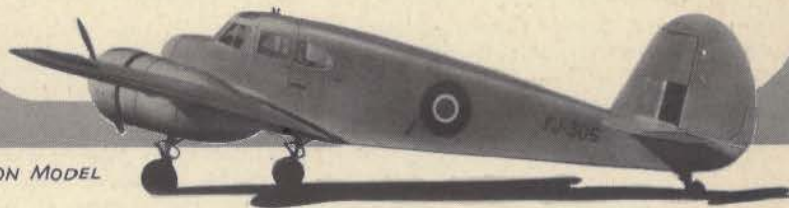


## SECTION II

### PILOT OPERATING INSTRUCTIONS



AT-17A COMPANION MODEL

#### NOTE Flight Restrictions

1. Do not exceed 200 mph, I.A.S.
  2. Maximum diving speed 200 mph, I.A.S.
  3. Maximum engine overspeed 2400 rpm.
  4. Maneuvers Prohibited:  
Loop, spin, roll, Immelman, tight turns, stall, inverted flight.
1. UPON ENTERING THE AIRPLANE.
- a. Check form 1A.
  - b. Ascertain that the proper "PLUG-IN" coils are installed in the radio. Change "PLUG-IN" coils if necessary.
  - c. Check storage box for contents. (See basic weight items in weight Handbook.)
  - d. Remove the airplane controls lock, if installed, and stow in place provided. (See figures 19 and 22, 122.)
  - e. Check the master fuse: A 75-ampere fuse should be in place. (Make certain the battery switch is in the "OFF" position before replacing fuse, if replacement is necessary.) (See figure 15.)
2. UPON ENTERING PILOT'S COMPARTMENT.
- a. CHECK PRIOR TO EACH FLIGHT.
    - (1) All electrical switches on the instrument panel with the exception of the generator switches should be in the "OFF" position. (See figures 8 and 9.)
    - (2) Check the fuse panel to ascertain that all fuses are in place, including spare fuses. (See figure 17.)
    - (3) Inspect the cockpit generally to ascertain that all components are in place and in good working order. Check for fire extinguisher, landing gear hand crank, and contents of map and data cases.
    - (4) Check operation of the seat adjustment safety belt, and shoulder harness. (See figure 18, 113 and 114.) Make certain that the locking pins for fore and aft movement of the seat are fully engaged; other-

wise, seat may slide forward or backward while in flight. Jiggle the seat slightly while pressing forward on the seat locking lever (figure 18, 114) until locking pins snap definitely into place.

(5) Check the electrical equipment as follows:

- (a) Turn the master battery switch "ON."
  - (b) Observe the fuel quantity gage. The gages should read 57 gallons each for full tanks while airplane is in three-point position.
  - (c) Observe the fuel pressure warning lights (figure 9, 82). The light should glow red when engine is not running or is idling slowly.
  - (d) The outside air temperature gage should register outside air temperature.
- (For night flying, check the following.)
- (e) Navigation lights.
  - (f) Cockpit lights.
  - (g) Compass light and compass light rheostat.
  - (h) Recognition lights and signal switch. Do not operate recognition light for over 10 seconds while airplane is on ground.

(i) Landing lights. Do not test operate for more than 5 seconds. Light should illuminate when "FULL DOWN" position is reached.

(6) CHECK CONTROLS AS FOLLOWS.

- (a) Ascertain that the ailerons, elevators, and rudder are free moving and will operate in the correct direction, and to the limit, of their travel.
- (b) Test the mixture, carburetor heat, and oil temperature controls for free operation.

#### WARNING

DO NOT PUMP THE THROTTLES.

(c) Ascertain that the elevator and rudder tab controls are free operating and set rudder tab to neutral and elevator at take-off position. (See figure 10.)

(d) Check fuel valves. Set the tank selector to the fullest tank; set engine selector to "BOTH" engines; set cross-feed valve "OFF." (See figures 6 and 12.)

(e) Set the parking brake.

### 3. STARTING ENGINES.

a. If engines have been idle for over 30 minutes, make certain the ignition switches are "OFF" and pull the propellers through by hand four or five complete revolutions in the direction of rotation before attempting to start the engines.

#### b. TO START THE ENGINES.

(1) Turn the generator switches "ON." (See figure 8, 68.)

(2) Open the throttles approximately 1/10 open.

(3) Set the mixture "FULL RICH."

(4) Set carburetor air "COLD."

(5) Set propeller to "FIXED HIGH PITCH." (Decrease rpm.)

(6) Check the fuel tank selector fuel valve. Set valve to fullest tank.

(7) Check the engine selector fuel valve. Set valve to "BOTH."

(8) Check the cross-feed fuel valve. Set valve to "OFF."

(9) Operate the fuel wobble pump (figure 12, 96) to bring the fuel pressure to approximately 2 pounds per square inch gage pressure. (Two to four strokes of the pump handle.)

(10) Prime the engine to be started with approximately two good strokes in warm weather (six good strokes in cold weather). (See figure 8, 66.) DO NOT PUMP THROTTLES. (If only one generator is installed, start the engine mounting the generator first.)

(11) Check the battery switch. (See figure 9, 80.) Turn to either plane's "BATTERY" or "AUXILIARY" battery cart, whichever is to be used.

(12) Start the engine by pushing starter toggle switch (figure 9, 81) with the index finger; hold the thumb in readiness to turn on the battery ignition switch after the engine has turned over one or two revolutions.

(13) Turn magneto switch "ON" the instant the engine fires. (Spark retard in on the battery ignition only.)

### NOTE

Leave both the ignition switches "ON," while running the engines.

The engines should start in three or four revolutions; however, if engines fail to start after four revolutions, release the starter switch and prime two more strokes. In very cold weather use additional shots of the primer to keep the engine running. Set the throttle at approximately 600 rpm position.

### 4. ENGINE WARM-UP.

a. Check oil pressure. (See figure 7, 61 and 62.) A minimum of at least 60 pounds per square inch gage pressure should be indicated within 5 minutes after starting the engine. If oil-pressure gage does not indicate pressure within 30 seconds, the engine should be turned off and an investigation made.

b. Set the propeller in "TAKE-OFF" (increase rpm) as soon as 50 pounds per square inch oil pressure is indicated.

c. Warm up the engine by idling at 600 rpm, for at least 30 seconds after normal oil pressure is indicated on the gage, after which warm-up will be continued between 800 and 900 rpm.

d. Apply carburetor heat to maintain a temperature of 20°C (68°F). (See figure 7, 60.)

e. If oil temperature regulators are installed, pull out the oil temperature control (figure 9, 76) to obtain heat through the oil temperature regulator. Oil should be warmed to a minimum of 40°C (104°F), maximum 85°C (185°F). (See figure 7, 61 and 63.) Airplanes not equipped with oil temperature regulators obtain oil heat by circulation through the engine.

f. Check oil pressure, normal oil pressure, 60 to 80 pounds per square inch. (See figure 7, 61 and 63.)

g. Check the fuel pressure. (Idling: 0 to 1/2 psi; cruising rpm: 2 to 3-1/2 psi, 2-3/4 psi desired.) (See figure 7, 61 and 63.)

h. Check the single-magneto ignition as follows:

(1) Run the engine at 1500 rpm. Hold toes on brake when "REVING UP" engines.

(2) First, turn the battery ignition switch "OFF" momentarily, noting the loss in rpm. With battery ignition "ON," allow engine to pick up lost rpm. Then turn magneto switch "OFF" momentarily. Engine rpm should not drop more than 80 rpm. Allow engine to pick up lost rpm before

testing the second set of plugs. (This test should be made in the shortest possible time. Do not operate engine on single magneto for more than 15 seconds.) After checking single magnetos, check engine pick-up by advancing both throttles to "OPEN" position, then rapidly close throttles.

i. Check cylinder head temperature. Minimum head temperature 100°C (212°F.) Maximum head temperature 200°C (392°F.) (See figure 7, 56.)

j. Check the suction gage reading. On the AT-17, AT-17B, and UC-78 airplanes the suction should read between 3.7 and 4.3 inches mercury; on the AT-17A, AT-17C, and UC-78C gage should read between 1.7 and 2.0 inches. (See figure 7, 55.)

#### CAUTION

The gyro instruments will be uncaged at all times except during maneuvers in the air which exceed the operating limit of the instruments. Note if the horizon bar of the gyro horizon is not level after the engines are started. Cage and immediately uncage the gyro at least 5 minutes before take-off.

#### 5. TAXYING.

a. Obtain directional control while taxiing by differential use of engines assisted by the liberal use of rudder. Use brakes only to correct for overcontrol, release brakes immediately after correcting track. **DO NOT DRAG THE BRAKES.**

#### CAUTION

The brakes are quickly overheated by dragging brakes while taxiing. The heat generated causes severe damage to tires and tubes and may cause partial or complete tire failure as the result. Keep the heels on the floor to avoid unintentional application of brakes. Use the tail wheel lock for straight taxiing, release the lock when turns are to be made.

#### NOTE

It is necessary to release any side load on tail before tail wheel lock will release. Apply right or left rudder to release side load.

b. During taxiing operations, 20°C should be maintained using full carburetor heat, if necessary.

#### 6. BEFORE TAKE-OFF.

a. Set propellers in "TAKE-OFF" (increase rpm).

b. Set fuel mixture "FULL RICH."

c. Set carburetor heat control at "COLD" (unless icing).

d. Set tank selector fuel valve to fullest tank.

e. Set engine selector fuel valve to "BOTH."

f. Set cross-feed fuel valve to "ON."

g. Set rudder tab control to "NEUTRAL." (See figure 10, 90.)

h. Set elevator tab control at "TAKE-OFF." (See figure 10, 92.)

i. Set tail wheel lock in "LOCKED" position. (See figure 10, 87.)

j. Release parking brake. (See figure 19.)

k. Refer to specific engine charts for take-off conditions.

l. Check landing gear operating switch (figure 8, 72) for "DOWN" position.

#### DANGER

On take-off, the landing gear will retract as soon as the landing gear strut extends, if the switch is left in the "UP" position.

m. Rest the heels on the floorboard to avoid unintentional use of the brakes during take-off. (Refer to emergency operation appendix III for procedure in case of engine failure at take-off.)

#### 7. TAKE-OFF PROCEDURE.

a. When lined up on runway, open the throttles slowly using them differentially to keep straight on the runway. Full throttle may be used for take-off.

b. Do not force the tail up, raise the tail when it will come up with light forward pressure on the control wheel.

c. After "breaking ground," climb approximately 10 feet, then level off and retract landing gear. (Wheels can be retracted any time after air speed indicates 60 mph.) Maintain an altitude of 10 to 20 feet, using full power until single-engine speed of 90 mph indicated has been reached.

#### CAUTION

Keep one hand on the throttles throughout the take-off period and until single-engine speed has been reached. This is the critical period during which you cannot maintain directional control in case of engine failure and you should always be ready to immediately throttle both engines in case of an engine failure before single-engine speed is reached. After single-engine speed is reached, proceed with single-engine procedure. (See Emergency Operations Section, appendix III.)

#### 8. CLIMB AND LEVEL FLIGHT.

a. Refer to the applicable "Take-Off, Climb and Landing Chart" for best indicated air speed to be used during climb.

b. Watch cylinder head and oil temperatures and keep within the specified limits.

c. Refer to applicable "Flight Operation Instruction Chart," for cruising conditions.

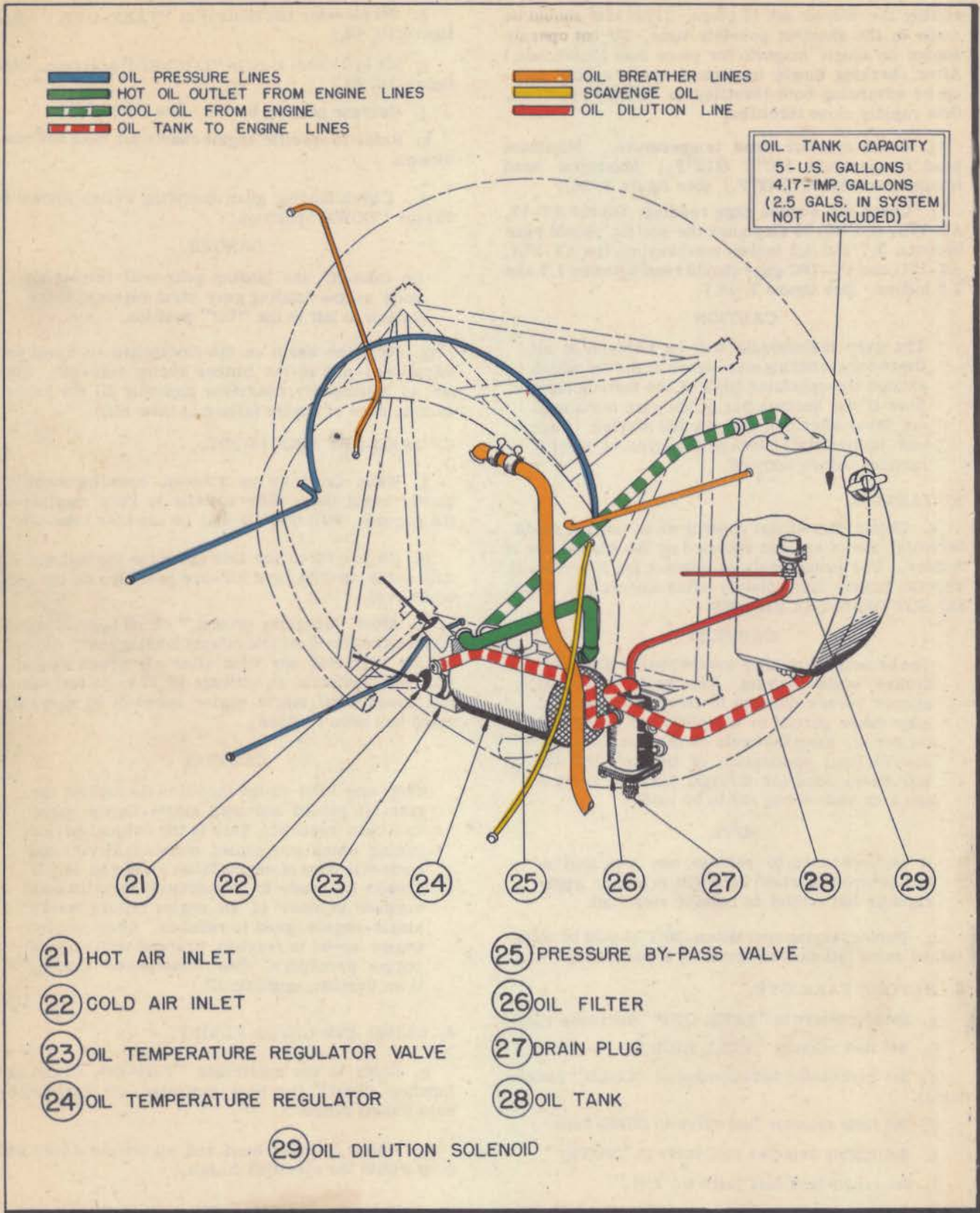


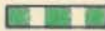


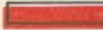
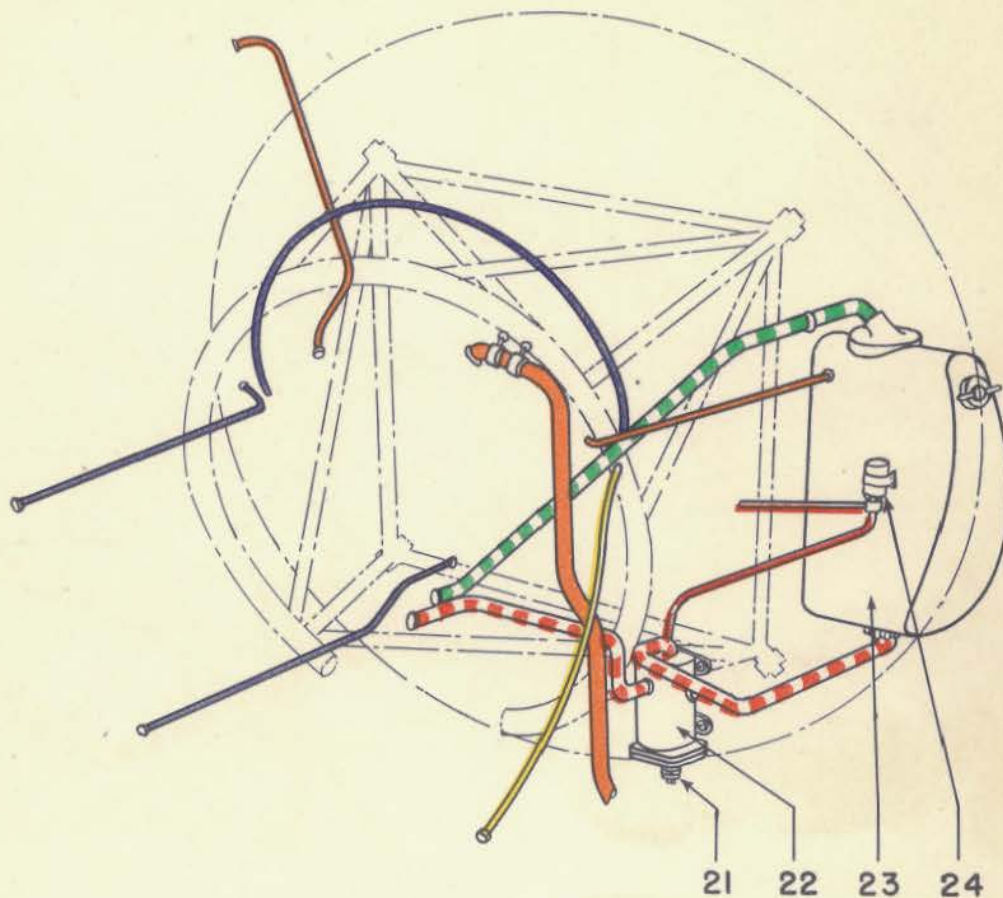


Figure 4 - Oil System Diagram

- |   |  |
|---|--|
|  OIL PRESSURE LINES      |  OIL BREATHER LINES |
|  COOL OIL FROM ENGINE    |  SCAVENGE OIL       |
|  OIL TANK TO ENGINE LINE |  OIL DILUTION LINE  |

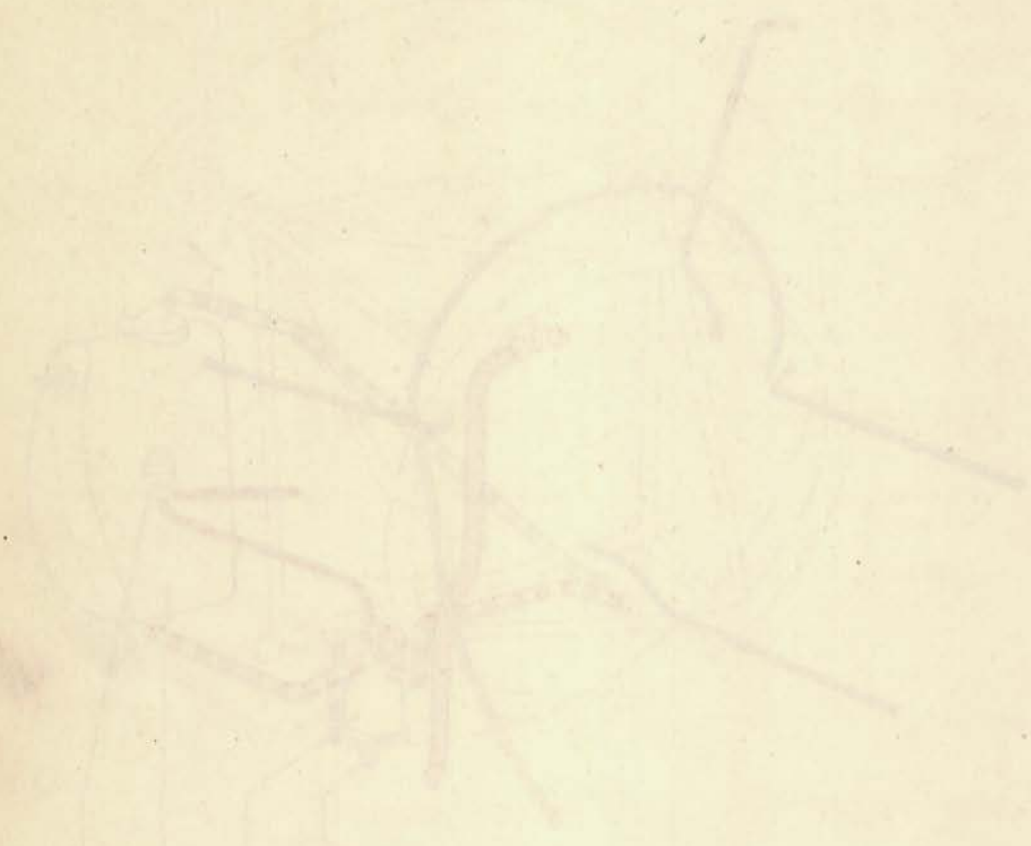


- 21 OIL FILTER DRAIN PLUG
- 22 OIL FILTER
- 23 OIL TANK
- 24 OIL DILUTION SOLENOID

OIL TANK CAPACITY 5-U.S. GALLONS 4 .17-IMP. GALLONS
---

Figure 4A - Oil System Diagram (Without Oil Temperature Regulator)

Oil Tank Capacity  
Oil Filter Drain Plug  
Oil Filter  
Oil Tank  
Oil Solution Solenoid



Oil Tank Capacity  
Oil Filter Drain Plug  
Oil Filter  
Oil Tank  
Oil Solution Solenoid

Oil Filter Drain Plug  
Oil Filter  
Oil Tank  
Oil Solution Solenoid

Oil Tank Capacity

Oil Tank Capacity

Oil Tank Capacity

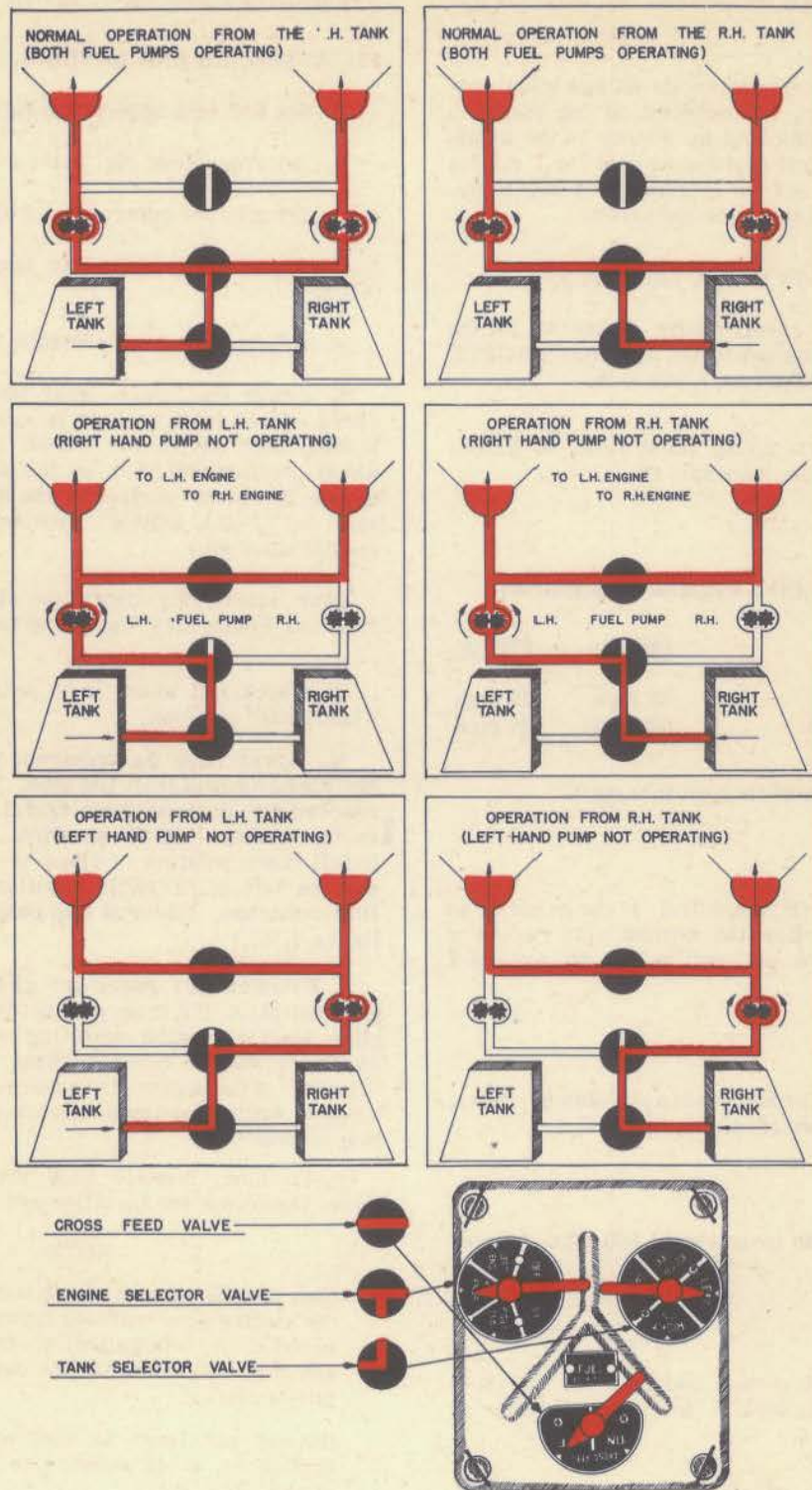


Figure 6 - Simplified Fuel System Operating Diagram

d. Trim the airplane for level flight by means of the rudder and elevator tabs. (Leave the tab handle pointed toward the rear of the cabin so that in the event of emergency exit the handles will not hook into clothes, belts, etc.)

e. Use full-cold carburetor air unless icing carburetor conditions are encountered. If ice forms in the carburetor, as indicated by a drop in the manifold pressure, apply full carburetor heat for 1 minute to remove ice, then set the heat as necessary to obtain 10°C (50°F) to prevent ice formation.

9. GENERAL FLYING CHARACTERISTICS.

This airplane is exceptionally stable at all the speeds within the limits set forth. DO NOT EXCEED AN INDICATED AIR SPEED OF 200 mph.

(For engine failure during flight refer to Emergency Operation Section, appendix III.)

10. STALLS.

a. Stalling speed of the airplane is as follows:

	5200 lb.	5700 lb.
Flaps and L. G. Up	63 mph	66 mph
Flaps and L. G. Down	63 mph	66 mph

b. The airplane controls well in a stall.

11. SPINS.

Deliberate spins are prohibited. In the event of an unanticipated spin, follow the normal spin recovery procedure. Maximum pull-out is not to exceed 2 "G's."

12. ACROBATICS.

See paragraph 21. for maneuvers prohibited. Steep, tight turns are to be avoided.

13. DIVING.

Do not dive airplane in excess of 200 mph, or over 2400 rpm.

14. NIGHT FLYING.

Operation of all electrical switches for lights is conventional. (See figures 8 and 9 for location of switches.)

Luminous-type identification plates are installed. Fluorescent instrument lights are installed.

A rheostat for dimming the compass light is located on the instrument panel. (See figure 8, 70.)

To operate identification lights, turn the selector switch for the desired light to "STEADY"; or, for intermittent signal turn to "KEY" and press keying switch button. (See figure 9, 84.)

15. APPROACH AND LANDING.

a. Set fuel tank selector to fullest tank.

b. Set cross-feed fuel valve to "ON."

c. Set mixture control to "FULL RICH."

d. Adjust carburetor air temperature to 20°C (68°F).

e. Adjust propeller controls to obtain 2000 rpm.

f. Lower the landing gear when an indicated air speed of 150 mph or less is reached by setting the landing gear switch in "DOWN" position. Observe wheel position indicator on the panel. (It is possible to see the lower portion of the landing gear wheels, when in "FULL DOWN" position, from the pilot and copilot windows.)

(For emergency operation of the landing gear, refer to Emergency Operating section, appendix III.)

g. Check tail wheel lock position. Should be in "LOCKED" position.

h. Lower flaps as required, when the indicated air speed is less than 108 mph. When the flaps have reached the desired down travel, put the flap switch in the center "OFF" position. (See figure 8, 71.) If full down position of flaps is desired, flap switch may be left in "DOWN" position until flap reaches limit switches. Observe flap position indicator. (See figure 7, 57.)

i. Optimum air speed for gliding approach is 90 mph indicated. If it is necessary to execute a prolonged glide, keep the engine operating under partial throttle so as to retard rapid cooling. Periodic low rpm "bursts" of the engine will insure clean cylinders and a warm engine for instantaneous emergency application of power.

j. To land, throttle back the engines, flare the glide, then close the throttles and land.

NOTE

The landing gear warning horn will sound, or the landing gear warning lights will illuminate (whichever is installed) whenever the engines are throttled back and the landing gear is not fully extended.

Retract the flaps as soon as possible after landing to avoid damage to flaps by stones, sticks, ruts, etc.

CAUTION

Flap switch is to the left side of the position indicator; be certain the flap switch and not the landing gear switch is selected.



16. CROSS-WIND LANDING.

Normal cross-wind landings should be carried out the same as noted above with the exception that windward wing should be lowered to compensate for drift and then airplane straightened out immediately before touching the ground.

17. SINGLE-ENGINE LANDING.

SEE EMERGENCY SECTION.

18. AFTER LANDING.

a. Retract the flaps. Put switch lever in "UP" position.

b. Do not "RIDE THE BRAKES." Care must be exercised to prevent applying brake pressure while landing. When taxiing with power, make definitely sure toes do not apply pressure unintentionally.

c. Unlock the tail wheel lock if turns are to be made while taxiing.

d. Taxi up to the line and set parking brake.

e. While engines are running at 1200 rpm put propeller controls in "FIXED HIGH PITCH" (decrease rpm) and allow a few seconds for engine to change prop pitch.

f. If a cold weather start 0° C (32° F) is anticipated, the oil system should be diluted before stopping the engine. Operate engine at 800 to 1000 rpm. Hold oil dilution valve switch in "ON" position for not over 2 minutes, release the switch, and stop the engine in the normal manner.

19. STOPPING ENGINES.

a. Idle the engines until the engine temperatures have cooled below 150° C (302° F).

b. Increase engine speed to 1000 to 1100 rpm for 1/2 minute to scavenge crankcase oil. (Propeller pitch may be changed during this "Reving Up" instead of as noted in paragraph 18.e., if desired.)

c. Return throttles to idle position and move mixture controls to "FULL LEAN."

d. Turn the ignition switches "OFF" when the engine ceases firing.

20. BEFORE LEAVING THE COCKPIT.

a. Turn the fuel tank selector valve "OFF."

b. Turn the engine fuel selector valve to "OFF."

c. Place all cockpit light switches, instrument switches, and pitot switches, etc., in "OFF" position.

d. Install controls lock on the pilot control wheel.

e. Turn master switch "OFF."

21. MANEUVERS PROHIBITED.

a. Loop.

b. Spin.

c. Roll.

d. Immelman.

e. Dive.

f. Tight turns.

g. Whip stalls.

h. Inverted flight.

22. AIRPLANES EQUIPPED WITH WOOD PROPELLERS.

a. For take-off, use full throttle.

b. Climb at 110 mph. Do not exceed 23-inch manifold pressure or 2000 rpm.

c. CRUISING. - Normal, do not exceed 1900 rpm or 20 inches Hq; maximum, do not exceed 2000 rpm or 21 inches Hq.



*If your airplane is equipped with wood props—note carefully!*



## Key to Figures 7 and 8

- |    |   |    |  |
|----|---|----|--|
| 42 | ALTIMETER                                 | 60 | CARBURETOR AIR TEMPERATURE,<br>LEFT & RIGHT  |
| 43 | AIRSPEED INDICATOR                        | 61 | ENGINE GAUGE UNIT - LEFT (INLET<br>OIL TEMP., OIL PRESS., FUEL PRESS.)               |
| 44 | TURN & BANK INDICATOR                     | 62 | TACHOMETER - LEFT ENGINE   |
| 45 | RATE OF CLIMB INDICATOR                   | 63 | ENGINE GAUGE UNIT - R. (INLET OIL<br>TEMP., OIL PRESS., FUEL PRESS.)                 |
| 46 | TURN INDICATOR                            | 64 | TACHOMETER - RIGHT ENGINE  |
| 47 | GYRO HORIZON                              | 65 | FUEL QUANTITY GAUGES   |
| 48 | COMPASS                                   | 66 | ENGINE PRIMER  |
| 49 | MANIFOLD PRESSURE - L. ENGINE             | 67 | STATIC PRESSURE SELECTOR VALVE   |
| 50 | MANIFOLD PRESSURE - R. ENGINE             | 68 | GENERATOR, PITOT HEAT, COCKPIT<br>LIGHT, OIL DILUTION, LANDING<br>LIGHT SWITCH PANEL |
| 51 | VOLTMETER - LEFT & RIGHT                  | 69 | POSITION LIGHT SWITCH  |
| 52 | AMMETER - LEFT ENGINE                     | 70 | COMPASS LIGHT RHEOSTAT   |
| 53 | AMMETER - RIGHT ENGINE                    | 71 | FLAP SWITCH  |
| 54 | CLOCK                                     | 72 | LANDING GEAR SWITCH  |
| 55 | VACUUM GAUGE                              | 73 | OIL TEMPERATURE REGULATOR VALVE<br>CONTROL, LEFT ENGINE                              |
| 56 | CYLINDER HEAD TEMPERATURE                 | 74 | FRICTION KNOB - QUADRANT<br>CONTROL  |
| 57 | FLAP & LANDING GEAR<br>POSITION INDICATOR |    |  |
| 58 | FUEL - AIR RATIO INDICATOR                |    |  |
| 59 | OUTSIDE (FREE) AIR TEMPERATURE            |    |  |

75 WARNING HORN SWITCH SHUT-OFF BUTTON



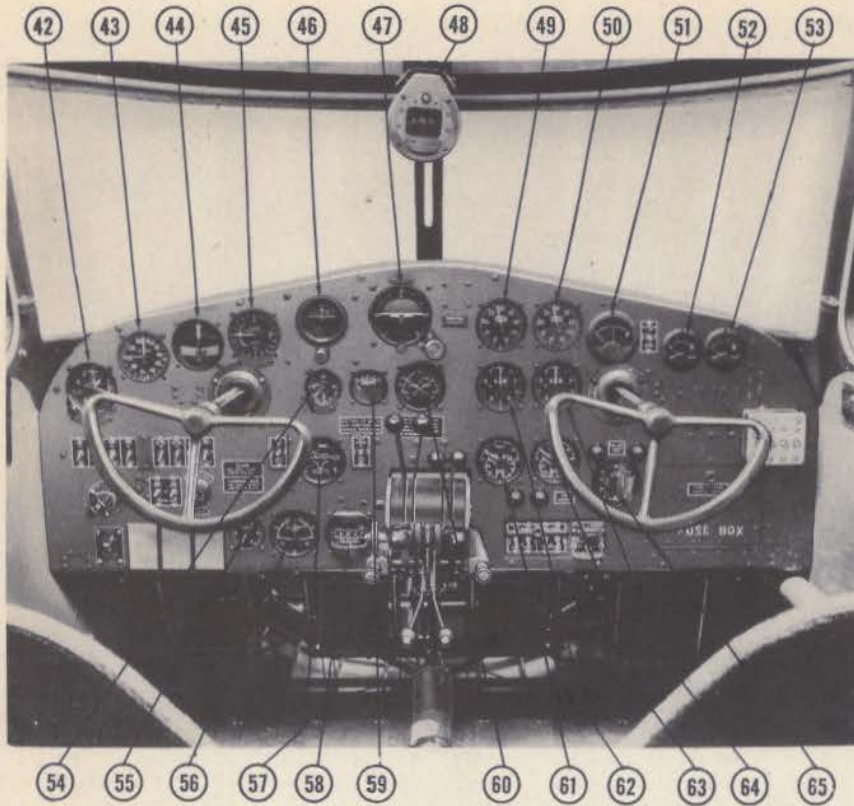
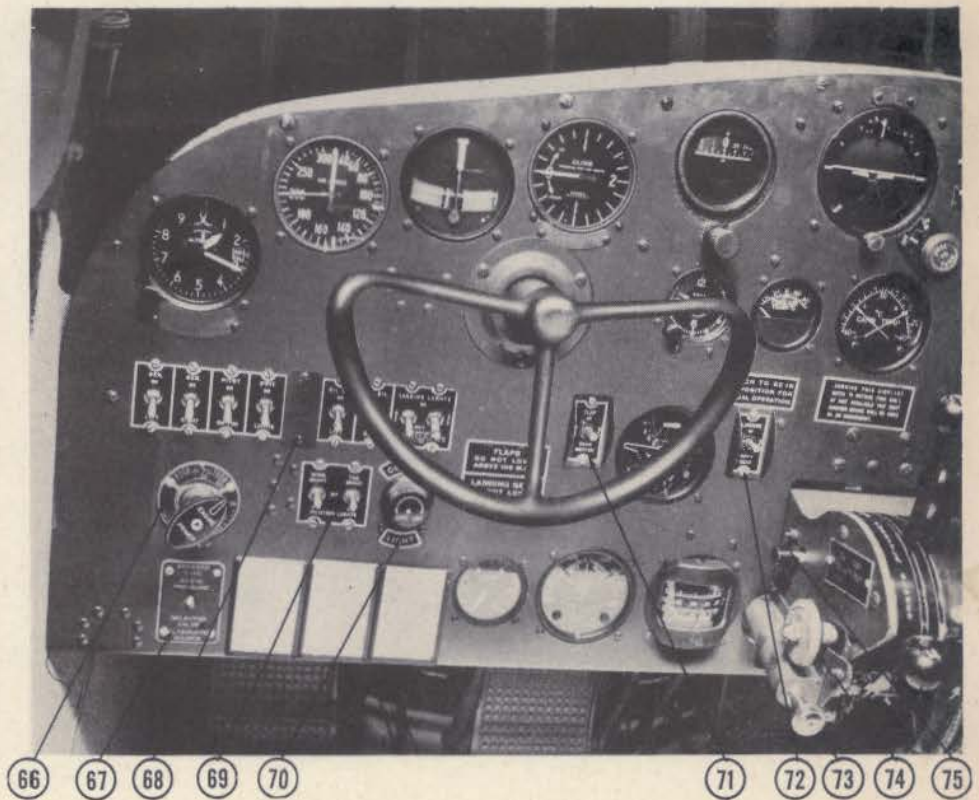
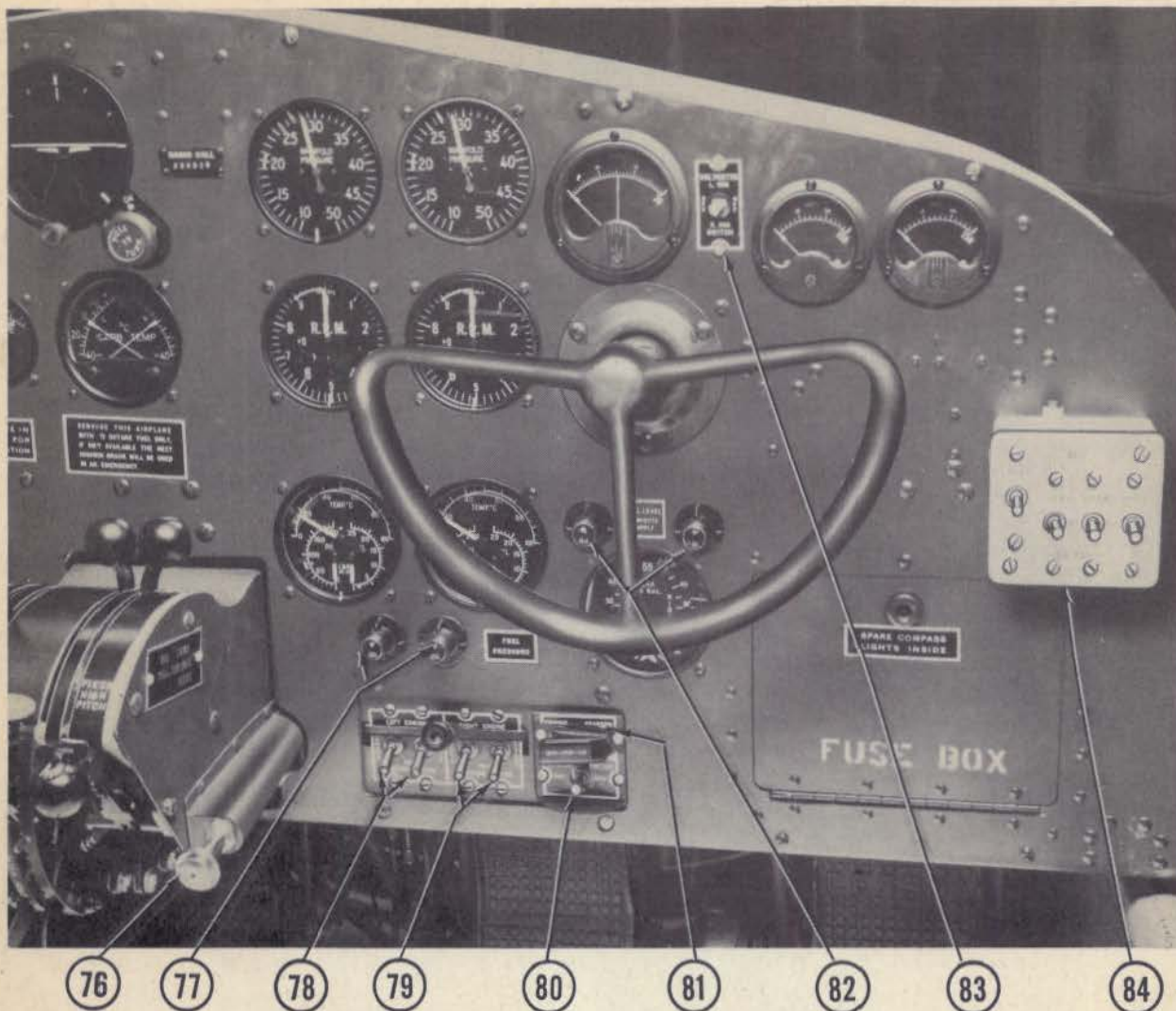


Figure 7  
Instrument  
Installation

Figure 8 -  
Instrument Panel  
Pilot's Side

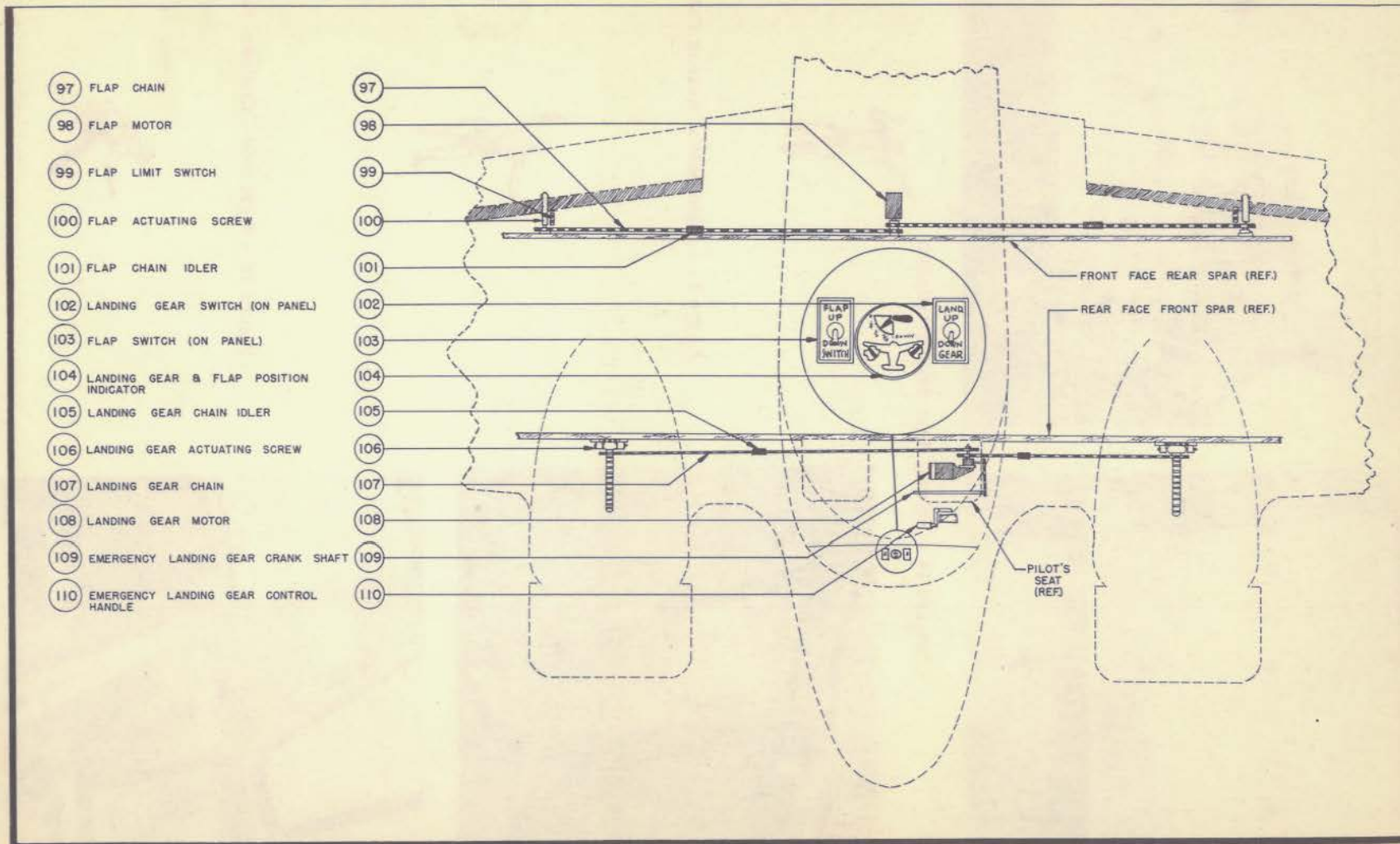




- |   |   |
|---|---|
| <p>(76) OIL TEMPERATURE REGULATOR<br/>HEAT CONTROL, RIGHT ENGINE</p> <p>(77) FUEL PRESSURE WARNING LIGHT</p> <p>(78) LEFT ENGINE SWITCHES,<br/>BATTERY &amp; MAGNETO</p> <p>(79) RIGHT ENGINE SWITCHES,<br/>BATTERY &amp; MAGNETO</p> | <p>(80) MASTER SWITCH - BATTERY, AUXILIARY</p> <p>(81) ENGINE STARTER - LEFT &amp; RIGHT</p> <p>(82) FUEL LEVEL WARNING LIGHTS</p> <p>(83) VOLTMETER SWITCH, LEFT &amp; RIGHT<br/>ENGINES</p> <p>(84) IDENTIFICATION LIGHT SWITCH BOX</p> |
|---|---|

Figure 9 - Instrument Panel - Copilot's Side

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★ Figure 13 - Flap and Landing Gear Operational Diagram

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Section II

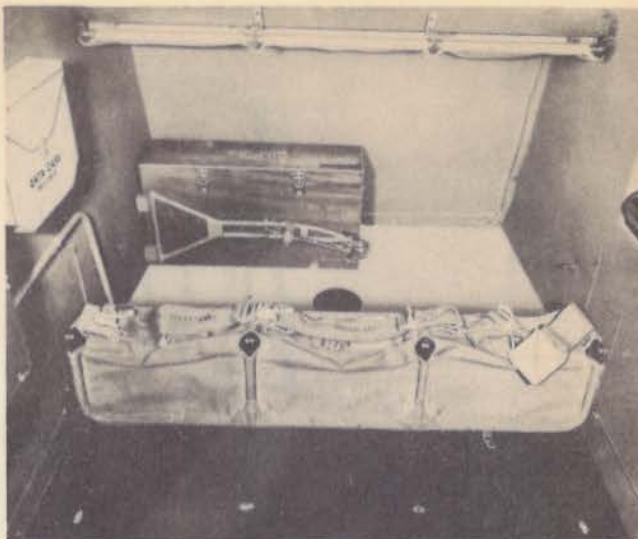
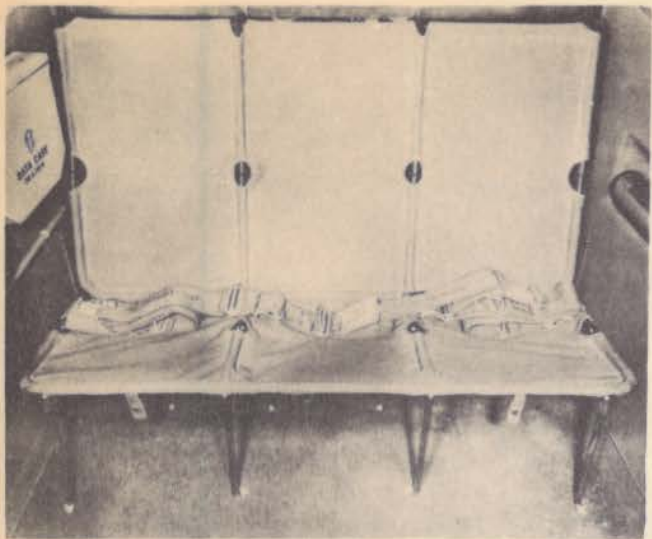


Figure 14 - Folding Rear Seat Installation



Figure 15 - Right Side at Rear of Cabin

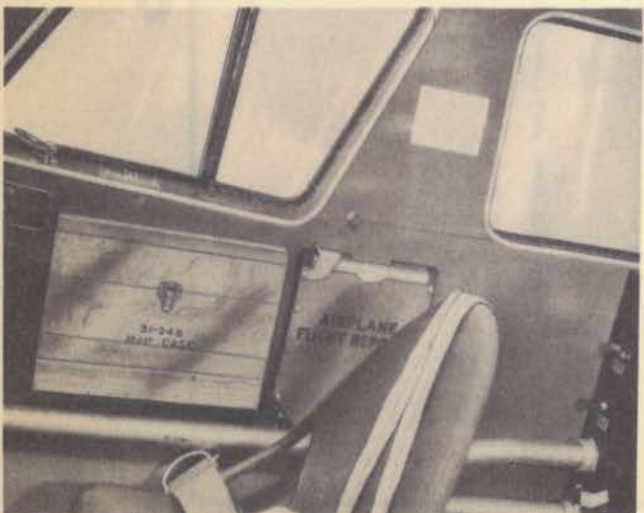


Figure 16 - Right Side - Copilots' Seat



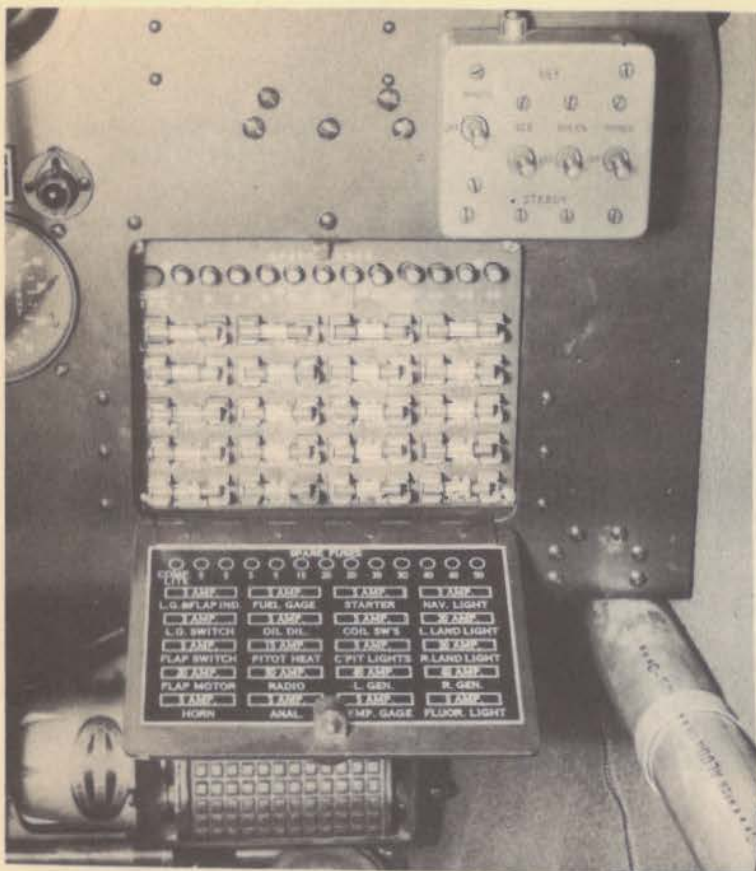


Figure 17 - Fuse Panel

Figure 18 - Pilot Seat Adjustment

- 111 CABIN HEATER REGISTER
- 112 CABIN HEATER CONTROL
- 113 SHOULDER HARNESS ADJUSTMENT LEVER
- 114 SEAT FORE & AFT ADJUSTMENT LEVER

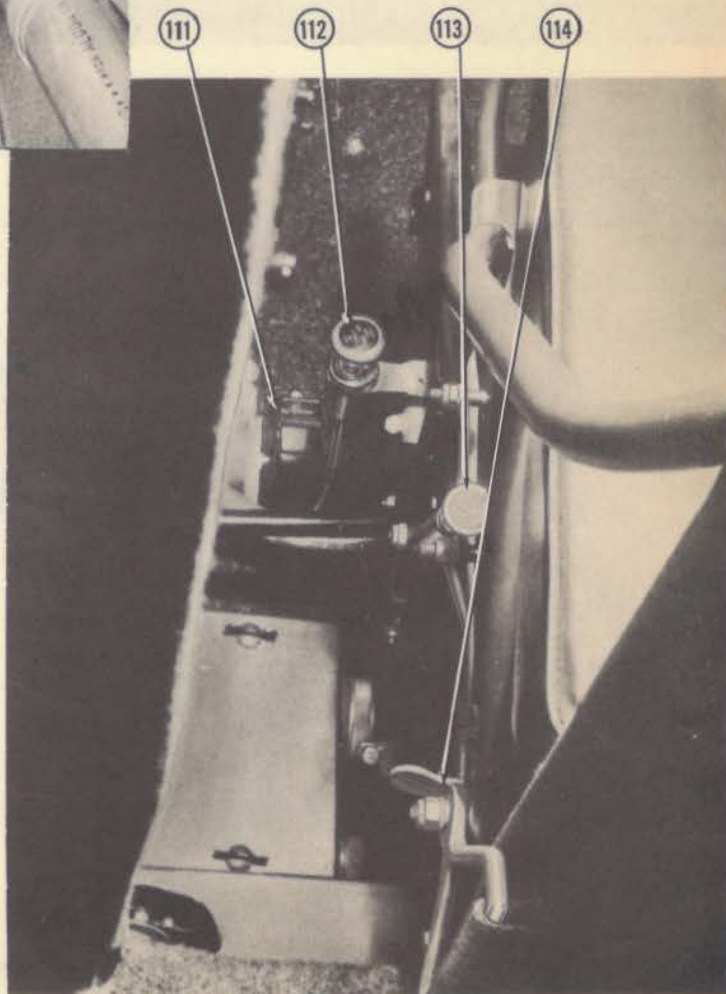




Figure 19 - Installation  
of Controls Lock

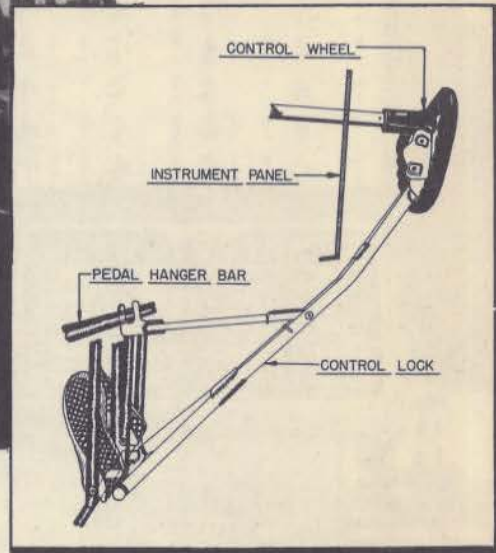


Figure 20 - Mooring Diagram

