PILOT'S FLIGHT OPERATING INSTRUCTIONS

FOR

ARMY MODELS

P-39K-1 and P-39L-1

AIRPLANES

This publication contains specific instructions for pilots and should be available for Transition Flying Training as contemplated in AAF Reg. 50-16.

This publication shall not be carried in aircraft on combat missions or when there is a reasonable chance of its falling into the hands of the enemy.

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W.P. CINCINNATI
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Published by authority of the Commanding General, Army Air Forces.

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Instructions Applicable to AAF Personnel.

Paragraph 5.*d.* of Army Regulation 380-5 relative to the handling of restricted printed matter is quoted below:

"*d.* Dissemination of restricted matter.—The information contained in restricted documents and the essential characteristics of restricted material may be given to *any person known to be in the service of the United States and to persons of undoubted loyalty and discretion who are cooperating in Government work,* but will not be communicated to the public or to the press except by authorized military public relations agencies."

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"Therefore, it is requested that all naval activities check their own local regulations and procedures to make sure that handbooks, service instructions and other *restricted* technical publications are actually being made available to both civilian and enlisted personnel who have use for them."

General.

These instructions permit the issue of restricted publications to civilian contract and other accredited schools engaged in training personnel for Government work, to civilian concerns contracting for overhaul and repair of aircraft or aircraft accessories, and to similar commercial organizations.

LIST OF REVISED PAGES ISSUED

NOTE: A heavy black vertical line, to the left of the text on revised pages, indicates the extent of the revision. This line is omitted where more than 50 percent of the page is revised.

Page No.	*Latest Revised Date*
B .....Deleted.....	April 15, 1944
C .....Deleted.....	April 15, 1944
4	June 30, 1943
17	April 15, 1944
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19	June 30, 1943
25	April 15, 1944
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Additional copies of this Technical Order may be secured on Requisition, AAF Form 102, as prescribed in AAF Regulation 15-102. Submit requisitions to: Commanding General, Air Service Command, Patterson Field, Fairfield, Ohio. Also, see T. O. No. 00-25-3 for details on distribution of Technical Orders.

SECTION I
DESCRIPTION

1. *AIRPLANE.*

a. General.—The model P-39K-1 and model P-39L-1 fighter airplanes are both low wing monoplanes manufactured by the Bell Aircraft Corporation. An Aero Products three-blade propeller with hydraulic speed control is installed on the P-39K-1 airplane. The P-39L-1 airplane is equipped with a Curtiss hollow-hub, electrically controlled, constant speed propeller. The tricycle landing gear and split type wing flaps are electrically controlled. The brakes are hydraulically operated. The overall dimensions are as follows:

Length	30′2″
Height, taxiing position	9′ 3¼″
Span	34′

b. Entrance to the Cockpit.

1. Entrance to the cockpit is made through the automobile type door on the right side of the cabin. The left hand door is recommended only in case of emergency. An auxiliary latch (Fig. 2—1) is provided at the top of each door to secure it shut in flight. An emergency door release handle (Fig. 7—50) is located forward of each door.

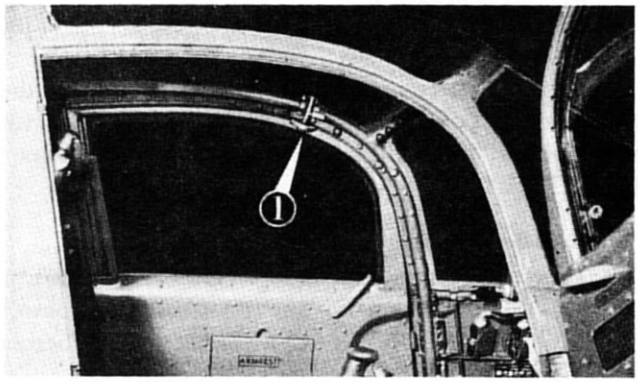


Figure 2—Auxiliary Door Latch

2. *FUEL, OIL AND COOLANT.*

Fuel—P-39K-1, P-39L-1—	Specification AN-VV-F-781 Octane 102
Oil—P-39K-1, P-39L-1—	Specification A.E.C. 124 Grade 1120 or S.A.E. 20
	Cold Weather—Specification A.E.C. 127 Grade 1100 or S.A.E. 50
Coolant—Prestone—	Specification AN-E-2

3. *PILOT PROTECTION.*

Armor plate is installed in front and rear of the pilot. The pilot is protected from enemy fire within the areas shown in (Figure 3).

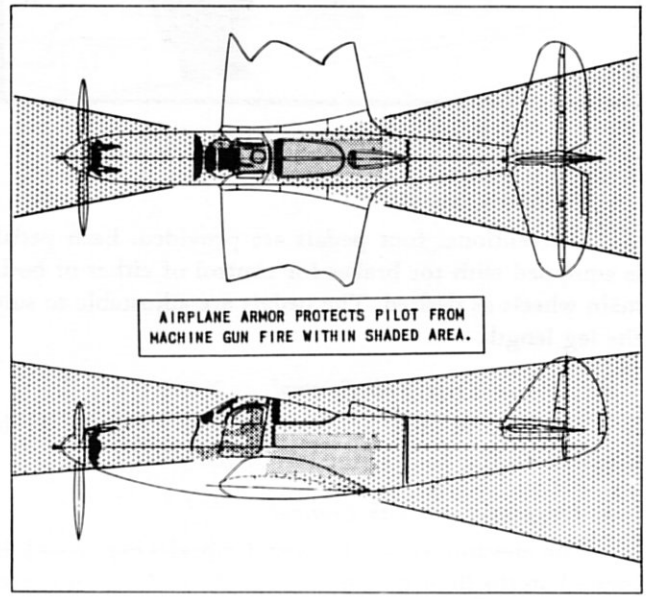


Figure 3—Armor Plate

4. *POWER PLANT.*

The Allison V-1710-63 engine in the P-39K-1 and P-39L-1 airplanes is a vertical "Vee" type, ethylene glycol cooled engine, connected with the reduction gear box in the nose of the airplane by an extension drive shaft.

5. *CONTROLS AND OPERATIONAL EQUIPMENT.*

a. Pilot's Seat.

The pilot's seat is non-adjustable, and equipped with a conventional type safety belt and shoulder harness with locking and unlocking adjustments. The shoulder harness is adjustable for individual size by operating the lock control in the bottom left side of the seat.

b. Aileron and Elevator Controls.

A conventional control stick is equipped with a "squeeze type" trigger (Figure 4—2) for firing the fuselage and wing machine guns, and a push button (Figure 4—1) for firing the 37 mm. cannon.

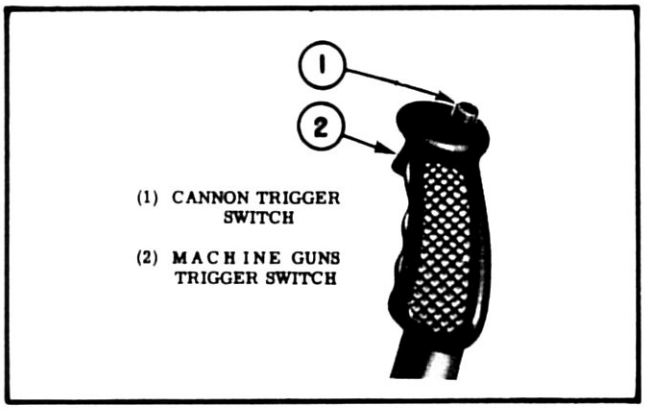


Figure 4—Control Stick Grip

c. Rudder Control.

Conventional foot pedals are provided. Each pedal is equipped with toe brakes for control of either or both main wheels as desired. The pedals are adjustable to suit the leg length.

d. Aileron Trim Tab Control.

The aileron trim tab control knob (Fig. 9—5) is installed on the floor at the left of the pilot.

e. Elevator Trim Tab Control.

The elevator trim tab control wheel (Fig. 9—4) is located on the floor directly to the left of the pilot's seat.

f. Rudder Trim Tab Control.

The rudder trim tab control knob (Fig. 9—3) is located on the floor directly to the left of the pilot's seat.

g. Landing Gear Controls.

An electric toggle switch for control of the landing gear is mounted to the left of the instrument panel approximately six (6) inches below the plexiglas cabin enclosure (Fig. 6—2). It is plainly marked "Up," "Down" and "Off." A landing gear clutch (Fig. 10—8) and an emergency hand crank (Fig. 10—3) are located on the floor to the right of the pilot to be used to raise or lower the landing gear in an emergency. A landing gear warning horn (Fig. 10—9) is installed on the turnover structure directly behind the pilot's head.

h. Flares.

A hand type flare pistol is located in a slide fastened container on the left cabin door, adjacent to the arm rest. The flare cartridges are stowed in a separate compartment located next to the pistol container.

i. Heating and Ventilation.

Cabin temperature is controllable. Hot air from behind the prestone radiator and cold air from in front of the prestone radiator enter ducts having outlets under pilot's seat. Two L-shaped handles located on the floor at the right side of the seat control the mixing valves. The forward handle controls the right hand duct and the rear handle, the left hand duct. For either handle: push down for hot, pull up for cold. Handles may be stopped in any position, depending on temperature desired.

The nose guns are heated by the induction of cabin air, which is under positive pressure, to the gun breeches in the armament compartment, which is under negative pressure.

CAUTION

In case fumes begin entering the cockpit the cockpit heater should immediately be switched to cold air. This is to prevent prestone fumes entering cockpit through hot air duct in case of bursted radiator or prestone line.

j. Fuel Tank Gages.

The fuel gage (Fig. 7—14) is located on the instrument panel. This gage is put in operation when the ignition switch and battery switch are turned "On" (Fig. 7—30).

CAUTION

No fuel gage is provided for the belly tank when it is installed.

k. Fuel Selector Valve.

The fuel selector valve (Fig. 9—9), located on the floor to the left of the pilot, is the conventional type with positions for "Off," "Left," "Right," "Res." and "Aux." (Belly Tank).

l. Radiator Shutter Controls.

There are two radiator shutter controls (Fig. 10).

(1) *Coolant Shutters.*—The coolant shutters control (Fig. 10—4), marked "Open" and "Closed" is located on the cockpit floor to the right of the pilot's seat.

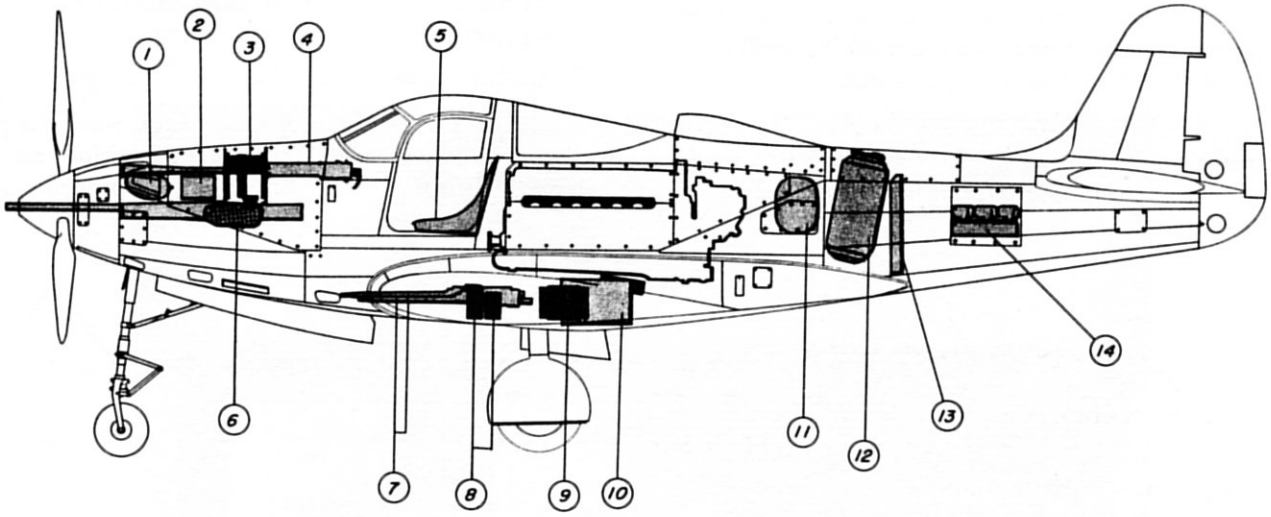
(2) *Oil Shutters.*—The oil shutter control handle (Fig. 10—5) marked "Open" and "Closed" is located on the fuselage turnover beam at the pilot's right hand.

m. Parking Brake.

The parking brake handle (Fig. 7—19) is located at the bottom center of the instrument panel.

6. *ENGINE CONTROLS.*

The engine controls are of the conventional type. The throttle control may be locked in place by the friction locks, located on the throttle quadrant. Turn the lock knob (Fig. 7—61) clockwise to lock the throttle in place.



1. OIL TANK REDUCTION GEAR BOX
2. DATA CASE
3. 37 mm AMMUNITION RACK
4. .50 CALIBER MACHINE GUNS
5. PILOT'S SEAT
6. GLYCOL SUPPLY TANK
7. .30 CALIBER MACHINE GUNS
8. AMMUNITION BOXES—.30 CALIBER
9. OIL TEMPERATURE REGULATOR, LEFT HAND
10. COOLANT RADIATOR
11. PRESTONE TANK
12. OIL TANK
13. MOORING KIT
14. RADIO
15. ENGINE TOOL KIT
16. MAP CASE
17. BATTERY
18. FIRST-AID KIT
19. AIRPLANE TOOL KIT
20. OIL TEMPERATURE REGULATOR, RIGHT HAND
21. .37 mm CANNON
22. OXYGEN TANK (SINGLE INSTALLATION)

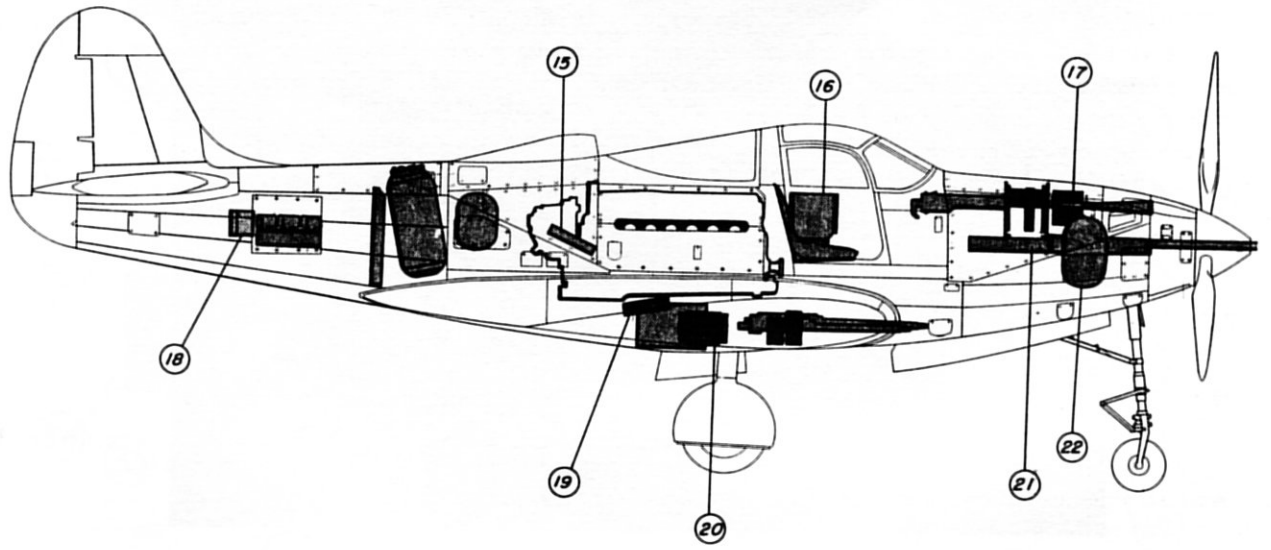


Figure 5—General Arrangement, Right and Left Sides

7. *PROPELLER CONTROLS.*

a. Aero Propeller on P-39K-1:

(1) Set the governor control to the desired R.P.M. at any given throttle setting. The propeller then will maintain this R.P.M. under all flying attitudes.

(2) R.P.M. may be changed by the propeller control to any given throttle setting. The Aero propeller, unlike the Curtiss, has no manual control to increase or decrease the blade angles.

NOTE

Because this propeller is hydraulically operated, its oil level must be checked carefully and regularly.

b. Curtiss Propeller on P-39L-1:

(1) To change the propeller R.P.M. when the propeller control is in the "Automatic" position, set the selector switch to "Auto" and adjust the propeller governor to obtain the desired R.P.M.

Figure 6—Cockpit, Right Hand Side of Seat

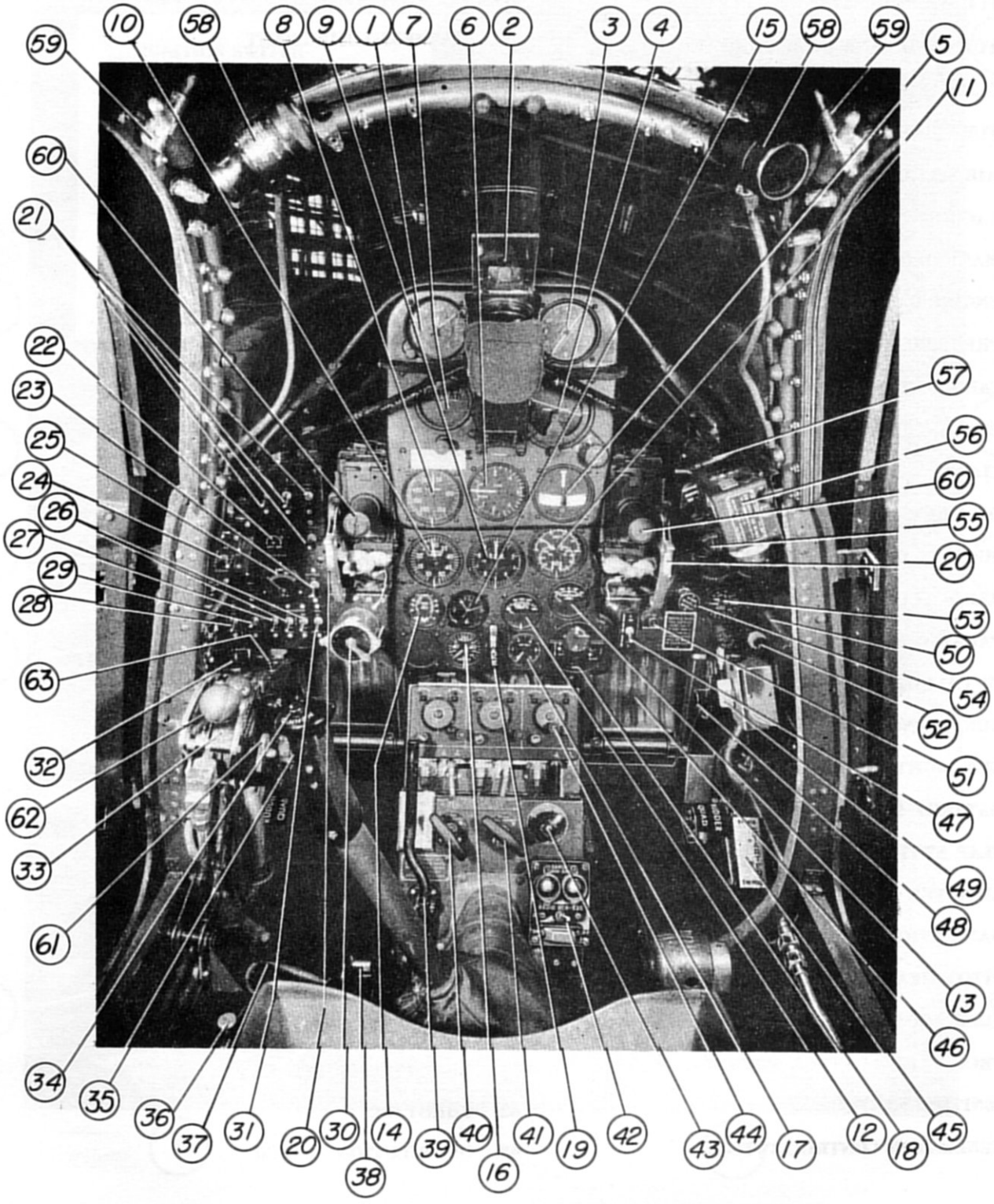


Figure 7—Instrument Panel and General Cockpit Arrangement For P-39K-1 and P-39L-1

1. ALTIMETER
2. GUN SIGHT
3. COMPASS
4. FLIGHT INDICATOR
5. TURN AND BANK INDICATOR
6. CLIMB INDICATOR
7. TURN INDICATOR
8. AIR-SPEED INDICATOR
9. TACHOMETER
10. MANIFOLD PRESSURE GAGE
11. ENGINE GAGE UNIT
12. PRESTONE THERMOMETER
13. CARBURETOR THERMOMETER
14. LIQUIDOMETER
15. CLOCK
16. OIL PRESSURE GAGE
17. SUCTION GAGE
18. RADIO CLOCK
19. PARKING BRAKE
20. .50 CALIBER GUN CHARGER
21. GUN, CANNON AND GUN CAMERA SWITCHES
22. GUN SIGHT RHEOSTAT
23. BATTERY SWITCH
24. FLAP SWITCH
25. AMMETER
26. NAVIGATION LIGHT SWITCHES
27. PITOT HEATER SWITCH
28. FUEL BOOSTER PUMP SWITCH
29. PROPELLER CONTROL SWITCH
30. IGNITION SWITCH
31. GENERATOR CONTROL SWITCH
32. LANDING LAMP RHEOSTAT
33. ENGINE CONTROL QUADRANT
34. CANNON STICK SWITCH
35. CONTROL SWITCH
36. HARNESS ADJUSTMENT
37. .30 CALIBER WING GUN CHARGERS
38. BOMB ARM AND SAFE LEVER
39. BOMB RELEASE
40. 37 mm SHELL LOADER HANDLE
41. 37 mm SHELL CHARGER HANDLE
42. RECEIVER CONTROL BOX
43. ENGINE PRIMER PUMP
44. RADIO CONTROL PANEL
45. STARTER FOOT SWITCH
46. RUDDER AND BRAKE PEDAL
47. HEATER SWITCH
48. RUDDER PEDAL ADJUSTMENT
49. RADIO RELAY SWITCH BOX
50. EMERGENCY DOOR RELEASE HANDLE
51. FUEL PRESSURE WARNING SIGNAL LIGHT
52. TURN AND BANK THROTTLE VALVE
53. OXYGEN REGULATOR AND GAGE
54. GLYCOL SPRAY PUMP
55. PROPELLER DE-ICER RHEOSTAT
56. RADIO CONTROL BOX
57. LIGHT SWITCH BOX
58. FLUORESCENT COCKPIT LIGHT
59. DOOR LATCH
60. .50 CALIBER GUN
61. THROTTLE FRICTION LOCK
62. THROTTLE
63. OIL DILUTION SWITCH

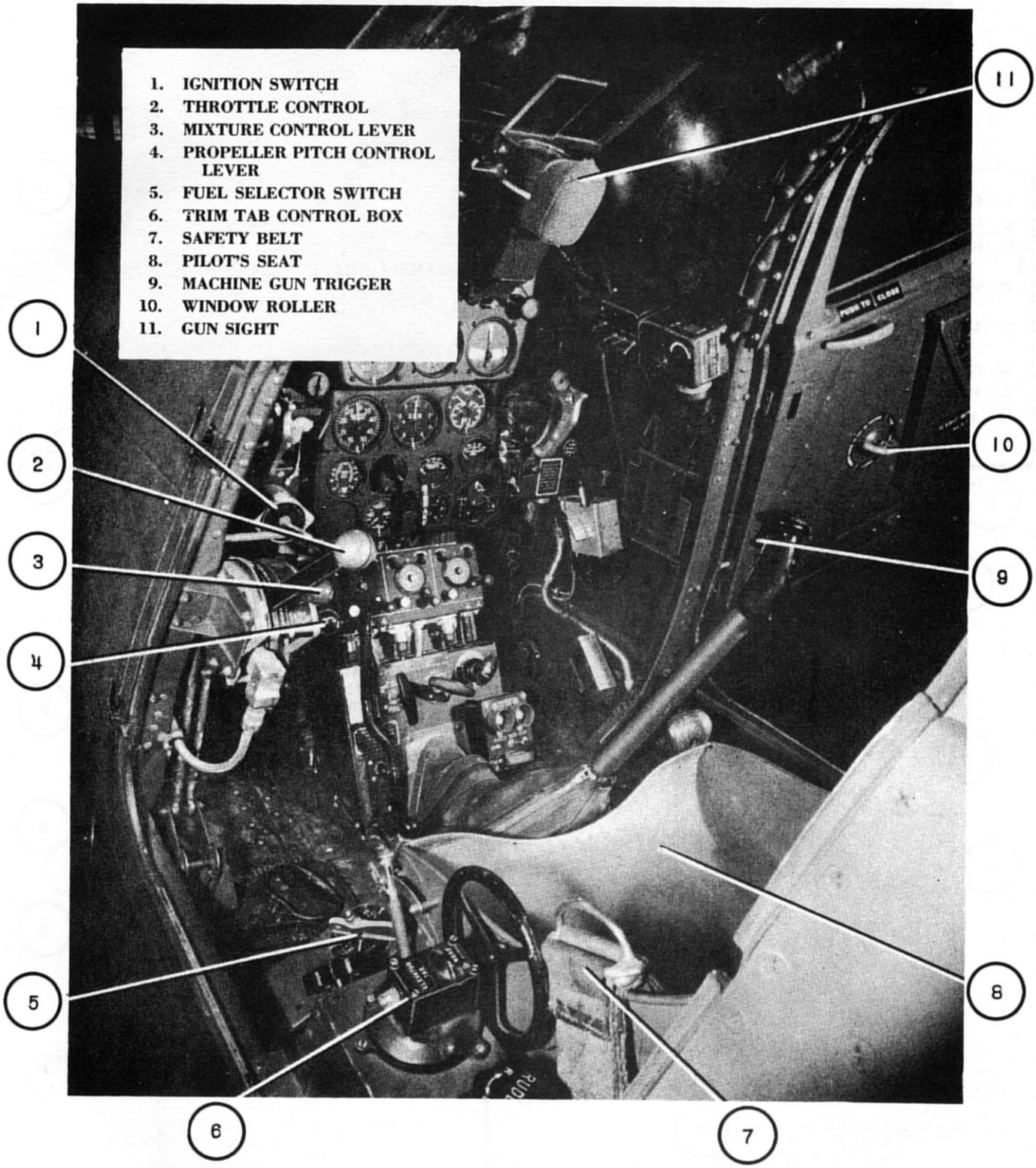


Figure 8—Cockpit, Left Hand Side of Seat

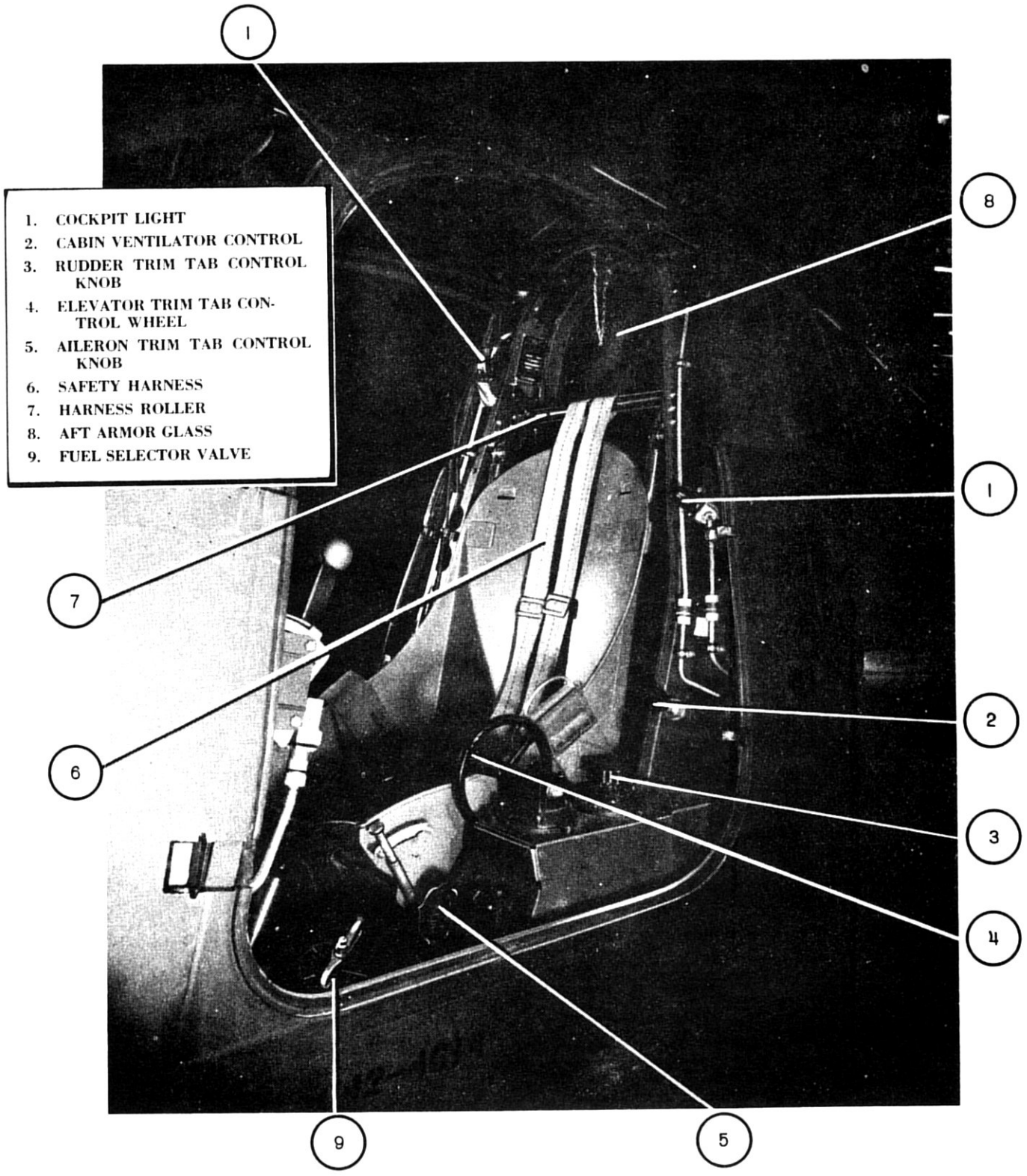


Figure 9—Turnover Beam, Left Hand Side

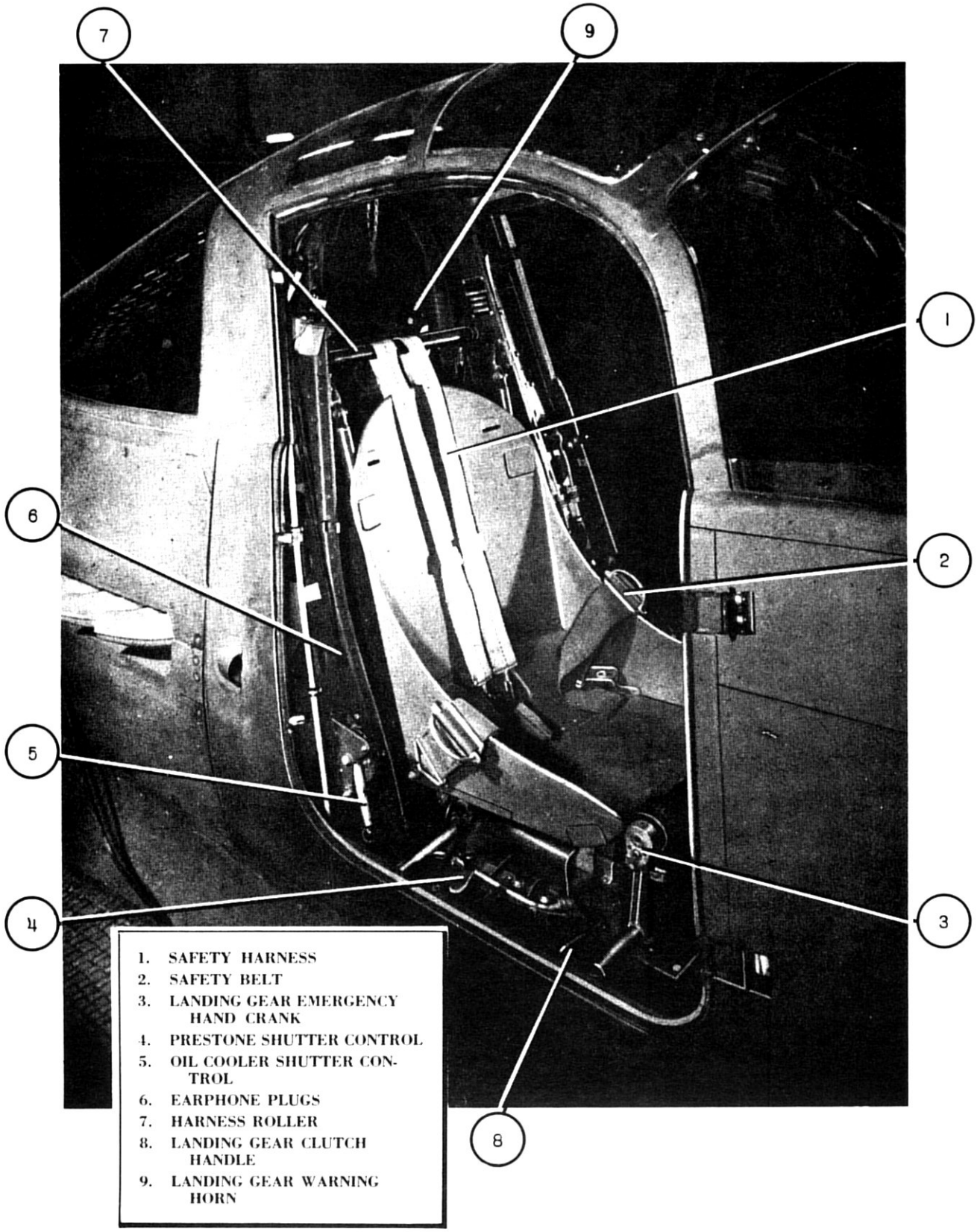


Figure 10—Turnover Beam, Right Hand Side

1. LINE FROM ENGINE TO OIL PRESSURE GAUGE ON INSTRUMENT PANEL
2. VENT LINES FROM ENGINE
3. OIL TANK (ENGINE)
4. OIL DRAIN "Y"
5. SURGE VALVE
6. OIL TEMPERATURE (OIL COOLERS) REGULATORS

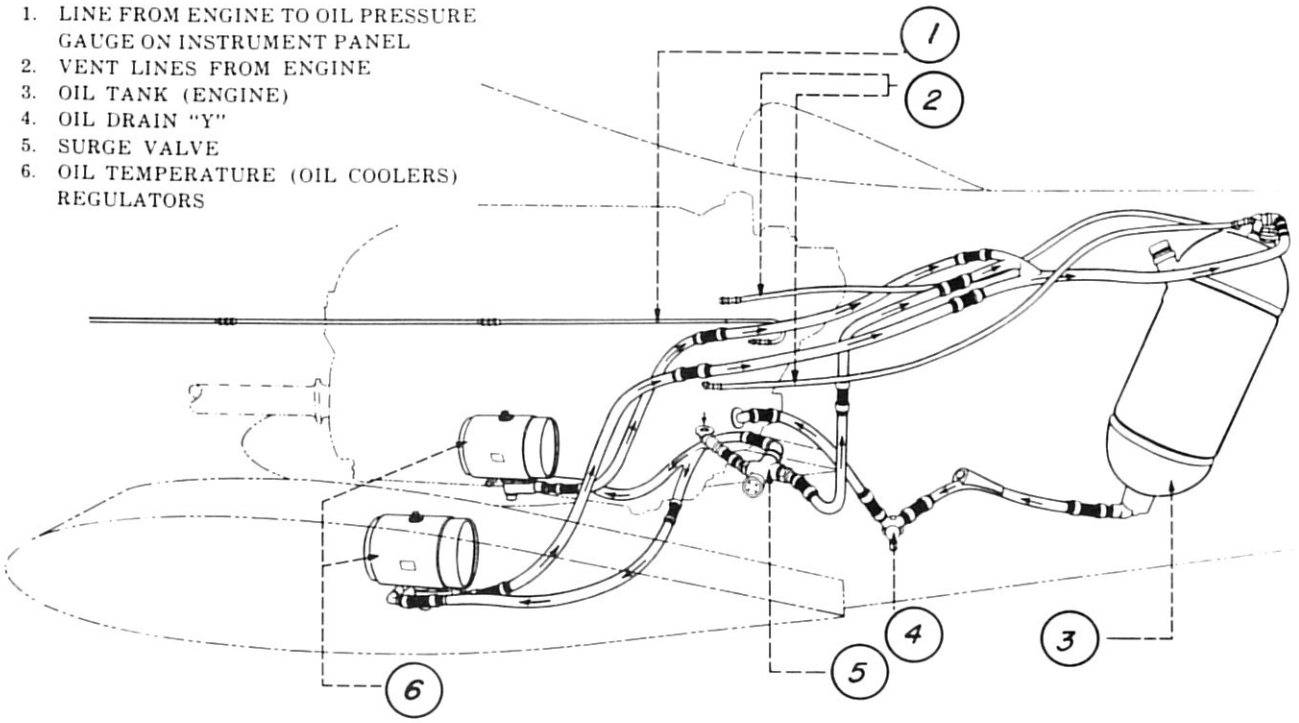
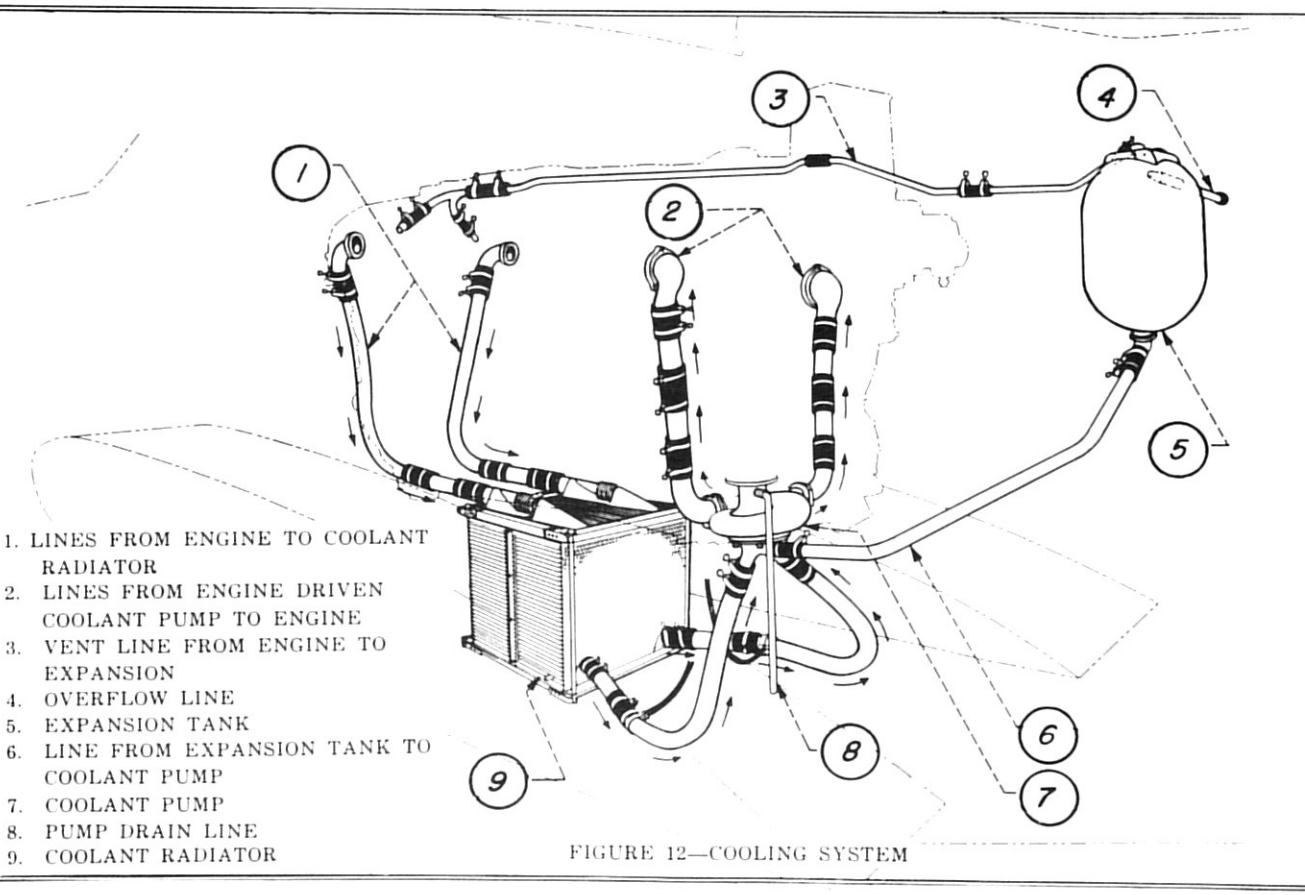


FIGURE 11—OIL SYSTEM



1. LINES FROM ENGINE TO COOLANT RADIATOR
2. LINES FROM ENGINE DRIVEN COOLANT PUMP TO ENGINE
3. VENT LINE FROM ENGINE TO EXPANSION
4. OVERFLOW LINE
5. EXPANSION TANK
6. LINE FROM EXPANSION TANK TO COOLANT PUMP
7. COOLANT PUMP
8. PUMP DRAIN LINE
9. COOLANT RADIATOR

FIGURE 12—COOLING SYSTEM

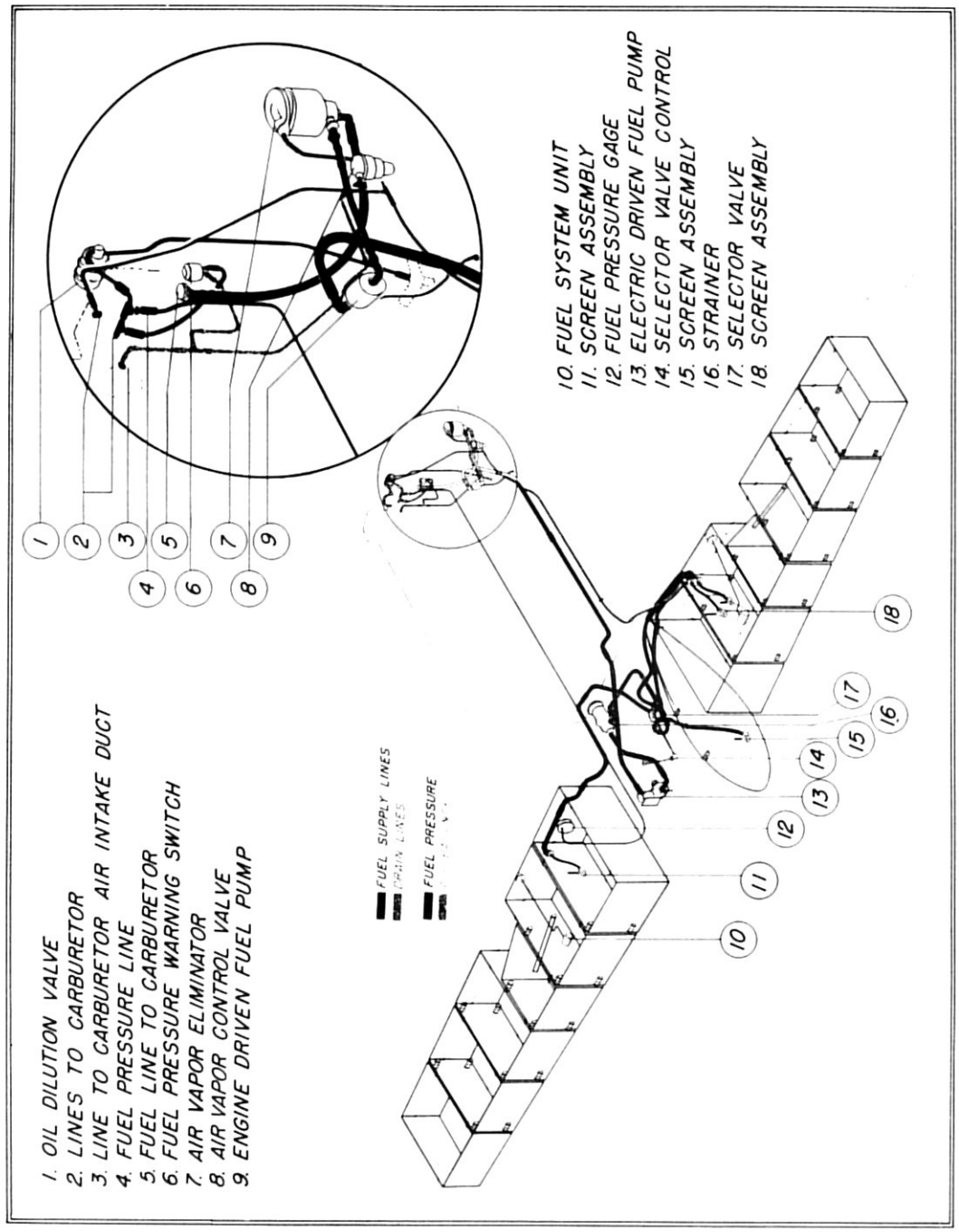


Figure 13—Fuel System

(2) If the propeller switch throws out and will not remain in the "On" position, the selector switch should be changed by placing the toggle switch in "Dec. R.P.M." or "Inc. R.P.M." as the needs require.

CAUTION

Do not change the R.P.M. more than absolutely necessary when the toggle switch is set to "manual" operation.

8. *CARBURETOR ICE.*

Heated air may be used in the carburetor to prevent the formation of ice or to remove ice already formed. A control knob, located on the fuselage turn-over beam at the pilot's left hand, is pulled out to admit warm air from the engine compartment into the carburetor. This knob is pushed in to admit outside air. To insure full travel of the heat door, rotate the knob "clockwise" after pushing knob "in" and rotate knob "counter-clockwise" after pulling knob "out." Knob should be rotated until it comes against a positive stop.

9. *MISCELLANEOUS EQUIPMENT.*

a. Relief Tube.

A relief tube is located beneath the right side of the pilot's seat.

b. Data Case.

The data case (Fig. 5—2) is attached to the under side of the top section of the fuselage gun compartment cowl.

c. First Aid Kit.

A first aid kit is located in the aft fuselage and is accessible through the radio door marked "First Aid Kit" forward of the stabilizer.

d. Mooring Kit.

A mooring kit (Fig. 5—13) is located on the deck of the aft fuselage.

SECTION II
PILOT OPERATING INSTRUCTIONS

1. *BEFORE ENTERING COCKPIT.*

a. It is essential that the pilot DETERMINE THE GROSS WEIGHT by referring to the WEIGHT AND BALANCE CHART for the applicable airplane. The P-39K-1 weight and balance chart is on page 23 and the P-39L-1 weight and balance chart is on page 24. Check the listed basic and alternate tabulated items against those loaded in the airplane. If the airplane is loaded in accordance with the "Basic Load Items" whose weights are entered under two loading conditions in the "Alternate Loading (Pounds)" column, the gross weight will be found listed at the bottom of the chart. If any items tabulated in the "Pounds" columns are omitted in the loading of the airplane, deduct the weight of these missing items from the "Gross Weight" and the answer will be the correct gross weight as the airplane is actually loaded.

A wise pilot, before he starts
Carefully studies his maps and charts
Won't end his flight far from his mark
As a tasty dish for a hungry shark!

b. FLIGHT OPERATION INSTRUCTION CHARTS on page 27 for P-39K-1 and page 28 for P-39L-1 are provided for flight planning purposes. The following outline may be used as a guide to assist personnel in their use in FLIGHT PLANNING.

NOTE

If the flight plan calls for a continuous flight where the desired cruising power and air speed are reasonably constant after take-off and climb to 5000 ft., the FUEL REQUIRED and FLIGHT TIME may be computed as a "single section flight."

(1) Within the limits of the airplane, the fuel required and flying time for a given mission depend largely upon the speed desired. With all other factors remaining equal in an airplane, speed is obtained at a sacrifice of range, and range is obtained at a sacrifice of speed. The speed is usually determined after considering the urgency of the flight plotted against the range required. The time of take-off is adjusted so as to have the flight arrive at its destination at the predetermined time.

(2) Select the FLIGHT OPERATION INSTRUCTION CHART for the model airplane and gross weight to be used at take-off. Locate the largest figure entered under g.p.h. (gallons per hour) in column I on the lower half of the chart. Multiply this figure by the number and/or fraction of hours desired for reserve fuel. Add the resulting figure to the number of gallons set forth in the chart footnote No. 2, and subtract the total from the amount of fuel in the airplane prior to starting of engine. The figure obtained as a result of this computation will represent the amount of gasoline available and applicable for flight planning purposes on the RANGE IN AIR MILES section of the FLIGHT OPERATION INSTRUCTION CHART.

(3) Select a figure in the fuel column equal to, or the next entry less than, the available amount of fuel in the airplane as determined in paragraph 1. *b.* (2) above. Move horizontally to the right or left and select a figure equal to, or the next entry greater than, the air miles (with no wind) to be flown. Operating values contained in the column number in which this figure appears, represent the highest cruising speed possible *at the range desired;* however, the airplane may be operated in accordance with values contained under OPERATING DATA in *any* column of a *higher* number with the flight plan being completed at a sacrifice of speed but at an increase in fuel economy.

(4) Using the same column number selected by application of instructions contained in paragraph 1. *b.* (3), determine the indicated air speed and gallons

per hour listed at sea level in the lower section of the chart under the sub-title OPERATING DATA. Divide this "IAS" into the air miles to be flown and obtain the calculated flight duration in minutes, which can then be converted into hours and minutes and deducted from the desired arrival time at destination in order to obtain the take-off time (without consideration for wind). To allow for wind, use the above "IAS" as ground speed and calculate a new corrected ground speed with the aid of a flight calculator or by a navigator's triangle of velocities.

(5) The airplane and engine operating values listed below OPERATING DATA in any single numbered column are calculated to give constant miles per gallon at any altitude listed. Therefore, the airplane may be operated at any altitude and at the corresponding set of values given so long as they are in the same column listing the range desired.

CAUTION

RANGES listed in column 1 under "Max. Cont. Power" are correct only at the altitude given in the chart footnote 1, and the engine and airplane operating data listed under OPERATING DATA will give constant miles per gallon if operation is consistent with values set opposite the listed altitudes.

(6) The flight plan may be readily changed at any time en route, and the chart will show the balance of range at various cruising powers by following the "INSTRUCTIONS FOR USING CHART" printed on each chart.

a. If the original flight plan calls for a mission requiring changes in power, speed, gross load or external load, in accordance with "GR. WT." or "EXTERNAL ITEMS" increments shown in the series of "Flight OPERATION INSTRUCTION CHARTS" provided, the total flight should be broken down into a series of individual short flights, each computed as outlined in paragraph 1. *b.* in its entirety, and then added together to make up the total flight and its requirements.

b. Obtain flight clearance.

(1) In the event of war operations, secure radio frequency assignment for the flight.

(2) If radio model SCR274 is installed in the airplane, be sure correct transmitter is installed and tuned for proper frequency.

(3) If radio model SCR522 is installed in the airplane, be sure correct crystals are installed for proper frequency.

(4) Be sure that the oxygen tank shut-off valve or valves (depending on whether one or two tanks are installed) have been opened.

(5) ENTRANCE TO THE COCKPIT is made through the right hand door. The door is opened by pushing in the upper end of the flush handle causing it to hinge out, upon which it can be pulled upward, opening the door.

2. *ON ENTERING THE COCKPIT.*

a. Special check for night flying.

(1) Turn battery switch (Fig. 7—23) "ON."

(2) Turn cockpit lights (Fig. 7—58) "ON." The three cockpit lights are all controlled by the one switch.

(3) Turn left fluorescent light (Fig. 7—58) "ON."

(4) Turn right fluorescent light (Fig. 7—58) "ON."

(5) Test-operate gun sight rheostat (Fig. 7—4).

(6) Test-operate the landing light by first operating landing light motor switch (Fig. 6—7). When light is extended turn on the light switch (Fig. 6—8) for not over 3 (three) to 5 (five) seconds. Test the complete operation of the motor switch (Fig. 6—7) by retracting the light.

(7) Test-operate "RED" recognition light switch.

(8) Test - operate "GREEN" recognition light switch.

(9) Test - operate "AMBER" recognition light switch.

b. Check for all flights.

(1) Ignition switch (Fig. 7—30) "OFF."

(2) Fuselage guns switch (Fig. 7—21) "OFF."

(3) Wing guns switch (Fig. 7—21) "OFF."

(4) Cannon switch (Fig. 7—21) "OFF."

(5) Landing gear control switch (Fig. 6—2) "OFF."

(6) Check that position of landing gear clutch handle (Fig. 10—8) is in position for electric operation of the landing gear.

(7) Flap Control Switch (Fig. 6—2) "OFF."

(8) Generator Switch (Fig. 7—31) "ON."

(9) Parking Brake "ON." To set parking brakes depress brake pedals (Fig. 7—46), and pull out on parking brake handle (Fig. 7—19).

(10) Adjust rudder pedals for correct leg length by pushing outboard on the spring loaded lever (Fig. 7—48) on the outer side of each rudder pedal, adjusting them to length and then release the lever, locking them in place. BE SURE BOTH PEDALS ARE ADJUSTED EQUALLY. Check for full right and left movements of the rudder.

(11) Check for free movement of control surfaces.

(12) Check oxygen control valve and supply.

3. *STARTING ENGINE.*

a. WITH AIRPLANE IGNITION SWITCH "OFF" turn propeller over (2) two or (3) three complete revolutions by hand.

b. Turn Battery Switch (Fig. 7—23) "ON."

c. Turn Ignition Switch (Fig. 7—30) on to "BOTH." The fuel quantity gauge, the carburetor air, the free air, and the coolant give readings upon operation of the Ignition Switch. (The coolant will not register if its temp. is below 50° C).

d. Turn Fuel Selector Valve (Fig. 9—9) to "RES. TANK."

e. Turn Propeller Safety Switch (Fig. 6—9) to "ON."

NOTE

Selection of the reserve tank is recommended as it provides sufficient fuel for both "WARM UP" and "TAKE-OFF."

f. Set the Mixture Control Handle (Fig. 6—10) to the "IDLE CUT-OFF" range.

g. Set the Propeller Governor Control Handle (Fig. 6—11) to the full "FORWARD" position and turn Propeller Switch (Fig. 7—29) to "automatic."

h. Crack the Throttle (Fig. 7—62) open approximately 1" (one) inch.

i. Turn Electric Booster Fuel Pump Switch "ON." And prime engine. Priming completed TURN ELECTRIC BOOSTER FUEL PUMP SWITCH "OFF."

j. Give the primer (Fig. 7—43) (2) two or (3) three full strokes when engine is cold and ½ or (1) one full stroke when engine is warm.

k. Energize the starter by pressing the starter pedal (Fig. 7—45) downward with the heel and hold until the inertia flywheel sounds as though it has reached maximum r.p.m. Then engage the starter by tipping the starter pedal forward with the toe. Hold pedal until the engine fires regularly, then release. WHEN THE ENGINE STARTS, PUSH MIXTURE CONTROL HANDLE (Fig. 6—10) FORWARD TO "AUTOMATIC RICH," AND TURN ELECTRIC BOOSTER FUEL PUMP SWITCH "ON."

NOTE

THE ELECTRIC BOOSTER FUEL PUMP MUST REMAIN "ON" UNTIL THE TAKE-OFF IS ACCOMPLISHED.

NOTE

The fuel warning light (Fig. 7—51) automatically goes out when the engine runs smoothly. However at altitudes over 10,000 ft., the fuel warning light will again go on showing that the fuel pressure has dropped. The Electric Booster Fuel Pump should be turned "ON" again to maintain the necessary fuel pressure.

4. *ENGINE WARM UP.*

a. The engine should be warmed up at a speed that is free from vibration, under 1400 r.p.m. During engine

"warm up" test-operate the flaps by placing the flap switch (Fig. 7—24) in the "DOWN" position until the indicator (Fig. 6—3) shows fully down. Then place the flap switch in the "UP" position until the indicator shows fully up.

b. Operation is assured for flight when the OIL TEMPERATURE GAGE (Fig. 7—11) shows a temperature of not less than 30° C and the PRESTONE TEMPERATURE GAGE shows a temperature of not less than 85°C. The oil pressure gage (Fig. 7—11) may fluctuate during warm up, but this should subside when the oil temperature increases, eventually becoming practically steady.

5. *ENGINE AND ACCESSORIES GROUND CHECK.*

a. Magnetos should be tested at approximately 2300 r.p.m. when the engine is warm.

CAUTION

In checking individual magneto, do not test above 2300 r.p.m. nor below 1500 r.p.m.

Note the loss of revolutions or manifold pressure when switched to one magneto at a time. Whenever an engine is operated on only one magneto, the manifold pressure must not exceed maximum cruising manifold pressure to avoid detonation when firing on only one set of spark plugs. It is important to switch back to "BOTH" and leave switch in that position until the engine has picked up the loss in r.p.m. resulting from operating on one magneto before testing for r.p.m. on the other magneto. The normal loss when operating on one magneto should not exceed 80 r.p.m. The difference in timing of the two magnetos results in loss of r.p.m. or manifold pressure when operating on either magneto alone. This check should be made in as short a time as possible and should not exceed 15 seconds.

CAUTION

On engines incorporating automatic boost control, it is necessary to observe the tachometer reading immediately after switching to single magneto operating before the automatic boost control has had time to compensate for the r.p.m. drop.

Release Parking Brakes Before Take-Off

b. Propeller.—The P-39K-1 airplane is equipped with an Aero products hydraulically operated propeller. To assure efficient operation of the propeller move the propeller pitch control handle located at the side of the engine control quadrant (Fig. 6—11) back and forth from 1400 r.p.m. to 2300 r.p.m. several times to free the oil in the hydraulic unit then push forward to "Take-Off."

The P-39L-1 airplane is equipped with a Curtiss electrically controlled propeller, the automatic operation should be checked by first setting the throttle lever (Fig. 7—62) to 2300 r.p.m. with the pitch control handle (Fig. 6—11) in full low pitch position. The propeller pitch control handle should then be pulled back until approximately 200 r.p.m. decrease is observed, then return to original setting, again repeat, and then place the control pitch handle in automatic position for "Take-Off."

6. *TAXIING INSTRUCTIONS.*

a. Release the parking brakes by depressing both brake pedals.

b. From a standing start it is not possible to start a sharp turn in one direction if the plane has been stopped with the nosewheel pointed in the opposite direction. Get the airplane moving and then apply brakes in direction of the desired turn.

c. Clear the engine by a "burst" of throttle and taxi down the runway for take-off position. When the throttle is applied quickly there is a tendency for the airplane to swing to the left. This is due to engine and propeller torque and may be easily corrected by application of "full right rudder" or a combination of "right rudder" and "right brake."

7. *TAKE-OFF.*

a. Both cabin doors must be tightly closed and the auxiliary latch (Fig. 7—59) above each door securely fastened. This latch prevents the door from opening at high speeds. In case of an emergency rest assured that the cabin doors can be immediately released as the emergency release handle (Fig. 7—50) breaks all door fastenings.

b. It is recommended that the trim tabs be set for the take-off as follows:

Rudder trim tab—4 graduations "Right Rudder."

Elevator trim tab—3 or 4 graduations "Nose Up."

Aileron trim tabs—"Zero" setting.

NOTE

PROLONGED IDLING OR TAXIING WILL RESULT IN FOULED PLUGS; THIS CAN BE REMEDIED BY A BURST OF THROTTLE TO APPROXIMATELY 2200 R.P.M.

c. The coolant shutter control (Fig. 10—4) and the oil shutter control (Fig. 10—5) must be adjusted prior to "Take-Off" to suit prevailing climatic conditions. Further adjustment must also be made in flight to maintain the necessary operating temperatures.

d. It is recommended that a mechanical take-off be made. Because of the tricycle landing gear, it is a good practice to ease the ship from the ground when an indicated airspeed of 100 m.p.h. is attained.

e. After reasonable altitude has been gained, turn the Landing Gear Switch (Fig. 6—2) to "UP," raising the landing gear.

f. Turn the Flap Switch (Fig. 7—24) to "Up." (Assuming the flaps have been used in take-off.)

g. Place the Landing Gear and Flap Switches to the "OFF" position.

h. Now throttle down to a manifold pressure of approximately 37.5 inches h.g., reducing the engine speed to about 2600 r.p.m.

8. *IF THE ENGINE FAILS DURING TAKE-OFF, LAND PLANE ON BELLY.*

WARNING

Drop belly tank first.

Should the engine fail during take-off, put the nose of the airplane down and maintain flying speed. Raise the landing gear if level ground is not ahead and fully lower the flaps. Then turn the "Ignition" switch off and land straight ahead.

WARNING

If a belly tank is installed, drop it before a forced landing.

9. *CLIMB.*—The best climbing speeds of these airplanes are as follows:

a. Altitudes up to 5000 ft.....162 ias.

b. Altitudes 5000 ft. to 10,000 ft.....160 ias.

c. Altitudes above 10,000 ft.....158 ias.

with a drop of 1 m.p.h. for every 1000 ft. additional altitude.

10. *FLIGHT OPERATION.*

a. To increase engine power during flight, set the Mixture Control Handle (Fig. 6—10) in the "Auto Rich" position, adjust the propeller control handle (Fig. 6—11) to the desired r.p.m. and then readjust the mixture controls if necessary.

b. To decrease engine power during flight, adjust the Throttle (Fig. 7—62) to the desired manifold pressure, adjust the Propeller Control Handle (Fig. 6—11) to obtain the desired r.p.m., and then readjust the mixture control as necessary.

11. *GENERAL FLYING CHARACTERISTICS.*

a. Fuel selection was noted "Reserve Tank" for "Take-off."

(1) After about twenty (20) minutes shift to Belly Tank (aux.) and run it dry.

(2) Run "Right Tank" dry.

(3) Run "Left Tank" dry.

(4) Switch to "Reserve."

NOTE

"Left Tank" will partially refill in flight due to vent return lines.

WARNING

Never turn selector valve to "Aux.," (Belly tank) when it is not installed.

b. In cruising flight, the following gages and their respective readings give the most satisfactory indication of the engine's performance:

R.P.M.....1600 to 2400
Oil inlet temp.....60°C to 80°C
Oil pressure (lbs./sq. in.).....60 to 70
Prestone outlet temp.....100°C to 120°C
Reduction gear box oil pressure (lbs./sq. inch)....60-120

CAUTION

In the event any of the above mentioned operation gages appear very irregular, it is recommended that the engine be throttled down. Then, if the cause of the irregularity is not apparent, land the airplane and have the trouble investigated and corrected.

12. *ENGINE FAILURE DURING FLIGHT.*

Should the engine fail during flight follow the same procedure as recommended for emergency landing because of engine failure during "Take-off."

13. *STALLS.*

This airplane has good stalling characteristics (about 105 m.p.h. flaps "UP" or 90 m.p.h. with flaps "DOWN"). The airplane will mush considerably at stalling speeds. The stall occurs first at the center section of each wing panel and progresses outboard. To recover, allow the speed to build up sufficiently or approximately between 130 and 140 m.p.h. so as to completely unstall the center section.

14. *SPINS.*

a. Deliberate spinning is not recommended. However, if a spin occurs, rapid recovery can be made as follows:

(1) First apply full opposite rudder.

(2) Wait until rudder effect is noticeable *then* apply full forward stick.

(3) Aileron as follows and simultaneously with forward stick:

(a) No ammunition in wings—aileron with spin will help.

(b) 300 to 1000 rounds in each wing gun box—aileron against (left stick in right spin) is extremely important.

(4) The spin is usually oscillatory in rate and it is mandatory that the opposite rudder be applied when the spin is at its slowest.

(5) If the procedure above is followed, the airplane will recover in one-half turn. If the procedure is not followed closely, the airplane may not recover.

15. *ACROBATICS.*

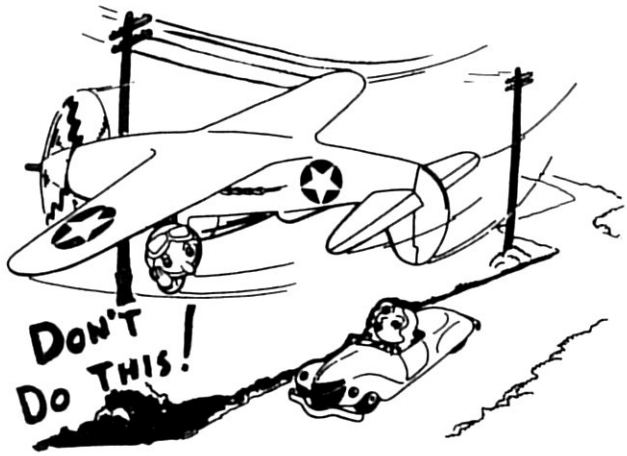
a. Normal loops, slow rolls and Immelmans are all done with ease.

b. The following acrobatics are not recommended:

(1) Snap rolls.

(2) Outside loops.

(3) Spinnning.



16. *DIVING.*

It is necessary to trim nose heavy when diving this airplane, otherwise the airplane will make a severe pull out as speed is attained. The maximum permissible diving speed is 523 miles per hour. 475 m.p.h. is the maximum recommended indicated air speed.

NOTE

To decrease the possibility of the engine malfunctioning and missing considerably, upon opening the throttle after pull out from POWER-OFF DIVES, the following precaution will be rigidly observed:

"DO NOT CLOSE THE THROTTLE TO ALLOW A MANIFOLD PRESSURE OF LESS THAN 20 INCHES HG DURING DIVE."

WARNING

Pull outs from dives at maximum permissible indicated air speed are to be started at 9,750 feet minimum altitude.

17. *EMERGENCY EXIT.*

Trim airplane nose heavy and switch off. Pull emergency release handle and push out on doors.

NOTE

Door will release when handle is approximately 90° to side of airplane. Slightly bank airplane and slide off wing.

17a. *IN CASE OF FIRE.*

CAUTION

In case fumes begin entering the cockpit, the cockpit heater should immediately be switched to cold air. This is to prevent prestone fumes entering cockpit through the hot air duct in case of a bursted radiator or prestone line.

18. *APPROACH FOR LANDING.*

a. Turn the fuel selector (Fig. 9—9) to "Reserve tank" and turn on electric fuel booster pump.

CAUTION

Never use left tank for "Take-off" or "Landing."

b. Next, lower the landing gear at a speed not over 200 m.p.h. The "pop-up" indicators, one over each mainwheel and one over the nosewheel in the right gun cowl, will show when the landing gear is fully extended for landing. Also the "Position Indicator Panel" (Fig. 6—3) in the cockpit will double check the position of the landing gear. The warning horn (Fig. 10—9) will not sound when the throttle is cut if the landing gear is extended.

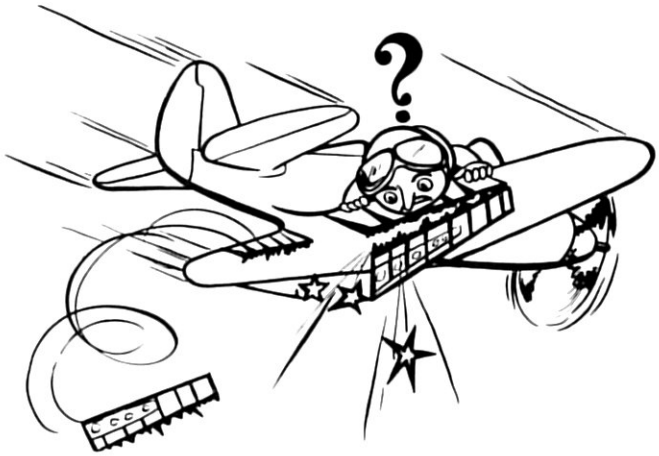
c. Lower the flaps if desired or if necessary due to short fields.

d. Return "landing gear switch" to "OFF."

e. Return "Flap Switch" to "OFF."

CAUTION

In the event the landing gear does not extend, crank it down manually by means of the emergency handcrank.



Never lower flaps at speeds exceeding 145 m.p.h.

f. Emergency operation of Landing Gear.

(1) Place landing gear switch in "OFF" position.

(2) Turn the landing gear clutch handle backward; slow the airplane down to 130 m.p.h. or slightly less and by means of the ratchet emergency handcrank, operate the landing gear down. If unsuccessful, reverse the ratchet and operate the landing gear up. Then again reverse the ratchet and repeat.

(3) A normal approach is a glide. With flaps full down and no power applied, the glide path and glide attitude of the airplane are extremely steep and it is necessary to maintain a gliding speed of about 130 m.p.h. in order to have sufficient control to level out before contacting the ground. If a power on approach is made with the airplane in about the landing attitude, a gliding speed of 110 m.p.h. will be comfortable.

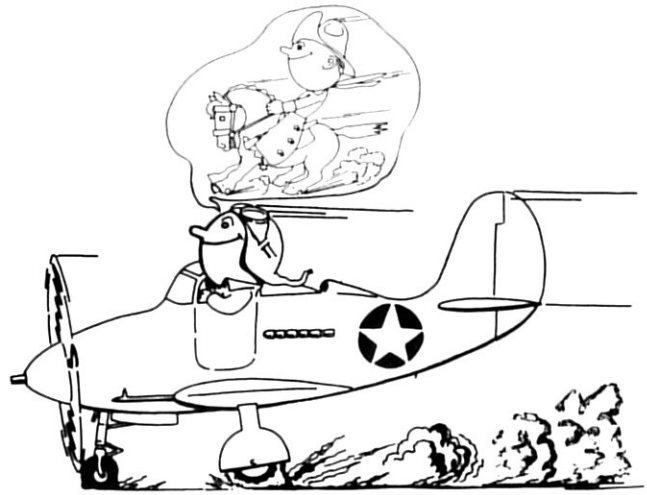
g. Then Land.

(1) Forget that the ship has a tricycle type landing gear and make a normal type landing. This type landing should be one where the nose of the airplane is well up and the main wheels touch the ground before the nosewheel (In other words a landing attitude equivalent to that with a conventional gear). This type landing will result in a landing speed between 95 and 100 m.p.h. Once the main wheels touch the ground, the plane will without any help from the pilot nose "Down" until the nosewheel is on the ground. There will be no tendency whatsoever for the airplane to ground loop or bounce.

(2) During the landing run, do not lock the brakes or apply them continuously. It is recommended that they be applied, then released numerous times, thus preventing severe wear on the tires and overheating of the brakes. Stopping will be accomplished equally as well if done in this manner, as it would by applying and holding on full brake.

NOTE

This point is stressed as application and holding on full brake will lock the wheels and cause skidding, which will, in all probability, ruin the tires on the main wheels.



(3) It should also be emphasized that due to the favorable landing characteristics of the Airacobra, it is not necessary to land this ship at speeds above 95 to 100 m.p.h. In fact, the landing run increases greatly in relation to the landing speed, i.e., a pilot landing at 135 m.p.h. requires two times the landing run necessary for a landing accomplished at 90 m.p.h.

(4) While taxiing back to the hangar, the flaps should be retracted, the oil and coolant shutters should be "Open."

19. *STOPPING ENGINE.*

The carburetor is equipped with an "Idle Cut-Off" (cut-off at about 1000 r.p.m.) which stops the engine.

a. Care must be taken after stopping the engine, to turn the ignition switch "Off," to prevent any serious accident which would result from possible "Kick-Over" of the propeller with the ignition turned "On."

Stay Clear of Propellers

20. *BEFORE LEAVING COCKPIT.*

a. Turn fuel selector valve "Off."

b. Place all cockpit light switches, pitot heater switch, fuselage light switches, etc., in "Off" position.

c. Place battery switch in "Off" position.

d. Unlock auxiliary door latches prior to opening cabin doors.

e. If oxygen has been used during flight, close valve to prevent leakage.

21. *OIL DILUTION.*

Oil dilution is recommended when outside temperature is below 0° Centigrade (32°) F. The dilution of the oil is accomplished prior to stopping the engine by operating the "Oil Dilution" valve switch (Fig. 7—63) to "ON" for approximately four (4) minutes with the engine running at approximately 800 r.p.m. The four (4) minute operation of the oil dilution valve switch is recommended as this period has given most satisfactory dilution when oil and coolant temperatures have not been too high at the time of dilution. When coolant temperatures are too high (over 100°C. for coolant and 70°C. for oil), it will be necessary to shut the engine off and allow to cool; then again start the engine and proceed as described above.

NOTE

One (1) quart of gasoline enters the oil system per each minute of operation of the switch at approximately 800 r.p.m. This will vary at different r.p.m.'s, but there is very little danger of over dilution.

SECTION III
FLIGHT OPERATION DATA

1. *WEIGHT AND BALANCE COMPUTATIONS.*

a. The Weight and Balance Charts contained in this Section are described, and their use explained, in Section 2.

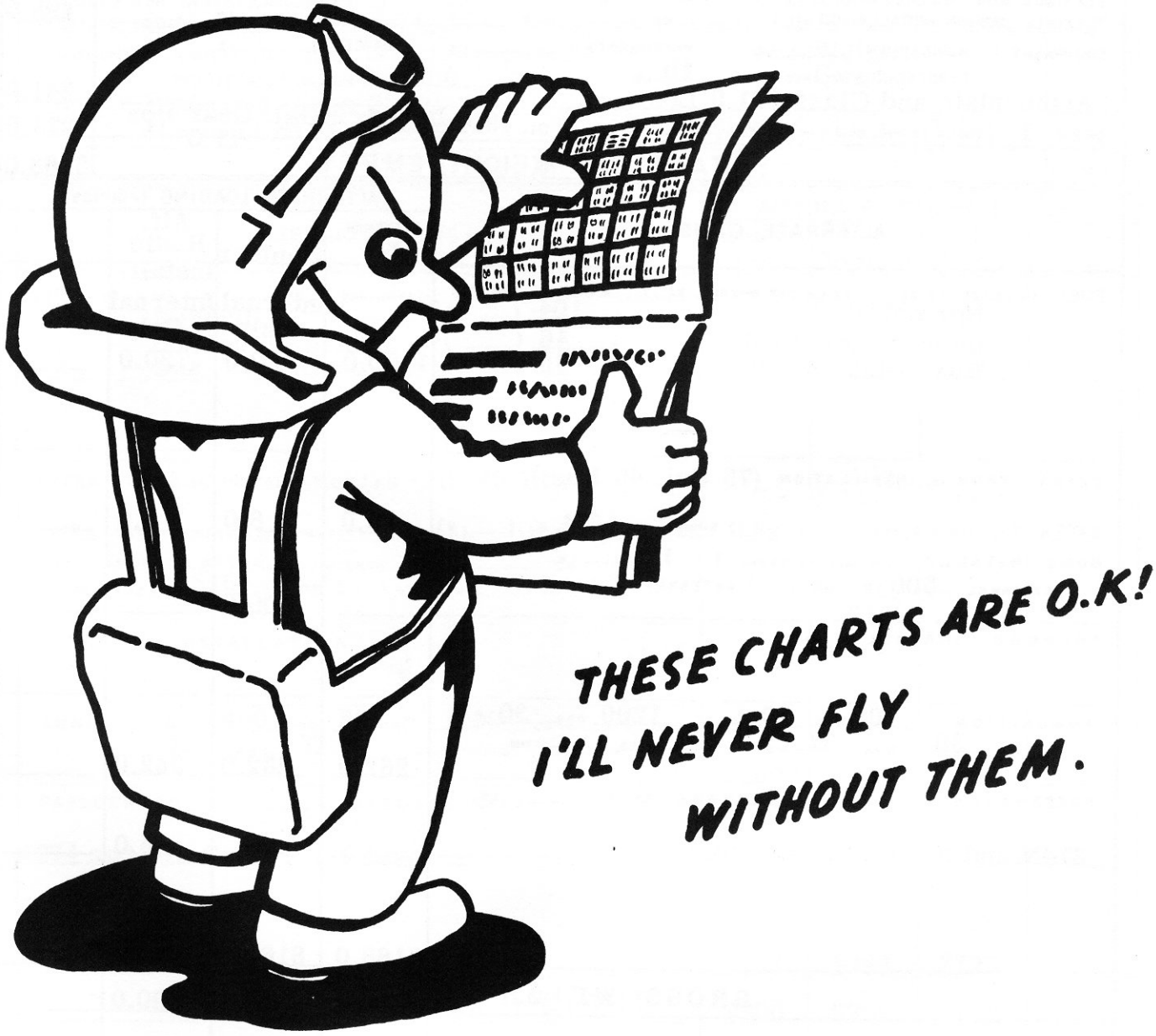
2. *FLIGHT OPERATION INSTRUCTION CHART.*

a. The Flight Operation Instruction Charts also contained in this Section are described, and their use explained, in Section 2.

3. *SPECIFIC ENGINE FLIGHT CHARTS AND TAKE-OFF, CLIMB AND LANDING CHARTS.*

a. The easily understood Specific Engine Flight Charts give the minimum, maximum, and desired operable conditions of the engine.

b. The self explanatory Take-Off, Climb and Landing Chart contained in this Section gives the recommended operation of the engine under varied conditions.



WEIGHT & BALANCE CHART

AIRPLANE MODELS

P-39K-1-BE

BASIC LOAD ITEMS	POUNDS
WEIGHT EMPTY, (INCLUDING) Prestone, 522 and 535 Radios, Oxygen, Deicing Fluid	5658.0
FIXED GUN INSTALLATION (S): (2) 50 CAL. 152 LB. (4) 30 CAL. 99 LB. GUN SIGHT 4.0 LB.	
FIXED CANNON INSTALLATION (S): (1) 37 MM 238 LB. ( ) MM LB.	
FLEXIBLE GUN INSTALLATION (S): ( ) CAL. LB. ( ) CAL. LB.	493.0
FLEXIBLE CANNON INSTALLATION (S): ( ) MM LB. ( ) MM LB.	
EQUIPMENT:- NAVIGATION LB. PHOTOGRAPHIC LB. OXYGEN LB.	
PYROTECNICS (FLARES ETC.) 10 LB.	
Armorplate and Glass 231.0 Lbs.	241.0
CREW 1 (200LB. EA. INCLUDING PARACHUTES) 200 LB. OIL (9.4 U.S. GAL. MP GAL.) 71.0 LB. Includ. 2 Gal. Gear Box	271.0
TACTICAL WEIGHT EMPTY	6663.0

ALTERNATE ITEMS	ALTERNATE LOADING (POUNDS) MAXIMUM FUEL	Bomber	Alt. Radio Install.	
FUEL (6 LB. PER U.S. GAL. - 7.2 LB. PER IMPERIAL GAL.) U.S. GAL. (IMP GAL.)				
Normal 104 ( )		Internal Only	Internal Only	
Internal Overload 16 ( )				
Aux. Tank Overload 75 ( )	1170.0	720.0	720.0	
( )				
( )				
( )				
EXTRA TANK (S) INSTALLATION (75 Gal. 45 Lbs.)				
EXTRA OIL (AS REQUIRED - MAXIMUM IS SHOWN) 6.4 G. (G.)	93.0	8.0	8.0	
BOMB INSTALLATION (S): INTERNAL ( ) LB.				
( ) EXTERNAL 500 LB. OR ( ) EXTERNAL LB.		500.0		
TORPEDO INSTALLATION				
AMMUNITION: 400 RDS. 50 CAL. 1200 RDS. 30 CAL. 30 RDS. 37 MM RDS. MM	262.0	262.0	262.0	
PASSENGERS BAGGAGE (MAX.) LB.				
274N and 515 Radio (-5 Lbs.)			-5.0	
	8188.0	8169.0	7648.0	
GROSS WEIGHT	8200.0	8200.0	7600.0	

WEIGHT & BALANCE CHART

AIRPLANE MODELS

P-39L-1-BE

BASIC LOAD ITEMS	POUNDS
WEIGHT EMPTY, (INCLUDING : Prestone 522 and 535 radio Oxygen Windshield Deicing Fluid)	5733
FIXED GUN INSTALLATION (S): (2) 50 CAL 152.0 LB. (4) 30 CAL 99.0 LB. GUN SIGHT 4.0 LB.	
FIXED CANNON INSTALLATION (S): (1) 37 MM 238.0 LB. ( ) MM LB.	
FLEXIBLE GUN INSTALLATION (S): ( ) CAL LB. ( ) CAL. LB.	
FLEXIBLE CANNON INSTALLATION (S): ( ) MM LB. ( ) MM LB.	493
EQUIPMENT :- NAVIGATION LB. PHOTOGRAPHIC LB. OXYGEN Weight LB Empty	
PYROTECNICS (FLARES ETC) 10.0 LB.	
Armor Plate and Glass 231.0	241
CREW 1 (200LB EA INCLUDING PARACHUTES) 200 LB. OIL (9.4 U.S. GAL. IMP. GAL.) 71.0 LB. Includ. 2 Gal. Gear Box	271
TACTICAL WEIGHT EMPTY	6738

ALTERNATE ITEMS	ALTERNATE LOADING (POUNDS) MAXIMUM FUEL	Bomber	Alt. Radio Install.	
FUEL (6 LB PER U.S. GAL. - 72 LB PER IMPERIAL GAL.) U.S. GAL. (IMP GAL.)				
Normal 104 ( )		Internal Only	Internal Only	
Internal Overload 16 ( )				
Aux. Tank Overload 75 ( )	1170	720	720	
( )				
( )				
( )				
EXTRA TANK (S) INSTALLATION (75 Gal. 45 Lbs.)		Add 1.1 Gals	Add 1.1 Gals.	
EXTRA OIL (AS REQUIRED - MAXIMUM IS SHOWN) 6.4 G (G)	93	8.0	8.0	
BOMB INSTALLATION (S): INTERNAL ( ) LB.				
(1) EXTERNAL 516 LB. OR ( ) EXTERNAL LB.		516		
TORPEDO INSTALLATION				
AMMUNITION : 400 RDS 50 CAL 1200 RDS. 30 CAL 30 RDS. 37 MM RDS. MM	262	262	262	
PASSENGERS BAGGAGE (MAX) LB.				
274 and 515 Radios (-5 Lbs.)			-5	
	8263	8244	7723	
GROSS WEIGHT	8300	8200	7700	

5-1-5 24-2

AIRPLANE MODELS
P-39K-1-BE
P-39L-1-BE

SPECIFIC ENGINE FLIGHT CHART

ENGINE MODELS
V-1710-63

CONDITION	FUEL PRESSURE LB./SQ. IN.	OIL PRESSURE LB./SQ. IN.	OIL TEMP. °C	COOLANT TEMP. °C		
DESIRED	17 ± 1	60-70	60-80	105-115		
MAXIMUM	18	85	95	125		
MINIMUM	12	55		55		
IDLING	9	15				

MAX. PERMISSIBLE DIVING R.P.M. 3120

CONDITION	ALLOWABLE OIL CONSUMPTION
"MAX CONTINUOUS"	IMP. PT./HR. 13.3 U.S. QT./HR.
"ECONOMICAL MAX."	IMP. PT./HR. 10 U.S. QT./HR.
"MIN. SPECIFIC"	IMP. PT./HR. 5-7 U.S. QT./HR.

OIL GRADE: (S) 1120 (W) 1100

SUPERCHARGER TYPE: SINGLE SPEED - SINGLE STAGE - GEAR DRIVEN

FUEL OCTANE 100*

OPERATING CONDITION	R.P.M.	MANIF. PRESS. (BOOST.)	HORSE POWER	CRITICAL ALTITUDE (FEET)	BLOWER	USE LOW BLOWER BELOW	MIXTURE CONTROL POSITION	FUEL FLOW (GAL./HR./ENG.) U.S.	FUEL FLOW IMP.	MAXIMUM CYL. TEMP. °C	MAXIMUM CYL. TEMP. °F	MAXIMUM DURATION (MINUTES)	REMARKS
TAKE-OFF	3000	51.0	1325	S.LEVEL	SINGLE SPEED	FT. ALT.	AUTO RICH	155		SEE COOLANT TEMPERATURE		5	TAKE-OFF POWER FOR 5 MINUTES
EMERGENCY MAXIMUM	3000	42	1150	12000		FT. ALT.	AUTO RICH	132				15	15 MINUTE OPERATION ONLY
MAXIMUM CONTINUOUS	2600	37.2	1000	10800		FT. ALT.	AUTO RICH	103					
ECONOMICAL MAXIMUM	2300	31	760	12250		FT. ALT.	AUTO LEAN	58					
MINIMUM SPECIFIC CONSUMPTION	1950 1950 1950 1950 1950	22.5 22.5 22.5 22.5 F.T.	375 420 460 490 450	S.LEVEL 5000 10000 15000 20000		FT. ALT.	AUTO LEAN	28 32 35 37 34					
MINIMUM CRUISING	1800	25	370	S.LEVEL		FT. ALT.	AUTO LEAN	29					

CONDITIONS TO AVOID

* FUEL GRADE-AN-VV-F-781
AMEND. 5

NOTE: CRITICAL ALTITUDE IS THAT AT WHICH MAXIMUM POWER IS OBTAINED WITH FULL THROTTLE UNDER CONDITIONS SHOWN.

AIRPLANE MODELS: P-39K-1 P-39L-1

5-1-42

TAKE-OFF, CLIMB & LANDING CHART

ENGINE MODELS: V-1710-63

TAKE-OFF DISTANCE (IN FEET)

GROSS WEIGHT (IN LBS)	HEAD WIND (MPH)	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.	
		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.
8400	0	2000	3050	2500	3750	3100	4750	2050	3100	2550	3850	3200	4850	2200	3250	2750	4050	3500	5100
	20	1400	2300	1800	2850	2300	3650	1450	2300	1850	2900	2350	3750	1550	2400	1950	3050	2550	3900
	40	900	1600	1200	2050	1550	2700	950	1650	1200	2100	1600	2750	1000	1700	1300	2150	1750	2850
7800	0	1600	2450	2000	3000	2450	3750	1650	2500	2050	3050	2550	3800	1750	2600	2200	3200	2750	4000
	20	1100	1800	1400	2250	1800	2850	1150	1800	1450	2300	1850	2900	1200	1900	1550	2400	1950	3050
	40	700	1250	900	1600	1150	2000	700	1250	950	1600	1200	2050	750	1300	1000	1650	1300	2150
7400	0	1400	2150	1750	2600	2150	3250	1450	2200	1750	2650	2200	3300	1550	2300	1900	2800	2350	3450
	20	950	1550	1200	1950	1550	2450	1000	1750	1250	1950	1600	2500	1050	1800	1350	2050	1700	2600
	40	600	1050	750	1350	1000	1750	600	1350	800	1350	1050	1750	650	1400	850	1400	1100	1850

NOTE: INCREASE DISTANCE 10% FOR EACH 10°C (20°F) ABOVE 0°C (32°F)

ENGINE LIMITS FOR TAKE-OFF 3000 RPM & 51 IN. HG

* CLIMB DATA

COMBAT MISSIONS USE 3000 RPM & 42 IN. HG

FERRY MISSIONS USE 2300 RPM & 31 IN. HG

GROSS WEIGHT (IN LBS)	TYPE OF CLIMB	S.L. TO 3000 FT. ALT.			5000 FT. ALT.				10000 FT. ALT.				15000 FT. ALT.				25000 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.	
8400	COMBAT	164	2200	1.4	164	2150	2.3	25	168	2100	4.6	30	168	1700	7.2	34	156	500	17.1	41	SINGLE SPEED
	FERRY	162	1000	2.9	165	1000	4.9	25	165	900	10.2	32	170	600	16.8	38	—	—	—	—	
7800	COMBAT	164	2500	1.2	164	2450	2.0	24	172	2400	4.1	29	168	1950	6.3	32	144	700	14.5	38	
	FERRY	160	1200	2.5	160	1200	4.2	24	160	1050	8.7	30	160	800	14.1	35	144	0	39.0	47	
7400	COMBAT	164	2700	1.1	164	2600	1.9	24	168	2700	3.8	28	168	2100	5.9	31	148	850	13.0	36	
	FERRY	160	1350	2.2	160	1300	3.8	24	160	1200	7.7	29	160	900	12.4	34	146	150	31.6	42	

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

* COMBAT MISSIONS USE TAKE-OFF POWER FOR 5 MINUTES AND EMERGENCY MAXIMUM FOR 15 MINUTES.

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.	
		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
7400	87	1900	1100	2000	1200	2200	1350	2000	1200	2150	1350	2300	1450	3400	2600	3650	2850	3950	3100
6700	93	1750	1000	1900	1100	2000	1200	1850	1100	2000	1200	2150	1350	3100	2350	3350	2600	3650	2800

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

REMARKS

LEGEND

I.A.S. — INDICATED AIR SPEED

NOTE: ALL DISTANCES ARE AVERAGE, AND SUBJECT TO CONSIDERABLE VARIATIONS BECAUSE OF DIFFERENCES IN PILOT TECHNIQUE, LOAD, C.G., ETC.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED.

Take-Off, Climb and Landing Chart—P-39K-1 and P-39L-1

MODEL(S)
① P-39K-1
② P-39L-1

FLIGHT OPERATION INSTRUCTION CHART

WEIGHT 7800 TO 7400 POUNDS

SHEET OF SHEETS
EXTERNAL LOAD ITEMS
NONE

5-1-42

INSTRUCTIONS: (THIS CHART APPLIES ONLY TO THE ABOVE MODELS WHILE WITHIN THE ABOVE WEIGHT LIMITS WITH ABOVE ITEMS)

1. OPPOSITE FUEL TO BE USED LOCATE AIR MILES (RANGE) DESIRED (AVOID CRUISING WITH "MAXIMUM CONTINUOUS POWER" EXCEPT IN EMERGENCY)
2. VERTICALLY BELOW AND OPPOSITE DESIRED CRUISING ALTITUDE READ OPTIMUM CRUISING R.P.M. AND INDICATED AIRSPEED (I. A. S.)
3. MIXTURE CONTROL (AND BLOWER CONTROL IF ANY) ARE INDICATED IN LOWER HALF OF CHART (FOR DETAILED INSTRUCTIONS SEE SECT. II PAR. 11)
4. MANIFOLD PRESSURE (M.P.)–GALLONS PER HOUR (G.P.H.)–TRUE AIRSPEED (T. A. S.) ARE APPROX. MAXIMUM VALUES FOR REFERENCE
5. USE CARE IN INITIAL ADJUSTMENT OF ENGINE CONTROLS THEN AVOID MANIPULATION — HOURLY RE-ESTABLISHMENT OF I.A.S. IS SUFFICIENT
6. TO DETERMINE ENDURANCE IN HOURS: DIVIDE GAL OF FUEL AVAILABLE BY G.P.H. (GAL. PER HR.) FOR THE CONDITIONS SELECTED.

ENGINE MODEL(S)
① V-1710-35
② V-1710-63
FOR ENGINE DATA SEE PAGES ____

STATUTE AIR-MILES	NAUTICAL AIR-MILES	FUEL* GAL.	STATUTE AIR-MILES	NAUTICAL AIR-MILES	STATUTE AIR-MILES	NAUTICAL AIR-MILES	STATUTE AIR-MILES	NAUTICAL AIR-MILES	STATUTE AIR-MILES	NAUTICAL AIR-MILES	FUEL* GAL.	STATUTE AIR-MILES	NAUTICAL AIR-MILES
		120	20 GALLON ALLOWANCE FOR TAKE-OFF ETC. NOT AVAILABLE IN FLIGHT.										
300	260	100									100	640	555
270	235	90									90	575	500
244	212	80									80	513	445
213	185	70									70	449	390
184	160	60									60	384	333
153	133	50									50	320	278
122	106	40									40	256	222
92	80	30									30	192	167
61	53	20									20	128	111
31	27	10									10	64	56

MAXIMUM CONTINUOUS POWER R.P.M.	M.P. (IN. HG.)	G.P.H.	T.A.S.	DENSITY ALTITUDE FEET	ALTERNATE CRUISING CONDITIONS I R.P.M.	I.A.S.	M.P.	G.P.H.	T.A.S.	II R.P.M.	I.A.S.	M.P.	G.P.H.	T.A.S.	III R.P.M.	I.A.S.	M.P.	G.P.H.	T.A.S.	IV R.P.M.	I.A.S.	M.P.	G.P.H.	T.A.S.	DENSITY ALTITUDE FEET	MAXIMUM RANGE – ENDURANCE R.P.M.	I.A.S.	M.P.	G.P.H.	T.A.S.
CRUISING LIMIT				30,000																					30,000					
2600	F.T.	54	309	25,000	CRUISING LIMIT					CRUISING LIMIT															25,000					
2600	F.T.	70	330	20,000											CRUISING LIMIT										20,000					
2600	F.T.	89	342	15,000																CRUISING LIMIT					15,000	CRUISING LIMIT				
2600	F.T.	102	346	12,000																					12,000	1600	193	F.T.	33	232
2600	37.5	105	340	9,000																					9,000	1600	201	26	32	230
2600	37.5	102	326	6,000																					6,000	1600	199	26	31	217
2600	37.5	99	313	3,000																					3,000	1600	196	26	29	205
2600	37.5	97	300	SEA LEVEL																					SEA LEVEL	1600	191	26	27	191

RANGE VALUES IN THIS COLUMN APPLY ONLY AT 12000 FT. ALT.

*ALLOW 20 GAL. FOR WARM-UP TAKE-OFF ETC.

ALL RANGE VALUES ARE BASED ON NO WIND – 0-10% RESERVE FUEL 12 U.S. GAL EQUAL 10 IMP. GALL.

HEAVY NUMBERS:- USE AUTO-RICH MIXTURE
LIGHT NUMBERS:- USE AUTO-LEAN MIXTURE

RED FIGURES ARE PRELIMINARY:- SUBJECT TO REVISION AFTER FLIGHT CHECK

ABBREVIATIONS

I.A.S.: INDICATED AIRSPEED
M.P. : MANIFOLD PRESSURE (IN. HG.)
G.P.H.: GALLONS PER HOUR (TOTAL)
T.A.S.: TRUE AIRSPEED (M.P.H.)
F.T.: FULL THROTTLE OPERATION

Flight Operations Chart—P-39K-1 —P-39L-1

MODEL(S)
① P-39K-1
② P-39L-1

FLIGHT OPERATION INSTRUCTION CHART

WEIGHT 8400 TO 7400 POUNDS

SHEET OF SHEETS
EXTERNAL LOAD ITEMS
BELLY TANK

5-1-42

INSTRUCTIONS: (THIS CHART APPLIES ONLY TO THE ABOVE MODELS WHILE WITHIN THE ABOVE WEIGHT LIMITS WITH ABOVE ITEMS)

1. OPPOSITE FUEL TO BE USED LOCATE AIR MILES (RANGE) DESIRED (AVOID CRUISING WITH "MAXIMUM CONTINUOUS POWER" EXCEPT IN EMERGENCY)
2. VERTICALLY BELOW AND OPPOSITE DESIRED CRUISING ALTITUDE READ OPTIMUM CRUISING R.P.M. AND INDICATED AIRSPEED (I. A. S.)
3. MIXTURE CONTROL (AND BLOWER CONTROL IF ANY) ARE INDICATED IN LOWER HALF OF CHART (FOR DETAILED INSTRUCTIONS SEE SECT II PAR 11)
4. MANIFOLD PRESSURE (M.P)-GALLONS PER HOUR (G.P.H.)-TRUE AIRSPEED (T. A. S.) ARE APPROX MAXIMUM VALUES FOR REFERENCE
5. USE CARE IN INITIAL ADJUSTMENT OF ENGINE CONTROLS THEN AVOID MANIPULATION — HOURLY RE-ESTABLISHMENT OF I.A.S. IS SUFFICIENT
6. TO DETERMINE ENDURANCE IN HOURS: DIVIDE GAL OF FUEL AVAILABLE BY G.P.H. (GAL PER HR) FOR THE CONDITIONS SELECTED.

ENGINE MODEL(S)
①V-1710-63
②V-1710-35
FOR ENGINE DATA SEE PAGES

STATUTE AIR-MILES	*NAUTICAL AIR-MILES*	FUEL* GAL.	STATUTE AIR-MILES	*NAUTICAL AIR-MILES*	STATUTE AIR-MILES	*NAUTICAL AIR-MILES*	STATUTE AIR-MILES	*NAUTICAL AIR-MILES*	STATUTE AIR-MILES	*NAUTICAL AIR-MILES*	FUEL* GAL.	STATUTE AIR-MILES	*NAUTICAL AIR-MILES*
	25	GALLONS ALLOWED FOR TAKE-OFF & CLIMB. NOT AVAILABLE IN FLIGHT.									195		
435	378	170									170	828	719
396	344	155									155	756	656
358	311	140									140	682	520
320	278	125									125	609	528
281	244	110									110	537	466
243	211	95									95	463	402
204	177	80									80	438	381
166	144	65									65	317	275
128	111	50									50	244	212
90	78	35									35	171	148
51	44	20									20	97	84

MAXIMUM CONTINUOUS POWER				DENSITY ALTITUDE FEET	ALTERNATE CRUISING CONDITIONS																DENSITY ALTITUDE FEET	MAXIMUM RANGE – ENDURANCE				
					I					II					III					IV							
R.P.M.	M.P. (IN. HG.)	G.P.H.	T.A.S.		R.P.M.	I.A.S.	M.P.	G.P.H.	T.A.S.	R.P.M.	I.A.S.	M.P.	G.P.H.	T.A.S.	R.P.M.	I.A.S.	M.P.	G.P.H.	T.A.S.	R.P.M.	I.A.S.	M.P.	G.P.H.	T.A.S.		R.P.M.	I.A.S.	M.P.	G.P.H.	T.A.S.
CRUISING		LIMIT		30,000	CRUISING LIMIT																	30,000				
				25,000																		25,000				
				20,000						CRUISING LIMIT					CRUISING LIMIT								20,000				
2600	FT.	89	285	15,000																CRUISING LIMIT					15,000				
2600	FT.	102	288	12,000																					12,000	CRUISING LIMIT			
2600	37.5	106	285	9,000																					9,000	1600	169	28.5	35	194
2600	37.5	102	275	6,000																					6,000	1600	171	28.5	35	188
2600	37.5	100	267	3,000																					3,000	1600	171	28.5	33	179
2600	37.5	96	256	SEA LEVEL																					SEA LEVEL	1600	168	28.5	31	168

*ALLOW 25 GAL. FOR WARM-UP TAKE-OFF ETC.

ALL RANGE VALUES ARE BASED ON NO WIND – 0-10% RESERVE FUEL 12 U.S. GAL EQUAL 10 IMP. GALL.

HEAVY NUMBERS:- USE AUTO-RICH MIXTURE
LIGHT NUMBERS:- USE AUTO-LEAN MIXTURE

RED FIGURES ARE PRELIMINARY - SUBJECT TO REVISION AFTER FLIGHT CHECK

ABBREVIATIONS

I.A.S.: INDICATED AIRSPEED
M.P. : MANIFOLD PRESSURE (IN HG)
G.P.H.: GALLONS PER HOUR (TOTAL)
T.A.S.: TRUE AIRSPEED (M.P.H)
F.T.: FULL THROTTLE OPERATION

Flight Operations Chart —P-39K-1 and P-39L-1

SECTION IV
OPERATIONAL EQUIPMENT

1. *OXYGEN EQUIPMENT.*

a. Oxygen will be used when operating above 12,000 feet pressure altitude.

b. The pilot's oxygen mask hose has a rubber bayonet connector. Be absolutely sure the mask connector will fit the regulator output connections before starting the airplane's engine.

c. The shut-off valve or valves for the bottle or bottles, depending whether there is a single or dual installation, should be opened before each flight and closed after each flight to prevent possible leakage.

d. Oxygen duration is 2¼ hours at 25,000 feet with a Type A9 regulator.

or

4½ hours at 25,000 feet with a Type A9 regulator and two (2) oxygen bottles.

2. *AUXILIARY FUEL TANK OR BOMB RELEASE.*

a. The bomb release handle or the auxiliary fuel tank release handle is located on the lower left hand side of the radio panel just under the primer handle (see Fig. 19.)

b. The bomb release control (used only when carrying 500 lb. bomb) is located on the floor directly in front of the pilot's seat and to the left of the propeller shaft. (See Fig. 13). This control is in "Safe" position when pulled back. Before pulling the "Release" on radio panel (marked Tank Release), push the "Release Control" forward into "Armed" position then the "Release" may be pulled.

c. Before releasing the belly tank, be sure that the selector valve has been turned to one of the wing tanks. Then pull the release control.

The belly tank fuel line will automatically pull out of the retainer inside the tank which holds it in place.

NOTE

The auxiliary belly tank should always be released before engaging in combat.

3. *OPERATION OF COMMUNICATION EQUIPMENT.*

a. Radio Set—SCR-535-A Operating Instructions.

(1) Before attempting to operate the SCR-535-A Radio Set, the detonator circuit should be checked as follows:

(2) The detonator located in the Radio Receiver (BC-647-A) is set off when a voltage of the required value or higher is placed across its terminals. This will occur if the inertia or crash switch is operated or the two buttons marked "DANGER" (located on the right hand side of the radio control panel in the cabin) are both pressed at the same time.

(3) When the airplane is on the ground for any length of time, the detonator plug should be disconnected from the detonator. (The detonator plug attaches to the detonator located in the left hand side of the Radio Receiver, which is on the aft cabin deck.)

(4) Always test the detonator circuit to make certain there is no voltage at the plug before attaching it to the detonator. A test lamp, attached to a bracket on the aft left hand side of the turn-over beam is used to test for voltage in the detonator circuit. Attach the detonator plug to the test lamp circuit at the male receptacle near the test lamp. If the lamp lights there is voltage at the detonator plug and it should not be attached to the detonator or destruction of the Radio Receiver will result.

(5) If there is current at the detonator plug, as indicated by a lighted test lamp, it is probably due to the inertia switch being tripped. To rest the inertia switch, proceed as follows:

(a) Remove the small adjustment setting wheel from its storage location on the top of the inertia switch and use it to turn the small square shaft, on the forward left hand side of the switch, in a clockwise direction until the stop is reached. Then press the button on the top of the inertia switch, remove the adjustment setting wheel, and then release the pressure on the button. (A spring in the inertia switch will rotate the small square shaft in a counter-clockwise direction until it is automatically stopped.) The inertia switch is now reset and the test lamp should be out indicating no voltage at the detonator plug.

NOTE

Re-attach the adjustment setting wheel to the top of the inertia switch.

(b) Rap the inertia switch lightly with the knuckles and if correctly set the switch will not be tripped by this test jarring and the test lamp will remain off.

(6) The detonator may be fired not only by the inertia or crash switch but also by a manual control on the radio control panel in the cabin. This manual control consists of two protected buttons marked "DANGER." To fire the detonator both of these buttons must be pressed at the same time. To make certain this manual detonator control circuit is in operation, attach the detonator plug to test lamp circuit and press both "DANGER" buttons at the same time. This should light the test lamp, indicating that the circuit is in operation.

(7) If the test lamp does not light when the two "DANGER" buttons are pressed at the same time, either the circuit is not in operation or the test lamp is burned out or broken. Replace the test lamp with a new one and again test the circuit by pressing the buttons. If the test lamp lights, the system is in operation.

(8) The detonator circuit controlled by the two "DANGER" buttons by-passes the inertia switch and is entirely independent of it. Therefore, pressing the "DANGER" buttons will not trip the inertia switch.

(9) The above tests have indicated that the inertia switch and the push buttons are in working condition and since the inertia switch has been reset and the test lamp is not lighted it is permissible to attach the detonator plug to the detonator at the left hand side of the Radio Receiver.

(10) The detonator plug should not be inserted in the detonator until the airplane is ready to leave on a mission over enemy territory and should be disconnected when the airplane is on the ground for any length of time.

NOTE

Always test the detonator circuit before attaching the detonator plug, to the Radio Receiver.

b. The SCR-535-A Radio Set is a recognition set only and cannot be used for communication.

(1) To start the radio equipment place the radio switch, located on the radio control panel in the cabin, in the "ON" position.

(2) To stop the equipment, push the radio switch on the radio control panel to the "Off" position.

c. Radio Set—SCR-522-A Operating Instructions.

(1) To start the radio equipment, push the button "A," "B," "C" or "D" on control box BC-602-A, which is located on the radio control panel. Each button mentioned above selects a different crystal controlled frequency channel. (The commanding officer will give instructions regarding the frequency channel to be used.) An indicator lamp below each channel-selector button shows the operator which channel is being used. Dimmer masks are provided to prevent glare from the channel-indicator lamps during night operation. Move the dimmer mask lever to the left to cover the channel-indicator lamps.

(2) After pressing the channel-selector button, allow approximately one minute for the vacuum tubes to warm up before attempting to use the radio.

(3) Place the "T.-R.-V.-O." switch in the "V.O." position for throttle button control of the transmitter.

(4) To transmit, hold in the button on the throttle handle, close the microphone switch (located in the oxygen mask) and speak into the microphone. (Always turn off the microphone switch when the radio is not in use; it is advisable to develop this habit, since whenever an interphone system is used, failure to shut off the microphone switch will permit exchange of outside noises between stations in the circuit.)

(5) Since there is a slight delay in transferring from the receive to the transmit condition, due to relay operation, it is advisable to begin the message with a meaningless word like "hello" which will actuate the switching mechanism and insure that the message is transmitted in full.

(6) To receive, release the button on the throttle handle.

(7) To stop the equipment, press the "Off" button on the "T.-R.-V.O." switch panel.

WARNING

The operation of this radio equipment involves the use of high voltages which are dangerous to life. A dangerous potential exists on both the transmitter and receiver whenever the equipment is in either the transmit or receive condition.

SECTION V
ARMAMENT

1. *GUN SIGHT OPERATION.*

The P-39K-1 and P-39L-1 airplanes are equipped with an electrically operated gun sight located in the cabin above the main instrument panel (Figure 8—11) in line with the pilot's eyes. The gun sight is controlled by a rheostat (Figure 7—22) located on the left hand auxiliary switch panel.

2. *GUNS.*

Each airplane is equipped with a 37 mm. cannon located in the forward fuselage and firing through the nose of the airplane, two (2) .50 calibre machine guns located in the forward fuselage of the airplane and synchronized to fire through the propeller blades and four (4) .30 caliber machine guns located two (2) in each wing. The cannon and machine guns are manually charged by the pilot and electrically fired from the cockpit.

3. *GUN LOADING.*

Loading 37 mm. Cannon.

To load the 37 mm. cannon on the ground pull the charging handle twice and the loading handle once. This will leave a live round in the chamber ready to fire. If the cannon jams in the air, pull the charging handle once and then the loading handle once.

Loading 20 mm. Cannon.

The 20 mm. cannon can be charged from the ground only. There are no charging or loading controls to be operated by the pilot.

Loading 50 Cal. Fuselage Guns.

Pull the operating handle completely to the rear "to charge," Release Operating Handle "to load." (Do not hold onto handle while it is returning to the forward position). To lock mechanism to the rear (gun safe), pull operating lever full rear and down. Lever should then stay to the rear. To return to battery position, knock lever up. After guns have been fired and barrel is hot, do not lock action in the intermediate position. *Reason:* The heat of the barrel will explode the cartridge. With the gun action open this will cause flashback into the cockpit and armament compartment.

Loading 30 Cal. Wing Guns.

Pull floor charging handle (one handle for each gun) full up "to charge" and RELEASE "to load." To hold gun open, pull handle full up and engage olive on charging cable above the slot in the rim of the charging cable hole through the floor.

4. *GUN OPERATION.*

The gun switches (toggle type) (Figure 7—21) are located on the left hand auxiliary switch panel; these switches select the gun to be fired. Firing is then accomplished by depressing the trigger (Figure 4) located on the forward side of the pilot's control stick. It will fire simultaneously all the guns selected by the toggle selector switches. The cannon toggle switch is located on the left hand auxiliary switch panel; firing is accomplished by depressing the push button located on the top of the handle of the pilot's control stick. In the event one or more guns jam, the others will continue to operate.

NOTE

Be sure all gun switches are in the "Off" position before landing.

5. *BOMBING EQUIPMENT.*

Provisions are provided on the P-39K-1 and P-39L-1 airplanes for the optional installation of a 500 or 600 pound bomb or auxiliary fuel tank to be carried on the bottom of the airplane. The installation consists of a bomb release handle "Armed" and "Safe" lever and the release bracket to which the bomb or tank is attached.

a. The bomb release handle is located on the lower left hand side of the radio control panel. To release pull upward and aft.

b. The "Armed" and "Safe" lever is located on the left hand side of the cabin floor adjacent to the pilot's seat. The lever pushed to the forward position arms the bomb for explosion before it is released. This lever incorporates a spring loaded handle which must be pushed down to release the locking pin from the sector before the handle can be moved.

c. The release bracket is installed on the lower surface of the wing center section and includes a spring loaded hook device which releases the bomb automatically, when the bomb release handle is pulled in the cockpit.

CAUTION

If it is desirable to remove a bomb after landing, make certain the "Arm" and "Safe" handle is secured in the "Safe" position before releasing it.

APPENDIX I

U. S.A.—BRITISH GLOSSARY OF NOMENCLATURE

U. S. A.	BRITISH
Accumulator	Should not be confused with electrical accumulator or battery
Anti-friction bearings	Ball and roller bearings
Battery (electrical)	Electrical accumulator
Blade connecting rod	Plain connecting rod
Block test	Bench test under engine's own power
Bombardier or Bomber	Bomb-aimer
Box-end wrench	Circular-ended wrench (for hexagon)
Cap screw	Setscrew or screw
Center of inboard wing panel	Center section
Check valve (hydraulic)	Non-return valve
Clevis	Fork joint or knuckle joint
Closed spanner—wrench with internal lugs or surface lugs	Ring spanner
Cotter pin	Split pin
Crock (used in heat-treatment)	Earthenware jar
Cylinder (hydraulic)	Jack
Fillister head screw	Cheese head screw
Flat head screw	Countersunk head screw
Flight indicator	Artificial horizon
Gall	To fret or score
Gasoline (gas)	Petrol
Green run	Endurance test
Ground (electrical)	Earth
Gross weight	All up weight
Gyro horizon	Artificial horizon
Gyro pilot	Automatic pilot
Kerosene	Paraffin
Knuckle pin (used on radial engines)	Wrist pin or anchor pin
Lock washer	Spring washer
Manifold pressure	Boost
Oil pan	Sump
Outboard panel	Outer plane
Pad	Often used to designate that portion of a raised machined surface designed for mounting accessories, etc.
Palnut	Type of lock nut
Parker Kalon screw (sheet metal screw)	
Piston pin	Gudgeon pin
Propeller	Airscrew
Reticule (gun sight, etc.)	Graticule
Round head screw	Cup head screw
Screen	Filter
Setscrew	Grub screw
Ship	Aircraft
Slushing compound	Corrosion inhibiter
Socket wrench	Box spanner
Spanner	C-spanner
Spanner wrench	Ring spanner
Stabilizer—	
Horizontal	Tail plane
Vertical	Fin
Stack	Manifold (inlet or exhaust)
Sylphon	Aneroid
Tachometer	Engine speed indicator
Tag	Label
Test club	Test fan
Tube (radio)	Valve
Turn indicator	Direction indicator
Valve (fuel or oil)	Cock
Weight empty	Tare