FA

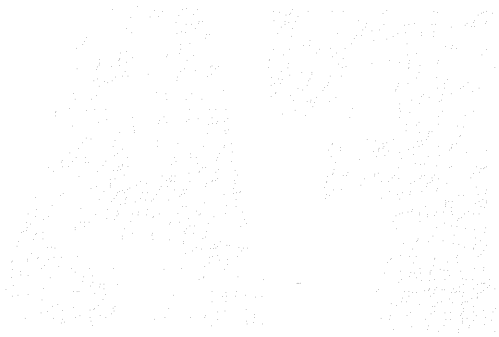
Maintenance, Parts, and Operations

FAIRCHILD HANDBOOK OF

SERIES
AIRPLANES

F – 24

FAIRCHILD AIRCRAFT
HAGERSTOWN, MARYLAND
DIVISION OF FAIRCHILD ENGINE & AIRPLANE CORPORATION



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FAIRCHILD

F-24W46 AND F-24R46

INTRODUCTION

This instruction book has been compiled with the view toward giving the private owner or operator of Fairchild equipment sufficient knowledge concerning the construction, operation, and care of the airplane so that he will obtain the service and satisfaction that have been built into it.

The private owner is particularly cautioned that the underlying cause of practically all airplane mishaps is carelessness, and the most insidious form of carelessness is neglect of proper inspection and attention while a plane is on the ground. While recklessness in the air continues to earn its own reward, and is condemned by all, recklessness on the ground is often the unseen cause of unexplained failures. Therefore, when taking delivery on your plane, be sure that you understand how to care for it. If you cannot give your equipment thorough and regular attention, put it in the hands of a competent and trustworthy mechanic, and give him this handbook.

In case of doubt concerning any service or operating problem not covered in this handbook, consult our Service Division. For satisfactory operation, do not allow inexperienced persons to service your airplane. Our Service Division is your department. It is here that the experiences of many operators are condensed and transformed into data from which better planes are developed. Your criticisms and comments are largely depended upon for further improvements and new methods. Your cooperation is of vital importance, and our Service Division will gladly advise you upon any question which may arise in the upkeep and repair of your Fairchild.

Because of the many difficulties connected with production of private owner aircraft during the early post war period it has been necessary to restrict special equipment installations at the factory.

All airplanes of the 24R46 and 24W46 production are identical at factory fly away except the choice of three exterior colors are available. Wherever in this handbook "special equipment" installations are mentioned they are listed for your information regarding such items which have been approved but they will require field installation, and you should contact your Fairchild Distributor or the Service Department, Fairchild Personal Planes Division, Winfield, Kansas, for the necessary information.

Figure 1-1—F-24W46—Radial Engine

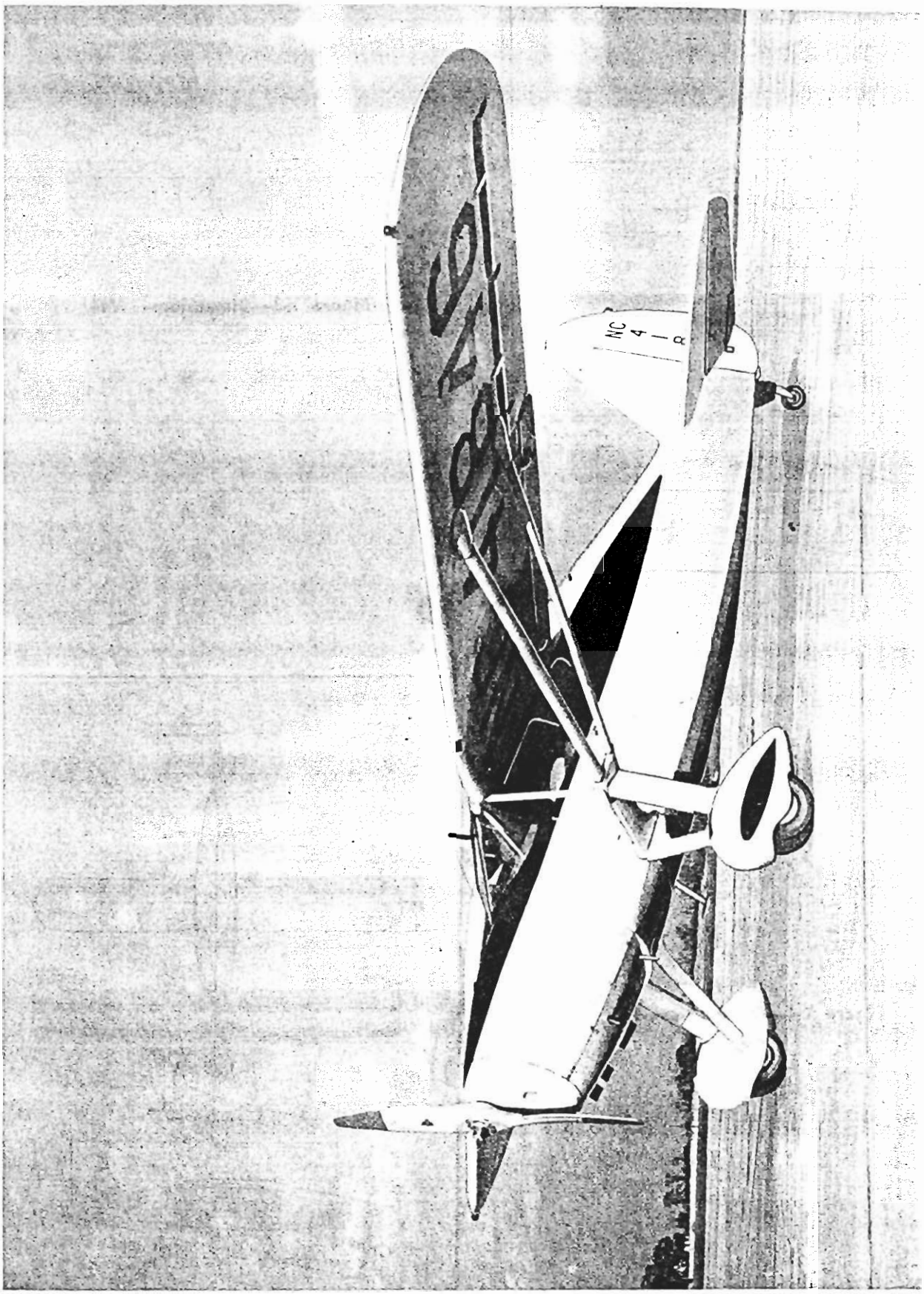


Figure 1-2—F-24R46—In-Line Engine

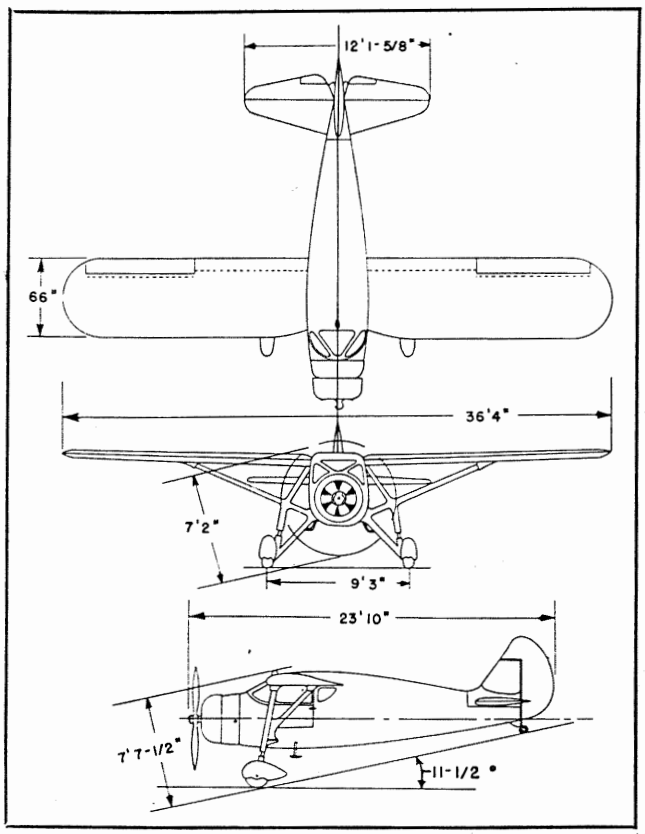


Figure 1-3—Dimensions—W46

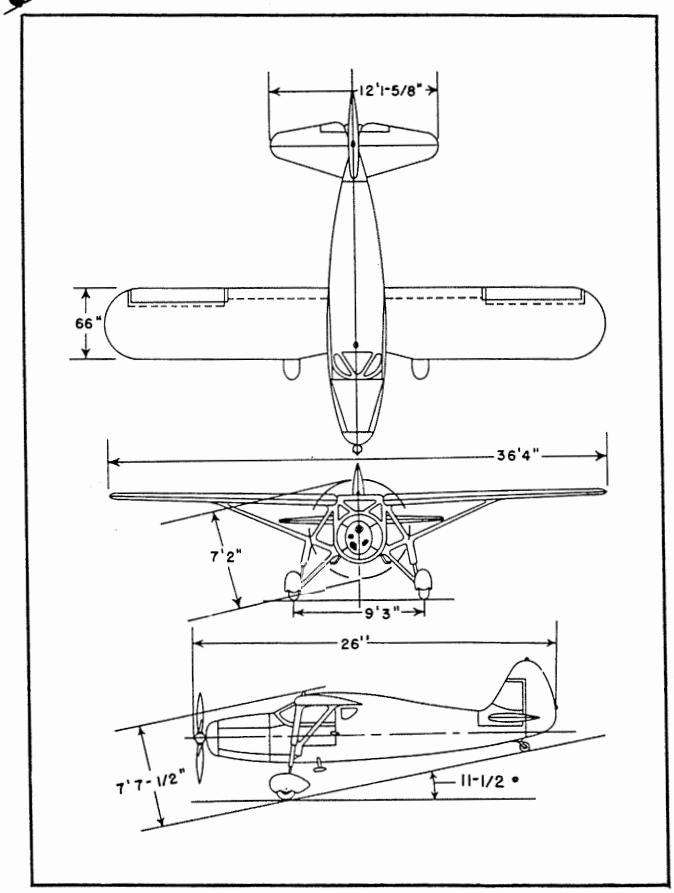


Figure 1-4—Dimensions—R46

SECTION I

GENERAL DESCRIPTION

1. DESCRIPTION. The Fairchild "24", series airplanes are single engine, single tail, strut-braced, high-wing cabin monoplanes, designed to accommodate a pilot and three passengers, one of which may be copilot.

The fuselage is fabric-covered with a frame of welded chrome molybdenum steel tubing, and the wings are fabric-covered over wood spars and wood ribs. The flaps are constructed of an aluminum alloy channel type spar, spruce ribs and an aluminum alloy cover. The ailerons, elevators and rudder are fabric-covered over metal structure. The fin and stabilizer are of conventional plywood construction. The landing gear is fixed. Floats or skis may be substituted for the wheels as special equipment.

A large door, 34½" high by 29¼" wide, is provided at each side of the cabin, hinged at the front. A step is provided at each door to aid persons entering and leaving the cabin. The cabin doors may be provided with quick-release hinges as special equipment. A catch is installed on the tripod fairing of each wing to hold the doors in the open position. Both doors may be locked. Three large triangular windows are provided ahead of the pilot and copilot. Two adjustable windows are provided, one in each side door, and a window on each side of the rear cabin wall is installed allowing side vision for passengers.

AIRPLANE DIMENSIONS

Airplane Model	Length Overall	Span	Prop. Diameter	Height At Rest
24W46	23′ 10″	36′ 4″	86″	7′ 7½″
24R46	26′	36′ 4″	86″	7′ 7½″

WING DIMENSIONS

	Chord (Feet)	Incidence (Degrees)	Dihedral (Degrees)
24W46 and R46	5′ 6″	1	2½

STABILIZER DIMENSIONS

	Span (Feet)	Maximum Chord (Feet)
24W46 and R46	12′ 1⅝″	4′ 8-11/16″

FUSELAGE DIMENSIONS

	Width (Feet)	Height (Feet)	Length Without Engine Mount (Feet)	Length With Engine Mount (Feet)
24W46	3′ 10-1/4″	5′ 1/4″	18′ 5-7/8″	19′ 8-15/16″
24R46	3′ 10-1/4″	5′ 1/4″	18′ 5-7/8″	22′ 4-1/4″

SURFACE AREAS

	Wing Including Ailerons and Flaps (Sq. Feet)	Ailerons (Sq. Feet)	Flaps (Sq. Feet)	Stabilizer (Sq. Feet)
24W46 and R46	193.3	21	6	21.9

	Elevator Including Tab (Sq. Feet)	Elevator Trim Tab (Sq. Inches)	Fin (Sq. Feet)	Rudder (Sq. Feet)
24W46 and R46	13.45	106.64	6.12	10.16

EXTREME REARWARD C. G. LOCATION PERMISSIBLE IN FLIGHT AFT OF LEADING EDGE OF WING:		EXTREME FORWARD C. G. LOCATION PERMISSIBLE IN FLIGHT AFT OF LEADING EDGE OF WING:	
24W46	25.9 inches	24W46	16.6 inches
24R46	24.6 inches	24R46	16.4 inches

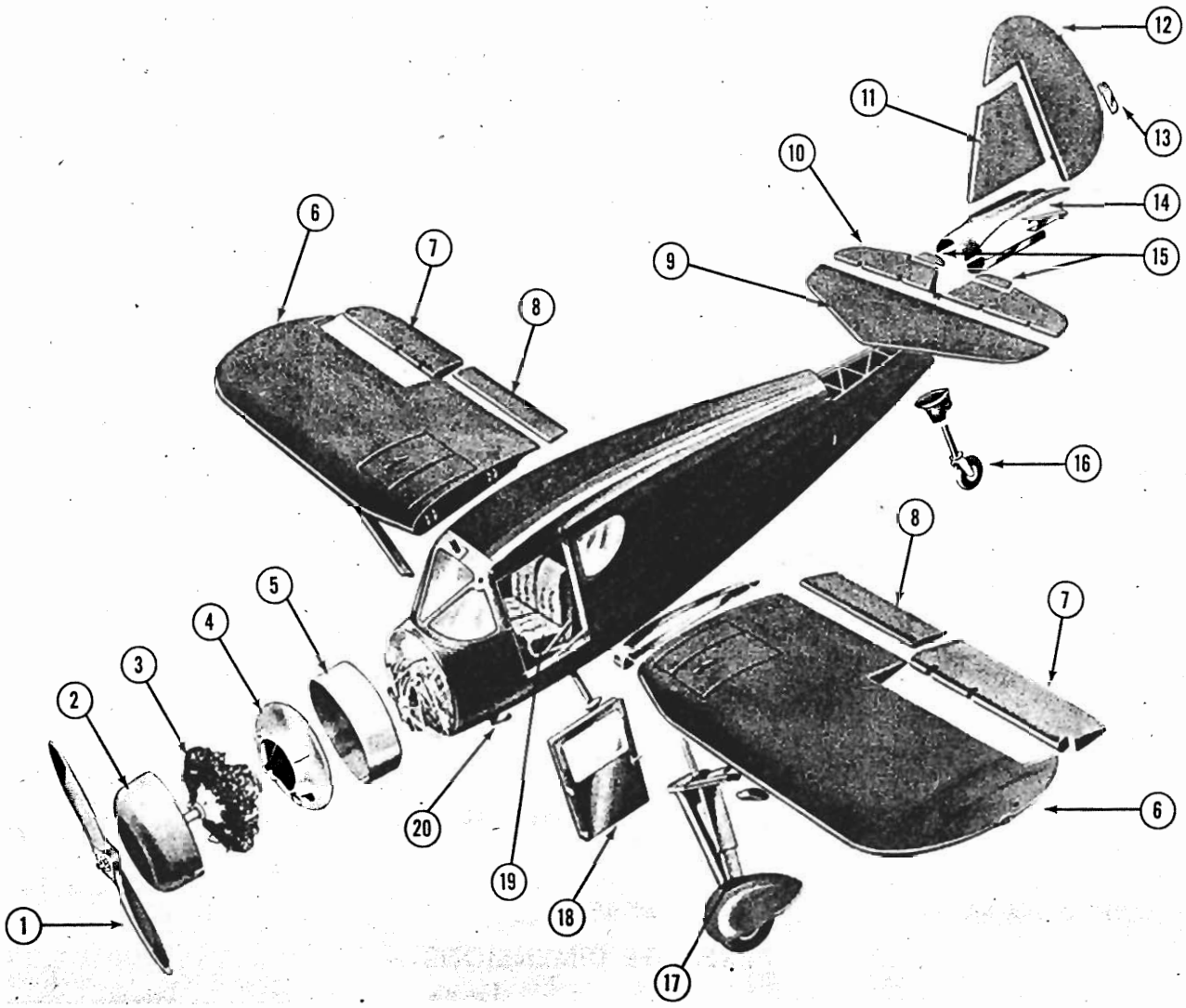


Figure 1-5—Exploded View—W46

Index No.	Nomenclature	*Index No.*	Nomenclature
1	*Propeller.*	*11*	*Fin.*
2	*Ring Cowl.*	*12*	*Rudder.*
3	*Warner Engine.*	*13*	*Trim Tab.*
4	*Inner Cowl.*	*14*	*Fairing.*
5	*Wrap Cowl.*	*15*	*Elevator Trim Tabs.*
6	*Wing Panel.*	*16*	*Tail Wheel.*
7	*Aileron.*	*17*	*Landing Gear.*
8	*Wing Flap.*	*18*	*Cabin Door.*
9	*Horizontal Stabilizer.*	*19*	*Seats.*
10	*Elevator.*	*20*	*Venturi Tube.*

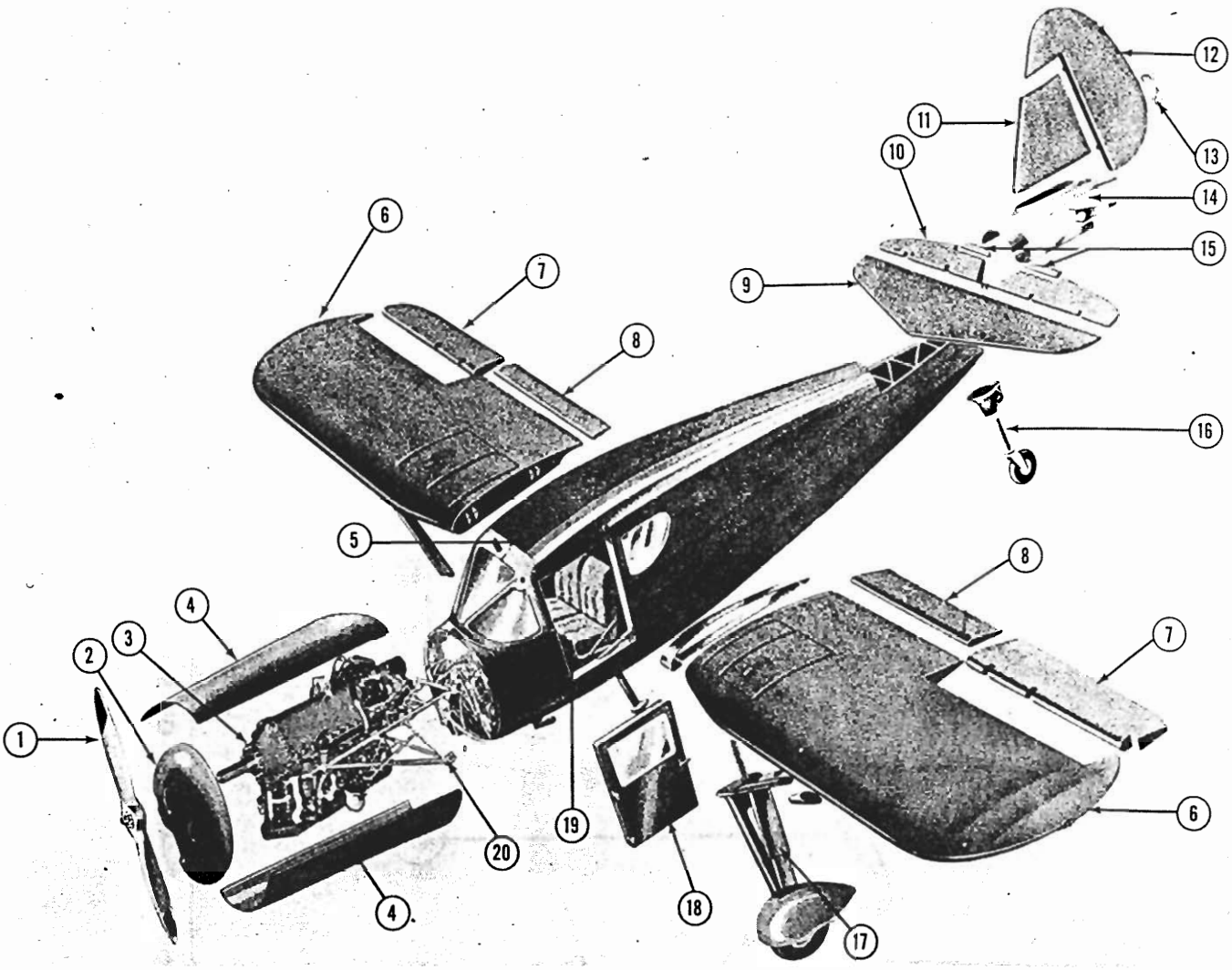


Figure 1-6—Exploded View—R46

Index No.	Nomenclature	Index No.	Nomenclature
1	*Propeller.*	*11*	*Fin.*
2	*Nose Cowl.*	*12*	*Rudder.*
3	*Ranger Engine.*	*13*	*Trim Tab.*
4	*Cowling.*	*14*	*Fairing.*
5	*Fuselage.*	*15*	*Elevator Trim Tabs.*
6	*Wing Panel.*	*16*	*Tail Wheel.*
7	*Aileron.*	*17*	*Landing Gear.*
8	*Wing Flaps.*	*18*	*Cabin Door.*
9	*Horizontal Stabilizer.*	*19*	*Seats.*
10	*Elevator.*	*20*	*Engine Mount.*

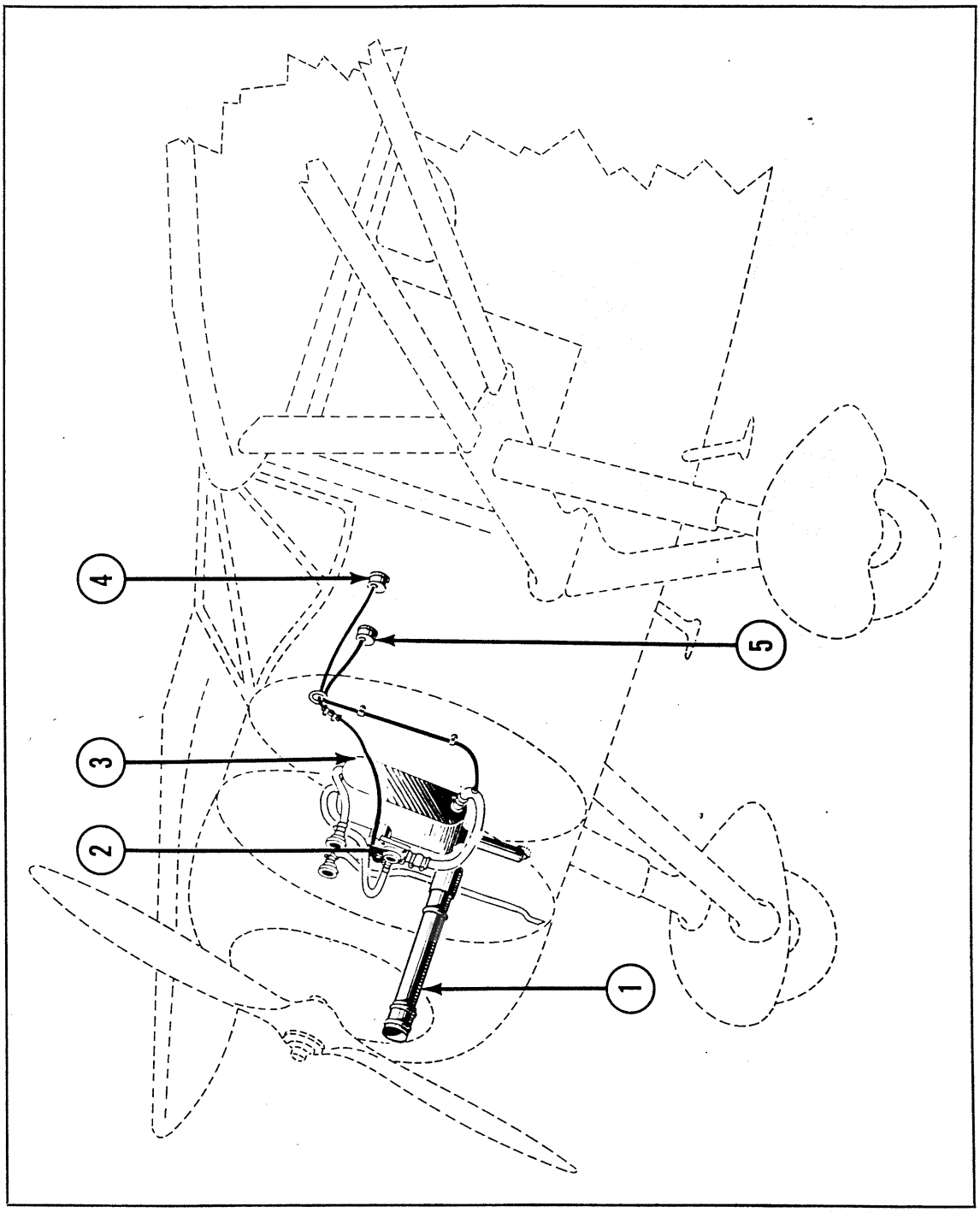


Figure 1-7—Warner Oil System

Index No.	Nomenclature	Index No.	Nomenclature
1	*Blast Tube.*	*4*	*Oil Temperature Indicator.*
2	*Oil Pump.*	*5*	*Oil Pressure Gage.*
3	*Oil Tank.*		

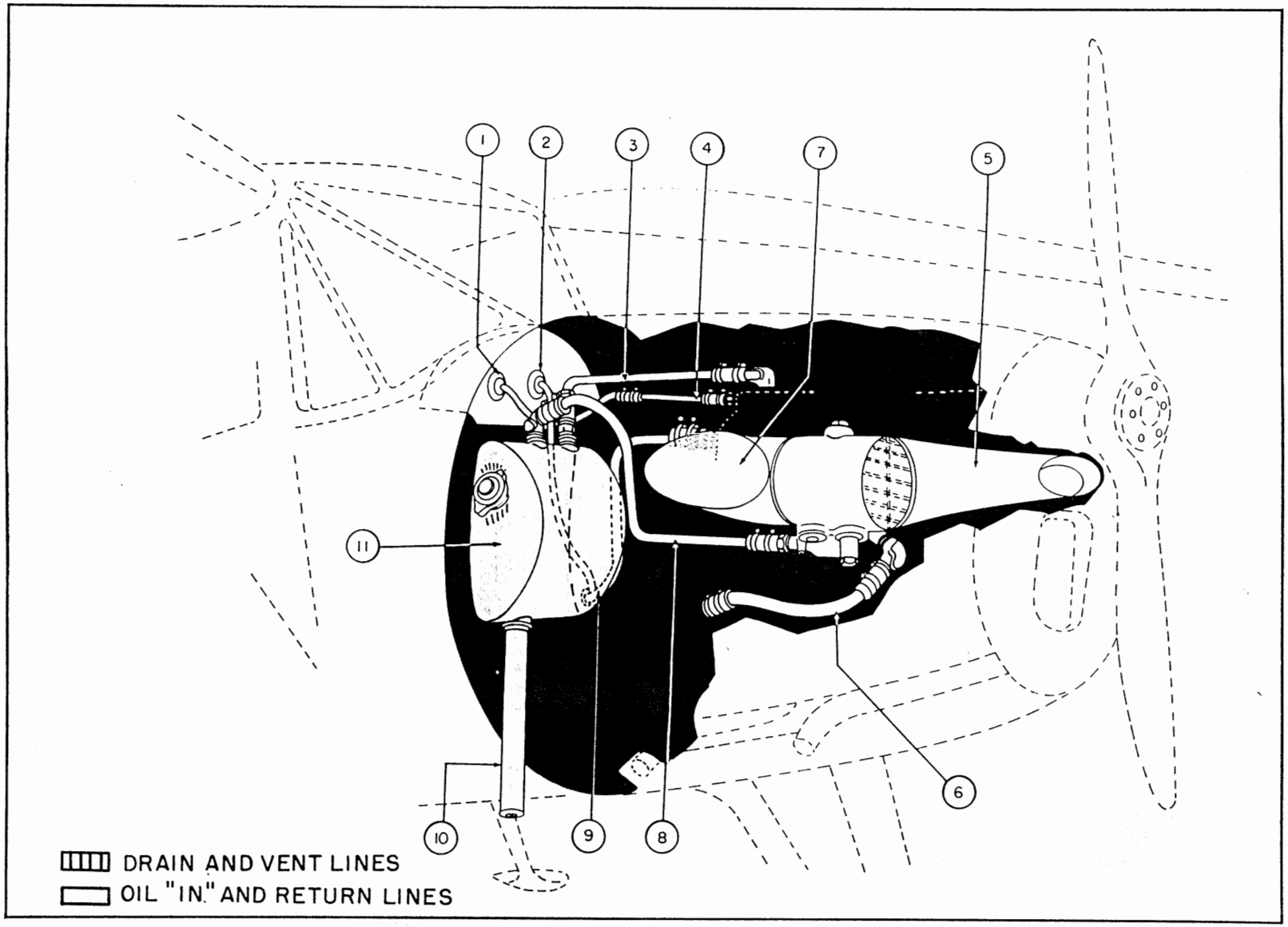


Figure 1-8—Ranger Oil System

Index No.	Nomenclature	Index No.	Nomenclature	Index No.	Nomenclature
1	*Oil Pressure Gage.*	*5*	*Cooler Duct Inlet.*	*9*	*Tank to Engine Line.*
2	*Oil Temperature Gage.*	*6*	*Engine to Oil Cooler Return Line.*	*10*	*Oil Tank Drain Line.*
3	*Engine Breather Line.*	*7*	*Cooler Duct Outlet.*	*11*	*Oil Tank.*
4	*Oil Pressure Line.*	*8*	*Cooler to Tank Return Line.*		

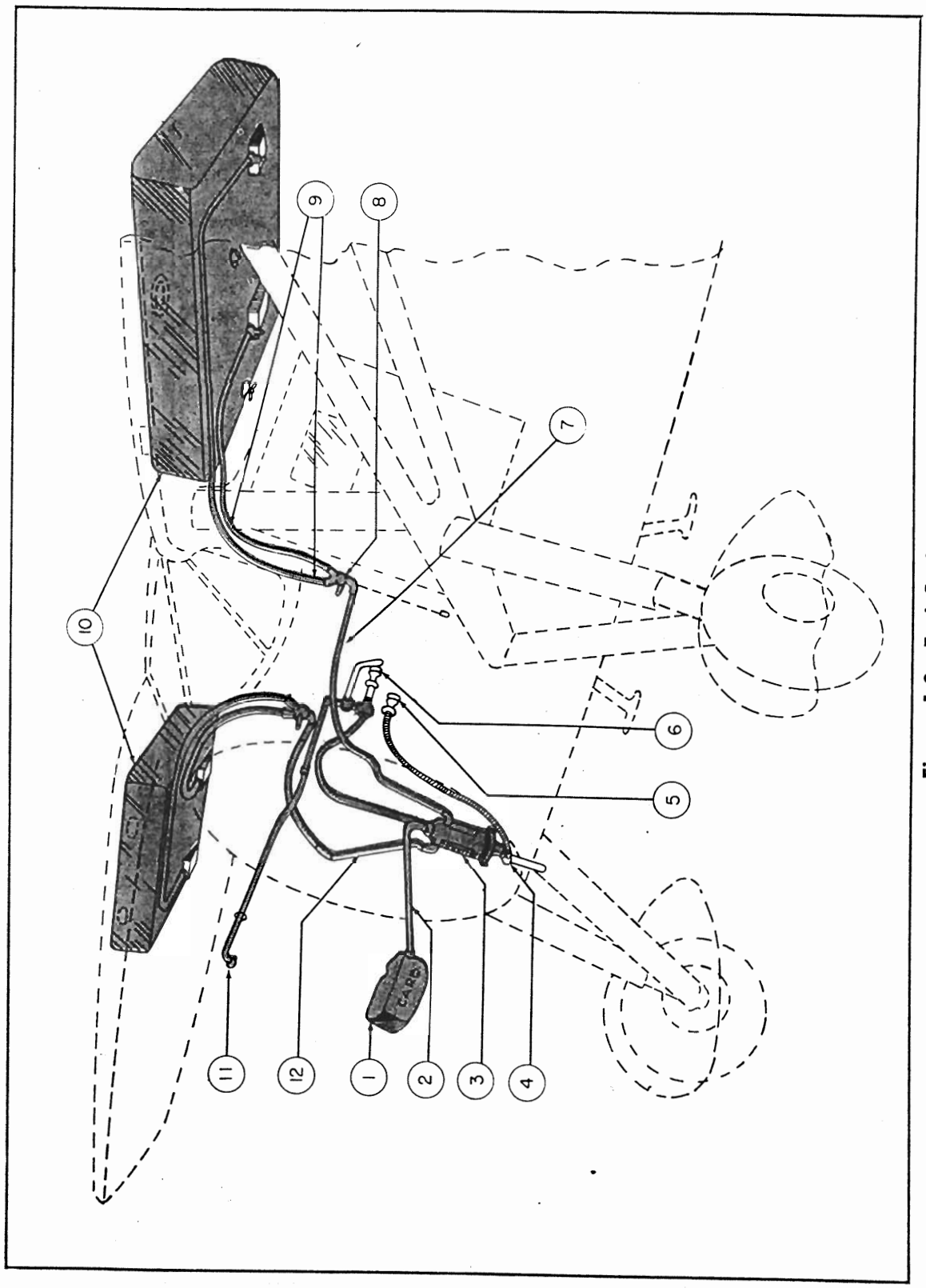
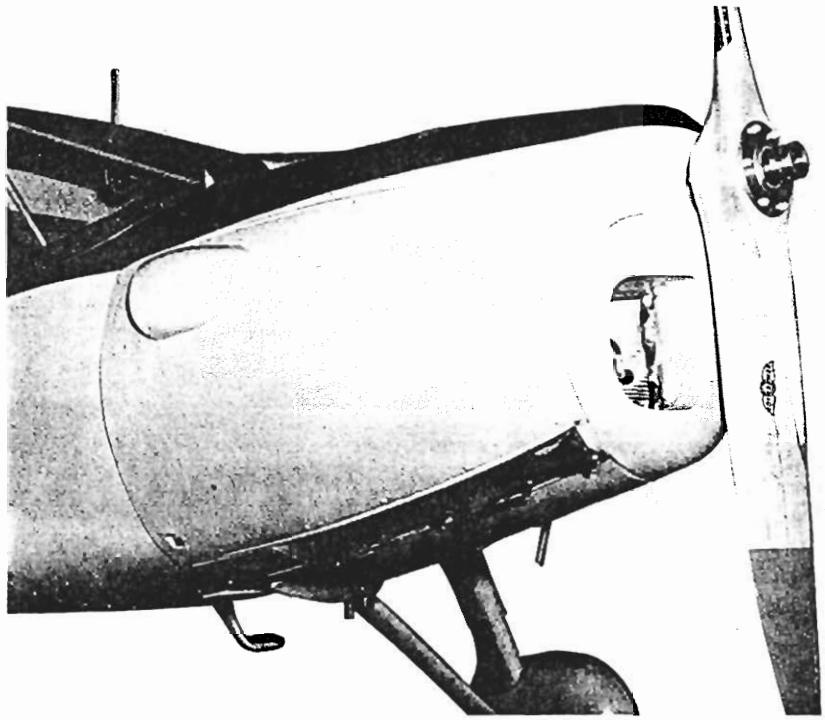


Figure 1-9—Fuel System

Index No.	Nomenclature	Index No.	Nomenclature	Index No.	Nomenclature
1	*Carburetor.*	*5*	*Fuel Strainer Control.*	*9*	*Fuel Tanks to Fuel Valve Lines.*
2	*Strainer to Carburetor Line.*	*6*	*Primer.*	*10*	*Fuel Tanks.*
3	*Fuel Strainer.*	*7*	*Fuel Valve to Strainer Line (LH).*	*11*	*Primer to Engine Line.*
4	*Fuel Drain.*	*8*	*Fuel Valve.*	*12*	*Fuel Valve to Strainer Line (RH).*



POWER PLANT

Airplane Model	Engine Model	HP	Recommended Cruising RPM
24W46	Warner Super-Scarab-R-500-7	165	1910
24R46	Ranger 6-440-C-2	175	2150

2. POWER PLANT. The "24" series airplanes are manufactured in two models; the basic difference between the two models being the power plant.

The 24W46 is powered with the Warner Super-Scarab 165-horsepower air-cooled radial engine. This is a seven-cylinder engine which is rated at 2150 rpm and carries a Sensenich 86CB69 fixed-pitch wood propeller which has an 86-inch diameter and 69-inch pitch.

The 24R46 is powered with a Ranger 6-440-C-2, 175-horsepower air-cooled in-line engine rated at 2450 rpm which carries a Sensenich 86RB60 wood fixed-pitch propeller which has an 86-inch diameter and a 60-inch pitch.

The propeller is held on the crankshaft by a splined hub incorporating six bolts holding the propeller to the hub.

3. OIL SYSTEM. *(See figures 1-7 and 1-8.)* Both engines are of the dry sump type and the oil is carried in a tank mounted on the engine mount for the Ranger model and on the firewall for the Warner model. Oil capacities for both models is 4.1 gallons plus expansion space. The 24W46 and 24R46 can be operated under normal temperature conditions with SAE grade 50 oil. In temperatures below 20° F with SAE grade 40; in warm temperatures SAE grade 60 should be used.

4. FUEL SYSTEM. *(See figure 1-9.)* The fuel system on both models is of the gravity-feed type. The fuel system consists of two 30-gallon tanks mounted in the wings just outboard of the fuselage. These tanks may be operated separately or together through selector valves. Fairchild recommends that 73-80 octane fuel be used in these planes. (Refer to section III, Fuel System.)

Fuel tanks are filled through filler neck openings just aft of the front spar on the top surface of the wing. Access to these openings may be obtained by first stepping on the wheel pants, then onto the tripod fairing step plate. Fuel quantities are shown by two remote reading electric gages located on each side of the cabin above the entrance doors. A switch on the instrument panel marked "FUEL" energizes the fuel gage circuit. After flicking the switch allow a short time for the needles to come to rest before reading the gages. The tank shut-off valves are located on either side forward of the entrance doors, set flush with the cabin walls and have two positions: "OFF" and "ON." Both tanks are in operation when both the left hand and the right hand shut-off valves are in the "ON" position. IT IS RECOMMENDED THAT THE "24" AIRPLANES BE FLOWN AT ALL TIMES ON ONE FUEL TANK AS A SAFEGUARD AGAINST THE POSSIBILITY OF AN AIR LOCK IN THE FUEL

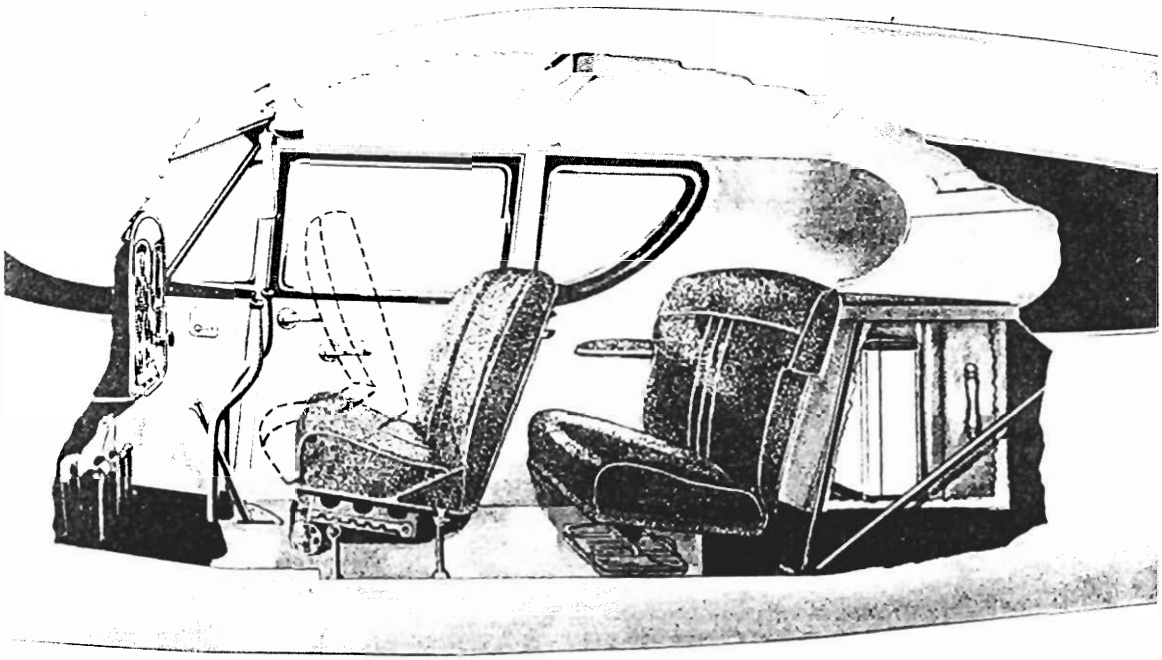


Figure 1-10—Interior Arrangements

LINE. THIS PROCEDURE SHOULD BE FOLLOWED IN TAKE-OFF AS WELL AS IN CRUISING FLIGHT. For maintaining balance, change to the other tank when the first tank in use is reduced to 1/2 full. A fuel strainer is operated from the cabin by a push-pull control and allows draining of the fuel system to clear any water or sediment that may have accumulated in the bottom of the fuel line.

5. POWER PLANT CONTROLS. Power plant controls are flexible type operating in a casing with friction regulators to hold them in a set position. They are located on the center of the instrument panel for easy access to both pilot and copilot. *(See figure 2-1.)* These controls consist of a throttle, mixture, carburetor air temperature and, on the Warner powered airplane, a spark control. The Ranger powered airplane does not require a spark control since one magneto is equipped with an impulse coupling for starting. A primer pump for injecting fuel directly into the engine is installed and operated by a handle on the lower left side of the instrument panel.

The ignition switch doubles as a master switch. When in the "OFF" position it is performing the function of a master switch, breaking all circuits on the aircraft. When switched to "BAT," all circuits except the magneto circuit are energized and the airplane's electrical system can function but the engine cannot be started. Switching to "L" (Left), "R" (Right), or "BOTH" allows all circuits to still function as in the "BAT" position but energizes the magneto circuit and the engine may be started.

This is a convenience to the operator so that, upon completing a flight and "cutting" the switch on the field, the second operation of "cutting" a master switch is not necessary. However, in case of distress during flight a second "emergency master switch" is provided by a toggle, at the lower right-side of the instrument panel. Putting that switch in the off position cuts out all electric circuits and the generator field circuit but allows the ignition switch to remain on to continue engine operation.

The "24" airplane is started by means of a direct drive electric starter located on the accessory case of the engine and energized by a 12-volt storage battery.

6. FLIGHT CONTROLS. *(See figure 3-36.)* A cable and push-pull rod flight control system is used. A control stick is installed for each pilot. The control sticks are rigidly interconnected through a steel torque tube for elevator movement and a steel tube link for aileron movement. The right control stick may be readily removed. The elevator is operated completely through push-pull tubes; the rudder is operated entirely through a cable system. The rudder controls include steerable tailwheel controls which are operated off the rudder bellcranks giving control of the aircraft while on the ground. The ailerons and flaps are operated through a combination of push-pull rods and cables. Rudder and aileron trim is obtained by adjustment of a metal tab on each surface while on the ground. This tab is not adjustable in flight and is for balancing purposes only. The elevators may be trimmed while in flight by means of an elevator trim tab operated by the elevator tab control handle and tab position indicator located above and centrally between the pilot and copilot. "NOSE UP" and "NOSE DOWN" directions are indicated. The system is pulley, cable and chain throughout, and is nonreversible.

The flaps are manually operated by a lever located forward and between the pilot and copilot seats.

The flaps may be locked in three positions. "FULL DOWN," "HALF DOWN," and "FULL UP," by operating a push button on the end of the flap lever. The pilot's rudder pedals are not adjustable but proper positioning may be obtained by adjustment of the pilot's seat. The copilot's pedals may be disengaged by removing the lock pins on the side of each pedal.

7. BRAKES. The "24" is equipped with expander tube type hydraulic brakes operated by brake pedals on the pilot's rudder pedals only. However, brakes for operation by the right hand, or copilot's pedals, may be installed as special equipment. The airplane is provided with a parking brake operated by a push-button handle on the left side under the instrument panel, accessible to the pilot.

8. LANDING GEAR. The fixed main landing gear is a conventional split-axle, swinging type, having as its main member a heat-treated steel streamline strut. Both the main landing gear and the tail wheel contain oil and spring type shock struts which give excellent landing characteristics and ease of maintenance. The tread of the main landing gear is 9 feet 3 inches and this, together with a steerable tail wheel, gives excellent ground handling characteristics. The tail wheel disengages and becomes full-swiveling after it has traveled to the maximum travel of the rudder. At that time a cam disengages the tail wheel and allows it to rotate completely.

The main gear tires are inflated to a pressure of 30 pounds per square inch. The tail wheel tire is inflated to a pressure of 45 pounds per square inch.

9. ELECTRICAL SYSTEM. The electrical power for the "24" is supplied by a 12 volt, 24 ampere-hour storage battery. The battery is located in the aft part of the fuselage on the right side of the Ranger model and forward of the fire wall of the Warner model. A metal door on the Ranger model is provided for inspection and service of the installation. The battery is suitably drained and ventilated. Recharging is obtained through an engine-driven generator.

All electrical switches are grouped on the center of the instrument panel in a position readily reached by either pilot. The knob type fuses are located at the bottom center of the instrument panel just below the ignition switch and are easily accessible and replaceable.

The airplane has navigation lights. A "moonglo" instrument light is mounted at the top in center of the cabin. It has a shield that may be moved for map reading and also an adjustment for controlling light intensity. The aircraft is wired for a landing light, which may be installed as special equipment, in left wing only. The landing light when installed is retractable.

10. FIXED EQUIPMENT. Fresh air to the cabin is supplied by intake ventilators, mounted at the top corners of the windshield on either side. The volume of air is controlled by a knob. An additional ventilator is installed on the under side of the forward fuselage. The control lever is located on the floor between the rudder pedals of the pilot and copilot.

The windows in each cabin entrance door may be lowered to give additional ventilation.

A cabin heating system using fresh air heated by the engine exhaust is installed as standard equipment. The heater is operated by a push-pull control on the instrument panel, suitably marked.

Three seats are provided as follows: Two single seats side-by-side for the pilot and copilot and a full width rear seat for two passengers. The pilot's seat on the left side of the airplane is adjustable fore and aft through a range of 3-3/4 inches with six positions. The right-front seat is not adjustable, but may be folded forward to give easy access to the rear portion of the cabin. The rear seat is removable for access to the rear of the fuselage for inspection. All seats are overstuffed, and upholstered to blend with the interior of the cabin. Each of the front seats is provided with an individual safety belt, while a single full width belt is installed on the rear seat. Assist straps are provided on either side for aid in entering or leaving the cabin. The baggage compartment, located aft of the rear seat, has a capacity of approximately 9 cubic feet. Access is gained through the cabin. Maximum baggage load permissible under various passenger loading conditions is indicated on a placard on the inside of the lid of the baggage compartment. A first aid kit is also fastened inside the lid of the baggage compartment.

A glove compartment is provided on the right side of the instrument panel. A map pocket is located under the pilot's seat for miscellaneous stowage. A one-quart fire extinguisher is installed on the floor of the cabin just forward of the pilot's seat. The location makes the extinguisher accessible from the outside as well as the inside of the airplane.

The tire, wheel and axle are well faired by the installation of wheel pants as standard equipment. Wheel streamlines or mud guards may be installed as special equipment.

11. INSTRUMENT PANEL. *(See figure 2-1)* The instrument panel extends the width of the cabin forward of the pilot and copilot. The instrument panel contains, immediately in front of the pilot on the left side, a shock mounted panel which carries the flight and engine instruments necessary for the easy and safe operation of the aircraft. The central portion of the panel mounts engine controls and electrical switches. Radio is installed at the top center of the panel when specified. An ash tray is provided on the instrument panel.

12. FLIGHT AND ENGINE INSTRUMENTS.

The following flight and engine instruments are installed on the standard instrument panel:

Flight Instruments
Airspeed Indicator
Altimeter
Bank and Turn Indicator
Rate of Climb Indicator
Engine Instruments
Tachometer
Oil Pressure Gage
Oil Temperature Gage
Carburetor Air Temperature Gage

In addition, a compass of the magnetic type is installed at the top center of the windshield. An ammeter is provided on the right side just forward of the door.

13. SPECIAL INSTRUMENTS.

The following instruments may be installed as special equipment:

Clock
Artificial Horizon and Venturi, Sperry
Directional Gyro and Venturi, Sperry
Outside Air Temperature Gage
Manifold Pressure Gage, Kollsman
Directional Indicator
Ice Warning Indicator
Pitot Tube, Electrically Heated

14. RADIO EQUIPMENT.

The standard "24" airplane has provision for quick mounting of one General Electric, AS-1B receiver-transmitter radio installation. The provisions for this special equipment include antenna, lead-in and mountings.

The following radio equipment may be installed at the option of the owner:

Receiver, R.C.A. AVR-7D, E, F, & 6
Receiver, R.C.A. AVR-15
Receiver, Lear Type R-3
Receiver, Lear AMR-1
Transmitter-Receiver, Lear AMT-12 AMR-12
Transmitter-Receiver, Bendix 3006-24 and 3103-24
Transmitter-Receiver, Western Electric 25B
Transmitter-Receiver, R.C.A. AVT-15 & AVR-15
Transmitter-Receiver, Lear T30AB & R-3AB

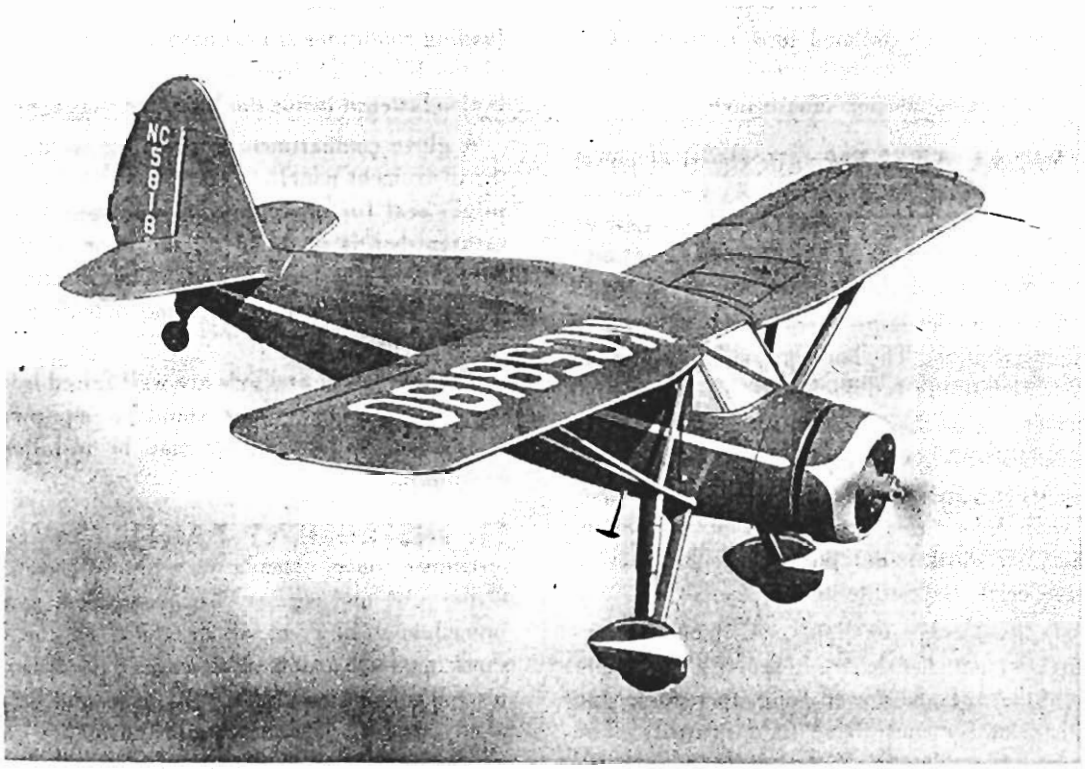


Figure 1-11—F-24W46 in Flight

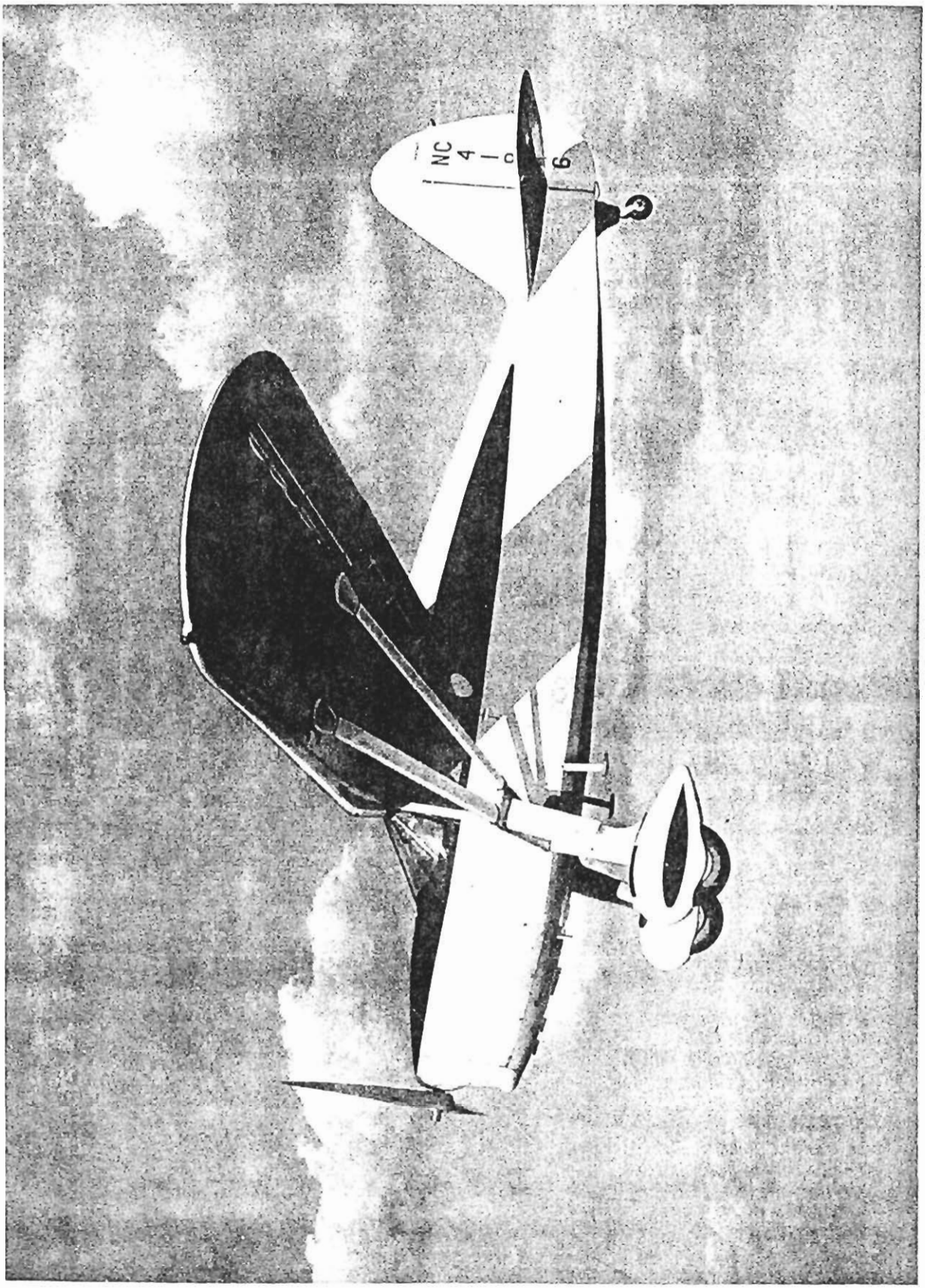


Figure 1-12—F-24R46 in Flight

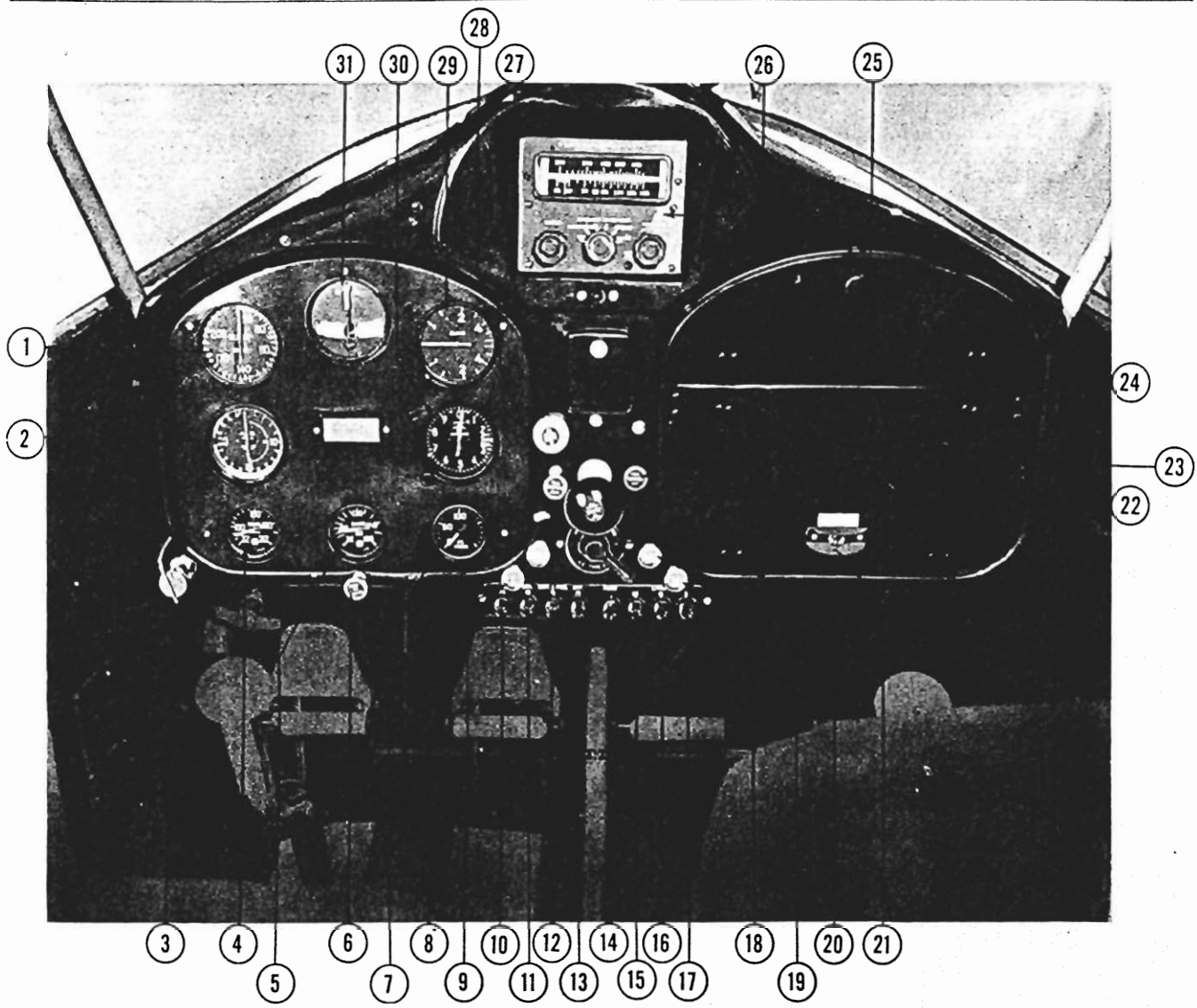


Figure 2-1—Instrument Panel

Index No.	Nomenclature
1	*Airspeed Indicator.*
2	*Tachometer.*
3	*Primer.*
4	*Oil Temperature Gage.*
5	*Carburetor Air Temperature.*
6	*Fuel Strainer Control.*
7	*Oil Pressure Gage.*
8	*Starter Switch.*
9	*Instrument Lights Switch.*
10	*Landing Light Fuse.*
11	*Navigation Lights Fuse.*
12	*Instrument Lights and Fuel Level Fuse.*
13	*Fuse 15 Amp.*
14	*Radio Fuse.*
15	*Spare Fuse—25 Amp.*
16	*Spare Fuse—15 Amp.*
17	*Spare Fuse—5 Amp.*
18	*Navigation Lights Switch.*
19	*Fuel Gage Control Switch.*
20	*Ignition Switch.*
21	*Master Switch.*
22	*Throttle.*
23	*Cabin Heat Control.*
24	*Ash Tray.*
25	*Glove Compartment.*
26	*Radio.*
27	*Carburetor Air Control.*
28	*Mixture Control.*
29	*Rate of Climb Indicator.*
30	*Altimeter.*
31	*Bank and Turn Indicator.*

SECTION II

OPERATING INSTRUCTIONS

1. PREFLIGHT. After completion of the preflight check of the "24" airplane, to determine that no damage has been done to it while parked, the pilot is ready to enter the aircraft and proceed with familiarization of starting and flying the aircraft. Upon entering the cabin the pilot should perform the following steps:

(1) Check the parking brake for full "ON" position. The lever is located at the lower left side of the instrument panel. To set, press down on brake pedals, push button on parking brake handle and pull back.

(2) Check fuel supply to assure sufficient fuel is available for the length of anticipated flight.

(3) By pulling knob marked "PULL TO DRAIN" located on the bottom of the instrument panel on the pilot's side, operate the fuel strainer drain for approximately five seconds with both tanks in "ON" position in order to drain the line of any moisture or sediments that may have accumulated in the bottom of the fuel strainer.

(4) Place the carburetor air temperature control in cold (IN) position.

(5) Turn one fuel shut-off valve to the "ON" position, leave the other valve in the "OFF" position. It is recommended that the airplane be flown at all times on one fuel tank as a safeguard against the possibility of an air lock in the fuel line, switching tanks occasionally to maintain balance.

(6) By pushing the knob all the way in, place the mixture control in the FULL RICH position. On Warner powered airplane *only*, retard the spark one-half to two-thirds of the maximum travel of the spark control.

(7) Pump the throttle two or three sharp strokes and then leave it in the "closed" position. In very cold weather use approximately four strokes of the throttle and two or three strokes of the primer.

(8) Place ignition switch on "BAT" and pull out the starter button to engage the electric starter. When the electric starter has gained proper momentum turn the ignition switch to "L" (left magneto).

(9) After the engine has caught and is running smoothly, the ignition switch should be turned to "BOTH."

(10) Check oil pressure immediately on starting engine and if it does not show on the dial in thirty seconds stop the engine and investigate cause of this failure.

2. WARM-UP. In warming up the engine the airplane should be turned into the wind which will give better cooling to the engine.

Oil pressure should range between 50 and 60 pounds on the Ranger engine and 50 to 90 pounds on the Warner. Warm-up engines of both types in the 800 to 1000 rpm range. Check the magnetos at 1500 rpm. If there is a loss of more than 100 rpm on either magneto the engine should be stopped and the cause of this trouble investigated.

Take-off should not be attempted until proper oil temperatures have been reached, a minimum of 35° Centigrade for the Ranger and an indicated rise of 10° for the Warner engine.

3. TAXIING. After the engine check is completed and the parking brake released, the pilot is ready to taxi to point of take-off. Although visibility is good, "fish-tailing" while taxiing is recommended to assure good forward visibility and to prevent damage to the aircraft.

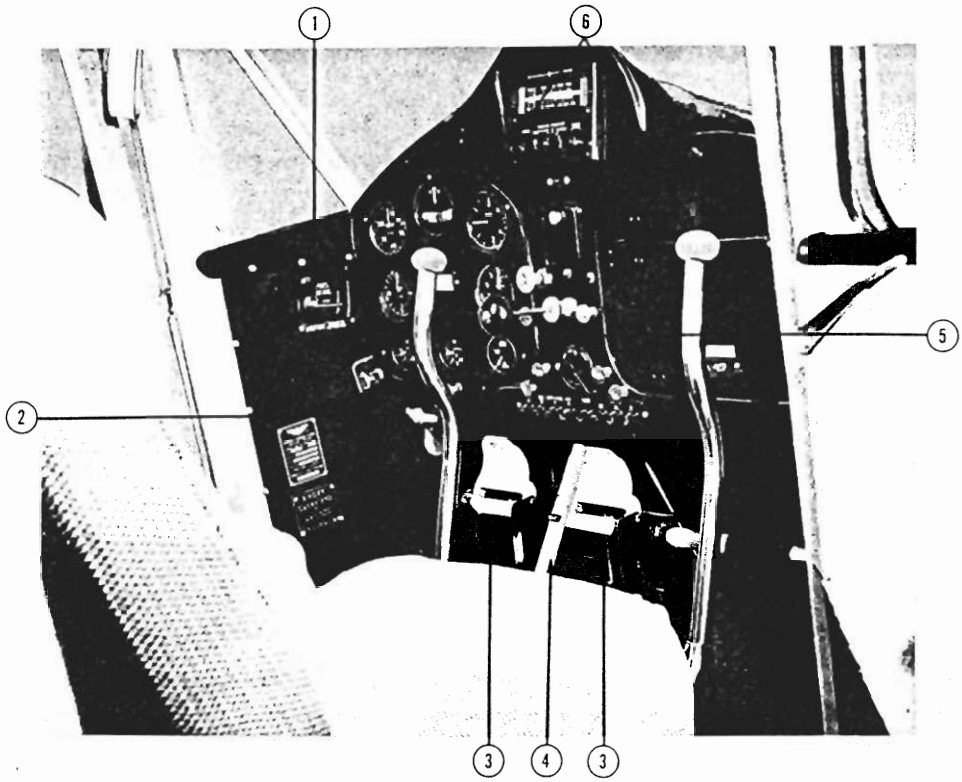


Figure 2-2—Cabin—Lower Left View

Index No.	Nomenclature
1	*Fuel Selector—Pilot's Side.*
2	*Parking Brake Handle.*
3	*Rudder Pedals.*
4	*Flap Control Lever.*
5	*Brake Pedals.*
6	*Control Sticks.*

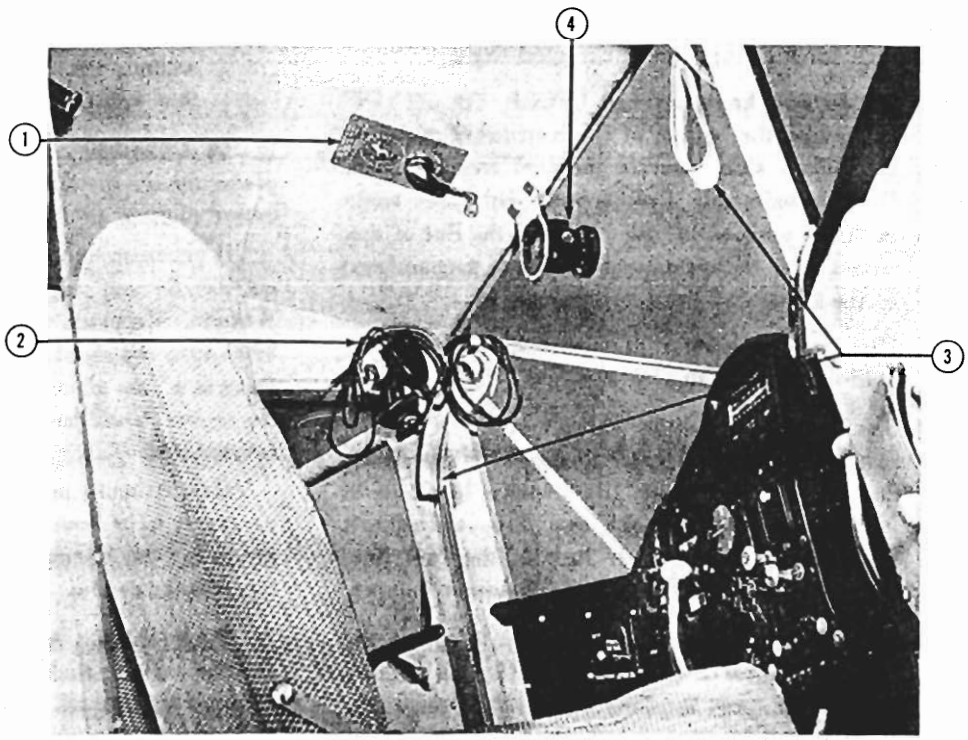


Figure 2-3—Cabin—Upper Left View

Index No.	Nomenclature
1	*Tab Control and Indicator.*
2	*Radio Microphone and Headset.*
3	*Assist Straps.*
4	*Compass.*

While taxiing, all flight controls should be checked thoroughly to make sure they have full length of travel and are operating properly prior to the take-off.

4. TAKE-OFF. Pilot should perform the following steps for take-off.

(1) Set the altimeter at the correct setting for the field elevation above sea level.

(2) Check to see that one tank only is in the "ON" position. Flaps should be up for normal take-off, however, for a short field take-off "ONE-HALF" flap may be used for minimum take-off run and maximum rate of climb.

(3) Set tab control in the top of the cabin, within the "TAKE-OFF" range to assure minimum loads on the elevator.

(4) Place carburetor air temperature control in the cold (IN) except under icing conditions.

During take-off and climb an indicated air speed of 80 to 85 mph is desirable, with full throttle. Mixture control setting should be RICH. Combinations of these three conditions will eliminate excessive head temperature.

5. ENGINE FAILURE DURING TAKE-OFF. In the event of engine failure on take-off place the ignition switch in the "OFF" position, the fuel tank valve on both tanks turned to the "OFF" position and apply full flaps. No attempt should be made to return to the field unless sufficient altitude is available to make a normal approach and landing. Master Switch "OFF."

6. CRUISING. The rpm will vary slightly in accordance with propeller tolerances.

To determine the best cruising rpm make the following flight check:

Fly the aircraft at or near sea level altitude in level flight, full throttle, until rpm and air speed stabilizes. Note rpm and take 91% of this figure and you will have the desired cruising rpm which will be 75% power. If engine operation should appear rough at this power setting, select a setting below the computed cruising rpm that gives a smooth operation.

Ranger cruising rpm, during level flight at sea level altitude, should be approximately 2150; above 5000 feet, 2250; or in both instances the nearest rpm to give smoothest engine operation. Oil temperatures for the Ranger should range from 60° Centigrade to 77° Centigrade, and for the Warner, 32° to 71° Centigrade, although under severe conditions temperature may go to 93° Centigrade maximum. As the altitude is increased above 5000 feet the mixture should be hand-leaned to obtain the highest rpm at a fixed throttle setting, backing off until a slight drop in rpm is noted, thereby insuring against too lean a mixture. Full throttle operation, in level flight, at sea level altitude, an indication of 2450 rpm + or –50 should be expected on the Ranger engine. The same procedure is followed with the Warner engine except that the cruising rpm is approximately 1950 below 5000 feet and 2000 rpm above this altitude. In level flight, full throttle rpm should be 2150 rpm + or –50.

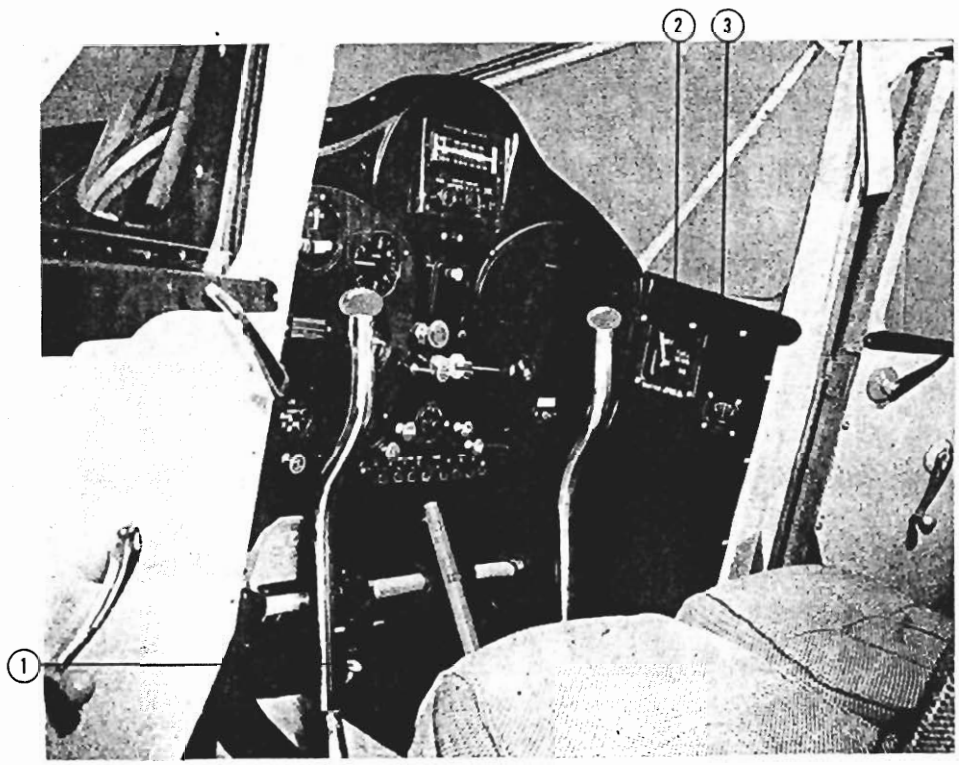


Figure 2-4—Cabin—Right View

Index No.	Nomenclature
1	*Cabin Exhaust Ventilator.*
2	*Fuel Selector—Copilot's Side.*
3	*Ammeter.*

7. FLIGHT SPEEDS. The "24" airplane has a high speed of 133 mph and a cruising speed of 118 mph at 75% rated horsepower. The endurance at operating speed is 5.45 hours and the stalling speed with flaps is 53 miles per hour and without flaps 57 miles per hour at the design gross weight of 2562 pounds.

8. STALLING CHARACTERISTICS. The airplane has excellent stalling characteristics and will tend to "mush." There is no tendency to fall off on either side into a spin and good aileron control is maintained through the stall.

9. AEROBATICS. Aerobatics should not be performed in this aircraft. However, intentional spins, spirals and steep turns are permissible. The aircraft has normal spinning characteristics and the best method of entering the spin is to stall the aircraft in a simulated landing attitude and apply full rudder in the direction of the desired spin rotation, along with backward pressure on the control stick until the control stick is all the way back. This position should be held as long as the spin is to be maintained and recovery is made by applying full opposite rudder slightly ahead of the point of recovery and after the aircraft starts to straighten out the stick should be shoved abruptly forward and as soon as flying speed is attained bring the nose up to the horizon.

10. APPROACH AND LANDING. When preparing to make a landing the fuel system capacity should be checked and the engine operated on the tank having the most fuel. The mixture control should be set in the FULL RICH position and to insure against the possible forming of carburetor ice the carburetor air temperature control should be in the HOT position during any prolonged glide such as the approach to landing. Flaps should be lowered to FULL position maintaining the most desirable gliding speed of 80 mph, when wind velocity is not in excess of 20 to 25 mph. When landings are attempted in higher wind, the use of half-flaps is suggested and in some instances no flaps at all. Care should be taken when using flaps to make certain they are properly latched so that they cannot accidentally release close to the ground on final approach.

Caution

Do not lower flaps when air speed is above 94 mph.

Brakes should be checked for FULL OFF position.

11. CROSS WIND LANDING. In the event of a cross wind landing either drop the wing on the windward side to compensate for drift, or "crab" into the wind, straightening out just prior to contact with the ground.

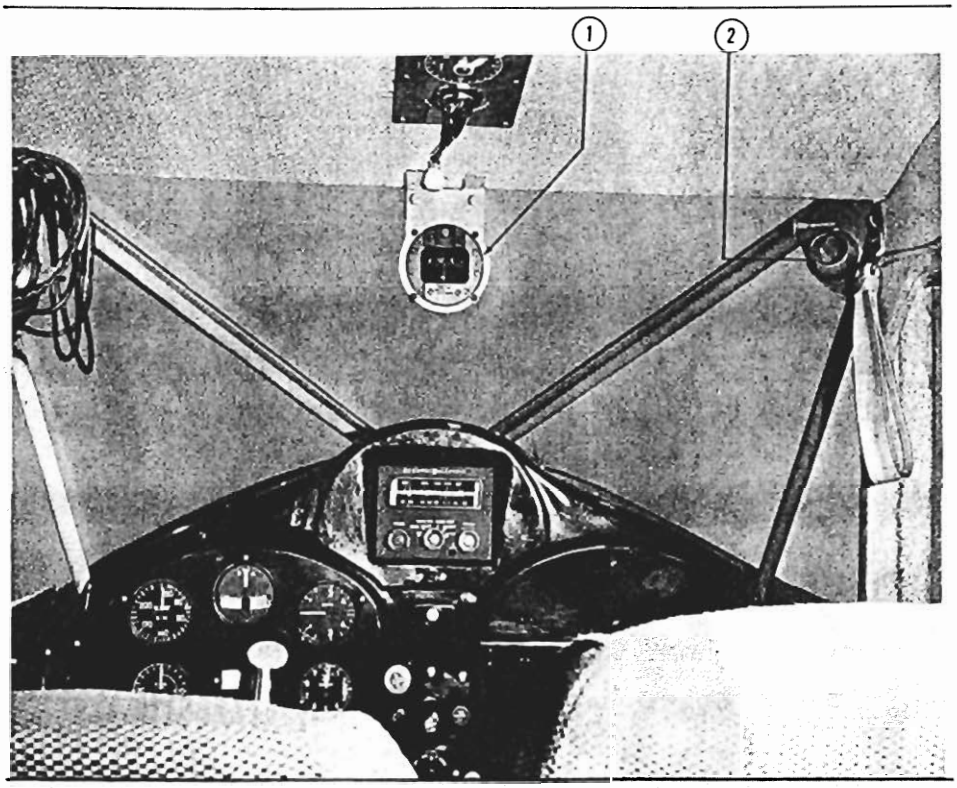


Figure 2-5—Cabin—Upper Forward View

Index No. Nomenclature

1 *Compass.*
2 *Cabin Ventilator.*

12. TAKE-OFF IF LANDING IS NOT COMPLETED. In the event the landing is not completed and a take-off is necessary, push throttle in to FULL THROTTLE position and exert forward pressure on the stick. Adjust the trim tab to correct for the heavy load due to the increase in power of the engine. The flaps should not be raised until sufficient altitude is reached and then they should be moved slowly into UP position so that no sudden change in the lift of the wing occurs.

13. STOPPING ENGINE. After completion of the landing and taxiing to the hangar, the engine should be stopped by pulling out the mixture control putting it in the FULL LEAN position, and in the case of the Warner engine, the spark retarded. Allow the engine to run until it stalls. The ignition switch should then be turned to "OFF" and the fuel tank selector valves switched to "OFF."

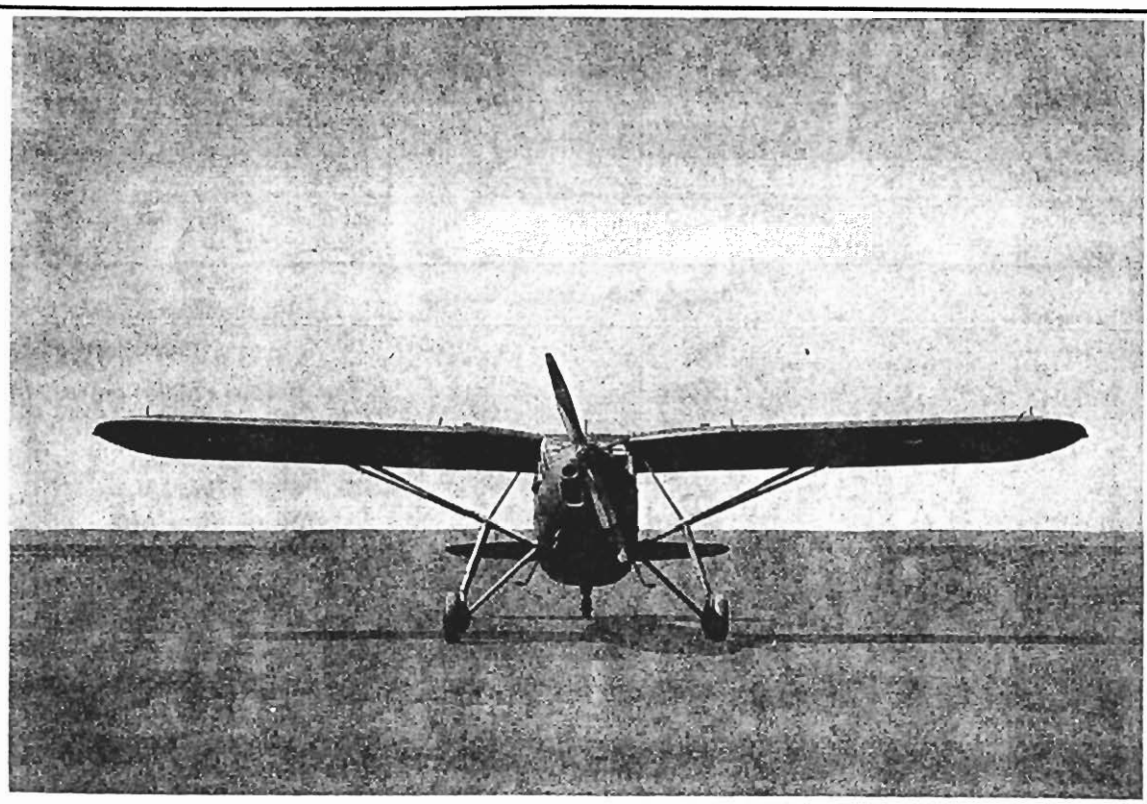
14. BEFORE LEAVING THE AIRPLANE. Flaps should be in the UP position and the parking brakes placed ON. In the event the aircraft must be left outdoors it is recommended that it be tied down. This should be accomplished by tying ropes around the lift struts and tying the tailwheel.

15. PROPELLER AND ENGINE COVERS. If the airplane is left out of doors for any length of time it is recommended that a propeller cover, Fairchild Part No. SD8992, and an engine cover (Warner only), Fairchild Part No. SD48629 be installed.

16. STORAGE. If the airplane is left over a period of time the battery should be removed. The propeller should be pulled through several times at least once a week to prevent corrosion and sticking engine parts. Make certain that the tires are not setting in oil or grease as this is injurious to the rubber. Parking brake should be left in the OFF position.

17. PERFORMANCE.

	Ranger 175 Hp	Warner 165 Hp
Top Speed at Sea Level	133 mph	132 mph
Operating Speed at 75% Power	118 mph	117 mph
Landing Speed Without Flaps	57 mph	57 mph
Landing Speed With Flaps	53 mph	53 mph
Take-off Distance to Clear 50′ Obstacle	1100 feet	1100 feet
Landing Distance Over 50′ Obstacle	1000 feet	1000 feet
Service Ceiling	14,000 feet	14,000 feet
Maximum Range	620 miles	639 miles
Maximum Duration	5.25 hours	5.45 hours



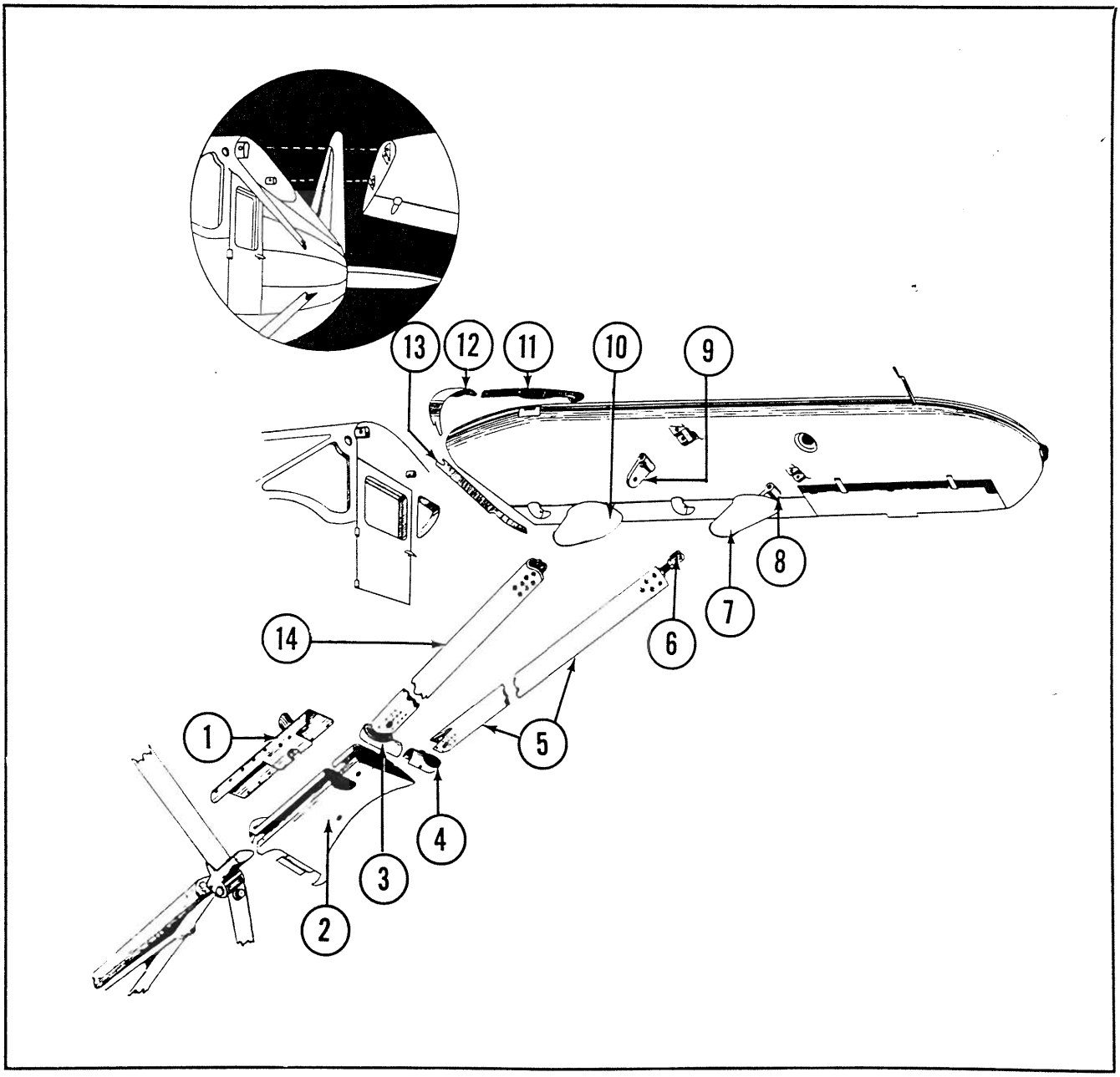


Figure 3-1—Wing Group

Index No.	Part No.	Nomenclature
1	*43268*	*Tripod Fairing—Scuff Plate.*
2	*41545*	*Tripod Fairing.*
3	*43266*	*Cuff—Front.*
4	*43267*	*Cuff—Rear.*
5	*44170*	*Strut—Rear Lift.*
6	*4005-2*	*Bolt—Adjustment Struts.*
7	*44182*	*Cuff—Rear Lift Strut.*
8	*44104*	*Clevis—Lift Strut Rear.*
9	*44179*	*Clevis—Lift Strut Front.*
10	*44181*	*Cuff—Front Lift Strut.*
11	*411008*	*Top Gap Fairing.*
12	*41542*	*Nose Gap Fairing.*
13	*41544-2*	*Bottom Gap Fairing.*
14	*44169*	*Strut—Front Lift.*

SECTION III

ERECTION & MAINTENANCE

WING GROUP

The wing group *(figures 3-1 and 3-2)* consists of two wing panels, flaps, ailerons, lift struts and wing fairing. Although the wings support the fuel tanks the description on fuel tanks and installation will be found under the fuel system. Access to the controls and the interior of the wings is obtained through inspection hole openings. *(See figures 3-4 and 3-5.)*

The wing panels are of conventional wood and fabric construction consisting of front and rear wooden spars, wooden ribs, metal trailing edges, plywood leading edge with the entire wing covered with fabric. The cover as installed at the factory is a fabric envelope that is slipped over the end of the wing and sewed at the trailing edge prior to doping and finishing. Compression loads in the wing are taken by four members, the inboard two being of welded steel tubing and the outboard two of aluminum alloy tubing. The drag and anti-drag loads are taken by wires which are shown in figure 3-3. The airfoil section of the "24" is of the N-22 type modified and the ribs composing this airfoil section are of the truss type, spruce strips reinforced with plywood gussets. The wings are attached to the fuselage by means of two 4130 steel fittings at the front and the rear spars.

The lift struts are attached by strap fittings at the front and rear spar at a point approximately 2/3 of the way out the wing. The angle of incidence of the wing is built into the fuselage fittings where the butt fittings of the panels attach to the fuselage. The dihedral is controlled by the lift struts. Details covering this information may be found in section IV under "Rigging."

REMOVAL OF WING PANELS.

a. Remove the gap fairing where the wing joins the fuselage by removing attaching screws.

b. Disconnect the fuel lines.

c. Disconnect the aileron and flap controls from the bell cranks in top of fuselage.

Note

If removing left panel, disconnect the air speed line.

d. Disconnect the fairing of the lift struts where they are attached to the wing and remove the fairing of the tripod where the bottom of the lift struts attach to the fuselage structure.

e. With the tip of the panel properly supported, disconnect the front and rear lift strut fittings where the struts attach to the wing.

f. Disconnect lift struts from tripod assembly.

g. Remove bolts at front and rear wing butt fairing.

FABRIC REPAIR. Damaged fabric may be repaired by patching or may be replaced in whole or in part by either the envelope or blanket method. The wing is covered by Flightex Grade "A" fabric and may be repaired in accordance with procedures as set up by CAA Bulletin No. 18. Wing cover envelopes may be obtained through your Fairchild Distributor.

DOPING. Refer to section V, Finish Specifications.

DRAIN GROMMETS. Grommets for drainage and ventilation of wing interior should be installed in new fabric. Holes should be 3/8 inch in diameter and one grommet placed at trailing edge of each bay forward of flap and aileron recesses, and at trailing edge of each bay in wing tip bow.

WOOD REPAIR. The plywood covering the leading edge of the wing is 1/16" thick and is 3-ply mahogany. A spruce stringer, 1/2" x 1/2" and 14' long, is inserted in the leading edge of the ribs and it is used as a reinforcement for the plywood leading edge. The leading edge plywood is repairable and it is recommended that the procedure used in making this patch should be in accordance with CAA Bulletin No. 18.

INSTALLING WING PANELS. The wing panels may be installed in the exact reverse order of the disassembly procedure given earlier in this section with the exception that care should be taken to be assured that the lower fairing muffs are installed on the lift struts prior to attaching the lift struts to the wing panels, as it will be necessary to remove the wing struts and reinstall the fairings if this procedure is not followed.

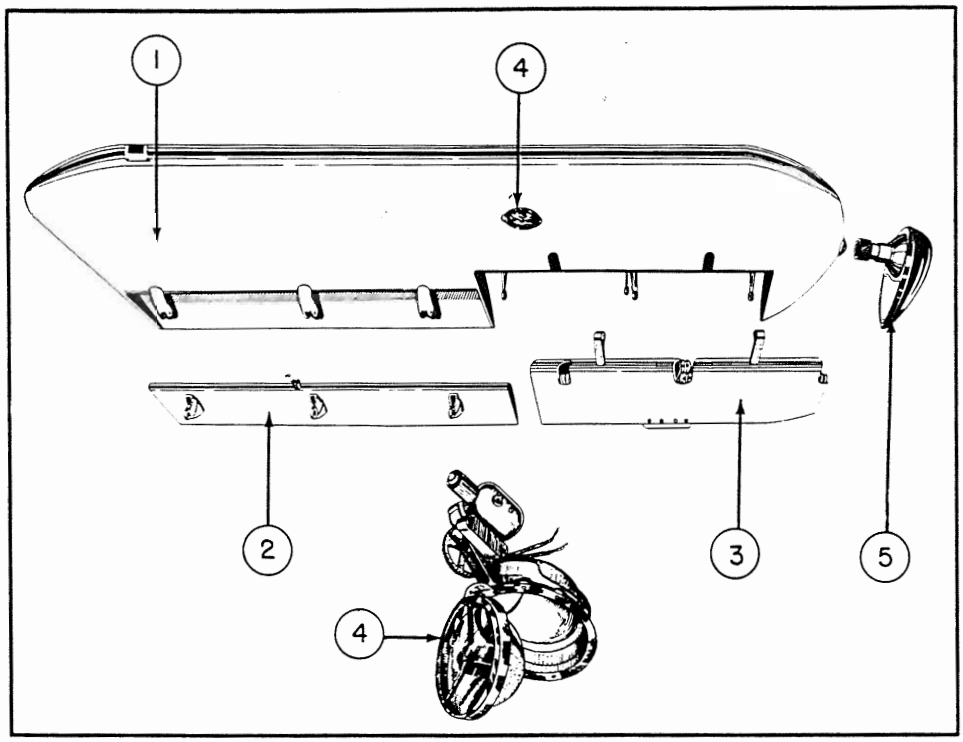


Figure 3-2—
Outer Panel Installation

Index No.	Nomenclature
1	*Wing Covered Assembly.*
2	*Flap Assembly.*
3	*Aileron Assembly.*
4	*Landing Light—Left wing only (Grimes).*
5	*Installation Wing Tip Light (Red on left, Green on right) Model E-1 (Grimes).*

WING SPARS

The spars are routed from Grade "A" spruce to finished dimensions of 1-1/2" x 7-1/8" x 15' 7-1/16" and 1-1/2" x 5-3/8" x 16' 2-9/32" for the front and spars respectively. The spars are reinforced by spruce blocks and 3-ply mahogany plywood reinforcements. Plywood reinforcements are 1/8" thick at the front lift strut fittings, 3/32" at the rear lift strut fittings and 1/16" at both front and rear fuselage fittings. When new spars are ordered from the factory to replace spars damaged on the aircraft they will be supplied with the *outboard reinforcements uninstalled* so that the spars may be slid through the existing ribs in the wing into place and the reinforcements installed after the spars have been placed within the wing structure. This enables easier assembly and saves considerable time in the reassembly of the wing.

SPAR REPAIR. The spars may be repaired providing damage is outboard of the lift strut attachment fittings. Fairchild does not recommend that any attempt at repair be made if the damage is inboard of the lift strut attachment points or if any repair will fall within the area of the lift strut attachment point. All spar repairs should be in accordance with CAA Bulletin No. 18.

SPAR INSTALLATION. When a new spar is inserted in the wing it is recommended that the old spar be removed by cutting the spar in sections on each side of the rib structure and the new spar may be inserted by sliding through the spar openings in the ribs and it will not be necessary to install a complete new set of ribs or to rebuild the existing ribs due to damage caused by trying to remove the spar the whole length of the wing panel. Marking off the rib locations before inserting the spar contributes to rapid and accurate installation when a new spar is installed.

WING RIBS AND COMPRESSION MEMBERS

The "24" wing has four compression members in each panel, the inboard ones being 4130 welded members. Damage to these is very infrequent and if damage does occur replace the damaged members. However, if the damage is slight, repair may be made in accordance with CAA Bulletin No. 18 (methods for welded steel tubing in the unheat-treated condition). The outer compression members are aluminum alloy tubes. If there is any damage to these tubes, install new tubes as repair is not recommended by Fairchild. When removing and installing drag trusses remove the tension from the drag and anti-drag wires incorporated in the wing structure. The ribs *(figure 3-3)* are made of Grade "A" spruce reinforced by 3-ply mahogany gussets. If extensive damage occurs to ribs, replace damaged members. However, minor or local damage may be easily repaired in accordance with CAA Bulletin No. 18.

LIFT STRUTS

The lift struts on the F24 are made of 53ST or 61ST aluminum alloy tubing and if damage occurs to these members it is recommended that no attempt be made to repair them but that the complete strut be replaced.

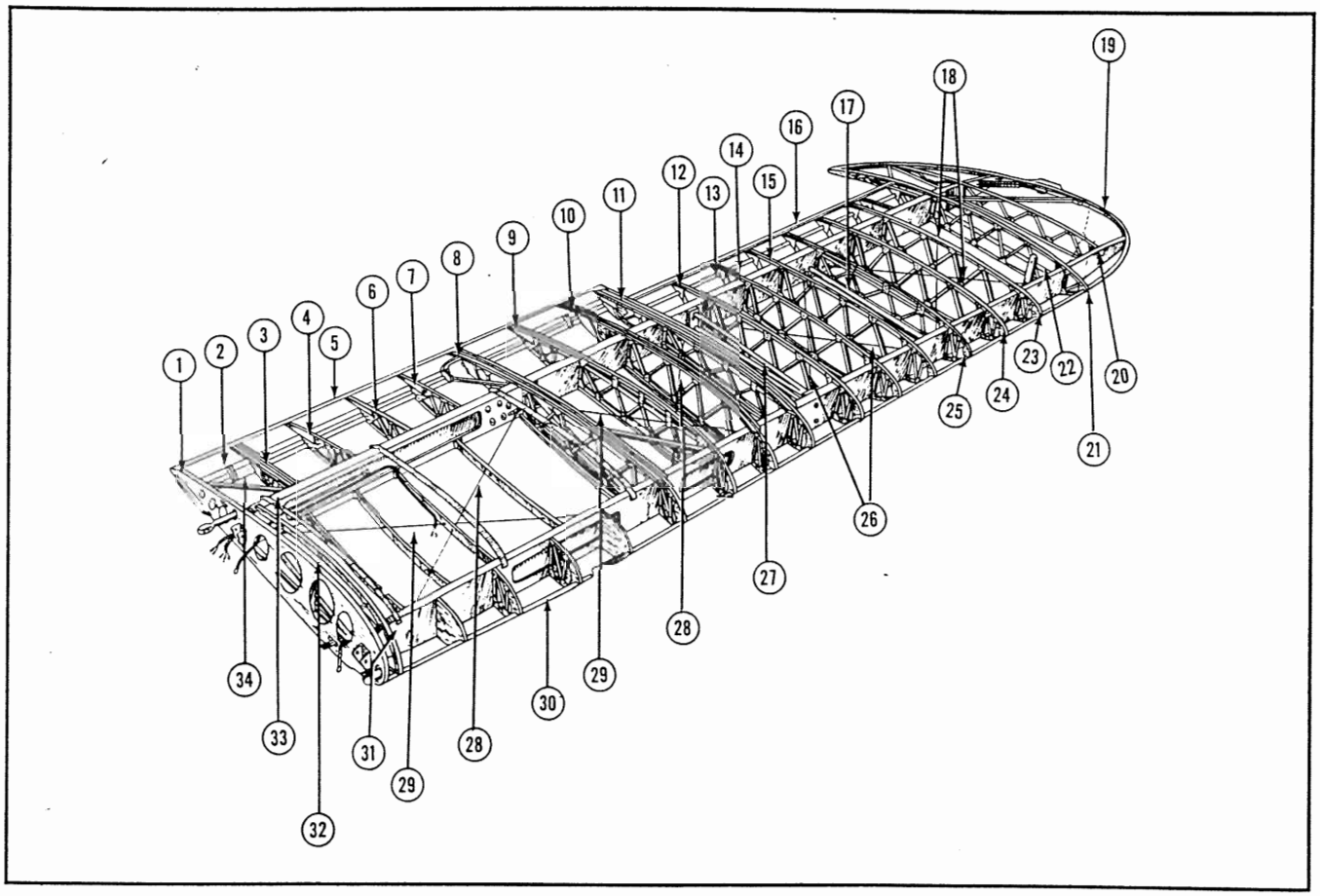


Figure 3-3—Outer Panel Structure

Index No.	Part No.	Nomenclature
1	44177	Rib—Butt.
2	44220–32	Stringer.
3	44185–21	Rib—Tank.
4	44184–21	Rib—Tank.
5	44174	Trailing Edge—Flap Well.
6	44159–20	Rib—Tank.
7	44159–21	Rib—Tank.
8	44158–2	Rib.
9	44160–1	Rib.
10	44158–1	Rib.
11	44160–2	Rib.
12	44150–2	Rib.
13	44220–4	Stringer.
14	44150–23	Rib.
15	44150–1	Rib.
16	44134	Trailing Edge—Aileron Cutout.
17	4498–1	Drag Strut.
18	44220–24	Drag Wires.
19	44125	Bow—Tip.
20	4442	Rib.
21	4443	Rib.
22	4498–2	Drag Strut.
23	44150–23	Rib.
24	44150–1	Rib.
25	4457	Rib.
26	44220–25	Drag Wires.
27	4453	Drag Strut.
28	44220–26	Drag Wire.
29	44220–27	Drag Wire.
30	44220–1	Leading Edge.
31	44137	Front Spar
32	4456	Drag Strut.
33	44138	Rear Spar
34	44220–19	Stringer.

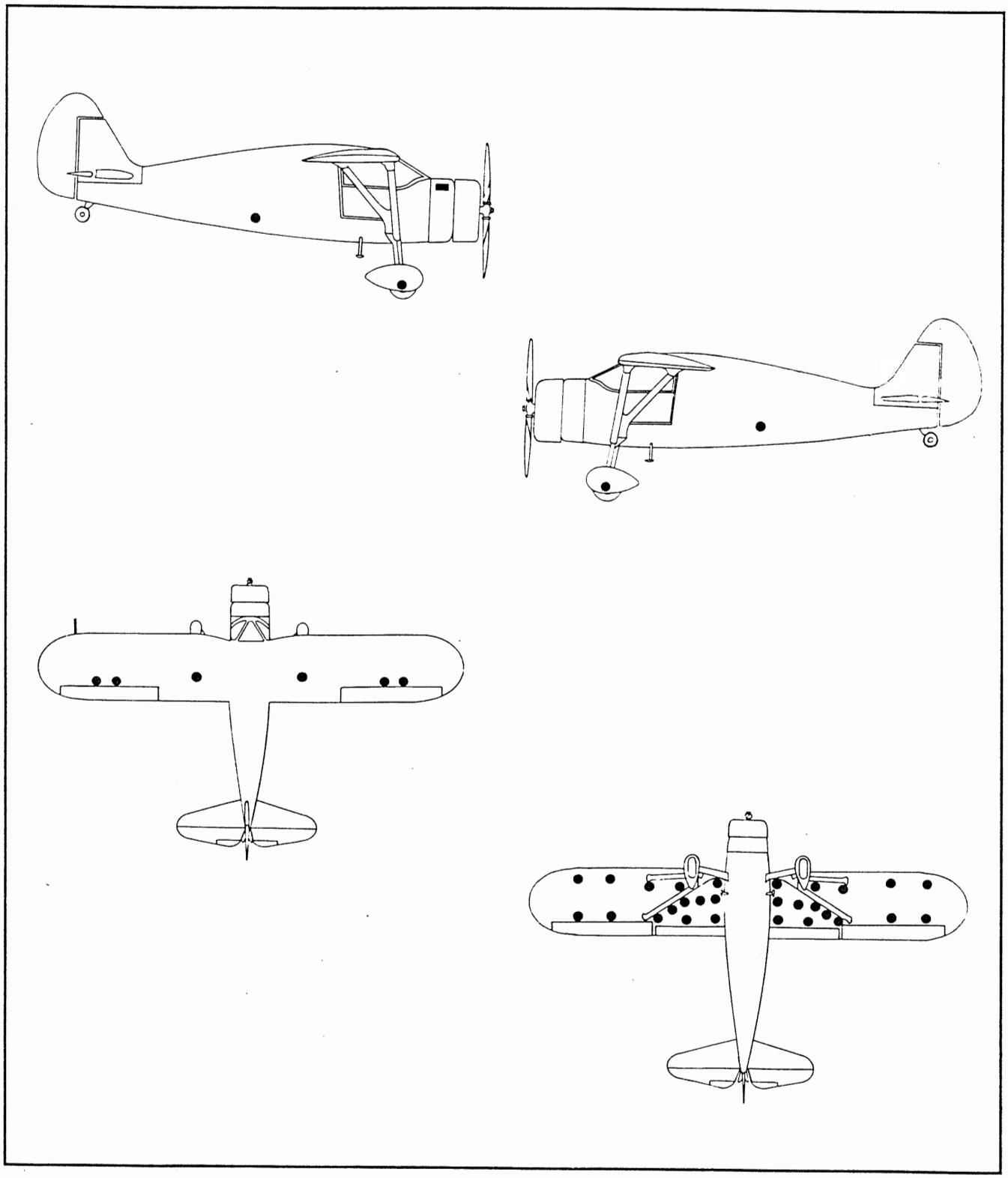


Figure 3-4—Inspection Holes—Warner

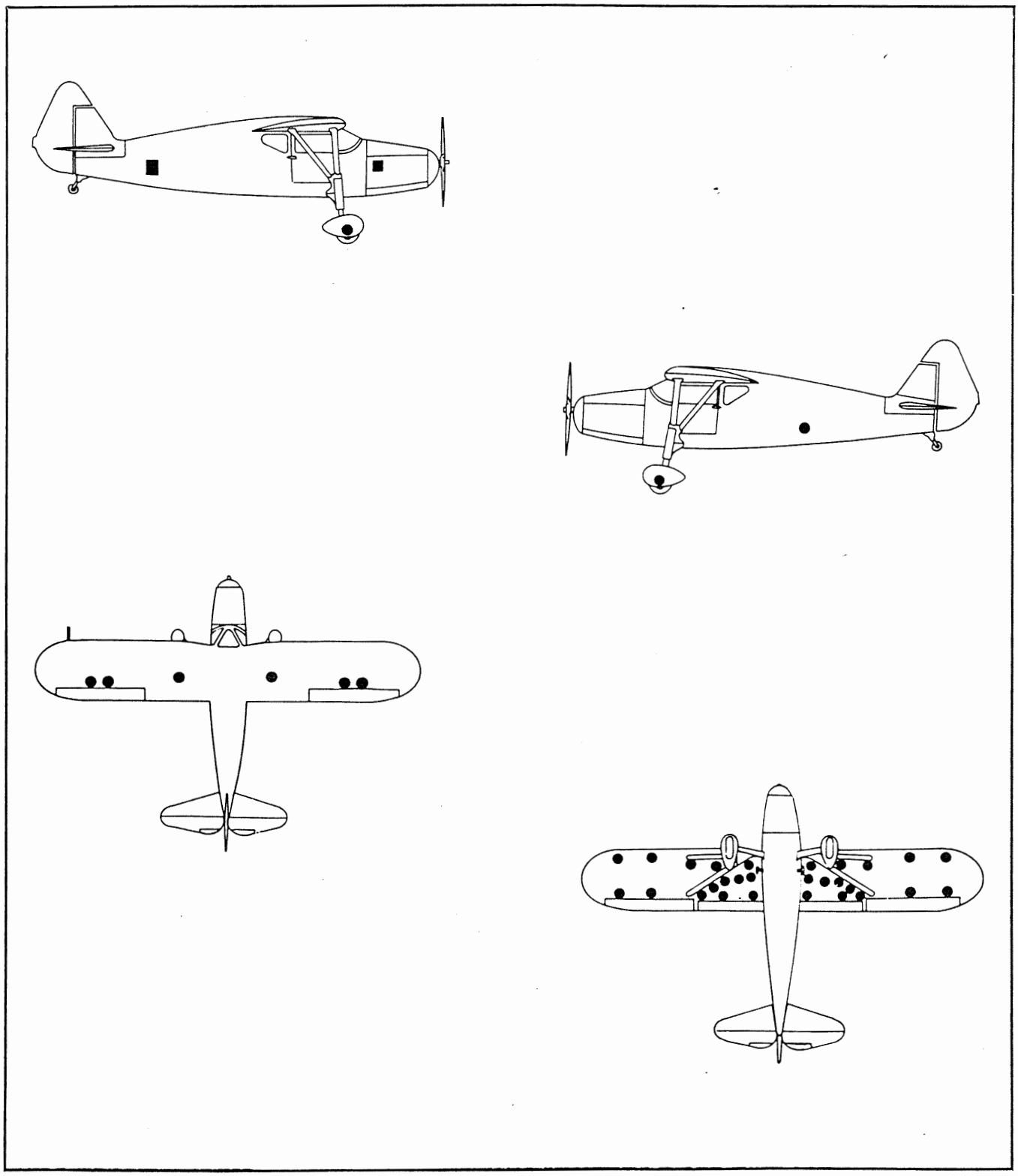


Figure 3-5—Inspection Holes—Ranger

WING FAIRING

The wing fairing is manufactured of 3S1/2 hard aluminum alloy. This fairing may be welded with oxygen-hydrogen to repair small cracks or tears or hammered with a soft mallet to remove dents. Damage that will not permit fairing to be reinstalled to a snug fit after repair and securely fastened at all points is not repairable. It should be replaced with new fairing.

AILERON

The aileron, except for the hinge fittings, is manufactured of 52S1/4H hard aluminum alloy. *(See figure 3-6.)* The hinge fittings are made of X4130 chrome molybdenum steel and are fastened to the wing at three points. The ailerons are controlled by links coming from a bell crank attached to the spar at the center hinge fitting and the side loads are taken off through the center hinge fitting, the inboard and outboard fittings taking only the drag loads imposed upon them by the aileron.

The aileron is fabric-covered and may readily be removed from the airplane by disconnecting the link connecting the aileron to the bell crank, moving the aileron to the maximum "up" position, at which time the attachment bolts to the aileron hinges become accessible and may be easily removed. Repairs to the hinges and to the spar are not recommended by Fairchild. Hinges may be replaced. Damage to ribs and trailing edge may be repaired in accordance with standard CAA Bulletin No. 18. The trailing edge may be spliced or replaced. In the event of major damage to the aileron it is advisable to replace with a complete new assembly.

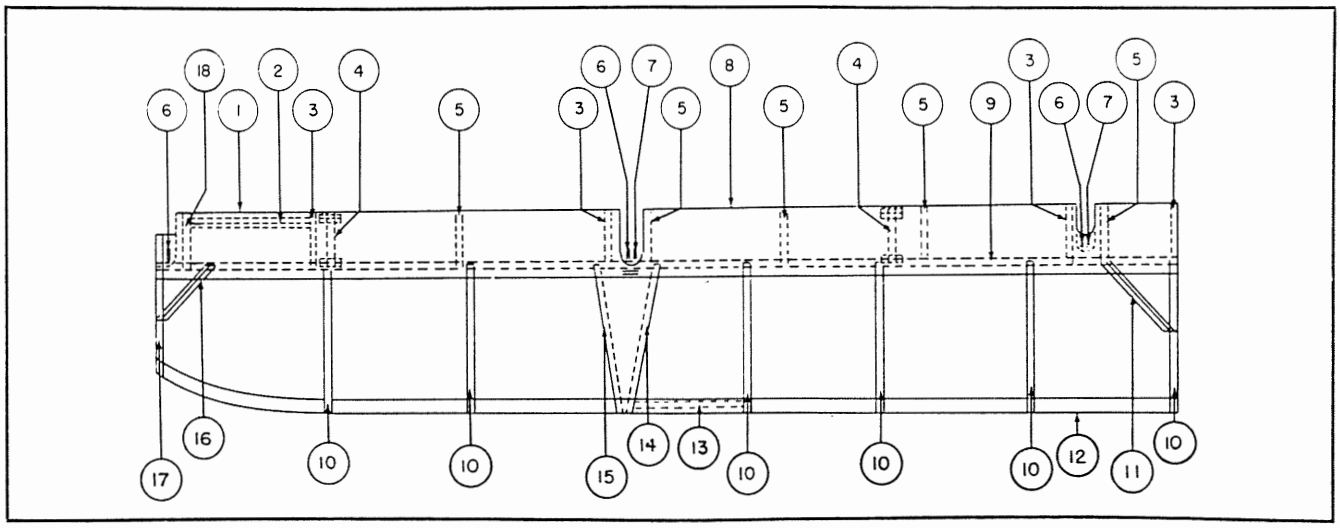


Figure 3-6—Aileron Assembly

Index No.	Part No.	Nomenclature
1	*4538-2*	Nose Skin: *.025, 52S-1/4H aluminum alloy sheet.*
2	*4539-7*	Balance Retainer: *.020 x 2 1/16 x 12 5/8 aluminum alloy sheet.*
3	*4539-16*	Nose Rib: *.025, 3S-1/2H aluminum alloy sheet.*
4	*44200*	Balance Bracket: *.035, X-4130 steel sheet: 5/8 x .058, X-4130 steel tube.*
5	*4532-15*	Nose Rib: *.025, 3S-1/2H aluminum alloy sheet.*
6	*4541*	Hinge: *.049, X-4130 steel sheet.*
7	*4540*	Horn Bracket.
8	*4538-1*	Nose Skin: *.025, 52S-1/4H aluminum alloy sheet.*
9	*4539-6*	Spar: *.020, 52S-1/4H aluminum alloy sheet.*
10	*4539-1*	Standard Rib: *.016, 52S-1/4H aluminum alloy sheet.*
11	*4539-4*	Inboard Brace: *.016, 52S-1/4H aluminum alloy sheet.*
12	*4539-14*	Trailing Edge.
13	*4550*	Tab Trimmer Block *(Left Aileron Only): 13/32 x 5/8 spruce.*
14	*4539-9*	Top Cover Plate: *.020, 52S-1/4H aluminum alloy sheet.*
	4539-10	Bottom Cover Plate: *.020, 52S-1/4H aluminum alloy sheet.*
15	*4539-3*	Hinge Rib: *.020, 52S-1/4H aluminum alloy sheet.*
16	*4539-5*	Outboard Brace: *.016, 52S-1/4H aluminum alloy sheet.*
17	*4539-2*	End Ribs: *.016, 52S-1/4H aluminum alloy sheet.*
18	*4539-17*	Special Nose Rib: *.025, 3S-1/2H aluminum alloy sheet.*

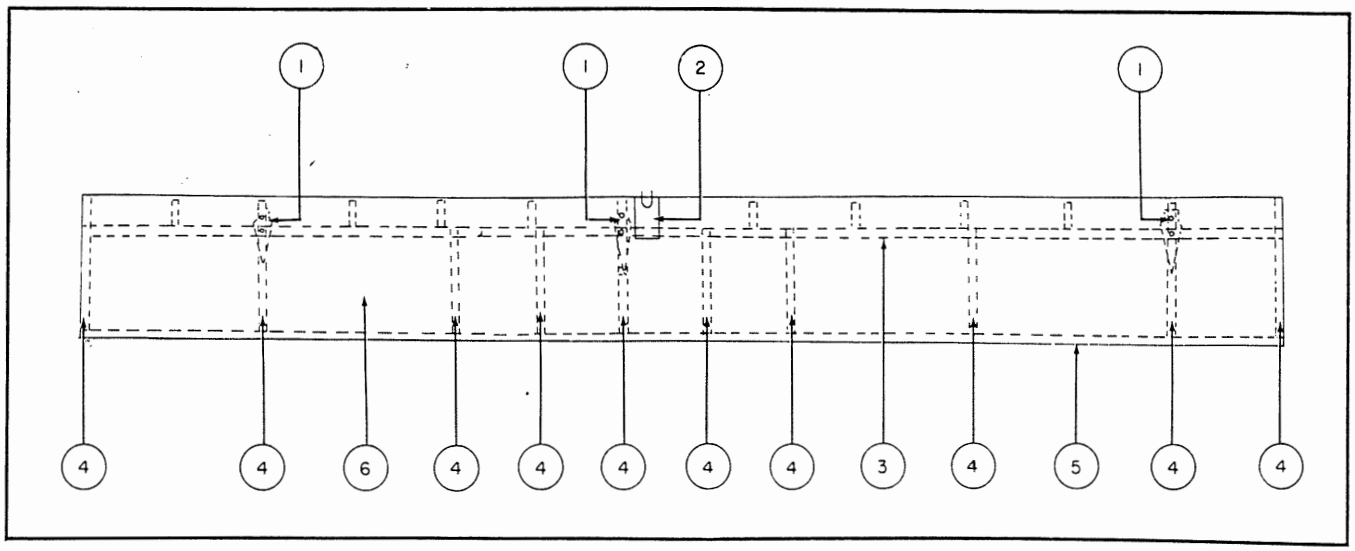


Figure 3-7—Flap Assembly

Index No.	Part No.	Nomenclature
1	*42144*	Hinge: *Casting—Aluminum Alloy.*
2	*42109*	Horn: Nose Cover—*.035, X-4130 steel sheet.*
		Clevis—*.049, X-4130 steel sheet.*
3	*42105*	Spar: *.051, 24ST aluminum alloy sheet.*
4	*42107-1*	Rib: *½ x 1 spruce.*
5	*3510*	Trailing Edge: *Extruded 17ST aluminum alloy.*
6	*42158-1*	Skin: *.020, 52S-1/4H aluminum alloy sheet or 24ST Alclad.*

WING FLAPS

The "24" flaps are of composite construction, the top and bottom surface being manufactured of 52S1/4H hard aluminum alloy sheet riveted to wooden ribs and nose formers, with a 24ST aluminum alloy channel type spar and an aluminum alloy trailing edge. *(See figure 3-7.)* It is a split trailing edge type operated by a lever in the cabin. Three hinges attaching the flap to the wing panel are ball-bearing type. The flap may be readily removed by disconnecting the control push-pull tube at the flap and removing the three hinge bolts from the hinges on the rear spar. The wooden flap ribs if damaged should be replaced and no attempt made to repair them. If minor damage occurs repairs may be made in accordance with CAA Bulletin No. 18. Major damage to flap skin should not be repaired. Experience shows that to repair any damage to the skin requires a jig to hold the alignment of the flap.

Upon reassembly of the flap to the wing great care should be taken to see that the anti-howl strip is properly fitted. This removes unpleasant noise and if not properly fitted may cause binding in the flaps causing wear either on the wing or on the flap itself. Flaps, when being refitted to a wing, should be checked to see that full travel is obtained when the lever is pulled to its maximum position.

TAIL GROUP

The tail group on the F24 is composed of a plywood covered horizontal stabilizer and a plywood covered vertical fin. *(See figure 3-8.)* The elevators and rudders are fabric over welded steel tubing and sheet. The elevator is equipped with an adjustable tab controllable from the cockpit and the rudder has a fixed metal trim tab on the trailing edge which may be adjusted on the ground for trimming the rudder.

REMOVAL OF TAIL ASSEMBLY.

Warning

When tail surfaces are removed the tail must be tied down or weighted with 150 pounds to prevent nosing over.

a. Remove all tail cowling.

b. Disconnect the rudder cables.

c. Disconnect the two bolts attaching the fin to the top of the stabilizer.

d. Disconnect the two bolts and the strap clamp attaching the fin to the fuselage tail post.

The rudder and fin may be removed as a unit. To remove the stabilizer and elevator it is then necessary to:

a. Disconnect the push-pull tube at the elevator horn.

b. Disconnect the tab control cables at the turnbuckles above the stabilizer.

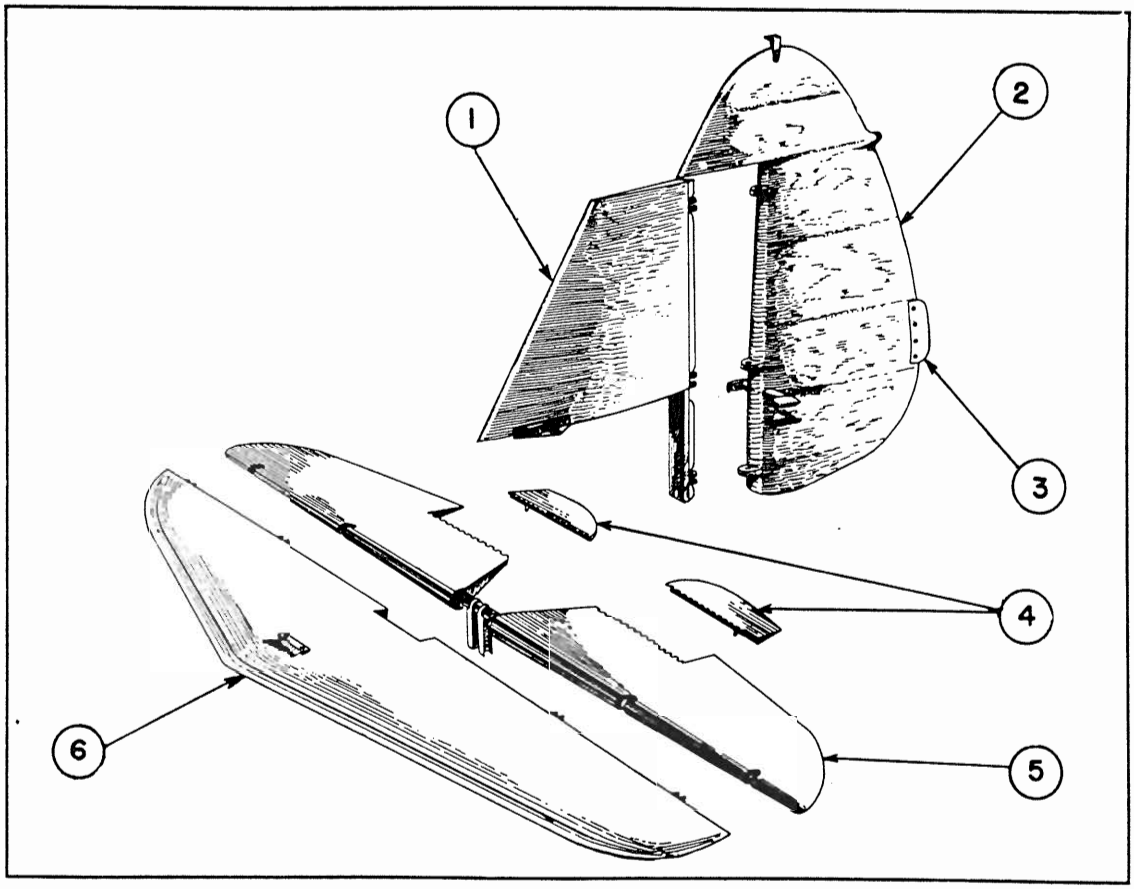


Figure 3-8—Tail Group

Index No.	Nomenclature	Index No.	Nomenclature
1	*Fin.*	*4*	*Elevator Trim Tab.*
2	*Rudder.*	*5*	*Elevator.*
3	*Rudder Trim Tab.*	*6*	*Horizontal Stabilizer.*

c. Remove the bolts from the front and rear stabilizer attachment fittings using long drift pins to drive the bolts from the holes.

The stabilizer and elevator then can be removed as a complete unit. The rudders are removed from the fin by removing the bolts at the three hinge attachment points and the elevator may be removed from the stabilizer by removing the six hinge attachment point bolts. The tail group may be reassembled by reversing the procedure outlined above.

STABILIZER

The horizontal stabilizer is of box-type cantilever construction. *(See figure 3-9.)* The spars are made of 1/2" thick grade "A" spruce with the front spar being laminated from 1/4" thick strips while the rear spar is a solid piece. Plywood reinforcements used on the spar are 1/8" or 1/16" 3-ply mahogany and when repairing the spar equivalent thicknesses of this material should be used. The stabilizer structure is covered with 1/16" 3-ply mahogany plywood. The stabilizer is not adjustable and is attached to the fuselage by four AN4-5 bolts through steel fittings bolted to the spar. A fitting is attached to the front spar at the top of the stabilizer to which the front fitting of the vertical fin is attached for assembly. The stabilizer is not considered repairable except for damage to the plywood skin and requires replacement of members involved, or, depending upon extent of damage, replacement of the entire stabilizer. The plywood skin should be repaired in accordance with CAA Bulletin No. 18. It is recommended that spruce batten strips be used for nailing the skin to the ribs to assure a smooth surface for finishing. Use of this procedure in addition to the procedure recommended in Bulletin No. 18 will enable the repair station to finish the stabilizer to the same appearance as originally manufactured. Installation of the stabilizer is a very simple operation in which proper rigging is automatically maintained by the fixed position of the four attaching bolts.

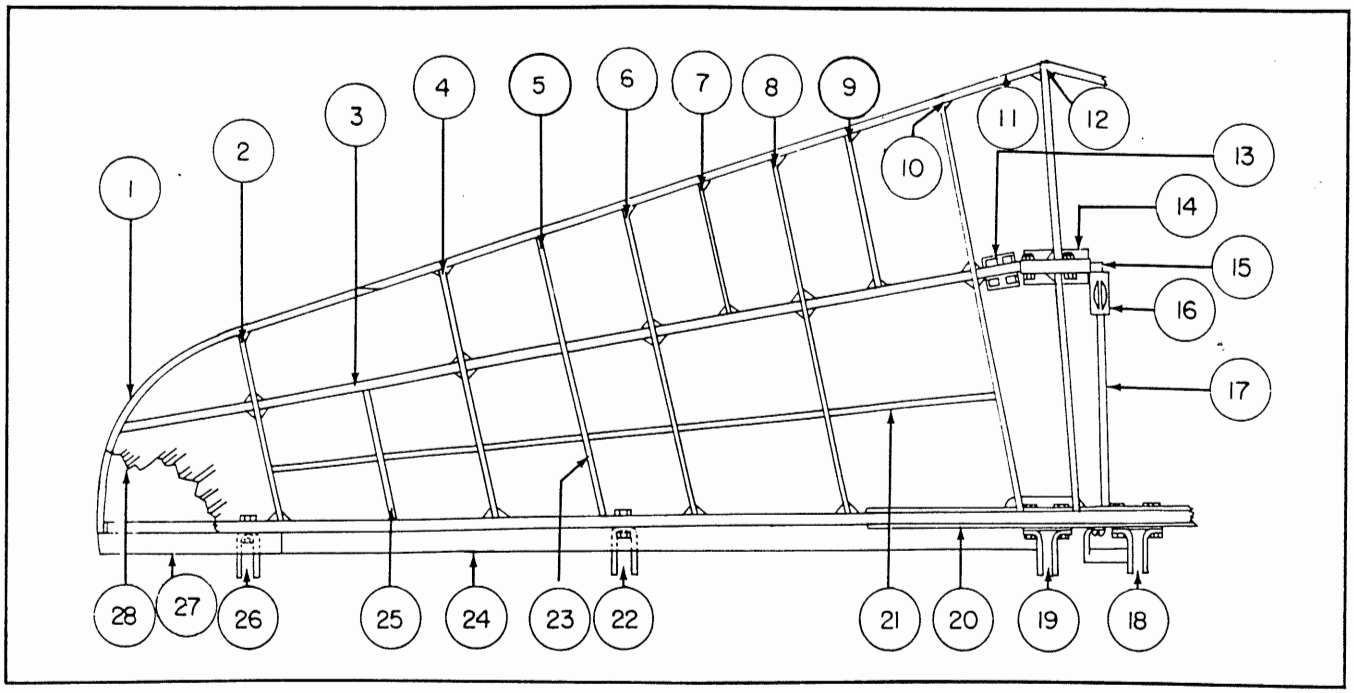


Figure 3-9—Stabilizer Assembly

Index No.	Part No.	Nomenclature
1	*4624-9*	Tip Fairing: ⅛ *x* 1½ *x 27 spruce.*
2	*4624-17*	No. 6 Rib: ¼ *x* 2¾ *x* 13¾ *spruce.*
3	*4624-2, 3, 4*	Front Spar: Web—¼ *x* 4 15/16 *x 148 spruce.* Reinforcements—⅛ *and* 1/16, *3-ply mahogany plywood,* 4 15/16 *x 54 and* 4 15/16 *x 14, respectively.*
4	*4624-16*	No. 5 Rib: ¼ *x* 3½ *x* 18¼ *spruce.*
5	*4624-40*	No. 4½ Nose Rib: ¼ *x* 3¾ *x* 7½ *spruce.*
6	*4624-15*	No. 4 Rib: ¼ *x* 4¼ *x 23 spruce.*
7	*4624-21*	No. 3½ Nose Rib: ¼ *x* 4¼ *x* 9½ *spruce.*
8	*4624-14*	No. 3 Rib: ¼ *x* 4¾ *x 25 spruce.*
9	*4624-20*	No. 2½ Nose Rib: ¼ *x* 4¾ *x* 10½ *spruce.*
10	*4624-13*	No. 2 Rib: ¼ *x 5 x 28 spruce.*
11	*4624-8*	Leading Edge: ⅝ *x* 1¾ *x 61 spruce.*
12	*4624-10*	No. 1 Rib: ½ *x* 6¼ *x 30 spruce.*
13	*4689-20*	Front Fitting.
14	*4666*	Fin Fitting.
15	*4675*	Guide for Tab Cables.
16	*4624-32*	Skin Reinforcement *(Right Side Only):* ⅛, *3-ply mahogany plywood,* 1½ *x* 5⅞.
17	*4660*	Elevator Tab Control Conduit: ⅝ *x .035, 2S-1/2H aluminum tubing.*
18	*4626-1*	Elevator Hinge Fitting *(Left Side Only).*
19	*4626-2*	Elevator Hinge Fitting *(Right Side Only).*
20	*4624-5, 6, 39*	Rear Spar: Web ½ *x* 4½ *spruce.* Reinforcements—⅛, *3-ply mahogany plywood.*
21	*4624-36*	Stringer *(Top and Bottom):* ¼ *x* 5/16 *x 54 spruce.*
22	*4630-1*	Elevator Hinge Fitting.
23	*4624-41*	No. 4½ Tail Rib: ¼ *x* 1 1/16 *x 23 spruce.*
24	*4624-7*	Rear Edge Fairing: ½ *x* 1⅜ *x 60 spruce.*
25	*4624-42*	No. 5½ Tail Rib: ¼ *x* 1 1/16 *x 19 spruce.*
26	*4630-2*	Elevator Hinge Fitting.
27	*4624-30*	Rear Edge Fairing: ½ *x* 1⅜ *x* 10½ *spruce.*
28	*4624-1*	Skin: 1/16, *3-ply mahogany plywood,* 30½ *x 74.*

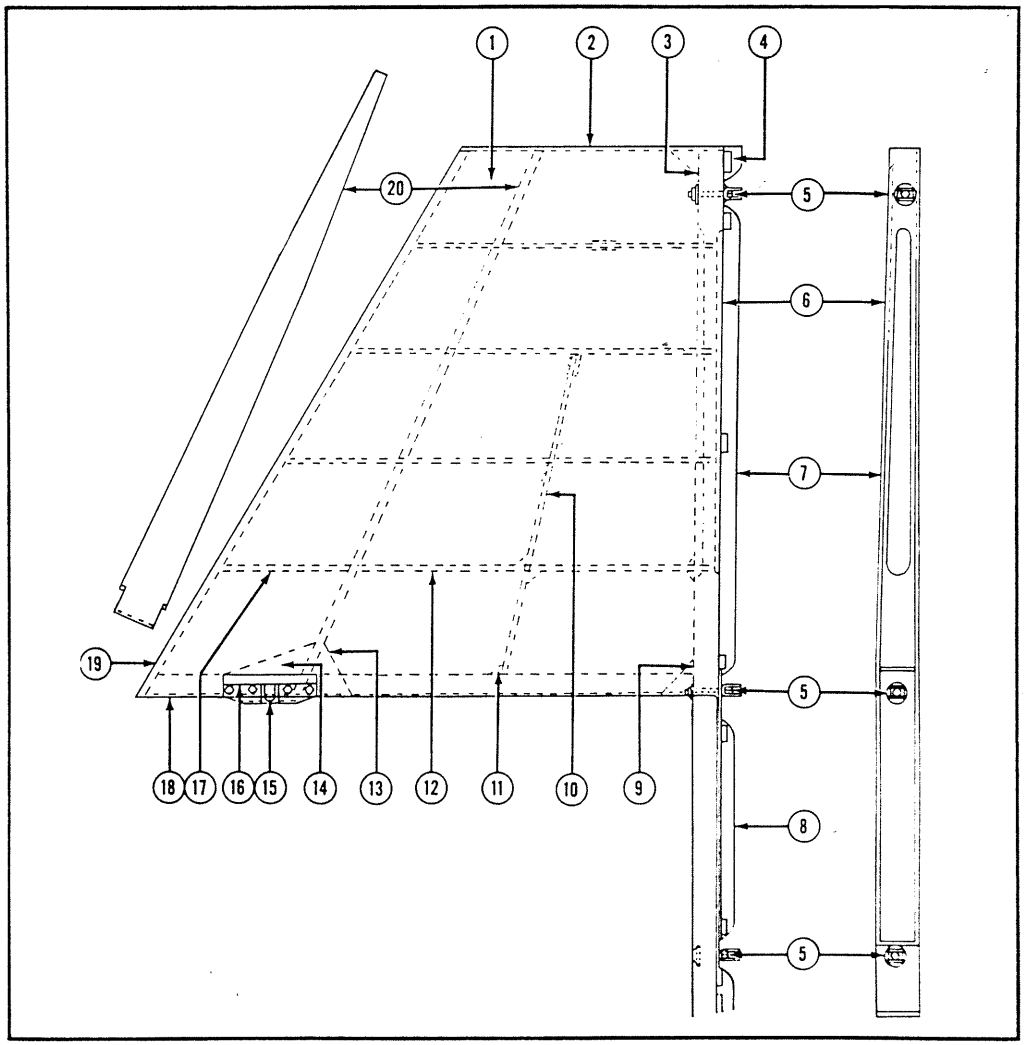


Figure 3-10—Fin Assembly

Index No.	Part No.	Nomenclature
1	*4668-3*	Skin: 1/16 *x 33 x 36, 3-ply mahogany plywood.*
2	*4668-4*	Top Rib: 1/4 *x* 1 3/4 *x* 15 7/8 *spruce.*
3	*4668-20*	Block: 1 1/2 *x* 1 1/2 *x* 1 9/16 *spruce.*
4	*4668-23*	Corner Block: 3/8 *x* 3/8 *x 1 spruce.*
5	*3686*	Hinge.
6	*4668-1*	Rear Spar: 1 1/2 *x* 2 21/32 *x* 51 7/8 *spruce.*
7	*4668-22*	Fairing: 3/16 *x* 1 3/8 *x 46 spruce.*
8	*4668-21*	Spar Reinforcement: 3/16 *x* 2 1/2 *x* 16 5/8, *3-ply mahogany plywood.*
9	*4668-17*	Block: 2 *x 2 x* 2 21/32 *spruce.*
10	*4668-18*	Stringer: 1/4 *x* 1/2 *x* 13 1/4 *spruce.*
11	*4668-19*	Gussets: 1/16 *x 1 x* 3 1/8, *3-ply mahogany plywood.*
12	*4668-9*	Tail Rib: 1/4 *x* 3 3/16 *x 21 spruce.*
13	*4668-16*	Block: 3 1/2 *x* 3 1/8 *x* 3 7/8 *spruce.*
14	*4668-15*	Block: 2 9/16 *x* 3 5/8 *x* 5 7/8 *spruce.*
15	*4669*	Front Attachment Fitting.
16	*4668-24*	Filler Block: 7/16 *x* 1 1/4 *x* 6 5/8 *spruce.*
17	*4668-8*	Nose Rib: 1/4 *x* 2 3/4 *x 8 spruce.*
18	*4668-10*	Bottom Rib: 1/8 *x* 3 1/2 *x* 34 1/2 *spruce.*
19	*4668-12*	Leading Edge: 1/2 *x 1 x* 38 1/2 *spruce.*
20	*4668-2*	Front Spar: 1/2 *x* 3 3/32 *x* 36 1/8 *spruce.*

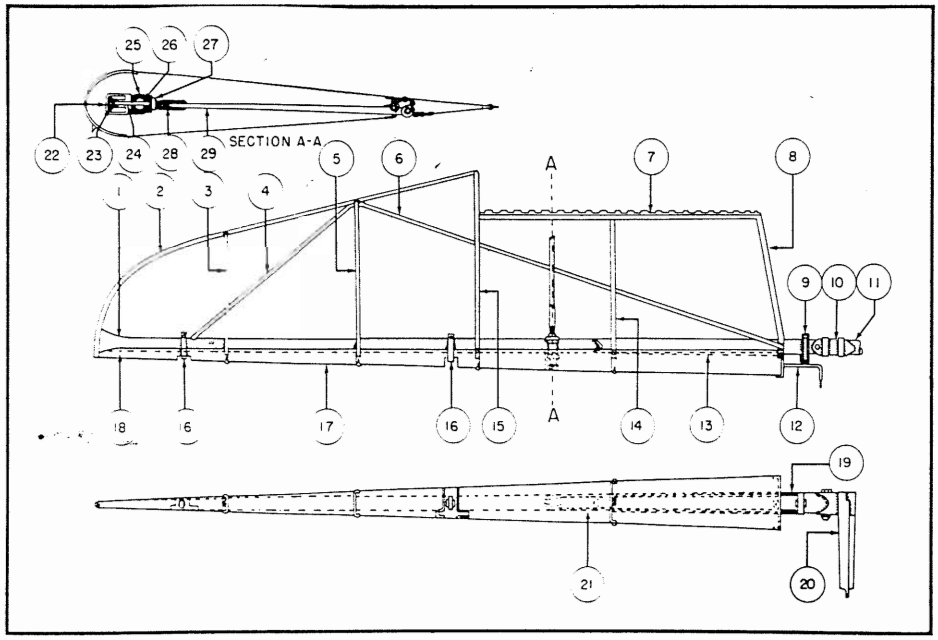


Figure 3-11—Elevator Assembly

Index No.	Part No.	Nomenclature
1	*4653–7*	Outer Spar: *1 x .035 x 56½, X-4130 steel tubing.*
2	*4653–8*	Trailing Edge: *5/16 x .035 x 57, X-4130 steel tubing.*
3	*4653–4*	No. 4 Rib: *.018 x 3 1/16 x 14 1/4, X-4130 steel sheet.*
4	*4653–9*	Brace: *¼ x .035 x 23, X-4130 steel tube.*
5	*4653–3*	No. 3 Rib: *.018 x 3 9/16 x 16½, X-4130 steel sheet.*
6	*4653–10*	Brace: *¼ x .035 x 42, X-4130 steel tube.*
7	*4653–5*	L/R Former: *.018 x 2 1/16 x 22½, X-4130 steel sheet. (Note: Hinge shown on Tab drawing, figure 3-12)*
8	*4653–6*	Inner Rib: *.018 x 4 9/16 x 15½, X-4130 steel sheet.*
9	*4638*	Hinge.
10	*4653–25*	Sleeve: *1¼ x 4¼, X-4130 steel tube.*
11	*4653–14*	Splice: *1 x .049 x 4¼, X-4130 steel tube.*
12	*4653–20*	Tab Cable: *1/16 Diameter, 7 x 7 x 56 flexible steel.*
13	*4653–17*	Inner Spar: *1⅛ x .058 x 19¼, X-4130 steel tube.*
14	*4653–1*	L/R No. 1 Rib: *.018 x 4 3/16 x 15½, X-4130 steel sheet.*
15	*4653–2*	L/R No. 2 Rib: *.018 x 3 15/16 x 19, X-4130 steel sheet.*
16	*4629*	Hinge.
17	*4653–11*	Center Leading Edge: *.025 x 7⅞ x 54, 52S-1-¼H aluminum alloy sheet.*
18	*4653–12*	Tip Leading Edge: *.025 x 5⅜ x 15½, 52S-1-¼H aluminum alloy sheet.*
19	*4653–19*	Center Cable: *1/16 Diameter, 7 x 7 x 38 flexible steel.*
20	*4654*	Horn: Stamping—*.065 x 2⅜ x 6⅛, X-4130 steel sheet.* Disc—*FS-2700-65-5 (Fairchild).*
21	*4653–21*	Chain: *Boston Gear Works No. 5B2, 21¼ long.*
22	*4653–13*	Chain Guard: *1⅛ x .035 x 1½, X-4130 steel tube.*
23	*4653–22*	Sprocket: *Boston Gear Works No. H962.*
24	*FS302–411*	Spacer *(Fairchild).*
25	*4636*	Bushing: *1⅛ x 3/16, S-1025 steel tube.*
26	*4653–23*	Ball Bearing: *(Schatz No. 2050).*
27	*AN335–6*	Nut.
28	*4634*	Screw.
29	*4633*	Rod.

FIN

The vertical fin is of the same construction as the stabilizer and is a full cantilever member. *(See figure 3-10.)* It is attached to the stabilizer by one bolt through the front fitting and is held to the airplane by means of a clamp and bolts at the tail post of the fuselage. Repairs to the fin are of the same nature as those to the stabilizer and procedures may be followed exactly as those for stabilizer repair. The fin offset is fixed by the fittings.

ELEVATOR

The spar of the elevator is in two sections joined at the fuselage center line by two bolts. *(See figure 3-11.)* Each spar is made up of two welded lengths of X4130 chrome molybdenum steel tubing; 1-1/8" x .058" x 19-1/4" for the inner tubing and 1" x .035" x 56-1/2" for the outer tubing. The ribs are of .018" X4130 chrome molybdenum steel sheet. The formers and tab cut-out are .028" X4130 chrome molybdenum steel sheet. The trailing edge is 5/16" x .035" X4130 chrome molybdenum steel tubing. The leading edge which is formed from .025" 52S1/4H hard aluminum alloy sheet is of three sections: center section and the right- and left-hand tip sections. Figure 3-11 shows the details of the elevator construction.

ELEVATOR REPAIR. No attempt should be made to repair damaged elevator ribs. Replace them. The spar brace and trailing edge tubing when only slightly bent may sometimes be successfully reworked under heat. More extensive damage to tubing may be repaired providing the steel tubing splice procedures are as set forth by the CAA Bulletin No. 18. In the event of damage to the bearings in the elevator control attachment points these bearings may be pressed out and new bearings Part No. CS2170 installed. If damage occurs to the hinges, replace with new hinges.

ELEVATOR TRIM TAB

The elevator trim tabs are of composite construction being made up of spruce ribs covered by 52S1/4H hard aluminum alloy skin. *(See figure 3-12.)* The hinges attaching the tabs to the elevator are piano type and the tabs may be readily removed by removing the hinge pin. The tabs are actuated by threaded push rods mating with threaded fittings on the elevator. These rods should be disconnected before attempting to remove the trim tabs. When damage occurs to the elevator trim tab, replace with a new unit.

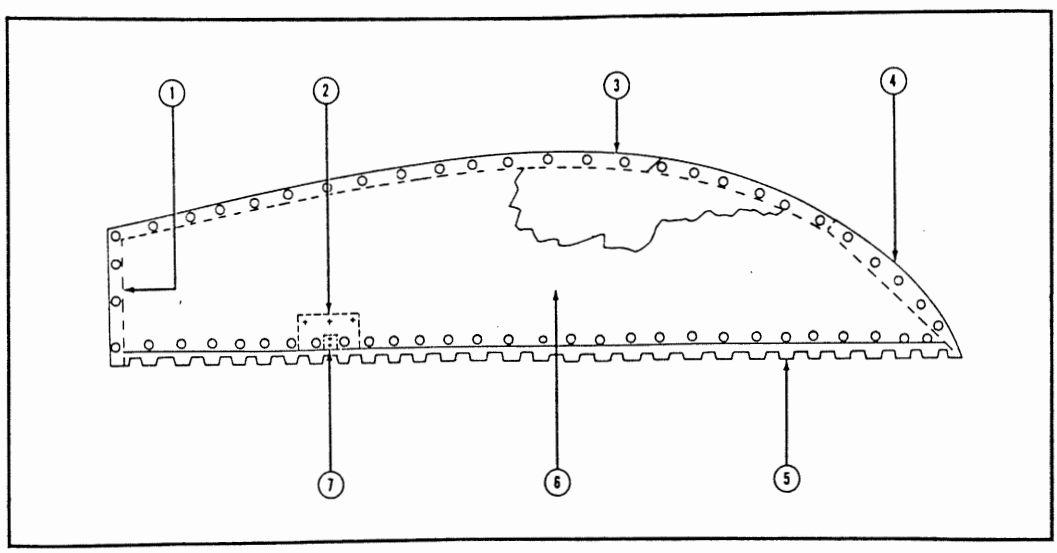


Figure 3-12—Elevator Tab Assembly

Index No.	Part No.	Nomenclature
1	*4632-8*	Rib: *⅝ x ⅞ spruce.*
2	*4632-6*	Reinforcement: *.032, 52S-¼H aluminum alloy sheet.*
3	*3510*	Trailing Edge: *Extruded 17ST aluminum alloy (Alcoa Extruded Section No. 4794).*
4	*4632-9*	Rib: *⅞ x 1 spruce.*
5	*4632-7*	Hinge: *17ST aluminum alloy (Bronson No. 0).*
6	*4632-1*	Bottom Skin: *.025, 52S-¼H aluminum alloy sheet.*
	4632-2	Top Skin: *.025, 52S-¼H aluminum alloy sheet.*
7	*4665*	Bracket: *.065, X-4130 steel sheet.*

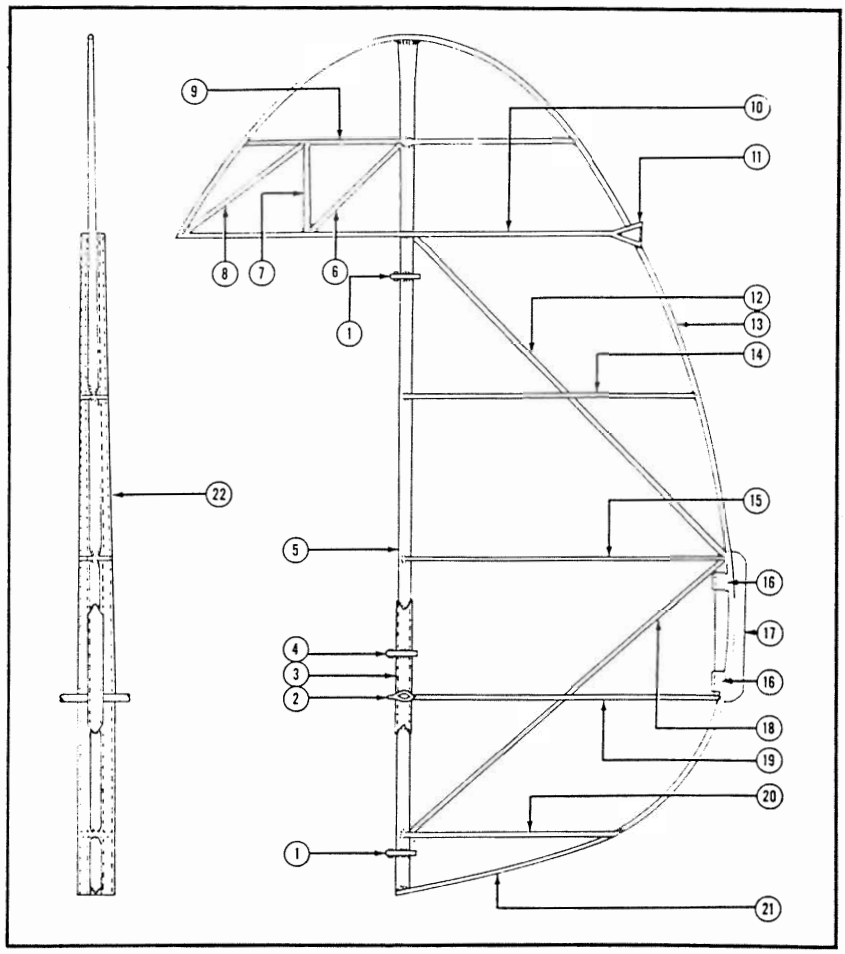


Figure 3-13—Rudder Assembly

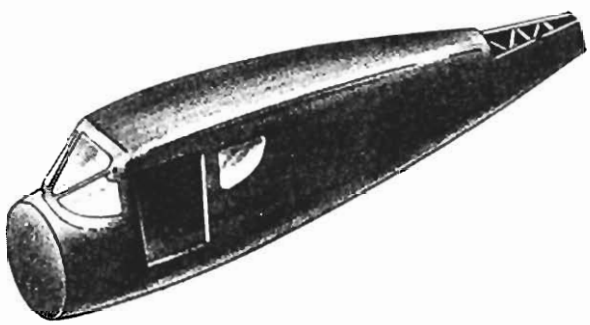
Index No.	Part No.	Nomenclature
1	*4629*	Hinge.
2	*4664*	Horn: Tube—1⅛ *x .035, X-4130 steel.* Strap—*.065, X-4130 steel sheet.* Plate—*.035, X-4130 steel sheet.*
3	*4692–3*	Beam Sleeve: 1⅛ *x .058, X-4130 steel tube.*
4	*4638*	Hinge.
5	*4692–2*	Beam: *1 x .035, X-4130 steel tube.*
6	*4692–16*	Diagonal: 5/16 *x .035, S-1025 steel tube.*
7	*4692–4*	Diagonal: 5/16 *x .035, S-1025 steel tube.*
8	*4692–17*	Diagonal: 5/16 *x .035, S-1025 steel tube.*
9	*4692–8*	Rib: 5/16 *x .035, S-1025 steel tube.*
10	*4692–9*	Rib: 5/16 *x .035, S-1025 steel tube.*
11	*4693*	Light Base.
12	*4692–5*	Diagonal: 5/16 *x .035, S-1025 steel tube.*
13	*4692–1*	Trailing Edge: 5/16 *x .035, S-1025 steel tube.*
14	*4692–10*	Rib: 5/16 *x .035, S-1025 steel tube.*
15	*4692–11*	Rib: 5/16 *x .035, S-1025 steel tube.*
16	*4692–20*	Tab Attachment Fitting: *.025, X-4130 steel sheet.*
17	*4682*	Fixed Tab.
18	*4692–6*	Diagonal: 5/16 *x .035, S-1025 steel tube.*
19	*4692–12*	Rib: 5/16 *x .035, S-1025 steel tube.*
20	*4692–13*	Rib: 5/16 *x .035, S-1025 steel tube.*
21	*4692–7*	Rib: ¼ *x .035, S-1025 steel tube.*
22	*4692–15*	Fairing: *.028, X-4130 steel sheet.*

RUDDER

The rudder is very similar to the elevator structurally, the major difference being that the rudder ribs are steel tubing while the elevator ribs are steel sheet. *(See figure 3-13.)* When making repairs to the rudder this figure should be consulted and standard repair procedures used as outlined by CAA Bulletin No. 18. In the event of major damage a new unit should be installed.

FUSELAGE

The fuselage structure *(See figure 3-14)* is made up entirely of X4130 chrome molybdenum steel. Longerons and bracing are either square or round and all fittings are made from sheet. *There are no members of the fuselage structure that are heat-treated.* This will facilitate any repair that may of necessity have to be made to this unit. Figures 3-16 thru 3-23 and accompanying legends will show the materials used in the members of the fuselage and may be used as reference in replacing members or for ordering tubing with which repairs will be made. Loads are carried into the fuselage at the engine mount: at the wing attachment points, lift strut attachment points, landing gear attachment points and the tail surface attachment points. All of the fittings at these points are of X4130 chrome molybdenum steel. The body group not only contains the basic fuselage structure as described in the preceding paragraph but all of the fairing, clips and brackets attached to the basic structure. They will be taken up in the order of their importance commencing with the fuselage structure.



FUSELAGE STRUCTURE

At weld joints in the fuselage structure where square tubing meets with either square tubing or round tubing the welding problem is much simpler due to the use of the square tubing.

If damage occurs to the main fuselage structure, repairs may be made in accordance with CAA Bulletin No. 18. When repairing damage to the engine mount attachment points, the tripod assembly, the front and rear landing gear fittings, the tail wheel-drag link attachment fitting point, and the wing attachment fitting points at the top of the fuselage, blueprints should be obtained from Fairchild through your Fairchild distributor or dealer. Also, if there is damage to the fuselage sufficient to indicate that the fuselage may be out of line, blueprints should be obtained.

When repairing major fuselage members exceptional care should be taken to assure that the fuselage is not out of line. If it is it will be necessary to realign the fuselage after the repairs are made to the members for satisfactory flight characteristics and to avoid excessive loads being imposed on the various members.

TRIPOD ASSEMBLY. The tripod assembly is made of 4130 chrome molybdenum steel tube, two of the bottom three members being streamline shaped tubes and the third member being rectangular. *(See figure 3-15.)*

This structure is an integral part of the fuselage and carries the loads of the lift struts and of the oleo shock strut into the major structure. Any repairs to this assembly should be checked carefully.

If major damage occurs it is recommended that the entire unit be replaced from where it joins the fuselage at the top to where it splices at the landing gear fittings at the bottom.

The two attachment points at the bottom are at Stations 2 and 2-1/2 and extreme care should be taken when installing the tripod assembly to make sure of proper removal of the old structure and proper attachment of the new at the landing gear fittings. When installing the new tripod assembly the blueprint covering this installation should be checked to assure that proper alignment is obtained. If minor repairs are necessary it is suggested that the splicing procedures as set up by the CAA and standard repair practices are followed.

LANDING GEAR FITTINGS. The landing gear fittings are located at Stations 2 and 2-1/2 *(See figure 3-16.)* Both fittings are made of steel sheet side plates, steel wrappers and steel bushings. Inside of the steel bushings are inserted aluminum bronze alloy shoulder bushings (Part No. S-112-7) which take the landing gear loads. Fairchild recommends, when damage occurs to the landing gear fittings, that a complete new cluster for the damaged fitting be installed as a unit. If damage

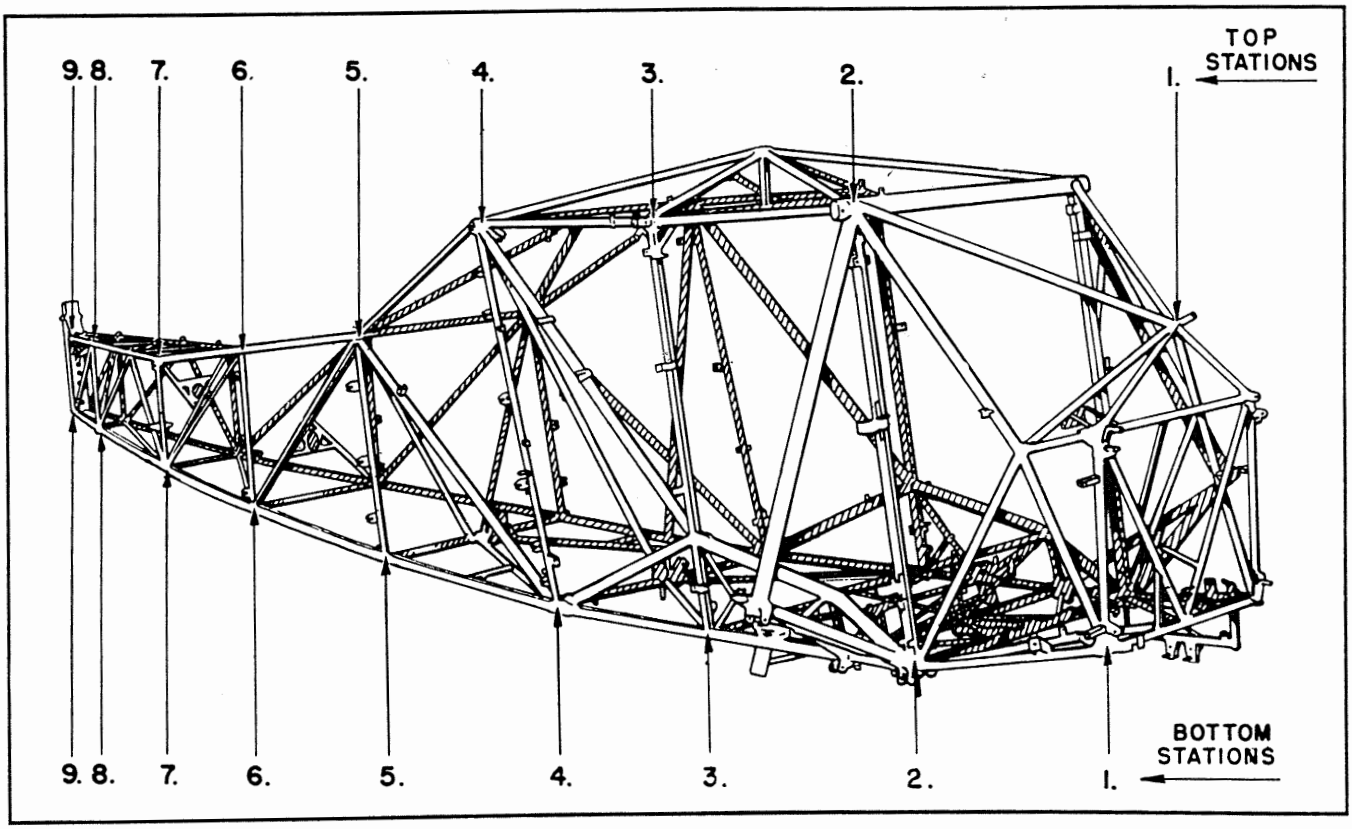


Figure 3-14—Fuselage Structure

occurs to both fittings a complete unit incorporating both fittings should be installed. This is done by cutting away the longerons on each side of the damage and splicing in a complete new fitting which can be supplied by your distributor or dealer. Care should be taken in installing these fittings to assure that they are properly lined up. This is done by placing the fittings at their proper location on the fuselage structure, inserting a 3/8" rod through the bushed holes long enough to pass through both the fittings. The new fitting should be lined parallel to the line of flight and installed in accordance with Fairchild Drawings 40249 and 40462. Care should be taken after welding is completed to assure that these fittings are properly aligned and that they will give the proper position for the landing gear strut.

In minor damage to the fittings it *may be possible* (but Fairchild does not recommend) to replace the side plates without welding in a complete new fitting. If this repair is possible your local CAA inspector should be contacted to determine if it will meet with CAA requirements and if so contact your distributor for replacement side plates, bushings, or wrappers at which time installation drawings should be requested.

Under no conditions should a repair of this nature be started until your local CAA inspector has had a chance to determine if the repair will meet with his approval and with the present applicable specifications.

ENGINE MOUNT FITTINGS. The engine mount fittings are made of normalized 4130 steel. *(See figure 3-16.)* If damage occurs to these fittings new detail parts should be installed in accordance with Fairchild Drawings 40258 and 40259. Care should be taken to assure that the fittings are lined up in the proper way. Use the engine mount as a jig to assure that the fittings are properly located in relation to the fuselage and the engine mount structure.

TAIL WHEEL LINK ATTACHMENT FITTINGS. It is recommended that the old tail wheel link attachment fittings be cut off and new fittings be welded in. Due to the small size of the fittings and their location *(See figure 3-16)* they are generally a replacement item and fittings may be obtained from your distributor and welded into the cross tube in the proper position. Fairchild Drawing No. 40173 should be checked to assure proper alignment so that the tail wheel is in true position when in operation.

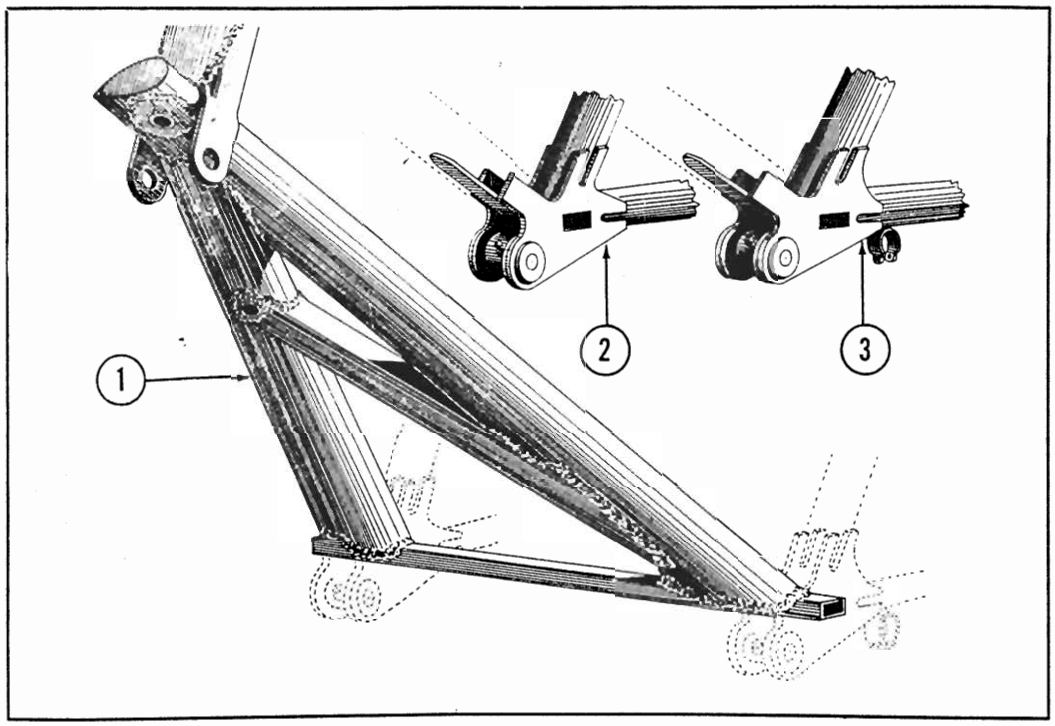


Figure 3-15—Tripod Assembly

Index No.	Part No.	Nomenclature
1	*40223*	*Tripod Assembly.*
2	*40249*	*Landing Gear Fitting—Station 2½ B.*
3	*40462*	*Landing Gear Fitting—Station 2 B.*

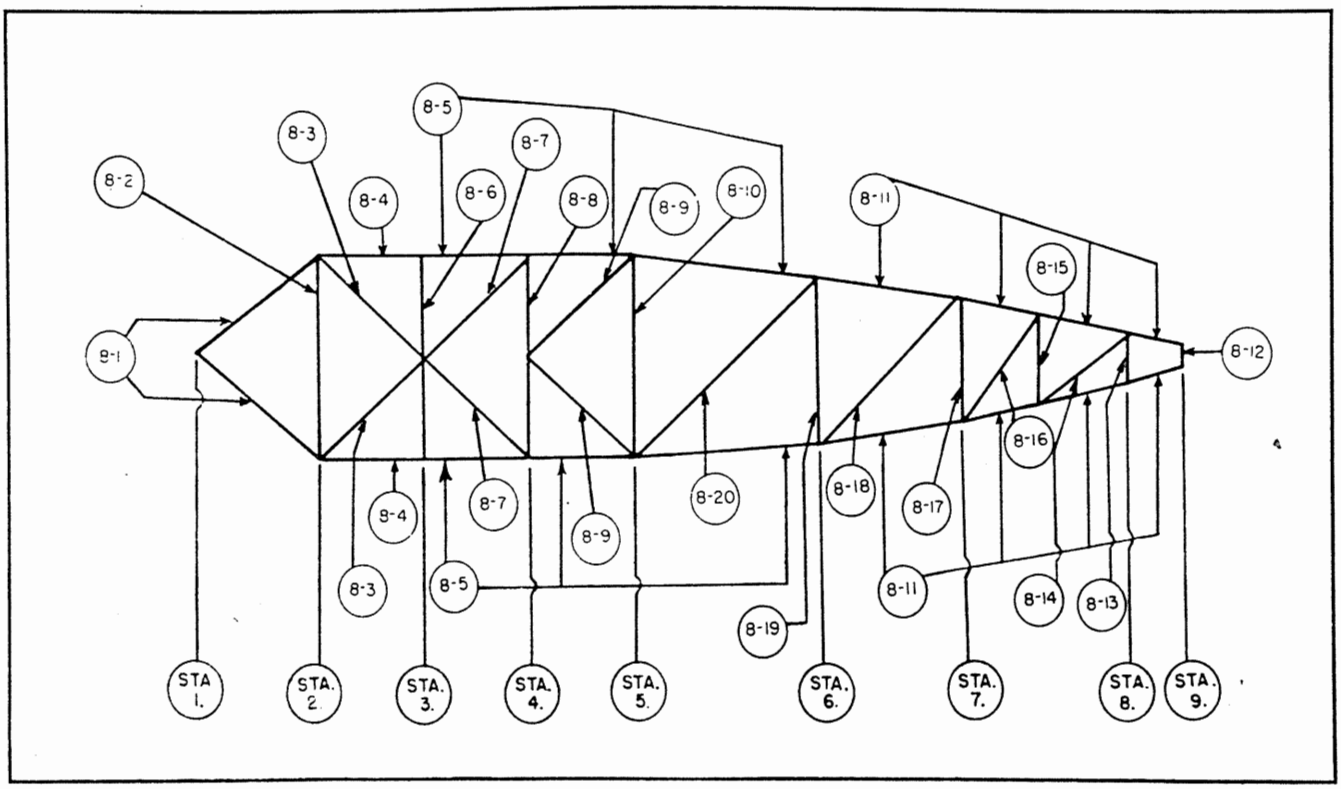


Figure 3-16—Fuselage Structure—Top

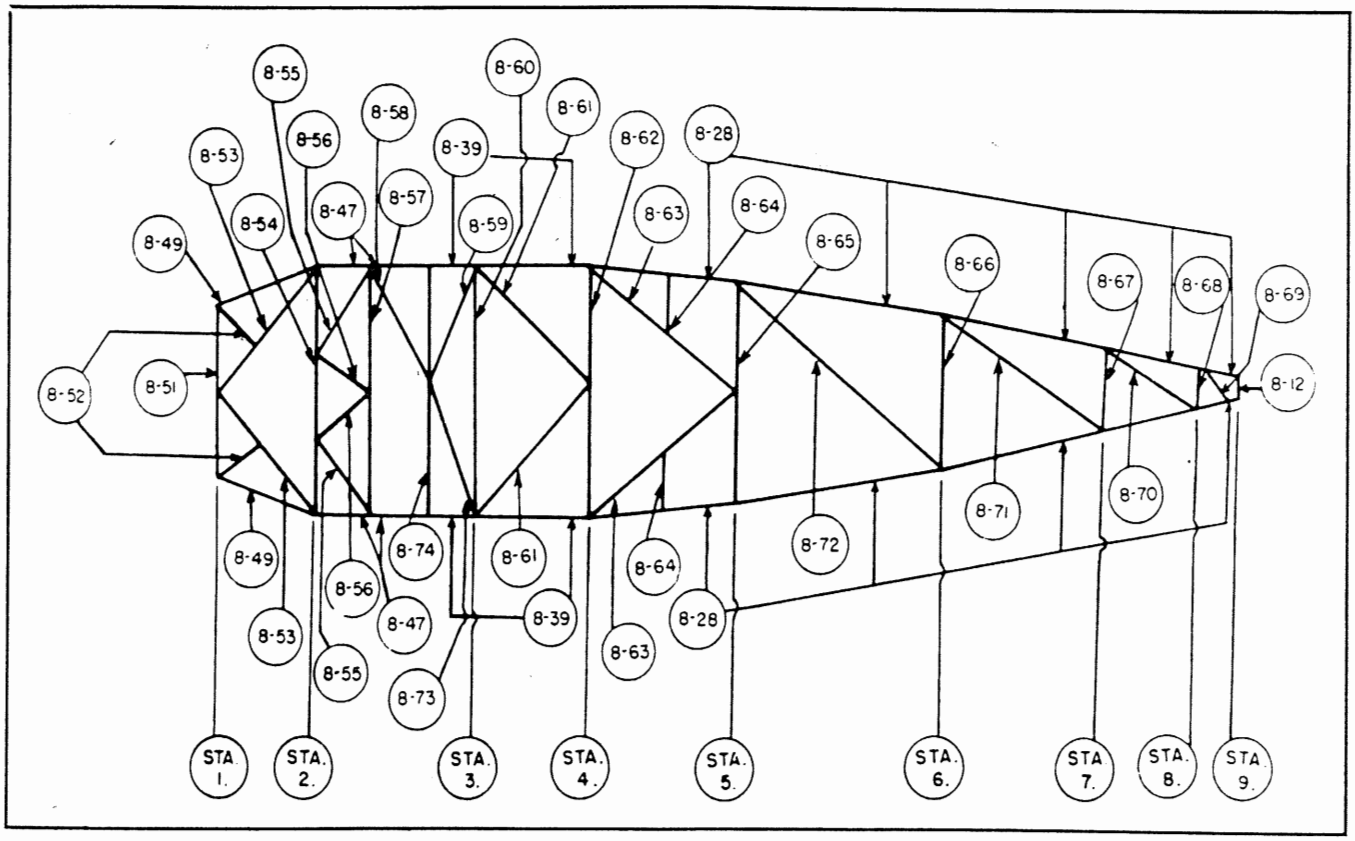


Figure 3-17—Fuselage Structure—Bottom

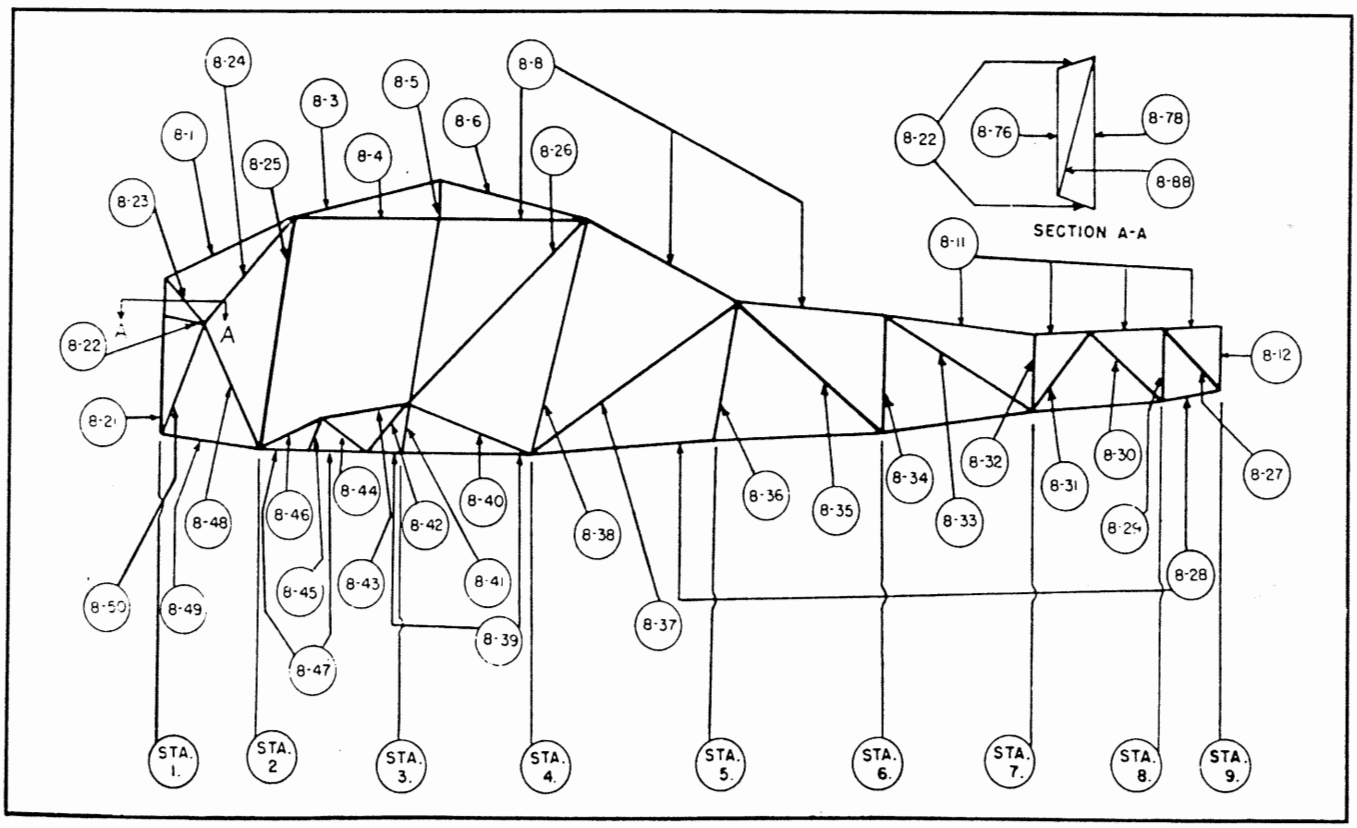


Figure 3-18—Fuselage Structure—Side

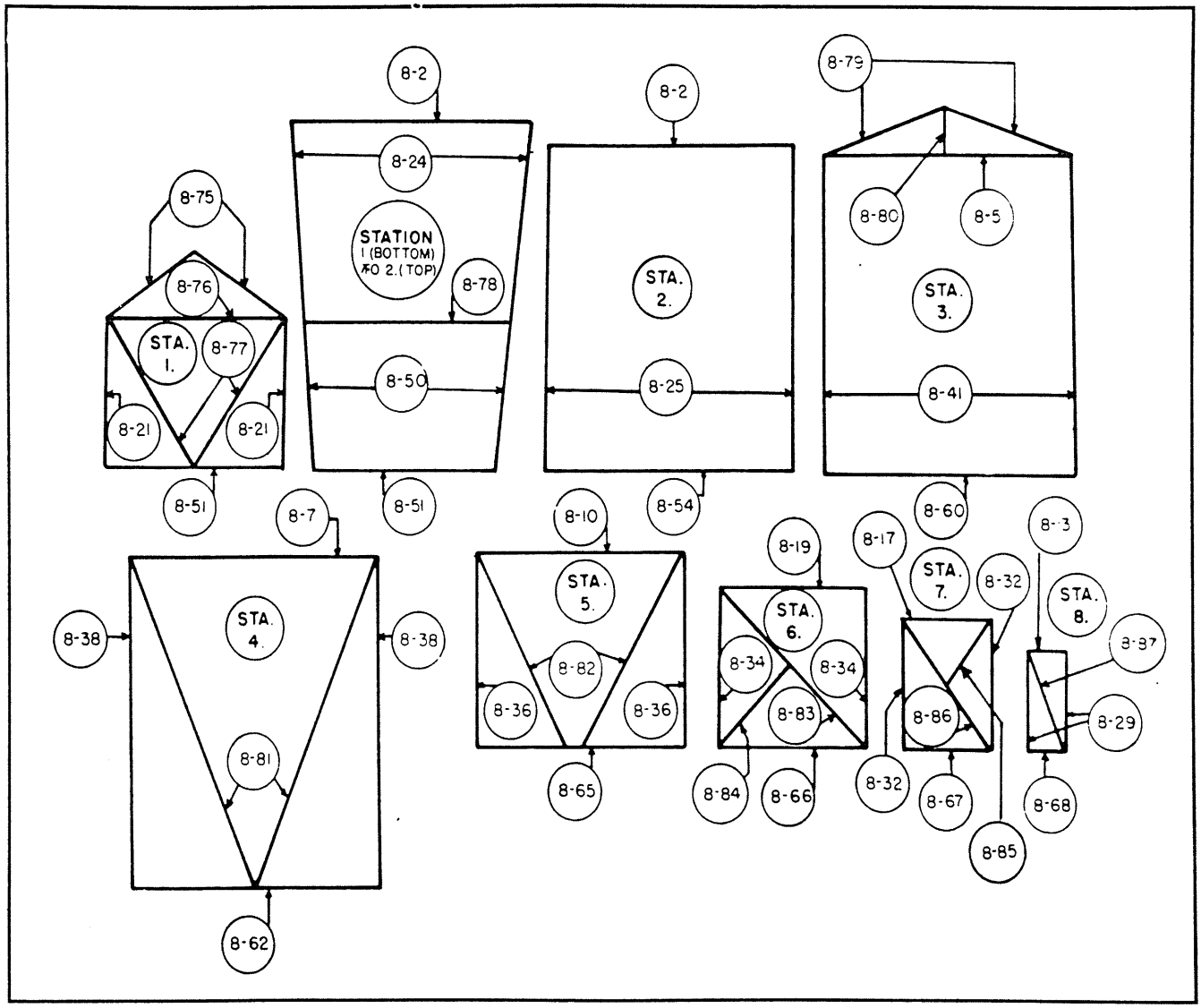


Figure 3-19—Fuselage Structure—Rear

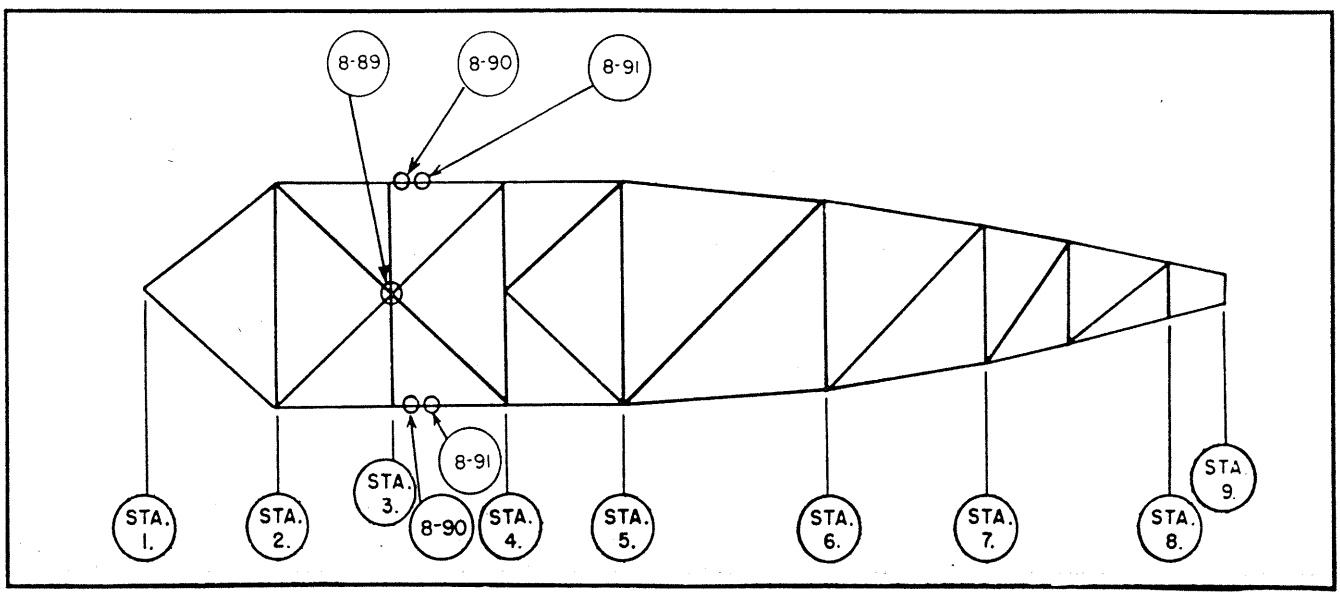


Figure 3-20—Fuselage Structure—Top

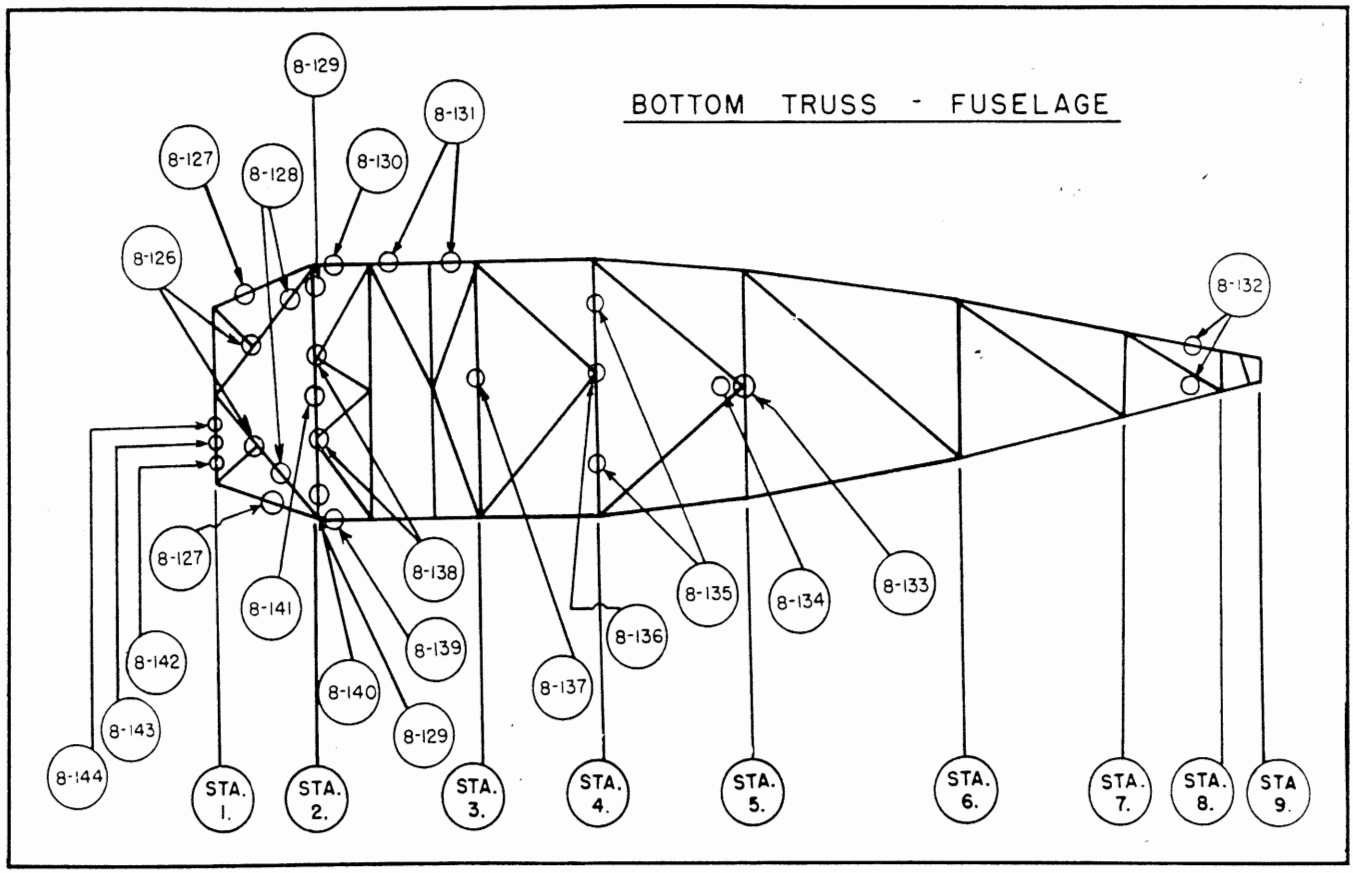


Figure 3-21—Fuselage Structure—Bottom

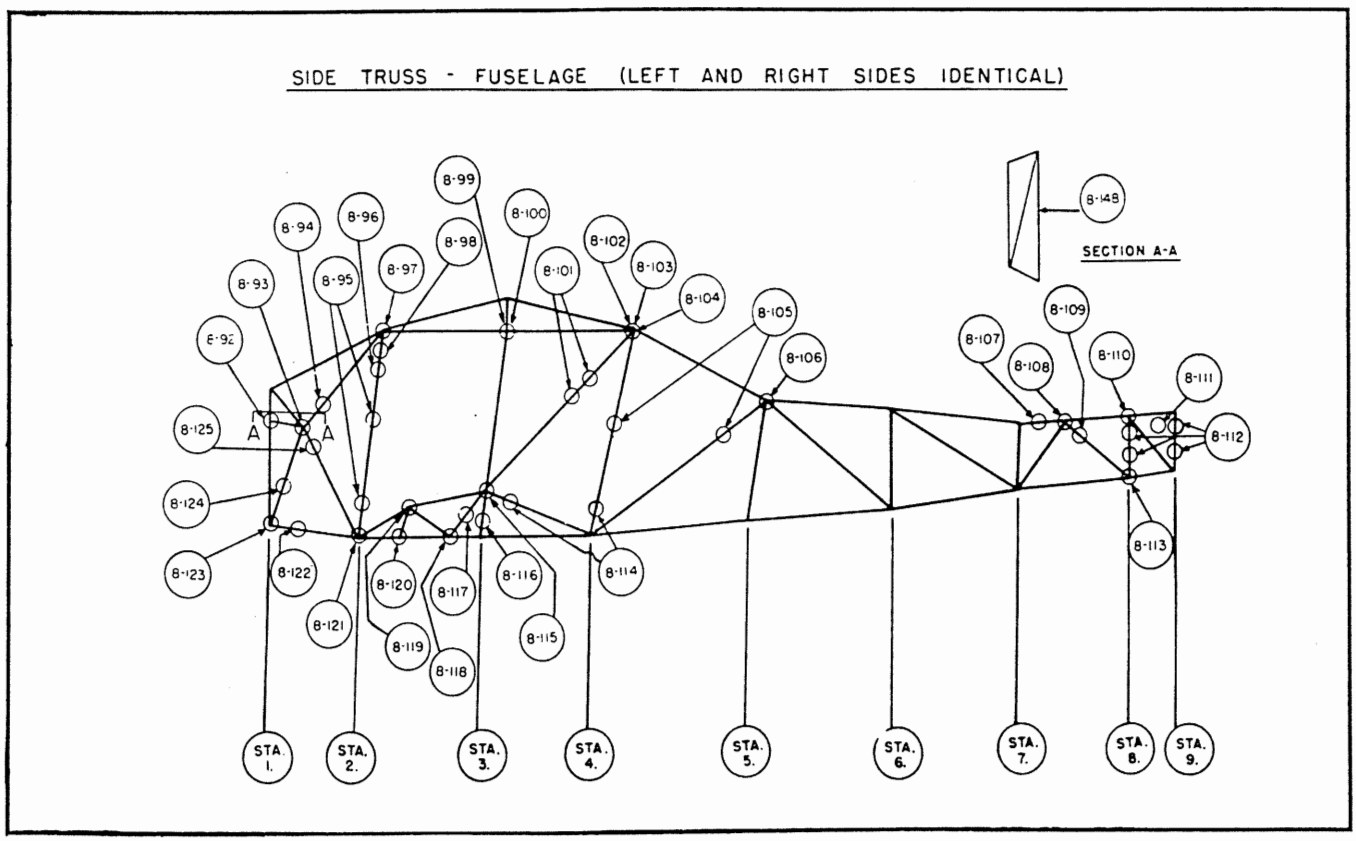


Figure 3-22—Fuselage Structure—Side

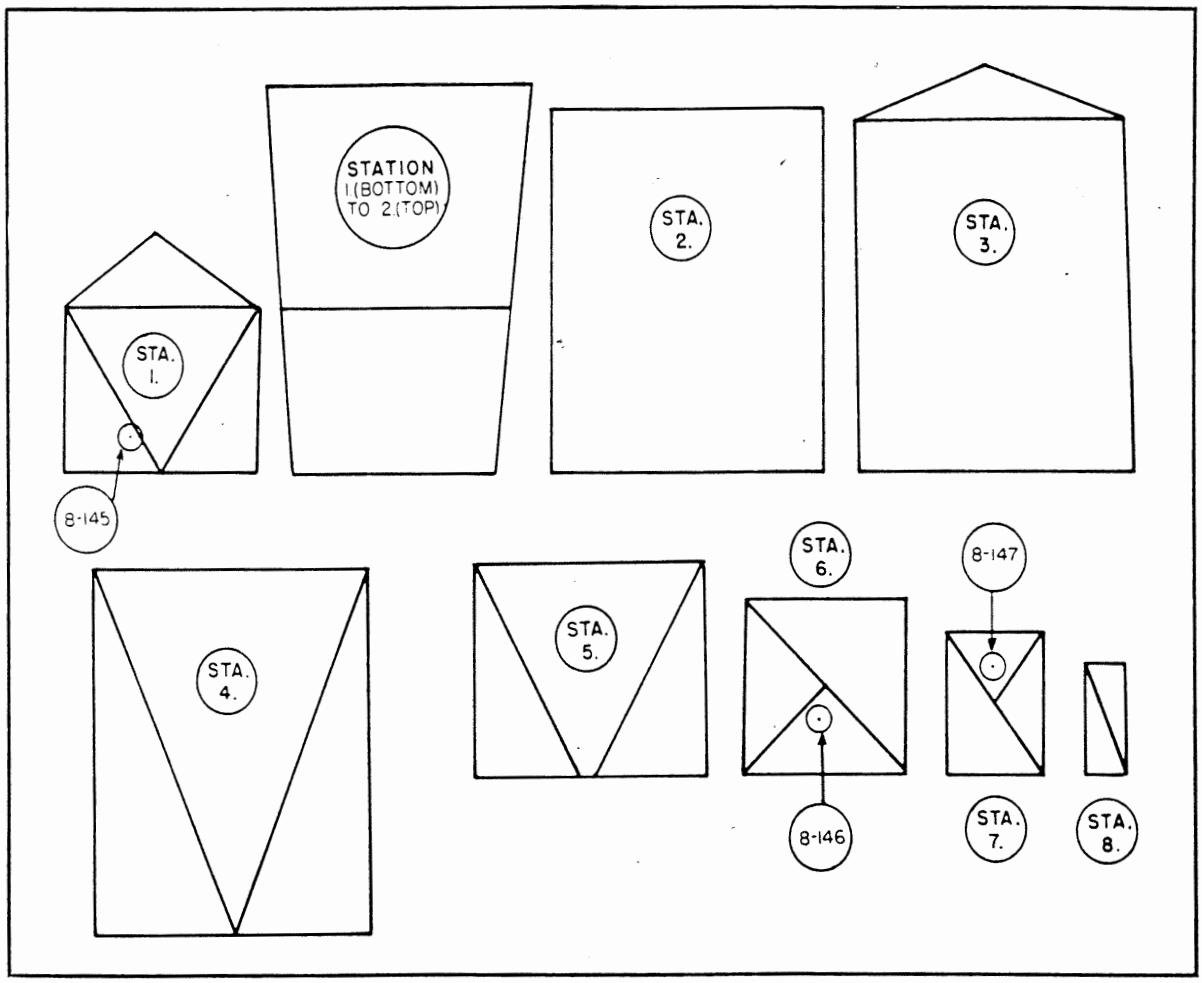


Figure 3-23—Fuselage Structure—Rear

TABLE OF REPAIR AND REPLACEMENT MATERIALS

FUSELAGE STRUCTURE

FIGURES 3-16, 3-17, 3-18, 3-19, 3-20, 3-21, 3-22, AND 3-23

Index No.	Part No.	Description
8-1	*40461-11 (2)**	Tube (round): ¾ x .035, *X-4130 steel.*
8-2	*4045-8*	Tube (round): 1¾ x .109, *X-4130 steel.*
8-3	*40461-21 (2)*	Tube (round): ⅞ x .035, *X-4130 steel.*
8-4	*40461-93*	Tube (square): ¾ x .049, *X-4130 steel.*
8-5	*40461-90 (2)*	Tube (square): ¾ x .035, *X-4130 steel.*
8-6	*4046-6*	Tube (round): 1¼ x .049, *X-4130 steel.*
8-7	*40461-39 (2)*	Tube (round): ¾ x .035, *X-4130 steel.*
8-8	*40461-43*	Tube (round): ⅝ x .035, *X-4130 steel.*
8-9	*40461-47 (2)*	Tube (round): ¾ x .049, *X-4130 steel.*
8-10	*40461-50*	Tube (round): ½ x .035, *X-4130 steel.*
8-11	*40461-81 (2)*	Tube (square): ¾ x .035 *(sta. 4 to 6) and* ⅝ x .035 *X-4130 steel. (sta. 6 to 9)*
8-12	*40292*	Tailpost: Channel—*.049, X-4130 steel sheet.* Lugs and Gussets—*.065, X-4130 steel sheet.*

**(2) indicates two such members are used in fuselage structure.*

TABLE FOR FIGURES 3-16, 3-17, 3-18, 3-19, 3-20, 3-21, 3-22, 3-23—Continued

Index No.	Part No.	Description
8-13	*40461-72*	Tube (round): ½ x .035, X-4130 steel.
8-14	*40461-88*	Tube (round): ⅝ x .035, X-4130 steel.
8-15	*40461-87*	Tube (round): ⅝ x .035, X-4130 steel.
8-16	*40461-86*	Tube (round): ⅝ x .035, X-4130 steel.
8-17	*40461-65*	Tube (round): ⅝ x .035, X-4130 steel.
8-18	*40461-62*	Tube (round): ⅝ x .035, X-4130 steel.
8-19	*40461-57*	Tube (round): ½ x .035, X-4130 steel.
8-20	*40461-54*	Tube (round): ⅝ x .035, X-4130 steel.
8-21	*40461-1 (2)*	Tube (round): ¾ x .035, X-4130 steel.
8-22	*40461-5 (2)*	Tube (round): ¾ x .049, X-4130 steel.
8-23	*40461-99 (2)*	Tube (round): ⅝ x .035, X-4130 steel.
8-24	*40461-23 (2)*	Tube (round): ⅞ x .049, X-4130 steel.
8-25	*40461-18 (2)*	Tube (square): 1 x .035, X-4130 steel.
8-26	*40461-40 (2)*	Tube (round): 1¼ x .049, X-4130 steel.
8-27	*40461-78 (2)*	Tube (round): ½ x .035, X-4130 steel.
8-28	*40461-82 (2)*	Tube (square): ⅝ x .035, X-4130 steel.
8-29	*40461-74 (2)*	Tube (round): ½ x .035, X-4130 steel.
8-30	*40461-71 (2)*	Tube (round): ⅝ x .035, X-4130 steel.
8-31	*40461-70 (2)*	Tube (round): ⅝ x .035, X-4130 steel.
8-32	*40461-67 (2)*	Tube (round): ½ x .035, X-4130 steel.
8-33	*40461-63 (2)*	Tube (round): ⅝ x .035, X-4130 steel.
8-34	*40461-59 (2)*	Tube (round): ⅝ x .035, X-4130 steel.
8-35	*40461-55 (2)*	Tube (round): ⅝ x .035, X-4130 steel.
8-36	*40461-51 (2)*	Tube (round): ⅝ x .035, X-4130 steel.
8-37	*40461-48 (2)*	Tube (round): ⅞ x .035, X-4130 steel.
8-38	*40461-44 (2)*	Tube (round): ¾ x .035, X-4130 steel.
8-39	*40461-83 (2)*	Tube (square): ¾ x .065, X-4130 steel.
8-40	*40461-30 (2)*	Tube (round): 1¼ x .049, X-4130 steel.
8-41	*40461-29 (2)*	Tube (square): ¾ x .035, X-4130 steel.
8-42	*40461-33 (2)*	Tube (round): ⅝ x .035, X-4130 steel.
8-43	*40461-22 (2)*	Tube (round): 1½ x .083, X-4130 steel.
8-44	*40461-32 (2)*	Tube (round): ⅝ x .049, X-4130 steel.
8-45	*40461-24 (2)*	Tube (square): ¾ x .049, X-4130 steel.
8-46	*40461-98 (2)*	Tube (round): 1½ x .083, X-4130 steel.
8-47	*40461-89 (2)*	Tube (square): ⅞ x .083, X-4130 steel.
8-48	*40461-4 (2)*	Tube (round): ¾ x .035, X-4130 steel.
8-49	*40461-3 (2)*	Tube (square): ¾ x .049, X-4130 steel.
8-50	*40461-2 (2)*	Tube (round): ⅞ x .049, X-4130 steel.
8-51	*40461-7*	Tube (square): ⅝ x .035, X-4130 steel.
8-52	*40461-85 (2)*	Tube (round): ⅝ x .035, X-4130 steel.
8-53	*40461-6 (2)*	Tube (round): ¾ x .035, X-4130 steel.
8-54	*40461-17*	Tube (square): 1 x .058, X-4130 steel.
8-55	*40461-34 (2)*	Tube (round): ½ x .035, X-4130 steel.
8-56	*40461-20 (2)*	Tube (round): ½ x .035, X-4130 steel.
8-57	*40461-19*	Tube (square): ¾ x .049, X-4130 steel.
8-58	*40461-35*	Tube (round): ¾ x .035, X-4130 steel.
8-59	*40461-36*	Tube (round): ½ x .035, X-4130 steel.
8-60	*40461-38*	Tube (round): ¾ x .035, X-4130 steel.
8-61	*40461-41 (2)*	Tube (round): ¾ x .035, X-4130 steel.
8-62	*40461-45*	Tube (round): ⅞ x .035, X-4130 steel.
8-63	*40461-49 (2)*	Tube (round): ⅝ x .035, X-4130 steel.
8-64	*40461-95 (2)*	Tube (round): ⅝ x .035, X-4130 steel.
8-65	*40461-52*	Tube (round): ⅝ x .035, X-4130 steel.
8-66	*40461-58*	Tube (round): ½ x .035, X-4130 steel.

TABLE FOR FIGURES 3-16, 3-17, 3-18, 3-19, 3-20, 3-21, 3-22, 3-23—Continued

Index No.	Part No.	Description
8–67	*40461–66*	Tube (round): ½ x .035, *X-4130 steel.*
8–68	*40461–73*	Tube (round): ¾ x .049, *X-4130 steel.*
8–69	*40461–76*	Tube (round): ½ x .035, *X-4130 steel.*
8–70	*40461–69*	Tube (round): ½ x .035, *X-4130 steel.*
8–71	*40461–64*	Tube (round): ½ x .035, *X-4130 steel.*
8–72	*40461–56*	Tube (round): ⅝ x .035, *X-4130 steel.*
8–73	*40461–94*	Tube (round): ¾ x .035, *X-4130 steel.*
8–74	*40276*	Seat Support Truss: Round Tube—¾ x .049, ½ x .035, and ⅜ x .035, *X-4130 steel.* Streamline Tube—1¾ x .049, *X-4130 steel.* Support Fittings—.095, *X-4130 steel sheet.* Bracket—.049, *X-4130 steel sheet.*
8–75	*40461–16 (2)*	Tube (round): ⅝ x .035, *X-4130 steel.*
8–76	*40461–14*	Tube (round): ⅝ x .035, *X-4130 steel.*
8–77	*40461–15 (2)*	Tube (round): ¾ x .035, *X-4130 steel.*
8–78	*40461–12*	Tube (round): ⅝ x .035, *X-4130 steel.*
8–79	*40461–79 (2)*	Tube (round): ⅝ x .035, *X-4130 steel.*
8–80	*40461–28*	Tube (square): ¾ x .035, *X-4130 steel.*
8–81	*40461–46 (2)*	Tube (round): ⅞ x .049, *X-4130 steel.*
8–82	*40461–53 (2)*	Tube (round): ½ x .035, *X-4130 steel.*
8–83	*40461–60*	Tube (round): ½ x .035, *X-4130 steel.*
8–84	*40461–61*	Tube (round): ½ x .035, *X-4130 steel.*
8–85	*40461–84*	Tube (round): ½ x .035, *X-4130 steel.*
8–86	*40461–68*	Tube (round): ½ x .035, *X-4130 steel.*
8–87	*40461–75*	Tube (round): ½ x .049, *X-4130 steel.*
8–88	*40461–13*	Tube (round): ⅝ x .035, *X-4130 steel.*
8–89	*40342*	Fairing Clip: .049, *X-4130 steel sheet.*
8–90	*40243 L/R*	Flap Control Support: Tubes—½ x .134, ½ x .035 and ½ x .188, *X-4130 steel.* Guide—.035, *X-4130 steel sheet.* Pulley Support Plate—.065, *X-4130 steel sheet.*
8–91	*40309 L/R*	Terminal Block Lug: .049, *X-4130 steel sheet.*
8–92	*40258 L/R*	Top Motor Mount Fitting: .065, *X-4130 steel sheet.*
8–93	*40179 (2)*	Gusset: .049, *X-4130 steel sheet.*
8–94	*40178 (2)*	Window Sill Clip: .049, *X-4130 steel sheet.*
8–95	*40277 L/R*	Cabin Door Hinge: Square Tube—1 x .035, *X-4130 steel.* Plates—.049, *X-4130 steel sheet.* Wraps—.049, *X-4130 steel sheet.* Door Sill Bracket—.049, *X-4130 steel sheet.* Window Sill Bracket—.049, *X-4130 steel sheet.* Clips—.049, *X-4130 steel sheet.* Discs—*FS2700-65-4 (Fairchild).*
8–96	*40300 L/R*	Door Frame Support Clip: .035, *X-4130 steel sheet.*
8–97	*4045 L/R*	Wing Fitting: Sleeve—1½ x .065, *X-4130 steel tube.* Gussets—.065, *X-4130 steel sheet.* Bushing—⅝ x .065, *X-4130 steel tube.* Rivets—⅜ dia., *X-4130 steel rod.* Clip—.035, *X-4130 steel sheet.* Cross Tube—1¾ x .109, *X-4130 steel tube.*
8–98	*40252 L/R*	Assist Strap Bracket: .049, *X-4130 steel sheet; AN345-10 nuts.*

TABLE FOR FIGURES 3-16, 3-17, 3-18, 3-19, 3-20, 3-21, 3-22, 3-23—Continued

Index No.	Part No.	Description
8-99	*4046 L/R*	Wing Fitting: Sleeve—1⅛ *x .049, X-4130 steel tube.* Bushing—7/16 *x .065, X-4130 steel tube.* Rivets—5/16 *dia., X-4130 steel bar.* Gussets—*.049, X-4130 steel sheet.* Plate—*.049, X-4130 steel sheet.* Cross Tube—1¼ *x .049, X-4130 steel.*
8-100	*40251 L/R*	Aileron Bellcrank Mount: ⅝ *x .035, X-4130 square steel tube* ⅜ *x .065, X-4130 round steel tube .049, X-4130 steel sheet.*
8-101	*40269 L/R*	Rear Window Frame Clips: *.049, X-4130 steel sheet.*
8-102	*40242 L/R*	Flap Pulley Support: *.049, X-4130 steel sheet.*
8-103	*40298*	Dome Light Clip: *.035, X-4130 steel sheet.*
8-104	*40299 L/R*	Gusset: *.065, X-4130 steel sheet.*
8-105	*40279*	Baggage Compartment Clips: *.049, X-4130 steel sheet.*
8-106	*4091 (2)*	Gusset: *.065, X-4130 steel sheet.*
8-107	*40226 L/R*	Fairing Clips—*Sta. 7 to 9: .049, X-4130 steel sheet.*
8-108	*40248 L/R*	Front Stabilizer Attachment Fitting: *.035, X-4130 steel sheet;* ⅜ *x .065, X-4130 steel tube.*
8-109	*40316 L/R*	Rudder Cable Fairlead: Sleeve—½ *x .035, X-4130 steel tube.* Fairlead—*No. 5 Formica*—Locking Wire—*.051 copper.*
8-110	*40144*	Rear Stabilizer Attachment Fitting: *.035, X-4130 steel sheet* ⅜ *x .065, X-4130 steel tube.*
8-111	*40287 L/R*	Tailwheel Fitting: ⅝ *x .035, X-4130 square steel tube* ½ *x .134, X-4130 round steel tube.*
8-112	*40321*	Inspection Panel Clips: *.049, X-4130 steel sheet.*
8-113	*40173 L/R*	Tailwheel Fitting: Plate—*.083, X-4130 steel sheet.* Stop *(LH only)*—⅛, *X-4130 steel sheet.* Disc—*FS2700-65-6 (Fairchild).*
8-114	*40275*	Rear Seat Supports: *.049, X-4130 steel sheet.*
8-115	*40255 L/R*	Gusset: *.065, X-4130 steel sheet.*
8-116	*40161 L/R*	Aileron Pulley Bracket: ½ *x .134, X-4130 steel tube; .065, X-4130 steel sheet.*
8-117	*40257 L/R*	Belt Strap: *.049, X-4130 steel sheet;* ⅜ *x .065, X-4130 steel tube; AN315-4R nut.*
8-118	*40253 L/R*	Aileron Pulley Bracket: *.049, X-4130 steel sheet.*
8-119	*40254 L/R*	Gusset: *.065, X-4130 steel sheet.*
	40250	Seat Support Truss: Tubes—¾ *x .035,* ⅜ *x .035 and* ¼ *x .065, X-4130 steel.* Plates—*.049, X-4130 steel sheet.* Link—*.095, X-4130 steel sheet.* Fitting—⅜ *x .065, X-4130 steel tube; .095, X-4130 steel sheet.*
8-120	*40249 L/R*	Landing Gear Fitting: Discs—*.125, X-4130 steel sheet.* Tube Bushing—⅝ *x .065, X-4130 steel tube.* Plate—*.065, X-4130 steel sheet.* Side Plate—*.095, X-4130 steel sheet.* Bushing—*S-112-7 (Fairchild).* Clamp—*561D6 (Curtiss).*
8-121	*40462*	Landing Gear Fitting: Side Plates—*.095, X-4130 steel sheet.* "U" Plate *.083, X-4130 steel sheet.* Bushings—⅝ *x .065, X-4130 steel tube: S-112-7 (Fairchild).* Alemite Fitting *No. 1633.* Clamp—*561D6 (Curtiss).*

TABLE FOR FIGURES 3-16, 3-17, 3-18, 3-19, 3-20, 3-21, 3-22, 3-23—Continued

Index No.	Part No.	Description
8–122	*40313*	Brake Idler Bracket: *.049 and .083, X-4130 steel sheet; ½ x .134, X-4130 steel tube.*
8–123	*40259 L/R*	Motor Mount Attachment Fitting: *.065, X-4130 steel sheet.*
8–124	*40237*	Rudder Pedal Stop: *⅜ x .065, X-4130 steel sheet.*
8–125	*40175 L/R*	Panel Clip: *.049, X-4130 steel sheet.*
8–126	*40156 (2)*	Rudder Pedal Plate: *.065, X-4130 steel sheet.*
8–127	*40213*	Rudder Control Bracket: *.065, X-4130 steel sheet.*
8–128	*4058 (2)*	Floor Clip: *.065, X-4130 steel sheet.*
8–129	*40161 L/R*	Aileron Pulley Bracket: *½ x .134, X-4130 steel tube .049, X-4130 steel sheet.*
8–130	*40221*	Rudder Cable Bracket: *.049 and .065, X-4130 steel sheet; ⅜ x .065, X-4130 steel tube.*
8–131	*40310*	Floor Attachment Lugs: *.049, X-4130 steel sheet.*
8–132	*40311*	Fairing Attachment Clips: *.049 and .065, X-4130 steel sheet.*
8–133	*40229*	Idler Lug: *.095, X-4130 steel sheet.*
8-134	*40306*	Rudder Idler Bracket: *.049, X-4130 steel sheet.*
8–135	*40262 L/R*	Rudder Pulley Bracket: *.049, X-4130 steel sheet.*
8–136	*40241*	Flap Control Support: *.049, X-4130 steel sheet.*
	40256	Elevator Tube Guide: *.028, X-4130 steel sheet; ⅝ x .035, X-4130 square steel tube.*
8–137	*40217*	Elevator Tube Guide: *.028, X-4130 steel sheet.*
	40227	Floor Board Clip: *.049, X-4130 steel sheet.*
8–138	*40155*	Stick Control Lugs: *.065, X-4130 steel sheet.*
8–139	*40220*	Rudder Cable Bracket: *.049 and .065, X-4130 steel sheet; ⅜ x .065, X-4130 steel tube.*
8–140	*40267*	Brake Pulley Mount: *⅜ x .065, X-4130 steel tube.*
8–141	*40228*	Flap Lever Bracket: Channel—*.049, X-4130 steel sheet.* Tubes—*½ x .049 and .134, X-4130 steel.* Bracket—*.035, X-4130 steel sheet.* Lug—*.049, X-4130 steel sheet.* Bushing—*½ x .134, X-4130 steel tube.* Sheet—*.065, X-4130 steel.* Washer—*FS2700-49-A (Fairchild).*
8–142	*40307*	Brake Cylinder Support Bracket: *⅜ x .035 and .065, X-4130 round steel tube; ⅝ and ¾ x .035, X-4130 square steel tube: .049 and .065, X-4130 steel sheet.*
8–143	*40209*	Pulley Housing: *.049, X-4130 steel sheet.*
8–144	*40308*	Brake Idler Bracket: *.049, X-4130 steel sheet.*
8–145	*40239*	Rudder Pedal Stop: *½ x .035, X-4130 steel tube; AN315-4R nut.*
8–146	*40164*	Elevator Tube Guide: *.028, X-4130 steel sheet.*
8–147	*40165*	Elevator Tube Guide: *.028, X-4130 steel sheet.*
8–148	*40176*	Throttle Bracket: *.049, X-4130 steel sheet; .035 x ⅜, X-4130 steel tube.*

FUSELAGE FAIRING

The fuselage fairing installation is principally top, side and bottom bulkheads to which fairing strips are glued and nailed. Bulkheads are made of 1/8" 3-ply mahogany plywood reinforced by curved strips of spruce. Top and bottom bulkheads are built with 1/4" square spruce cross strips which are secured to the fuselage tubing with 3/4" friction tape or wrap-lock. All fairing strips except for balsa strips on bottom longerons are of spruce.

REPAIR OF FAIRING BULKHEAD. If excessive damage occurs to the bulkhead and stringer assembly at the top and bottom fairings the bulkhead should be replaced by a complete new bulkhead assembly. This may be done by removing the bulkhead which is accomplished by cutting the shellac wrapper tied to the bulkhead of the cross tube, breaking open or cutting the glue joint where the bulkhead is attached to the stringer, removing the nails attaching the stringer to the bulkhead, and removing the damaged bulkhead between the stringers from the assembly. When installing a new bulkhead, care should be taken to see that the stringers are aligned properly so that no disfiguring lines will appear in the finished contour of the fabric. To do this it may be necessary to enlarge the slots through which the stringers fit into the bulkhead. The bulkhead should then be re-inserted and fitted into position and the stringers attached to the bulkhead by small nails and glue. The bulkhead is then tied to the longeron cross members and the assembly is ready for recovering. The fairing should be done in accordance with wood splicing procedures in CAA Bulletin No. 18. If considerable damage occurs replace the strip. When ordering stringers it is suggested that you order under Part No. 41554-1. Only stringers of one length will be procurable which will facilitate repair and will assure the customer of having the proper length stringer for his replacement or repair.

There are two balsa fairing strips attached to the bottom longerons on the outside to form the contour at the bottom of the fuselage. The fairing strips run from Station 2-1/2 to Station 9. If damage occurs to these strips they may be replaced with new stringers under Part No. 41554-1. However, if a small amount of damage occurs it is possible to cut out the damaged section and insert a new section. Make certain that the ends are properly wrapped and that the contours are neat at the joint to avoid disfiguring marks in the fabric.

If major damage occurs to either the top or bottom deck it will probably be necessary to obtain a complete new deck assembly Part No. 40350-40 top and Part No. 40350-30 bottom, which may be installed upon the aircraft.

In addition to the members already mentioned, other fairing strips used in the "24" fuselage are a composite structure of plywood and spruce or in many instances of spruce strips only.

If damage occurs to these members it is advisable that they be replaced. However, some of the larger members may be repaired. In each case the repaired member should be set up to give the same contour as the original part. This will assure proper fairing and a neat appearing airplane.

WINDSHIELD

The windshield on the "24" is composed of three sections, the center section being of duplate safety glass carried under Part No. 41586. The left- and right-side panels are preformed .100" plexiglas carrying Part No. 41587. The entire unit is held in place by an aluminum alloy frame and retainer strips which have been suitably prepared with dum-dum to prevent leakage through the windshield.

The entire unit including the frame, center, left and right panels may be purchased as a unit under Part No. 41915.

The duplate and plexiglas panels cannot be repaired if major damage occurs. However, small cracks or scratches to the plexiglas may be repaired in accordance with CAA procedures or in the case of the latter, scratches may be polished out with a very fine grain pumice.

MAIN LANDING GEAR

The landing gear on the "24" *(See figure 3-24.)* incorporates shock absorption in both the main gears which is taken during landing by hydraulic fluid, while taxiing loads are absorbed by springs contained in the shock struts.

The main unit of the landing gear is composed of a streamlined 4130 steel tube welded into an assembly containing the brake flange to which the brake assembly is bolted. THIS STREAMLINED STRUT IS HEAT-TREATED TO 180,000 POUNDS PER SQUARE INCH. Fairchild does not recommend repair to this unit. If repairs are attempted CAA Bulletin 18 should be followed and your local inspector contacted prior to beginning repairs. The oleo strut parts are not heat-treated *with the exception of the spring.* No repairs to the spring should be attempted. Minor repairs such as dents and cracks may be made on the other members of the oleo strut. However, removal of dents from the cylinder or the piston is extremely critical and unless adequate facilities are available no repairs should be attempted on these members. The universals are forgings and damaged members should be replaced. The oleo struts are packed with Part No. 43260 oleo packing and should be replaced as no repairs are possible. The packing nut,

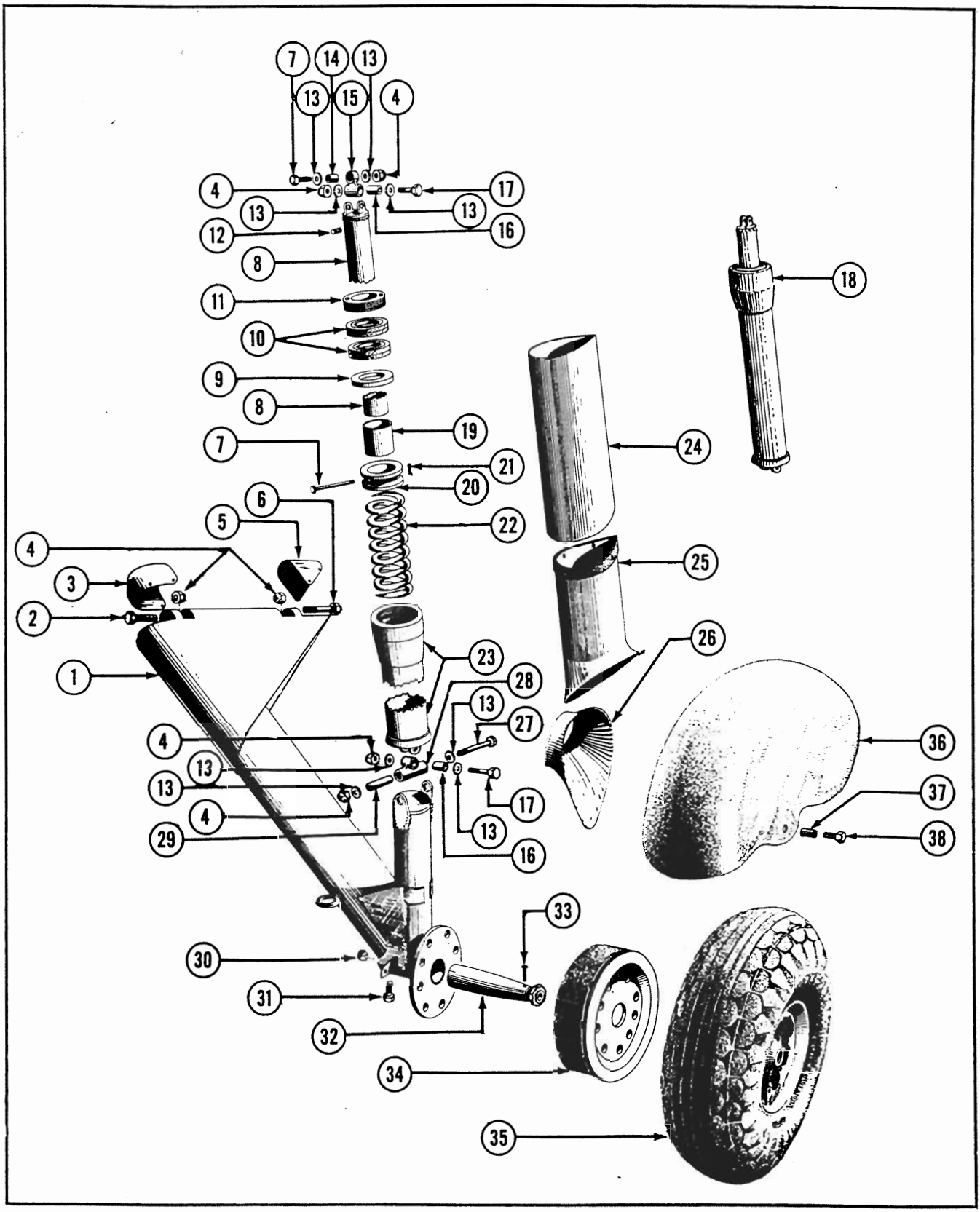


Figure 3-24—Main Landing Gear

Part No. 43244, is an aluminum alloy nut and it is recommended that it be replaced if any damage or wear to the threads occurs. The hydraulic strut should be filled with hydraulic fluid AAF Specification 3586C which is the same fluid as that used in the brake system. (Lockheed No. 5, Lockheed No. 12, Delco No. 7)

Fairchild spanner wrench No. 3350 should be used when removing the packing gland to prevent damage to the holes of the gland nut. The wheel bearings should be packed with water repellent grease AN-6-5 (Essoleum "C"). Excess grease should be wiped off and precaution taken to keep grease from the brake linings as this ruins the effectiveness of the brakes.

The hydraulic struts are filled through a plug opening at the top of the piston tube and are filled until they reach a point at the fluid level screw on the side of the oleo cylinder that the fluids flows through the hole. At that time the screw should be inserted and the plug at the top should be reinstalled. When assembling the strut the packing rings should be lightly coated with graphite grease so as to permit free operation of the piston tube through the packing without leakage. The packing nut should be drawn up so that the piston will extend to full length under not more than a 23-pound pull.

The gland nut should always be safetied to prevent possibility of coming loose and allowing the landing gear to hang free.

Legend for Figure 3-24—Main Landing Gear

Index No.	Part No.	Nomenclature.
1	*43300-1*	*Strut.*
2	*AN 6-25*	*Bolt.*
3	*43180*	*End Fairing—Front.*
4	*AN 310-6*	*Nut.*
5	*43181*	*End Fairing—Rear.*
6	*AN 6-26*	*Bolt.*
7	*AN 394-47*	*Pin.*
8	*43247*	*Piston Assembly.*
9	*43239*	*Washer.*
10	*43260*	*Linear Packing.*
11	*43240*	*Gland.*
12	*117B*	*Slot Head Brass Plug (Imperial).*
13	*AN 960-616*	*Washer.*
14	*43274-1*	*Bushing.*
15	*3330*	*Universal.*
16	*43274-2*	*Bushing.*
17	*AN 6-15*	*Bolt.*
18	*43245*	*Oleo Strut Assembly.*
19	*43247-4*	*Spacer.*
20	*43238*	*Plunger.*
21	*AN380-2B-2*	*Cotter.*
22	*43256*	*Spring.*
23	*43243*	*Cylinder Assembly.*
24	*43251*	*Fairing.*
25	*43252*	*Fairing.*
26	*43178*	*Cuff—Wheel Pants.*
27	*AN 6-22*	*Bolt.*
28	*3328*	*Universal.*
29	*43276*	*Bushing.*
30	*AN 310-4*	*Nut.*
31	*AN 4-6*	*Bolt.*
32	*43128*	*Axle.*
33	*AN435-4-24*	*Pin.*
34	*G-2-122*	*Brake Assembly (Hayes).*
35	*G-3-145M*	*Wheel—with 6 ply, 6.50 x 10 Goodrich Tire and 6.50 x 10 Tube.*
36	*43177*	*Wheel Pants.*
37	*43128-1*	*Axle Fitting (for wheel pants).*
38	*AN 4-11*	*Bolt.*

TAIL WHEEL

The tail wheel *(See figure 3-25.)* is of the spring-oil type with the two main tubes of 4130 steel tubing. BOTH TUBES ARE HEAT-TREATED TO 180,000 POUNDS PER SQUARE INCH. The tail wheel is of welded construction and it is recommended in most instances that repairs not be attempted. If damage occurs to any of the parts, replace with new factory manufactured items. If the tail wheel appears to be leaking it is a good indication that the leather washer around the steel tube above the aluminum alloy plug, as shown in figure 3-25, is worn. This should be replaced by Part No. 43214. Loose splines or worn splines may be replaced by drilling out the rivets and replacing with new spline Part No. 43212-2 and steel rivets. The following procedure is recommended in removing and disassembling the tail wheel:

a. Disconnect steering cable from the horn.

b. Remove upper strut attachment bolt.

c. Remove bolt attaching tail wheel link at fuselage.

d. Pull tail wheel assembly through bottom of fuselage.

With the tail wheel removed as outlined in the preceding paragraph it may be disassembled as follows:

a. Remove locking pin housing.

b. Remove the bronze bearing cap.

c. Remove fork and trunnion assembly.

d. Remove four countersunk screws holding piston ram tube assembly which may then be pulled out of piston.

Note

The piston tube and fork being a press fit cannot be separated unless an arbor press is available for forcing tube and fork apart.

To reassemble, reverse the procedure as outlined for disassembly.

The oleo strut is filled through a plug *(See figure 3-25)* in the top of the cam and is checked by a level screw *(See figure 3-25)* in the side of the cylinder to which level the strut should be filled. The same fluid is used in the hydraulic brakes and the main gears as is used in the tail wheel. With the tail wheel completely assembled it should be checked for a maximum correct travel of 3-5/8".

The tail wheel boot should be kept installed at all times so that dust and dirt are kept from the tail wheel. This will give added life to this unit.

Legend for Figure 3-25—Tail Wheel

Index No.	Part No.	Description
1	*AN4–25*	*Bolt.*
	AN310–4	*Nut.*
	AN960–416	*Washer.*
2	*4389*	*Alemile Screw.*
3	*AN3–20*	*Bolt.*
	AN310–3	*Nut.*
4	*4388–3*	*Trunnion.*
5	*43208*	*Piston Tube.*
6	*4390*	*Link.*
7	*43257–2*	*Flapper Valve Disc.*
8	*43200*	*Piston.*
9	*43201*	*Stop Collar.*
10	*43202*	*Stop Bumper.*
11	*43199*	*Piston Tube Plug.*
12	*43214*	*Oil Wiper.*
13	*43209*	*Spring Washer.*
14	*43206*	*Collar.*
15	*43203*	*Locking Pin Housing.*
16	*43197*	*Piston Ram Tube.*
17	*43210*	*Cam and Attachment Fitting.*
18	*43205–5*	*Bushing.*
19	*43205–3*	*Roller.*
20	*43205–2*	*Roller Arm.*
21	*43205–1*	*Locking Pin and Plug.*
22	*43205–4*	*Spring.*
23	*43211*	*Spring.*
24	*43212*	*Drive Tube.*
25	*43212–2*	*Splines.*
26	*10-inch, 6 ply*	*Tire and Tube (General Tire and Rubber Co.)*
27	*10-inch*	*Wheel (General or Goodrich)*
28	*4389*	*Alemite Screw.*
29	*43168*	*Collar.*
30	*43272*	*Fork (10-inch)*
31	*VG-16*	*Axle Bolt (Air Associates)*

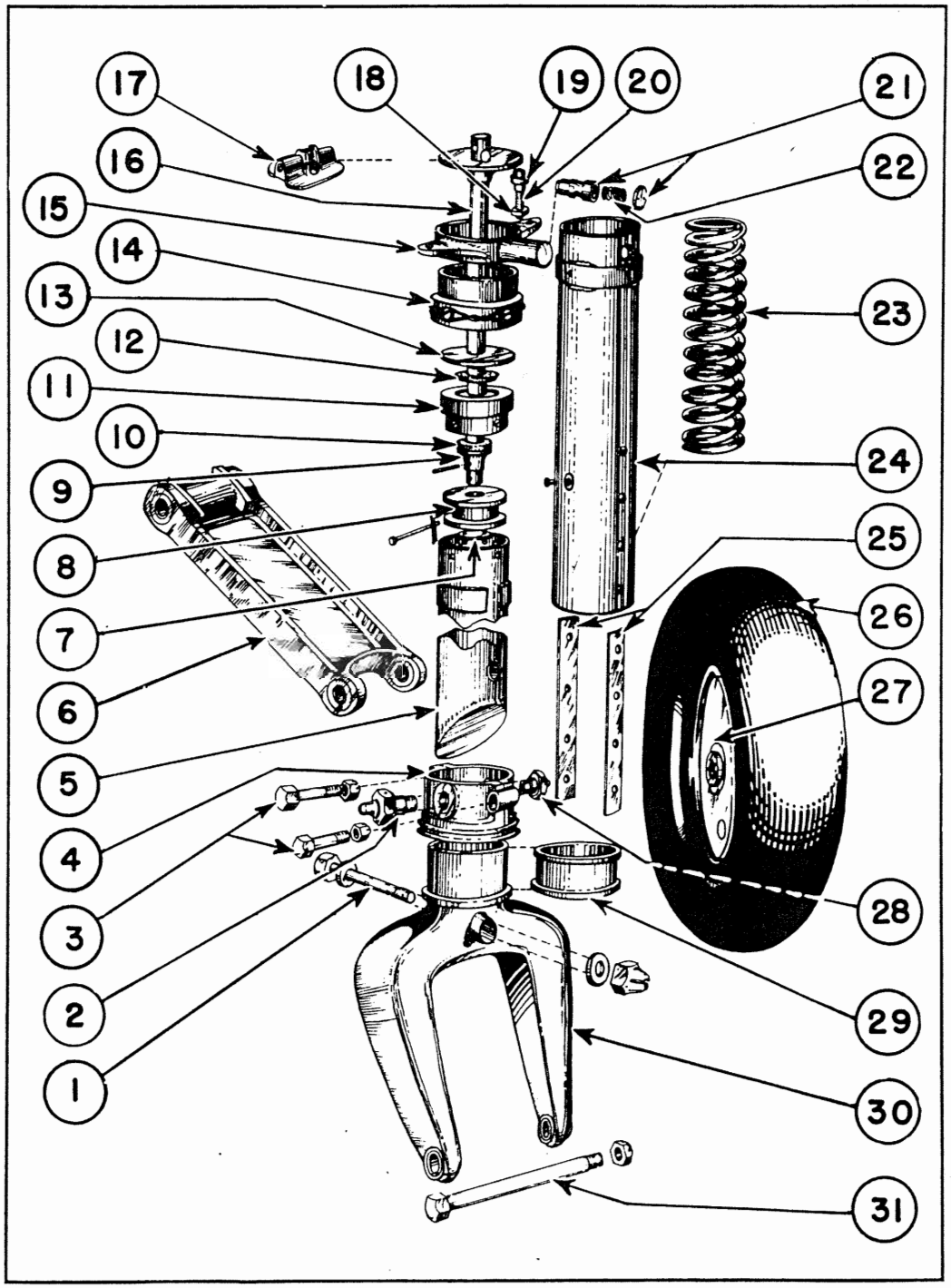


Figure 3-25—Tail Wheel

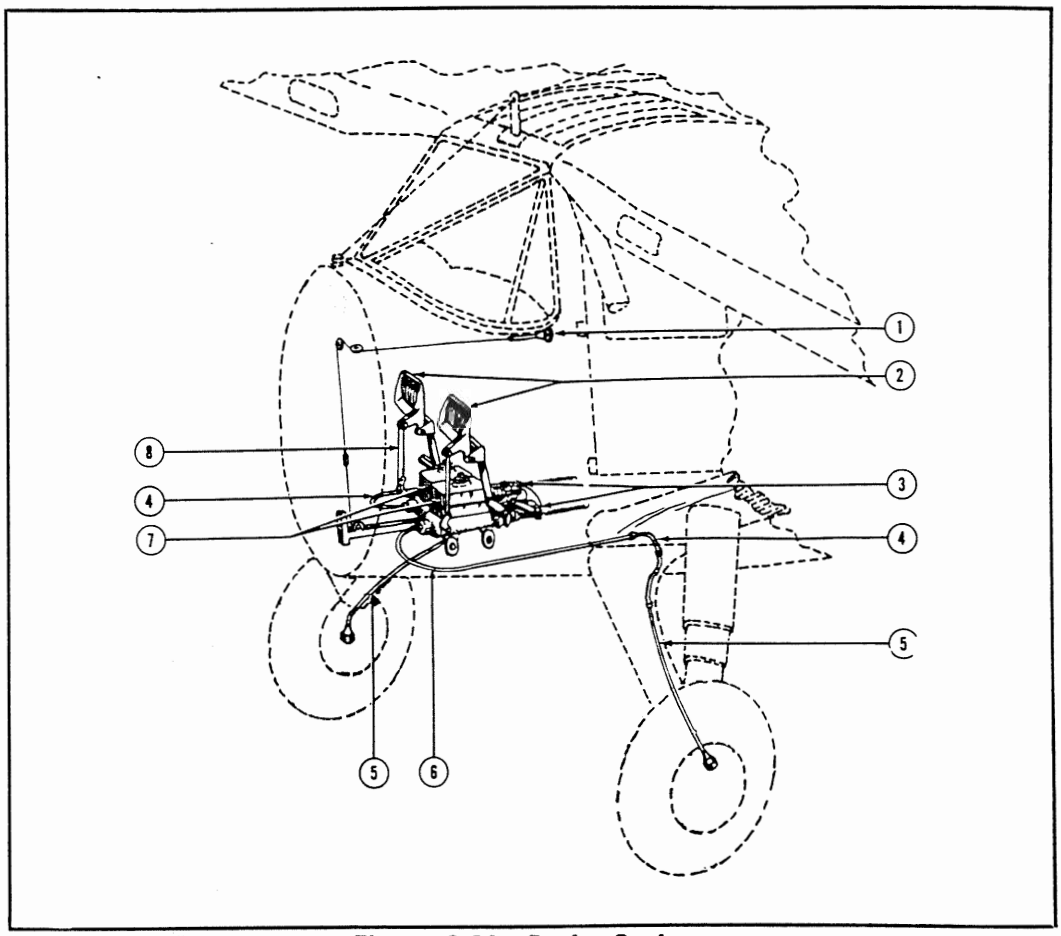


Figure 3-26—Brake System

Index No.	Part No.	Description
1	42399	*Parking Brake.*
2	42166 L/R	*Brake Pedals.*
3	42171	*Link.*
4	B-91-8	*Brake Line (Hose).*
5	43253-1	*Brake Line.*
6	43253-1	*Brake Line*
7	D-87-3	*Master Cylinders and Hydraulic Fluid Tanks. (Hayes Industries).*
8	42268	*Brake Pedal Link.*

BRAKE SYSTEM

The brake system on the "24" is of the expander tube type *(See figure 3-26)* employing two hydraulic cylinder units operated by pedals through mechanical linkage. The system includes a parking brake locked by a handle which maintains the hydraulic pressure applied through the brake pedals. The reservoirs for the hydraulic fluid in this system are contained on the cylinder assemblies and no external source of supply is required. The brake system on the "24" is relatively free from trouble. However, if it is necessary to remove the hydraulic cylinders the following procedure should be followed:

a. Drain fluid, pumping brake pedals to expel it completely through the bleeder valve at the hydraulic line connection on the wheel.

b. Remove bolts holding cables and springs.

c. Remove bolts from plunger arms.

d. Disconnect lines on cylinders.

e. Remove the two bolts from the mounting brackets.

Repairs to the hydraulic cylinder unit shall not be attempted. However, replacement of defective or worn parts may be accomplished. Normal clearance between the shoe and the drum is .007" to .010".

When the airplane is parked with the parking brakes on for a period of 8 to 10 hours in cold weather the brake clearance may be found to be entirely gone after the parking brakes are released. The reason for this loss of brake clearance is that the synthetic rubber in the expander tube, when held in an expanded position under pressure for a length of time at low temperature, will take a permanent set and the brake retractor springs do not have sufficient tension to overcome this condition. This condition is not considered critical because the original brake clearance can be restored and the permanent set taken out of the expander tube by taxiing the airplane and applying the brakes several times. This will heat the brake and soften the synthetic rubber in the

expander tube, allowing the brake retractor springs to return the expander tube and brake block to the original position. This action restores the original brake clearance.

If the airplane is to be left for any considerable time it is recommended that it be chocked and tied down. The brakes should not be set for any extended period of storage.

REPLACEMENT OF HYDRAULIC CYLINDER MEMBERS. When replacing members of the hydraulic cylinder unit it is suggested that it be so adjusted that 1/16" clearance exist between the piston rod *(See 7, figure 3-27)* and the piston plunger, *(See 11, figure 3-27)* with the rod completely back against the parking brake cam. When replacing the hydraulic brake lines it is recommended that aluminum alloy tubing be wrapped

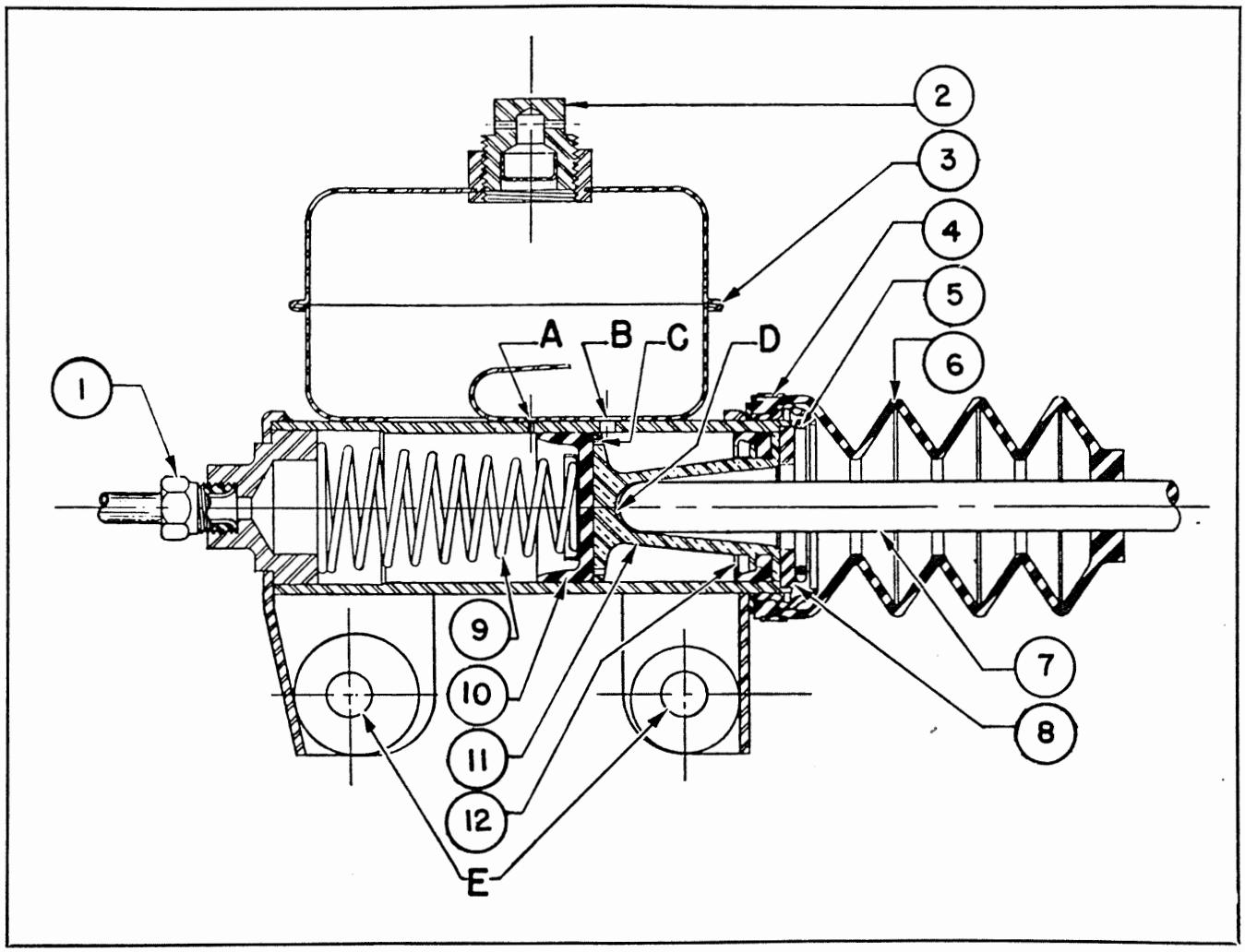


Figure 3-27—Master Cylinder Assembly

Index No.	Part No.	Nomenclature
1	*A-63-11*	*Inverted Tube Nut.*
2	*A-106-3*	*Breather Cap Assembly.*
3	*D-108-4*	*Body Assembly.*
4	*A-53-3*	*Boot Clamp Ring.*
5	*A-85-4*	*Piston Stop Lock Ring.*
6	*A-77-7*	*Rubber Boot.*
7	.....	*Piston Rod.*
8	*A-80-15*	*Piston Stop Washer.*
9	*A-40-13*	*Piston Return Spring.*
10	*A-76-7*	*Primary Piston Cup.*
11	*A-116-2*	*Piston Assembly.*
12	*A-76-8*	*Secondary Piston Cup.*

heavily with friction tape at the same points as in the original installation to prevent chafing.

To replace the brake blocks or install new ones the following procedure should be followed: *(See figure 3-28.)*

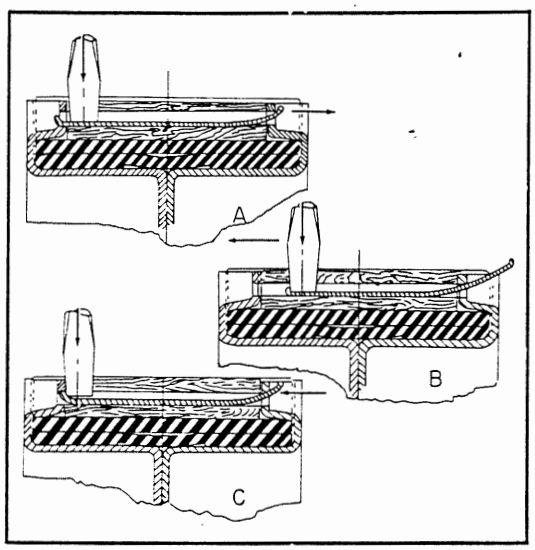


Figure 3-28—Installation of Brake Blocks

With two of the blocks in place insert one of the retractor links in the slot as shown in detail B, pushing the spring in as far as possible. With a screw driver push the spring down to the left until the position shown in "C" is reached. The screw driver can then be removed and by pressing on the right end of the spring it will snap into position as shown in the bottom of the cross section of the brake. *(See figure 3-29.)* If brakes are equipped or are to be equipped with tube shields, one of these is placed on each space between the ends of the block at the time the blocks are assembled. In reconditioning these brakes if the lining is worn off 1/16" then the lining retractor springs and tubes shall be replaced. If leaks are noticeable in the expander tube it must be replaced by a new one. No repair can be attempted on the tube.

REASSEMBLY OF BRAKE WITH NEW EXPANDER TUBE. To reassemble the brake with a new expander tube *(See figure 3-29)*, lay brake frames (*15* and *17*) with the outer flange down, insert the connector *(21)* with the rubber packing *(28)*, the washer, and the nut, and tighten nut *(25)* slightly to hold the expander tube nozzle in position. The expander tube can then be stretched onto the frame by working both ways from the nozzle, pushing it on with the fingers or stretching it with a tool which must have rounded edges so as not to injure the tube. The expander tube can be pressed down on the frame and will stay in position. The frame can then be properly located and pressed down into the expander tube, after which the screws and the nuts *(16)* can be installed along with the two screws which hold the connector *(21)* to the brake frame. The brake torque lugs in the frame shall be lined up and the axle collar shall be used in the center hole to line the frames *(15* and *17)* radially. The screws holding the frames together shall now be thoroughly tightened. Nut *(25)* shall now be tightened. Make sure that the nozzle is in the slight depression, which should appear on the outer face of the expander tube over the nozzle. This depression is necessary in order not to restrict the flow of fluid from the expander tube. After nut *(25)* is tightened, nut *(28)* shall be tightened to seal the packing around the nozzle. The brake shall be inspected to make sure the expander tube has equal clearance on both sides between the frame flanges. The brake blocks can now be installed. New blocks must be ground concentric with center hole in brake to a diameter that will give proper clearance (.007" to .010") for brake in drum.

FILLING THE BRAKE SYSTEM. The brake system should be filled with AAF Specification No. 3586-C brake fluid or equivalent (Lockheed No. 5). This is a non-petroleum product. Access to the filler plugs of the hydraulic reservoir is gained by removing the cover provided for this purpose between the two left-hand rudder pedals. The filler plugs may be removed with an open end or socket wrench.

BLEEDING THE BRAKE SYSTEM. To eliminate all air from lines the brake system is bled during filling as follows:

a. Remove the round-head screws from the end of the filler screw at the wheel and insert the bleeder hose fitting.

b. Fill the hydraulic brake fluid reservoirs attached to the cylinders.

c. Unscrew the bleeder screw at the wheel about a half turn.

d. Apply the pedal of the brake being bled.

e. Hold the pedal down until the bleeder screw is closed and then release the pedal.

f. Remove the bleeder screw and repeat the above operation for the other brake making sure that the bleeder screw is shut off before the brake pedal is released. If the bleeder screw is left open on release, air may be drawn in through the bleeder hose and it will be difficult to bleed the lines satisfactorily.

g. Repeat the preceding operation until all air ceases to come from the bleeder hose making sure that at no time does the reservoir supplying the cylinder with fluid run dry as this would only admit more air into the system.

h. After the air ceases to come from the bleeder hose, apply the brakes with the bleeder fitting closed and, with the brake applied, open the bleeder screw allowing hydraulic fluid to flow out of the brake.

i. Close the bleeder screw and release the brake.

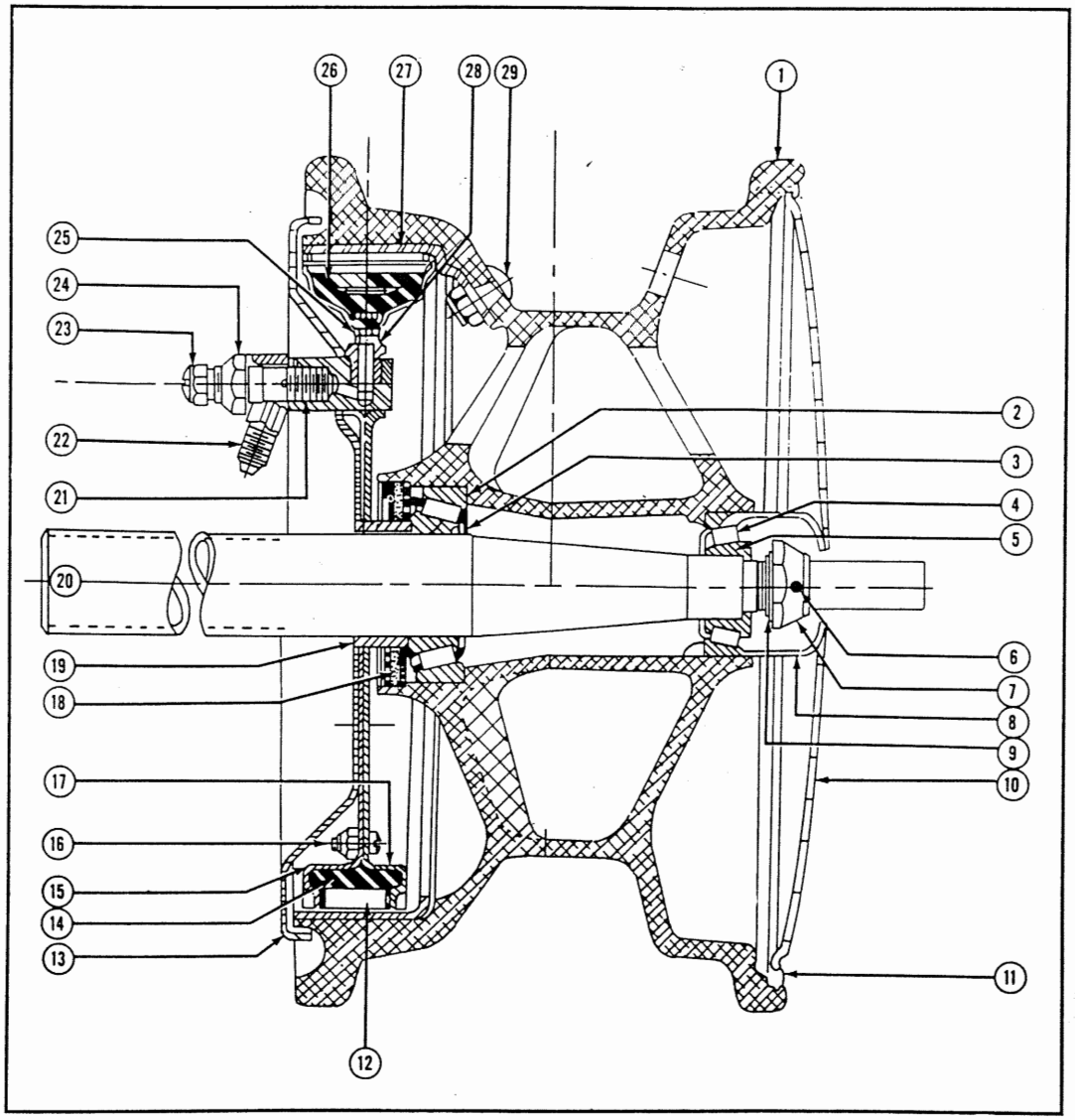


Figure 3-29—Expander Tube Brake and Wheel Assembly

Index No.	Part No.	Nomenclature
1	G-3-73-A and M	Wheel Casting.
2	19268	Cup—Timken (Inner).
3	19150	Cone—Timken (Inner).
4	07196	Cup—Timken (Outer)
5	07100	Cone—Timken (Outer).
6	A-67-6	Cotter Pin.
7	A-34-9	Axle Nut.
8	A-32-37	Dust Cap.
9	A-35-5	Axle Washer.
10	D-31-34	Fairing (Outer).
11	D-85-53	Internal Lock Ring.
12	B-27-38	Brake Lining.
13	D-7-24	Fairing (Inner).
14	D-22-26	Expander Tube Assembly.
15	G-12-30	Brake Frame (Outer).
16	A-18-7	Screw.
16	A-63-34	Nut.
17	G-12-30	Brake Frame (Inner).
18	A-85-68	Lock Ring.
18	A-56-35	Grease Retainer.
18	E-50024-71	Felt.
19	A-25-25	Axle Collar.
20	B-33-55	Axle Forging.
21	A-57-10	Nozzle Connection.
22	A-57-6	Tube Connection.
23	A-84-1	Bleeder Screw.
23	A-61-1-4	Screw.
23	A-86-2-10	Lock Washer.
24	A-58-5	Tube Connection Bolt.
24	A-68-5	Tube Connection Gasket.
25	A-63-8	Nozzle Nut.
26	A-21-26	Lining Retracting Spring.
27	D-13-37	Brake Drum.
28	A-64-2	Rubber Nozzle Packing.
28	A-80-7	Nozzle Packing Washer.
28	A-63-2	Nozzle Packing Nut.
29	E-5073-15	Bolt.
29	A-63-17	Nut.

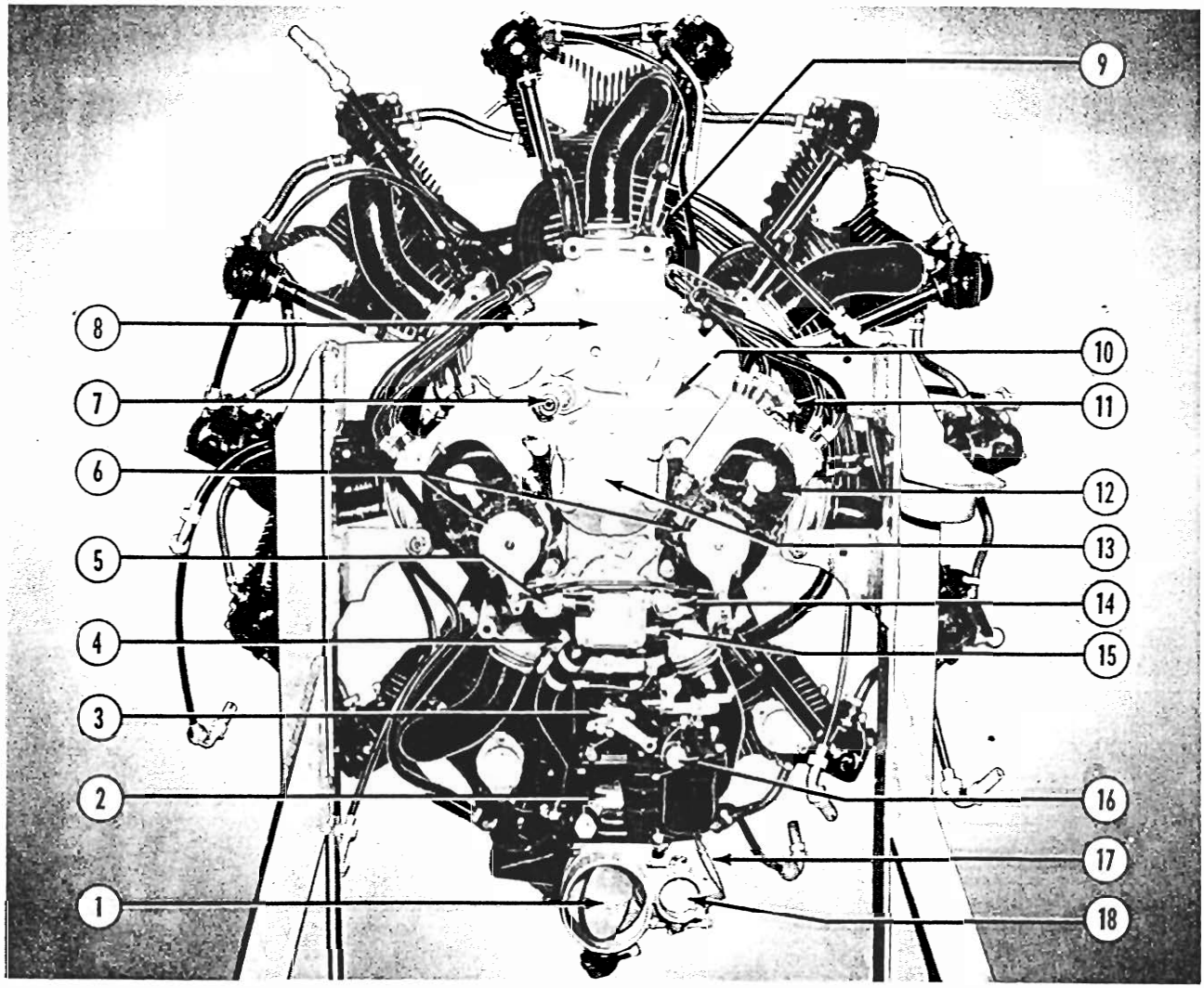


Figure 3-30—Warner Engine

Index No.	Nomenclature
1	*Cold Air Inlet.*
2	*Carburetor.*
3	*Throttle Control Connection.*
4	*Oil Inlet Nipple.*
5	*Oil Pressure Regulating Valve.*
6	*Spark Adjustment Points.*
7	*Tachometer Connection.*
8	*Generator Mounting Pad.*
9	*Primer Connection.*
10	*Oil Tank Vent Connection.*
11	*Breather Elbow.*
12	*Magneto.*
13	*Starter Mounting Pad.*
14	*Oil Screen and Pressure Gage Connection.*
15	*Oil Outlet Nipple.*
16	*Fuel Inlet Connection.*
17	*Hot Air Inlet.*
18	*Hot Air By-Pass.*

POWER PLANT

The major difference between the 24W46 and the 24R46 airplanes is in the power plant. *(See figures 3-30 and 3-31.)* The W46 is powered by the Warner Super Scarab model R-500-7 engine, of 500 cubic inch displacement, seven-cylinder, radial, unsupercharged, air-cooled, which drives a two-blade, fixed pitch wooden propeller. The propeller used is a Sensenich 86CB69. The compression ratio of this engine is 6.4 to 1 and the rating is 165 horsepower at 2150 rpm at sea level. The R46 is powered by the Ranger 6-440C-2 inline, six-cylinder engine of 440 cubic inch displacement, rated at 175 horsepower at 2450 rpm at sea level.

WARNER POWER PLANT *(Figure 3-30)*

Access to the engine is obtained by removing the NACA cowl, Part No. 48489, by releasing the two clamps at the bottom of the cowl, lifting it from the brackets, sliding it over the propeller and off. Two men are required to remove this piece of cowling. Access to the accessory section of the engine is obtained by removing the wrap cowl just forward of the fire wall by releasing the two clamps at the bottom and pushing it up on the side to which access is desired. It can be removed entirely from the airplane by removing the brackets, or by pulling the hinge pins at the top. The Warner power plant is supported on an engine mount and an engine mount ring which attaches directly to the engine. The engine mount ring contains four rubber mounts, Part No. 604141, which act in shear for absorbing the vibration loads of the engine and propeller.

These vibration absorbers may be replaced if damaged or worn or if deterioration due to operation occurs. The engine mount frame and engine mount ring are not heat-treated and may be repaired in accordance with CAA Bulletin No. 18. If damage is extensive it is generally recommended that these units be replaced to assure proper alignment with the engine and engine mount. The complete Warner power plant installation, including all parts forward of the fire wall, is connected to the engine with the exception of the oil tank, fuel strainer and battery.

The power plant may be removed as a unit. However, it is desirable to remove the engine from the engine mount ring rather than remove the engine mount, the engine mount ring and accessories, which may be done by the following procedure:

a. See that the ignition switch is "OFF."

b. Remove the propeller.

c. Remove cowling to permit disconnection of all engine attachments, controls, lines and mounting bolts.

d. Drain fuel tank, or put valves in "OFF" position and drain fuel at strainer.

e. Drain oil from engine by loosening the two bolt flange seat connections on the sump located at No. 4 exhaust valve rocker arm housing.

f. Disconnect the following wires and controls from the engine:

1. Cables at the battery terminals that cut off master control switch.
2. Throttle control at the rear of the carburetor.
3. Mixture control at the right side of the carburetor.
4. Main gasoline supply line at the rear of carburetor.
5. Carburetor heater control duct including the air scoop.
6. Main oil in and out lines attaching at rear of oil pump.
7. Oil pressure gage line on right side of oil pump.
8. Oil thermometer bulb.
9. Oil tank vent connection from the rear of the induction housing cover.
10. Control for the advance-retard lever on the magneto.
11. Tachometer cable and exhaust manifold.
12. Generator and starter electrical wiring.
13. Right and left magneto ground wires.

g. Move an overhead hoist into position and attach engine sling to engine lifting eyes that are located on the rear half of crankcase between the No. 1 and No. 7 cylinders on the left and No. 1 and No. 2 cylinders on the right. Operate hoist until weight of engine is removed from the airplane.

h. Remove engine mount bolts leaving the two bolts at the rear of No. 1 cylinder until last. Slowly separate engine from mount, carefully guiding rear of engine past the mounting ring.

i. Lower the engine and attach to assembly stand with at least 3/8" bolts. The engine may be installed by reversing the procedure outlined above. Repair and maintenance to the engine is not considered in this handbook as that is strictly an engine function. In case of damage or failure of the engine itself it is recommended that a Warner approved distributor or the Warner factory be contacted for recommendation as to repair or overhaul.

WARNER ENGINE BAFFLES. The engine is completely baffled by aluminum alloy baffles with leather inserts at the top. Baffles may be repaired, providing damage is slight.

In case damage is excessive it is recommended that new baffles be installed. Figure 3-32 shows the baffle arrangement around the seven cylinders of the Warner engine.

WARNER ENGINE EXHAUST MANIFOLD. The 24W46 is equipped with a circular manifold. This manifold is made of 1020 steel and stainless steel or completely of stainless steel. Those parts subjected to the most intense heat and corrosive action of the exhaust

fumes are of stainless steel while the exterior collector is of 1020 steel (except where all stainless is used).

The manifold is made in sections and it may be replaced as a complete unit or various sections that might fail. *(See figure 3-33.)* The exhaust manifold has an intensifier tube, for supplying carburetor hot air, incorporated in the structure of the manifold. This intensifier tube is of stainless steel and is the inside sleeve of the manifold. Cold air is taken in between cylinders No. 1 and No. 7, then passes into the intensifier tube where it is heated, and thence by a duct at the bottom of the intensifier tube into the carburetor air intake system.

Repairs may be made to the exterior surface of the manifold by welding in replacement patches if holes are small and if the remainder of the manifold is in sufficiently good condition so that a strong patch may be made. If damage is extensive and repairs can not be made it is recommended that an entire section or a complete manifold assembly be procured and replaced on the aircraft.

The manifold should be checked regularly to see that no damage or leakage of exhaust fumes is occurring as any damage to the manifold presents a fire hazard to the operation of the aircraft. The exhaust manifold has a cabin heater manifold attached to it.

WARNER CARBURETOR AIR INTAKE SYSTEM. The carburetor air intake system on the 24W46 consists of a scoop which takes outside air into the carburetor. A butterfly valve, which may be operated from a push-pull control located in the center of the instrument panel, closes off this intake and allows hot air to be taken in through the carburetor air heat intensifier tube for eliminating icing conditions. The intake system is very simple on this unit and it is recommended, if damage occurs, that the ducts be replaced rather than repaired. Any repairs that are attempted, however, should be carefully checked to maintain, as nearly as possible, the contours of the intake ducts so that the flow of air to the carburetor will be similar to that on the original manufactured part.

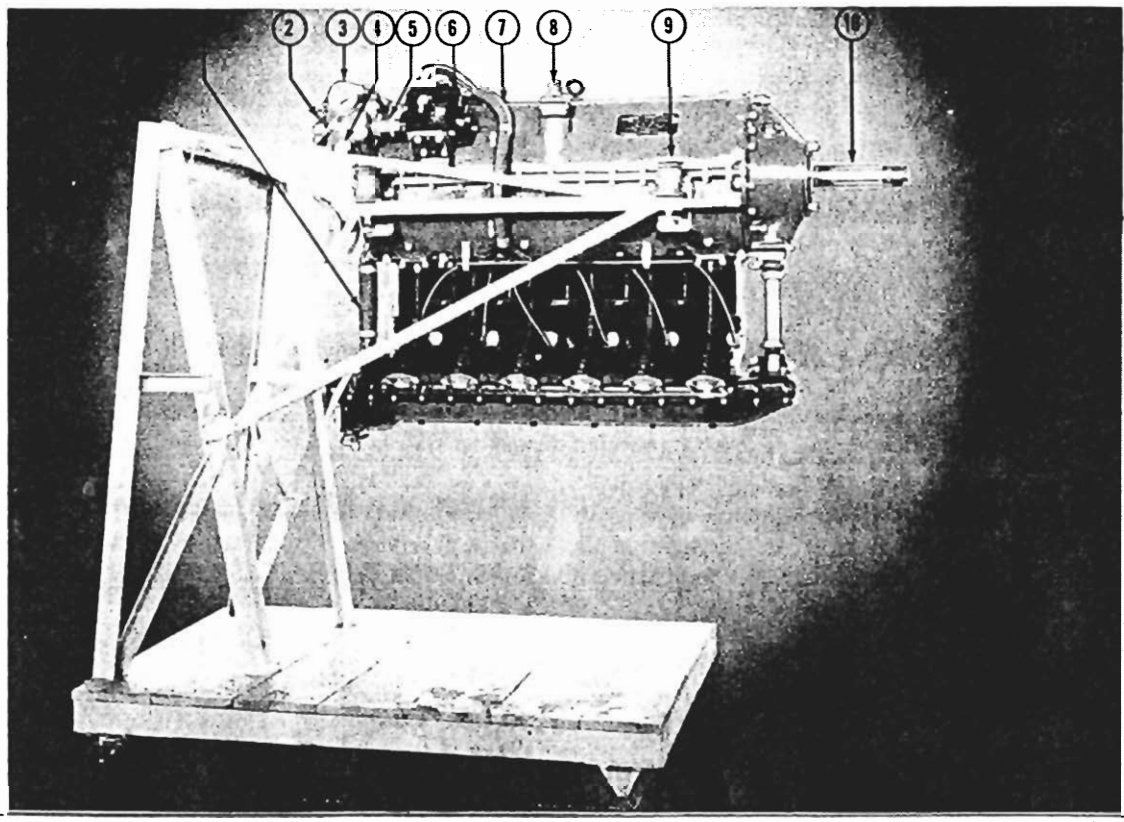


Figure 3-31—Ranger Engine—Right Side (1 of 2)

Index No.	Nomenclature	Index No.	Nomenclature
1	*Scavenge Oil Drain Tube.*	*6*	*Right Magneto.*
2	*Oil Pressure Relief Valve.*	*7*	*Ignition Harness.*
3	*Oil Screen.*	*8*	*Engine Breather Connection.*
4	*Oil Inlet Strainer.*	*9*	*Engine Shock Mount.*
5	*Magneto Drive.*	*10*	*Engine Crank Shaft.*

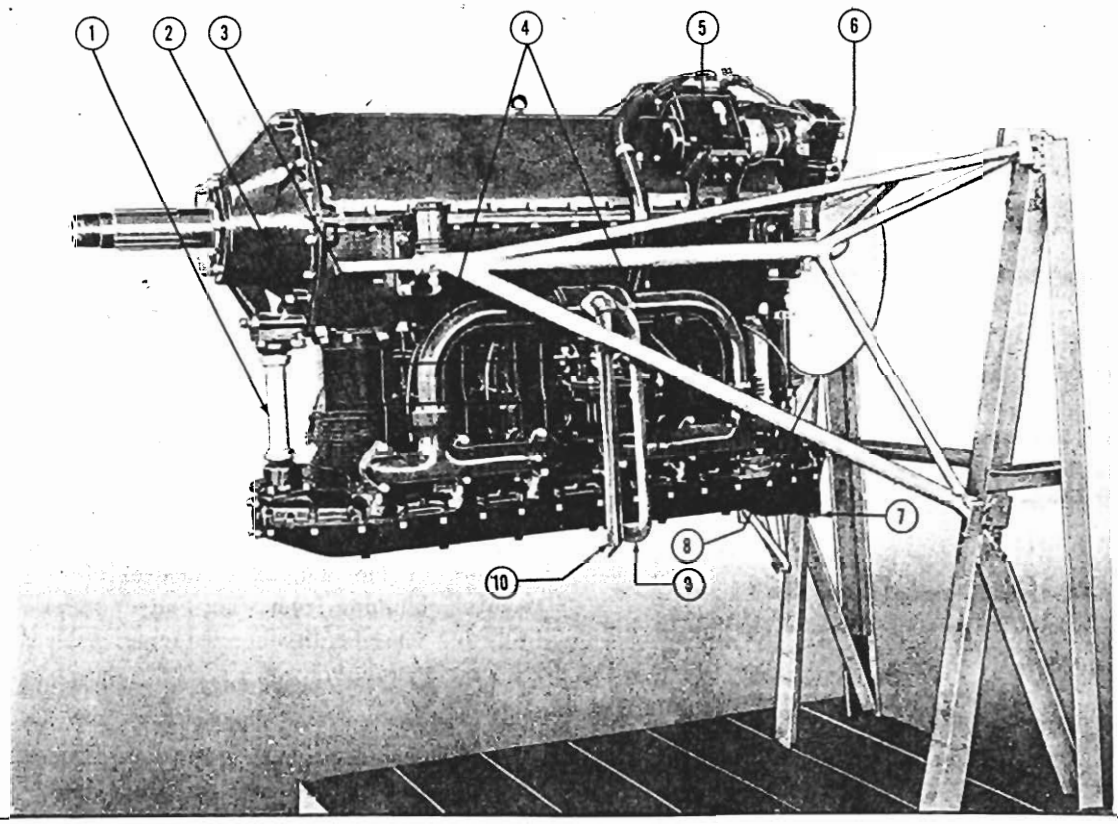


Figure 3-31—Ranger Engine—Left Side (2 of 2)

Index No.	Nomenclature	Index No.	Nomenclature
1	*Vertical Drive Shaft Housing.*	*6*	*Tachometer Drive.*
2	*Carburetor.*	*7*	*Oil Drain Plugs.*
3	*Throttle.*	*8*	*Oil Tank.*
4	*Intake Manifold.*	*9*	*Hot Spot Inlet.*
5	*Magneto.*	*10*	*Hot Spot Outlet.*

RANGER POWER PLANT *(Figure 3-31)*

The Ranger engine installation may be removed from the aircraft as a unit with the engine, engine mount, nose cowl and all cowl beams. A hoisting ring on top of the engine is provided for this purpose. To remove the engine only without the engine mount, disconnect the following:

a. Fuel line at carburetor.
b. Oil inlet and oil outlet lines.
c. Breather tube.
d. Throttle control.
e. Mixture control.
f. Oil pressure connection.
g. Magneto ground connection.
h. Fuel pressure connector.
i. Oil temperature connection.
j. Carburetor air temperature control.
k. Tachometer shaft.
l. Starter wires.
m. Generator wires.

After this is accomplished the engine may be lifted by the hoist ring at the top of the engine. Then remove the four bolts attaching the engine mount to the fuselage.

If it is desired to remove the engine from the engine mount, it is necessary to remove the nose cowl, the cowl beams, all accessories, the carburetor air intake system, the oil cooler and the oil cooler ducts. When this is accomplished the engine may be easily removed from the engine mount by removing the four bolts attaching the engine mounting feet to the engine mount.

RANGER ENGINE MOUNT. Vibration is absorbed in the Ranger engine installation through four rubber mounts in the engine mounting feet. These units may be obtained from your nearest Ranger distributor or from Ranger Aircraft Engines, Farmingdale, New York, either completely set up in the feet or as replacement

items if deterioration to the vibration absorbers occurs and inspection discloses they are not satisfactory for operation.

The actual cylinder baffling of the Ranger engine may be obtained from your nearest Ranger distributor or from Ranger Aircraft Engines, Farmingdale, New York. However, the inner-cooling cowl and ducting should be obtained from your Fairchild Distributor when replacements are required.

Repair and maintenance for the Ranger engine are not considered in this book and in case trouble develops it is recommended that the nearest Ranger distributor or approved repair station be contacted, or in the event there is not a repair station available, that the Service Department of Ranger Aircraft Engines be contacted for recommendations, as to repair or overhaul. The Ranger engine may be installed by reversing the procedure for removal.

ENGINE ACCESSORIES

The Ranger and Warner engines are equipped with the following accessories:

Item	*Model*		*Manufacturer*
Spark plugs	W46	C-26S	Champion
	R46	B6-5B2-S	BG Corp.
Starter		E-80	Eclipse
Generator		NA-1	Elec. Specialties
Magnetos	W46	VMN7DFL	Bendix Scintilla
	R46	SB6RN-8R-106	Bendix Scintilla
Carburetor	W46	419	Holley
	R46	NAR4B	Stromberg

The wood fixed-pitch propellers as used on the Fairchild "24" are manufactured by Sensenich Brothers and it is not recommended that repairs be attempted on these units unless in accordance with Sensenich Brothers' recommendations. When replacing a propeller exceptional care should be taken to see that the propeller is properly balanced and tracked.

FUEL SYSTEMS

The fuel system of the "24" is of the gravity feed type. The fuel supply is carried in two 30-gallon tanks, one in each wing panel just outboard of the fuselage. When filling the tank, ground attachments should be installed to prevent any static electricity from causing fire. The Ranger uses 65 minimum octane fuel and the Warner, 73 minimum octane fuel.

Caution

Never use a lower octane fuel than the specified minimum. Higher octane may be used, but not higher than 80.

Fuel tanks are manufactured of 3S-½H hard aluminum alloy and each tank contains one remote reading fuel indicator unit. The float units are installed in the bottom of the tanks and the indicator units are installed in the cabin immediately above each door. The fuel lines are 3/8" x .032" 52SO aluminum alloy tubing. Primer lines are 1/8" x .032" annealed copper tubing.

The fuel systems for the Ranger and Warner installations are identical. It is recommended if damage occurs to any part of the fuel system with the exception of the fuel tanks, that these units be replaced.

FUEL TANK REPAIR. Dented fuel tanks may be restored to original contour with a raw hide or other type of soft mallet. Outside of repairing dents or small holes Fairchild does not recommend that major repairs be made to the fuel tanks. When replacing damaged fuel lines except for tubing from the wing butt to each shut-off valve and the longer lines from the tank to the wing butt, the fuel lines are readily removable for replacement. The longer, tank to wing-butt line, may be drawn out through the area occupied by the tank after removal of the tank. For removal of tubing from wing butt to shut-off valve the following must be disconnected and removed:

a. Screws from outside edge of windshield.
b. Upholstery from door posts.
c. Corner fairings on the front door frame.
d. Balso fairings on the front door post.
e. Side panels forward of the door.
f. Tubing at wing butts and shut-off valves.
g. Saw off fittings at shut-off valves.
h. Pull tubing up and through hole in window sill.

Length of tubing required for replacement is as follows:

a. Long lines from tank to wing butt 38".
b. Short lines from tank to wing butt 10".
c. Lines from wing butts to shut-off valve 39".
d. Right-hand lines from shut-off valves to strainer 53-1/2".
e. Left-hand lines from shut-off valves to strainer 53-1/2".
f. Lines from strainer to carburetor 19" on Warner; on Ranger 39".

The primer pump is not repairable and damaged parts should be replaced. The fuel gage units in each tank may readily be removed by removing the attachment screws. When replacing the fuel gages, Part No. 689-A, gasket No. 96468 or its equivalent should be used and Bakelite varnish should be applied to the screws before installation.

If damage or malfunctioning of the carburetor occurs it is recommended that the carburetor be taken either to an approved carburetor repair station or be returned to the manufacturer of the unit. Inasmuch as carburetor repairs are difficult and the work should be done by trained personnel any attempt to repair them should not be considered.

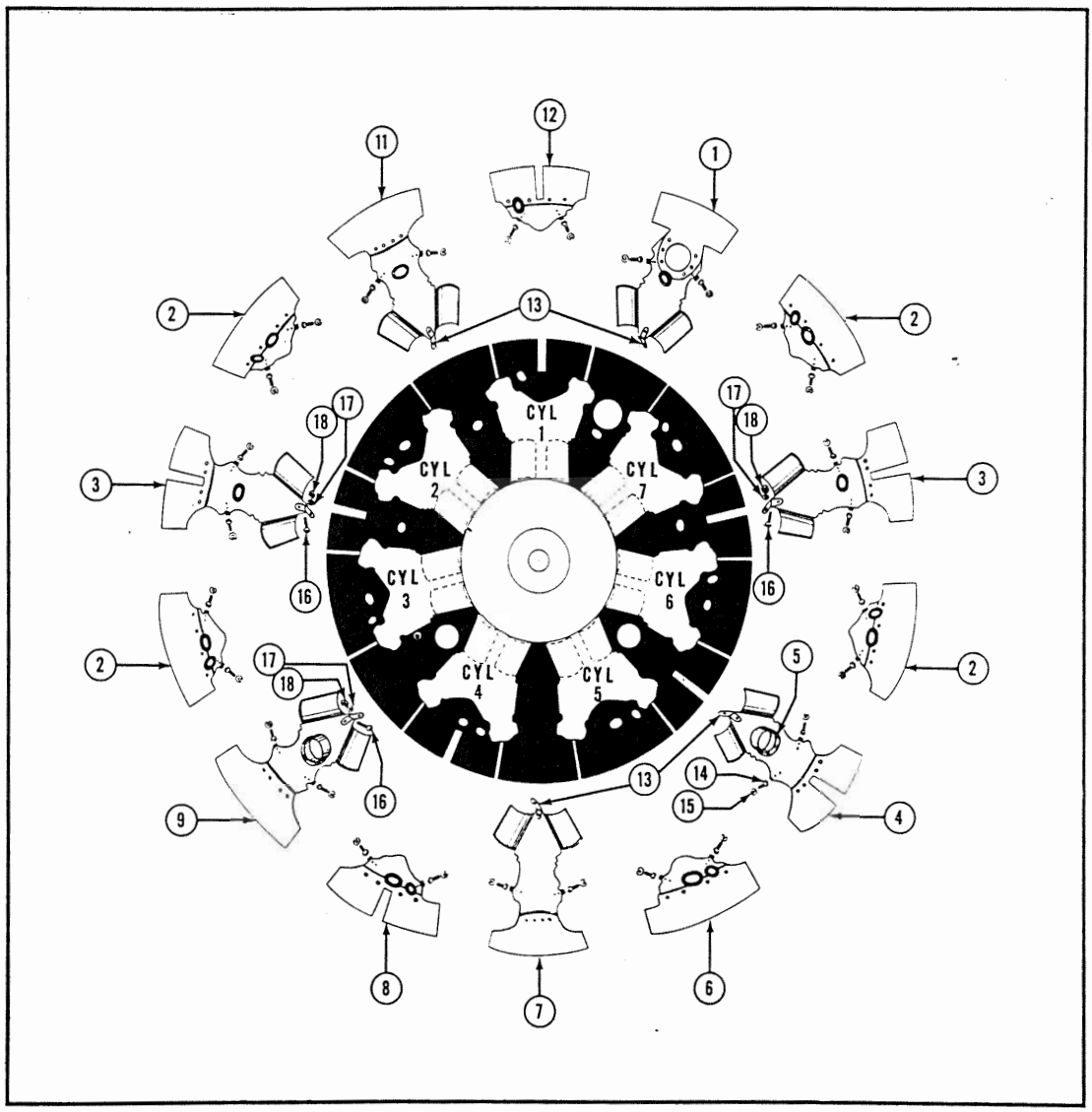


Figure 3-32—Baffle Assembly, Warner

Index No.	Part No.	Nomenclature
1	*647108*	*Intercylinder Baffle—Cylinders 1-7.*
2	*647118*	*Cylinder Head Baffle—Cylinders 2, 3, 6, 7.*
3	*647112*	*Intercylinder Baffle—Cylinders 6-7 and 2-3.*
4	*48529*	*Intercylinder Baffle—Cylinders 5-6.*
5	*48501*	*Collar—Carburetor Cold Air Intake.*
6	*647115*	*Cylinder Head Baffle—Cylinder 5.*
7	*647111*	*Intercylinder Baffle—Cylinders 4-5.*
8	*647117*	*Cylinder Head Baffle—Cylinder 4.*
9	*48528*	*Intercylinder Baffle—Cylinders 3-4.*
10	*48522*	*Collar—Oil System Air Duct.*
11	*647109*	*Intercylinder Baffle—Cylinders 1-2.*
12	*645116*	*Cylinders Head Baffle—Cylinder 1.*
13	*647105*	*Clip.*
14	*12-24x½*	*Round Head Machine Screw.*
15	*AN935-12*	*Lock Washer.*
16	*AN515-6-6*	*Screw.*
17	*AN960-6*	*Washer.*
18	*AN365-632*	*Nut.*

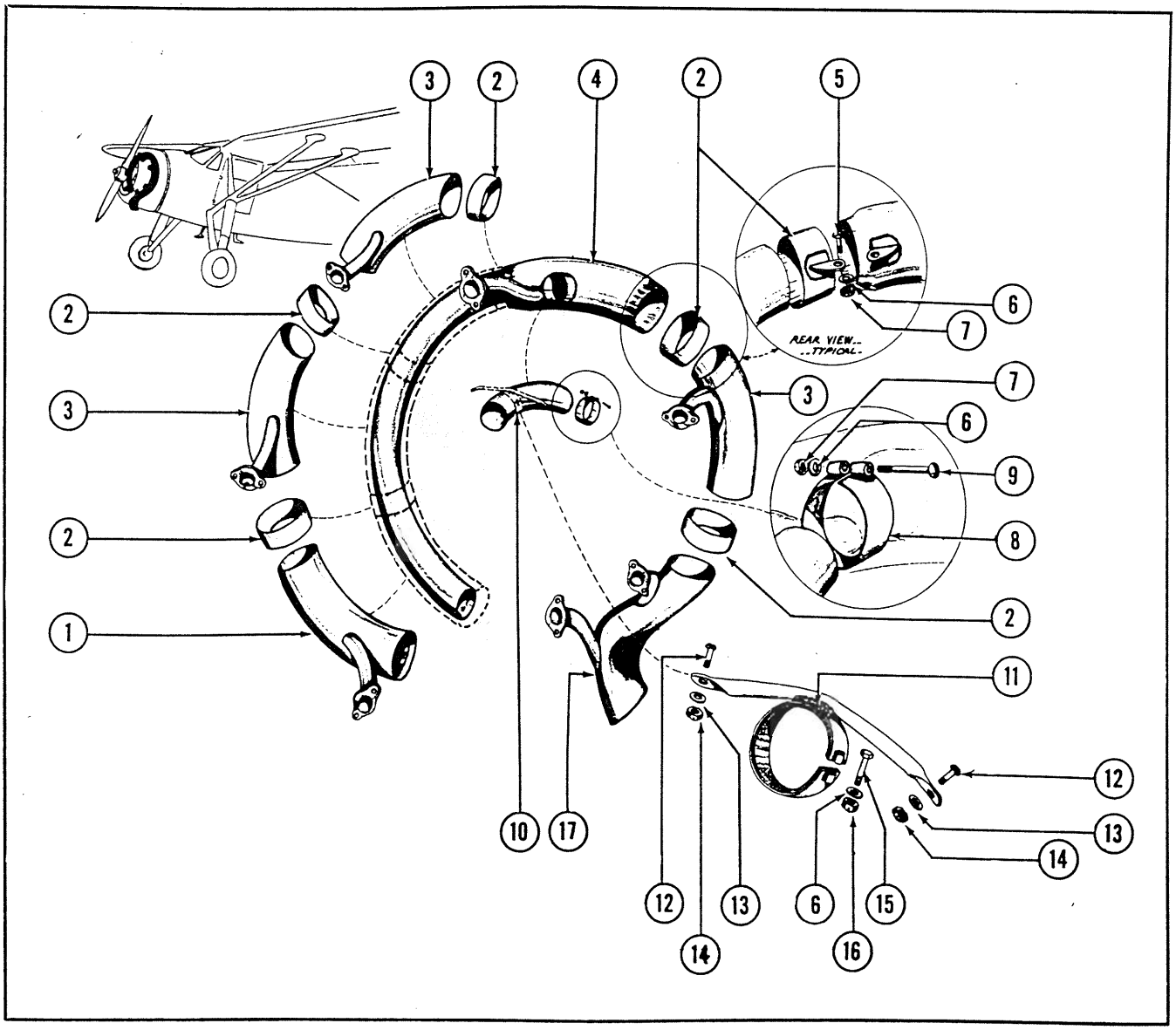


Figure 3-33—Manifold, Warner, Assembly No. 641115

Index No.	Part No.	Nomenclature
1	*641118-2*	*Segment.*
2	*641125*	*Collar.*
3	*641118-1*	*Segment.*
4	*641116*	*Adapter.*
5	*AN3-5*	*Bolt.*
6	*AN960-10*	*Washer.*
7	*AN320-3*	*Nut.*
8	*641124*	*Clamp.*
9	*AN23-23*	*Clevis Bolt.*
10	*641119*	*Intake Duct—Hot Air.*
11	*641161*	*Clamp—Intake Duct.*
12	*AN24-17*	*Bolt.*
13	*AN960-416*	*Washer.*
14	*AN320-4*	*Nut.*
15	*AN3-14*	*Bolt.*
16	*AN310-3*	*Nut.*
17	*641117*	*Tail Pipe.*

OIL SYSTEMS

The oil system of the Fairchild "24" is somewhat different in the Warner engine installation *(See figure 1-7)* than in the Ranger installation *(See figure 1-8)*; therefore, the oil system will be taken up separately for each model.

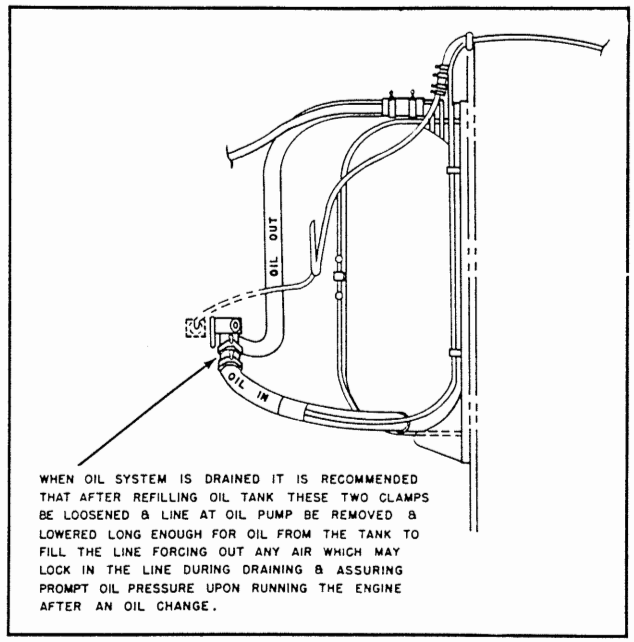
RANGER OIL SYSTEM *(Figure 1-8)*

The Ranger oil tank is manufactured of 3S-½H hard aluminum and is slung in supports on the engine mount on the right hand side of the ship. The oil tank capacity is 4.1 gallons with sufficient space for expansion above the filler inlet. The oil system operates from the tank through a line into the engine through the engine oil pump. The oil is then taken by the scavenger pump to the rear of the engine and it passes through the oil cooler and back to the top of the oil tank. The oil cooler incorporates a thermostatic by-pass valve so that in extreme cold weather operation the oil goes through the by-pass valve rather than the cooler and the oil is maintained at the proper temperature. The air for the oil cooler is taken from an inlet duct passing through the nose cowl just to the right of the propeller, thence by ducts through the oil cooler and is exhausted on the right-hand side cowl panel just forward of the fire wall. Damage to the oil cooler inlet and outlet ducts may be repaired by use of a soft mallet, special care being taken to return the duct to as near the original contour as possible so that the flow of cooling air through the cooler will not be affected by any repairs performed. Damage to oil lines generally call for replacement of the lines.

WARNER OIL SYSTEM *(Figure 1-7)*

The oil system of the F24W46 Warner powered "24" is somewhat similar to that of the Ranger except that an oil cooler is not installed as standard equipment. Sufficient cooling is obtained by an air blast upon the oil tank. The capacity of the Warner oil tank is 4.1 gallons. The oil tank is slung from the fire wall on the right-hand side of the aircraft and is made of 3S-½H hard aluminum. The temperature bulb well from which the capillary tube leads to the temperature gage in the cabin is installed in the oil inlet line at the lower left side of the oil tank. Oil inlet lines and return lines are 3/4" x .040" 2SO aluminum tubing. Oil tank and engine vent lines are 3/8" 52SO aluminum alloy tubing. The oil pressure line leading to the gage on the instrument panel is 1/4" x .032" copper tubing. The breather tube Part No. 48623 and duct Part No. 48711-4 are respectively 3/4" and 2-1/2" flexible aluminum tubing.

The oil tank is drained by means of a plug in the drain tube which extends from the bottom of the tank to the bottom of the engine cowling immediately forward of the fire wall. Standard AN clamps and rubber hose connections are used throughout the system. Except for repairable oil tanks, damaged members of the oil system should be replaced.



All members of the oil system are readily removable, however, should it be necessary to replace the dole "L" fitting connecting the oil pressure gage line at the engine, the engine end of the replacement fitting must be filled with solder and drilled with a No. 60 (.040) drill. This is necessary if a regular restricted fitting is not used to create smooth pressure flow and prevent oscillation of gage indicator.

ELECTRICAL SYSTEM

The Fairchild 24W46 and 24R46 electrical systems are practically identical except for the location of the battery. A wiring diagram for both airplanes is shown in figure 3-34.

The power source for these airplanes is a Reading 12 volt, 24 ampere-hour battery.

The battery is installed in the battery box, which is treated with acid-resistant paint. The Ranger box incorporates a drain. Care should be taken to be sure that the drain is not plugged so that no fluid will become trapped in the box and possibly spill over onto the aircraft under rough air conditions. The Warner box has absorbent pads in the bottom to take up spillage.

Aircraft batteries are subject to the same limitations and restrictions that automobile batteries are and should be kept at full charge if being operated in very cold weather at or near 0° F.

The battery in the 24W46 is slung in the engine mount section on brackets and is readily accessible through the engine wrap cowl. The battery in the 24R46 is located in the rear of the fuselage aft of the baggage compartment and is accessible through an entrance door on the

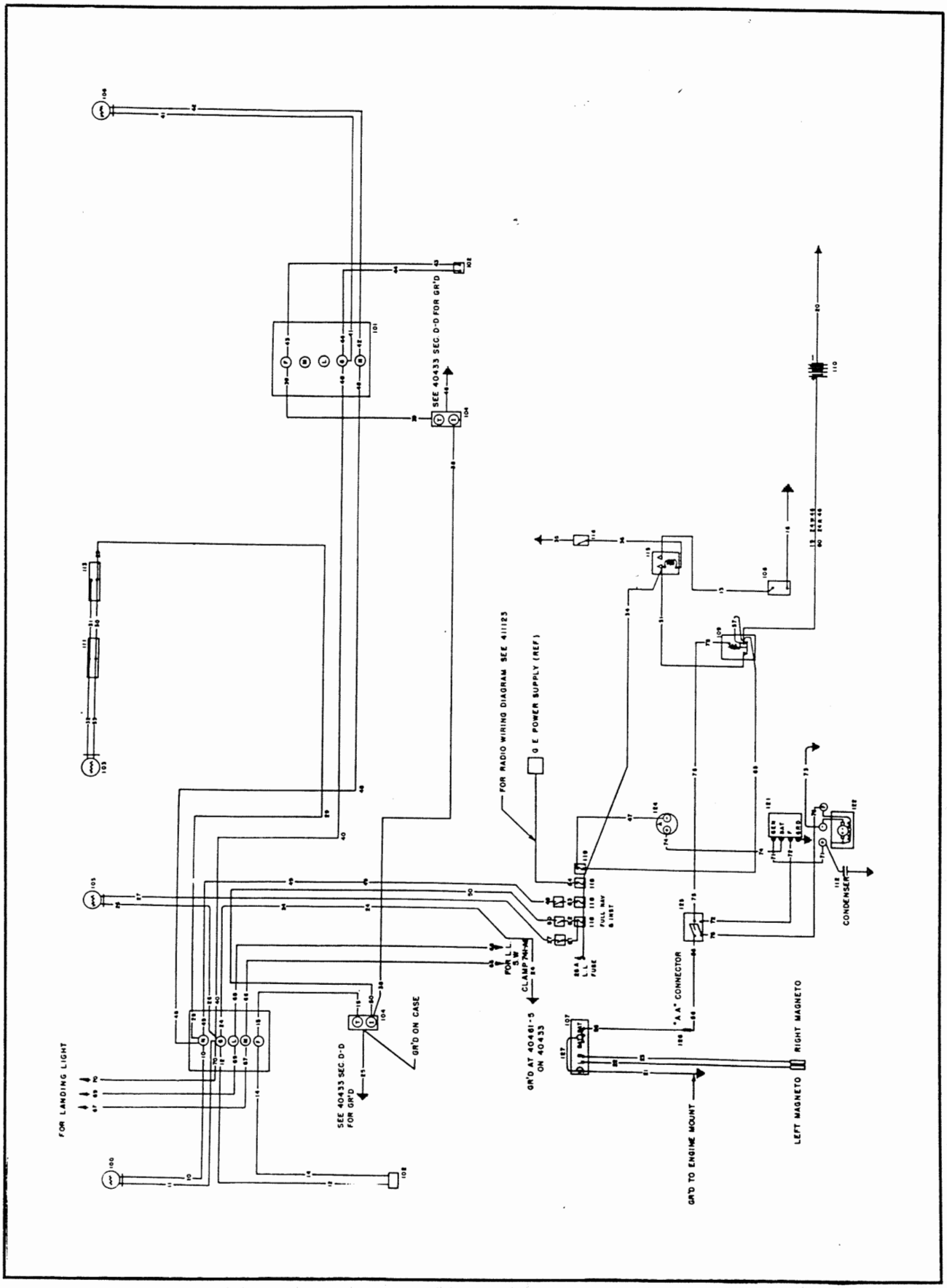


Figure 3-34—Wiring Diagram

TABLE FOR WIRING DIAGRAM

Number	Fairchild Part Number	Number	Fairchild Part Number	Number	Fairchild Part Number	Number	Fairchild Part Number
10	FS-6120-B245	27	FS-6120-B135	44	FS-6120-B60B	65	FS-6116-26
11	FS-6120-B245	29	FS-6120-B173	46	FS-6120-B34	66	FS-6116-B107B
12	FS-6120-B60B	30	FS-6120-B23¼	47	FS-6118-Strip 36½	67	FS-6116-B150B
13	FS-6104-E6¼E	31	FS-6120-B23¼	48	FS-6118-B56	68	FS-6116-B107B
14	FS-6120-B60B	32	FS-6120-31770-70	49	FS-6116-B107B	69	FS-6116-B150B
15	FS-6120-B35B	33	FS-6120-31770-70	50	FS-6118-B84B	70	FS-6116-B150B
16	FS-6104-C21½E	34	FS-6118-26	51	FS-6104-D6¼D	71	FS-6116-B-20
19	FS-6104-D32D	35	FS-6120-B14½B	55	FS-6120-B60	72	FS-6120-B52
20	FS-6104-C14D	36	FS-6120-B28B	56	FS-6120-52	73	FS-6116-E15½
21	FS-6215-B45½	38	FS-6120-B101B	57	FS-6120-4	74	FS-6118-B63½
22	FS-6215-B63½	39	FS-6120-B34B	60	FS-6104-E193½	75	FS-6120-52
23	FS-6215-B68	40	FS-6120-B56B	61	FS-6120-B3	76	FS-6120-52
24	FS-6116-B107B	41	FS-6120-B224½	62	FS-6118-B12	77	FS-6104-D14
25	FS-6120-B35B	42	FS-6120-B224½	63	FS-6116-B8S-T½	78	FS-6104-E14D
26	FS-6120-B40	43	FS-6120-B60B	64	Furn. with Radio		

No.	Description	Type	Part No.	Fairchild Drawing No.	Source
100	Light—Wing Tip, Left, Red	E (12 Volt)		44252	Grimes
101	Terminal Block—Wing			41918	Fairchild
102	Fuel Tank Unit			48402	Stewart-Warner
103	Light Tail	C		4683	Grimes
104	Fuel Gage				Stewart-Warner
105	Moonglo Light	12 Volt		41996	Fairchild
106	Light—Wing Tip, Right, Green	E (12 Volt)		44252	Grimes
107	Switch—Ignition	A-9			
108	Starter	E-80	397-6		Eclipse
109	Relay		7220-12		Leach
110	Battery	12 Volt	R-24		Reading
111	Knife Disconnect	AMP	37770		
112	Generator Filter Condenser	5MFD 200V	1C-2P5C		Cornell-Dubilier
113	Block—Rudder Wire—Junction			4679-9	Fairchild
115	Solenoid—Starter	2430			Cole-Herse
116	Switch—Starter		AN3022-8		Cutler-Hammer
118	Fuse—5A	5A			
119	Fuse—15A	15A	1118209		
121	Control Box—Generator				Delco-Remy
122	Generator	12 Volt—15 Amp	NA-1		Elect. Specialties Co.
124	Ammeter—Voltmeter	(0-30A and 0-30V.)	338		Champion
125	Emergency Switch	DPST			H. & H.
126	Splice Connector	AA			Thomas & Betts
127	Copper Bus				

right-hand side of the airplane. Care should be exercised never to fill the battery above its marked level line.

The 24W46 and 24R46 are equipped with a master switch which will close all circuits except the magneto circuit so that in the event of an anticipated forced landing all electrical circuits with the exception of the magneto circuit may be closed by flipping one switch. This enables the engine to function with all other circuits being dead and eliminates some of the fire hazard involved in crash landings. The master toggle switch is shown in figure 2-1 immediately underneath the glove compartment on the right side of the instrument panel.

The ignition switch on these aircraft is adjacent to the master switch and has five positions: "OFF," "BATTERY," "LEFT MAG," "RIGHT MAG," and "BOTH."

When the switch is thrown to "BAT." the system is energized and the landing light, fuel gages, starter, navigation light, moonglo light and radio may be operated. The ignition system at this point, however, is not energized and the aircraft cannot be started. Throwing of the switch to "LEFT," "RIGHT," or "BOTH" keeps the system still energized and throws in the magneto system so that the aircraft may be started.

The navigation lights are Grimes type E-1 and it is recommended that no repairs on these units be attempted. Green, white, and red lenses may be easily replaced if damage occurs to them. Replace the entire light unit as a whole if damage is sufficient to warrant this change. Landing light wires are installed in the wing so that in the event a landing light is desired it can be installed in the bracket provided for it. The landing light has two switches, one switch of which controls the extension and retraction of the light and the second switch controls the turning on of the light itself. Under no circumstances should the retraction motor and the landing light be turned on at the same time. If damage occurs to the landing light the entire unit may be replaced. Assembly details may be purchased as shown in figure 3-35. In case of damage to the electrical wiring system it is recommended that wires be replaced in accordance with the wiring diagram *(See figure 3-34)*, and the wire sizes shown in the accompanying tables. The solenoid that operates the starter is not repairable and in event of failure of this unit a new unit should be installed. It is carried under Part No. 40441.

Eight fuse extractor posts and fuses are located at the bottom center of the instrument panel on both the 24W46 and 24R46. Fuses for navigation lights, instruments and fuel gages, ammeter, radio and landing lights are installed, with three spares.

The moonglo light unit is relatively simple and is not subject to damage. However, in the event of any failure outside of bulb failure the whole unit should be replaced. All connections between outlying sections of the airplane are through quick disconnects or junction boxes.

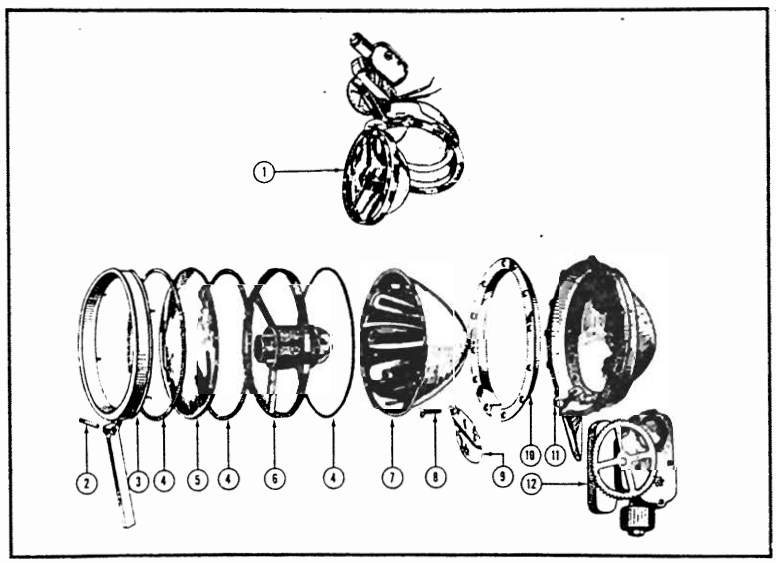


Figure 3-35—Landing Light Assembly

Index No.	Part No.	Nomenclature
1	*ST-250*	*Landing Light (Crimes).*
2	*A 1175*	*Trunnion Pin.*
3	*B 1174*	*Operating Arm and Ring Assembly.*
4	*A 1172*	*Gasket.*
5	*A 1170*	*Lens.*
6	*B 1171*	*Lamp Assembly.*
7	*A 1169*	*Reflector.*
8	*S 1223*	*Screw.*
9	*A 1167*	*Name Plate.*
10	*A 1166*	*Rim.*
11	*A 1163*	*Base and Canopy Assembly.*
12	*B 2290*	*Power Unit Assembly.*

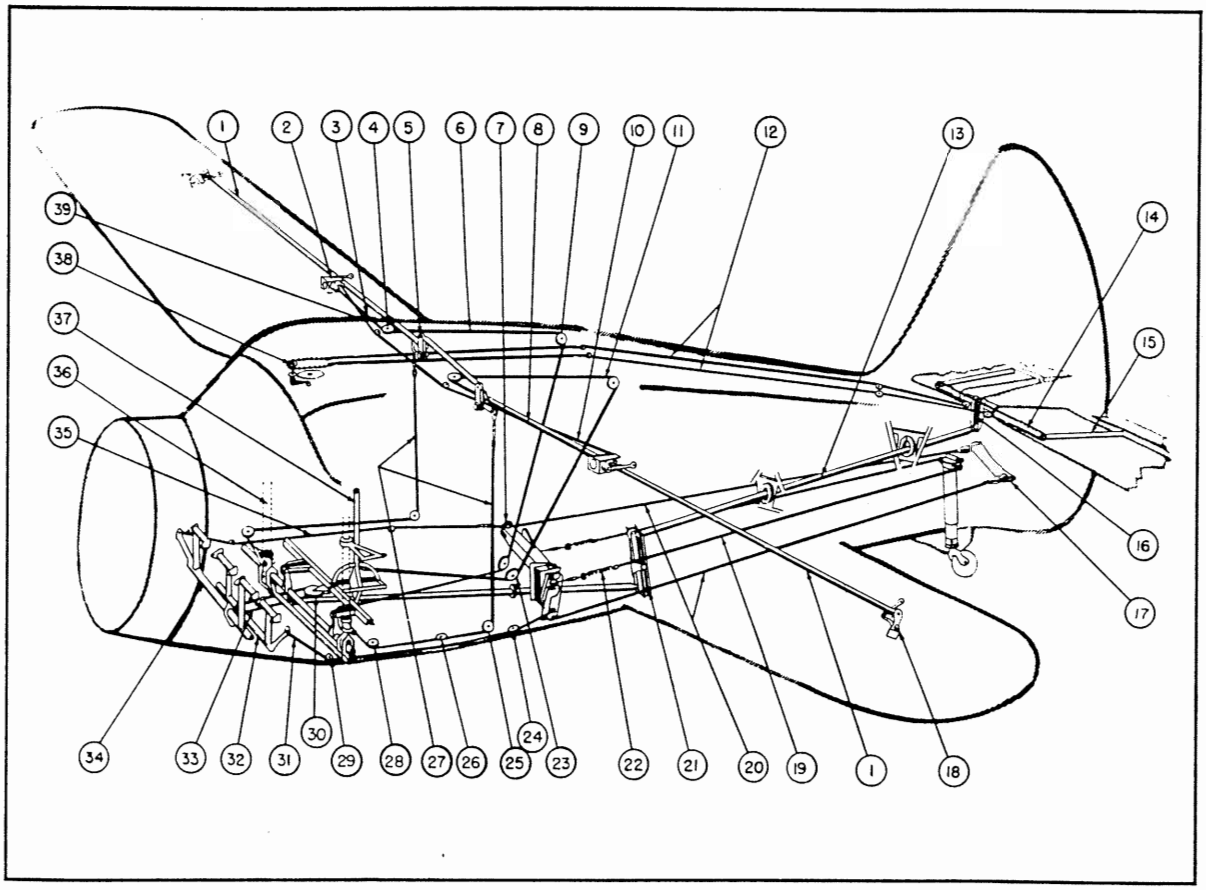


Figure 3-36—Flight Control System

Index No.	Part No.	Nomenclature
1	4713	*Aileron Control Tube.*
2	42147	*Flap Control Bellcrank.*
3	42255-3	*Flap Control Cable Assembly.*
4	A-114	*Pulley.*
5	42267 L/R	*Aileron Control Bellcrank.*
6	42255-5	*Flap Control Cable Assembly.*
7	42266	*Rudder Idler.*
8	42255-4	*Flap Control Cable Assembly.*
9	A-114	*Pulley.*
10	42255-2	*Flap Control Connecting Cable. Assembly.*
11	42255-6	*Left Flap Control Cable Assembly.*
12	42376-2	*Tab Control Cable Assemblies.*
13	42175	*Elevator Control Tube.*
14	4653-19, 20, 21	*Tab Control Chain and Cable Assembly.*
15	4633	*Tab Control Rod.*
16	4654	*Elevator Control Horn.*
17	4664	*Rudder Control Horn Assembly.*
18	4715	*Aileron Control Bellcrank.*
19	43235	*Tail Wheel Control Cable Assembly.*
20	42274-3	*Rudder Control Cable Assembly.*
21	42215	*Elevator Idler.*

Index No.	Part No.	Nomenclature
22	43237	*Tail Wheel Cable Spring.*
23	A-114	*Flap Control Pulley.*
24	A-151	*Rudder Control Pulley.*
25	AN210-4A	*Aileron Control Pulley.*
26	A-176	*Aileron Control Pulley.*
27	42176	*Aileron Control Cable (Spliced and Swaged Terminals).*
	42383	*Aileron Control Cable (Swaged Terminal).*
28	AN210-4A	*Aileron Control Pulley.*
29	A-120	*Rudder Control Pulley.*
30	AN210-4A	*Rudder Return Pulley.*
31	42274-1	*Left Rudder Control Cable Assembly.*
32	42216	*Left Rudder Pedal Torque Tube.*
33	42220	*Rudder Return Cable Assembly.*
34	42217	*Right Rudder Pedal Torque Tube.*
35	42274-2	*Right Rudder Control Cable Assembly.*
36	47106	*Control Stick.*
37	42265	*Flap Control Lever Assembly.*
38	42236-1	*Tab Control Chain.*
39	42255-1	*Flap Control Connecting Cable Assembly.*

FLIGHT CONTROLS

The flight controls function through a system of cables and push-pull tubes using both to their best advantage *(See figure 3-36.)* All joints are mounted on ball bearings except where certain standard cable terminals are used. Access to the surface control system is easily gained though the various inspection holes on the airplane and zippers arranged in the rear of the cabin upholstery, which facilitate inspection and normal repair and replacement operations. Access to the aileron torque tube, rudder pedal torque tubes and the forward elevator push-pull tube may be gained by removing the cabin floor.

A large part of the system may also be reached by entering the fuselage through the rear of the cabin back of the rear seat. Access to elevator trim tab cables requires removal of the tail cowl at the rear of the top deck.

REPAIR OF PUSH-PULL TUBES. If the location of damage is such that repair is practicable, the steel tubing used in the surface control system may be repaired by welding in accordance with normal welding procedures. None of these members are heat-treated. Except for the repair of push-pull tubes all other members including cables, bell cranks, and pulleys should be replaced when inspection indicates wear or damage. Replacement cables, bell cranks, etc., should be ordered from your Fairchild distributor or dealer under their proper part number and nomenclature as shown in figure 3-36. When replacing guide grommets it is recommended that they be coated with thin graphite grease where making contact with push-pull tubes. The grease should be rubbed well into the felt and all surplus grease wiped away.

AILERON CONTROLS

Before removal of the cable to be replaced, a wire or cord should be attached to its end and drawn through the pulley system as the cable is pulled out. The replacement cable is attached to the other end of the wire or cord which is then used to pull the cable through the pulley system.

FLAP CONTROLS

As with the aileron control cable, a leading wire or cord should be used to install replacement cables to avoid unnecessary disassembly of the airplane.

ELEVATOR CONTROLS

Replacement of the elevator controls is simple as no cables are used in this installation.

Elevator tab control stop blocks should be installed for the following tab settings:

7-1/2°	Nose Down (which is "up" tab)
10°	Nose Up (which is "down" tab)

RUDDER CONTROLS

The rudder is controlled by cables running from the rudder pedal torque tubes to a bell crank just aft of the baggage compartment. Another set of cables runs from the bell crank (or walking beam) to the rudder control horn attached to the rudder spar. Still another set of cables runs to the steerable tail wheel control horns at the top of the tail wheel.

Note

See section IV for Rigging Data.

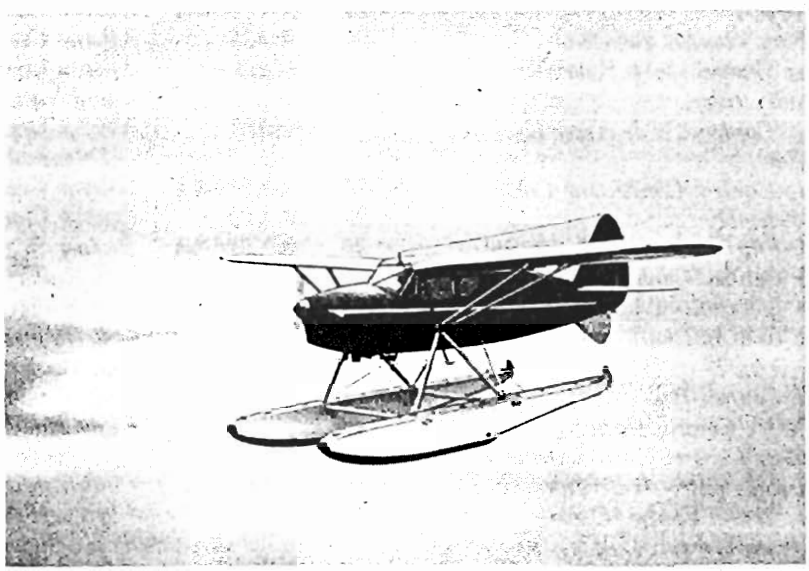


Figure 3-37—F-24 Ranger on Floats

SECTION IV

RIGGING AND LUBRICATION DATA

RIGGING DATA

DIHEDRAL	2-1/2 Degrees
SWEEPBACK	0 Degrees
INCIDENCE	1 Degree*

*Built into Fuselage at Wing Butt Attachment Point

SPAR LOCATION	
Front spar	16.65% of chord
Rear spar	62.2% of chord
ASPECT RATIO	6.84

AILERON RANGES OF MOVEMENT

Up		*Down*	
Degrees	*Inches*	*Degrees*	*Inches*
17	3-31/32	12	2-25/32

Note

Measurement of aileron should be taken from the trailing edge of wing at inboard edge of aileron to trailing edge of aileron in the "up" and "down" condition and held to a tolerance of +0°, -2°.

FLAP RANGES OF MOVEMENT

Down	
Degrees	*Inches*
60	8-1/8

Flap measurements are taken from the trailing edge of the wing to the trailing edge of the flap in the "down" position, and held to a tolerance of +0°, -2°.

FIXED ANGLE OF INCIDENCE HORIZONTAL STABILIZER

The fixed angle of incidence, relative to the longitudinal axis, is -2° down.

ELEVATOR RANGES OF MOVEMENT

Airplane	*Up*		*Down*	
Model	*Degrees*	*Inches*	*Degrees*	*Inches*
24W46	25	7-1/2	25	7-1/2
24R46	35	9-9/16	25	7-1/2

Measurements on elevator should be taken at the first rib outboard of trim tab cut-out.

ELEVATOR TAB RANGES OF MOVEMENT

Airplane	*Up*		*Down*	
Model	*Degrees*	*Inches*	*Degrees*	*Inches*
24W46	10	11/16	10	11/16
24R46	8-1/2	3/4	11-1/2	1

FIXED FIN YAW ANGLE

The yaw angle of the fixed fin is 1° 6" to the right. This dimension is built into fin and stabilizer attachment points at time of original manufacture.

RUDDER RANGES OF MOVEMENT

Right		*Left*	
Degrees	*Inches*	*Degrees*	*Inches*
25	11-3/32	25	11-3/32

Rudder travel should be measured at point of maximum length of rudder or most aft point of rudder to airplane in level flight position.

CABLE TENSIONS

1/8"	Flap cable	94.6 lb
5/32"	Flap cable	94.6 lb
1/16"	Tab cable	28.6 lb
1/8"	Aileron cable	45 lb
1/8"	Rudder cable	51 lb
3/32"	Rudder return cable	169 lb

There are no established tensions for the rigging of the internal wing brace wires. They are rigged per standard practice. Tensions of the two wires in any one bay are balanced to bring that bay perfectly square when checked diagonally from spar centers with trammel points.

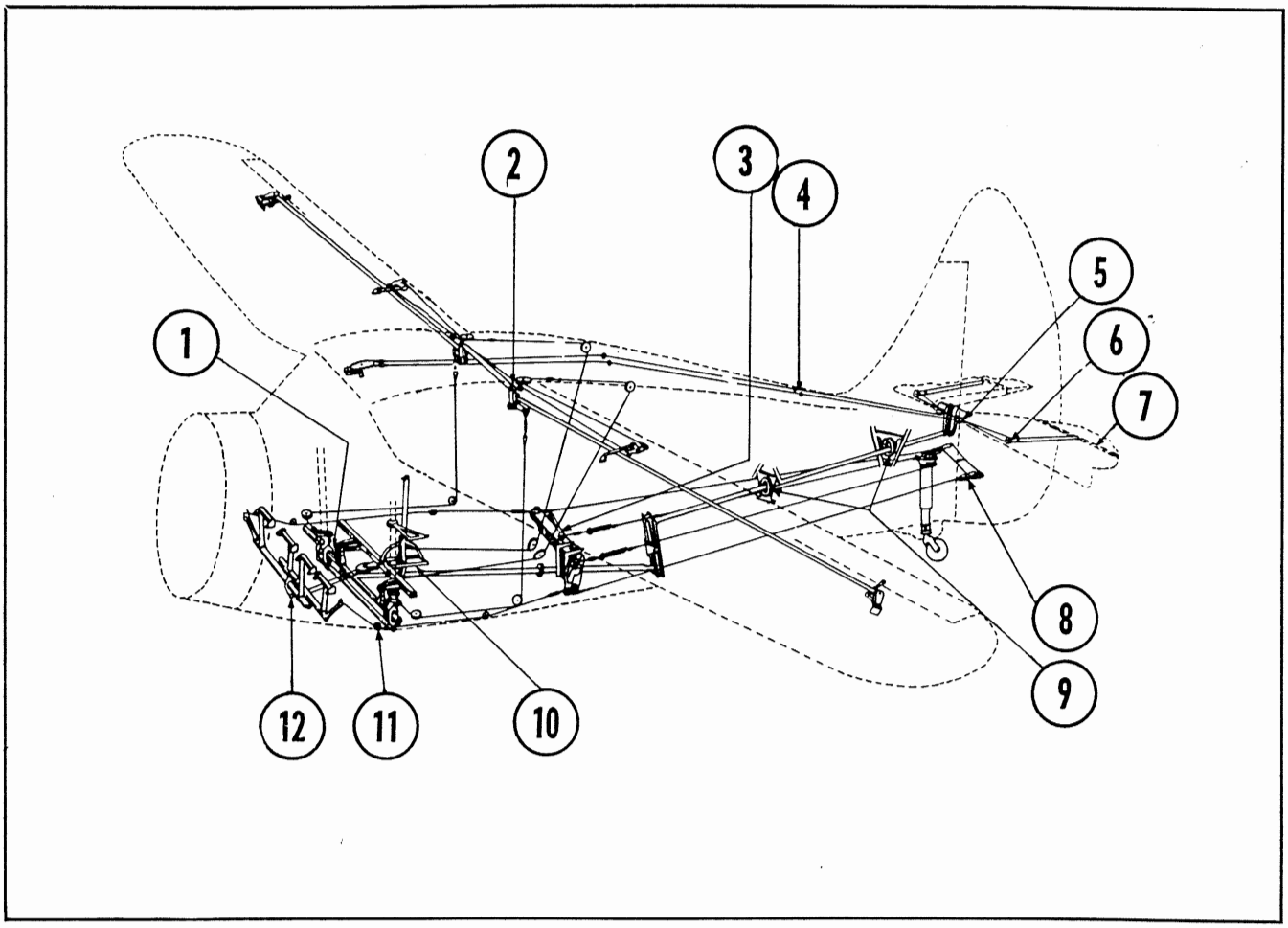


Figure 4-1—Lubrication Diagram (1 of 2)

Index No.	Part	Lubricant
1.	Control Stick Mechanism.	*Lubricating Oil, 100-hour.*
2.	Aileron Control Bellcrank.	*Cup Grease, 100-hour.*
3.	Rudder and Tail Wheel Bellcrank in Center of Fuselage.	*Lubricating Oil, 25-hour.*
4.	Tab Cable Guide.	*Cup Grease, 50-hour.*
5.	Tab Cables in Fuselage at Rear Pulleys.	*Cup Grease, 25-hour.*
6.	Tab Cables and Jacks in Elevator.	*Cup Grease, 25-hour.*
7.	Tab Hinges.	*Lubricating Oil, 50-hour.*
8.	Rudder Cable Yokes.	*Lubricating Oil, 100-hour.*
9.	Elevator Torque Tube at Felt Vibration Snubbers.	*Cup Grease, 25-hour.*
10.	Flap Control Lever on Bottom.	*Lubricating Oil, 25-hour.*
11.	Rudder Return Cable and Pulley.	*Cup Grease, 50-hour.*
12.	Bearings on Rudder Pedals.	*Lubricating Oil, 25-hour.*

NOTE

All pulleys and guides for flight control cables should be lubricated with cup grease at the 50-hour inspection period.

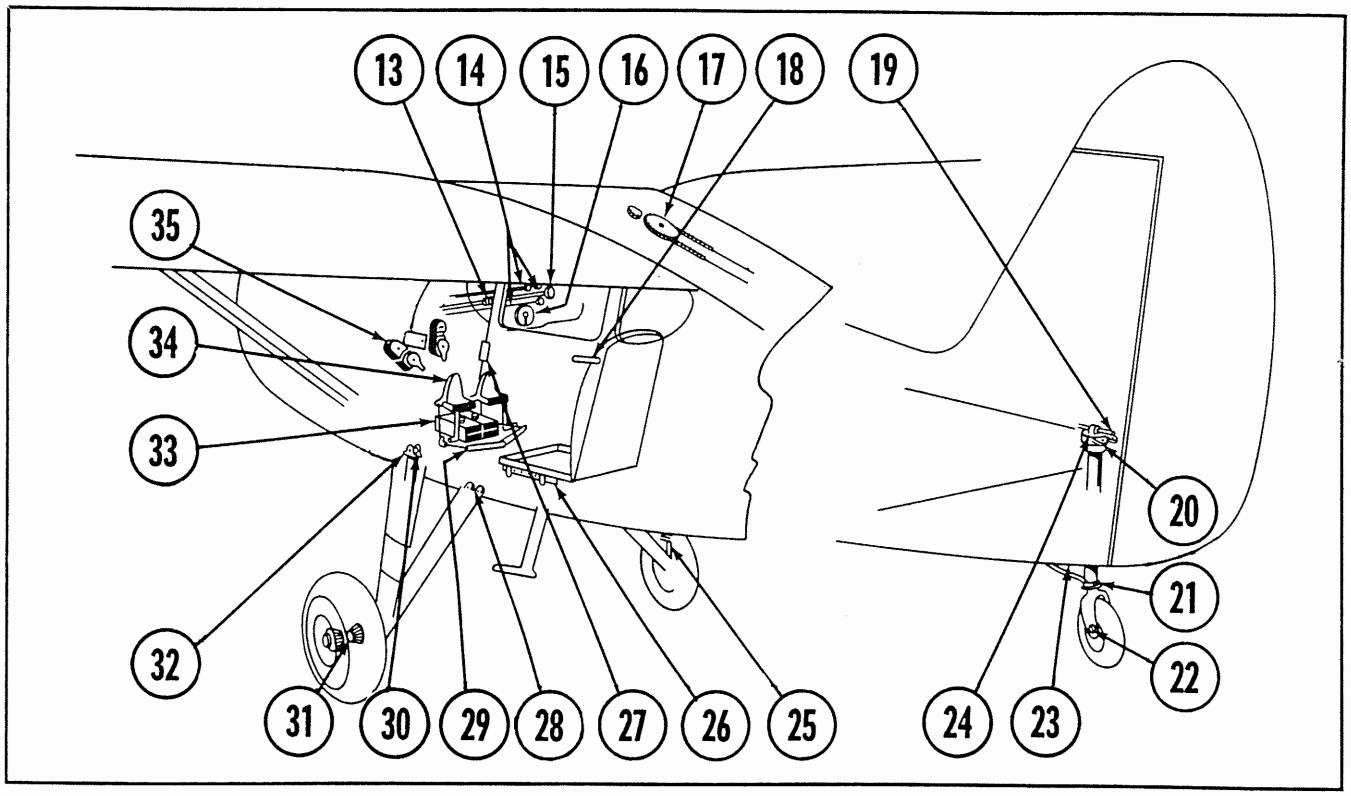


Figure 4-1—Lubrication Diagram (2 of 2)

Index No.	Part	Lubricant
13.	Parking Brake	*Cup Grease, 100-hour.*
14.	Spark, Mixture, and Carburetor Heat Controls in Cabin.	*Cup Grease, 25-hour.*
15.	Throttle Control in Cabin.	*Cup Grease, 25-hour.*
16.	Magneto Switch.	*Lubricating Oil, 25-hour.*
17.	Tab Chain in Cabin Control Box.	*Cup Grease, 100-hour.*
18.	Door Lock and Latch.	*Lubricating Oil, 25-hour.*
19.	Attachment Bolt at Top of Tail Wheel Cam.	*Lubricating Oil, 25-hour.*
20.	Tail Wheel Bronze Bearing and Cam.	*Cup Grease, 25-hour.*
21.	Tail Wheel Trunnion.	*Cup Grease, 25-hour.*
22.	Tail Wheel Axle.	*Cup Grease, 50-hour.*
23.	Tail Wheel Drag Link.	*Cup Grease, 25-hour.*
24.	Tail Wheel Oleo Fluid Filler Plug.	*Hydraulic Oil (Castor Oil Base), 25-hour.*
25.	Attachment of Oleo Strut at Tripod Assembly (Bottom).	*Lubricating Oil, 25-hour.*
26.	Pilot's Seat Slides and Adjustment Mechanism.	*Cup Grease, 100-hour.*
27.	Door Quick-Release Hinges.	*Lubricating Oil, 25-hour.*
28.	Streamlined Strut at Fuselage.	*Cup Grease, 25-hour.*
29.	Actuating Mechanism at Master Cylinder.	*Cup Grease, 25-hour.*
30.	Landing Gear Oleo Fluid Filler Plug.	*Hydraulic Oil (Castor Oil Base), 25-hour.*
31.	Landing Gear Wheel Bearings.	*Cup Grease, 50-hour.*
32.	Attachment of Oleo Strut at Tripod Assembly (Top).	*Lubricating Oil, 25-hour.*
33.	Brake Cylinder Reservoir.	*Hydraulic Oil (Castor Oil Base), 25-hour.*
34.	Brake Pedal Mechanism.	*Lubricating Oil, 50-hour.*
35.	Magnetos.	*Engine Oil, 50-hour.*

SECTION V

FINISH SPECIFICATIONS

The following, are procedures and specifications for materials which should be used in the finishing of the Fairchild 24W46 and 24R46.

WOOD AND PLYWOOD

INTERIOR SURFACES.

1. Exposed surfaces (visible to cabin interior).
   Clear varnish — two coats
   Quick drying semi-gloss enamel — one coat
2. Unexposed surfaces.
   Clear varnish sealer — two coats

EXTERIOR SURFACES.

Fabric — intermediate grade

DuPont 5499 sealer-adhesive (or equivalent) — one coat, dry one-half hour

Sealer-adhesive thinned 50% with DuPont 3328 sealer-adhesive thinner — one coat

While still wet, apply pre-doped fabric with coated side out. Allow to dry one-half hour.

Note

In sanding a fabric-covered surface, caution should be exercised so as not to cut through the fabric or reinforcing tape.

Apply tape and spray entire area with two coats of clear cellulose-nitrate dope.

Dry one-half hour and scuff sand. This operation applies only when raw (not pre-doped) fabric is used.

Clear dope — two coats
Dry one-half hour and scuff sand.

Clear dope — two coats
Dry two hours and scuff sand.

Aluminum pigmented dope — two coats
Dry eight hours, dry sand (4/0 paper), wet sand (320 paper).

Pigmented dope, desired color — five coats
Dry eight hours, wet sand (4/0 paper), hand rub with rubbing compound (Berry Brothers superfine or equivalent).

Note

On the bottom surface of the stabilizer, the above finish requirements may be modified to the extent of omitting two coats of clear dope, two coats of pigmented dope and adding one gloss coat of pigmented dope.

FABRIC SURFACES

STANDARD COLD DOPING SYSTEM. Unsupported fabric-covered surfaces are finished with cold dope as follows:

1. Brush Coat — one coat
   Cellulose nitrate clear dope — one coat
   Dry one-half hour
   Apply tape with dope, dry one-half hour.
   Cellulose nitrate clear dope — one coat
   Dry one-half hour, scuff sand (4/0 paper)
   Cellulose nitrate clear dope — two coats
   Dry two hours and scuff sand.
   Aluminum pigmented dope — two coats
   Dry eight hours, dry and sand (4/0 paper) wet sand paper (320).
2. Finish Coats.
   a. Fuselage, Rudder, Elevator and Elevator Tabs.
      Pigmented dope, desired color — six coats
      Dry eight hours, wet sand (4/0 paper), hand rub with rubbing compound (Berry Brothers superfine or equivalent).
   b. Wings and Ailerons.
      Pigmented dope — five coats
      High gloss pigmented dope — one coat

Note

An addition of zinc naphthenate or Milban to the first coat of clear dope, for the purpose of preventing mould growth, is optional.

ALTERNATE FABRIC DOPING SYSTEMS. In lieu of the standard cold doping system described above, it is permissible to use predoped grade "A" fabric on unsupported fabric-covered control surfaces. Either hot or cold dope is employed.

FABRIC DOPE-PROOF REQUIREMENTS. Fabric in contact with wood surfaces (except actual fabric-covered wood surfaces) is suitably protected by first coating the wood faying surfaces with one coat of dope-proof paint. The dope-proofing of metal surfaces in contact with doped fabric is not required when the metal is finished with zinc chromate primer.

METAL SURFACES AND PARTS

Prior to painting, all metal parts should be thoroughly cleaned to produce satisfactory results for paint adhesion. Surfaces should be given the initial specified coat as soon as practical after cleaning.

ALUMINUM ALLOY PARTS. All structural aluminum alloy parts are anodized. Because of discoloring effect, substitute processes are not satisfactory for exposed surfaces which subsequently remain unpainted.

PARTS EXEMPT FROM ANODIC TREATMENT

a. All aluminum alloy fluid line tubing.

b. Alloys with copper content above 5%.

c. Closed welded assemblies such as tanks.

d. Castings.

e. Aluminum alloy parts forming the scuff plates, fluid lines, cooling cowl and the forward side of the firewall.

ALUMINUM ALLOY FINISH

1. Wing Flaps. (Metal covered)
   Zinc chromate primer — two coats
   Pigmented dope — one coat
   High gloss pigmented dope — one coat
2. Wing Filets, Struts and Fairings.
   Zinc chromate primer — one coat
   Pigmented dope — two coats
   Dry eight hours, wet sand, (4/0 paper), hand rub with rubbing compound (Berry Brothers superfine or equivalent).
3. Fuel and Oil Tanks.
   a. Fuel Tanks.
      Zinc chromate primer — one coat
      Finish the top to match exterior finish of top of wing.
   b. Oil Tanks.
      Zinc chromate primer — one coat
      Aluminum lacquer — two coats
      Aluminum alloy parts forming fluid lines, scuff plates, cooling cowl and the forward side of the fire wall receive no finish.

STEEL PARTS

Independent steel parts and fittings are sand-blasted, then cadmium or zinc plated.

TREATMENT OF UNPLATED PARTS.

1. Fuselage Structure
   Sand-blasted and finished with
   zinc chromate primer (cross coats) — two coats
2. Pilot's Compartment.
   Sand-blasted and finished with
   zinc chromate primer — one coat
   Lacquer (to match interior finish) — one coat
3. Exposed Parts.
   Sand-blasted and finished with
   zinc chromate primer — one coat
   Lacquer (to match exterior finish) — one coat
4. Battery Box and Mounting Brackets.
   Zinc chromate primer — one coat
   Acid-proof paint — one coat

The fire wall within twelve inches of the battery on Warner-powered model receives an identical treatment.

5. Miscellaneous.
   Sand-blasted and finished with
   zinc chromate primer — one coat
   Aluminum lacquer — one coat

INDIVIDUAL COLOR AND TRIM

In the event the F24 owner is confronted with redoping, patching or refinish work of any kind, presented herewith is a handy reference list regarding exterior and interior colors and finishes.

Base Color	*Trim Color*	*Edging Color*
Loening Yellow	Stinson Green	Black
Stinson Red	Diana Cream	Black
Insignia Red	Aircraft Gray	Black

Note

When exterior color scheme having Loening Yellow background is used, the first two coats of pigmented dope should be applied in "Orange Yellow."

All colors designated are from Berry Brothers pigmented dope color card. If purchased from other vendors, the color should be an identical match. Trim color is the broad stripe over the top of the cowl and the upper front portion of the fuselage. This same trim is used for the broad stripe on the wheel pants and for the license numbers on the wings and tail. One-eighth (1/8) inch black edge striping is used between the trim stripe and the base color. (This edging is not used around the license numbers.) The base color is used on all exterior surfaces, except where trim color is required.

INTERIOR COLOR AND TRIM FINISHES

1. One coat standard gloss lacquer, color to match Tennessee Eastman Corporation color chip for TENITE plastic number 6647-5171, is used on the following:
   Fuselage structure—from station 4 forward (except as noted under 2 below).
   Seat frames
   Inside of windshield frame
   Metal fairing over the flap cables above the baggage compartment
   License card holder
   Ventilator inlets
   Glove compartment interior
   Cover plates and removable panel over instruments
   Raised bulkhead forming glove compartment

2. The top of the baggage compartment door, interior, and the shield of the baggage compartment are covered with intermediate grade fabric and finished with:

Clear dope	three coats
Pigmented dope	three coats
Gloss pigmented dope	one coat

3. Semi-gloss lacquer, color to match Berry Brothers Stinson Red is used for:

Top cuff over instrument panel
Rear face of fire wall
Rudder pedals
Side panels
Exposed members of fuselage structure

4. Hand rubbed standard gloss lacquer color to match Berry Brothers Stinson Red is used for finishing all sill mouldings.

5. Carpets are made from maroon sponge rubber backed—40 inch.

6. Assist cords are of two ounce upholstery grade leather, permanently dyed.

UPHOLSTERY

SEATS AND ARM RESTS.

Craftex Mills, cloth No. K-58 (FAIL10).
Width—54 inches, 11 yards required per airplane.

WELTING.

Used around seats, ceiling and side panels.
This welting is made by folding and sewing upholstery cloth over 1/8-inch welting cord. Where welting is specified around the windshield and at the door it is made from sidewall upholstery cloth.

APPENDIX I

DATA FOR "24" SERIES PRIOR TO 1946 MODELS

The following tables list items that are installed as standard and special equipment on F24 series airplanes:

24C0E

STANDARD

Engine—Warner Super-Scarab
Propeller—Sensenich
Starter—Eclipse
Fire Extinguisher—Fyr Fyter
Fuel Strainer—Lunkenheimer
Fuel Tanks (20-gallon)
Oil Tank
Wheels—Warner 6.50 x 10
Tires and Tubes—Goodrich 6.50 x 10
Tail Wheel—Goodyear 8-inch
Pilot's Seat
Copilot's Seat
Rear Seat
First Aid Kit
Navigation Lights—Grimes
Instrument Light—Fairchild
Safety Belts—Nicholas-Beazley

SPECIAL

Propeller—Hamilton, Curtiss-Reed or Hartzell
Engine Radio Shielding—Air Associates
Generator—Leece-Neville or Bosch
Generator, Wind-Driven—Air Associates
Battery—Exide or Reading
Landing Lights—Adams-Westlake
Landing Lights—Grimes
Wheel Pants—Fairchild
Ventilating System—Fairchild
Clock—Pioneer
Pressure Fire Extinguisher—Lux
Heating System—Fairchild
Pitot Tube (electrically heated)
Cantilever Landing Gear—Fairchild
Sport-Type Fairing—Fairchild
Parachute-Type Seats—Irvin
Auxiliary Fuel Tank (20-gallon)
Parachute Flares—International Flare Co.
Radio Receiver—Western Electric
Dynamotor—Western Electric
Radio Receiver—RCA
Radio Compass—RCA or Fairchild
Radio Compass—Fairchild
Rear Bench Seat
Radio Transmitter—Lear

24C8F

STANDARD

Engine—Ranger
Propeller—Sensenich
Starter—Eclipse
Fire Extinguisher—Fyr Fyter
Fuel Strainer—Lunkenheimer
Fuel Tanks (20 gallon)
Oil Tank
Wheels—Warner 6.50 x 10
Tires and Tubes—Goodrich 6.50 x 10
Tail Wheel—Goodyear or General 8-inch
Pilot's Seat
Copilot's Seat
Rear Seat
First Aid Kit
Oil Cooler—Harrison
Generator—Electric Specialty Co.
Voltage Regulator—Delco-Remy
Booster Coil—Ford
Navigation Lights—Grimes
Instrument Light—Fairchild
Safety Belts—Nicholas-Beazley

SPECIAL

Propeller—Hartzell
Engine Radio Shielding—Air Associates
Generator, Wind-Driven—Air Associates
Battery—Exide or Reading
Landing Lights—Adams-Westlake
Landing Lights—Grimes
Wheel Pants—Fairchild
Clock—Pioneer
Pressure Fire Extinguisher—Lux
Heating System—Fairchild
Pitot Tube (electrically heated)
Cantilever Landing Gear—Fairchild
Sport-Type Fairing—Fairchild
Parachute-Type Seats—Irvin
Auxiliary Fuel Tank (20-gallon)
Parachute Flares—International Flare Co.
Radio Receiver—Western Electric
Dynamotor—Western Electric
Radio Receiver—RCA
Radio Compass—RCA or Fairchild
Rear Bench Seat

24G

STANDARD

Engine—Warner Super-Scarab
Propeller—Sensenich
Starter—Eclipse
Fire Extinguisher—Fyr Fyter
Fuel Strainer—Lunkenheimer
Fuel Tanks (20-gallon)
Oil Tank
Wheels—Warner 6.50 x 10
Tires and Tubes—Goodrich 6.50 x 10
Tail Wheel—Goodyear or General 8-inch
Pilot's Seat
Copilot's Seat
Rear Seat
First Aid Kit
Navigation Lights—Grimes
Instrument Light—Fairchild
Safety Belts—Air Associates
Hub Streamlines—Fairchild
Engine Ring Cowl and Supports
Baggage Tie-Down Straps

SPECIAL

Propeller—Hamilton or Curtiss-Reed
Engine Radio Shielding—Air Associates
Generator—Leece-Neville or Bosch
Generator, Wind-Driven—Air Associates
Battery—Reading
Landing Lights—Adams-Westlake
Landing Lights—Grimes
Wheel Streamlines—Fairchild
Ventilating System—Fairchild
Clock—Pioneer
Pressure Fire Extinguisher—Lux
Heating System—Fairchild
Pitot Tube (electrically heated)
Parachute-Type Seats—Irvin
Auxiliary Fuel Tank (20-gallon)
Parachute Flares—International Flare Co.
Dynamotor—Western Electric
Radio Receiver—Western Electric or RCA
Radio Compass—Fairchild
Rear Bench Seat
Radio Transmitter—Lear or RCA
Quick-Release Door Hinges—Fairchild
Dual Brakes—Fairchild
Antenna Mast
Trailing Antenna
Special Cabinet

24H

STANDARD

Engine—Ranger
Propeller—Sensenich
Starter—Eclipse
Fire Extinguisher—Fyr Fyter
Fuel Strainer—Lunkenheimer
Fuel Tanks (20-gallon)
Oil Tank
Wheels—Warner 6.50 x 10
Tires and Tubes—Goodrich 6.50 x 10
Tail Wheel—Goodyear or General 8-inch

Pilot's Seat
Copilot's Seat
Rear Seat
First Aid Kit
Oil Cooler
Generator—Electric Specialty Co.
Voltage Regulator—Delco-Remy
Booster Coil—Ford
Navigation Lights—Grimes
Instrument Light—Fairchild
Safety Belts—Air Associates
Wheel Streamlines—Fairchild
Ventilating Systems—Fairchild

SPECIAL

Propeller—Curtiss-Reed or Hartzell
Engine Radio Shield—Air Associates
Generator, Wind-Driven—Air Associates
Battery—Reading
Landing Lights—Adams-Westlake
Landing Lights—Grimes
Clock—Pioneer
Pressure Fire Extinguisher—Lux
Heating System—Fairchild
Pitot Tube (electrically heated)
Parachute-Type Seats—Irvin or Switlik
Auxiliary Fuel Tank (20-gallon)
Parachute Flares—International Flare Co.
Dynamotor—Western Electric
Radio Receiver—RCA or Western Electric
Radio Compass—RCA or Fairchild
Radio Transmitter—Lear or RCA
Quick-Release Door Hinges—Fairchild
Dual Brakes—Fairchild

24J

STANDARD

Engine—Warner
Propeller Sensenich
Starter—Eclipse
Fire Extinguisher—Fyr Fyter
Fuel Strainer—Lunkenheimer
Fuel Tanks (20-gallon)
Oil Tank
Wheels—Warner 6.50 x 10
Tires and Tubes—Goodrich or General 6.50 x 10
Tail Wheel—Goodyear or General 8-inch
Pilot's Seat
Copilot's Seat
Rear Seat
First Aid Kit
Navigation Lights—Grimes
Instrument Light—Fairchild
Safety Belts—Air Associates
Hub Streamlines—Fairchild
Engine Ring Cowl and Supports
Baggage Compartment

SPECIAL

Propeller—Hamilton or Curtiss-Reed
Engine Radio Shielding—Air Associates
Generator—Leece-Neville or Bosch
Generator, Wind-Driven—Air Associates
Battery—Exide
Landing Lights—Adams-Westlake
Landing Lights—Grimes
Wheel Streamlines—Fairchild
Ventilating System—Fairchild
Clock Pioneer
Pressure Fire Extinguisher—Lux
Heating System—Fairchild
Pitot Tube (electrically heated)
Parachute-Type Seats—Irvin or Switlik
Auxiliary Fuel Tank (20-gallon)
Parachute Flares—International Flare Co.
Dynamotor—Western Electric
Radio Receiver—Western Electric or RCA
Radio Compass—RCA or Fairchild
Radio Transmitter—RCA or Lear
Quick-Release Door Hinges—Fairchild
Dual Brakes—Fairchild
Lear Radio
Dome Light
Steerable Tail Wheel
Oil Cooler—Harrison

24K

STANDARD

Engine—Ranger
Propeller—Sensenich
Starter—Eclipse
Fire Extinguisher—Fyr Fyter
Fuel Strainer—Lunkenheimer
Fuel Tanks (20-gallon)
Oil Tank
Wheels—Warner 6.50 x 10
Tires and Tubes—General 6.50 x 10
Tail Wheel—General 8-inch
Pilot's Seat
Copilot's Seat
Rear Seat
First Aid Kit
Oil Cooler—Harrison
Generator—Electric Specialty Co.
Voltage Regulator—Delco-Remy
Navigation Lights—Grimes
Instrument Light—Fairchild
Safety Belts—Air Associates
Baggage Compartment

SPECIAL

Propeller—Curtiss-Reed
Engine Radio Shielding—Air Associates
Generator, Wind-Driven—Air Associates
Battery—Exide
Landing Lights—Adams-Westlake
Landing Lights—Grimes
Wheel Streamlines—Fairchild
Ventilating System—Fairchild
Clock—Pioneer
Pressure Fire Extinguisher—Lux
Heating System—Fairchild
Pitot Tube (electrically heated)
Parachute-Type Seats—Irvin or Switlik
Parachute Flares—International Flare Co.
Radio Receiver—Western Electric or RCA
Dynamotor—Western Electric
Radio Compass—Fairchild or RCA
Radio Transmitter—RCA or Lear
Quick-Release Door Hinges—Fairchild
Dual Brakes—Fairchild
Lear Radio
Dome Light
Steerable Tail Wheel
Fuel Tanks (30-gallon)

24W9

STANDARD

Engine—Warner Super-Scarab
Propeller—Sensenich
Starter—Eclipse
Fire Extinguisher—Fyr Fyter
Fuel Strainer—Lunkenheimer
Fuel Tanks (20-gallon)
Oil Tank
Wheels—Hayes 6.50 x 10
Tires and Tubes—Goodrich or General 6.50 x 10
Tail Wheel—Goodyear or General 8-inch
Pilot's Seat
Copilot's Seat
Rear Seat
First Aid Kit
Navigation Lights—Grimes
Instrument Light—Fairchild
Safety Belts—Air Associates
Hub Streamlines—Fairchild
Engine Ring Cowl and Supports
Ventilating System—Fairchild
Baggage Compartment
Hydraulic Brake Cylinders—Hayes
Steerable Tail Wheel

SPECIAL

Propeller—Hamilton or Curtiss-Reed
Engine Radio Shielding—Air Associates
Generator—Leese-Neville
Generator, Wind-Driven—Air Associates
Battery—Reading
Landing Lights—Grimes
Wheel Pants—Fairchild
Clock
Pressure Fire Extinguisher—Lux
Heating System
Pitot Tube (electrically heated)
Parachute-Type Seats—Irvin or Switlik
Parachute Flares—International Flare Co.
Radio Receiver—Western Electric or RCA
Dynamotor—Western Electric
Radio Compass—RCA
Radio Transmitter—RCA or Lear
Quick-Release Door Hinges—Fairchild
Dual Brakes—Fairchild
Lear Radio
Dome Light
Oil Cooler—Harrison
Fuel Tanks (30 gallon)
Cabin Door Windows—Duplate or Aerolite

24R9

STANDARD

Engine—Ranger
Propeller—Sensenich
Starter Eclipse
Fire Extinguisher—Fyr Fyter
Fuel Strainer—Lunkenheimer
Fuel Tanks (20-gallon)
Oil Tank
Wheels—Hayes 6.50 x 10
Tires and Tubes—Goodrich 6.50 x 10
Tail Wheel—Goodyear 8-inch
Pilot's Seat
Copilot's Seat
Rear Seat
First Aid Kit
Oil Cooler—Harrison
Generator—Electric Specialty Co.
Voltage Regulator—Delco-Remy
Navigation Lights—Grimes
Instrument Light—Fairchild
Safety Belts—Air Associates
Hub Streamlines—Fairchild
Ventilating System—Fairchild
Baggage Compartment
Hydraulic Brake Cylinders—Hayes
Steerable Tail Wheel

SPECIAL

Engine Radio Shielding—Air Associates
Battery—Reading
Landing Lights—Grimes
Wheel Pants—Fairchild
Pressure Fire Extinguisher—Lux

Heating System—Fairchild
Pitot Tube (electrically heated)
Parachute-Type Seats—Irvin or Switlik
Parachute Flares—International Flare Co.
Radio Receiver—Western Electric or RCA
Dynamotor—Western Electric
Radio Compass—RCA
Radio Transmitter—RCA or Lear
Quick-Release Door Hinges—Fairchild
Dual Brakes—Fairchild
Antenna Mast
Dome Light
Fuel Tanks (30-gallon)
Cabin Door Windows—Duplate or Aerolite

24W40

STANDARD

Engine—Warner Super-Scarab
Propeller—Sensenich
Starter—Eclipse
Fire Extinguisher—Fyr Fyter
Fuel Strainer—Lunkenheimer
Fuel Tanks (30-gallon)
Oil Tank
Wheels—Hayes 6.50 x 10
Tires and Tubes—Goodrich or General 6.50 x 10
Tail Wheel—Goodyear or General 8-inch
Pilot's Seat
Copilot's Seat
Rear Seat
First Aid Kit
Navigation Lights—Grimes
Instrument Light—Fairchild
Safety Belts—Air Associates
Hub Streamlines—Fairchild
Engine Ring Cowl and Supports
Ventilating System—Fairchild
Baggage Compartment
Hydraulic Brake Cylinders—Hayes
Steerable Tail Wheel
Cabin Door Windows—Duplate or Aerolite

SPECIAL

Propeller—Hamilton or Curtiss-Reed
Engine Radio Shielding—Air Associates
Generator—Leece-Neville
Generator, Wind-Driven—Air Associates or Hodges-Champion
Battery—Reading
Landing Lights—Grimes
Wheel Streamlines—Fairchild
Clock
Pressure Fire Extinguisher—Lux
Heating System—Fairchild
Pitot Tube (electrically heated)
Parachute-Type Seats—Irvin or Switlik
Parachute Flares—International Flare Co.
Dynamotor
Radio Receiver—RCA
Radio Receiver and Transmitter—Lear
Quick-Release Door Hinges—Fairchild
Dual Brakes
Dome Light
Oil Cooler

24R40

STANDARD

Engine—Ranger
Propeller—Sensenich
Starter—Eclipse
Fire Extinguisher—Fyr Fyter
Fuel Strainer—Lunkenheimer
Fuel Tanks (20-gallon)
Oil Tank
Wheels—Hayes 6.50 x 10
Tires and Tubes—Goodrich or General 6.50 x 10
Tail Wheel—Goodyear or General 8-inch
Pilot's Seat
Copilot's Seat
Rear Seat
First Aid Kit
Oil Cooler—Harrison
Generator—Electric Specialty Co.
Voltage Regulator—Delco-Remy
Navigation Lights—Grimes
Instrument Light—Fairchild
Safety Belts—Air Associates
Hub Streamlines—Fairchild
Ventilating System—Fairchild
Baggage Compartment
Hydraulic Brake Cylinders—Hayes
Steerable Tail Wheel

SPECIAL

Engine Radio Shielding—Air Associates
Battery—Reading
Landing Lights—Grimes
Pressure Fire Extinguisher—Lux
Heating System—Fairchild
Pitot Tube (electrically heated)
Parachute-Type Seats—Irvin or Switlik
Parachute Flares—International Flare Co.
Radio Transmitter and Receiver—RCA or Lear
Quick-Release Door Hinges—Fairchild
Dual Brakes—Fairchild
Fuel Tanks (30-gallon)
Cabin Door Windows—Duplate or Aerolite

24W41

STANDARD

Engine—Warner Super-Scarab
Propeller—Sensenich
Starter—Eclipse

Fire Extinguisher—Fyr Fyter
Fuel Strainer—Lunkenheimer
Fuel Tanks (30-gallon)
Oil Tank
Wheels—Hayes 6.50 x 10
Tires and Tubes—Goodrich 6.50 x 10
Tail Wheel—Hayes 8-inch
Pilot's Seat
Copilot's Seat
Rear Seat
First Aid Kit
Landing Lights—Grimes
Navigation lights—Grimes
Instrument Light—Fairchild
Safety Belts
Hub Streamlines
Ventilating System
Baggage Compartment
Hydraulic Brake Cylinders
Steerable Tail Wheel

SPECIAL

Propeller—Hamilton or Curtiss-Reed
Radio Engine Shielding
Battery—Reading
Radio Compass—Lear
Radio Transmitter—Lear
Aeronaut Reel
Oil Cooler
Clock
Generator, Wind-Driven—Champion
Dual Brakes

24W41A

STANDARD

Engine—Warner
Propeller—Sensenich
Starter—Eclipse
Battery—Reading
Fire Extinguisher—Fyr Fyter
Fuel Strainer—Lunkenheimer
Fuel Tanks (30-gallon)
Oil Tank
Wheels—Hayes 6.50 x 10
Tires and Tubes—Goodrich or General 6.50 x 10
Tail Wheel—Goodyear or General 8-inch
Pilot's Seat
Copilot's Seat
Rear Seat
First Aid Kit
Navigation Lights—Grimes
Instrument Light—Fairchild
Safety Belts—Air Associates
Hub Streamlines—Fairchild
Ventilating System—Fairchild
Engine Ring Cowl and Supports
Baggage Compartment
Hydraulic Brake Cylinders—Hayes
Steerable Tail Wheel
Cabin Door Windows—Duplate

SPECIAL

Propeller—Hamilton or Curtiss-Reed
Engine Radio Shielding—Air Associates
Generator—Leece-Neville
Generator, Wind-Driven—Champion
Landing Lights—Grimes
Wheel Pants—Fairchild
Pressure Fire Extinguisher—Lux
Heating System—Fairchild
Pitot Tube (electrically heated)
Parachute-Type Seats—Irvin or Switlik
Parachute Flares—International Flare Co.
Dome Light
Dual Brakes Fairchild
Radio Transmitter and Receiver—Western Electric, RCA or Lear
Quick-Release Door Hinges—Fairchild

MAIN LANDING GEAR.

WHEELS AND BRAKES

24C8E, 24C8F, 24G, 24H, 24J, 24K.....Warner
24W9, 24R9, 24W40, 24R40, 24W41, 24W41A.....Hayes

TIRES

Type.....General or Goodrich 6.50x10
Pressure.....25 pounds

SHOCK STRUT

Type.....Spring—Oleo
Fluid.....Lockheed No. 5 Hydraulic Brake Fluid, or equivalent

TAIL WHEEL

WHEEL (HUB)

All models.....Air Associates or Variety Hub, 8-inch

TIRES

Type.....Goodyear or General, 8-inch Streamline, 6-ply
Pressure.....45 pounds

SHOCK STRUT

Type.....Spring—Oleo
Fluid.....Lockheed No. 5 Hydraulic Brake Fluid, or equivalent

POWER PLANT

Airplane Model	*Engine Model*	*HP*	*Recommended Cruising R.P.M.*
24C8E	Warner Super-Scarab 40, 50 or 50A	145	1870
24C8F	Ranger 6-390D	145	2140
24C8F	Ranger 6-390D3	150	2140
24G	Warner Super-Scarab 40, 50 or 50A	145	1870
24H	Ranger 6-390D3	150	2140
24J	Warner Super-Scarab 50 or 50A	145	1870
24K	Ranger 6-410-B1, -B1A, -B2, -B2A, or -B2B	165	2230
24W9	Warner Super-Scarab 50 or 50A	145	1870
24R9	Ranger 6-410-B1, -B1A, -B2, -B2A or -B2B	165	2230
24W40	Warner Super-Scarab 50 or 50A	145	1870
24R40	Ranger 6-410-B3	175	2230
24W41	Warner Super-Scarab 50 or 50A	145	1870
24W41A	Warner Super-Scarab 135E	165	1910

WING DATA

Airplane Model	*Chord (Feet)*	*Incidence (Degrees)*	*Dihedral (Degrees)*
24C8E, 24C8F, 24G, 24H	5′ 6″	1	1½
24J, 24K, 24W9, 24R9, 24W40, 24R40, 24W41, 24W41A	5′ 6″	1	2½

APPENDIX I

FUSELAGE DIMENSIONS

Airplane Model	*Width (Feet)*	*Height (Feet)*	*Length Without Engine Mount (Feet)*	*Length With Engine Mount (Feet)*
24C8E, 24G, 24J, 24W9, 24W40, 24W41	3′ 10¼″	5′ ¼″	18′ 5⅞″	19′ 11⅞″
24C8F, 24H, 24K, 24R9, 24R40	3′ 10¼″	5′ ¼″	18′ 5⅞″	22′ 1⅜″
24W41A	3′ 10¼″	5′ ¼″	18′ 5⅞″	19′ 8 15/16″

STABILIZER DATA

Airplane Model	*Span (Feet)*	*Max. Chord (Feet)*
All models	12′ 1⅝″	4′ 8 11/16″

SURFACE CONTROLS RANGES OF MOVEMENT

ELEVATOR TABS

Airplane Model	*Up*	*Down*
24C8E, 24G	5½° or ⅜″	6° or 13/32″
24C8F, 24H	10¾° or 23/32″	3½° or ¼″
24J, 24K, 24W9, 24R9, 24W40, 24R40, 24W41, 24W41A	10° or 11/16″	10° or 11/16″

FLAPS

Airplane Model	*Down*
All models	60° or 8⅛″

VERTICAL FIN SETTING

Airplane Model	*(Degrees to Right)*
All models	1° 6′

APPENDIX I

ELEVATOR

Airplane Model	*Up*	*Down*
24C8E, 24G, 24J, 24W9, 24W40, 24W41, 24W41A	25° or 7½″	25° or 7½″
24C8F	29° or 8¾″	25° or 7½″
24H, 24K, 24R9, 24R40	36° or 11″	25° or 7½″

AILERON

Airplane Model	*UP*		*DOWN*	
	Degrees and Minutes	*Inches*	*Degrees and Minutes*	*Inches*
24C8E, 24C8F, 24G, 24H	19° 32′	5½″	14° 6′	3¼″
24J, 24K, 24W9, 24W40, 24R40, 24W41, 24W41A	17° 38′	4 1/16″	12° 28′	2⅞″

RUDDER

Airplane Model	*Right*	*Left*
24C8E, 24C8F, 24G	27° or 12 3/16″	27° or 12 3/16″
24H, 24J, 24K, 24W9, 24R9, 24W40, 24R40, 24W41, 24W41A	25° or 11 3/32″	25° or 11 3/32″

HORIZONTAL STABILIZER SETTING

Airplane Model	*(Degrees of Incidence)*
All models	−2°

APPENDIX I

PROPELLER INSTALLATION

Airplane Model	*Sensenich (Standard)*	*Curtiss-Reed (Optional)*	*Hamilton (Optional)*	*Hartzell (Optional)*
C8E	86C63* 86CA63**	55511	Blades—19B1/2-6, Hub—7056-H*	706E*
C8F	86B53* 86B58*	.....	.....	729C*
24G	86C67* 86CA67** 86C63* 86CA63**	55511*	Blades—19B1/2-16, Hub—7056-H*	.....
24H	86B53* 86B58*	55511*	.....	729C*
24J	86C67* 86CA67**	55511*	Blades—19B1/2-16, Hub—7056-H*	.....
24K	86B58*	55511*	.....	.....
24W9	86C67*	55511*	Adjustable Pitch, Metal	.....
24R9	86B55* 86B58*	.....	.....	.....
24W40	86C67* 86CA67** 86CA69**	55511*	Adjustable Pitch, Metal	.....
24R40	86B55* 86BAS58*	.....	.....	.....
24W41	86C67* 86CA67** 86CA69**	55511*	Adjustable Pitch, Metal	.....
24W41A	86CA69**	55518	Blades 6165A-O, Model 2B	.....

*Taper shaft engine. **Spline shaft engine.

SURFACE AREAS

Airplane Model	*Wing Including Ailerons and Flaps (Square Feet)*	*Ailerons (Square Feet)*	*Flaps (Square Feet)*	*Stabilizer (Square Feet)*
All models	193.3	16.34	6	21.9

Airplane Model	*Elevator Including Tab (Square Feet)*	*Elevator Trim Tab (Square Inches)*	*Fin (Square Feet)*	*Rudder (Square Feet)*
24C8E 24C8F 24G 24H	13.45	106.64	4.10	9.40
24J 24K 24W9 24R9 24W40 24R40 24W41 24W41A	13.45	106.64	6.12	10.16

APPENDIX I

LAND PLANE DIMENSIONS

Warner Engine	*Length Overall*	*Span*	*Propeller Diameter (Maximum Allowable)*	*Height At Rest*
24C8E, 24G	23′ 9″	36′ 4″	90″	7′ 3¼″
24J-145HP, 24W9, 24W40, 24W41, 24W41A	23′ 9″	36′ 4″	92″	7′ 3¼″
Ranger Engine				
24C8F, 24H, 24K, 24R9, 24R40	24′ 10″	36′ 4″	90″	7′ 3¼″

SEAPLANE DIMENSIONS

Warner Engine	*Length Overall*	*Span*	*Propeller Diameter*	*Height At Rest*
24C8ES	24′ 10″	36′ 4″	90″	11′ 4½″
24GS	28′ 8⅝″	36′ 4″	90″	11′ 4½″
24JS, 24W9S, 24W40S, 24W41S	26′ 2″	36′ 4″	92″	11′ 7¼″
Ranger Engine				
24C8FS	24′ 10″	36′ 4″	90″	11′ 4½″
24KS, 24R9S, 24R40S	26′ 3″	36′ 4″	90″	11′ 7¼″

MISCELLANEOUS DATA, F-24 SERIES AIRPLANES

Airplane Model	Maximum Engine RPM	Brakes	Fuel Tanks (Capacity, Each Tank, and No. of Sumps)	Cruising Speed (MPH)	Tail Wheel	Rudder Trim	Gross Weight (Lbs.), Land-Planes	Gross Weight (Lbs.), Sea-Planes
24C8E	*2050*	*Mechanical*	*20 gal., 1 sump*	*105*	*Full-swiveling*	*Camber*	*2400*	*2550*
24C8F	*2250*	*Mechanical*	*20 gal., 1 sump*	*120*	*Full-swiveling*	*Camber*	*2400*	*2550*
24G	*2050*	*Mechanical*	*20 gal., 1 sump*	*105*	*Full-swiveling*	*Camber*	*2400*	*2550*
24H	*2350*	*Mechanical*	*20 gal., 1 sump*	*115*	*Full-swiveling*	*Camber*	*2400*	*2550*
24J	*2050*	*Mechanical*	*20 gal., 1 sump*	*120*	*Full-swiveling*	*Camber*	*2550*	*2750*
24K	*2450*	*Mechanical*	*20 gal., 1 sump*	*115*	*Full-swiveling*	*Camber*	*2550*	*2750*
24W9	*2050*	*Hydraulic*	*20 gal., 2 sumps*	*115*	*Full-swiveling steerable*	*Camber*	*2550*	*2750*
24R9	*2450*	*Hydraulic*	*20 gal., 2 sumps*	*120*	*Full-swiveling steerable*	*Camber*	*2550*	*2750*
24W40	*2050*	*Hydraulic*	*30 gal., 2 sumps*	*125*	*Full-swiveling steerable*	*Camber*	*2550*	*2750*
24R40	*2450*	*Hydraulic*	*20 gal., 2 sumps*	*120*	*Full-swiveling steerable*	*Camber*	*2550*	*2750*
24W41, 24W41A	*2100*	*Hydraulic*	*30 gal., 2 sumps*	*120*	*Full-swiveling steerable*	*Camber*	*2562*	*2762*

THE FOLLOWING TABLE LISTS INSTRUMENTS INSTALLED IN VARIOUS F-24 SERIES AIRPLANES:

AIRPLANE MODEL	INSTRUMENT	MANUFACTURER
24C8E	*Ammeter*	*Weston, Delco-Remy or Champion*
	Voltmeter	*Weston*
	Ice Warning Indicator	*Kollsman*
	Outside Air Temperature Gage	*Weston*
	Manifold Pressure Gage	*Kollsman*
24C8F	*Ice Warning Indicator*	*Kollsman*
	Outside Air Temperature Gage	*Weston*
	Ammeter	*Weston, Delco-Remy or Champion*
24G	*Ammeter*	*Weston, Delco-Remy or Champion*
	Voltmeter	*Weston*
	Ice Warning Indicator	*Kollsman*
	Outside Air Temperature Gage	*Weston*
	Manifold Pressure Gage	*Kollsman*
	Moonglo Instrument Light	*Fairchild*
24H	*Ice Warning Indicator*	*Kollsman*
	Outside Air Temperature Gage	*Weston*
	Manifold Pressure Gage	*Kollsman*
	Ammeter	*Molometer*
	Moonglo Instrument Light	*Fairchild*
24J	*Ammeter*	*Weston, Delco-Remy or Champion*
	Voltmeter	*Weston*
	Ice Warning Indicator	*Kollsman*
	Outside Air Temperature Gage	*Weston*
	Manifold Pressure Gage	*Kollsman*
	Moonglo Instrument Light	*Fairchild*
24K	*Voltmeter*	*Weston*
	Ice Warning Indicator	*Kollsman*
	Outside Air Temperature Gage	*Weston*
	Manifold Pressure Gage	*Kollsman*
	Ammeter	*Stewart Warner*
	Moonglo Instrument Light	*Fairchild*
24W9	*Ammeter*	*Weston, Delco-Remy or Champion*
	Voltmeter	*Weston*
24W9	*Ice Warning Indicator*	*Kollsman*
	Outside Air Temperature Gage	*Weston*
	Manifold Pressure Gage	*Kollsman*
	Moonglo Instrument Light	*Fairchild*
24R9	*Ice Warning Indicator*	*Kollsman*
	Outside Air Temperature Gage	*Weston*
	Manifold Pressure Gage	*Kollsman*
	Ammeter	*Weston, Delco-Remy or Champion*
	Moonlight Instrument Light	*Fairchild*
24W40	*Ice Warning Indicator*	*Kollsman*
	Outside Air Temperature Gage	*Weston*
	Manifold Pressure Gage	*Kollsman*
	Ammeter	*Weston, Delco-Remy or Champion*
	Moonglo Instrument Light	*Fairchild*
24W41	*Ammeter*	*Weston, Delco-Remy or Champion*
	Voltmeter	*Weston*
	Moonglo Instrument Light	*Fairchild*
24W41A	*Ammeter*	*Weston, Delco-Remy or Champion*
	Moonglo Instrument Light	*Fairchild*
	Turn and Bank Indicator	*Pioneer*
	Rate of Climb	*Pioneer*
	Carburetor Air Temperature Gage	*U. S. Gage*