\_  
 DRAWN BY ...  
 W. A. WYLAM

# VICKERS

**NOTE:**  
 ENTIRE GUN WITH EXCEPTION OF  
 STEEL MOVING PARTS (CHARGING UNIT)  
 WAS DULL (ELECTROLYTIC) NON-RUST  
 BLACK.

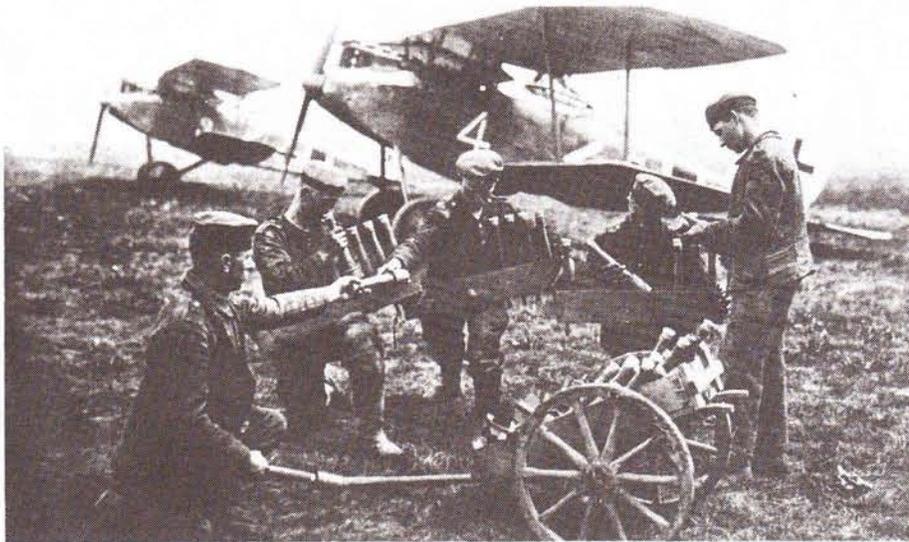


**NOTES:**  
 ON MOST VICKERS INSTALLATION, THE  
 BELT WAS DISCARDED IN THE AIR WITH  
 THE EMPTY SHELL CASES WERE THE  
 DESIGN SHOWN IS TYPICAL CHUTE DESIGN  
 FOR DISCARDING BOTH BELT & CASES.  
 SOME BELTS WERE DISCARDED IN A  
 SEPARATE CHUTE; OR WERE DRIVEN  
 INTO BELT BOX FOR GROUND REMOVAL.

DETAILS OF TYPICAL  
 GUN MOUNT FOR VICKERS

# Air Bombs

drawing by WILLIAM WYLAM



*Bombs being loaded into German Halberstadt CL.II light bombers.*

**O**NE OF THE FIRST bombs to fall from an aircraft on an enemy was a glass jar filled with petrol, nails, and powder. The airplane in war was seen as providing a better vantage point in observing enemy troop movements.

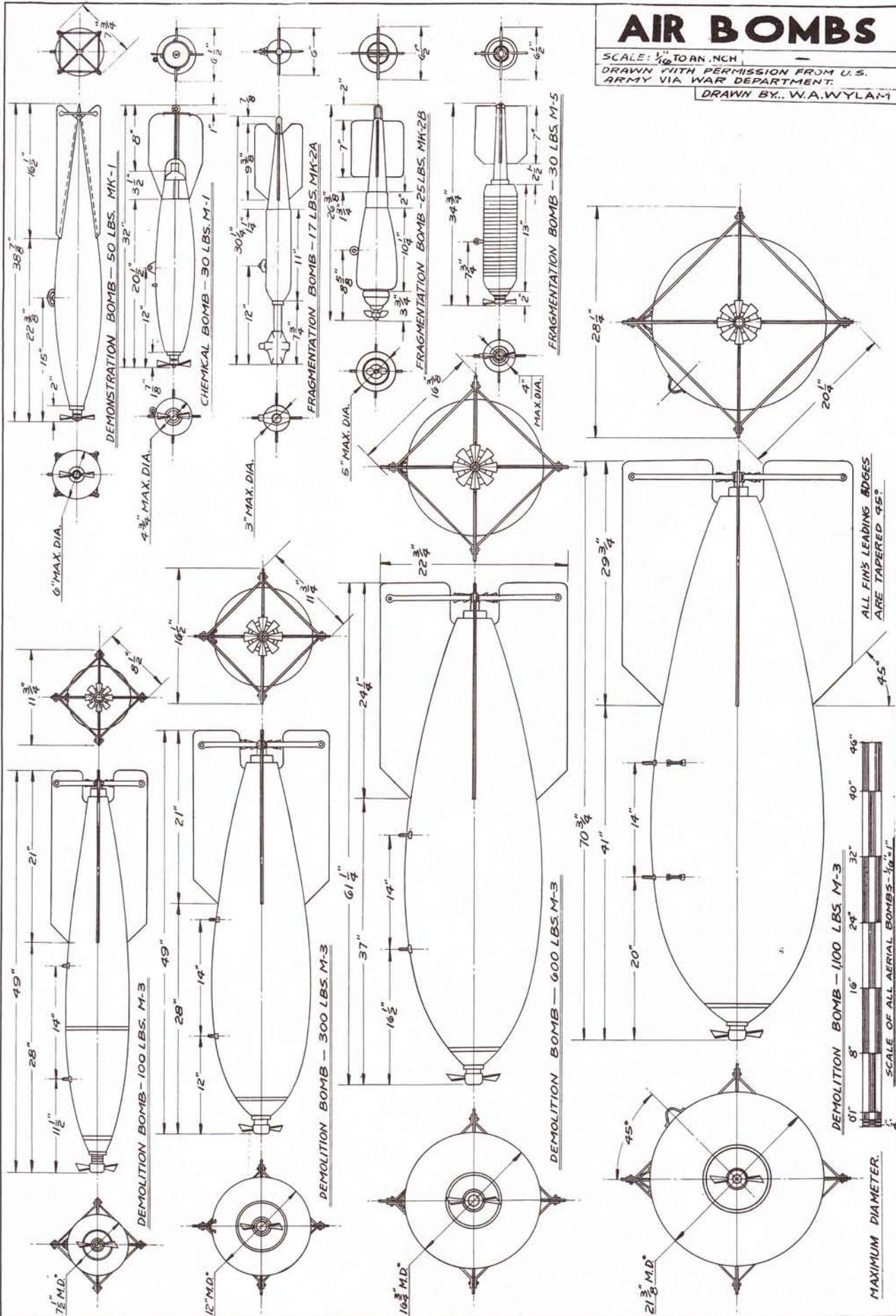
The first bombing equipment was nothing more than a pilot with a satchel with a few lightweight bombs made from artillery shells or hand grenades that he simply tossed over the side. Encouraged with this new way of creating havoc on

the ground, aircraft were soon equipped with racks under the aircraft, a release mechanism in the cockpit for the pilot to activate, and even additional crew members to assume the tasks of gunner and bombardier.

Shortly after the end of WW I, General Billy Mitchell managed to sink a battleship in a test for the Navy using only bombs. □

# AIR BOMBS

SCALE:  $\frac{1}{16}$ " TO AN .NCH.  
 DRAWN WITH PERMISSION FROM U.S.  
 ARMY VIA WAR DEPARTMENT.  
 DRAWN BY... W.A.WYLAN

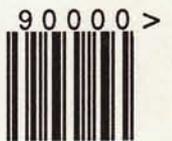


\$17.95

2013



ISBN: 0-911295-02-X



9 780911 295023