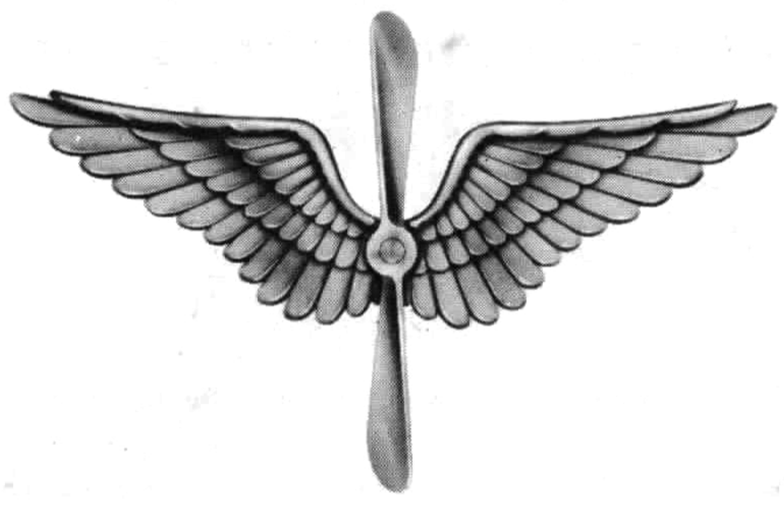
PILOT'S FLIGHT OPERATING INSTRUCTIONS

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L-5
AIRPLANE



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This Handbook is published as advance information for the Model L-5 short range observation Liaison airplane Pilot's Flight Operating Instructions.

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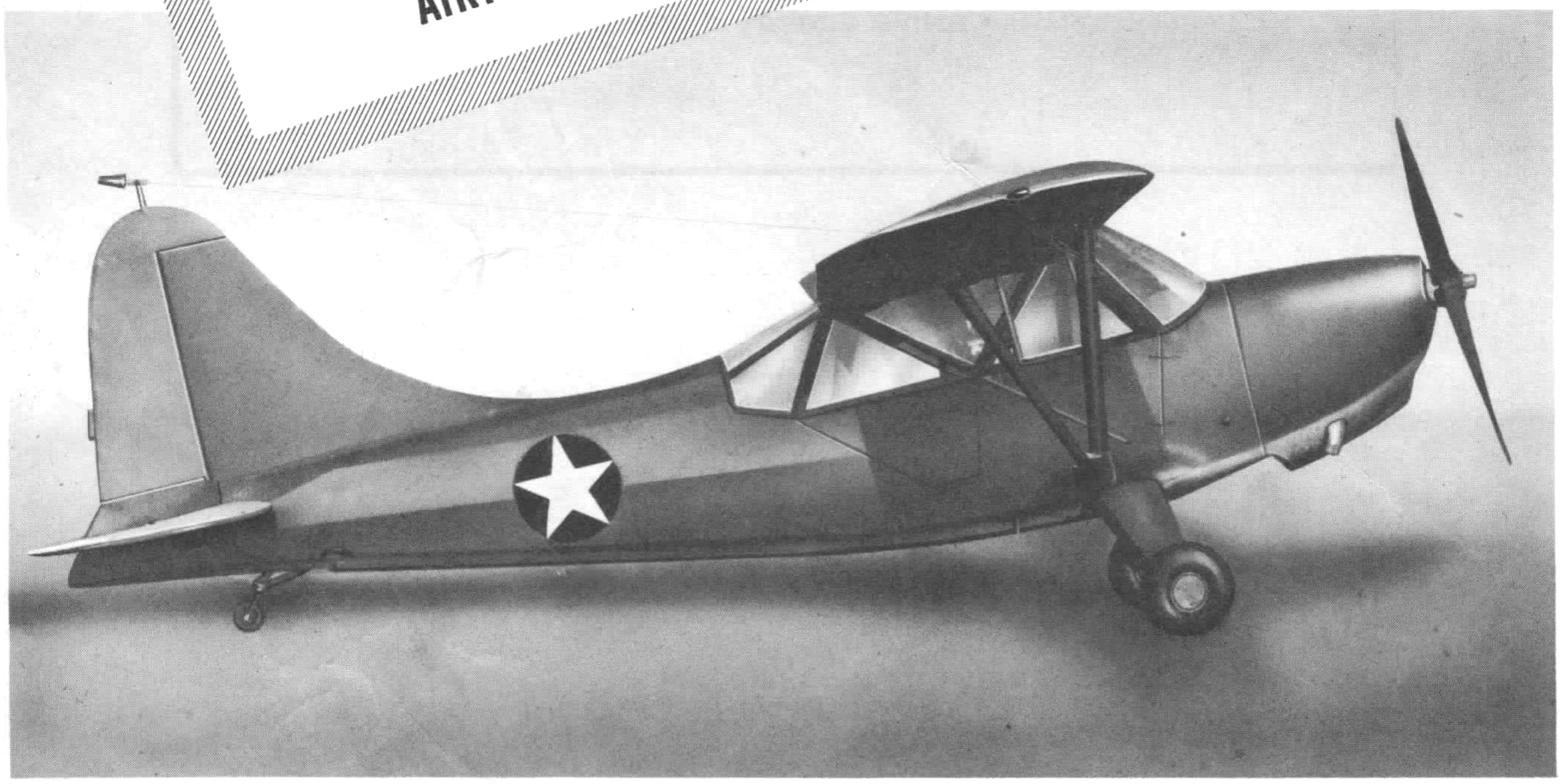


Figure 1 - Rear Quarter View - Complete Airplane

L-5

SHORT RANGE LIAISON OBSERVATION AIRPLANE

Figure 2 - Side View - Complete Airplane



SECTION 1

DESCRIPTION

1. AIRPLANE.

a. GENERAL. - The Model L-5 Short Range Liaison Observation Airplane is manufactured by Vultee Aircraft Incorporated, Stinson Aircraft Division, Wayne, Michigan, under contract No. W535 ac-24616. It is designed for short take-off over a high obstacle, and for landing in a short distance over a high obstacle. The airplane is fabric-covered, with a fixed-type landing gear, and powered by a six-cylinder, horizontally opposed air-cooled engine. The over-all span is 33 feet 11-5/8 inches, over-all length 24 feet 1-1/4 inches, and over-all height 7 feet 1 inch. (See figures 1 and 2.)

b. WING. - Each wing consists of a single fabric-covered panel constructed of wood, and attached to the fuselage by streamlined lift struts. The slotted trailing-edge flaps are operated manually, and may be locked in either 45 degrees or 30 degrees deflected positions. Each wing has a fixed leading-edge slat extending from mid-span to the wing tip.

c. EMPENNAGE. - The fin and stabilizer are of wood, and are covered with fabric over plywood. Both are attached in fixed alignment to the fuselage, and are of full-cantilever type. The rudder and elevator are of metal with fabric-covering construction. The longitudinal trim of the airplane is obtained by an elevator trim tab adjustable in flight. The directional trim is obtained by a rudder trim tab, adjustable on the ground only.

d. FUSELAGE. - The fuselage is constructed of welded steel tubing, and is fabric-covered. The pilot's and observer's compartment doors are on the right side of the airplane and can be used as emergency exits by pulling the cables attached to the hinge pins which allow the doors to drop free.

e. ALIGHTING GEAR. - The landing gear is of the fixed type, consisting of two members: the main beam and the oil-and-spring shock absorber. The main wheels mount 7.00 x 6 tires. Brakes are of the expander-tube type, operated by master cylinders. The tail wheel is of the steerable type with a friction release which permits full swiveling beyond 45 degrees movement. The shock-absorbing unit is of the oil-and-spring type. The tail wheel mounts an 8-inch diameter smooth contour tire.

2. POWER PLANT.

a. ENGINE. - The model 0-435-1 air-cooled, six-cylinder, horizontally opposed engine is operated on 73 octane, Specification No. AN-VV-F-761 fuel. The compression ratio is 6.50:1 and the propeller is directly driven.

b. PROPELLER. - The propeller is made of wood and is of fixed pitch.

c. OIL SYSTEM. - This is a wet-sump engine, equipped with an oil temperature gage, oil cooler, lines and fittings. The oil capacity is 12 U.S. quarts (10 Imperial quarts).

d. FUEL SYSTEM. - The fuel system consists of two fuel tanks (one in each wing), fuel-selector valve, strainer, lines, and fittings. This is a gravity-feed system and has no hand or engine pump. The capacity of each tank is 18 U.S. gallons (15 Imperial gallons). The normal fuel load is 25 U.S. gallons (21 Imperial gallons). Allowable overload provides 11 U.S. gallons (9 Imperial gallons) auxiliary fuel supply. (See figure 3.)

3. EQUIPMENT.

a. SURFACE CONTROLS. - Conventional dual stick and rudder pedal controls are provided. The rear rudder pedals and stick are removable. The stick can be stowed in clips provided on top of the mooring kit when not in use.

b. ELECTRICAL SYSTEM. - The electrical system consists principally of wiring and equipment for the ignition, generator, and starter systems; the landing, position, recognition, instrument and cockpit light circuits; and the radio power supply circuit. The system is of the 12-volt, single-wire, grounded type with the exception of the generator and instrument lighting circuits, which are of the 12-volt, two-wire type. All circuits, except the starter, are protected by fuses. Disconnect plugs are used at each removable section of the airplane. An electrical system diagram, drawing No. 76-64001, is supplied in the data case of each airplane.

c. FUSELAGE EQUIPMENT. (See figure 4.)

(1) COMPARTMENT ENCLOSURE. - The sloping windshield is made up of two curved transparent plastic sheets joined at the center and extending back on either side of the airplane to the door frame on one side and the window frame on the other. The windows on the left side of the airplane are made up of hinged and fixed panels, sloping outward at the top to allow downward vision. (See figures 5 and 6.) The hinged panels, which are opposite the pilot and observer, open out and downward. The pilot's and observer's doors are on the right side of the airplane with their windows sloping

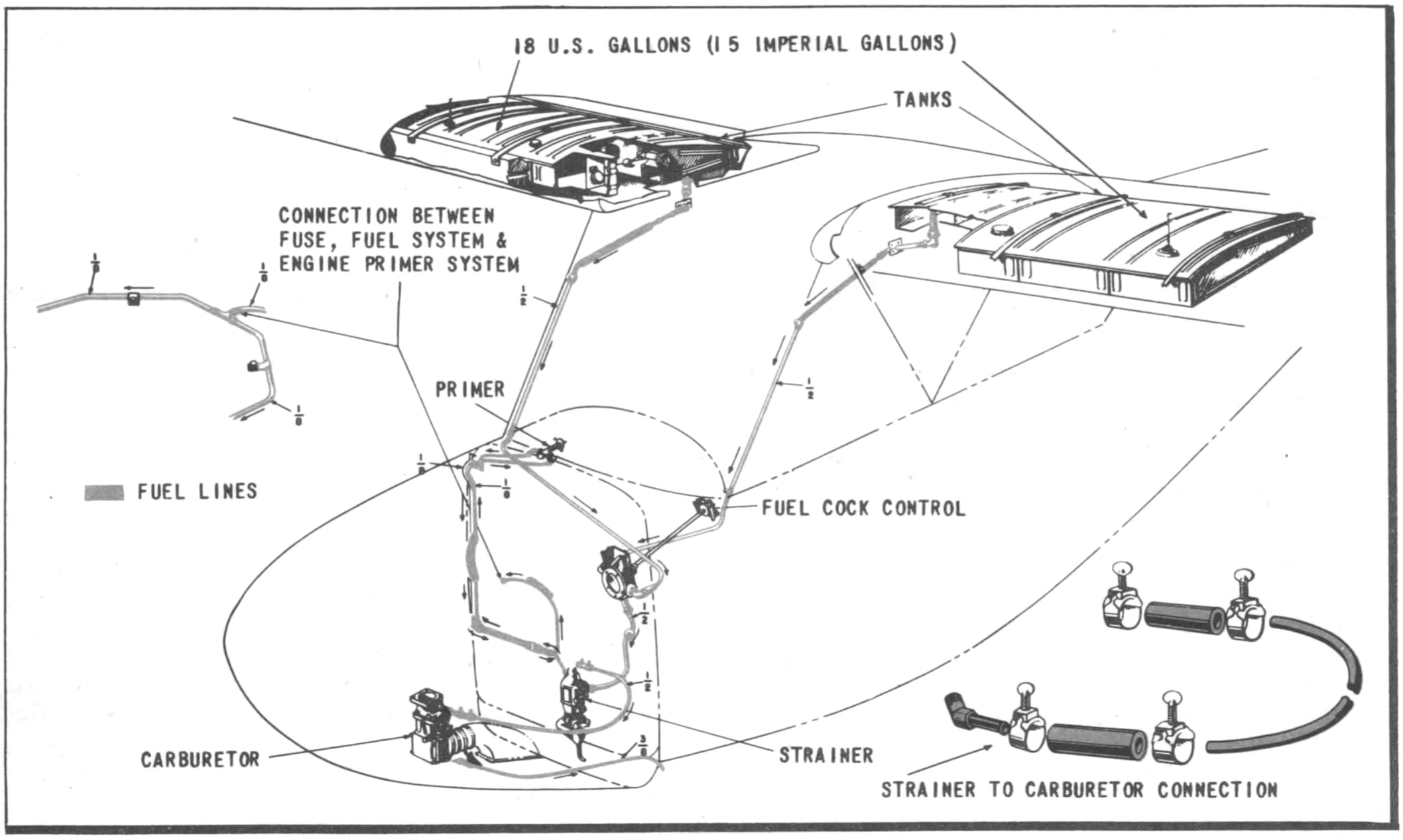


Figure 3 - Fuel System Diagram

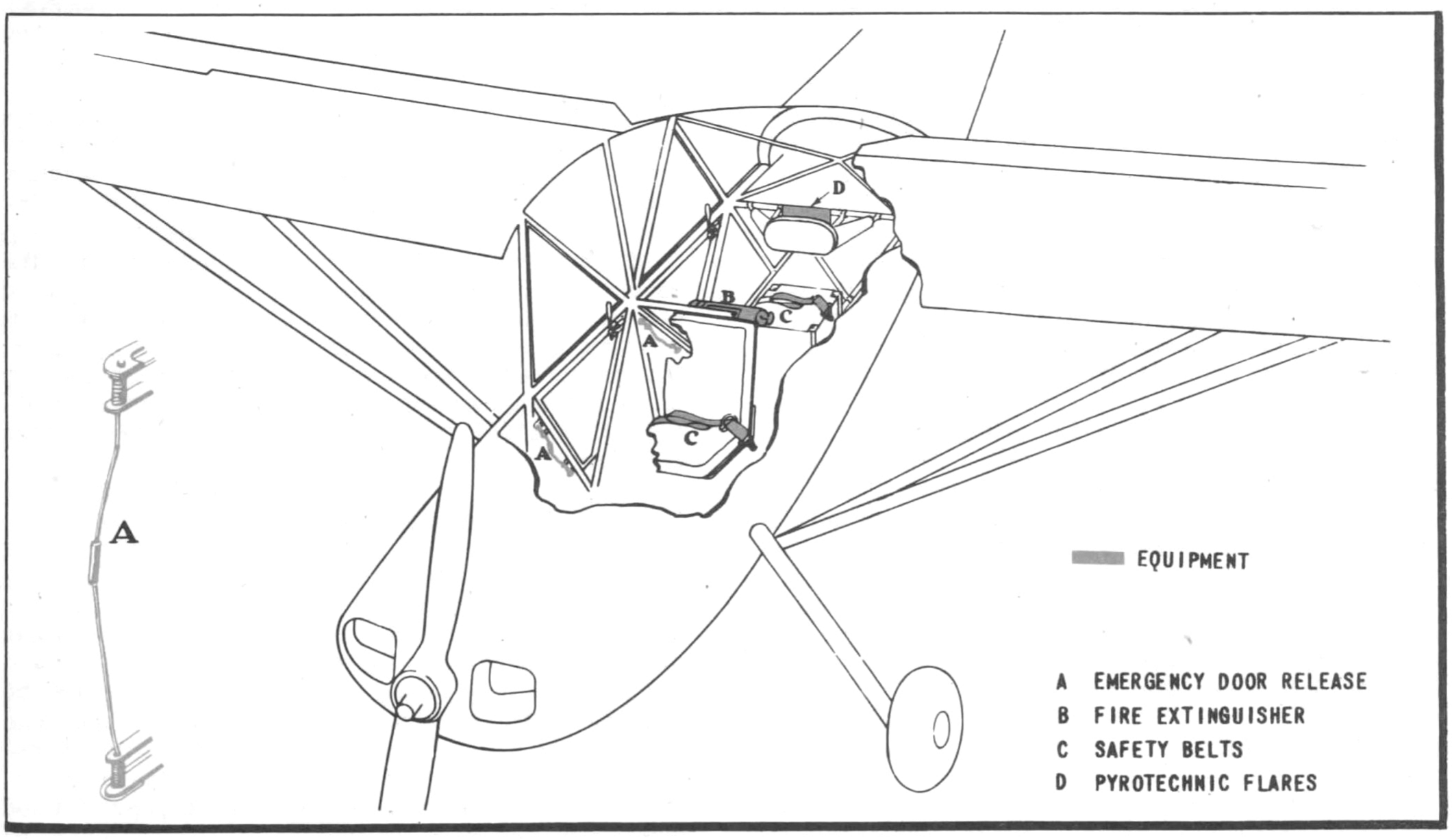


Figure 4 - Emergency Exits and Equipment Diagram

outward at the top in a similar manner to the windows on the left side. The door windows are single panels hinged at the bottom. The fixed windows are at the same angle as the hinged panels. The entire pilot's and observer's compartment is covered by a transparent plastic dome. There are six panels in the dome, joined together longitudinally and laterally by metal frames supported from the fuselage structure.

CAUTION

Do not lean on doors when open.

(2) MESSAGE CONTAINERS. - The five message containers are located in the box aft of the observer's seat.

(3) MESSAGE PICK-UP ASSEMBLY. - The message pick-up assembly is located in the box aft of the observer's seat.

(4) AIRPLANE FLIGHT REPORT HOLDER. - The airplane flight report holder is mounted on the inside of the pilot's compartment door.

(5) AIRPLANE DATA CASE. - The airplane data case is mounted on the left side of the fuselage aft of the observer's seat.

(6) AIRPLANE CHECK LIST HOLDER. - The airplane check list holder is located forward of the door in the pilot's compartment.

(7) PARKING HARNESS. - The parking harness is stowed in the box aft of the observer's seat.

(8) MOORING KIT. - A mooring kit is mounted on the right side of the fuselage aft of the observer's seat.

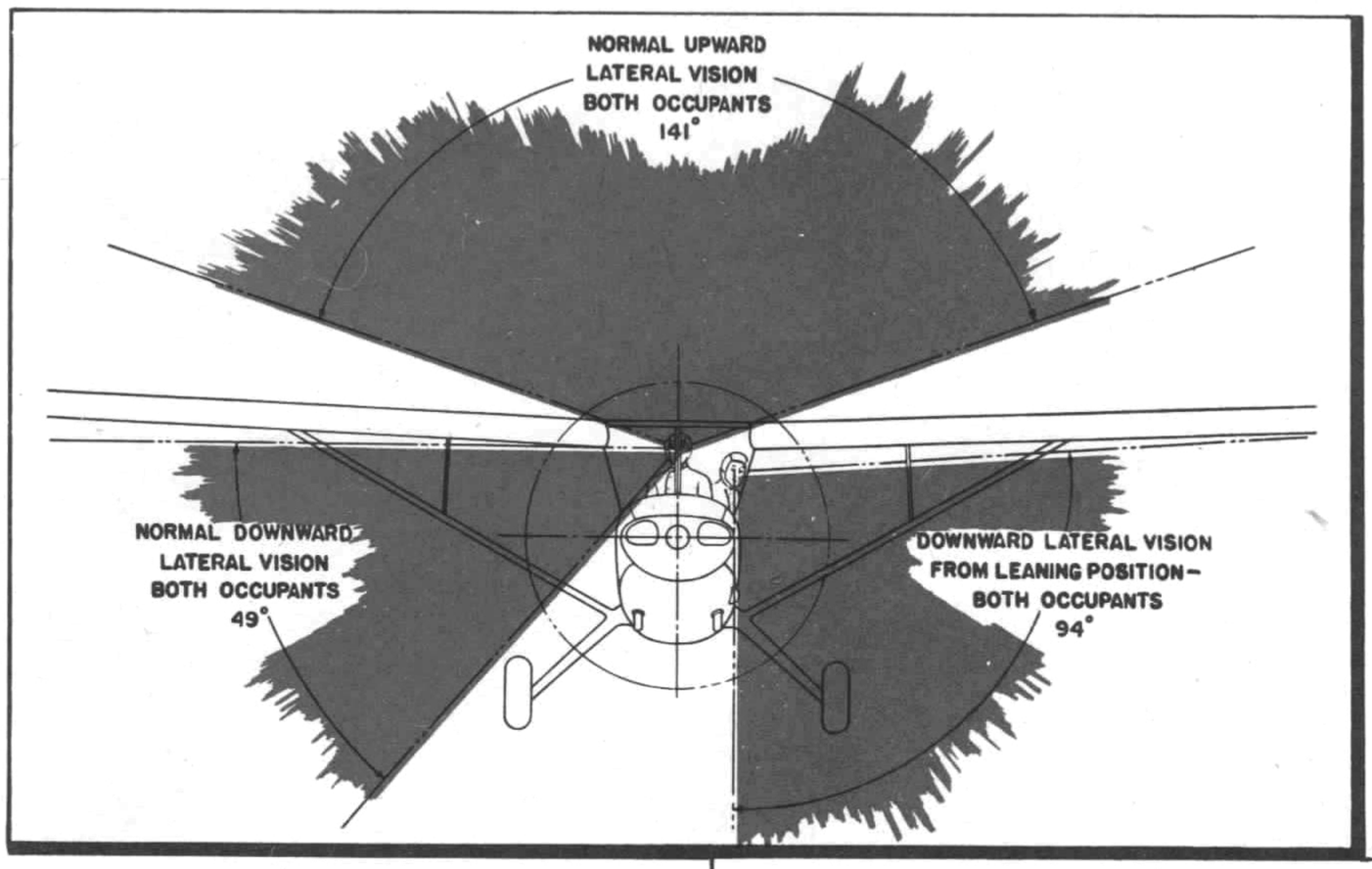


Figure 5 - General Vision Drawing (Front View)

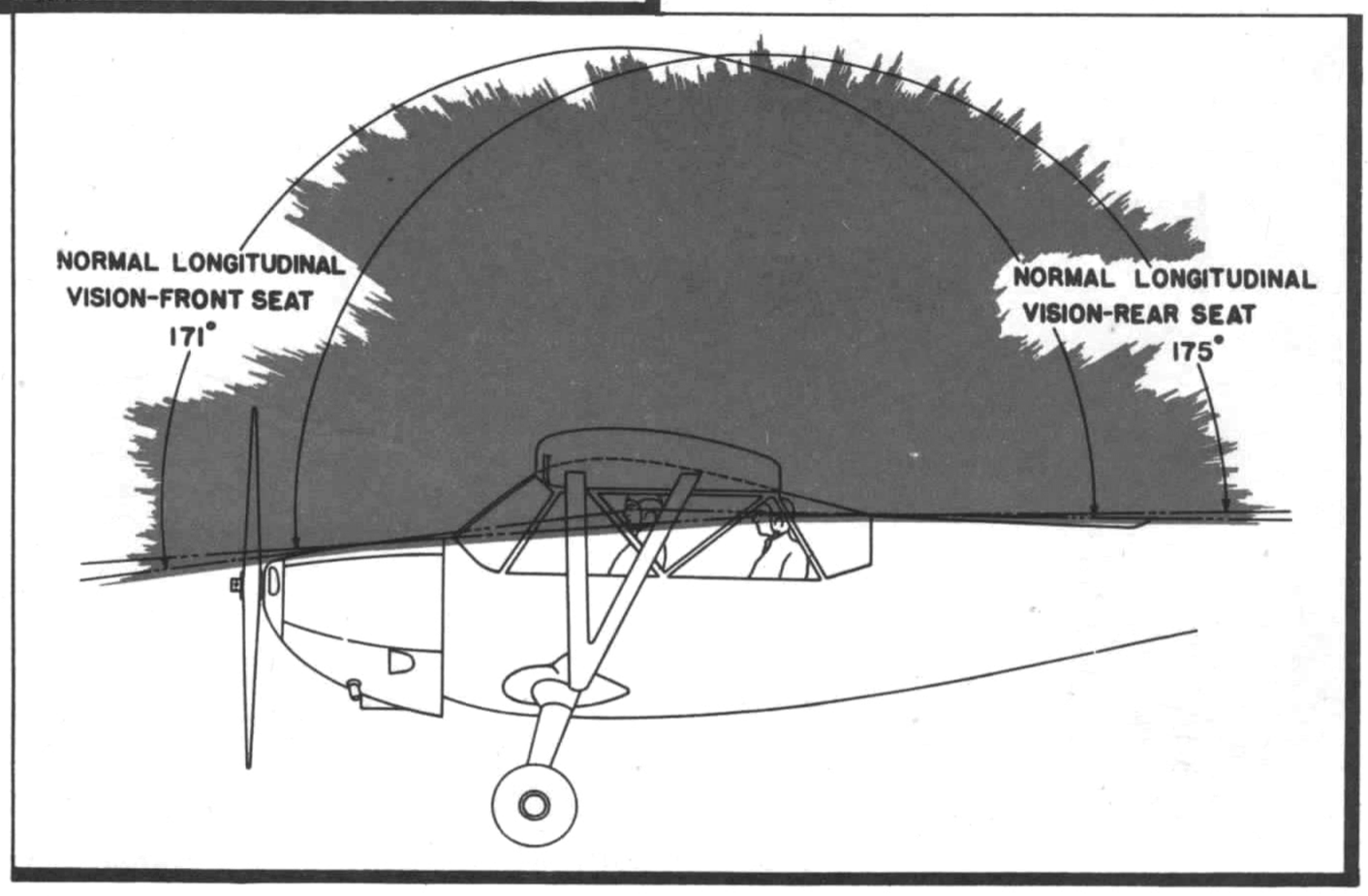


Figure 6 - General Vision Drawing (Side View)

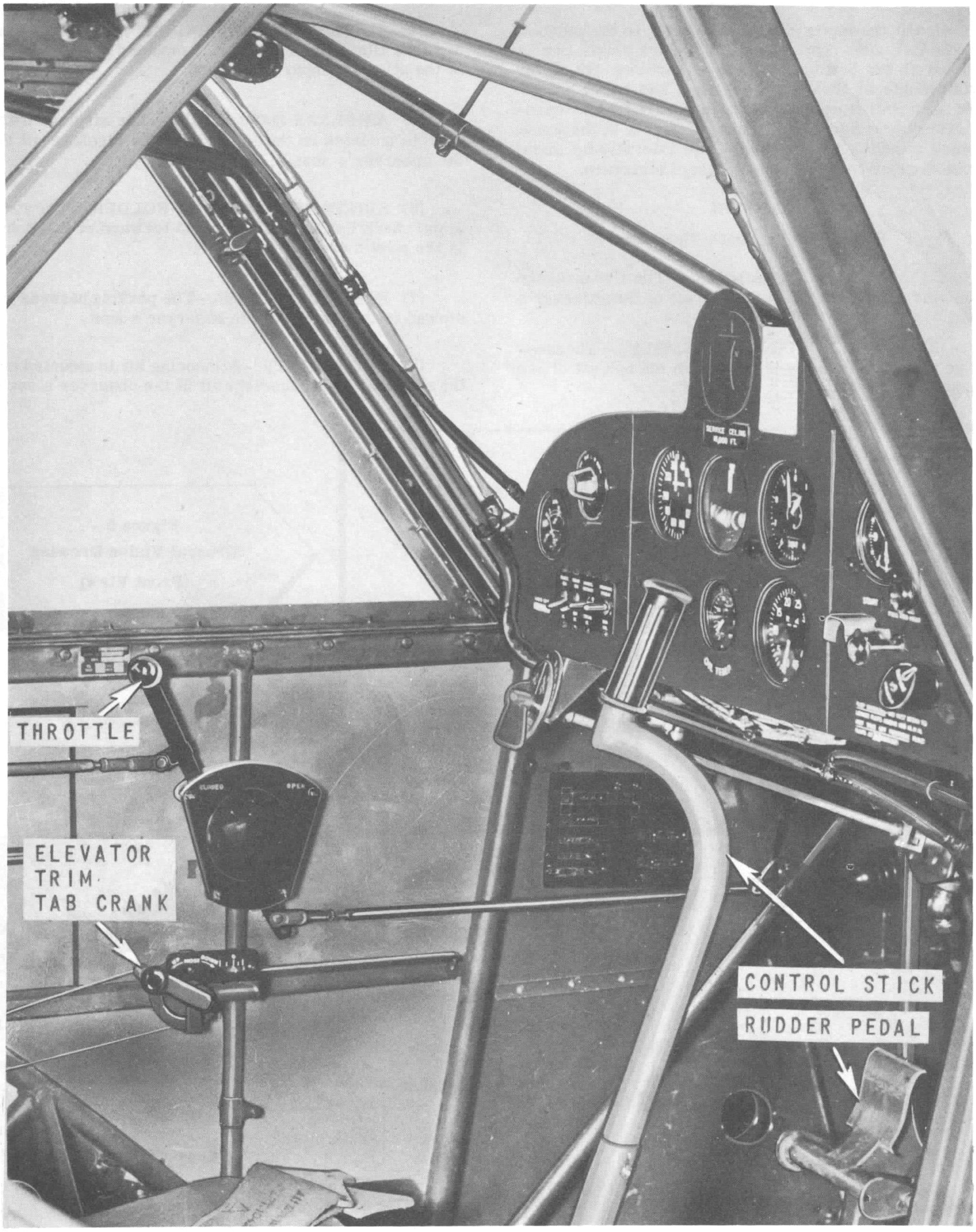


Figure 7 - Pilot's Cockpit Arrangement and Control

(9) PILOT'S SEAT. - The pilot's seat accommodates a seat-pack parachute and is adjustable forward and aft. A "Tee" handle at the right side actuates spring-loaded pins which lock the adjustment. (See figure 7.)

(10) OBSERVER'S SEAT. - The observer's seat is of the fixed stool type and accommodates a seat-pack parachute. (See figure 8.)

d. VENTILATING EQUIPMENT. - Fresh air is taken in through six rotatable scoops, one located on each side of the windshield below the wing, one on each side of the shroud panel near the lower longeron for the pilot's use, and one on each fixed window aft of the pilot for the observer's use.

e. FIRE EXTINGUISHER EQUIPMENT. - The type A-2 fire extinguisher is mounted on the cross tube behind the pilot's seat.

f. COMMUNICATIONS EQUIPMENT. - The 12-volt radio installation consists of a receiver (AVR-20), transmitter (AVT-15), antenna reel (AVA-120), and necessary accessories. The complete installation is located near the rear compression tube above and to the rear of the pilot's seat. The receiver and antenna reel are on the right side, and the transmitter on the left. (See figures 9 and 10.)

The radio fuse is located to the right of the pilot's seat between the doors. A radio system cording diagram, drawing No. 76-72016, is supplied in the data case of each airplane.

g. PYROTECHNIC EQUIPMENT. - The pyrotechnic equipment is installed on a shelf fastened to the rear of the observer's back rest and consists of the following:

1	Pyrotechnic Pistol	Type M-2
1	Pistol Holder	Type A-1
1	Signal Flare Container	Type A-1
3	Pyrotechnic Signal	Type M-11
3	Pyrotechnic Signal	Type M-15
3	Pyrotechnic Signal	Type M-16

h. DIAGRAMS. - A fuel system diagram, rigging diagram, and weight data chart are on the right side of the pilot's cockpit.

A fuse chart is on the left side of the pilot's cockpit.

The radio operating instructions and transmitter tuning chart are on the left side of the pilot's cockpit aft of the throttle.

i. EMERGENCY DOOR RELEASE. - Unlock the window latch and pull the emergency release handle (red) shown in figure 4 to dispose of the doors.

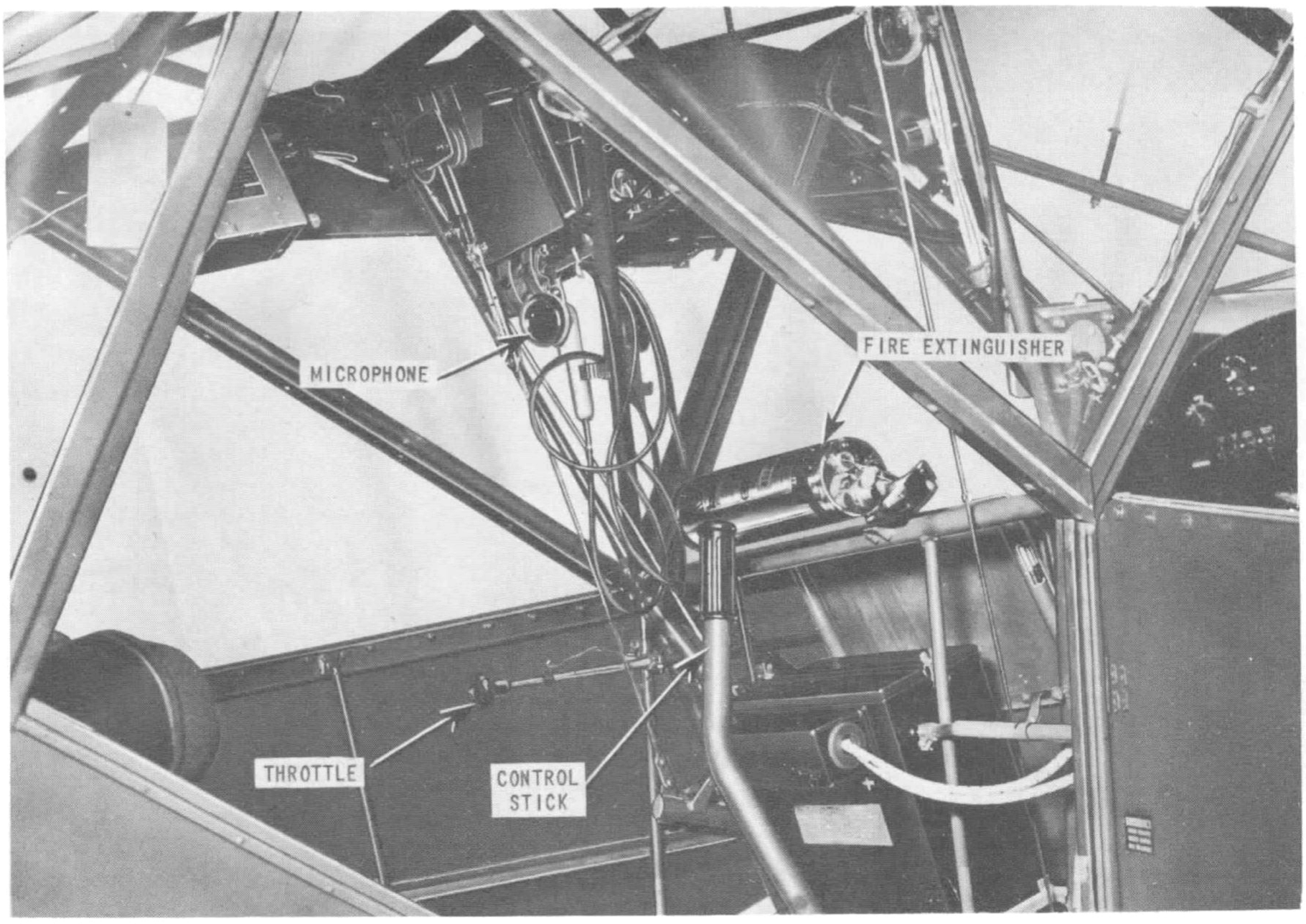


Figure 8 - Observer's Cockpit Arrangement and Controls

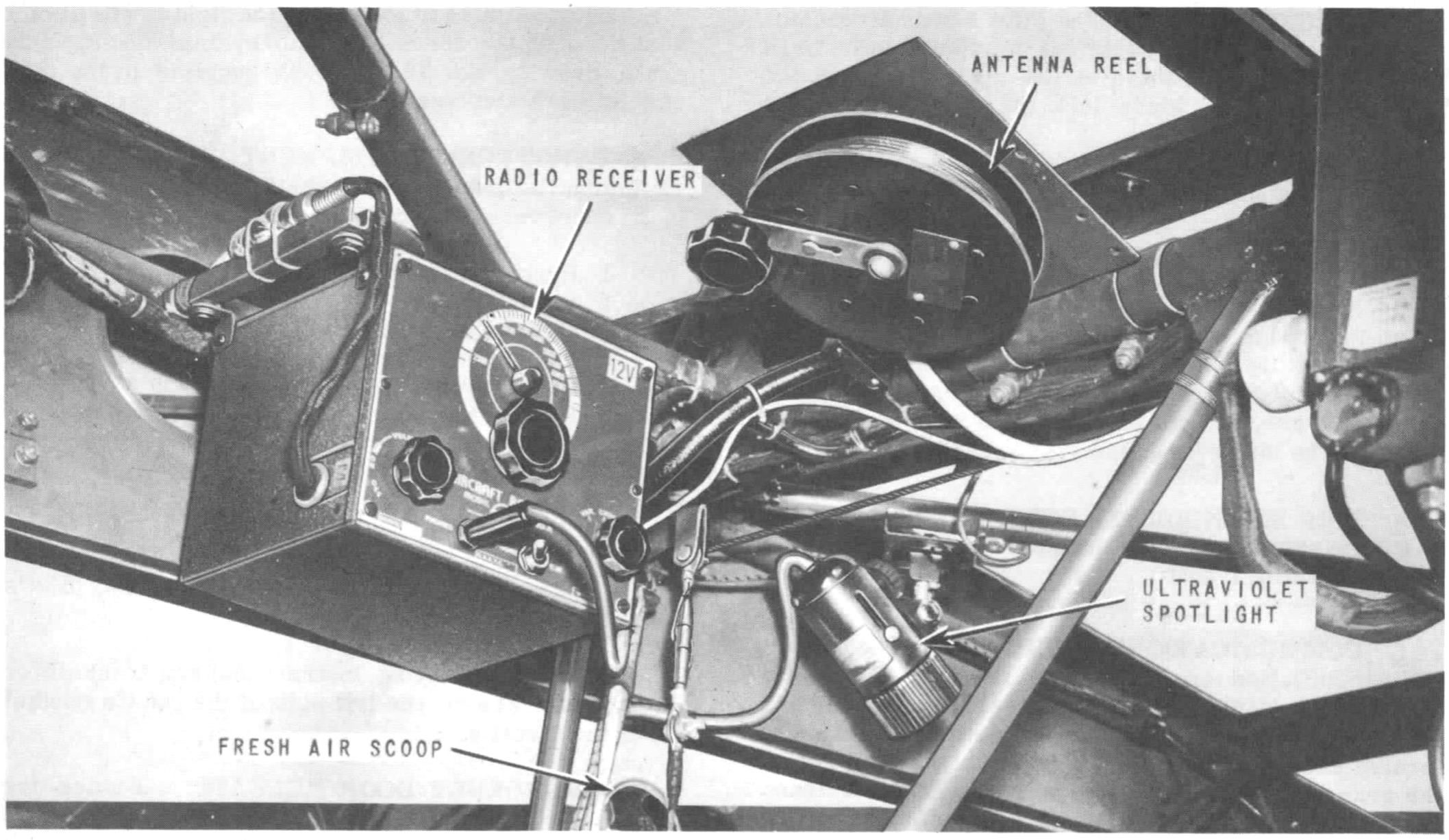


Figure 9 - Radio Receiver and Antenna Reel

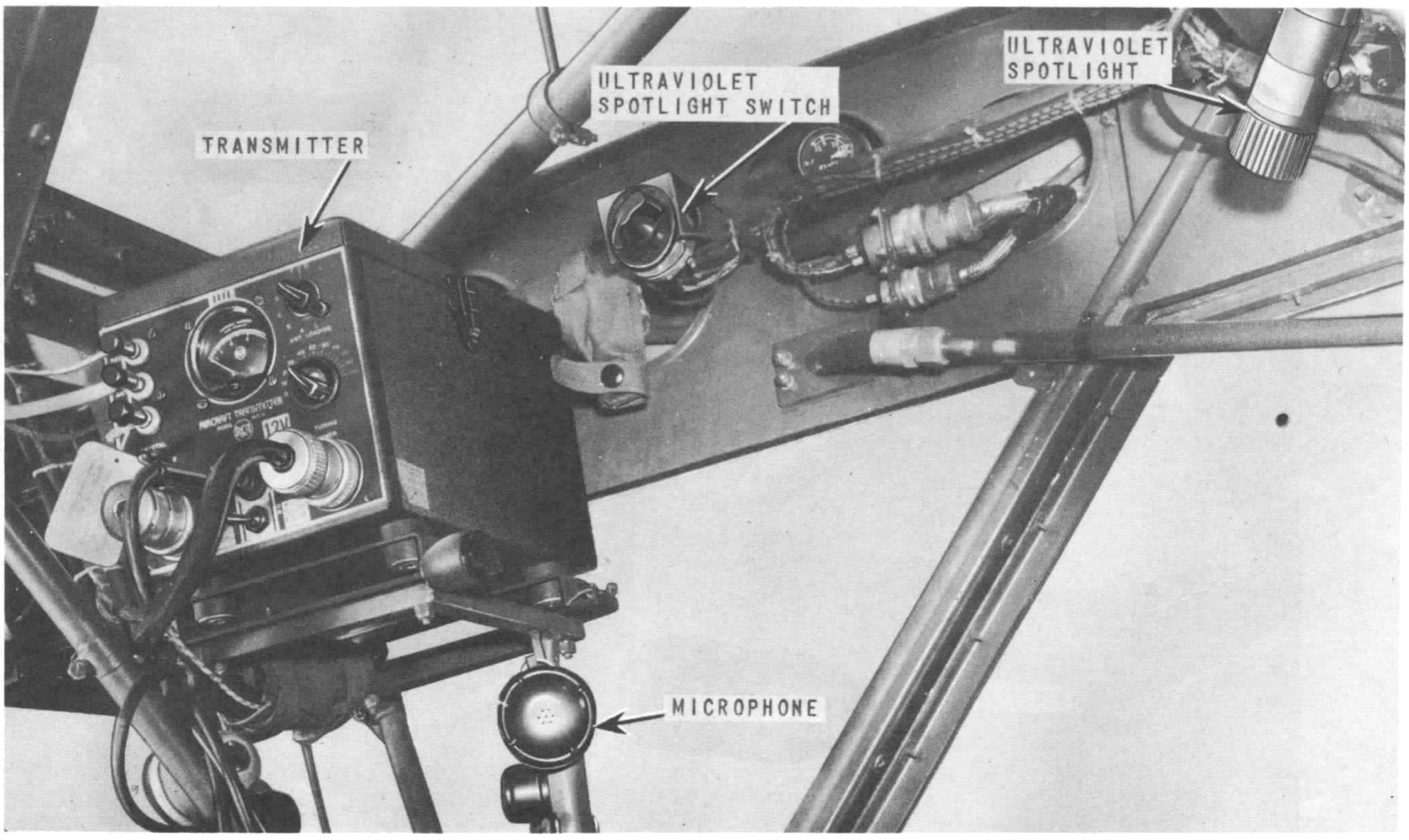


Figure 10 - Radio Transmitter

SECTION 2

GENERAL INSTRUCTIONS

1. LOCATION OF CONTROLS.

a. FLIGHT CONTROLS.

(1) Elevator Trim Tab - Crank is on left side of pilot's compartment, below throttle.

(2) Flap Handle - Left side of pilot's compartment.

b. POWER PLANT CONTROLS.
(See figures 11 and 12.)

(1) Throttle (T) - Left side of airplane, both compartments.

(2) Carburetor Air Heat - Right side of instrument panel.

(3) Fuel-Selector Valve - Left side of pilot's compartment below instrument panel.

(4) Primer - Right side of instrument panel.

(5) Mixture - Right side of instrument panel.

(6) Ignition Switch - Left side of instrument panel.

(7) Starter Button - Right side of instrument panel.

c. OTHER CONTROLS.

(1) Brake - Upper portion of pilot's rudder pedals only.

(2) Parking Brake - Center line of airplane below and just forward of the pilot's control stick.

(3) Seat Adjustment - A "Tee" handle on the right side of pilot's seat only.

(4) Fluorescent Light Switch - Left side of instrument panel.

(5) Compass Light Switch - Left side of instrument panel.

(6) Landing Light Switch - Left side of instrument panel.

(7) Position Light Switch - Left side of instrument panel.

(8) Control Assembly, Recognition Lights - Between doors above sill line - right side.

(9) Recognition Light Keying Switch - Top of recognition light above the transmitter.

(10) Starter Switch, Fluorescent Light - Left side of pilot's compartment.

(11) Cockpit Light Switches - On each light, one in pilot's cockpit on the left side above the instrument panel, the other above the observer's right hand.

(12) Radio Transmitter Control - Left side of pilot's compartment above the pilot's head.

(13) Radio Receiver Control - Right side of pilot's compartment above the pilot's head.

(14) Antenna Reel - Right side back and above the pilot's head.

(15) Microphone Switch - On the microphone. Both microphones are on the left side midway between the pilot's and observer's seats.

d. DURING WARM-UP.

(1) Warm-up at 1000 rpm until oil temperature is 45°C (113°F).

(2) Check left and right magnetos at 1800 rpm; fall-off not to exceed 75 rpm.

(3) Carburetor air heat "FULL HOT" if outside air temperature between 20° to 70°F (6.7° to 21.1°C).

CAUTION

Avoid full throttle operation on the ground.

e. BEFORE TAKE-OFF.

(1) Set flaps at 30 degrees.

(2) Set tabs at 0 degrees.

(3) Check flight controls for free movement.

(4) Check oil pressure for 65 to 85 pounds per square inch, oil temperature 45°C (113°F) to 104°C (220°F) and left and right magneto at full throttle.

(5) Best take-off air speed 52 mph.

(6) Safe air speed over 50-foot obstacles after take-off 45 mph.

(7) Best climbing air speed after obstacle, flaps "UP," 80 mph.

(8) Carburetor heat "FULL COLD."

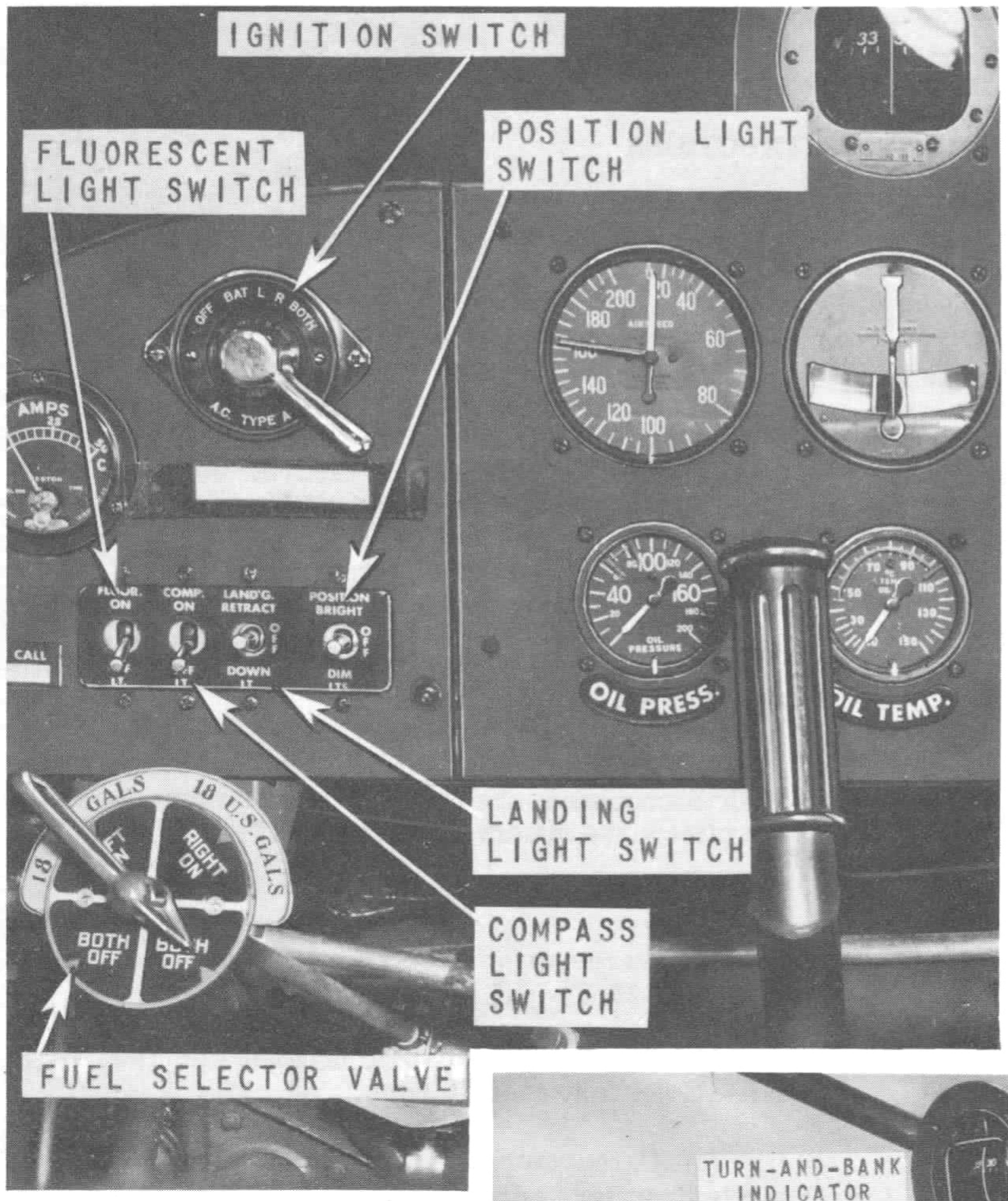


Figure 11 -
Pilot's Instrument Panel
(Left Side)

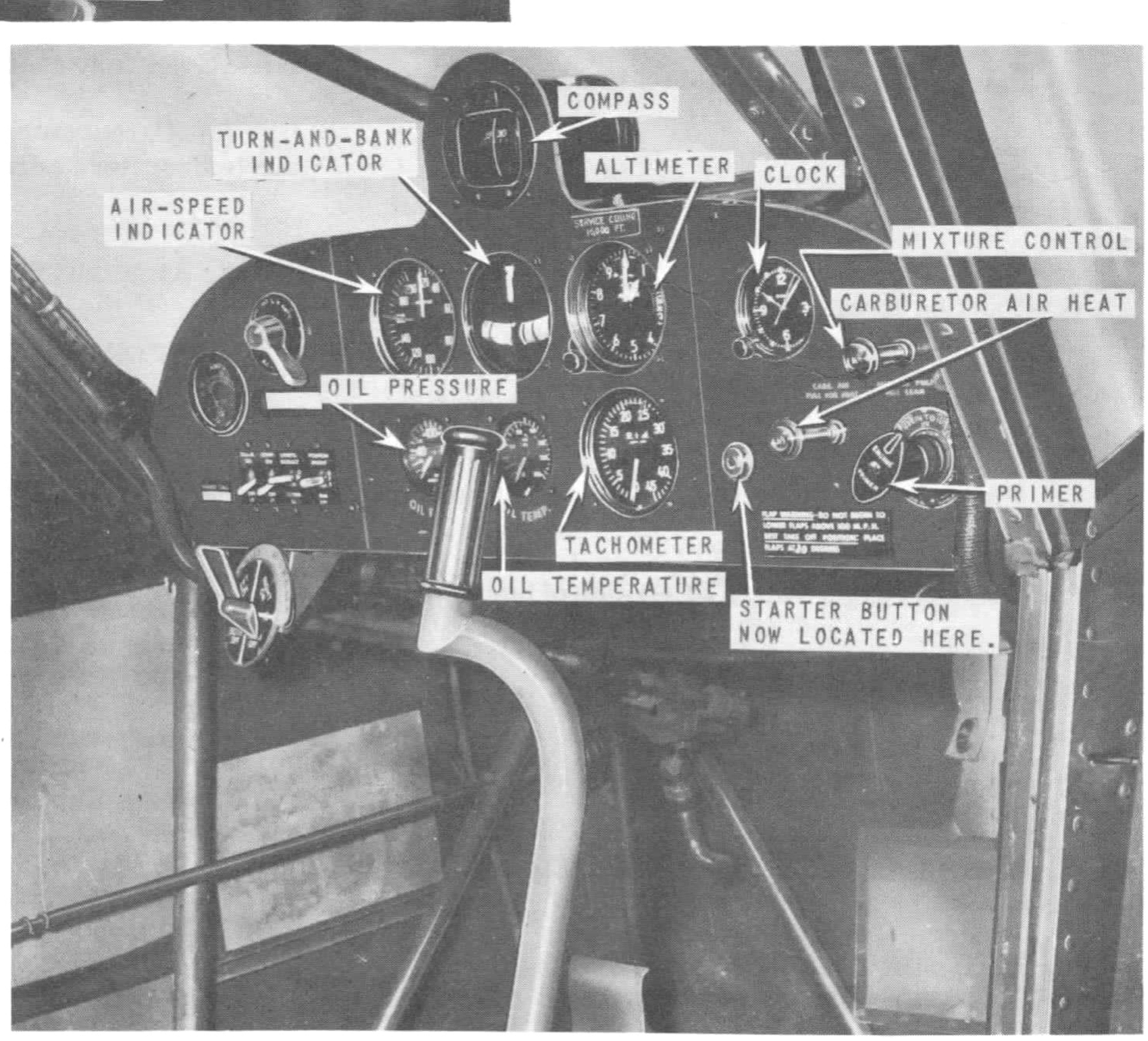


Figure 12 -
Pilot's Instrument
Panel (Right Side)

f. DURING FLIGHT.

(1) Maximum climb and high speed, "FULL THROTTLE" ~~3550~~ rpm. 2550 rpm.

(2) Cruise (75 percent power) 2315 rpm.

(3) Desired cruise (67 percent power) 2230 rpm.

(4) Desired cruise (60 percent power) 2150 rpm.

(5) Oil pressure, minimum 65, maximum 85 pounds per square inch, desired 75 pounds per square inch.

(6) Oil temperature, desired 70°C (158°F), maximum 104°C (220°F).

(7) Mixture control below 5000 feet SMOOTH OPERATION.

(8) Mixture control above 5000 feet RICHEST SMOOTH OPERATION.

(9) Carburetor heat "FULL HOT" if outside air temperature between 20° to 70°F (6.7° to 21.1°C).

g. BEFORE LANDING.

(1) Check the fuel supply.

(2) Mixture control "FULL RICH."

(3) Carburetor air heat "FULL HOT."

(4) Set flaps at 45 degrees.

(5) Set tab at best trim.

(6) Best glide speed 65 mph (stalling speed 52 mph).

(7) Best approach to obstacle - part throttle, 58 mph. At obstacle close throttle for settle landing.

h. AFTER LANDING.

(1) Taxi with flaps "UP."

(2) Before stopping engine, idle for short period to allow to cool.

(3) Stop engine by placing mixture control in "FULL LEAN" position.

(4) After engine stops firing turn ignition switch "OFF."

(5) Close throttle.

(6) Leave mixture control in "LEAN" position (to prevent accidental starting).

(7) Fuel selector valve "OFF."

(8) Parking brake "ON."

i. OTHER CONTROLS.

(1) Brake - Toe pressure on left brake pedal operates left brake. Toe pressure on right brake pedal operates right brake.

(2) Parking Brake - To engage, push foot pedals and turn handle to the left slightly more than 90 degrees until brakes lock. To release, push foot pedals and turn handle to the normal position.

(3) Seat Adjustment - Pull "Tee" up, move seat forward or aft, and jiggle to lock.

(4) Electrical Switches - The fluorescent light, compass light, landing light, position lights, and recognition lights switches are operated by toggle-type switches.

(5) Starting Switch, Fluorescent Light - The toggle switch marked "FLUORESCENT" must be on before the rheostat will operate the fluorescent light. To start the light, turn the switch clockwise to the "START" position. After starting, the intensity is controlled by rotating the switch.

(6) Radio Microphone Switch - Normal position allows for receiving. Pressed switch is used for transmitting.

(7) FIRE EXTINGUISHER.

(a) The fire extinguisher provided is primarily for use on the ground. This is the hand type utilizing carbon tetrachloride as the extinguishing medium. Hand-type extinguishers are unsuitable for combating a fire outside of the fuselage in flight.

(b) When a fire breaks out, if flying low, and conditions permit, as much altitude as possible should be attained. If the fire continues to burn, it must be left to the discretion of the pilot whether a landing will be attempted or the airplane abandoned. The extinguishing equipment carried on this aircraft is adequate for combating incipient fires only, and the extinguisher should accordingly be put into action as soon as possible after the fire starts.

(c) Close all windows and ventilators and use hand fire extinguisher on the fire. Open windows and ventilators immediately after using the extinguisher because carbon tetrachloride produces phosgene, a poisonous gas, when sprayed on fire. If an electrical fire, turn main switches off. If a leaking fuel or oil line, shut off valves. If gasoline, oil or other similar combustible liquids are involved, use hand extinguisher.

2. OPERATION OF CONTROLS.

a. FLIGHT CONTROLS.

(1) GENERAL. - Operation of the dual stick and rudder pedal flight controls is conventional.

(2) ELEVATOR TRIM TAB. - Operate the crank clockwise for "NOSE UP" and opposite for "NOSE DOWN." Indicator shows position of trim tab on either side of neutral. Trim tab may be operated from observer's compartment by manipulating cable.

(3) FLAPS.

(a) To lower the flaps pull up on handle which automatically locks in 30 degrees or 45 degrees deflected positions. To raise the flaps the handle is lifted slightly, pulled toward the pilot, and lowered. (See figure 13.)

(b) The correct use of flaps in flight is to increase the gliding angle of the airplane and not to decrease the gliding speed. A depressed flap produces a marked increase in wing diving moment, generally neutralized by increased down-wash on the tail. However, simultaneous use of the elevator trim tabs may be necessary to maintain longitudinal balance.

(c) In case of engine failure with flaps down it is important that the flaps be kept down as sudden raising of the flaps may result in an excessive loss of lift.

(d) Since the airplane stalls abruptly with flaps down, care must be taken to maintain the gliding speed to the point of leveling-off. The airplane with flaps down stalls very rapidly when leveled off and consequently the altitude above the landing field at which this maneuver is made must be much lower than for airplanes not equipped with flaps.

b. BEFORE STARTING ENGINE.

(1) Check Flight Report Form 1 and 1A.

(2) Parking brakes "ON."

(3) Set throttle one-tenth open.

(4) Pull engine through four or five revolutions by hand. This should not be done if the engine is still warm from recent operation.

(5) Fuel selector valve "ON."

(6) Mixture control "FULL RICH." To operate, the button in the center of the knob must be pressed to release the automatic locking device.

(7) Carburetor air heat "FULL COLD." To operate, the button in the center of the knob must be pressed to release the automatic locking device.

(8) Prime two to five strokes, depending on the temperature. Do not prime hot engine.

(9) Ignition switch on "BOTH."

(10) Press starter switch.

(11) Check oil pressure for immediate pick-up.

WARNING

If 40-50 pounds per square inch is not reached in 30 seconds, stop engine.

(12) As soon as the engine is operating smoothly, warm up the engine at 1000 rpm until throttle can be opened rapidly without missing or back firing.

CAUTION

The pressure baffle-type cooling system used on this engine requires forward speed of the airplane to cool the engine; therefore, under no circumstances shall the engine be operated at or near full throttle longer than necessary for a quick reading of the instruments.

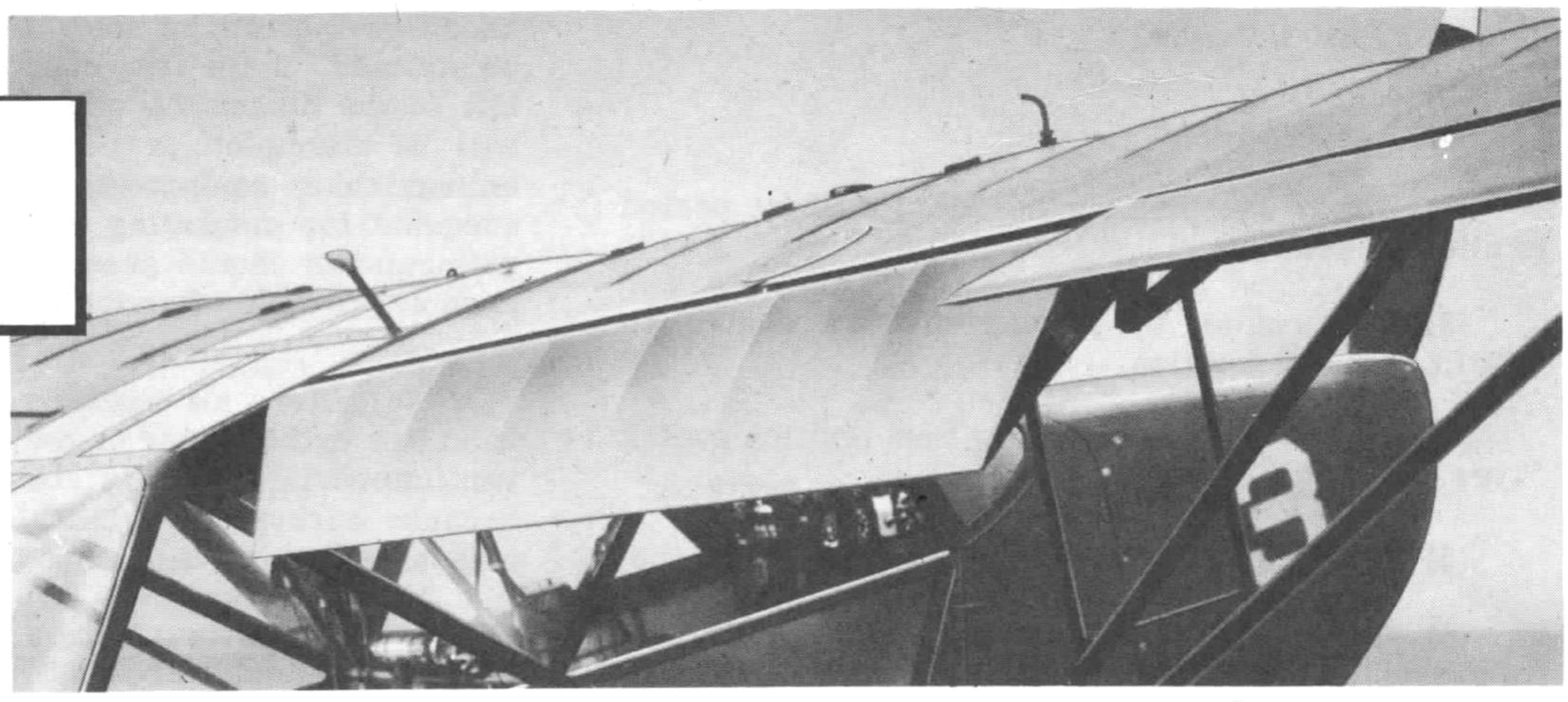


Figure 13 - View Showing Flap Lowered

SECTION 3

SPECIAL INSTRUCTIONS

1. FLYING INSTRUCTIONS.

a. FLIGHT RESTRICTIONS.

(1) Do not exceed 100 mph indicated air speed with flaps down.

(2) Do not exceed 161 mph indicated air speed at any time.

2. FLYING CHARACTERISTICS.

For best take-off position place flaps at 30 degrees.

SECTION 4

WEIGHT DATA

Weight in Pounds	Overload	Normal
Weight Empty	1472 lb	1472 lb
Useful Load	662.5 lb	573 lb
Crew - 2 at 200 lb each	400 lb	400 lb
Fuel - 25 gal		150 lb
36 gal (Reserve Space) (Special)	216 lb	
Oil - 3 gal	23 lb	23 lb
Pyrotechnics	9.2 lb	
Mooring Kit	11.3 lb	
Message Containers	3.0 lb	
Gross Weight	2134.5 lb	2045 lb
Maximum Loaded Weight, Safe Flight	2134.5 lb	
Wing Loading, Normal Gross Weight	13.2 lb/sq ft	
Power Loading, Normal Gross Weight	11.1 lb/hp	

APPENDIX I

UNITED STATES - BRITISH GLOSSARY OF NOMENCLATURE

UNITED STATES	BRITISH EQUIVALENT
Airplane	Aeroplane
Alighting gear or landing gear	Alighting gear, undercarriage or chassis
Antenna	Aerial
Cable controls, air controls, or flight controls	Flying controls
Empennage	Empennage or tail unit
Flare or signal flare	Signal projectile or signal star
Fuel	Petrol or motor spirit
Fuel selector valve	Fuel cock
Horizontal stabilizer, stabilizer, or fixed tail surface	Tail plane
Observation airplane	Reconnaisance aeroplane
Power plant or engine	Aero-engine
(to) Prime	(to) Dope
Radio	Wireless
Reel	Reel or winch
Vertical stabilizer, tail fin, or vertical tail surface	Fin
Weight	Tare
Windshield	Windscreen