T. O. NO. 01-150JA-1

PILOT'S FLIGHT OPERATING INSTRUCTIONS

FOR

ARMY MODEL F-8 AIRPLANE

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Figure 1—Three-quarter Front View of Airplane



Figure 2—Three-quarter Rear View of Airplane

SECTION I
DESCRIPTION

1. GENERAL.

The Army model F-8 airplane *(Figures 1 and 2)* is a modification of the Canadian built Mosquito bomber, designed specifically for photographic reconnaissance work. It is an all-wood, midwing monoplane with two Packard Rolls Royce Merlin XXXI or XXXIII engines and hydromatic propellers. It carries a crew of two—pilot and observer. The observer also acts as photographer, radio operator and navigator. No armament is carried. Armor plate *(See figure 3)* is installed behind the pilot and observer, head high.

2. CONTROL SURFACES.

The flying controls are conventional in operation. A control wheel is mounted on a vertical control column for aileron and elevator control and the rudder is operated by pendulum type pedals which are adjustable fore and aft. Operation is by means of cables, tie rods and chains. The rudder, elevator and ailerons are provided with combined trim and balance tabs. On the left hand side of the pilot, is the elevator tab control wheel. The aileron tab is operated by a small hand wheel at the bottom right hand side of the instrument panel. The rudder trim tab is operated from a control box situated above the instrument panel in the cockpit roof.

3. ALIGHTING GEAR.

a. GENERAL.—The alighting gear is hydraulically operated. The main gear retracts into the engine nacelles and the tail gear into the fuselage.

b. CONTROLS.—The main alighting gear and tail wheel selector lever is the center lever on the hydraulic control box. A safety catch must be released before the UP position can be selected. The selector should return automatically to NEUTRAL when the UP or DOWN operation is completed.

CAUTION

Do not hold the selector down for more than 20 seconds.

c. INDICATORS.—A visual indicator shows when the main alighting gear wheels and tail wheel are locked in the UP or DOWN position, and a warning horn will sound when the alighting gear is not locked down and throttles are more than three-quarters closed.

4. WHEELS AND BRAKES.

a. DESCRIPTION.—The landing wheels are Dunlop Type AH 2221, mounted on ball and roller bearings on a tubular steel axle with forged steel end fittings. These end fittings are flat on the upper side and are spigoted into the shock absorber strut bottom fittings. The axle assembly is rigidly attached to the shock absorber strut by a forged steel saddle and four high tensile steel bolts.

b. BRAKES.—The brakes are the Dunlop pneumatic type. The brake unit is bolted to a flange on the axle end fittings and brake reactions are thus transferred to the shock absorber unit. The axle end fittings are located by end caps which are connected by a tie rod.

c. CONTROL WHEEL.—The control wheel incorporates a brake operating lever connected to the brake differential unit and provided with a catch for parking purposes. Each rudder pedal is independently adjustable for leg reach in flight, adjustments being made with the toe.

5. HYDRAULICS.

(See figure 13.)

a. NORMAL.—Two pumps, one on each engine, together supply hydraulic power for the operation of the alighting gear, wing flaps and bomb doors.

b. EMERGENCY. — The hydraulic hand pump is mounted on the floor beneath the pilot's seat and is operated by a detachable handle stowed in clips on the floor under the observer's seat. The pump may be used for operating the main alighting gear and tail wheel, wing flaps and bomb doors, through the normal hydraulic system, on the ground or if the engine-driven pumps fail during flight. The approximate time taken to lower the alighting gear by the hand pump is four minutes.

6. POWER PLANT.

a. ENGINES.—The airplane is powered with two Packard Rolls Royce Merlin XXXI or XXXIII engines driving Hamilton Standard three bladed propellers, type 23EX-319-6533A-12 or 23EX-493-6519A-12. The cooling of the engines is effected by ethylene glycol Specification AN-E-2. The engine mount frames are tubular steel structures, bolted to the wing front spar and the fixed portion of the alighting gear structure. They are interchangeable left and right. Starting is by direct electric starter motor and booster coil. The 24 volt current for the starter may be supplied from an outside source by a socket on the left hand side of the fuselage, aft of the wing, or from the airplane batteries. Priming is by Parker Primer pump in each engine nacelle. Graviner automatic fire extinguishers are fitted in each engine nacelle.

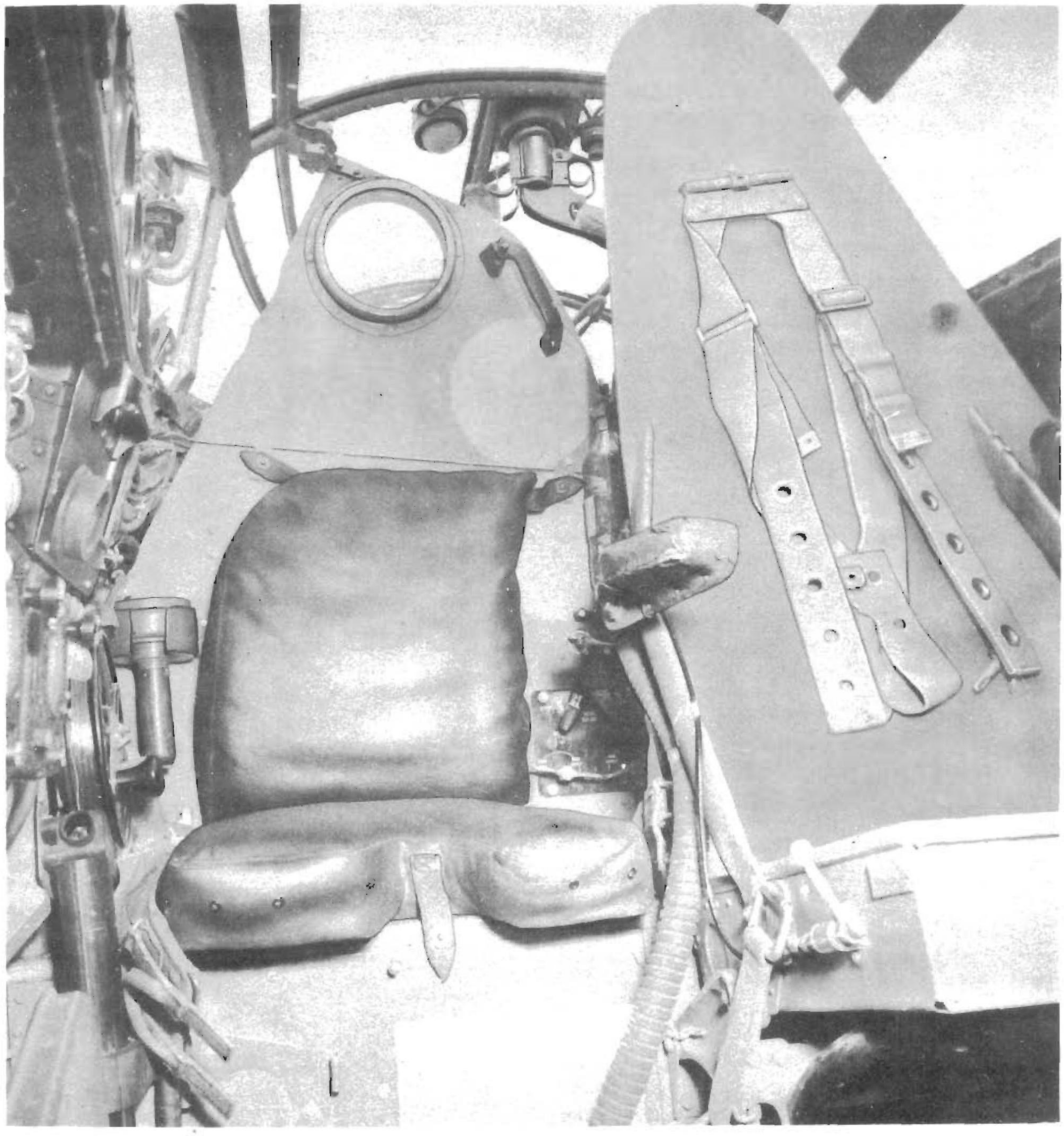


Figure 3—Pilot's and Observer's Seat, Showing Armor Plate

b. ENGINE CONTROLS.

(1) THROTTLE AND MIXTURE CONTROLS. —When the XXXI engine is installed the throttle levers and a single mixture control lever are mounted on a control box on the pilot's left. This unit also carries the propeller speed control levers and the two-speed supercharger control switch. The throttle lever quadrant is provided with a stop at the climbing boost position. Maximum take-off boost is obtained by pressing the throttle lever triggers back and pushing the levers fully forward. Friction adjusters are provided for the control levers. When the XXXIII engine is installed, the quadrant is identical except that the mixture control lever is removed. The XXXIII engine is equipped with an automatic carburetor.

(2) AUTOMATIC BOOST CONTROL CUT-OUT.—An automatic boost control cut-out is provided on the top left hand side of the instrument panel. When this is pulled out, it will give 12 psi up to about 8,500 feet.

(3) PROPELLER FEATHERING CONTROLS.—The feathering control push-switches are on the right hand front panel.

(4) TWO-SPEED SUPERCHARGER CONTROL.—If the switch on the cockpit control box is set to AUTO (UP), the supercharger is automatically changed to high-blower by an aneroid-operated switch when the airplane has reached about 15,000 feet. The low blower can be retained above 15,000 feet by moving the selector switch down to MOD.

(5) COOLANT RADIATOR SWITCHES.—The shutters are controlled electrically by two switches marked OPEN and CLOSED on the right switch panel, one for each engine. The shutters are operated by compressed air and will not operate unless pressure is above 180 psi.

(6) IDLE CUT OFF CONTROLS. — These are mounted on the fuel control panel behind the pilot's seat.

(7) STARTER AND BOOSTER COIL BUTTONS. —The two engine starter buttons and two push switches operating booster coils in the respective engine ignition systems, are provided on the front panel.

(8) IGNITION SWITCHES. — The ignition switches are on the left hand front panel. When the magnetos are ON, the electrical services switch is compelled to be ON. This switch brings into operation the alighting gear indicator, the fuel gages and coolant flap control.

(9) AIR INTAKE FILTER CONTROL. — For tropical operation only, aircraft are fitted with Vokes air intake filters, operated by a switch above the engine control box on the left hand side of the fuselage. This filter is also operated by compressed air and pressure must be over 180 psi.

(10) OIL DILUTION.—Two buttons are provided on the fuel cock control panel.

(11) HOT AIR CONTROL. — This is operated electro-pneumatically and is controlled by a switch in the cockpit. Air pressure must exceed 180 psi in order to operate.

7. PNEUMATIC SYSTEM.

An air compressor on the left engine operates the brakes, the automatic supercharger control, the radiator cooling flaps and, if fitted, the air cleaner flap and carburetor heat control. Two suction pumps, one on each engine, together operate the instrument blind flying panel. In the event of one pump failing, it is automatically isolated from the suction system. The panel will operate correctly on one pump.

8. FUEL SYSTEM.

(See figure 11.)

a. TANK INSTALLATION.—For normal purposes, 10 fuel tanks with a total capacity of 646.8 U. S. (539 Imp.) gallons, are installed in the airplane. Additional long range tanks may be fitted as follows: two interconnected tanks containing 145 U. S. (121 Imp.) gallons in the fuselage and two droppable wing tanks of 40 U. S. (33.3 Imp.) gallons each, situated outboard of the engines.

b. FEEDING.—The outer wing tanks feed to their respective engines while the main supply tanks and fuselage tanks, if fitted, feed through a fuel collector box (fuel gallery) to both engines. When fitted, the droppable wing tanks, which are pressurized, feed direct to the outer wing tanks, and special instructions are issued to cover the operation of these. Bleed pipes from the pressurized carburetors return a limited amount of fuel back to the outer wing tanks during flight.

c. BOOSTER PUMPS. — Fuel booster pumps are situated between the main fuel cocks and the engine, and are controlled by toggle switches in the cockpit.

d. TANK SELECTION. — Tank selection is controlled by fuel cocks in the cockpit and the immersed electric fuel pump for the fuselage long range tanks is also controlled by a switch which is operated by the pilot. Each fuel cock has three positions—"OFF," "OUTER TANKS," and "MAIN SUPPLY." If operationally necessary to jettison droppable wing tanks, the aluminum type should be jettisoned only from straight and level altitudes.

e. FUEL GAGES.—Fuel contents gages are situated on the right cockpit wall.

f. FUEL TANK PRESSURIZATION. — Fuel tank pressurization with automatic control is fitted to the main supply fuel tanks. This is designed to reduce the possibility of vapor locks at altitude. The pressurization is obtained from the pressure side of the right vacuum pump, and is controlled by an "ON"—"OFF" cock situated above the fuel cock on the fuel control panel. With the pressurization "ON" the automatic control brings it into operation at a predetermined height.

9. OIL SYSTEM.

(See figure 12.)

Two tanks are carried, one in each engine nacelle, and these have an effective oil capacity of 18 U. S. (15 Imp.) gallons per engine. For long range purposes, an additional tank carrying 11.7 U. S. (9.75 Imp.) gallons is situated in the fuselage. This tank is heated in order to prevent the oil from congealing in cold weather, and a pressurization system feeds the oil through two pipes direct to the engine oil tanks. Two oil control cocks, one for each engine, are situated in the pilot's compartment.

10. WING FLAPS.

The wing flaps are operated by the lever situated to the right side of the alighting gear selector. This lever should return automatically to "NEUTRAL" on completion of the full operation. Any flap angle up to 45 degrees can be obtained by returning the lever to "NEUTRAL" when the desired angle is reached.

11. TRIM TAB CONTROLS.

The elevator tab control is a hand wheel to the left of the pilot, the indicator is under the left hand side window rail. The rudder tab control and indicator are fixed to the front windscreen. The aileron tab control and indicator are situated on the lower right hand side of the main instrument panel.

12. ELECTRICAL SYSTEM.

A generator driven by the right engine supplies electric power to all electrical instruments and controls.

13. HEATING AND VENTILATING SYSTEM.

A lever for controlling cockpit ventilation is mounted on the right hand side of the cockpit. An adjustable ventilator is also mounted at the left hand side of the cockpit forward of the pilot. The heating control is behind the pilot's seat.

14. MISCELLANEOUS EQUIPMENT.

a. COCKPIT ENTRANCE HATCH.—Entrance to the cockpit for both the pilot and observer is gained through a hatch in the forward underside of the fuselage. A folding ladder for use with this entrance is stowed beneath the cockpit floor. The hatch is opened from inside and outside by a door handle.

b. PILOT'S SEAT. *(See figure 3.)* — The seat is adjustable for height by means of a lever on the left hand side. The harness release gear is operated by a lever at the right hand side of the seat. Downward movement of the lever releases the harness shoulder straps, enabling the pilot to lean forward. The harness must be re-locked by the lever when the normal sitting position is resumed.

c. WINDOWS.—The two front corner windows are hinged and can be opened inwards. The pilot's windshields and the observer's panel are the "dry air sandwich" type, the air being kept dry by the silica-gel container. The windshields should remain free from internal misting and icing under all conditions, but if misting does occur, the cockpit heat control should be turned fully on and the side windows opened ½ an inch. Keep the cockpit as warm as possible when descending from great height and very low temperatures.

d. COCKPIT LIGHTING.—A roof light is provided above the pilot's head controlled by a push switch on the light. Floodlights are provided for the left hand instrument panel, the right hand instrument panel and the compass. Dimmer switches for the floodlights are on the left side by the left hand instruments. Panel lights are also provided for the left-right indicator, the chart table, the radio and a goose neck light in the nose.

e. EMERGENCY EXITS. *(See figure 16.)* — The pilot's entrance hatch is also used as a parachute exit for the crew and is made jettisonable for this purpose. To jettison the hatch, the floor door is opened and the pedal at the left hand side of the hatch is pressed. An emergency exit for use in the event of a crash landing is fitted in the cockpit roof and is operated by pulling down the red-colored lever and pushing out the panel.

f. LIFE RAFT.—An inflatable life raft is stowed above the wing center section *(See figure 17)* in a container secured within the fuselage, with the door on top. It is inflated automatically by an immersion switch, or, manually, by a cable on the cockpit roof behind the pilot's head.

g. FIRE EXTINGUISHERS.—The Graviner-type fire extinguisher system is operated by two push-switches on top of the fuel gages panel at the right hand side of the cockpit. The forward switch operates the left engine extinguisher and the rear switch the right one. An impact switch in the bomb sight compartment, attached to the rudder pedals cover, and flame switches in each engine nacelle, provide automatic operation of this system. Two hand fire extinguishers are provided, one beside the pilot and one on the rudder pedals cover in the bomb sight compartment.

h. FIREMAN'S AX.—A fireman's ax for cutting a way out of the fuselage in an emergency, is stowed on the right hand side of the bomb sight compartment.

i. FIRST AID OUTFIT. — A first aid outfit is stowed beneath the pilot's seat.

j. THERMOS FLASKS. — Provision is made for carrying four thermos flasks at the left hand side of the bomb sight compartment.

k. SANITARY FUNNEL. — A sanitary funnel and tank are stowed beneath the pilot's seat.

l. PYROTECHNICS.—An AN-M-8 pyrotechnic pistol *(See figure 4)* is installed, ready for firing in the top of the transparent canopy aft of the navigator's seat. Extra cartridges for the pistol are carried in the cockpit.

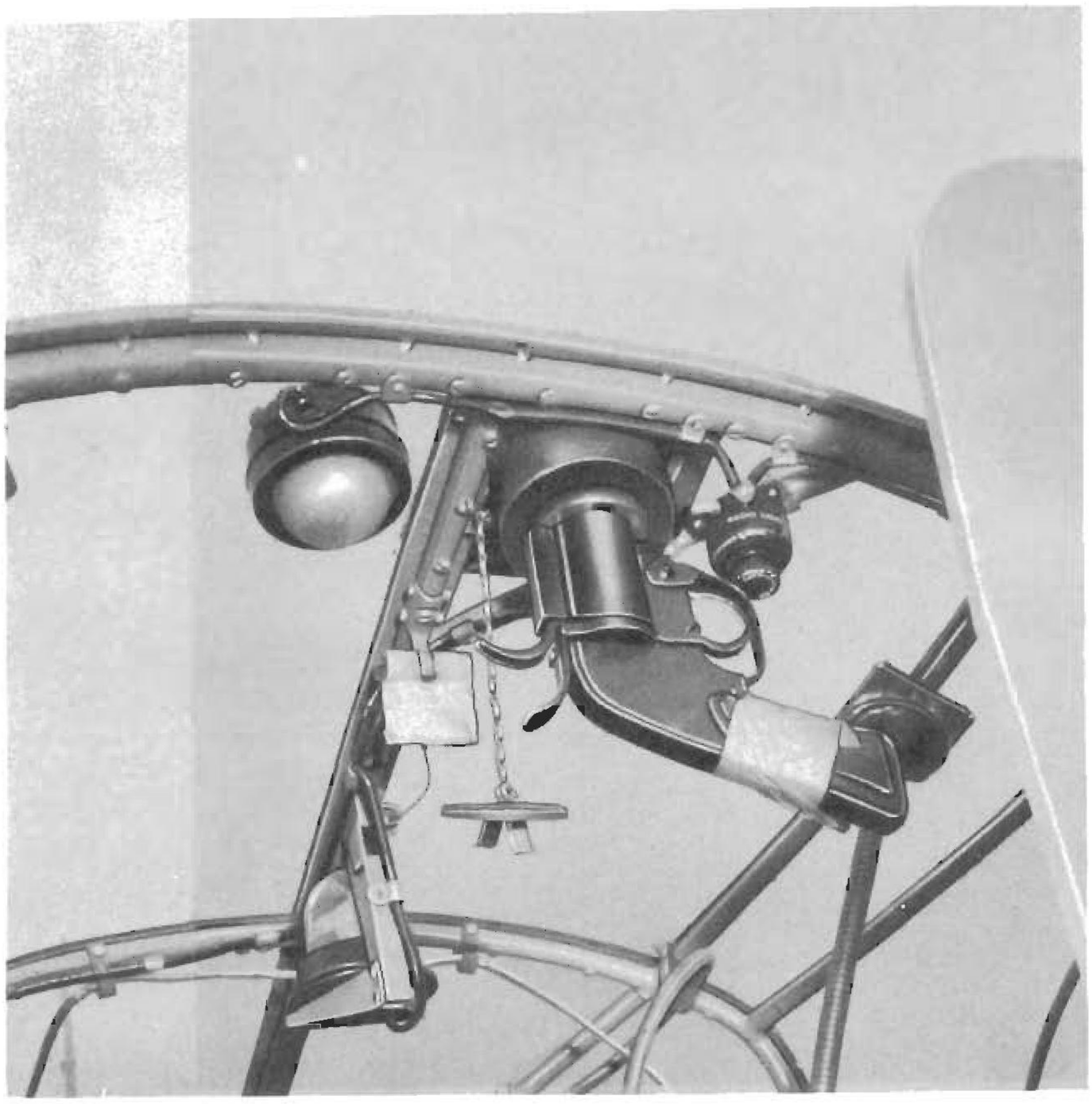


Figure 4— Signal Pistol

Figure 5— Internal View of Cockpit



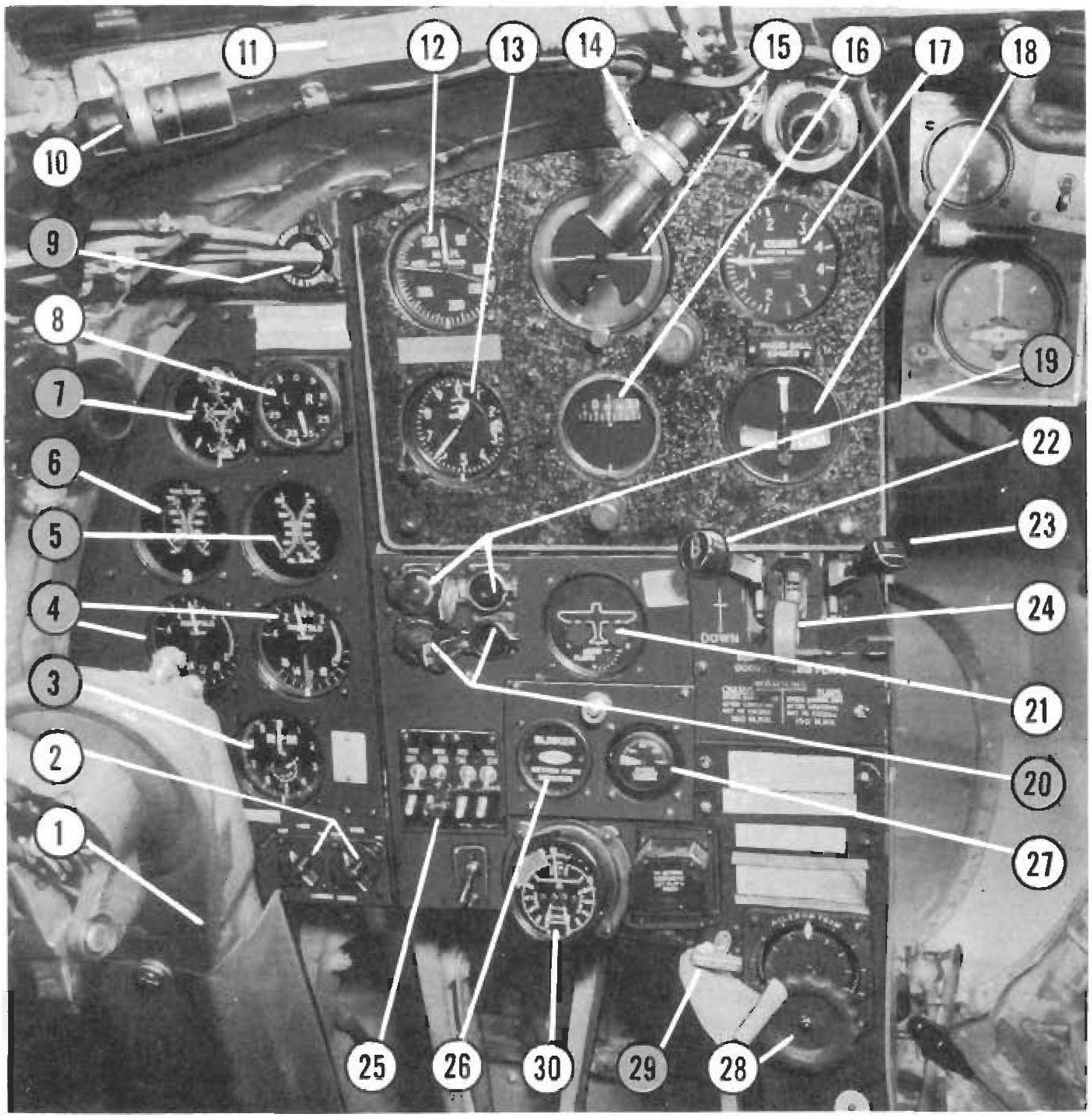


Figure 6— Left Side of Front Instrument Panel

1. Control Column.
2. Landing Lamp Switches.
3. Tachometer—Right.
4. Manifold Pressure Gages.
5. Oil Temperature Gage.
6. Radiator Temperature Gages.
7. Oil and Fuel Pressure Indicator.
8. P.D.I.
9. Automatic Boost Cut Out Control.
10. Light.
11. Radio Call Plate.
12. Air Speed Indicator.
13. Altimeter.
14. Lamp.
15. Artificial Horizon.
16. Directional Gyro.
17. Rate of Climb Indicator.
18. Bank and Turn Indicator.
19. Starter Buttons.
20. Booster Coil Buttons.
21. Flap and Alighting Gear Indicators.
22. Bomb Door Control Lever.
23. Flap Control Lever.
24. Alighting Gear and Tail Wheel Control Lever.
25. Master Switches.
26. Oxygen Flow Indicator.
27. Oxygen Cylinder Pressute.
28. Aileron Lateral Trim Control and Indicator.
29. Bomb and External Fuel Tank Salvo Switches.
30. Brake Pressure Gage.

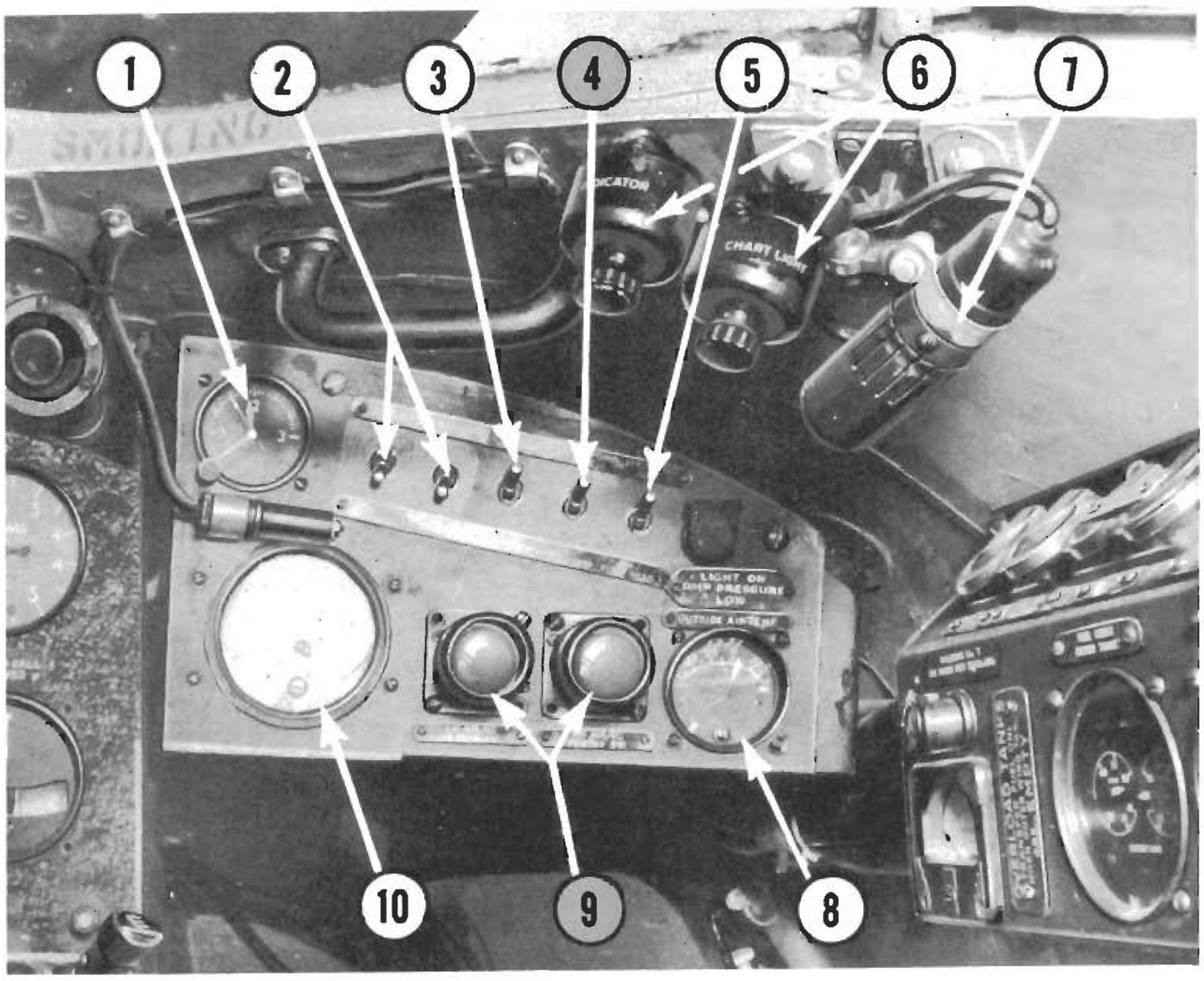


Figure 7— Right Side of Front Instrument Panel

1. Time of Flight Clock.
2. Radiator Flap Switches.
3. Navigation Lamps Switch.
4. Fuel Pump Switch.
5. Pitot Head Switch.
6. Dimmer Switches.
7. Air Observer's Lamp.
8. Air Temperature Gage.
9. Feathering Control Switches.
10. Left Right Indicator for Radio Compass.

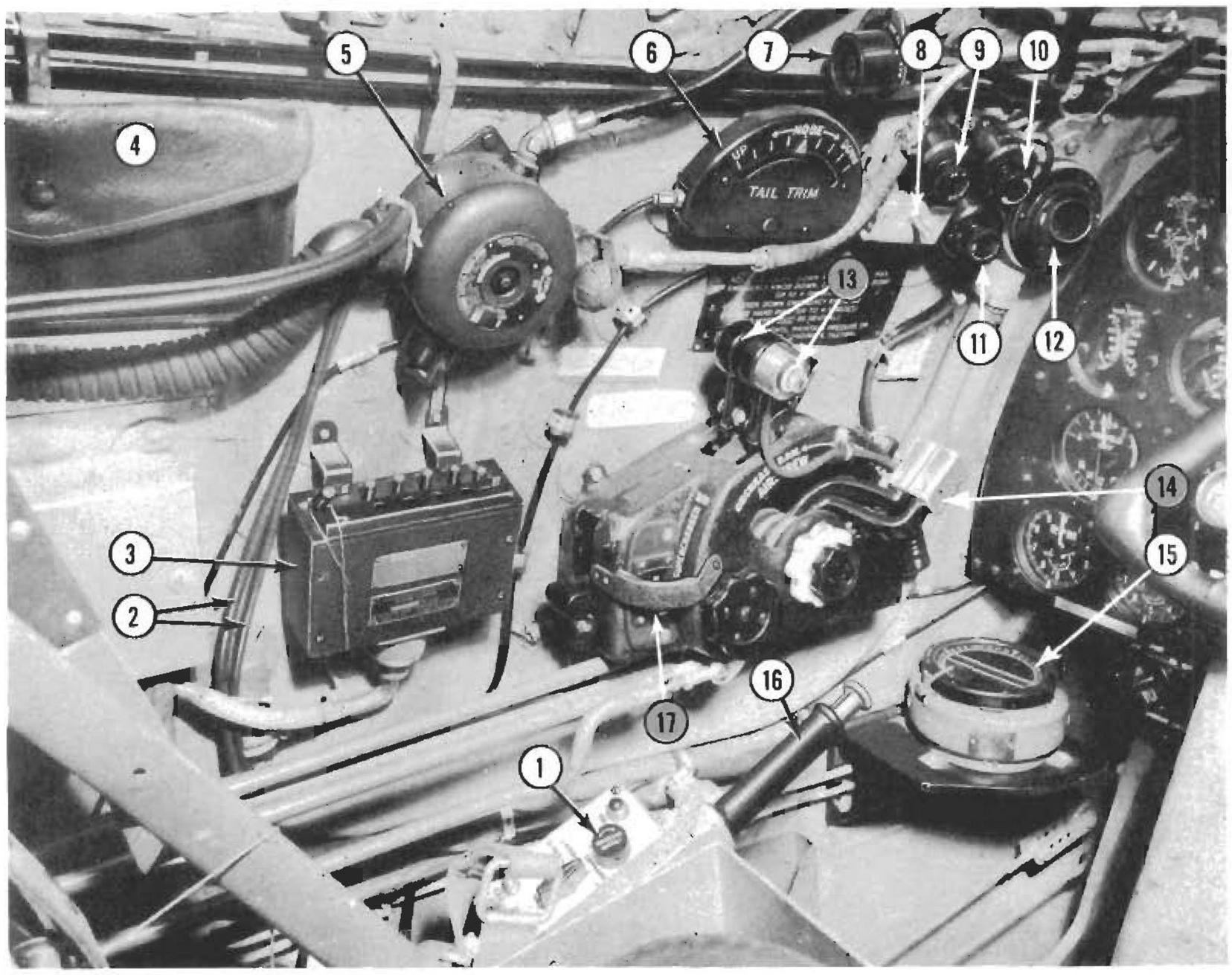


Figure 8— Left Side of Pilot's Compartment

1. Pilot's Station Box.
2. Microphone and Head Set Cords.
3. SCR-522 Control Box.
4. Pilot's Pouch.
5. Oxygen Demand Regulator.
6. Elevator Trim Tab Indicator.
7. Pilot's Bomb Release Switch.
8. Radio Switch.
9. Dimmer Switch.
10. Dimmer Switch.
11. Compass Dimmer Switch.
12. Ventilator.
13. Throttle Controls.
14. Propeller Control Levers.
15. Compass.
16. Pilot's Seat Adjusting Lever.
17. Supercharger Switch.

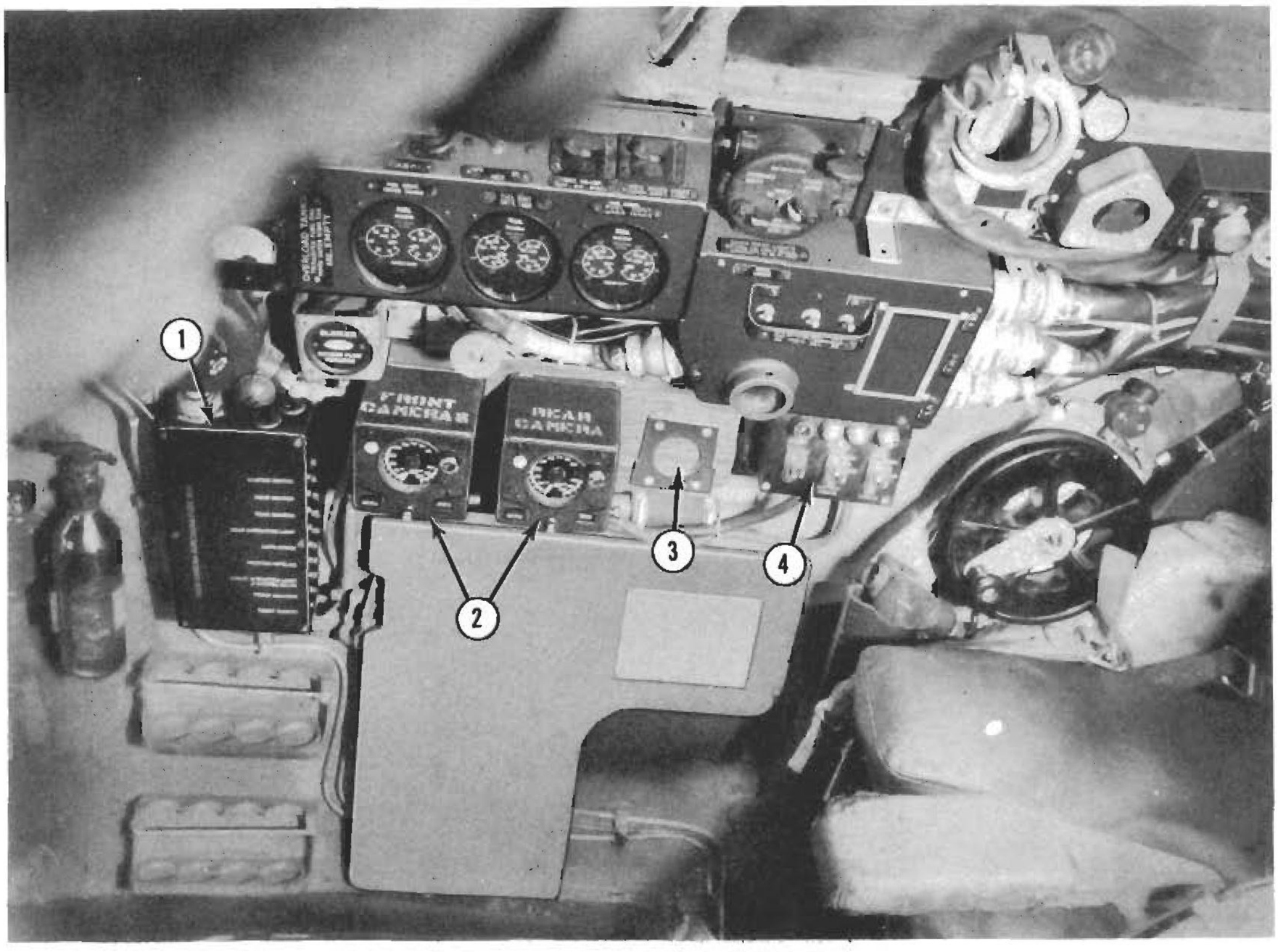


Figure 9— Right Side of Pilot's and Observer's Compartment

1. Main Camera Junction Box.
2. B-3B Intervalometer.
3. Wedge Plate.
4. Camera Operation Panel.

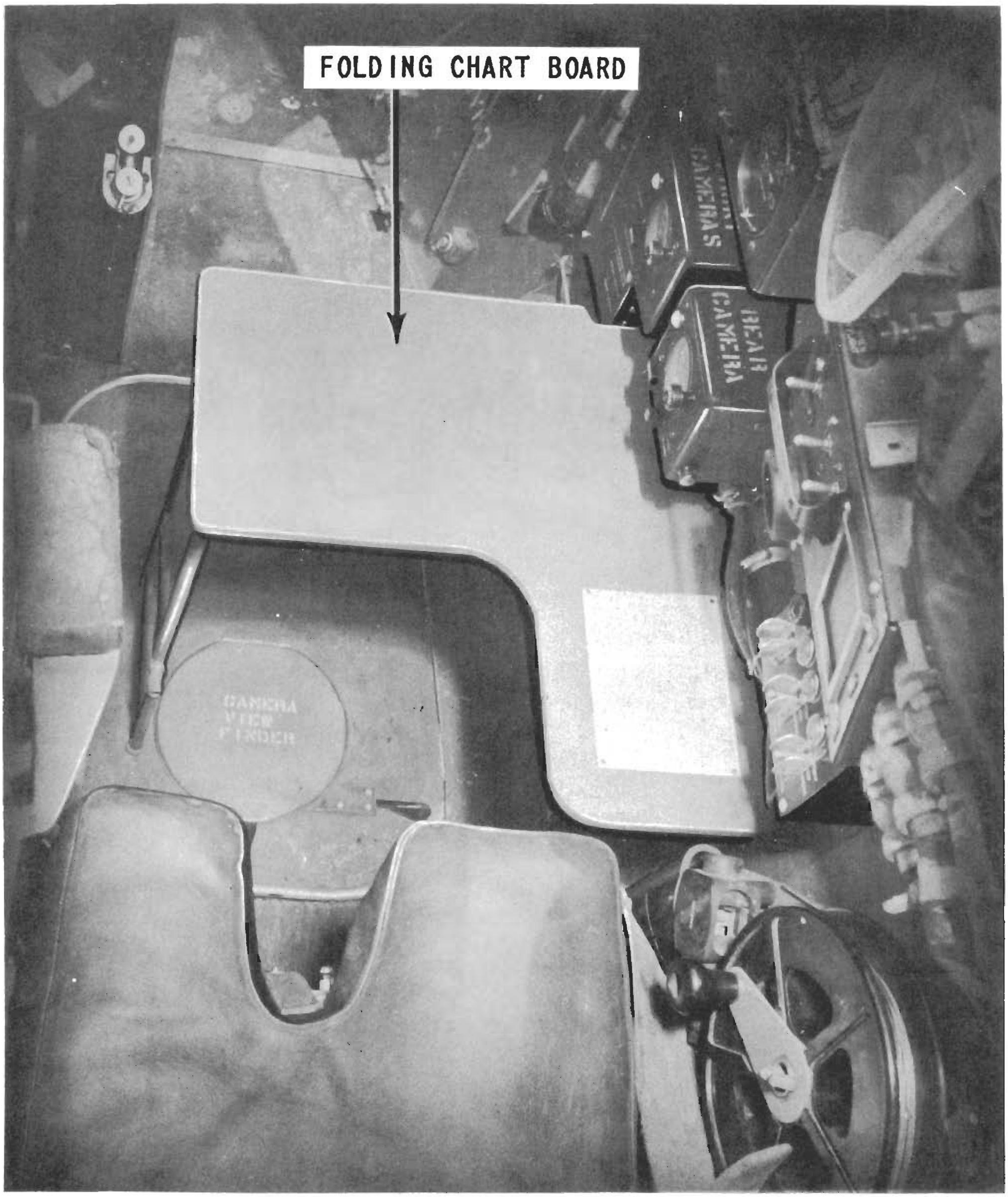


Figure 10—Navigator's and Photographer's Station

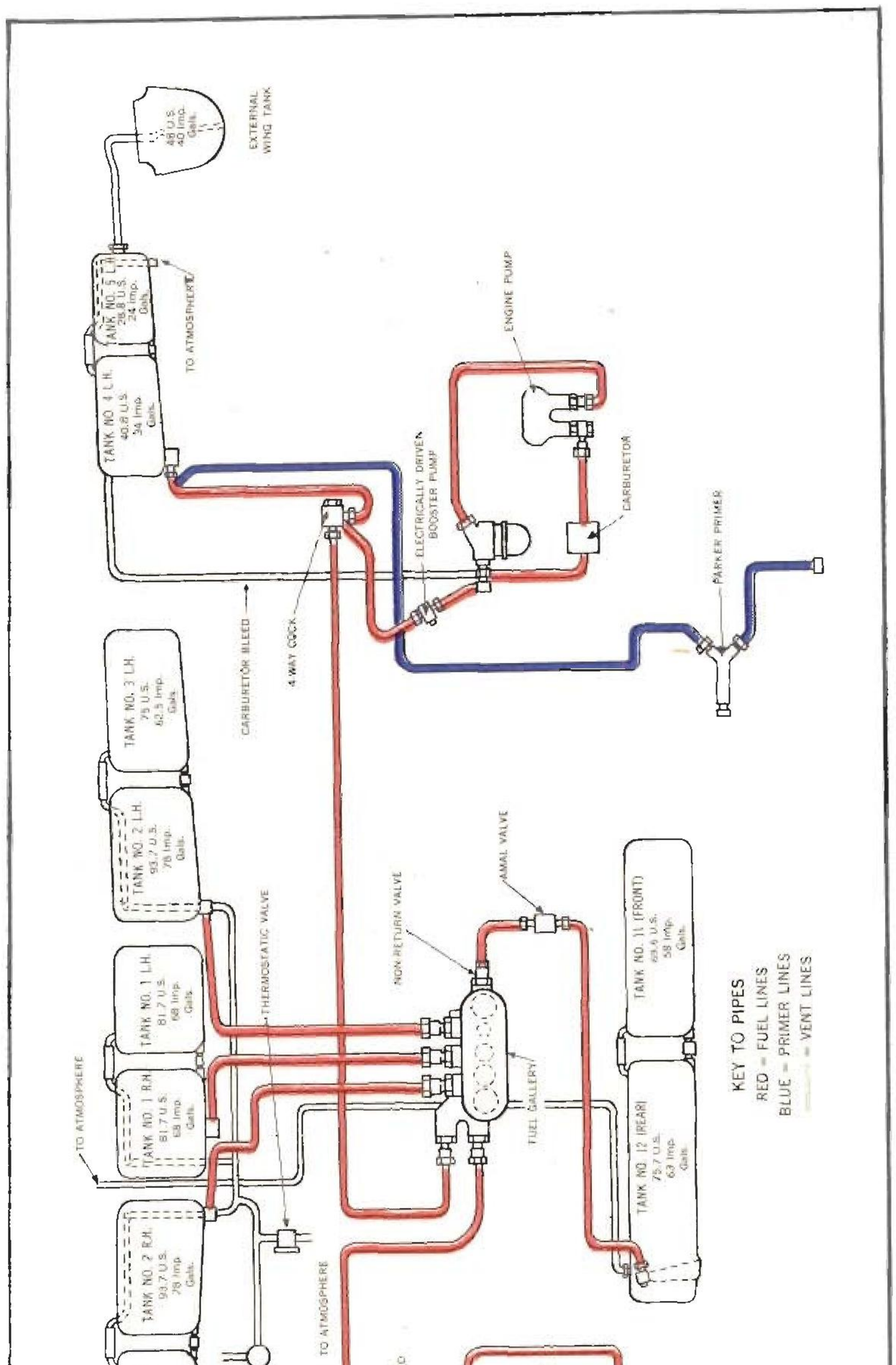


Figure 11—Fuel System Diagram

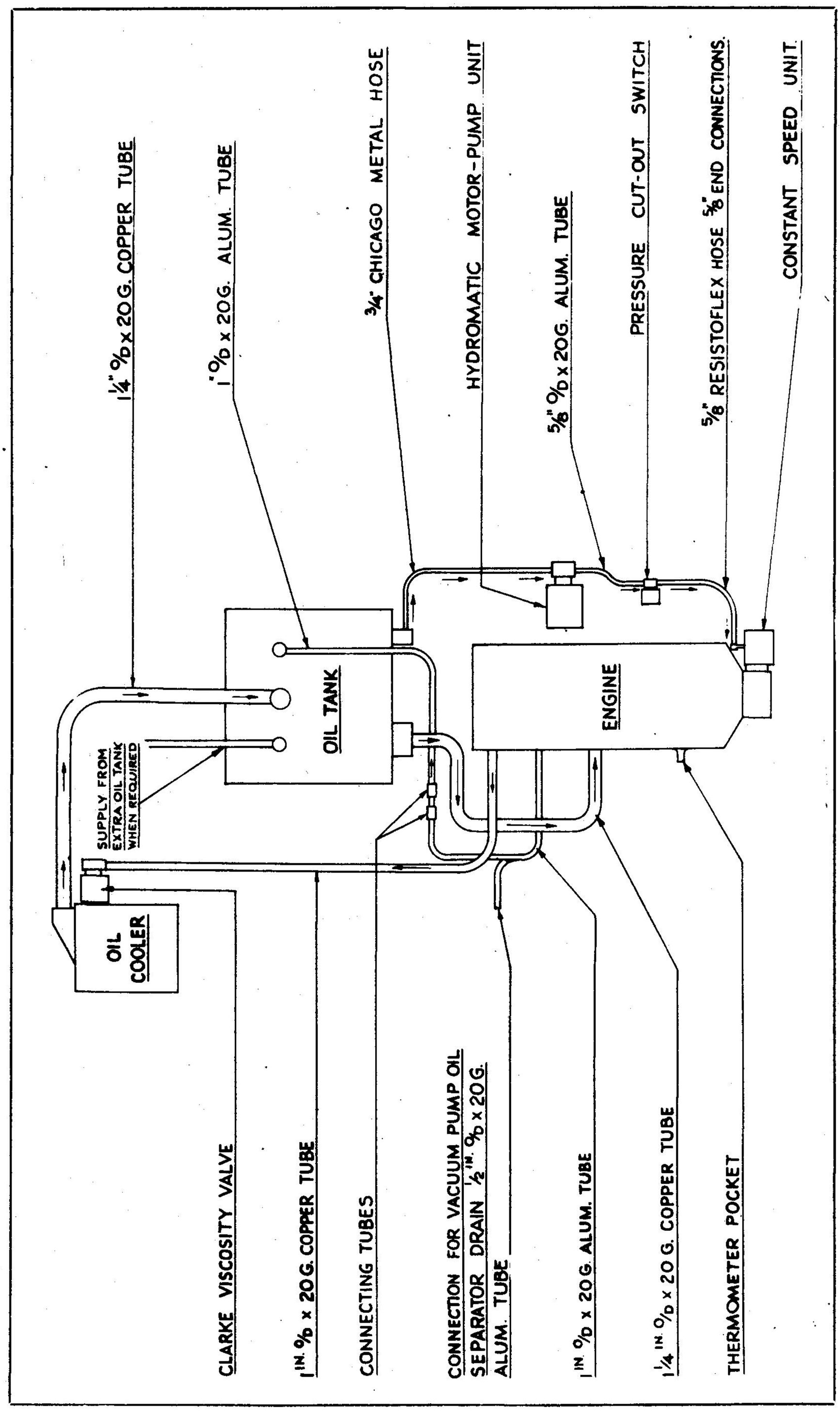


Figure 12—Oil System Diagram

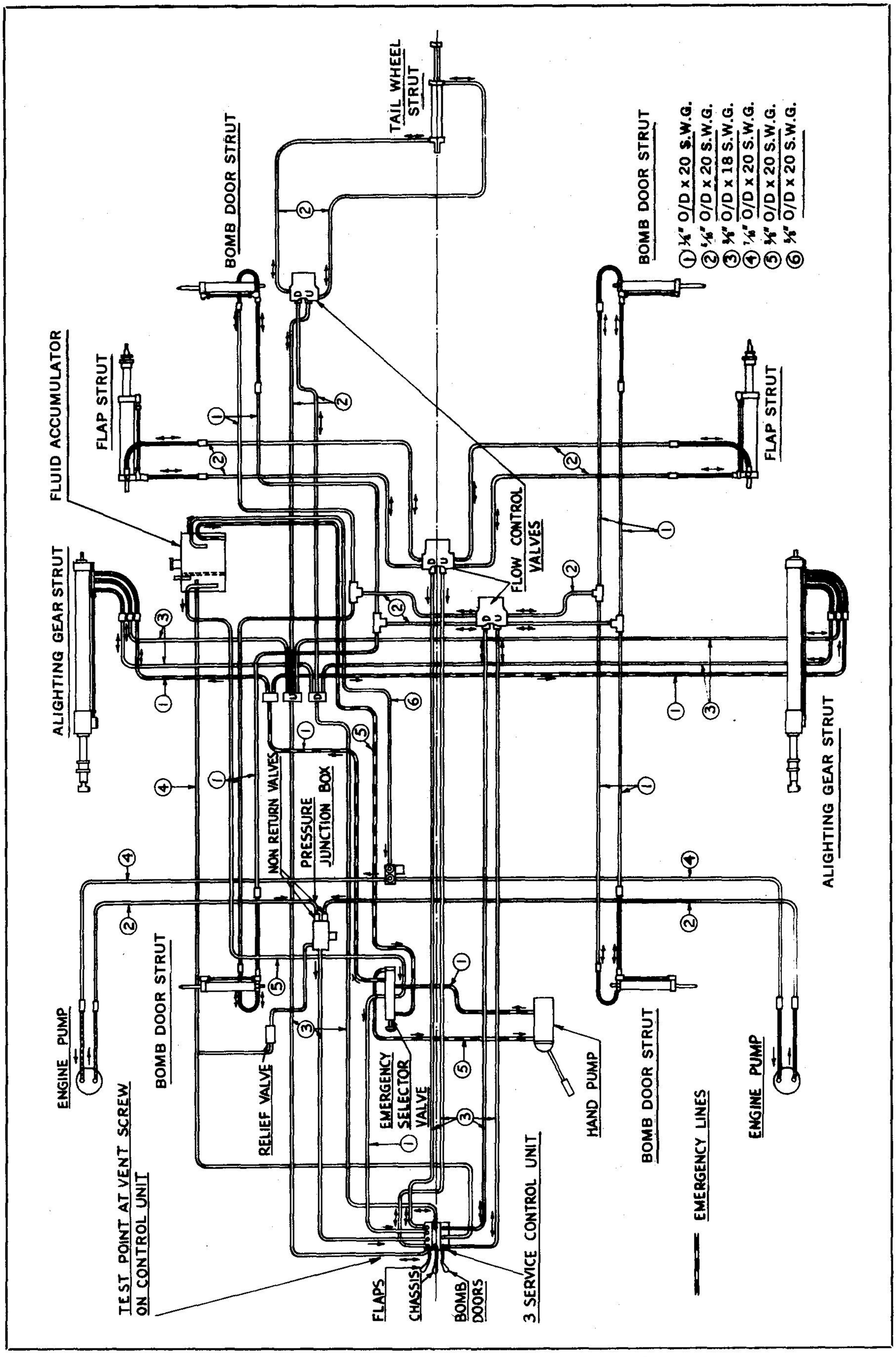


Figure 13—Diagrammatic Hydraulic System

SECTION II

PILOT OPERATING INSTRUCTIONS

1. FLIGHT RESTRICTIONS.

a. The following maneuvers are prohibited:

(1) Intentional spinning.

(2) Violent maneuvers.

(3) Violent use of the rudder at high speeds.

b. Due to the light controls, care must be taken not to impose heavy loads by the excessive use of the elevators in pulling out of dives or in turns at high speed.

2. BEFORE ENTERING PILOT'S COMPARTMENT.

a. Make sure that the airplane has been serviced and is ready for flight, particularly in regard to proper quantities of fuel, oil, hydraulic fluid, and oxygen.

b. Determine that the amount of fuel, oil and special equipment carried is suited to the mission to be performed, and that allowable limits of weight and center of gravity are not exceeded. (Refer to AN 01-1B-40.)

c. See that airplane is headed into the wind.

d. Insure that the landing gear down lock caps have been removed and stowed by the crew chief.

3. ON ENTERING THE PILOT'S COMPARTMENT.

a. Check that alighting gear emergency release knob (marked "PUSH FOR EMERGENCY") is in the normal position, and its safety catch properly engaged.

b. Check that the alighting gear lever is at NEUTRAL, and its safety catch properly engaged.

c. Check form 1.

d. Check Form F—Weight and Balance Clearance—AN 01-1B-40.

e. Insure that emergency escape hatch is firmly secured.

4. FUEL SYSTEM MANAGEMENT.

(See figure 11.)

a. ORDER OF USING FROM TANKS

(1) STARTING AND TAKE-OFF. — Use "OUTER TANKS" for starting, take-off, and for first half-hour of flying. During the run-up, change to MAIN TANKS for a period in order to insure that there are no air locks in the system.

(2) DURING FLIGHT.—During flight the tanks should be used in the following order:

(a) OUTER TANKS.—Use until 30 U. S. (25 Imperial) gallons are exhausted from each side in order to make room for fuel returned from the carburetors via the vapor bleed pipes. But,

(b) If "DROPPABLE WING TANKS" are fitted, "OUTER TANKS" should be exhausted of 48 U. S. (40 Imperial) gallons each to make room for the necessary fuel transfer.

CAUTION

If droppable wing tanks are of the aluminum type, they should only be dropped in level flight, due to the danger of damage to the aircraft.

(c) "AUXILIARY LONG RANGE FUSELAGE TANKS" should be used as soon as the "OUTER TANKS" are depleted of 30 U. S. (25 Imperial) gallons (and provided the "DROPPABLE TANKS," if fitted, have been used). Switch "ON" the immersed fuel pump for these tanks, and switch them "OFF" immediately after the immersed pump warning light indicates that they are exhausted.

(d) MAIN TANKS.

(e) "OUTER TANKS" for balance of fuel remaining in them.

b. ELECTRIC FUEL BOOSTER PUMPS.

(1) Turn on the fuel booster pumps for the "MAIN" and "OUTER" tanks for take-off, landing, or in the event of failure of the engine driven pumps, or at any time when lack of fuel pressure makes it desirable.

(2) Operate the immersed booster pump for the "AUXILIARY" tanks as outlined in paragraph 4. *a.* (2) *(c)* preceding.

c. Operate the fuel tank pressurizing control under all conditions of flight, except:

(1) If fuel tanks are punctured.

(2) While actually feeding from an unpressurized long range tank.

5. STARTING ENGINES.

a. Parking brake "ON."

b. Master switch ONLY "ON."

c. Radiator shutters switches "OPEN."

d. Ignition switches "OFF."

e. Pull propellers through by hand if engines have been idle.

f. Set fuel cock to "OUTER TANKS."

g. Set controls as follows:—

(1) Throttles cracked—½ inch open.

(2) Mixture control (if fitted)—"RICH" (Slow running cut-out "OUT" for starting XXXIII Engines.)

(3) Propeller speed controls — Fully forward— "MAX RPM."

(4) Supercharger switch—"MOD." (Low Blower) (DOWN).

b. Switch booster pumps "ON" until a fuel pressure rise of 14 psi is indicated and then switch pump "OFF."

i. Start right engine first.

j. High volatile fuel should, if possible, be used for priming at air temperatures below freezing. The ground crew should work the priming pumps until increased resistance shows that fuel has reached the priming nozzles.

k. Switch "ON" ignition and simultaneously press starter and booster coil buttons. *(See 19 and 20, figure 6).* Turning periods must not exceed 20 seconds, with a 30 second wait between each. The ground crew should work priming pump as rapidly as possible while the engine is turning. It should start after the following number of strokes:

Air temperature (°C)	+30	+20	+10	0	−10	−20
(°F)	+86	+68	+50	+32	+14	−4
No. of strokes, normal fuel:		3	4	7	12	
No. of strokes, high volatile fuel:				4	8	18

l. At temperatures below 0°C (32°F) continue priming after the engine has fired until it picks up on the carburetor.

m. As soon as the engine is running satisfactorily, release the booster coil button. The ground crew must screw down priming pumps and close the priming pump panels.

6. ENGINE WARM UP.

a. Run the engine as slowly as possible for half a minute, then warm up at 800 to 900 rpm.

b. Fuel pressure (engine pump only)—9 psi.

c. Oil pressure	MIN.	60 psi (5 minutes)
	DESIRED	80 psi
	MAX.	120 psi
d. Oil Temp.	IDLING MIN.	15°C (59°F)
e. Coolant Temp.	MIN.	60°C (140°F)
	MAX.	120°C (248°F)

f. ENGINE AND ACCESSORIES OPERATION GROUND TEST.

WARNING

The following testing procedures must be carried out whenever possible. Owing to a tendency for the engines to overheat in anything but the coldest weather, however, it may not be possible to do all the checks during the actual run-up, and the item enumerated in subparagraph (1)*(a)* following can be checked during the taxying period.

(1) WHEN LEFT ENGINE COOLANT REACHES 60° C (140°F).

(a) Check the operation of each engine-driven hydraulic pump by opening up each engine to 2,000 rpm, and then lower and raise the flaps. Failure of an engine-driven pump will be indicated by sluggish movement of the flaps during one of these tests.

(b) Open up to +4 psi boost (38 inches Hg), and check operation of the constant speed propeller and RETURN TO INCREASE RPM.

(c) Open throttle fully and check take-off boost and static rpm which should be +12 psi (54 inches Hg) and 3,000 rpm. Drop boost by 2 psi. The rpm drop should be about 50.

(d) Throttle back to +7 psi boost (44 inches Hg), 2650 rpm and test each magneto in turn. The drop should not exceed 150 rpm.

(e) During the above tests, change over to "MAIN" tanks for a short period and then back to "OUTER" again in order to eliminate any air locks.

7. EMERGENCY TAKE-OFF.

An emergency take-off may be made as soon as the engines will take the throttle without missing or backfiring.

8. TAXYING INSTRUCTIONS.

a. Before taxying, check with ground crew that alighting gear strut locking caps are removed and stowed in the airplane, and that dust caps are replaced, and check that brake pressure is at least 200 psi.

b. Have wheel chocks removed and disengage parking brake.

c. Keep flaps up when taxying, except for operational check.

9. BEFORE TAKE-OFF.

a. Brake pressure—MIN 200 psi.

b. Gyros set and uncaged.

c. Alighting gear "down and locked."

d. Check flying controls for free movement.

e. TRIM TABS.

Elevator: With flaps up, ½ to one division nose heavy. With flaps 25 degrees down, one division nose heavy.

Rudder: Slightly right.

Ailerons: Neutral.

f. Mixture—"RICH" (Merlin XXXI) (Merlin XXXIII has automatic carburetor).

g. Propellers—"MAX RPM" controls fully forward.

h. Fuel—Check contents. Set cocks to outer tanks. Boost pump on.

i. Flaps—"UP" or not more than 25 degrees down. (Do not open up engines separately after setting flaps down).

CAUTION

Although the lowering of the flaps will improve the take-off, the time taken to reach the

single engined flying speed will be increased considerably. If ample run is available, take-off without flaps is recommended. If used, however, they should be lowered after clearing the engines and turning into wind, and with both engines throttled to the same idling speed. Set flap selector to "UP" and allow it to return to "NEUTRAL," then set it to "DOWN" and return it to "NEUTRAL" when desired flap setting is reached. This should be 15 degrees normal and 25 degrees as maximum.

j. Supercharger Switches—"MOD" (Low Blower).

k. Radiator Cooling Switches—OPEN.

l. Oil pressure	MAX	120 psi	
	DESIRED	80 psi	
	MIN	60 psi	
m. Oil Temperature	MAX	90°C	(194°F)
	DESIRED	75°C	(167°F)
n. Coolant Temp.	MAX	120°C	(248°F)
	MIN	60°C	(140°F)
o. Fuel pressure	DESIRED	14 to 16 psi	
	MIN	12 psi	

10. TAKE-OFF.

a. Allow airplane to run straight for a few yards and then open both throttles slowly to take-off position, if necessary opening left engine throttle ahead of the right until such time as rudder control is obtained. Maintain right rudder as necessary to check tendency to swing to left. Raise the tail by a light forward pressure on the stick. As soon as possible raise alighting gear and check that it locks up. If selector returns to "NEUTRAL" and mechanical indicator does not indicate "LOCKED UP" return the selector to "UP" and hold in position. *(See 24, figure 6.)* If indicator still shows that alighting gear is not retracted, (probably owing to the locking caps not having been removed) hold the selector down for five seconds before landing, to insure that the tailwheel is down.

Note

Always move alighting gear lever sharply to desired position. If this is not done, control may stick in the neutral position.

b. Do not climb until safety speed of 170 IAS is reached.

c. Before raising the flaps (if used), trim the airplane slightly tail heavy. Raise flaps slowly.

d. If alighting gear fails to lock up in cold weather, raise and lower several times to allow hydraulic oil to circulate.

11. ENGINE FAILURE DURING TAKE-OFF.

Refer to Section IV, Paragraph 2.

12. CLIMB.

a. Climb at 170 mph IAS to 20,000 feet; above this height, reduce speed by one mph per thousand feet. If engine shows signs of overheating, increase speed to 200 IAS until temperatures are normal.

b. For maximum air miles per gallon, climb at 2,650 rpm and +4 psi boost, and 175 mph IAS. Set mixture control to "LEAN," and remain in "MOD" (Low blower) as long as boost can be held.

c. If required, move supercharger switch to "AUTO" (UP). *(See 17, figure 8).*

d. Switch on fuel booster pumps in event of fuel pressure failure.

13. GENERAL FLYING CHARACTERISTICS.

a. STABILITY.—The directional and lateral stability are adequate. When carrying four 250 pound bombs, the fore and aft stability is neutral in level flight but the airplane is unstable in climb and glide. When carrying four 500 pound bombs the airplane is unstable fore and aft under all flight conditions. The rear bombs must be released first.

b. CHANGE OF TRIM.

Alighting gear up	—Nose up slightly
Flaps up	—Nose down sharply
Radiator shutters open	—Nose up
Bomb doors open	—Nose up slightly

c. MAXIMUM LEVEL SPEED.—For all-out level flight at 3,000 rpm and +9 psi boost set supercharger control to "AUTO."

d. FLYING AT REDUCED AIR SPEEDS.—In bad visibility near the ground, flaps should be lowered 10-15 degrees and propeller set to give 2,650 rpm. Speed may then be reduced to 140-150 mph IAS.

WARNING

When cruising, do not reduce rpm to 2,300 or below. Trailing aerial must be retracted before opening bomb doors.

14. STALLS.

a. The stalling speeds (engine off) in mph are:

Weight	*21,000 lbs.*	*18,500 lbs.*
Alighting gear and flaps up	135 IAS	125 IAS
Alighting gear and flaps down	116 IAS	107 IAS

b. At the stall there is considerable vibration, and if the control column is held back the nose drops, followed by one wing. The stall is not violent, and control is quickly regained when the speed is increased.

15. SPINS.

INTENTIONAL SPINS PROHIBITED.

16. DIVING.

CAUTION

Owing to the elevator trim tab being extremely sensitive on this airplane, it is essential that the trim tabs are not adjusted during the dive. The necessary trimming to relieve the push force which normally would be required in the dive should be applied before entering the dive and amounts to approximately one quarter division nose heavy from the setting

for level flight at 200 mph IAS, or approximately one half division nose heavy 300 mph IAS. It is important that great care is exercised in recovery to prevent the nose rising too rapidly.

a. At normal loadings the airplane becomes tail heavy in a dive, and should be trimmed into the dive.

b. At full load when trimmed for diving, a slight pull on the control column is required to start recovery, but as soon as the nose begins to rise a reversal occurs, and a push force must be applied to the column to prevent too rapid a recovery, which might overstress the airplane.

c. Maximum dive speed—450 mph IAS.

17. APPROACH AND LANDING.

CAUTION

On airplanes equipped with Merlin XXXIII engines, having automatic mixture control, it is recommended that power approaches be made and that care be exercised in opening of throttles in emergency. The carburetors are set in automatic lean at low powers and there is a possibility of the engines not picking up under sudden application of throttle.

a. Radiator shutters—"OPEN".

b. Set altimeter.

c. Check brake pressure:—200 psi.

d. Reduce speed to 180 mph IAS.

e. Alighting gear—"DOWN". Check by indicator that alighting gear is locked down.

CAUTION

After flight in extreme cold, operate the alighting gear up and down a few times before finally lowering for landing, in order to allow hydraulic oil to circulate throughout the system.

WARNING

Check the green alighting gear lights after lowering the flaps. If these lights have gone out re-select the alighting gear down.

f. Mixture—"RICH".

g. Propeller—"MAX RPM" (controls fully forward) (Low Pitch).

h. Fuel—FULLEST TANK. Boost pumps "ON".

i. Supercharger Switch—"MOD" (LOW BLOWER).

j. Flaps—"FULLY DOWN".

CAUTION

Before lowering flaps, the speed must be further reduced to 150 mph IAS.

k. Approach speeds in mph at normal loads.

Engine assisted	125 IAS
Glide	140 IAS

l. The tail heaviness and reduction of elevator control when the flaps are lowered is marked.

m. Do not turn at speeds of less than 150 IAS with alighting gear down.

n. If flaps fail to work, do not approach at under 140 IAS.

o. Do not yaw the aircraft, or attempt to "flat" sideslip, during the approach.

p. When the ultra long range belly tank is fitted, considerable surging of the fuel may be apparent during a three point landing, particularly when the tank is one quarter full. Pilots should be prepared for a consequent increase in tail heaviness, unless a wheel landing is made.

q. MISLANDING.

(1) Open throttles fully.

(2) *Raise alighting gear immediately.*

(3) Climb at about 140 mph IAS.

(4) The flaps come up quickly and should not be raised until a safe height has been reached. They should then be raised in stages, and the airplane trimmed tail heavy before raising them the last 20 degrees.

18. AFTER LANDING.

a. After landing and before taxying, raise flaps and insure that radiator shutters are OPEN.

19. STOPPING THE ENGINES.

a. To stop, let the engines idle for a short time, then operate the slow running cut-outs at 1000 rpm. Switch "OFF" ignition and master switch after engines stop and turn "OFF" fuel.

b. OIL DILUTION IN COLD WEATHER.

(1) Stop engine and allow it to cool until oil temperature is within range of 10°-45° (50°C-113°F).

(2) Start engine and run at 1000 rpm.

(3) Operate oil dilution as follows:

(a) One minute, when anticipated air temperature at next start will be above —10°C (14°F).

(b) Two minutes, if anticipated temperature will be between —10° to —20°C (14° to —4°F).

(c) Three to four minutes, if anticipated temperature will be below —20°C (—4°F).

20. BEFORE LEAVING THE PILOT'S COMPARTMENT.

a. Turn off all switches and valves.

b. Engage parking brakes.

c. Lock controls.

d. Fill out Form 1 completely.

SECTION III
FLIGHT OPERATING DATA

1. AIR-SPEED LIMITATIONS.

a. Do not exceed an engine speed of 3180 rpm.

b. Do not lower alighting gear at speed in excess of 180 IAS.

c. Do not lower wing flaps or fly airplane with wing flaps down at a speed in excess of 150 IAS.

d. Do not exceed a diving speed of 450 IAS.

e. Do not open bomb bay doors at an airspeed in excess of 390 IAS.

2. AIR-SPEED CORRECTION CHART.

IAS	*TAS*	*Altitude*
285	283	Sea Level
280	322	10,000
252	341	20,000
225	329	25,000

3. SPECIFIC ENGINE FLIGHT CHART.

a. Operating limitations and characteristics of the Merlin XXXI and XXXIII engines are summarized on the Specific Engine Flight Chart *(See figure 14)* for ready reference. Flight operating personnel should be thoroughly familiar with this information.

b. Engine power ratings found on the chart are defined as follows:

(1) Take-Off.—Maximum recommended for take-off under the specified time limit of five minutes.

(2) Military.—Maximum recommended for operation for periods not exceeding 30 minutes.

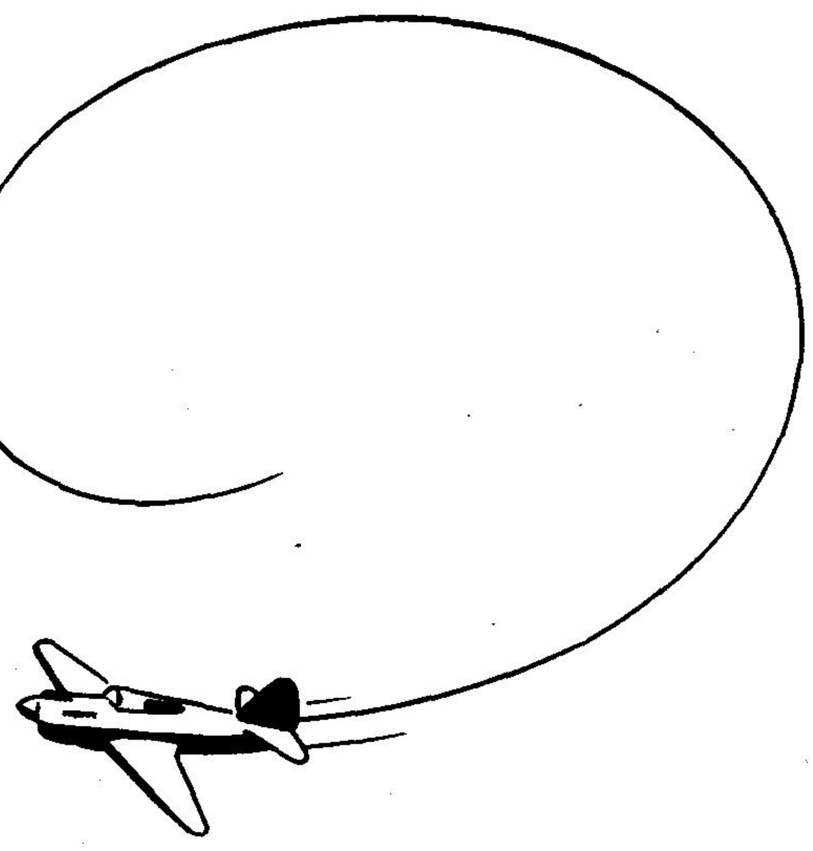
(3) Normal Rated (Maximum Continuous).—Maximum recommended for operation with rich mixture in climb and level flight.

(4) Maximum Cruise.—Maximum recommended for operation with lean mixture.

(5) Minimum Specific Consumption.—The power at which greatest range can be obtained under average loading conditions.

4. LOAD AND BALANCE.

A Weight and Balance Data handbook AN 01-1B-40 is furnished with each airplane.



FORM ASC-512A

AIRPLANE MODELS

F-8

SPECIFIC ENGINE FLIGHT CHART

ENGINE MODELS

Merlin XXXI and XXXIII

CONDITION	FUEL PRESSURE (LB/SQ. IN.)	OIL PRESSURE (LB/SQ. IN.)	OIL TEMP. °C	OIL TEMP. °F	COOLANT TEMP. °C	COOLANT TEMP. °F		
DESIRED	14 to 16	80	75	167	100	212		
MAXIMUM	16	120	90	194	120	248		
MINIMUM	12	60	15	59	60	140		
IDLING	9							

MAX. PERMISSIBLE DIVING RPM: .....

CONDITION	ALLOWABLE OIL CONSUMPTION
NORMAL RATED (MAX. CONT.)	.....U.S.QT/HR.....IMP.PT/HR
MAX. CRUISE	.....U.S.QT/HR.....IMP.PT/HR
MIN. SPECIFIC	.....U.S.QT/HR.....IMP.PT/HR

OIL GRADE: (S) 1120 (W) 1100

SUPERCHARGER TYPE: TWO SPEED

FUEL GRADE: AN-F28 100-130 OCTANE

OPERATING CONDITION	RPM	MANIFOLD PRESSURE (BOOST) LB.	MANIFOLD PRESSURE (BOOST) IN.	HORSE-POWER	CRITICAL ALTITUDE		BLOWER	USE LOW BLOWER BELOW:	MIXTURE CONTROL POSITION	FUEL FLOW (GAL/HR/ENG.) U.S.	FUEL FLOW (GAL/HR/ENG.) IMP.	MAXIMUM CYL. TEMP. °C	MAXIMUM CYL. TEMP. °F	MAXIMUM DURATION (MINUTES)
TAKE-OFF	3000	14	58			Sea Level to 1000 FT.	Low		Rich					5 min.
WAR EMERGENCY	3000	14	58			12,000	Low Use boost cut-out	1000 FT.	Rich					5 min.
MILITARY	2850	9	48			18,500	Auto.		Rich					30 min.
NORMAL RATED (MAX. CONT.)	2650	7	44			16,000	Auto.							Continuous
MAXIMUM CRUISE	2650	7	44				Auto.							Continuous
MINIMUM SPECIFIC CONSUMPTION	2650	4	38				Auto.							

REMARKS:

Figure 14—Specific Engine Flight Chart

SECTION IV
EMERGENCY OPERATING INSTRUCTIONS

1. GENERAL.

All emergency instructions have been assembled in this section to facilitate quick reference by the flight crew. Members of the crew should thoroughly acquaint themselves with these instructions before their first flight in the airplane. Ground drills in emergency operations, exiting from airplane and ditching are highly recommended. *(See figure 15).*

2. ENGINE FAILURE DURING TAKE-OFF.

a. If safety speed of 170 mph IAS has not been reached, close both throttles and land straight ahead; if necessary, raise alighting gear.

b. If safety speed has been attained, the airplane will climb with alighting gear and flaps up and no bombs. Feather dead propeller and close the throttle.

3. ENGINE FAILURE DURING FLIGHT.

a. The propeller of the dead engine should be feathered and the radiator shutter closed.

b. The radiator on the live engine must be OPEN.

c. The airplane will easily maintain height at +7 psi boost and 2,650 rpm and will climb at 170 mph IAS. Speeds below 170 mph IAS are not recommended, as the temperatures are likely to become excessive.

d. Landing with one engine inoperative, lower alighting gear at 170-180 IAS but DO NOT lower flaps until it is certain that the airfield can be reached and then only to 30 degrees. Remember that the operation of both, flaps and alighting gear, are sluggish on one engine. When making a partial-power final approach on one engine, NEVER let the speed drop below 150 mph until the airfield boundary is well within gliding distance.

e. FEATHERING PROPELLERS.

(1) Hold the button in only long enough to ensure that it stays in by itself, then release. It will spring out when feathering is complete.

(2) Close throttle immediately and switch off when engine stops.

Note

A defective pressure cut-out switch may fail to release the button and stop the feathering pump when the propeller is fully feathered. If the rpm reaches a low value and then begins to rise, the button should be pulled out at once. The propeller can then be fully feathered by pressing the button again and pulling it out before the unfeathering actions begin.

f. UNFEATHERING.

(1) Set the throttle slightly open, set propeller speed control to minimum rpm (full back) and ignition switches on.

(2) Hold feathering button in until rpm reaches 1800-2000.

(3) If the propeller does not return to normal constant speed operation, open throttles slightly.

(4) Always warm up engine before opening up to full power.

(5) If the trouble described in paragraph 3.*e.*(2) "Note" is experienced and the button is not pulled out in time, or if the rpm is allowed to rise too far before the button is released in the normal unfeathering process, the propeller blades may go to full fine pitch and give excessive rpm. If this occurs:

(a) Close throttles.

(b) Reduce airspeed.

(c) Set propeller speed control fully forward.

The propeller will return to normal constant speed operation when the actual rpm is reduced below the setting of the propeller speed control.

4. ALIGHTING GEAR EMERGENCY LOWERING SYSTEM.

a. Indicators continue to show that the alighting gear has lowered but not locked down.

(1) If the alighting gear selector has returned to NEUTRAL, maintain pressure in the struts by holding the selector DOWN (or by operating hand pump with selector DOWN) until landing is complete and the units can be locked by the ground staff. Avoid using brakes, if possible.

(2) If there is no tendency for the alighting gear selector to return to NEUTRAL, it shows that the engine pumps will not maintain pressure in the struts; in this case, return alighting gear selector to NEUTRAL, push emergency selector DOWN and lock alighting gear down, or maintain pressure in the struts with the hand pump.

b. If alighting gear fails to lower at all on engine pumps:

(1) Attempt to lower by selecting DOWN and pumping with the hand pump. Approximate time taken to lower by this method is four minutes.

(2) If this should fail, leave alighting gear selector NEUTRAL. Push emergency selector DOWN. Operate the hand pump until the alighting gear indicator shows that the wheels are locked down, or very considerable resistance is felt for several strokes.

Note

This will not lower the tailwheel or flaps, nor can the alighting gear be raised by this method.

c. TAILWHEEL.—Put alighting gear selector to DOWN, and attempt to lower tailwheel with the hand pump, through normal system.

5. WING FLAPS EMERGENCY LOWERING SYSTEM.

Once alighting gear is locked down, return alighting gear emergency selector to "NEUTRAL". Put flap selector DOWN and hand pump until flaps position indicator shows that flaps are down.

6. EMERGENCY EXITS.

(See figure 16.)

a. The entrance door is also the parachute exit, and is jettisonable. Parachute exit can be made through the emergency roof exit only when flying inverted.

b. In the event of a crash landing the roof emergency exit can be operated by pulling down the red emergency lever and pushing the panel out.

7. FIRE EXTINGUISHER EQUIPMENT.

a. ENGINE FIRE EXTINGUISHERS.—The fire extinguisher system is operated by two push-switches on top of the fuel gages panel at the right hand side of the cockpit. The forward switch operates the left engine extinguisher and the rear switch operates the right one. An impact switch in the nose compartment attached to the rudder pedals cover, and flame switches in each engine nacelle provide automatic operation of this system.

b. HAND FIRE EXTINGUISHERS.—Two hand fire extinguishers are provided, one beside the pilot and one on the rudder pedals cover in the nose compartment.

8. DITCHING.

a. Lower flaps to 25 degrees and make final approach without engines.

b. As soon as airplane stops release life raft. *(See figure 17).*

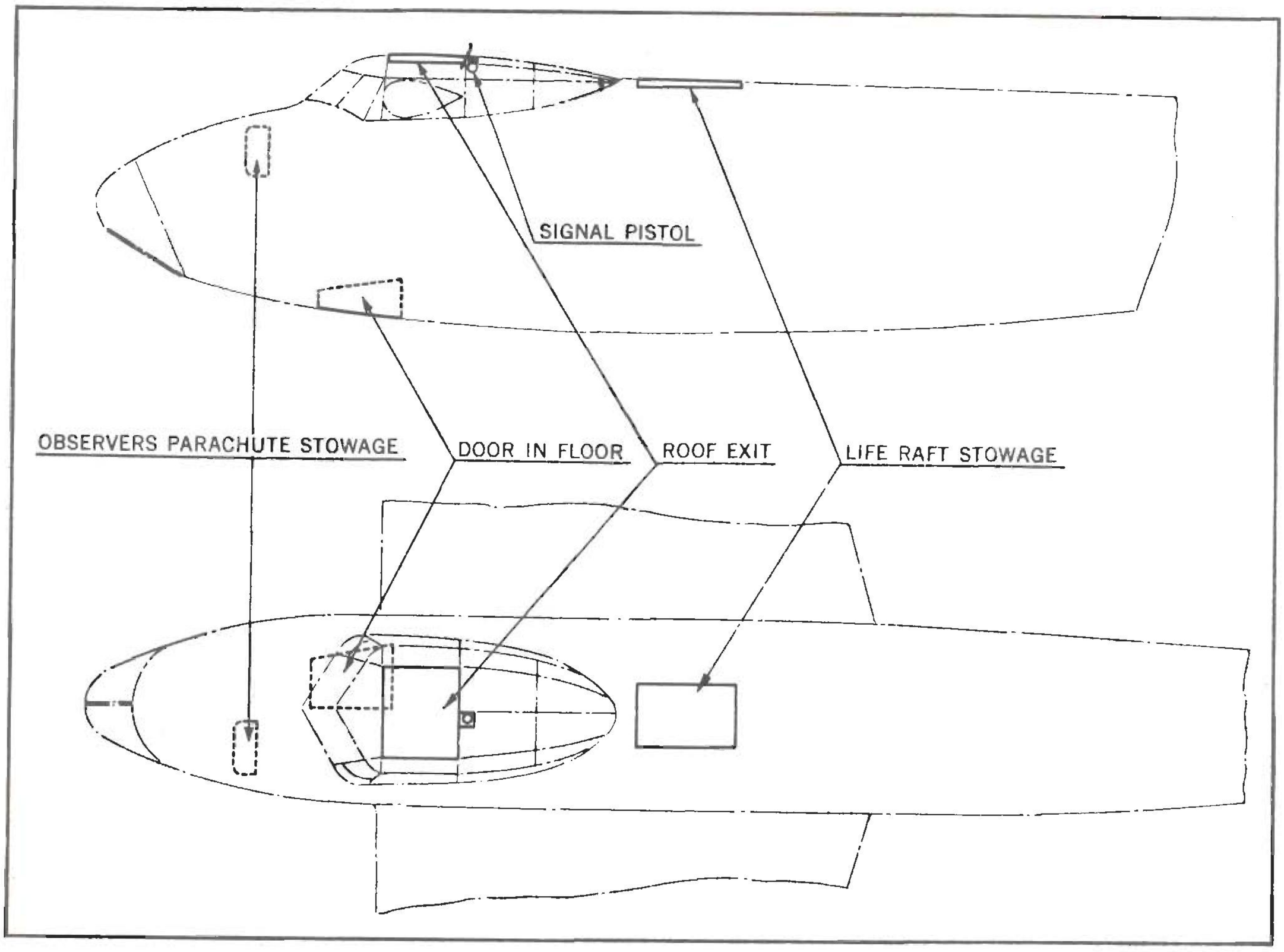
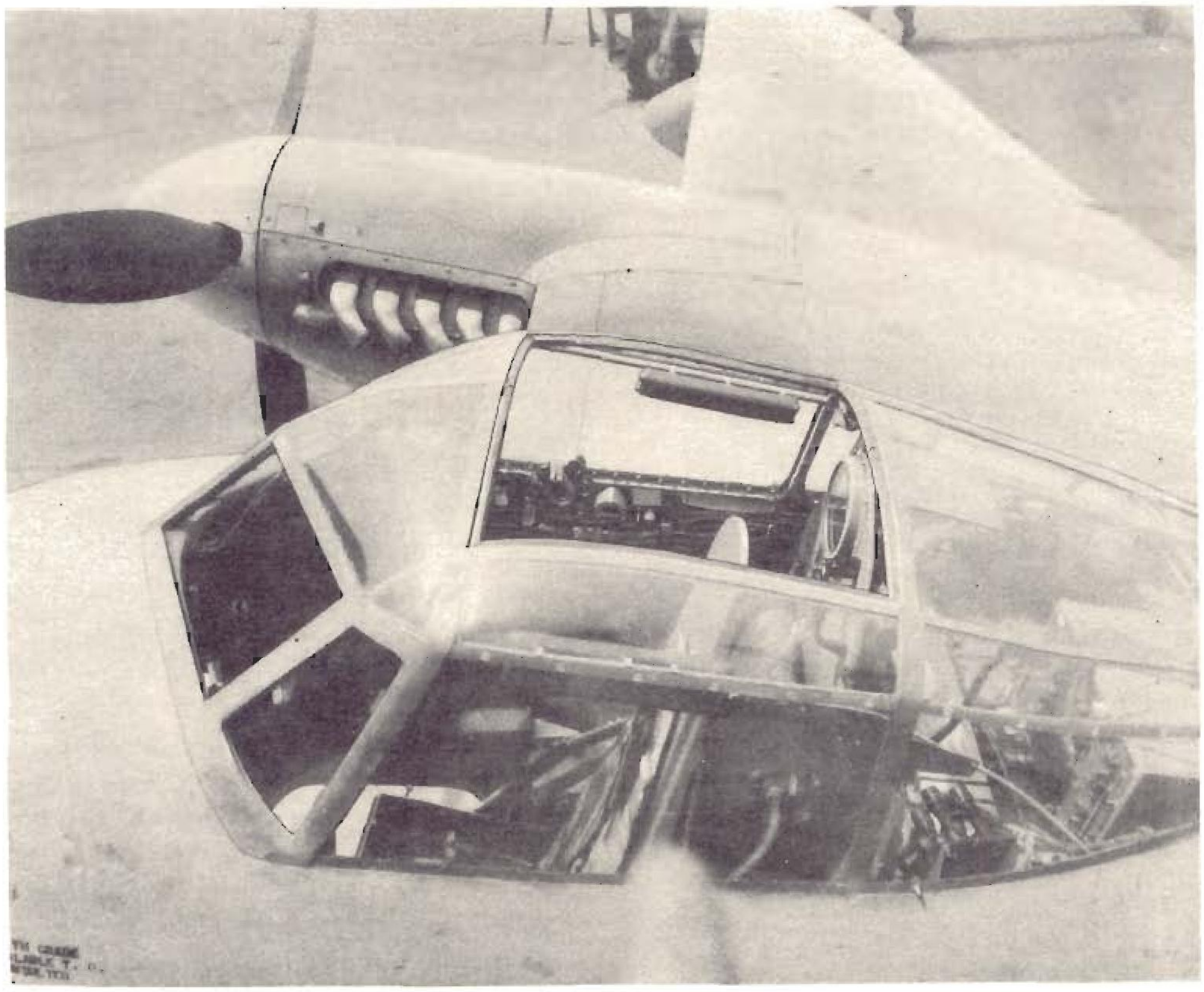
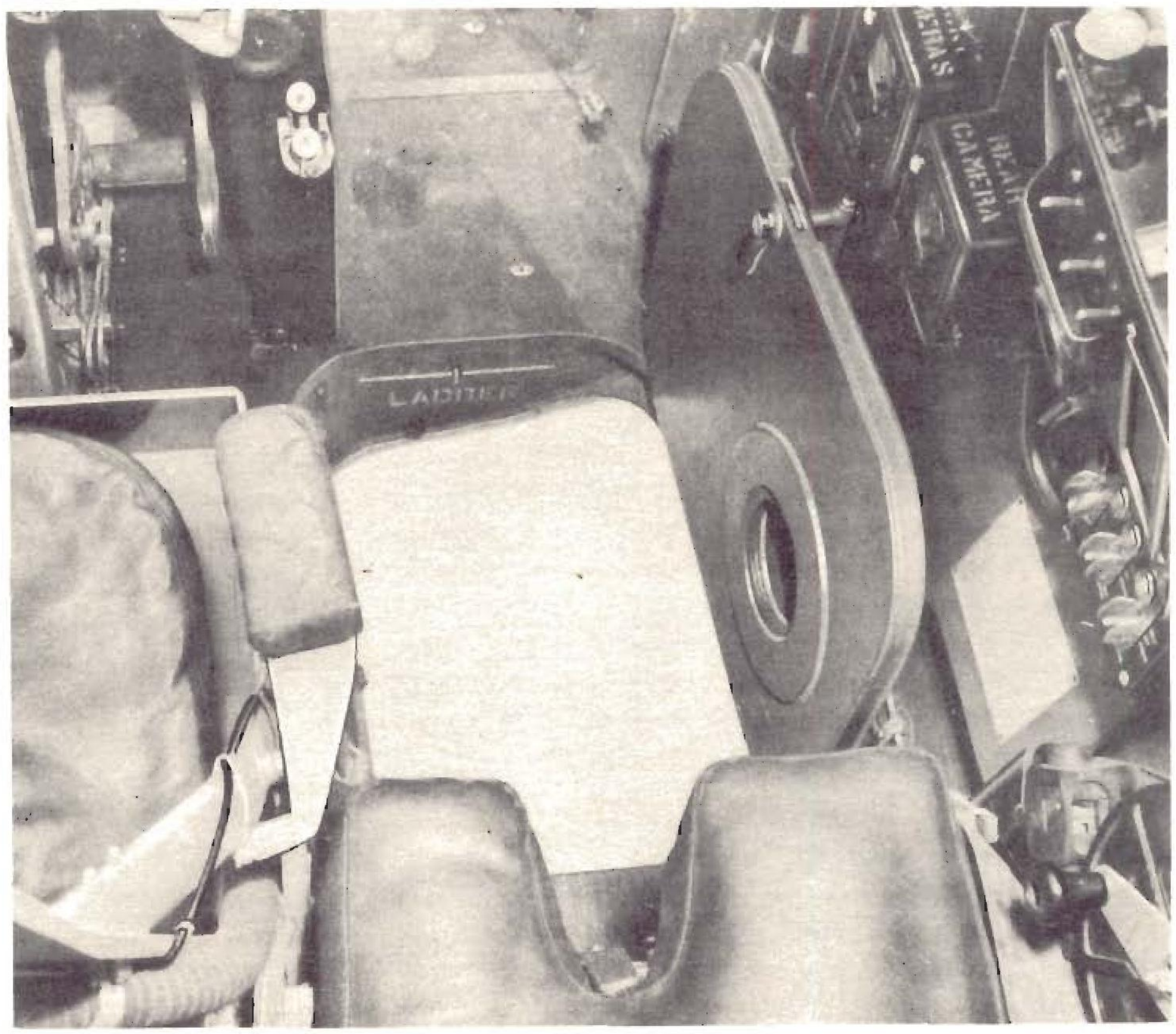


Figure 15—Emergency Exits and Equipment



Belly Landing or Ditching Escape Hatch

Figure 16—Emergency Escape Hatches



Normal Ground Entrance and Flight Escape Hatch

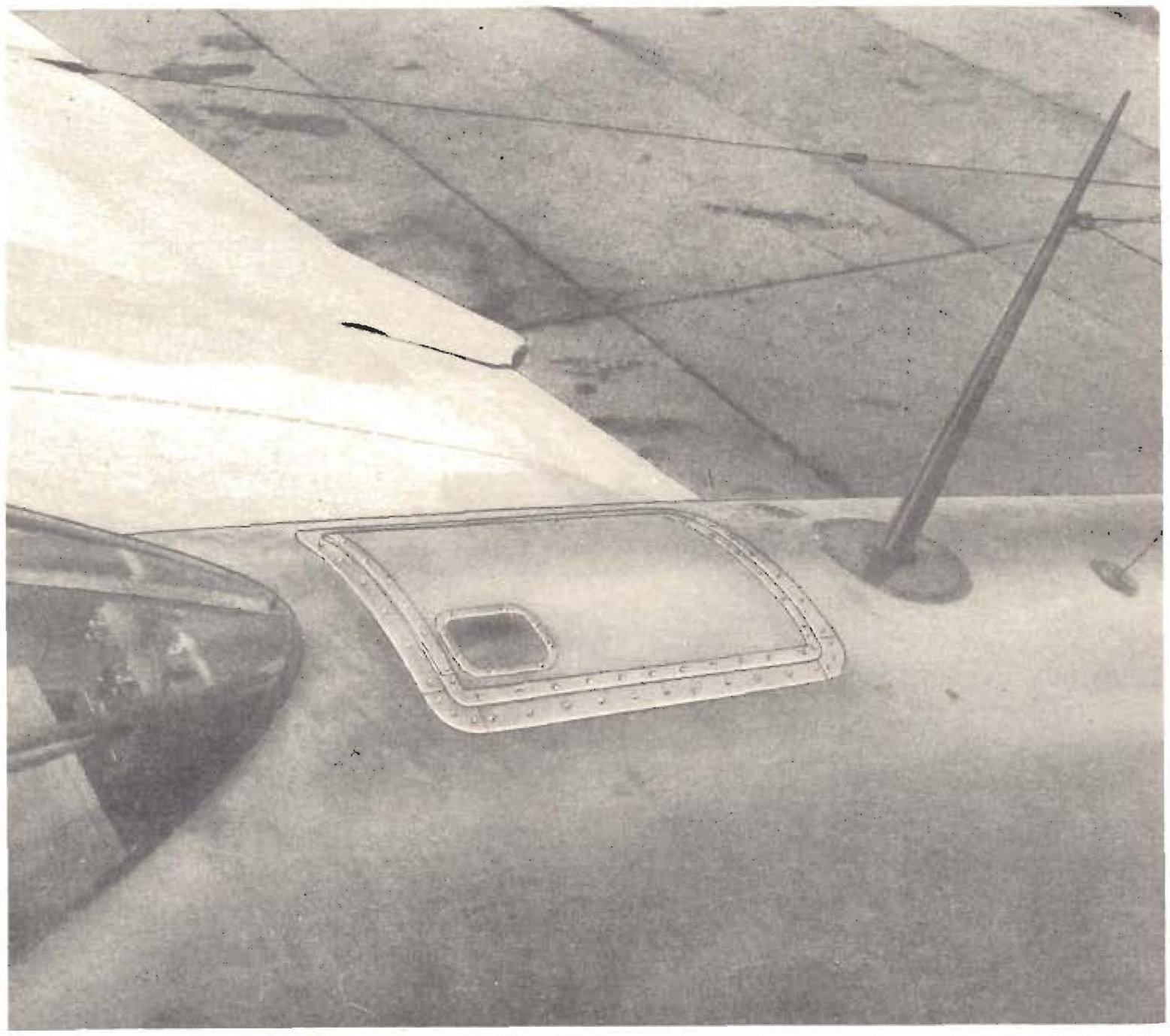


Figure 17—Life Raft Stowage

SECTION V
OPERATIONAL EQUIPMENT

1. OXYGEN SYSTEM.

(See figure 18.)

a. DESCRIPTION. — Oxygen demand regulators Type A-12 are provided at two positions in the airplane convenient for pilot and observer. The demand regulators are supplied from a set of six interconnected high pressure cylinders, located in the aft camera compartment forward on the door. The supply is controlled by a high pressure valve positioned below the fuel gage panel and is connected through a pressure control valve below the cockpit floor on bulkhead No. 2, to the two demand regulators. There is a flowmeter and high pressure gage on the instrument panel and a flowmeter on the right side of the cockpit, mounted between the high pressure valve and demand regulator. The altimeter is positioned in the left hand corner of the blind flying instrument panel. Although the demand system is fed from high pressure bottles, insofar as the crew is concerned, the oxygen installation is the standard, AAF, low pressure type.

b. CHARGING VALVE.—The oxygen charging valve is located on the right side of the fuselage, immediately forward of the door, on the inside of the camera compartment. A U.S.-British adapter is provided.

2. COMMUNICATIONS EQUIPMENT.

a. GENERAL.—Provisions are made for installation of Bendix aircraft radio receiving equipment, model RA-10DB, transmitting equipment model TA-12C, interphone equipment, model MI-22A, radio compass equipment model MN-26-C *(See figure 19)* and for the installation of signal equipment command radio set SCR-522-A and identification radio set SCR-595-A or SCR-695-A.

b. AIRCRAFT RADIO RECEIVING EQUIPMENT MODEL RA-10DB.

(1) DESCRIPTION.—The type RA-10DB aircraft receiver is located on a rack aft of the pilot's and observer's positions. Type MR-9B remote control unit is located just aft of the pilot's seat and is controlled by the observer. The receiver is employed for the reception of CW, MCW, and voice signals in the two

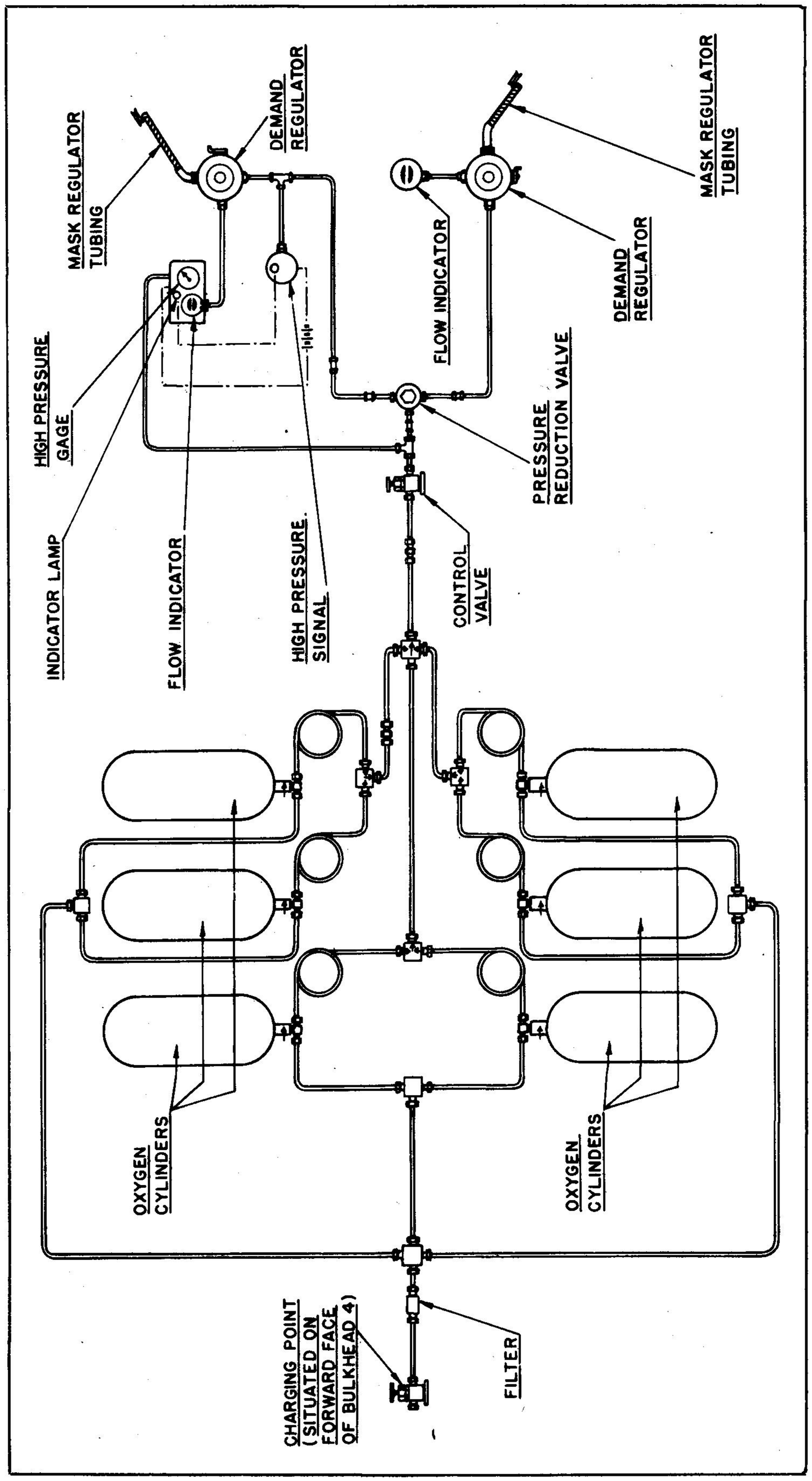


Figure 18—Diagrammatic Oxygen System

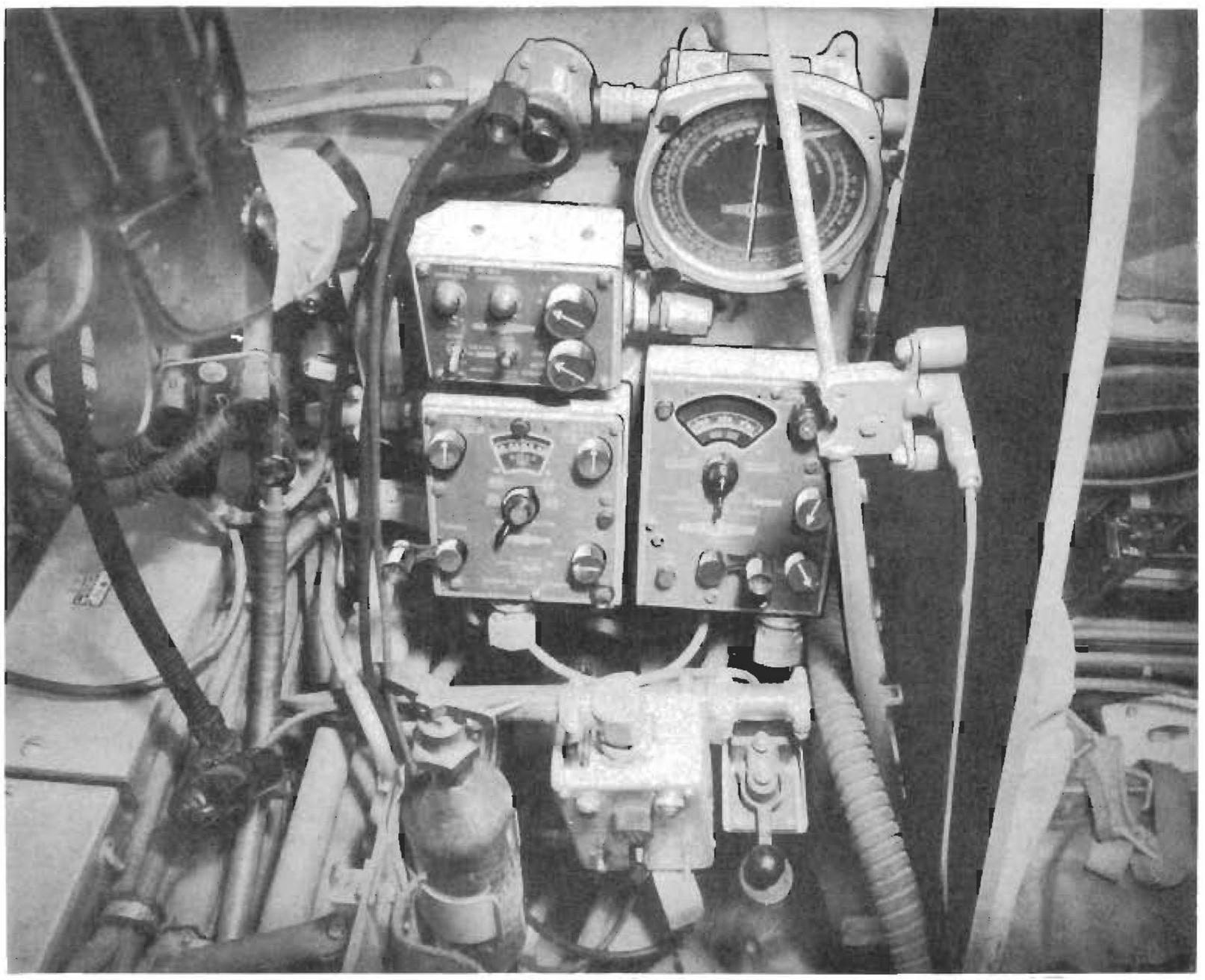


Figure 19—
MN-26C Radio Compass and Indicator Installation

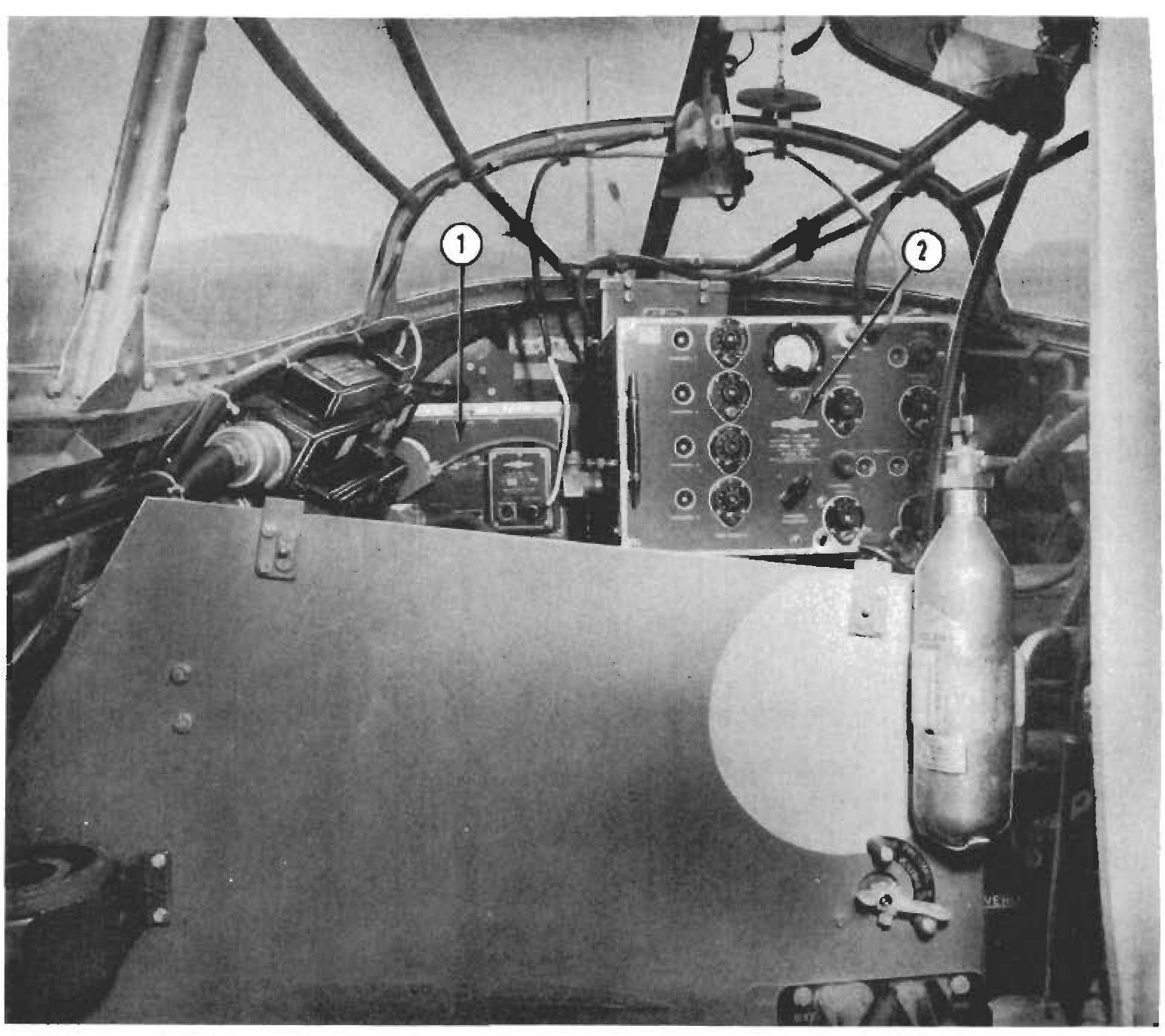


Figure 20—
Aft View of Pilot's Compartment

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1. Bendix RA-10 Receiver.
2. Bendix TA-12C Transmitter.

frequency range 150-1100 kc and 2.0-10.0 mc. Two hands are used to give full coverage in each frequency range. Provisions are made for two lock-in crystal controlled frequencies, one each for the 2.0-5.0 mc and the 5.0-10.0 mc bands. The receiver is remotely controlled. All power is obtained from dynamotor D-1.

(2) FUNCTION.—The receiver is controlled by the type MR-9B remote control unit. All normal tuning and operating adjustments are made from this unit. The "TUNING" control provides for selection of the desired frequency on any of four bands. The dial is illuminated by an instrument lamp which can be readily replaced during flight, by the spare lamp which is mounted on the unit. The "BAND SELECTOR" switch energizes the band selector motor which selects any one of the four bands. The "AVC-MVC-CW" switch functions as follows: "AVC" gives automatic volume control on all bands except Band 1, where it is not desirable when receiving "CW;" "MVC" is used for manual volume control and "CW" is used for reception of continuous wave signals. The "OFF-VOLUME" when not on "AVC" controls the volume and turns the receiver "ON" and "OFF." The "XTALON-XTALOFF" switch connects the crystals if installed into the receiver heterodyne oscillator circuit of the two high frequency bands.

c. AIRCRAFT TRANSMITTING EQUIPMENT MODEL TA-12C.

(1) DESCRIPTION.—The type TA-12C aircraft transmitter is a remotely controlled, 4 channel, 40 watt output transmitter. The frequency ranges covered are 300-600 kc and 3,000-12,000 kc. Voice, CW and MCW transmission are possible. Power is supplied by the type MP-28B power supply unit. The transmitter is located on the rack aft of the pilot's and observer's positions. The type MT-51B remote control unit and telegraph key are located just aft of the pilot's seat and are controlled by the observer. *(See figure 20).*

(2) FUNCTION.—The type MT-51B remote control unit controls the transmitter. All normal operating adjustments are made from this unit. The "CHANNEL" switch has four positions for selecting the desired channel of the transmitter. The "EMISSION" switch controls the "MCW," "CW," and "R/T" (radio, telephone or voice) types of emission. The "ON-OFF" switch controls the power to all circuits in the equipment. The "SEND" switch has two positions, both of which energize the transmitter. The non-locking position permits "push to talk" radio telephone (voice) operation, while the locking position permits continuous operation.

d. AIRCRAFT INTERPHONE EQUIPMENT MODEL MI-22-A.

(1) DESCRIPTION. — The aircraft interphone equipment consists of model MI-22A station boxes, of which three are installed. The interphone provisions of radio set SCR-522-A are used for amplification in place of the Model 3611-B interphone amplifier. Model MI-22-A station boxes are located at the left of the pilot's position, at the right and aft of the observer's forward position and at the left of the observer's cockpit position immediately back of the pilot's seat.

(2) FUNCTION. — The model MI-22-A station box functions as follows: The function selector switch selects Model MN-26-C radio compass on "COMPASS" position; type RA-10 DB aircraft receiver and Type TA-12C aircraft transmitter on "LIAISON" position and Radio Set SCR-522-A on "COMMAND" position. "INTER" and "CALL" positions are not used. However, communication between crew members is possible when radio set SCR-522-A is turned "ON," interphone station box selector switches are on "COMMAND" and "T-R-REM" switch on radio control box BC-602-A is on "R." The "SEND LOCK-REC-SEND" switch in the raised position, is locked in that position for transmitting. If held in the down, spring-tensioned position, transmission is also possible, but when switch is released it is spring returned to "REC" position where reception is possible. The "SEND LOCK-REC-SEND" switch has no function when on "COMPASS." When the liaison transmitter is in operation, the "LIAISON TRANS ON" indicator jewels will be illuminated on all station boxes. Each box is equipped with a "CALL" attention light jewel which is illuminated when any of the "CALL LIGHT" buttons are depressed.

e. AIRCRAFT RADIO COMPASS EQUIPMENT MODEL MN-26-C.

(1) DESCRIPTION.—The aircraft radio compass equipment model MN-26C consists of a control box, a "LEFT-RIGHT" indicator, a fixed loop antenna and a receiver. Reception is possible over three frequency ranges covering the 150-325, 325-695 and 695-1500 kc bands. The remote control is located just aft of the pilot's seat and is controlled by the observer. The type IN-4A "LEFT-RIGHT" indicator is located on the right center of the instrument panel. The type MN-26C radio compass is located on the rack aft of the pilot's and observer's position. Type MN-20A fixed loop is mounted on the upper inside part of the fuselage back of the wing.

(2) FUNCTION.—Through selection on the type MN-28C remote control, the equipment provides for visual bearing indication with regard to the longitudinal axis of the airplane, when on "COMP" position; aural reception of modulated or unmodulated radio frequency energy, using a non-directional antenna, when on the "REC ANT" position; aural reception (at a net gain of snow static reduction and a loss of signal strength as compared to operation on "REC ANT") of modulated or unmodulated radio frequency energy, using a loop antenna, when on "REC LOOP" position; and aural null directional indications of the arrival of modulated or unmodulated radio frequency energy, using the loop antenna, when in the "REC LOOP" position. Besides the above functions, the function selector switch also turns the radio compass "OFF." The "LIGHT" knob controls the dial lamps, the "AUDIO" knob regulates

the headset volume, the "COMPASS" knob regulates the extent of the pointer deflection of the "LEFT-RIGHT" indicator needle, the band selector switch and "TUNING" crank select station frequencies and tune them for greatest audio response for the incoming signal, and the "CW-ON-OFF" switch makes reception of CW signals possible.

f. COMMAND RADIO SET SCR-522-A.

(1) DESCRIPTION. — The command radio set SCR-522-A is designed for airplane to airplane or airplane to station communication in short range operation at ultra high frequencies. Only voice reception and transmission are possible. The transmitter and receiver are mounted in one case and a dynamotor unit, common to both, is mounted in a separate case. The radio set is remotely controlled from radio control box BC-602-A. Both receiver and transmitter operate on four pre-tuned channels between 100 and 156 mc. The radio control box BC-602-A is located at the left of the pilot's position. The transmitter-receiver case CS-80-A and the dynamotor unit PE-94-A are located aft in the fuselage, back of the radio rack. The dipole antenna used with the radio set is located in the inside of the fuselage forward of the tail section.

(2) FUNCTION.—Radio control box BC-602-A controls operation of both receiver and transmitter. When one of four buttons "A," "B," "C," and "D" on the control box is pressed, the receiver and transmitter are turned "ON" and the frequency selected. The "OFF" button turns both receiver and transmitter "OFF." A "T-R-REM" switch selects the transmitter when on "T," the receiver when on "R," and when on "REM" position, the transmitter and receiver are switched "ON" and "OFF" alternately by pressing and releasing the "push-to-talk" button. The radio set furnishes power for the interphone equipment for intracrew communication.

g. RADIO SET SCR-595-A OR SCR-695-A.

(1) DESCRIPTION. — Radio set SCR-595-A or SCR-695-A consists of radio receiver BC-965-A and radio control equipment RC-255-A which consists of power control box BC-958-A and selector box BC-965-A. The radio set has provisions for destruction of the receiver. The radio control equipment RC-255-A is located at the observer's position. The detonator switch box BC-765, painted red and marked "DANGER" is located forward of the observer's position. The radio receiver BC-965-A, inertia switch and indicator lights are located opposite radio set SCR-522-A. The antenna is in and on the upper rear fuselage.

(2) FUNCTION.—The radio set, known as IFF equipment, is used for identification purposes. Operation of the set is automatic when set is turned "ON" by placing the "ON-OFF" switch on the control box in the "ON" position. Operational adjustments should be made on the ground prior to flight, but may be made while in flight. The selector switch, "EMERGENCY" switch and the "695-G" band switches (if installed) are used in accordance with tactical orders and directions from the Communications Officer-in-Charge. When the dual push buttons of switch box BC-765 are pressed and the detonator plug PL-177 is in the receiver, detonation takes place. Two indicator lights are supplied for indicating presence of voltage at the detonator plug terminals, and an inertia switch is provided for automatically setting off the detonator charge in the receiver in the event of a crash landing.

b. MISCELLANEOUS EQUIPMENT.—Two headsets, HS-33, connected with two headset adapters, MC-358-C, are installed for use of the pilot and observer. Two throat microphones, T-30-P, one microphone switch, CD-508 and two microphone adaptors, M-299 are provided for the flight crew.

3. PHOTOGRAPHIC EQUIPMENT.

a. GENERAL.—The photographic equipment *(See figure 23)* in the F-8 Airplane consists of two K-17 or K-22 12-inch cameras mounted in split vertical arrangement in the forward bomb bay of the airplane. Provision is made at the rear camera station aft of the rear entry door for a single vertical camera supported in a standard camera mount. Controls for the cameras are located in the cockpit so as to be accessible to the pilot or navigator. The cameras may also be operated from the nose of the airplane by means of a duplicate control panel. Vacuum, hot air heat and electrical outlets are provided at each station.

b. REAR CAMERA STATION.

(1) CAMERA MOUNT.—The rear camera support is adjustable to provide for installation of various focal length cameras in standard camera mounts. However, due to moisture, the wood support for the channels may warp so that the channels do not retain their original alignment. This condition may prevent the use of camera mounts having their mounting studs rigidly attached to the mounts. However, the mounting points on the type A-8 mount are flexible enough to allow installation of this mount regardless of the alignment of the channels.

(2) ELECTRICAL.—The power for operating the camera is obtained from the camera junction box, located immediately aft of the rear entry door. The camera cable is attached to the junction box and should be plugged into the intervalometer receptacle on the camera.

(a) The receptacle labeled "HEATER" is for use with an external or internal electrical heater. The receptacle labeled "OPEN. IND." is used with the external (microswitch) type blinker assembly to indicate that unexposed film still remains in the camera. This switch causes the aft light on the "Camera Control" boxes to blink while the camera is winding film into place.

(b) The third receptacle on the junction box is for use with the automatic camera mount, instruction for the use of which follows: hot air heat and vacuum outlets are provided on the left camera support box

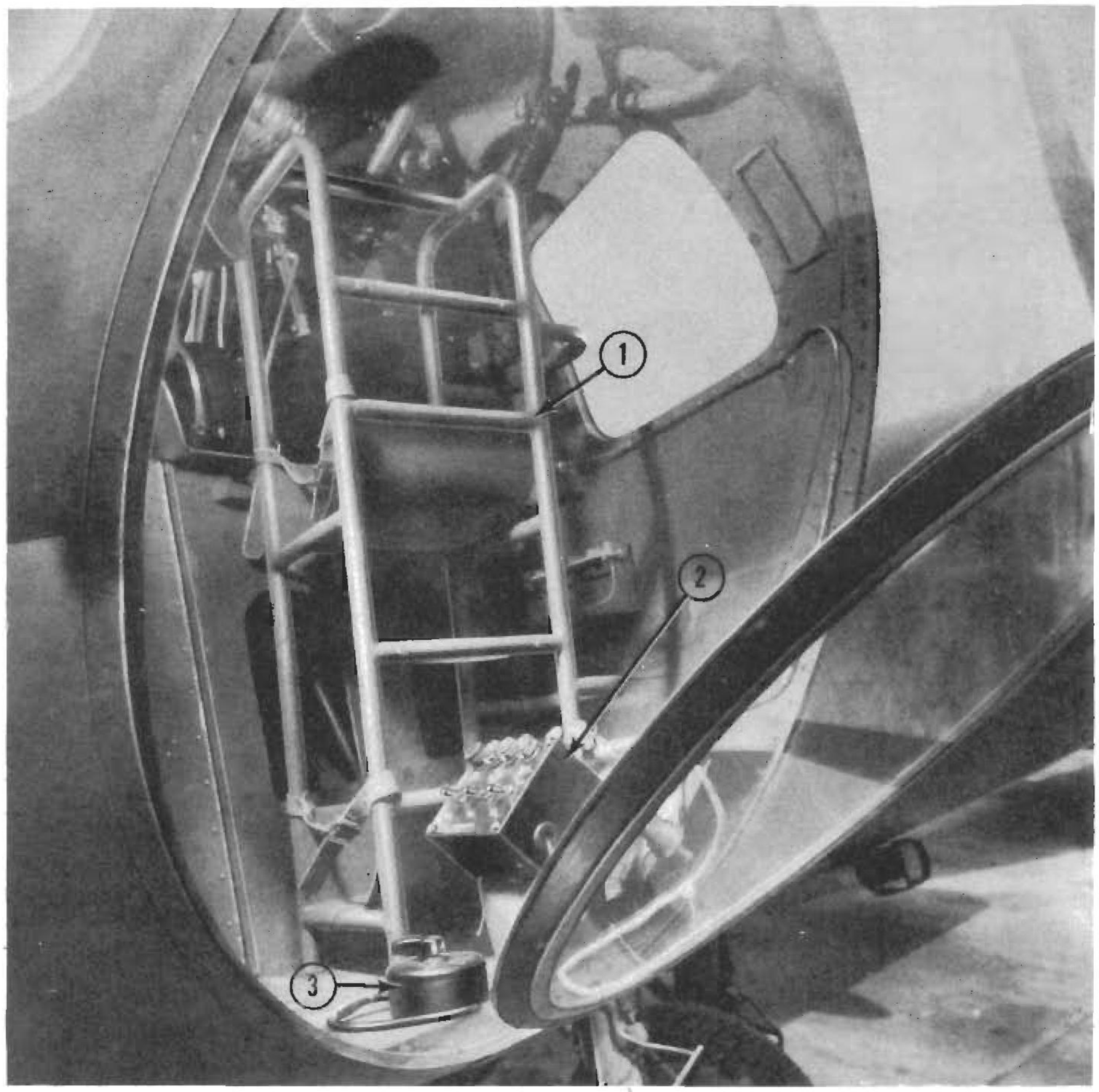


Figure 21—
Exterior View of Photographer's Nose Compartment

★

1. Spare Camera Magazine Rack for Films.
2. Camera Controls.
3. P.D.I. Switch.

aft of the entrance door. A flared tube bracket is also available for stowing the vacuum hose when no camera is installed.

(3) AUTOMATIC CAMERA MOUNT—TYPE A-15B.—The type A-15B mount assembly consists of a control box which should be mounted on the wedge plate provided next to the camera control box in the cockpit, a camera mounting frame and an electronic amplifier box. The latter two items are installed at the rear camera station, the mount in the mount support and the amplifier in the support box aft of bulkhead No. 5.

(a) When an automatic mount assembly is to be installed in an F-8 airplane it will be necessary first to provide an electrical connection between the mount control box in the cockpit and the amplifier in the rear. A five wire cable has been provided in the airplane between the forward bomb bay and bulkhead No. 5 for use with the automatic mount. The mount control box, when delivered, has a 12 foot five wire cable and AN standard plug attached. This cable should be cut in half so that the cable attached to the mount control box can be routed to the terminal block in the forward ceiling of the bomb bay. An opening through which the cable should be routed has been provided in the right rear corner of the navigator's seat.

(b) The other half of the severed cable, containing the AN plug, should be connected to the rear terminal block of the automatic mount for attachment to the amplifier.

(4) CAMERA WINDOW (REAR STATION).—The rear camera window is held in place by a plywood retaining ring and wood screws. When delivered, the airplanes have a protecting cover on the outside and inside of the window. This can be removed without disturbing the glass mounting. Replacement glass should be in accordance with U.S. Army Specification 75-357, Type I. The dimensions of the glass are ¼ in. thick by 13 in. diameter.

c. BOMB BAY CAMERA STATION.

(1) CAMERAS AND MOUNTS.—The mount for the split vertical 12 in. focal length cameras will accommodate either the K-17 or K-22 cameras.

(a) The trunnions should be removed before attaching the mounting frame to the cameras. The trunnion on the K-22 camera is held in place by means of two dowel pins and two flat head machine screws. When the split vertical mount is used with the K-22 cameras, the same dowels and machine screws are used, but the cameras are held at the required 18½ degrees angle from the vertical for correct overlap.

The K-22 cameras are mounted with the electrical receptacles to the rear.

(b) The K-17 cameras require the use of two adapter brackets per camera in order to be used with the split vertical mount. These brackets and trunnions, removed from the camera, are stowed in the "CAMERA CABLE" pouch at the rear station when not in use. Also due to the limited space it is necessary to remove the bumper ring on the bottom of the cones of these cameras. The K-17 cameras are mounted with the diaphragm and shutter speed settings to the rear.

(c) Adjustment for height of the cameras above the bomb bay doors and for flying attitude of the airplane is provided by the four adjusting screws, holding the mount in place.

(2) ELECTRICAL.—The necessary electrical connections are made by attaching the two cables from the electrical junction box to the "INTERVALOMETER" receptacles on the cameras.

(a) Receptacles for electrical heaters are provided, although it is anticipated that the hot air emptying into the bomb bay will be sufficient for heating the cameras. The limited space in the bomb bay of the F-8 airplane plus the desirability of having the film travel in one direction has made it impossible to use the magazine heater on the left camera.

(b) The "OPERATION INDICATOR" receptacles are used in the same manner as those with the rear camera. These cause the two center lights on the "CAMERA CONTROL" Boxes to blink. However, care should be taken to use the left "OPERATION INDICATOR" receptacle with the left camera, etc.

(3) CAMERA WINDOWS (BOMB BAY).—These camera windows are held in place by wood strip



Figure 22—Camera View Finder

and screws which are removable from inside the bomb bay. Replacement glass should be installed with the rubber channel surrounding it to prevent breakage of the glass due to torsion in the doors. The glass for the bomb doors should be in accordance with the U.S. Army Specification No. 75-357, Type I. The dimensions of the glass are 1/4 in. thick.

(4) MISCELLANEOUS. — Vacuum is provided through a surge tank on the upper wall of the bomb bay aft of the cameras. When preparing the split vertical cameras for flight, the magazines are attached through the navigator's access door, by removing part of the navigator's seat. When the K-22 cameras are used, the diaphragm and shutter speed settings may be made from the cockpit (navigator's station). The K-17 camera setting must be made through the bomb bay. Lights are provided in the bomb bay and are operated by a toggle switch on the under side of the navigator's seat.

d. COCKPIT.—The cockpit camera equipment consists of two B-3B intervalometers, a camera control box, the main camera junction and circuit breaker panel and mounting provisions for an automatic mount control box. A viewfinder mounting ring is provided on the floor of the entrance door beneath the navigator's feet.

e. NOSE STATION. *(See figure 21).*

(1) The nose compartment of the F-8 Airplane contains a duplicate camera control box, a pilot's direction indicator switch. Stowage position for the A-2 viewfinder and a stowage bracket for two A-5 magazines.

(2) The pilot's direction indicator is an instrument for indicating to the pilot in which direction he should correct the plane in order to follow the photographer's flight line. The indicator switch located on the forward edge of the floor in the nose of the airplane operates the indicator on the upper left instrument panel in the cockpit. A light and an indicator needle are both operated by the pilot's direction indicator switch.

f. OPERATING INSTRUCTIONS. — The instruments for operating the camera are located on the right cockpit so as to be accessible to the observer or pilot. The necessary instruments consist of a viewfinder, two intervalometers, a camera control panel, and in some cases a control box for the automatic camera mount. A duplicate camera control box and a pilot's direction indicator is also located in the nose of the airplane.

(1) VIEWFINDER.—The viewfinder *(See figure 22)*, is stowed in the nose of the airplane forward of the cockpit instrument panel. When used, the viewfinder is engaged with the mounting ring on the floor of the cockpit accessible to the navigator.

(2) INTERVALOMETERS AND CAMERA CONTROL BOX.

(a) Two intervalometers are provided, one for use at each camera station. The intervalometer switch should be left on so that the cameras can be operated directly from the "CAMERA CONTROL" panel. The "MASTER" switch on the control panel controls the electric vacuum valve, and the power outlets at the camera junction boxes.

(b) The "SPLIT VERT" and "VERT" switches operate the front and rear cameras respectively. The upper or "INTERV" position of the switch operates the cameras through the intervalometer. The down or "MANUAL" position operates the cameras at runaway. The camera control panel in the nose has duplicate controls.

(3) AUTOMATIC MOUNT CONTROL BOX. —The mount is turned on by the ON-OFF switch at the bottom of the panel. The camera MASTER switch must be "ON" before the mount will operate the "AZIMUTH." The Mount Control dial should be set to correspond to the drift of the airplane.

g. PHOTOGRAPHER'S INSTRUCTIONS.

(1) FRONT CAMERA OPERATION.

(a) Set the front camera intervalometer.

(b) Turn the camera master switch "ON."

(c) Turn the "SPLIT VERT" switch to "INTER."

(d) Note the blinker lights above the "SPLIT VERT" switch for operation of the cameras. If the light blinks at intervals, unexposed film still remains in the camera.

(2) REAR CAMERA OPERATION.

(a) Set the rear camera intervalometer.

(b) Turn the master switch "ON."

(c) Turn the "VERT" rear switch to "INTER."

(d) Check the blinker light.

(e) "MANUAL" position of the "SPLIT VERT" and "VERT" switches operates cameras at "run away."

(3) AUTOMATIC CAMERA MOUNT.

(a) Turn the "MASTER" switch and automatic mount switch "ON" at least 10 minutes before using the mount.

(b) Make necessary drift (Azimuth) corrections on the mount control box.

4. DE-ICING CONTROL.

a. CONTROLS.—The alcohol de-icing control switch is mounted below the hydraulic selector panel. It consists of two toggle switches operating vertically in three positions, "LOW FLOW," "OFF," and "HIGH FLOW." The left hand switch controls the carburetor de-icing and the right hand one the propeller de-icing.

b. WINDSHIELD.—De-icing fluid can be sprayed on the windshield from a nozzle mounted in front of it. The supply is controlled by a small hand pump with a regulator mounted immediately below the aileron trim tab control.

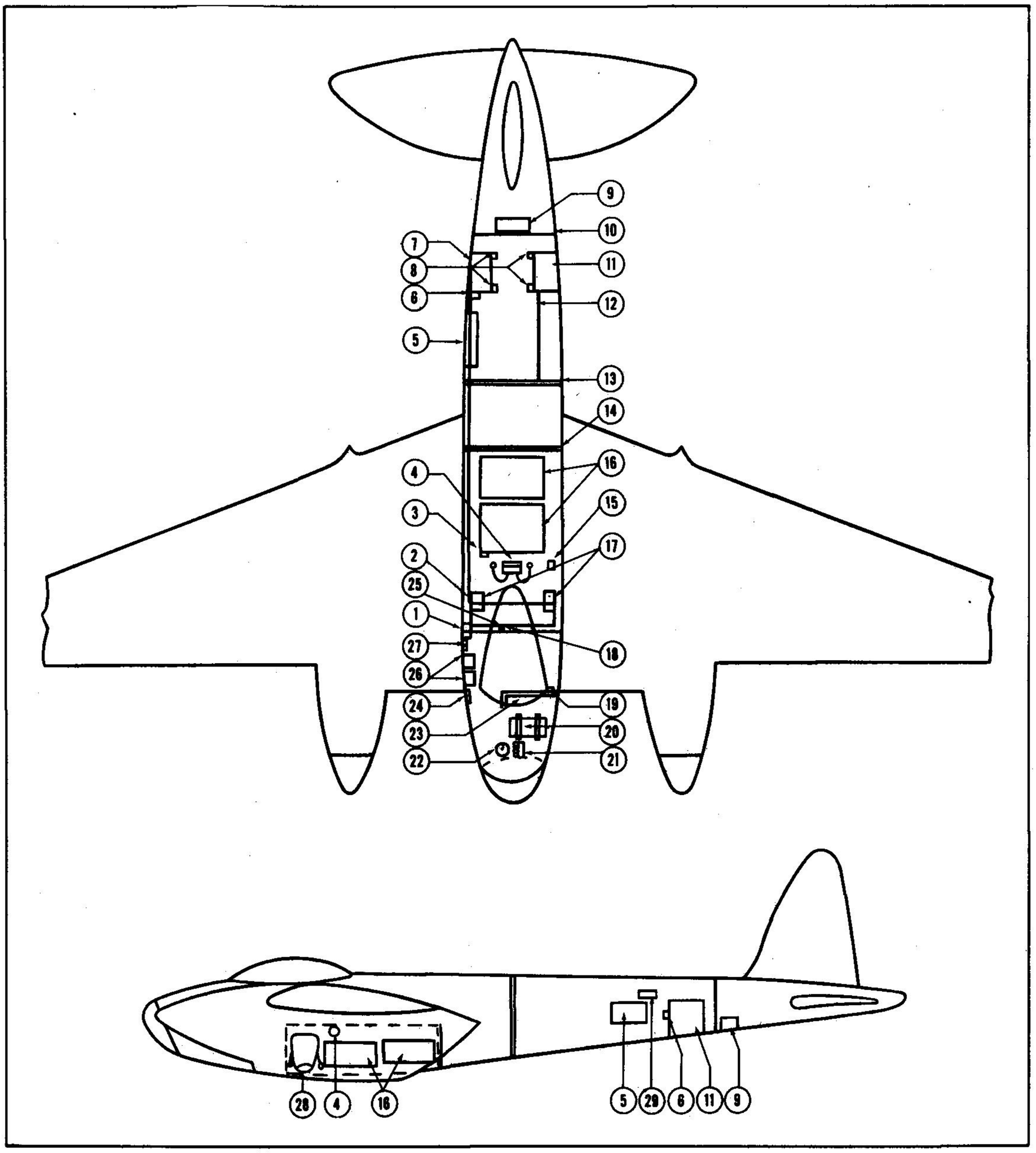


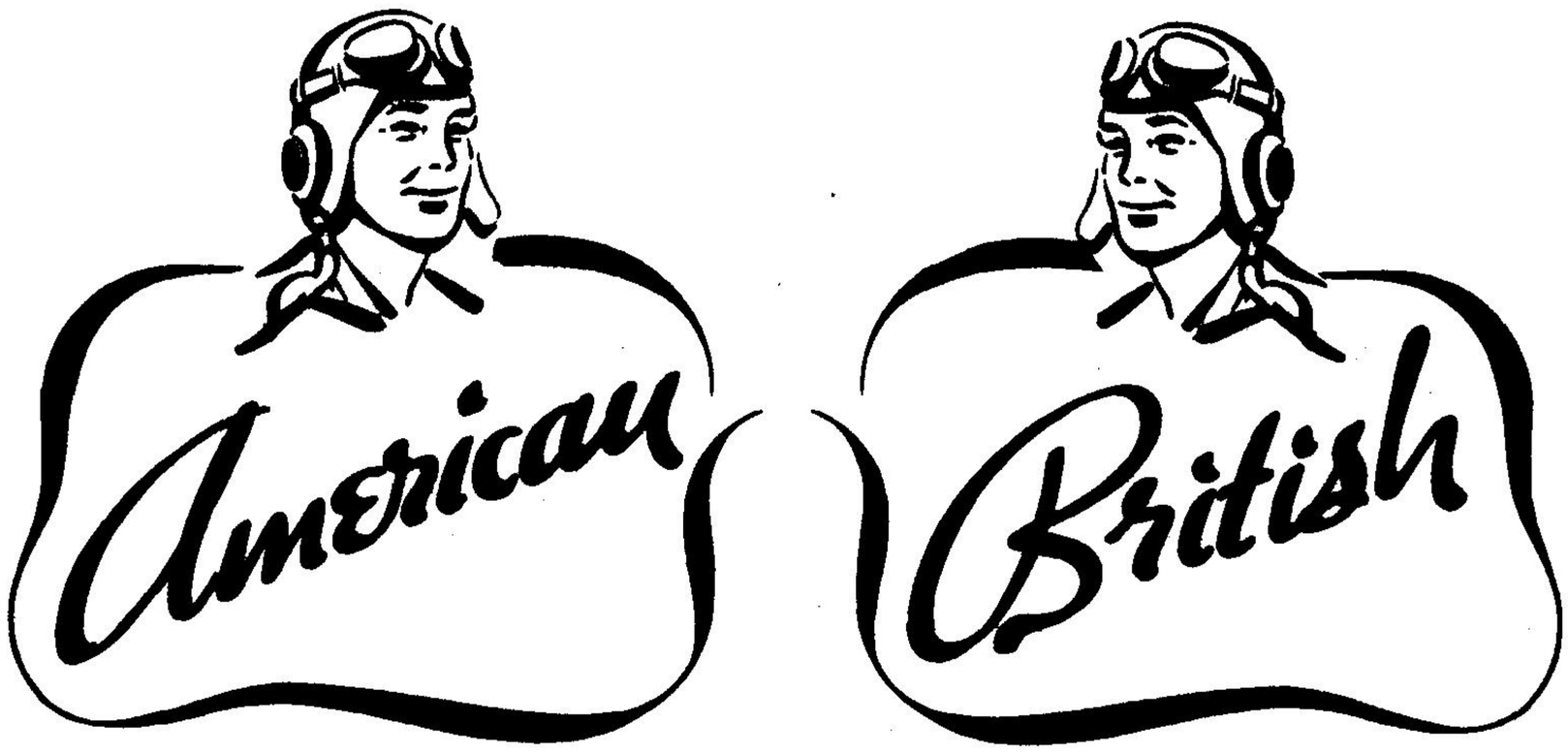
Figure 23—Location of Photographic Equipment

1. Camera Control Box (Navigator—Photographer's Station).
2. Access Door to Bomb Bay.
3. Front Terminal Block-Automatic Camera Mount Cable.
4. Vacuum Surge Tank and Vacuum Hose for Bomb Bay Cameras.
5. Rear Entry Door.
6. Electrical Junction Box (Rear Camera).
7. Vacuum and Hot Air Outlet (Rear Camera Station).
8. Rear Camera Mount Support Channels.
9. Support Bracket for Automatic Camera Mount Amplifier Box.
10. Bulkhead No. 5.
11. Wood Support Structure for Rear Camera.
12. Protective Partition for Control Cables (To Be Used When Baggage is Stowed in Rear).
13. Bulkhead No. 4.
14. Bulkhead No. 3.
15. Electrical Junction Box (Front Cameras).
16. Fuel Tanks (Bomb Bay).
17. Camera Windows in Bomb Doors (¼ in. Plate Glass Squares in Accordance with U.S. Army Specification 75-357, Type 1).
18. Bulkhead No. 2.
19. Pilot's Direction Indicator (Instrument Panel).
20. Rack for Stowage of Two A-5 or A-5A Camera Magazines.
21. Camera Control Box.
22. Pilot's Direction Indicator Switch.
23. View Finder Stowage.
24. Main Camera Junction and Circuit Breaker Box.
25. Switch on Under Side of Observer's Seat (Access Door) for Bomb Bay Lights on Side.
26. Two B-3B Intervalometers for Control of Split Vertical and Single Vertical Cameras.
27. Wedge Plate for Attachment of Automatic Mount Control Box.
28. Split Vertical K-17 or K-22 Cameras in Bomb Bay.
29. Pouch for Stowage of Extra Camera Cables.

APPENDIX I

GLOSSARY OF UNITED STATES-BRITISH AERONAUTICAL TERMS

American	*British Equivalent*
Accumulator	Reservoir
Airfoil	Aerofoil
Airplane	Aeroplane
Airspeed Head	Pressure Head
Alighting Gear	Undercarriage
Antenna	Aerial
Auxiliary Shaft	Lay Shaft
Battery	Accumulator
Bombardier	Bomb Aimer
Cap Screw	Set Screw
Center	Centre
Check Valve	Non-return Valve
Cotter Pin	Split Pin
Engine Mount	Engine Bearer
Filling	Topping up
Fillister Screw	Cheese Headed Screw
Frame	Gautry
Gage	Gauge
Gasoline	Petrol
Gritty Grease	Swarf
Ladder	Steps
Lean	Weak
Left	Port
Life Raft	Dinghy
Light	Lamp
Lines	Pipes
Mooring	Picketing
Observation	Reconnaissance
Power Plant	Power Egg
Propeller	Airscrew
Radio	Wireless
Reel	Winch
Right	Starboard
Screen	Shield
Set Screw	Grub Screw
Shock Strut	Shock Absorber Leg
Signaling	Morsing
Snap Ring	Circlip
Stabilizer	Tail Plane
Strut	Jack
Tachometer	Revolution Counter
Trim Tab	Trimming Tab
Windshield	Windscreen
Wing	Main Plane
Wrench	Spanner



SPEC. AN-H-8 Dec. 18, 1942 FORM ASC-510

AIRPLANE MODELS: F-8

TAKE-OFF, CLIMB & LANDING CHART

ENGINE MODELS: Merlin XXXI and XXXIII

TAKE-OFF DISTANCE (IN FEET)

GROSS WEIGHT (IN LBS.)	HEAD WIND		HARD SURFACE RUNWAY						SOD-TURF RUNWAY						SOFT SURFACE RUNWAY					
			AT SEA LEVEL		AT 3,000 FT.		AT 6,000 FT.		AT SEA LEVEL		AT 3,000 FT.		AT 6,000 FT.		AT SEA LEVEL		AT 3,000 FT.		AT 6,000 FT.	
	MPH	KNOTS	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.
19,822	0	0		2,500																
	17	15																		
	34	30																		
	51	45																		
	0	0																		
	17	15																		
	34	30																		
	51	45																		
	0	0																		
	17	15																		
	34	30																		
	51	45																		

NOTE: INCREASE DISTANCE % FOR EACH 10°C ABOVE 0°C (% FOR EACH 20°F ABOVE 32°F) ENGINE LIMITS FOR TAKE-OFF RPM & IN. HG

CLIMB DATA

COMBAT MISSIONS USE RPM & IN. HG — FERRY MISSIONS USE RPM & IN. HG

GROSS WEIGHT IN LBS.	TYPE OF CLIMB	S.L. TO 20,000 FT. ALT.				FT. ALT.						FT. ALT.						FT. ALT.						FT. ALT.						BLOWER CHANGE
		BEST I.A.S.		FT/MIN	TIME FROM S.L.	BEST I.A.S.		FT/MIN	TIME FROM S.L.	FUEL FROM S.L.		BEST I.A.S.		FT/MIN	TIME FROM S.L.	FUEL FROM S.L.		BEST I.A.S.		FT/MIN	TIME FROM S.L.	FUEL FROM S.L.		BEST I.A.S.		FT/MIN	TIME FROM S.L.	FUEL FROM S.L.		
		MPH	KNOTS			MPH	KNOTS			U.S.	IMP.	MPH	KNOTS			U.S.	IMP.	MPH	KNOTS			U.S.	IMP.	MPH	KNOTS			U.S.	IMP.	
16,770		170	148		8.6																									
21,000		170	148		22																									
	COMBAT																													
	FERRY																													

NOTE: INCREASED ELAPSED CLIMBING TIME % FOR EACH 10°C ABOVE 0°C FREE AIR TEMPERATURE (% FOR EACH 20°F ABOVE 32°F) FUEL INCLUDES WARM-UP AND TAKE-OFF ALLOWANCE

LANDING DISTANCE (IN FEET)

GROSS WEIGHT IN LBS.	BEST I. A. S. APPROACH		HARD DRY SURFACE						FIRM DRY SOD						WET OR SLIPPERY					
			AT SEA LEVEL		AT 3,000 FT.		AT 6,000 FT.		AT SEA LEVEL		AT 3,000 FT.		AT 6,000 FT.		AT SEA LEVEL		AT 3,000 FT.		AT 6,000 FT.	
	MPH	KNOTS	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL
*19,822	125	108	2535																	

NOTE: FOR GROUND TEMPERATURES ABOVE 35°C (95°F) INCREASE APPROACH I.A.S. 10% AND ALLOW 20% INCREASE IN GROUND ROLL.

REMARKS

*Power off landings should be made at 140 mph IAS (122 knots)

LEGEND
I.A.S.: Indicated Air Speed
M.P.H.: Miles Per Hour
S.L.: Sea Level
U.S.: U. S. Gallons
IMP.: Imperial Gallons
NOTE: All Distances are Average

Figure 24—Take-Off, Climb, and Landing Chart

MODEL(S) F-8

FLIGHT OPERATION INSTRUCTION CHART

EXTERNAL LOAD ITEMS

WING TANKS

ENGINE(S): MERLIN XXXI and XXXIII

CHART WEIGHT LIMITS: 21,000 TO 19,000 POUNDS

LIMITS	R. P. M.	M. P. (IN. HG.)	BLOWER POSITION	MIXTURE POSITION	TIME LIMIT	TOTAL G. P. H.
WAR MAX.						
MILITARY POWER						
NORMAL RATED						

INSTRUCTIONS FOR USING CHART: Select figure in FUEL column equal to or less than amount of fuel to be used for cruising. Move horizontally to left or right and select RANGE value equal to or greater than the statute or nautical air miles to be flown. Vertically below and opposite desired cruising altitude (ALT.) read optimum R. P. M., I. A. S. and MIXTURE setting required.

NOTES: Column I is for emergency high speed cruising only. Columns II, III, IV and V give progressive increase in range at a sacrifice in speed. Manifold pressure (M. P.), gallons per hour (G. P. H.) and true airspeed (T. A. S.) are approximate values for reference. For efficiency maintain indicated airspeed (I. A. S.) hourly. Adjust RPM slightly if necessary to avoid exceeding manifold pressure more than 3 in. Hg.

I		FUEL	II		III		IV		FUEL	V	
RANGE IN AIR MILES		U. S.	RANGE IN AIR MILES		RANGE IN AIR MILES		RANGE IN AIR MILES		U. S.	RANGE IN AIR MILES	
STATUTE	NAUTICAL	GAL.	STATUTE	NAUTICAL	STATUTE	NAUTICAL	STATUTE	NAUTICAL	GAL.	STATUTE	NAUTICAL
			○ ____ GAL. ALLOWANCE NOT AVAILABLE IN FLIGHT ○								
		887			2430	2111			887		
		791			2200	1911			791		
		646			1800	1563			646		

MAXIMUM CONTINUOUS						ALT.	OPERATING DATA						OPERATING DATA						OPERATING DATA						ALT.	MAXIMUM RANGE					
R. P. M.	I. A. S. M.P.H.	MIX-TURE	M. P. In. Hg.	G. P. H.	T. A. S.	Feet	R. P. M.	I. A. S. M.P.H.	MIX-TURE	M. P. In. Hg.	G. P. H.	T. A. S.	R. P. M.	I. A. S. M.P.H.	MIX-TURE	M. P. In. Hg.	G. P. H.	T. A. S.	R. P. M.	I. A. S. M.P.H.	MIX-TURE	M. P. In. Hg.	G. P. H.	T. A. S.	Feet	R. P. M.	I. A. S. M.P.H.	MIX-TURE	M. P. In. Hg.	G. P. H.	T. A. S.
						40000																			40000						
						35000																			35000						
						30000																			30000						
						25000								273			98								25000						
						20000																			20000						
						15000																			15000						
						10000																			10000						
						5000																			5000						
						S. L.																			S. L.						

NOTES

○ ALLOW GAL. FOR WARM-UP, TAKE-OFF & INITIAL CLIMB PLUS ALLOWANCE FOR WIND, RESERVE & COMBAT AS REQ'D.

EXAMPLE

AT LB. GROSS WT. WITH GAL. OF FUEL
(AFTER DEDUCTING TOTAL ALLOWANCES OF GAL.)
TO FLY STAT. AIRMILES AT FT. ALT.
MAINTAIN RPM AND MPH IND. AIRSPEED
WITH MIXTURE SET

LEGEND

I. A. S.: INDICATED AIRSPEED
M. P.: MANIFOLD PRESSURE
G. P. H.: U. S. GAL. PER HOUR
T. A. S.: TRUE AIRSPEED
S. L.: SEA LEVEL
F. T.: FULL THROTTLE
F. R.: FULL RICH
A. R.: AUTO-RICH
A. L.: AUTO-LEAN
C. L.: CRUISING LEAN

Figure 25—Flight Operation Instruction Chart