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PRELIMINARY HANDBOOK

(CONTRACTOR'S UNEDITED INSTRUCTIONS ISSUED IN ACCORDANCE WITH PAR. 6, T. O. 00-5)

OF

OPERATION & FLIGHT INSTRUCTIONS

FOR THE

P-66 PURSUIT AIRPLANE

MANUFACTURED BY

VULTEE AIRCRAFT INC.

CONTRACT DA-ac-272

MODEL 544-6-F



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OF
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PRELIMINARY HANDBOOK

CONTRACTORS' COORDINATING INSTRUCTIONS ISSUED IN ACCORDANCE WITH PAR. 4, E. 11, GEN.

OF

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INSTRUCTIONS

FOR THE

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FLYING CHARACTERISTICS

WEIGHT DATA

CURVES

CALCULATED SPEED AND GAS CONSUMPTION - CURVES - ENGINE CONTROL RANGE - 30

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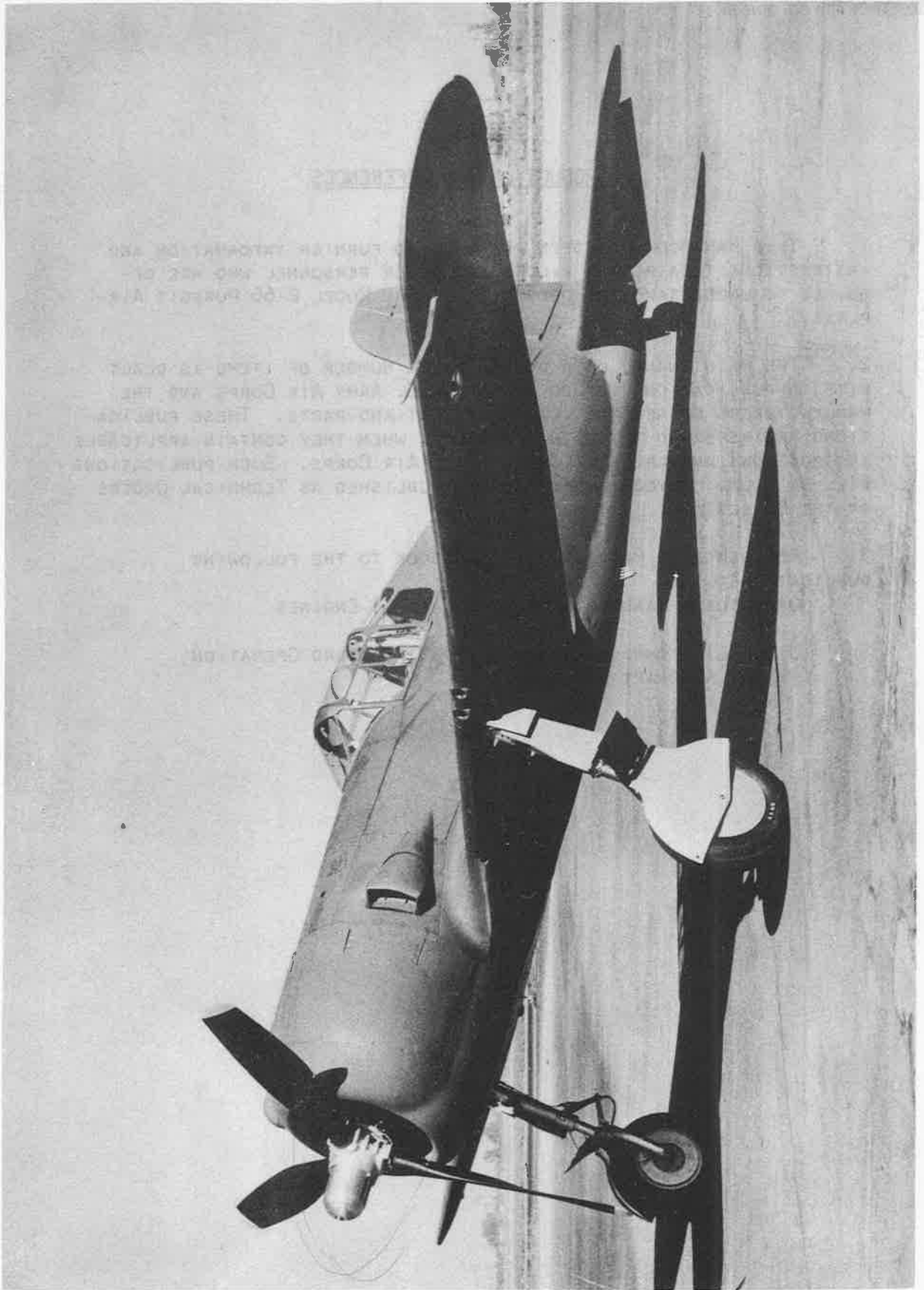


FIG.
1

VIEW OF COMPLETE
AIRPLANE

FIG.
1

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SECTION I

INTRODUCTION AND REFERENCES

1. THIS HANDBOOK HAS BEEN PREPARED TO FURNISH INFORMATION AND INSTRUCTIONS TO AIRCRAFT PILOTS AND OTHER PERSONNEL WHO ARE REQUIRED TO UNDERSTAND THE OPERATION OF THE MODEL P-66 PURSUIT AIRPLANE.
2. THE MAINTENANCE OF A CONSIDERABLE NUMBER OF ITEMS IS DEALT WITH IN PUBLICATIONS ISSUED BY THE U. S. ARMY AIR CORPS AND THE MANUFACTURERS OF AERONAUTICAL EQUIPMENT AND PARTS. THESE PUBLICATIONS ARE REFERRED TO IN THIS HANDBOOK WHEN THEY CONTAIN APPLICABLE INSTRUCTIONS AND ARE AVAILABLE TO THE AIR CORPS. SUCH PUBLICATIONS WILL BE FOUND LISTED IN THE INDICES PUBLISHED AS TECHNICAL ORDERS OF THE OO SERIES.
3. REFERENCE IS MADE IN THIS HANDBOOK TO THE FOLLOWING PUBLICATIONS:
OPERATOR'S HANDBOOK FOR TWIN WASP C4 ENGINES

U.S.A.C. TECHNICAL ORDER 02-1-29, "GROUND OPERATION OF AIRCRAFT ENGINES".

SECTION IIDESCRIPTION1. AIRPLANE

A. GENERAL. - THE P-66 PURSUIT AIRPLANE IS A SINGLE-ENGINE, SINGLE-PLACE, LOW WING MONOPLANE OF ALL-METAL CONSTRUCTION. ITS OVER-ALL SPAN IS 35.9 FEET, OVERALL LENGTH 28.4 FEET, AND OVERALL HEIGHT 13.08 FEET.

B. WING. - (1) GENERAL. - THE ALL-METAL WING IS OF THE STRESSED SKIN CANTILEVER TYPE, COMPOSED OF A CENTER SECTION AND TWO DETACHABLE OUTER PANELS.

(2) AILERONS. - THE AILERONS ARE LIGHT-METAL COVERED ALUMINUM-ALLOY STRUCTURES, AND ARE STATICALLY, DYNAMICALLY, AND AERODYNAMICALLY BALANCED. THEY ARE OPERATED BY CONVENTIONAL STICK CONTROL THROUGH A DIFFERENTIAL CONTROL SYSTEM. A METAL TRIM TAB IS INSTALLED ON EACH AILERON. THE RIGHT-SIDE AILERON TAB IS ADJUSTABLE ON THE GROUND ONLY. THE LEFT-SIDE AILERON TAB IS CONTROLLABLE FROM THE COCKPIT.

(3) FLAPS. - THE FLAPS ARE OF THE SPLIT TRAILING EDGE TYPE, EXTENDING FROM AILERON TO AILERON, EXCEPT FOR A SMALL GAP AT THE CENTER SECTION. THEY ARE OPERATED THROUGH A 45° RANGE BY A HYDRAULIC ACTUATING CYLINDER. EMERGENCY MANUAL OPERATION IS PROVIDED BY A HYDRAULIC HAND-PUMP IN THE COCKPIT. A POSITION INDICATOR IS PROVIDED.

C. EMPENNAGE. - (1) STABILIZERS. - THE ALL METAL HORIZONTAL AND VERTICAL STABILIZERS ARE ALLUMINUM ALLOY, STRESSED SKIN CANTILEVER TYPE STRUCTURES, ATTACHED IN FIXED ALIGNMENT TO THE FUSELAGE.

(2) ELEVATORS. - THE ELEVATORS ARE FABRIC-COVERED ALUMINUM-ALLOY STRUCTURES. THEY ARE STATICALLY, DYNAMICALLY, AND AERODYNAMICALLY BALANCED. A METAL TRIM TAB IS INSTALLED ON EACH ELEVATOR -- CONTROLLABLE FROM THE COCKPIT.

(3) RUDDER. - THE RUDDER IS A FABRIC-COVERED ALUMINUM-ALLOY STRUCTURE. IT IS STATICALLY, DYNAMICALLY, AND AERODYNAMICALLY BALANCED. THE METAL TRIM TAB PROVIDED IN THE TRAILING EDGE OF THE RUDDER IS CONTROLLABLE FROM THE COCKPIT.

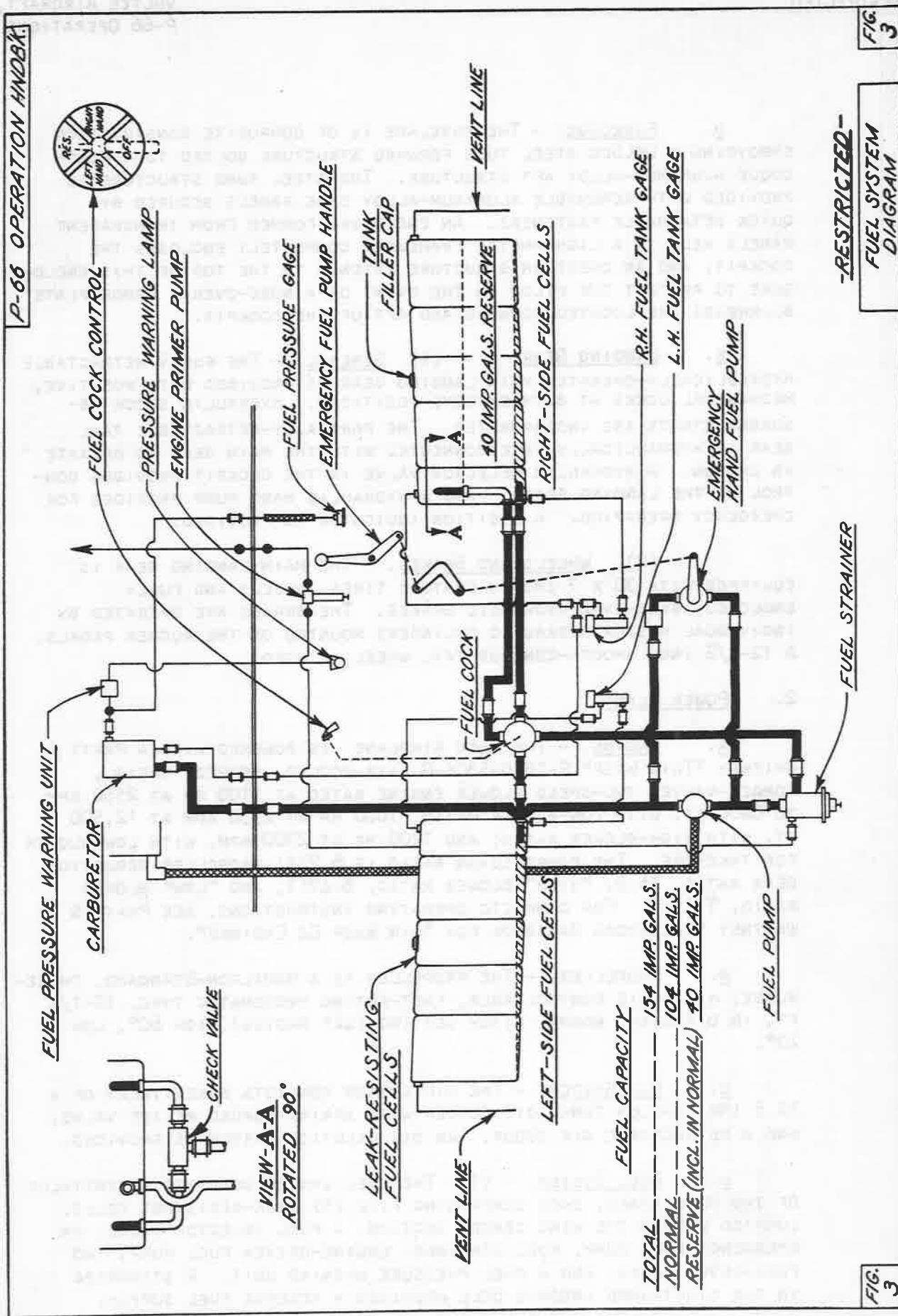
EMERGENCY HATCH RELEASE
(SHOWN WITH L.H. LATCH
RELEASED & PANELS FALLING
FREE)

LIFE PRESERVER
CUSHION

FIRE EXTINGUISHER

EMERGENCY HYDRAULIC
HAND PUMP

EMERGENCY FUEL PUMP
CONTROL



D. FUSELAGE. - THE FUSELAGE IS OF COMPOSITE CONSTRUCTION EMBODYING A WELDED STEEL TUBE FORWARD STRUCTURE BOLTED TO A MONOCOQUE ALUMINUM-ALLOY AFT STRUCTURE. THE STEEL TUBE STRUCTURE IS PROVIDED WITH REMOVABLE ALUMINUM-ALLOY SIDE PANELS SECURED BY QUICK DETACHABLE FASTENERS. AN ENCLOSURE FORMED FROM TRANSPARENT PANELS HELD IN A LIGHT-METAL FRAMEWORK COMPLETELY ENCLOSES THE COCKPIT, AND AN OVERTURN STRUCTURE EXTENDS TO THE TOP OF THIS ENCLOSURE TO PROTECT THE PILOT IN THE EVENT OF A NOSE-OVER. ARMOR-PLATE BULKHEADS ARE LOCATED FORWARD AND AFT OF THE COCKPIT.

E. LANDING GEAR. - (1) GENERAL. - THE FULLY-RETRACTABLE HYDRAULICALLY-OPERATED MAIN LANDING GEAR IS PROVIDED WITH POSITIVE, MECHANICAL LOCKS AT BOTH EXTREME POSITIONS. HYDRAULIC SHOCK ABSORBER STRUTS ARE INCORPORATED. THE PARTIALLY-RETRACTABLE TAIL GEAR IS HYDRAULICALLY INTERCONNECTED WITH THE MAIN GEAR TO OPERATE IN UNISON. A HYDRAULIC SELECTOR VALVE IN THE COCKPIT PROVIDES CONTROL OF THE LANDING GEAR, AND A HYDRAULIC HAND PUMP PROVIDES FOR EMERGENCY OPERATION. A POSITION INDICATOR IS PROVIDED.

(2) WHEELS AND BRAKES. - THE MAIN LANDING GEAR IS EQUIPPED WITH 30 X 7 SMOOTH-CONTOUR TIRES, WHEELS AND FULLY ENCLOSED, BAND-TYPE HYDRAULIC BRAKES. THE BRAKES ARE OPERATED BY INDIVIDUAL MASTER HYDRAULIC CYLINDERS MOUNTED ON THE RUDDER PEDALS. A 12-1/2 INCH SMOOTH-CONTOUR TAIL WHEEL IS USED.

2. POWER PLANT

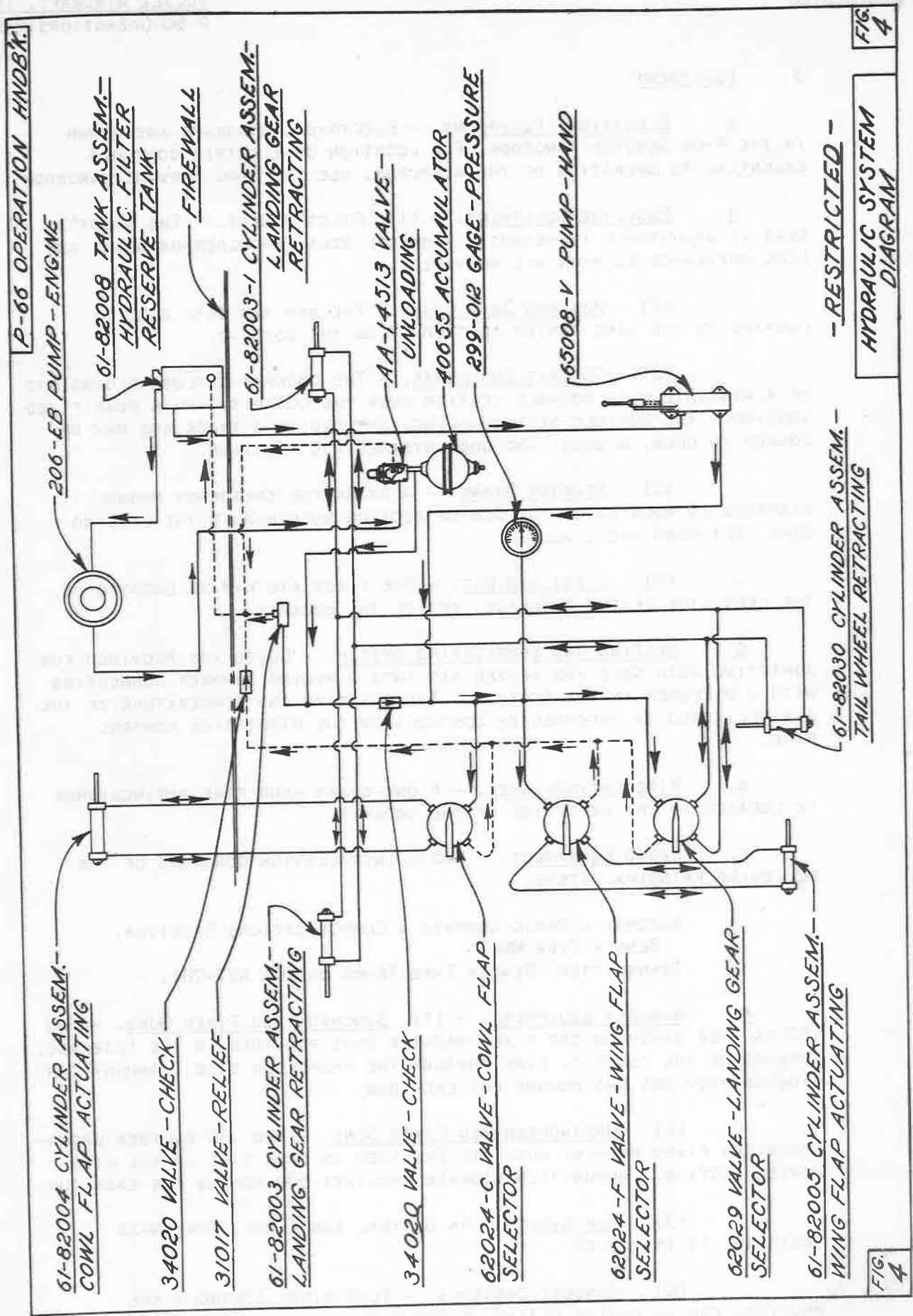
A. ENGINE. - THE P-66 AIRPLANE IS POWERED WITH A PRATT & WHITNEY "TWIN WASP" R-1830-S3C4-G, AIR-COOLED, GEARED, RADIAL, POPPET-VALVE, TWO-SPEED BLOWER ENGINE RATED AT 1100 HP AT 2550 RPM TO 6200 FT. WITH LOW-BLOWER RATIO; 1000 HP AT 2550 RPM AT 12,500 FT. WITH HIGH-BLOWER RATIO; AND 1200 HP AT 2700 RPM, WITH LOW-BLOWER FOR TAKE-OFF. THE COMPRESSION RATIO IS 6.7:1; PROPELLER REDUCTION GEAR RATIO, 16:9; "HIGH" BLOWER RATIO, 8.47:1; AND "LOW" BLOWER RATIO, 7.15:1. FOR COMPLETE OPERATING INSTRUCTIONS, SEE PRATT & WHITNEY "OPERATORS HANDBOOK FOR TWIN WASP C4 ENGINES".

B. PROPELLER. - THE PROPELLER IS A HAMILTON-STANDARD, THREE-BLADE, HYDRAULIC CONTROLLABLE, FAST-ACTING HYDROMATIC TYPE, 10-1/4 FT. IN DIAMETER, NORMAL PITCH SETTING (42" RADIUS) HIGH 60°, LOW 23°.

C. OIL SYSTEM. - THE OIL SYSTEM CONSISTS ESSENTIALLY OF A 12.5 IMP. GALLON TANK, OIL COOLER WITH SPRING-LOADED RELIEF VALVE, AND A RETRACTABLE AIR SCOOP. AN OIL DILUTION SYSTEM IS PROVIDED.

D. FUEL SYSTEM. - (1) THE FUEL SYSTEM CONSISTS ESSENTIALLY OF TWO FUEL TANKS, EACH COMPRISING FIVE (5) LEAK-RESISTANT CELLS, LOCATED WITHIN THE WING CENTER SECTION; A FUEL SELECTOR VALVE, AN EMERGENCY FUEL PUMP, FUEL STRAINER, ENGINE-DRIVEN FUEL PUMP, TWO FUEL-LEVEL GAGES, AND A FUEL PRESSURE WARNING UNIT. A STANDPIPE IN THE RIGHT-HAND INBOARD CELL PROVIDES A RESERVE FUEL SUPPLY.

(2) THE TOTAL FUEL CAPACITY IS 154.0 IMP. GALLONS.



3. EQUIPMENT

A. ELECTRICAL EQUIPMENT. - ELECTRICAL DIAGRAMS ARE SHOWN IN THE P-66 SERVICE HANDBOOK. FOR LOCATION OF ELECTRIC CONTROLS ESSENTIAL TO OPERATION OF THE AIRPLANE, SEE THE P-66 SERVICE HANDBOOK.

B. FUSELAGE EQUIPMENT. - (1) PILOT'S SEAT. - THE PILOT'S SEAT IS ADJUSTABLE IN HEIGHT. A SAFETY BELT, SHOULDER-HARNESS, AND LIFE PRESERVER CUSHION ARE PROVIDED.

(2) MAP AND DATA CASE. - THE MAP AND DATA CASE IS LOCATED IN THE WING CENTER SECTION BELOW THE COCKPIT.

(3) COCKPIT ENCLOSURE. - THE COCKPIT ENCLOSURE CONSISTS OF A WINDSHIELD, A MOVABLE SECTION OVER THE COCKPIT, AND A REAR FIXED SECTION. THE MOVABLE SECTION SLIDES AFTWARD IN A TRACK AND MAY BE LOCKED IN OPEN, CLOSED, AND ONE INTERMEDIATE POSITION.

(4) STARTER CRANK. - A CRANK FOR EMERGENCY MANUAL STARTING IS MOUNTED ON THE CENTER SECTION NOSE RIB IN THE LANDING GEAR LEFT-HAND WHEEL WELL.

(5) FIRST AID KIT. - THE FIRST AID KIT IS LOCATED ON THE LEFT SIDE OF THE FUSELAGE, AFT OF THE COCKPIT.

C. HEATING AND VENTILATING SYSTEM. - DUCTS ARE PROVIDED FOR ADMITTING BOTH COLD AND HEATED AIR INTO A MIXING CHAMBER CONNECTING WITH A DIFFUSER IN THE COCKPIT. THE QUANTITY AND TEMPERATURE OF THE AIR DELIVERED IS GOVERNED BY CONTROLS ON THE RIGHT SIDE CONTROL PANEL.

D. FIRE EXTINGUISHER. - A ONE-QUART HAND FIRE EXTINGUISHER IS LOCATED AT THE LEFT SIDE OF THE COCKPIT.

E. RADIO EQUIPMENT. - RADIO INSTALLATION CONSISTS OF THE FOLLOWING PRINCIPAL ITEMS:

AUTOMATIC RADIO COMPASS & COMMUNICATIONS RECEIVER,
BENDIX TYPE MN-31
TRANSMITTER, BENDIX TYPE TA-6A OR RCA AVT-7B1.

F. GUNNERY EQUIPMENT. - (1) SYNCHRONIZED FIXED GUNS. - TWO .50 CALIBER SYNCHRONIZED FIXED MACHINE GUNS PROVIDED IN THE FUSELAGE, FORWARD OF THE COCKPIT, FIRE THROUGH THE PROPELLER DISC. AMMUNITION STOWAGE PROVIDES 225 ROUNDS FOR EACH GUN.

(2) UNSYNCHRONIZED FIXED GUNS. - TWO .30 CALIBER UNSYNCHRONIZED FIXED MACHINE GUNS ARE PROVIDED IN EACH SIDE OF THE WING CENTER SECTION. AMMUNITION STOWAGE PROVIDES 500 ROUNDS FOR EACH GUN.

(3) GUN SIGHT. - AN OPTICAL GUN SIGHT, TYPE N-2A MODIFIED, IS INSTALLED.

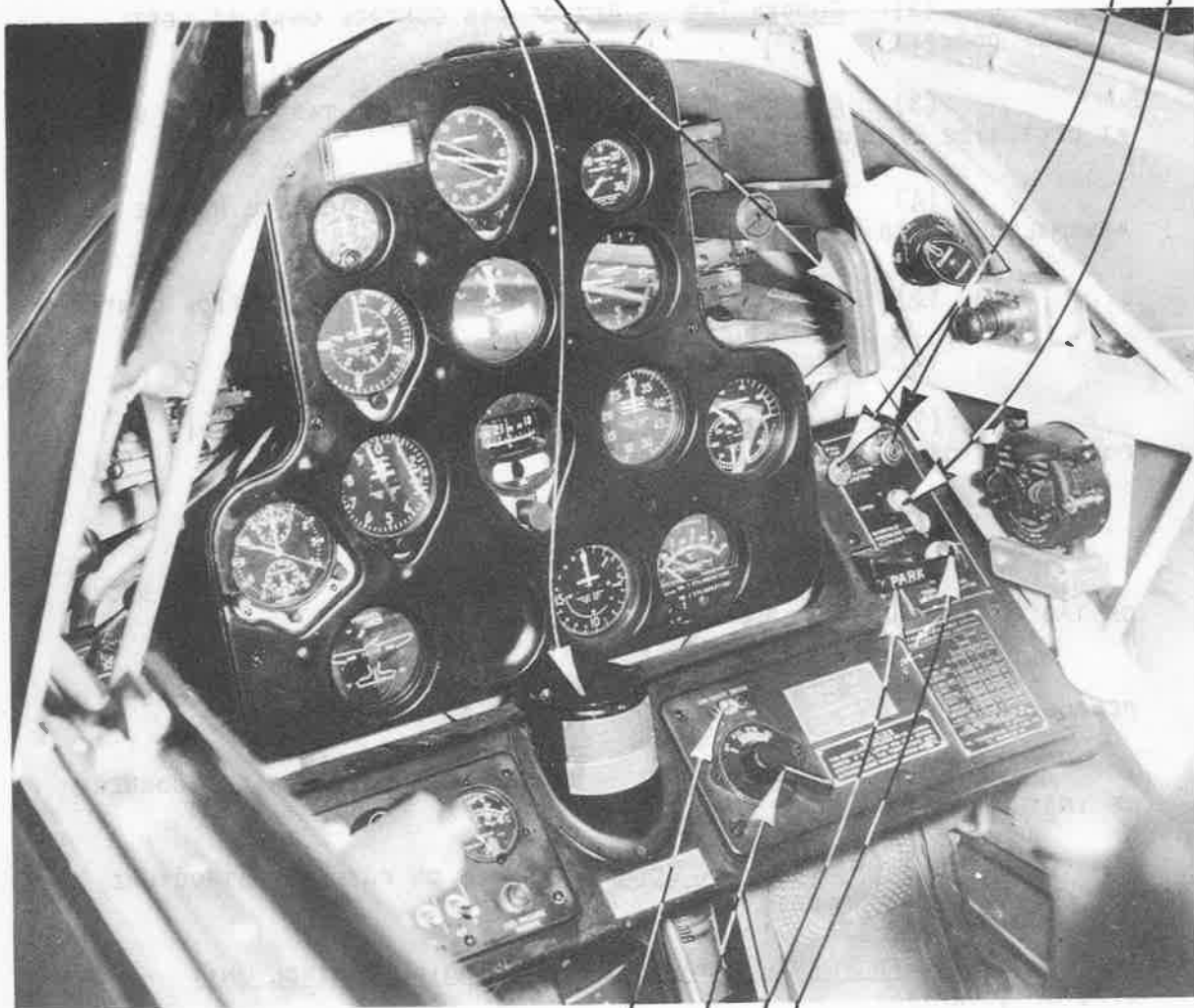
(4) GUNNERY CONTROLS. - ELECTRICAL CONTROLS ARE PROVIDED FOR SELECTIVE FIRING OF THE GUNS.

HANDLE - GUN
CHARGING

CONTROL - MANIFOLD
PRESSURE GAGE DRAIN

SIGHT - OPTICAL
GUN

HANDLES - VENTILATING
SYSTEM CONTROL



SWITCH - GUN SAFETY

VALVE - VACUUM
RESTRICTOR

SWITCH - GUN SELECTOR

HANDLE - PARKING
BRAKE

FIG.
5

INSTRUMENT PANEL

FIG.
5

SECTION III

GENERAL INSTRUCTIONS

1. LOCATION OF CONTROLS

A. FLIGHT CONTROLS. - (1) ELEVATOR TAB. - OUTBOARD WHEEL ON TAB CONTROL UNIT AT LEFT SIDE OF COCKPIT.

(2) RUDDER TAB. - AFT OF TAB CONTROL UNIT AT LEFT SIDE OF COCKPIT.

(3) AILERON TAB. - INBOARD WHEEL ON TAB CONTROL UNIT AT LEFT SIDE OF COCKPIT.

(4) WING FLAPS. - INBOARD LEVER OF CONTROL HANDLE ASSEMBLY LOCATED BELOW THE ENGINE CONTROL UNIT.

(5) AILERON AND ELEVATOR. - CONVENTIONAL STICK CONTROL

(6) RUDDER. - CONVENTIONAL RUDDER PEDALS.

(7) SURFACE CONTROL LOCK. - ON FLOOR OF COCKPIT --- FORWARD OF CONTROL STICK.

B. LANDING GEAR CONTROLS

(1) HYDRAULIC SELECTOR VALVE CONTROL. - INBOARD SIDE OF TAB CONTROL UNIT AT LEFT SIDE OF COCKPIT

(2) WHEEL BRAKES. - INDIVIDUAL TOE-PEDALS ON RUDDER PEDALS.

(3) PARKING BRAKE. - HANDLE NEAR LOWER, RIGHT CORNER OF INSTRUMENT PANEL

(4) TAIL WHEEL LOCK. - HANDLE ON FUSELAGE STRUCTURE TO LOWER RIGHT OF PILOT.

C. POWER PLANT CONTROLS. - (1) ENGINE CONTROL UNIT. - LEFT SIDE OF COCKPIT.

(2) ENGINE STARTER - (A) ELECTRIC. - SWITCH ON ELECTRIC CONTROL PANEL

(B) EMERGENCY MANUAL. - A HAND CRANK IS STOWED IN LANDING GEAR LEFT-HAND WHEEL WELL.

(3) FUEL QUANTITY GAGE. - ONE DIRECT-READING GAGE IN INBOARD-END BULKHEAD OF EACH TANK.

(4) EMERGENCY FUEL PUMP. - LEVER BETWEEN AILERON AND ELEVATOR CONTROL HANDWHEELS.

P-66 OPERATION HANDBK.

CONTROL-WING FLAPS
HYDRAULIC SELECTOR

CONTROL-COWL FLAPS
HYDRAULIC SELECTOR

RELEASE-LANDING GEAR
WARNING SIGNAL

HANDLE-OIL COOLER
SCOOP CONTROL

EXTINGUISHER-FIRE

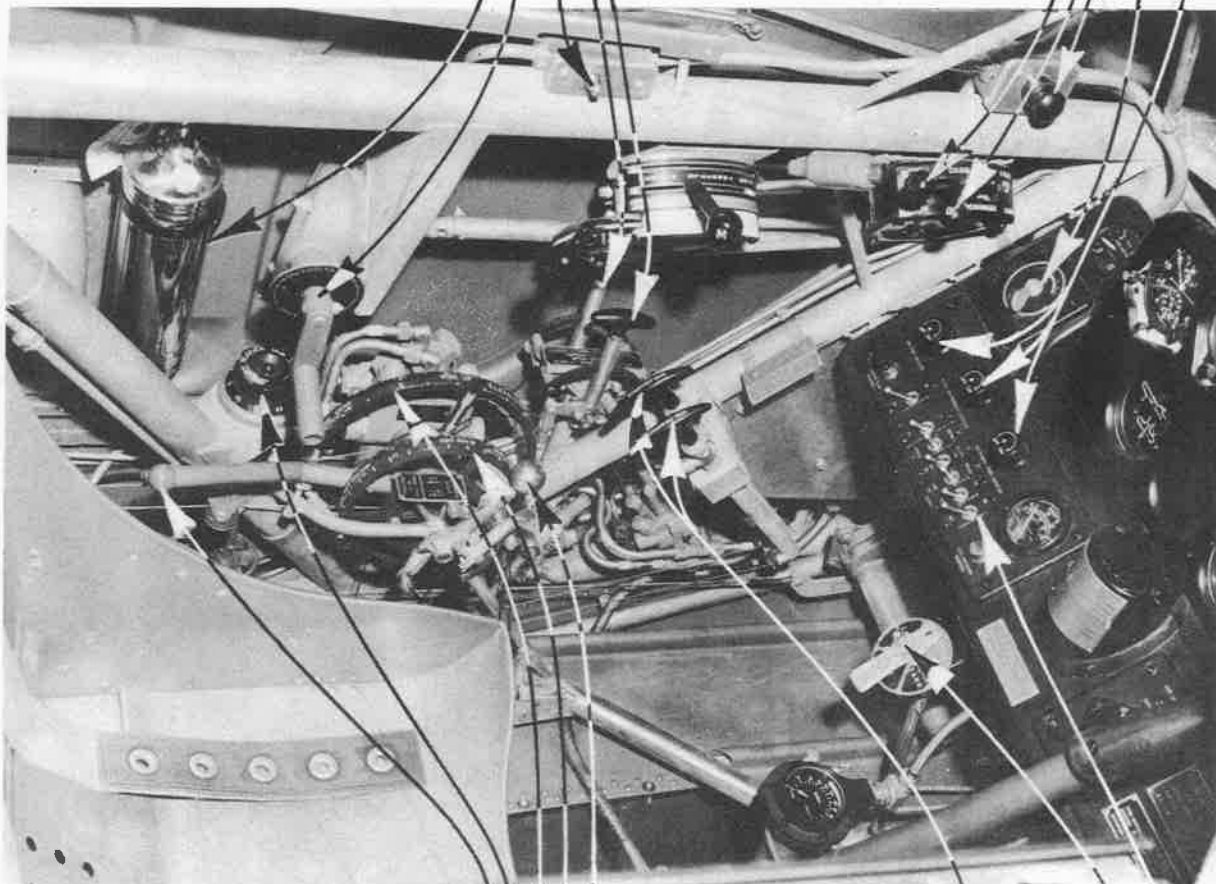
RHEOSTATS FOR GUN
SIGHT, FLIGHT INSTRUMENTS,
& INSTRUMENT PANEL

SWITCH-IGNITION

LAMP-COCKPIT

CONTROL-ENGINE
BLOWER

CONTROL-
CARBURETOR HEAT



HANDLE-EMERGENCY
FUEL PUMP

CONTROL-RUDDER
TRIM TAB

HANDWHEEL-ELEVATOR
TRIM TAB

HANDWHEEL-AILERON
TRIM TAB

CONTROL-LANDING GEAR
HYDRAULIC SELECTOR

HANDLES-GUN
CHARGING

CONTROL-FUEL TANK
SELECTOR VALVE

SWITCHES FOR BATTERY,
PITOT HEATER, STARTER,
OIL DILUTION, RUNNING
LAMPS, COCKPIT LAMPS,
& LANDING LAMPS

FIG.
6

COCKPIT ARRANGEMENT
AND CONTROLS - LEFT SIDE

FIG.
6

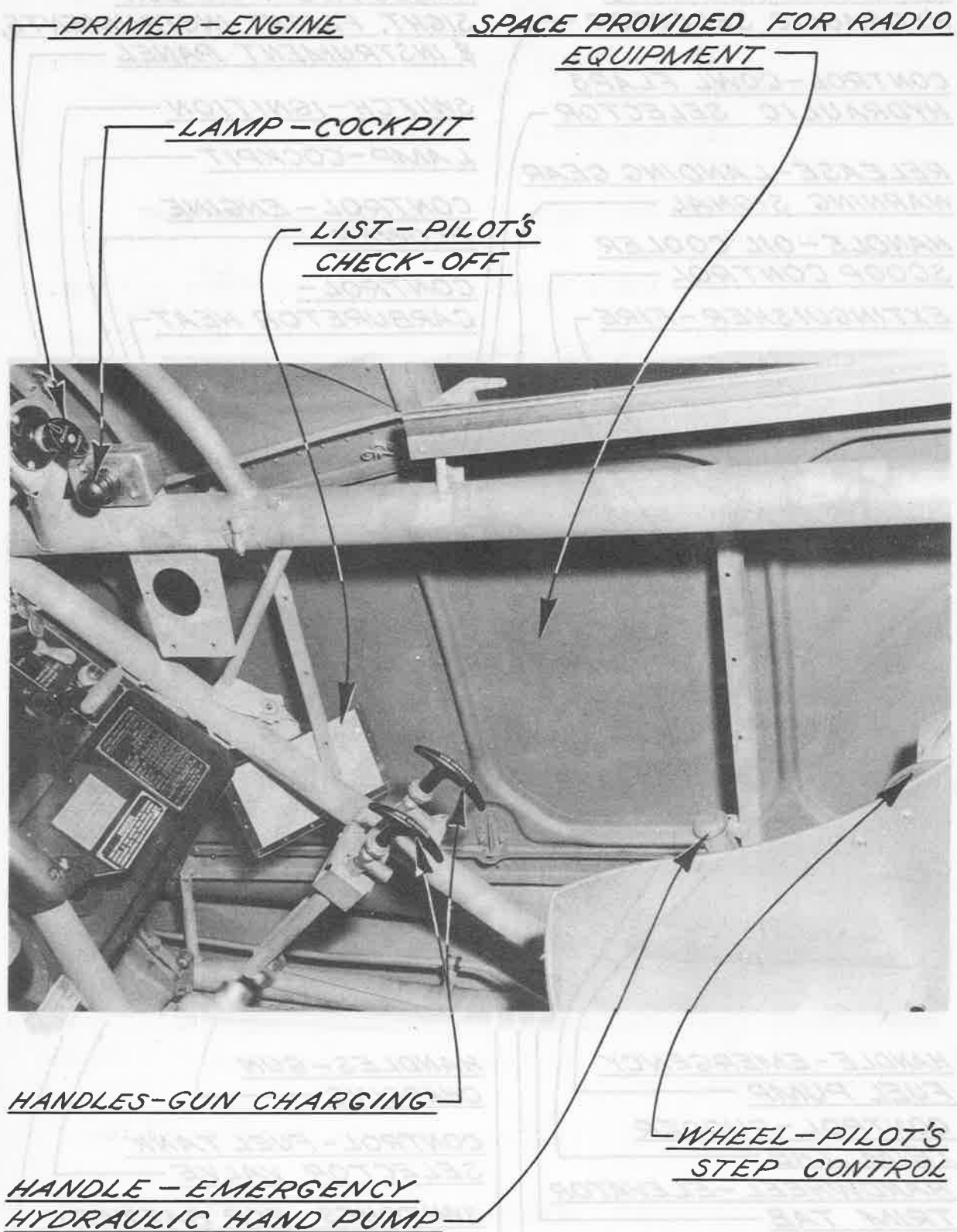


FIG.
7

COCKPIT ARRANGEMENT AND
CONTROLS-RIGHT SIDE

FIG.
7

(5) OIL COOLER AIR SCOOP. - CRANK LOCATED ABOVE RUDDER TAB CONTROL ON LEFT SIDE OF COCKPIT.

(6) CARBURETOR HEAT. - OUTBOARD LEVER ON AUXILIARY QUADRANT FORWARD OF ENGINE CONTROL UNIT.

(7) OIL DILUTION. - TOGGLE SWITCH IN CENTER OF ELECTRIC PANEL.

(8) ENGINE PRIMER. - RIGHT SIDE INSTRUMENT TRIM PANEL.

(9) ENGINE BLOWER. - INBOARD LEVER ON AUXILIARY QUADRANT FORWARD OF ENGINE CONTROL UNIT.

(10) COWL FLAPS. - OUTBOARD LEVER OF CONTROL HANDLE ASSEMBLY LOCATED BELOW THE ENGINE CONTROL UNIT.

D. OTHER CONTROLS. - (1) EMERGENCY HYDRAULIC PUMP HANDLE - BELOW RIGHT SIDE OF PILOT'S SEAT.

(2) SEAT ADJUSTMENT. - A SHORT HAND LEVER AT THE RIGHT SIDE OF THE SEAT.

(3) COCKPIT ENCLOSURE. - HANDLE ON LEFT UPPER PORTION OF MOVABLE ENCLOSURE FRONT BOW.

(4) EMERGENCY EXIT. - RELEASE LEVERS ON INSIDE AND OUTSIDE OF THE MOVABLE ENCLOSURE SIDE PANELS.

(5) GUN CHARGING HANDLES. - (A) WING GUNS. - Two HANDLES AT EACH SIDE OF COCKPIT - MOUNTED TO FUSELAGE TUBE STRUCTURE.

(B) SYNCHRONIZED GUNS. - ON EACH GUN.

(6) ELECTRICAL. - (A) BATTERY DISCONNECT SWITCH. - ON ELECTRIC PANEL.

(B) INSTRUMENT LAMP RHEOSTATS. - Two RHEOSTATS IN THE UPPER PORTION OF THE ELECTRIC PANEL.

(C) GUN SIGHT RHEOSTAT. - ADJACENT TO INSTRUMENT LAMP RHEOSTATS.

(D) PITOT HEAT. - SWITCH LOCATED ON ELECTRIC PANEL.

(E) LANDING LAMP. - SWITCH LOCATED ON ELECTRIC PANEL.

(F) LANDING GEAR WARNING SIGNAL RELEASE. - UPPER LEFT OF PILOT - ABOVE THE ENGINE CONTROL UNIT.

(G) IGNITION SWITCH. - ABOVE LEFT END OF ELECTRIC PANEL.

(H) GUN SAFETY SWITCH. - ABOVE GUN SELECTOR SWITCH ON ARMAMENT CONTROL PANEL.

(I) GUN SELECTOR SWITCH. - ON ARMAMENT CONTROL PANEL AT LOWER RIGHT OF INSTRUMENT PANEL.

(7) RADIO EQUIPMENT. - RIGHT SIDE OF COCKPIT.

(8) STEP CONTROL. - RIGHT SIDE OF PILOT'S SEAT.

(9) EMERGENCY HARNESS RELEASE. - HANDLE AT LEFT SIDE OF PILOT'S SEAT FREES HARNESS FOR LIMITED FORWARD MOVEMENT. RELEASE PIN AT FRONT JUNCTION OF STRAPS RELEASES THE HARNESS.

(10) HEATING AND VENTILATING SYSTEM. - RIGHT SIDE INSTRUMENT TRIM PANEL.

(11) VACUUM RESTRICTOR VALVE. - ABOVE RIGHT END OF ARMAMENT CONTROL PANEL.

(12) MANIFOLD PRESSURE GAGE DRAIN. - ABOVE RIGHT END OF ARMAMENT CONTROL PANEL.

2. OPERATION OF CONTROLS

A. FLIGHT CONTROLS. - (1) TRIM TAB CONTROLS. - (A) RUDDER TAB. - ROTATE CLOCKWISE FOR TURNING MOMENT TO THE RIGHT.

(B) ELEVATOR TAB. - ROTATE THE WHEEL CLOCKWISE FOR NOSE DOWN.

(C) AILERON TAB. - ROTATE THE WHEEL CLOCKWISE TO RAISE THE LEFT WING.

(2) WING FLAPS. - MOVE THE SELECTOR VALVE CONTROL LEVER AFT TO LOWER THE FLAPS - FORWARD TO RAISE THE FLAPS. INDICATOR ON INSTRUMENT PANEL SHOWS POSITION. LEVER MUST BE RETURNED TO NEUTRAL WHEN FLAPS REACH DESIRED POSITION.

(3) AILERONS, ELEVATOR AND RUDDER. - CONVENTIONAL OPERATION.

(4) RUDDER PEDAL ADJUSTMENT. - ADJUSTMENT LATCH CONTROL LEVERS ON THE OUTBOARD SIDE OF EACH PEDAL, WHEN RELEASED BY FOOT PRESSURE, FREE THE PEDAL FOR FORE AND AFT MOVEMENT.

(5) SURFACE CONTROL LOCK. - TO LOCK THE SURFACE CONTROLS, CENTRALIZE THE RUDDER PEDALS AND MOVE THE CONTROL STICK IN THE COCKPIT TO THE FORWARD CENTRAL POSITION. PULL THE LOCK ARM FREE OF ITS ANCHOR CLIP, AND ENGAGE IT WITH THE CONTROL STICK. TO UNLOCK THE CONTROLS, RELEASE THE ARM FROM THE STICK AND RETURN TO ANCHOR CLIP ON THE FUSELAGE FLOOR.

WARNING: MAKE CERTAIN THAT LOCK IS SECURELY STOWED, OR RUDDER ACTION MAY BE IMPAIRED.

B. LANDING GEAR CONTROLS. - (1) HYDRAULIC SELECTOR VALVE CONTROL. - MOVE CONTROL LEVER DOWN TO EXTEND THE LANDING GEAR - UP TO RETRACT. INDICATOR ON INSTRUMENT PANEL SHOWS POSITION OF BOTH LANDING GEAR STRUTS AND TAIL GEAR. A HYDRAULIC PRESSURE GAGE IS MOUNTED IN THE UPPER LEFT CORNER OF THE ELECTRICAL CONTROL PANEL. NORMAL PRESSURE IS 1050 TO 1250 POUNDS PER SQ. IN.

(2) WHEEL BRAKES. - EACH WHEEL BRAKE IS OPERATED BY DEPRESSING THE TOE PEDAL ON THE SAME SIDE. NO BRAKE PRESSURE GAGE IS PROVIDED.

(3) PARKING BRAKE. - (A) TO LOCK THE PARKING BRAKE. PULL CONTROL HANDLE, PRESS BOTH BRAKE PEDALS, AND RELEASE PRESSURE ON PEDALS.

(B) TO RELEASE PARKING BRAKE. - PRESS BRAKE PEDALS UNTIL THE CONTROL HANDLE SNAPS IN; THEN RELEASE THE PEDALS.

(4) TAIL WHEEL LOCK. - PULL CONTROL HANDLE AND TWIST TO LOCK. WHEN HANDLE IS RELEASED, THE TAIL WHEEL AUTOMATICALLY LOCKS AT CENTERED POSITION.

C. POWER PLANT CONTROLS. - (1) ENGINE CONTROL UNIT. - THIS UNIT CARRIES THE THROTTLE, MIXTURE, AND PROPELLER CONTROLS - THEIR OPERATION IS CONVENTIONAL.

(2) ENGINE STARTER. - (A) ELECTIC. - TO ENERGIZE THE STARTER, MOVE THE SWITCH UP. TO ENGAGE THE STARTER, MOVE THE SWITCH DOWN.

(B) MANUAL. - INSERT THE HAND CRANK INTO THE OPENING IN THE UPPER LEFT SIDE OF THE ACCESSORY COMPARTMENT AND ENERGIZE THE STARTER.

(3) FUEL QUANTITY GAGES. - ACCURATE INDICATIONS ARE SHOWN ONLY WHEN THE AIRPLANE IS IN FLYING POSITION; AND SLIGHTLY HIGH INDICATIONS ARE SHOWN WITH THE AIRPLANE IN LANDING ATTITUDE.

(4) EMERGENCY FUEL PUMP. - MOVE THE OPERATING LEVER BACK AND FORTH TO OPERATE THE EMERGENCY FUEL PUMP.

(5) OIL COOLER AIR SCOOP. - TURN THE HANDLE CLOCKWISE TO EXTEND THE SCOOP AND LOWER THE OIL TEMPERATURE.

(6) CARBURETOR HEAT. - MOVE CONTROL LEVER AFT TO INCREASE THE TEMPERATURE OF THE AIR ENTERING THE CARBURETOR.

(7) OIL DILUTION. - MOVE SWITCH UP TO DILUTE OIL

(8) ENGINE PRIMER. - CONVENTIONAL OPERATION

(9) ENGINE BLOWER. - MOVE CONTROL AFT FOR LOW-BLOWER; FORWARD FOR HIGH-BLOWER.

(10) COWL FLAPS. - MOVE LEVER FORWARD TO OPEN COWL FLAPS - AFT TO CLOSE. LEVER MUST BE RETURNED TO NEUTRAL WHEN FLAPS REACH DESIRED POSITION.

D. OTHER CONTROLS. - (1) EMERGENCY HYDRAULIC PUMP. - MOVE LEVER UP AND DOWN TO OPERATE EMERGENCY HYDRAULIC PUMP. THIS PUMP IS SIMPLY A STAND-BY, FOR USE IN CASE OF FAILURE OF THE ENGINE-DRIVEN PUMP, AND ALL HYDRAULIC CONTROLS ARE OPERATED IN THE NORMAL MANNER WHEN USING THE EMERGENCY HYDRAULIC PUMP.

(2) SEAT ADJUSTMENT. - PULL SEAT LOCK HANDLE UP TO RELEASE, AND MOVE SEAT AS DESIRED. PUSH DOWN TO LOCK HANDLE.

(3) COCKPIT ENCLOSURE - MOVABLE ENCLOSURE. - TURN THE LOCKING HANDLE AND SLIDE THE ENCLOSURE TO DESIRED POSITION. BE SURE THAT LOCK PINS ENGAGE HOLES IN TRACK.

(4) EMERGENCY EXITS. - (A) TO OPEN EMERGENCY EXIT FROM INSIDE. - RAISE THE LOCKING CROSSBAR AND PULL INSIDE HANDLE INBOARD AND DOWN UNTIL LATCH PINS ARE RELEASED; THEN PUSH PANEL FREE FROM AIRPLANE.

(B) TO OPEN EMERGENCY EXIT FROM OUTSIDE. - PULL OUTSIDE HANDLE OUTBOARD AND UP UNTIL LATCH PINS ARE RELEASED; THEN PULL HANDLE OUT TO FREE PANEL FROM AIRPLANE.

(C) TO LOCK EMERGENCY EXIT CONTROLS. - SLIDE THE LOCKING CROSSBAR ABOVE EACH INSIDE HANDLE DOWN TOWARD THE HANDLE. WHEN THE CROSSBAR IS IN THIS POSITION, THE WORK "LOCKED" WILL BE EXPOSED.

NOTE: THE LOCKING CROSSBARS SHOULD ALWAYS BE IN THE RAISED OR UNLOCKED POSITION WHEN FLYING.

(5) GUN CHARGING HANDLES. - CONVENTIONAL OPERATION.

(6) ELECTRICAL. - ALL ELECTRICAL CONTROLS ARE CLEARLY MARKED.

(7) RADIO EQUIPMENT. - REFER TO BENDIX PUBLICATIONS RELEVANT TO EQUIPMENT USED.

(8) STEP CONTROL. - ROTATE CRANK CLOCKWISE TO RETRACT STEP - ANTI-CLOCKWISE TO EXTEND.

(9) EMERGENCY HARNESS RELEASE. - PULL HANDLE TO FREE HARNESS FOR LIMITED FORWARD MOVEMENT. PULL RELEASE PIN AT FRONT JUNCTION OF STRAPS TO RELEASE HARNESS.

(10) HEATING AND VENTILATING SYSTEM. - PULL OUT ON THE CONTROL HANDLES MARKED "HOT" AND "COLD" TO OBTAIN QUANTITY AND TEMPERATURE OF AIR DESIRED.

(11) VACUUM RESTRICTOR VALVE. - To REDUCE PRESSURE,
TURN HANDLE TOWARD "CLOSE" POSITION.

(12) MANIFOLD PRESSURE GAGE DRAIN. - To DRAIN LINE,
TURN HANDLE TOWARD "OPEN" POSITION.

SECTION IV

HANDLING AND FLYING NOTES FOR PILOT

1. INTRODUCTORY NOTES

FULL DETAILS OF THE EQUIPMENT OF THE AIRPLANE ARE GIVEN IN PRECEDING SECTIONS. THE PILOT SHOULD BE ACQUAINTED WITH THESE BEFORE FLYING THE AIRPLANE.

2. FITNESS OF AIRPLANE FOR FLIGHT

MAKE CERTAIN THAT THE TOTAL WEIGHT AND DISTRIBUTION OF THE LOAD ARE IN ACCORDANCE WITH THE LOADING DIAGRAM GIVEN IN SECTION VI, AND ASCERTAIN THAT THE AIRPLANE IS IN ALL OTHER RESPECTS FIT FOR FLIGHT.

3. PRELIMINARIES

ON ENTERING THE COCKPIT CHECK THAT:

- A. IGNITION SWITCH IS OFF.
- B. GUN SWITCHES OFF.
- C. CONTROLS HAVE FREE MOVEMENT.
- D. FLAPS ARE UP.
- E. BRAKES LOCKED.
- F. TAIL WHEEL UNLOCKED.
- G. LANDING GEAR SELECTOR CONTROL AT DOWN POSITION.
- H. WIND IN STEP.
- I. ADJUST RUDDER PEDALS AND CHECK FOR NEUTRAL POSITION.
- J. BATTERY SWITCH ON.
- K. FUEL COCK ON TO LEFT TANK. CHECK TOTAL FUEL CONTENTS.
- L. MAKE SURE THAT EMERGENCY ESCAPE LEVERS ARE UNLOCKED.
- M. CHECK THAT ELEVATOR TRIM TAB IS IN NEUTRAL POSITION, AS IT IS POSSIBLE TO ROTATE TAB WHEEL THROUGH 360°.

4. STARTING ENGINE AND WARMING UP

PROCEED AS FOLLOWS:

- A. IF ENGINE HAS BEEN STANDING, TURN OVER BY HAND.

- B. SEE THAT BLOWER CONTROL LEVER IS FULLY IN LOW BLOWER.
- C. CONSTANT SPEED PROPELLER CONTROL IN LOW PITCH
- D. CARBURETOR HEAT CONTROL TO FULL COLD.
- E. OIL COOLER SHUTTER CLOSED.
- F. COWL FLAPS OPEN.
- G. MIXTURE CONTROL TO IDLE CUT-OFF.
- H. BUILD UP FUEL PRESSURE WITH EMERGENCY FUEL PUMP TO 10 LBS/SQ. IN. PRESSURE.
- I. PRIME AS REQUIRED, AND SCREW PUMP HOME. DO NOT ATTEMPT TO PRIME BY PUMPING THROTTLE.
- J. LEAVE MIXTURE CONTROL IN IDLE CUT-OFF FOR STARTING.
- K. THROTTLE TO GIVE APPROXIMATELY 1000 RPM.
- L. IGNITION SWITCHES TO BOTH.
- M. MAINTAIN 8 TO 10 LBS/SQ. IN. FUEL PRESSURE THROUGHOUT THE STARTING OPERATIONS AND PRELIMINARY FIRING BY WORKING THE EMERGENCY FUEL PUMP AS REQUIRED.
- N. ENERGIZE STARTER, AND WHEN SUFFICIENT REVS. HAVE BEEN REACHED, SWITCH OVER TO ENGAGE; IMMEDIATELY ENGINE FIRES, SET MIXTURE CONTROL TO AUTO RICH AND OPEN THROTTLE ENOUGH TO GIVE EVEN RUNNING.

NOTE: IF THE ENGINE DOES NOT FIRE AFTER TWO OR THREE REVOLUTIONS WITH THE STARTER, THE TROUBLE MAY BE DUE TO INSUFFICIENT PRIMING IN THE LOWER CYLINDERS (NOT PRIMED BY PUMP). IN SUCH A CASE, MOVE THE MIXTURE CONTROL OUT OF IDLE CUT-OFF FOR HALF A REVOLUTION OF THE ENGINE, AND IMMEDIATELY RETURN TO IDLE CUT-OFF TO AVOID FLOODING. THEN REPEAT THE ATTEMPT TO START.

O. CHECK OIL PRESSURE AND IF PRESSURE DOES NOT REGISTER WITHIN 30 SECONDS STOP ENGINE AND INVESTIGATE. RUN ENGINE AT 1000 RPM UNTIL OIL TEMPERATURE IS 40°C. NOTE THAT WHEN STARTING WITH COLD OIL, INITIAL OIL PRESSURES AS HIGH AS 300 LBS/SQ. IN. MAY BE ENCOUNTERED.

P. IF THE AIRPLANE HAS BEEN STANDING OVERNIGHT IN COLD ATMOSPHERE, CONDENSED MOISTURE MUST BE DRAINED FROM THE MANIFOLD PRESSURE GAGE AND PIPE LINE. THIS CAN BE DONE DURING WARMING UP BY OPERATING A VALVE ON THE INSTRUMENT PANEL. ENSURE THAT THIS VALVE IS RETURNED TO THE CLOSED POSITION ON COMPLETION OF DRAINING.

5. TESTING ENGINE AND INSTALLATION

- A. CHECK CYLINDER HEAD TEMPERATURE DURING GROUND RUNNING.
- B. WHILE WARMING UP, CHECK FLAP OPERATION.
- C. CHECK CONSTANT-SPEED PROPELLER OPERATION.
- D. OIL PRESSURE SHOULD BE 70-90 LBS.
- E. MINIMUM OIL TEMPERATURE BEFORE RUNNING UP - 40°C.
DESIRED - 60° C. MAXIMUM - 85° C.
- F. CHECK FUNCTIONING OF MAGNETOS ON BOTH SWITCHES AT
APPROXIMATELY 25" Hg. AND CHECK MAIN ENGINE INSTRUMENTS.
- G. CHECK HYDRAULIC PRESSURE. THIS SHOULD BE 1050-1250
LBS/SQ. IN.
- H. CHECK THE TWO-SPEED BLOWER FOR PROPER FUNCTIONING IN THE
FOLLOWING MANNER: WITH THE ENGINE RUNNING AT 1400 TO 1500 RPM, MOVE
THE BLOWER CONTROL WITHOUT HESITATION INTO HIGH-BLOWER POSITION.
OPEN THE THROTTLE TO OBTAIN 28 TO 30 IN. Hg. MANIFOLD PRESSURE, AND
PERMIT THE ENGINE SPEED TO STABILIZE. NOTE THE MANIFOLD PRESSURE,
AND SHIFT THE BLOWER CONTROL INTO LOW-BLOWER, WITHOUT MOVING THE
THROTTLE CONTROL. A SUDDEN DROP IN MANIFOLD PRESSURE WILL OCCUR IF
THE BLOWER CONTROL IS FUNCTIONING PROPERLY.

6. TAXIING. - BEFORE STARTING TO TAXI, CHECK THAT:

- A. TAIL WHEEL IS UNLOCKED.
- B. COWL FLAPS OPEN.
- C. OIL COOLER OPEN (AS NECESSARY)

TEST BRAKES FREQUENTLY WHEN TAXIING TO INSURE THAT THE
SYSTEM IS WORKING CORRECTLY. THIS AIRCRAFT IS QUITE MANEUVERABLE
ON THE GROUND.

7. ACTIONS PRIOR TO TAKE-OFF. - IF THE ENGINE HAS BEEN IDLING FOR
ANY LENGTH OF TIME, RUN UP AGAINST THE BRAKES TO CLEAN OUT AND CHECK
THE ENGINE. PRIOR TO ACTUAL TAKE-OFF, CHECK THE FOLLOWING VITAL
ACTIONS: -

- A. TRIM TABS. AILERONS NEUTRAL - ELEVATORS NEUTRAL -
RUDDER  RIGHT.
13°
- B. MIXTURE CONTROL IN AUTO RICH.
- C. PROPELLER CONTROL IN LOW PITCH.
- D. FLAPS DOWN ABOUT 20°.

E. COWL FLAPS - OPEN (AS NECESSARY).

F. BLOWER - LOW RATIO.

G. OIL TEMPERATURE CONTROL OPEN (AS NECESSARY).

H. CARBURETOR HEATER TO COLD.

I. TAIL WHEEL LOCKED.

WARNING: COWL FLAPS AND WING FLAP OPERATING LEVERS MUST ALWAYS BE RETURNED TO NEUTRAL AFTER EACH OPERATION.

J. FUEL SELECTOR ON LEFT OR RESERVE.

8. TAKE-OFF. - THE TAKE-OFF IS NORMAL AND A VERY SLIGHT TENDENCY TO SWING TO THE LEFT CAN EASILY BE CORRECTED BY THE APPLICATION OF RUDDER.

DO NOT EXCEED FOLLOWING ENGINE LIMITATIONS DURING TAKE-OFF (1 TO 1-1/2 MINS. LIMIT).

A. LOW BLOWER RATIO - RICH MIXTURE

B. RPM 2700 - Boost 43" Hg. AT SEA LEVEL
- Boost 45" Hg. AT 5000 FT.

C. CYLINDER HEAD TEMPERATURE - 260° C.

D. OIL INLET TEMPERATURE - 100° C.

9. ACTIONS AFTER TAKE-OFF. - AS SOON AS THE AIRPLANE IS CLEAR OF THE GROUND -

A. RETRACT LANDING GEAR.

B. THROTTLE BACK TO 41" Hg.

C. REDUCE REVS TO 2550 RPM.

D. RAISE FLAPS WHEN ABOVE 400 FT. (RETURN CONTROL TO NEUTRAL).

WARNING: THE RAISING OF THE FLAPS WILL GIVE A NOSE HEAVINESS, AND BACK PRESSURE WILL BE NEEDED ON THE STICK TO OVERCOME THIS UNTIL SUCH TIME AS THE AIRPLANE HAS BEEN RETRIMMED, AND IT IS THEREFORE SUGGESTED THAT BEFORE RAISING THE FLAPS THE AIRPLANE SHOULD BE RETRIMMED TAIL HEAVY, BUT CARE MUST BE TAKEN TO MAINTAIN AMPLE FLYING SPEED DURING THIS OPERATION. FURTHERMORE, IT IS SUGGESTED THAT WHEN TAKING OFF AT NIGHT, OR UNDER LOW CEILING CONDITIONS WHEN AMPLE ROOM FOR TAKE-OFF IS AVAILABLE, THE FLAPS SHOULD NOT BE USED.

E. RE-TRIM FOR CLIMBING.

- F. CHECK CYLINDER HEAD TEMPERATURE (260° MAXIMUM) AND ADJUST COWL FLAPS.
- G. CHECK OIL TEMPERATURE (100° MAXIMUM, 85° RECOMMENDED) AND ADJUST SHUTTER.
- H. CHECK ALL OTHER ENGINE INSTRUMENTS.
- I. CLOSE COCKPIT ENCLOSURE.

10. ENGINE FAILURE DURING TAKE-OFF. - IF ENGINE SHOULD FAIL DURING TAKE-OFF, MAINTAIN FLYING SPEED, LOWER FLAPS AND ENDEAVOR TO RAISE LANDING GEAR AS FAR AS POSSIBLE. SWITCH OFF AND LAND STRAIGHT AHEAD.

11. CLIMBING. - THE BEST INITIAL CLIMBING SPEED OF THIS AIRPLANE IS APPROXIMATELY 145 M.P.H., AND THE FOLLOWING ENGINE LIMITATIONS APPLY FOR MAXIMUM CLIMB:

- A. 0 TO 10,000 FT. BLOWER, LOW RATIO - RICH MIXTURE
2550 RPM - 41" Hg. BOOST
CYLINDER HEAD TEMP. 260° C. MAX.
OIL INLET - 100° C. MAX.
- B. 10,000 FT. UPWARD: BLOWER, HIGH RATIO - RICH MIXTURE
2550 RPM - 40" Hg. BOOST
CYLINDER HEAD TEMP. 260° C. MAX.
OIL INLET - 100° C. MAX.

NO ADVANTAGE IS TO BE OBTAINED IN OPERATING AT HIGH BLOWER AT LESS THAN 11,000 FEET. IN SHIFTING BLOWER, THE CONTROL SHOULD BE MOVED WITHOUT HESITATION. IN SHIFTING FROM LOW BLOWER TO HIGH BLOWER, THE ENGINE SHOULD BE THROTTLE BACK SUFFICIENTLY THAT AT HIGH BLOWER, MANIFOLD PRESSURE LIMIT WILL NOT BE EXCEEDED.

COWL FLAPS MUST BE USED TO REGULATE CYLINDER HEAD TEMPERATURES.

12. CRUISING. - THE ENGINE SHOULD NORMALLY BE RUN AT THE LOWEST SUITABLE POWER OUTPUT, PROVIDED ROUGH PERIODS ARE AVOIDED, AND THE FOLLOWING ARE THE NORMAL CRUISING CONDITIONS:

	RPM	Boost " Hg.	CYL. TEMP.	OIL INLET
LOW BLOWER) RICH MIXTURE)	2325	32.5	232°C.	85°C.
LOW BLOWER) LEAN MIXTURE)	2250	28	232°C.	75°C.
HIGH BLOWER) RICH MIXTURE)	2325	31	232°C.	85°C.
HIGH BLOWER) LEAN MIXTURE)	2250	29.5	232°C.	75°C.

THE FOLLOWING EMERGENCY CONDITIONS ARE MAXIMUM PERMISSIBLE FOR 5 MINUTES LIMIT:

	<u>RPM</u>	<u>Boost</u> " Hg.	<u>CYL.</u> <u>TEMP.</u>	<u>OIL</u> <u>INLET</u>
LOW BLOWER) RICH MIXTURE)	2700	45	260°C.	100°C
HIGH BLOWER) RICH MIXTURE)	2700	41	260°C.	100°C.

THE FOLLOWING OIL LIMITATIONS ALWAYS APPLY:

NORMAL - 90 LBS./SQ. IN.

EMERGENCY MINIMUM - 65 LBS./SQ. IN.
(5 MINS. ONLY)

NOTE: COWL FLAPS MUST BE OPENED WHEN CRUISING AT MAXIMUM POWER WITH HIGH BLOWER IN ORDER TO OBTAIN SATISFACTORY CYLINDER HEAD COOLING. (SEE ENGINE OPERATING LIMITS IN PARA. 27.)

13. GENERAL FLYING. - THE FLYING CHARACTERISTICS OF THIS AIRPLANE ARE GOOD; IT IS MANEUVERABLE AND HANDLES WELL.

THE LANDING GEAR SHOULD NOT BE LOWERED AT OVER 160 I.A.S.
THE FLAPS SHOULD NOT BE LOWERED AT OVER 160 I.A.S.

14. INSTRUMENT FLYING. - THE INSTRUMENT FLYING QUALITIES OF THIS AIRPLANE ARE SATISFACTORY. IT SHOULD BE NOTED THAT IF A WING DROPS, IT HAS LITTLE OR NO TENDENCY TO RIGHT ITSELF, AND THE PILOT MUST THEREFORE KEEP THE AIRPLANE Laterally LEVEL AT ALL TIMES.

THE AIRPLANE MUST RE-TRIMMED DIRECTIONALLY, AND FORE AND AFT, IF THE ENGINE POWER OUTPUT IS ALTERED.

RATE OF CHANGE OF TURN INDICATOR CAN BE ADJUSTED TO DESIRED AMOUNT BY OPERATING THUMB SCREW VALVE ON RIGHT OF DASHBOARD. ALWAYS SET TO DESIRED AMOUNT BEFORE DOING INSTRUMENT FLYING.

15. STALLING. - THE STALLING CHARACTERISTICS OF THIS AIRPLANE ARE QUITE NORMAL.

STALLING SPEEDS UNDER FULL LOAD ARE AS FOLLOWS:

LANDING GEAR UP AND FLAPS UP	- 94 M.P.H. I.A.S.
LANDING GEAR UP, FLAPS DOWN	- 85 M.P.H. I.A.S.
LANDING GEAR DOWN, FLAPS UP	- 98 M.P.H. I.A.S.
LANDING GEAR DOWN, FLAPS DOWN	- 88 M.P.H. I.A.S.

16. GLIDING. - THE GLIDE IS NORMAL, AND THE FOLLOWING SPEEDS ARE RECOMMENDED.

POWER "OFF"

LANDING GEAR AND FLAPS UP	- 125-130 M.P.H. I.A.S.
LANDING GEAR AND FLAPS DOWN	- 120 M.P.H. I.A.S.

POWER "ON"

LANDING GEAR AND FLAPS UP	-120-125 M.P.H. I.A.S.
LANDING GEAR AND FLAPS DOWN	-110-115 M.P.H. I.A.S.

THESE SPEEDS SHOULD BE INCREASED SLIGHTLY BEFORE MAKING A TURN.

CHECK CYLINDER HEAD AND OIL TEMPERATURES DURING GLIDE, AND ADJUST COWL FLAPS AND OIL COOLING ACCORDINGLY.

17. SIDE SLIPPING. - THIS AIRPLANE CAN BE SIDE SLIPPED REASONABLY WELL. WITH POWER "OFF" AND LANDING GEAR AND FLAPS DOWN, SPEED SHOULD BE INCREASED TO ABOUT 120 M.P.H. BEFORE AND DURING THE SIDE-SLIP. CONTROL AT THIS SPEED IS ADEQUATE.

18. DIVE. - THIS AIRPLANE BECOMES INCREASINGLY TAIL HEAVY IN THE DIVE AS SPEED INCREASES, AND SHOULD BE TRIMMED SLIGHTLY NOSE HEAVY BEFORE STARTING A DIVE. AILERON CONTROL IS GOOD THROUGHOUT COMPLETE SPEED RANGE.

IF THE PROPELLER CONTROL IS PLACED IN THE FULL HIGH PITCH POSITION, THE MAXIMUM ENGINE SPEED DURING A DIVE IS 1550 R.P.M. THIS IS NOT THE RECOMMENDED PROCEDURE FOR A DIVE, AND IT IS PREFERABLE TO SET THE PROPELLER CONTROL TO GIVE SLIGHTLY IN EXCESS OF 2250 RPM. THE ENGINE SPEED USED WILL BE MAINTAINED THROUGHOUT.

BEFORE COMMENCING DIVE -

- A. SET PROPELLER CONTROL TO GIVE IN EXCESS OF 2250 RPM.
- B. BLOWER IN LOW RATIO.
- C. MIXTURE CONTROL TO AUTOMATIC RICH.
- D. THROTTLE APPROXIMATELY 1/3 OPEN (12-15 IN.HG.MIN.)
- E. RUDDER TAB CENTRAL.
- F. ELEVATOR TRIM SLIGHTLY NOSE HEAVY.
- G. COWL FLAPS CLOSED.
- H. OIL COOLING SHUTTER IN (CLOSED).
- I. COCKPIT ENCLOSURE OPEN.

NOTE: (1) MAXIMUM PERMISSIBLE DIVING SPEED IS 425 M.P.H. I.A.S.

(2) MAXIMUM PERMISSIBLE ENGINE REVS IN THE DIVE ARE 3060 FOR 30 SECONDS MAXIMUM.

19. AEROBATICS. - ALL NORMAL AEROBATICS MAY BE CARRIED OUT ON THIS AIRPLANE. CARE MUST BE TAKEN TO SEE THAT AMPLE HEIGHT IS LEFT FOR RECOVERY FROM ANY MANEUVER, AND TRIMMER TABS MUST NOT BE USED TO ASSIST CONTROL.

THIS AIRPLANE HANDLES EASILY AND SMOOTHLY IN ALL MANEUVERS.

20. APPROACH AND LANDING (GENERAL)

WARNING: ATTENTION IS DRAWN TO PARAGRAPH 9, AND THE PILOT MUST BE PREPARED FOR A CHANGE OF TRIM TO "NOSE-UP" CONDITION WHEN FLAPS ARE LOWERED.

IN ORDER TO AVOID TROUBLES ARISING FROM THIS SOURCE, PARTICULARLY AT NIGHT, IT IS RECOMMENDED THAT ABOUT 15° OF FLAP IS APPLIED IMMEDIATELY AFTER THE LANDING GEAR HAS BEEN LOWERED, THE REST OF THE FLAP BEING APPLIED WHEN IN A SUITABLE POSITION. THE LOWERING OF THE FLAPS FROM 15° ONWARDS PRODUCES LITTLE OR NO FURTHER CHANGE IN ATTITUDE AND ONLY A SLIGHT ALTERATION OF TRIM WILL BE NECESSARY, ALTHOUGH THE DRAG IS MUCH INCREASED.

APART FROM THE ABOVE CHARACTERISTICS, THE REST OF THE APPROACH AND LANDING ARE NORMAL.

NOTE THE FOLLOWING:

- A. LANDINGS SHOULD ALWAYS BE MADE WITH FLAPS LOWERED.
- B. ANGLE OF DESCENT IS STEEP, AND HEIGHT IS QUICKLY LOST DURING GLIDING TURNS.
- C. EITHER ENGINE ASSISTED OR ENGINE OFF APPROACHES MAY BE MADE.
- D. THIS AIRPLANE KEEPS PERFECTLY STRAIGHT AFTER LANDING IF THE TAIL WHEEL IS LOCKED. ANY TENDENCY TO SWING, WHEN TAIL WHEEL IS NOT LOCKED, IS EASILY CORRECTED BY IMMEDIATE APPLICATION OF RUDDER, OR, IF NECESSARY, BRAKE.
- E. LANDING GEAR AND FLAPS ARE NOT TO BE LOWERED AT SPEEDS IN EXCESS OF 165 M.P.H.

21. PRELIMINARY APPROACH. - REDUCE SPEED DURING THE INITIAL CIRCUIT TO ABOUT 140-150 M.P.H., AND -

- A. ENCLOSURE FULLY OPEN.
- B. MIXTURE CONTROL AUTO RICH.
- C. COWL FLAPS AND OIL COOLING SHUTTER CLOSED AS REQUIRED. (RETURN LEVER TO NEUTRAL).
- D. BLOWER LOW.
- E. LOWER LANDING GEAR, CHECK TO SEE THAT IT IS LOCKED IN DOWN POSITION, AND RE-TRIM.
- F. LOWER FLAPS TO 15°, AND RE-TRIM AS NECESSARY. (RETURN LEVER TO NEUTRAL).
- G. TAIL WHEEL LOCKED.
- H. PROPELLER CONTROL TO FULL LOW PITCH.
- I. WHEN IN SUITABLE POSITION, LOWER FLAPS FULLY. (RETURN LEVER TO NEUTRAL.)
- J. CHECK BRAKE PRESSURE BY PUSHING ON PEDALS ONCE OR TWICE.

22. FINAL APPROACH AND LANDING. - THIS AIRPLANE HAS A HIGH RATE OF DESCENT WITH FLAPS FULLY DOWN, AND A NORMAL ENGINE-ASSISTED APPROACH IS RECOMMENDED. THE FOLLOWING SPEEDS SHOULD BE ADHERED TO:

ENGINE "OFF"	- 120 M.P.H. I.A.S.
ENGINE "ON"	- 110-115 M.P.H. I.A.S.

ONCE IN LANDING ATTITUDE, SPEED IS LOST VERY QUICKLY AND THE PRECEDING SPEEDS WILL GIVE SATISFACTORY "HOLD-OFF" DURING LANDING. KEEP STRAIGHT ON GROUND BY APPLICATION OF RUDDER AND, IF NECESSARY, BY GENTLE USE OF BRAKES. THERE IS LITTLE OR NO TENDENCY TO SWING.

ON COMPLETION OF RUN -

- A. TAIL WHEEL UNLOCKED.
- B. FLAPS UP. (RETURN LEVER TO NEUTRAL).
- C. COWL FLAPS OPEN. (RETURN LEVER TO NEUTRAL).
- D. OIL COOLING SHUTTER FULL OPEN.

STOP ENGINE BY -

- E. OPENING THROTTLE TO ABOUT 1000 RPM.

NOTE: DILUTE OIL IF A COLD WEATHER
START IS ANTICIPATED. REFER
TO T.O. No. 02-1-29.

- F. MIXTURE CONTROL TO IDLE CUT-OFF.
- G. WHEN ENGINE STOPS, SWITCH OFF IGNITION SWITCH AND BATTERY SWITCH. TURN OFF FUEL.
- H. COWL FLAPS MUST BE LEFT OPEN FOR AT LEAST 15 MINUTES AFTER SHUT-DOWN.

23. FORCED LANDINGS. - IN EVENT OF A FORCED LANDING, THE PILOT MUST DECIDE WHETHER OR NOT IT IS ADVISABLE TO LOWER THE LANDING GEAR OR WHETHER A LANDING SHOULD BE MADE WITH THE LANDING GEAR RETRACTED. THE LOWEST STALLING SPEED OF THIS AIRPLANE IS OBTAINED WITH THE LANDING GEAR RETRACTED AND THE FLAPS EXTENDED, AND THIS SHOULD BE BORNE IN MIND WHEN MAKING A DECISION.

- A. IF IN DOUBT, LAND WITH LANDING GEAR UP.
- B. FUEL COCK OFF, AND IGNITION SWITCH OFF.
- C. FLAPS DOWN

IN EVENT OF FORCED LANDING ON WATER -

- D. LANDING GEAR MUST BE UP.
- E. LANDING MUST BE MADE INTO WIND.
- F. SAFETY HARNESS SHOULD BE KEPT ON; BUT PARACHUTE HARNESS SHOULD BE RELEASED.
- G. LIFE SAVING JACKET, IF WORN, SHOULD BE PARTIALLY INFLATED ONLY.

- H. COCKPIT ENCLOSURE SHOULD BE IN THE FULLY OPEN POSITION.
- I. LAND AS MUCH TAIL DOWN AS POSSIBLE, AND USE ENGINE IF AVAILABLE TO REDUCE SPEED AND INCREASE ANGLE OF ATTACK.
24. FLYING IN RAIN OR BAD VISIBILITY. - FLY AT ABOUT 140 M.P.H.
- A. COCKPIT ENCLOSURE MAY BE OPENED IF DESIRED.
- B. FLAPS DOWN ABOUT 15°. (RETURN LEVER TO NEUTRAL.)
- C. SET PROPELLER CONTROL TO GIVE 2550 RPM.
- D. CHECK CYLINDER HEAD TEMPERATURE AND ADJUST COWL FLAPS AS NECESSARY.
- E. CHECK OIL TEMPERATURE AND ADJUST SHUTTER AS NECESSARY.
- F. SUFFICIENT CARBURETOR PRE-HEAT SHOULD BE MAINTAINED TO PREVENT ICING OF INDUCTION SYSTEM.
25. AIRPEED ERROR TABLE. - THE CORRECTIONS FOR AIRSPEED INDICATOR ERROR ARE AS FOLLOWS:

AT 100 M.P.H. I.A.S. READING, ADD - M.P.H.

AT 125 M.P.H. I.A.S. READING, ADD 1 M.P.H.

AT 150 M.P.H. I.A.S. READING, ADD 2 M.P.H.

AT 175 M.P.H. I.A.S. READING, ADD 3 M.P.H.

AT 200 M.P.H. I.A.S. READING, ADD 4 M.P.H.

AT 225 M.P.H. I.A.S. READING, ADD 5 M.P.H.

AT 250 M.P.H. I.A.S. READING, ADD 6 M.P.H.

AT 275 M.P.H. I.A.S. READING, ADD 7 M.P.H.

AT 300 M.P.H. I.A.S. READING, ADD 8 M.P.H.

AT 325 M.P.H. I.A.S. READING, ADD 9 M.P.H.

AT 350 M.P.H. I.A.S. READING, ADD 10 M.P.H.

26. ENGINE OPERATING LIMITS

	RPM	Boost " Hg.	CYL.°C. TEMP.	OIL INLET
TAKE-OFF 1-1/2 MIN. LIMIT (LOW RATIO - RICH MIXTURE)				
SEA LEVEL	2700	48	260	100
5000'	2700	45	260	100

		RPM	Boost " Hg.	CYL.°C. TEMP.	OIL INLET
CLIMBING - 1/2 Hour LIMIT	(0-10,000' Low RATIO (RICH MIXTURE)	2500	41	260	100
	(10,000'-Up HIGH RATIO (RICH MIXTURE)	2500	40	260	100
CRUISING -	(Low RATIO (RICH MIXTURE)	2325	32.5	232	85
	(HIGH RATIO (RICH MIXTURE)	2325	31	232	85
	(Low RATIO (LEAN MIXTURE)	2250	28	232	75
	(HIGH RATIO (LEAN MIXTURE)	2250	29.5	232	75
EMERGENCY - 5-MINUTE LIMIT	(Low RATIO (RICH MIXTURE)	2700	45	260	100
	(HIGH RATIO (RICH MIXTURE)	2700	41	260	100

OIL PRESSURE: NORMAL - 90 LBS /SQ. IN.

EMERGENCY MINIMUM (5 MINS.) 65 LBS /SQ. IN.

OIL TEMPERATURE FOR TAKE-OFF: 40° C. MINIMUM

27. USE OF OIL DILUTION SYSTEM

REFER TO U. S. ARMY AIR CORPS TECHNICAL ORDER No. 02-1-29
FOR COMPLETE INSTRUCTIONS REGARDING USE OF OIL DILUTION
SYSTEMS.

SECTION V

FLYING CHARACTERISTICS

1. CONDITIONS

ENGINE: P. & W. R-1830 S3C4-G
PROP.: DIAMETER = 10.25 FT. 3 BLADES
GEAR RATIO: 16:9
EXTERNAL CONFIGURATION: SHORT NOSE; NO ANTENNAS; NO PAINT;
4—.30 CAL. WING GUNS; 2—.50 CAL.
SYNCH. GUNS
GROSS WEIGHT: 7100 LBS. (124 GALS. FUEL, 100 OCTANE)

2. PERFORMANCE

<u>ITEM</u>	<u>UNITS</u>	<u>GUARANTEED**</u>
HIGH SPEED (MILITARY RATING)		
AT 6900 FT. (L.B.) (2000 FT. RAM)	MPH	332
AT 15100 FT. (H.B.) (2000 FT. RAM)	MPH	340
HIGH SPEED (NORMAL RATING)		
AT 8200 FT. (L.B.) (2000 FT. RAM)	MPH	324
AT 14500 FT. (H.B.) (2000 FT. RAM)	MPH	331
CRUISING SPEED AT RATED CRUISING POWER		
AT 17000 FT. (H.B.) (700 BHP)	MPH	292
CLIMB IN 5 MIN. (MILITARY RATING)	FT.	12,600
TIME TO CLIMB TO 6000 M. (19,680')	MIN.	9.2
MILITARY POWER FOR FIRST 5 MINUTES, NORMAL POWER THEREAFTER		
SERVICE CEILING	FT.	28,200
RANGE AT RATED CRUISING POWER		
AT 17,000 FT. (124 GALS. FUEL)	MI	600
ENDURANCE AT NORMAL RATED POWER WITH NORMAL FUEL (124 GALS. FUEL)		
AT MAXIMUM NORMAL POWER (L.B.) (1100 BHP)	HRS.	0.89
AT MAXIMUM NORMAL POWER (H.B.) (1000 BHP)	HRS.	0.96
LANDING SPEED	MPH	82

** TOLERANCE: SPEEDS, 3%. ALL OTHER CHARACTERISTICS, 5%.

SECTION VIWEIGHT DATA1. WEIGHT IN POUNDS

REFER TO FIG. 8, "LOADING CHART."

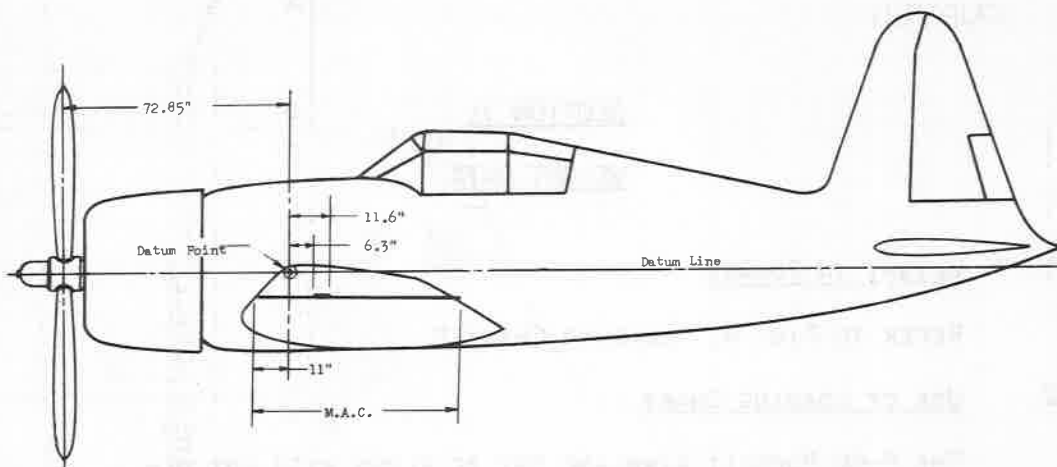
2. USE OF LOADING CHART

THE P-66 PURSUIT AIRPLANE MAY BE FLOWN WITH ANY DESIRED LOADING COMBINATION, PROVIDED THAT THE BALLAST STIPULATED IN THE LOADING DIAGRAM, AT FIGURE 8 IS IN PLACE.

IN ORDER TO OBTAIN THE CENTER OF GRAVITY OF THE DESIRED LOADING, THE WEIGHT OF EACH ITEM AND ITS MOMENT ABOUT THE DATUM POINT SHOULD BE ADDED RESPECTIVELY TO THE TARE WEIGHT AND MOMENT OF THE AIRCRAFT, AND THE TOTAL MOMENT THUS OBTAINED, DIVIDED BY THE TOTAL GROSS WEIGHT. THE RESULT FROM THIS OPERATION WILL INDICATE THE LOCATION OF THE CENTER OF GRAVITY IN RELATION TO THE DATUM POINT.

SHOWN IN THE LOADING DIAGRAM IS THE RESULT OF ADDING THE NORMAL GROSS LOAD TO THE WEIGHT OF THE AIRPLANE EMPTY, AND THE LOADING THAT WILL BRING ABOUT A MOST FORWARD CENTER OF GRAVITY CONDITION. A MOST REARWARD CENTER OF GRAVITY CONDITION IS ACHIEVED BY ADDING THE OVERLOAD FUEL AND THE OVERLOAD OIL TO THE NORMAL GROSS LOADING.

NOTE: THE PERMISSIBLE LIMITS OF THE CENTER OF GRAVITY TRAVEL FOR THE SUBJECT MODEL ARE FROM 6.3 INCHES TO 11.6 INCHES AFT OF THE DATUM POINT.



No.	Removable Load	Normal Gross			Most Forward		
		Weight	Arm To Datum	Moment	Weight	Arm To Datum	Moment
1	Pilot & Chute	180.0	53.75	9675	Same as Normal Gross		
Note 1	2-Cal. .50 Syn. Guns	134.0	1.05	141	Same as Normal Gross		
	450 Rds. Cal. .50 Ammo.	112.0	6.05	678	Same as Normal Gross		
Note 2	4-Cal. .30 Wing Guns	112.0	21.05	2358	Same as Normal Gross		
	2000 Rds. Cal. .30 Ammo.	130.0	17.25	2242	0		
Note 3	Gun Sight	7.2	30.15	96	Same as Normal Gross		
	Forward Armor Plate	16.0	12.95	181	Same as Normal Gross		
	Rearward Armor Plate	88.0	69.45	6112	Same as Normal Gross		
	Bullet Proof Windshield	28.0	33.75	945	Same as Normal Gross		
	Fuel - 100 Imp. Gal. - Normal	744.0	25.75	19158	0		
	Oil - 7.5 Imp. Gal. - Normal	68.0	14.65	996	Same as Normal Gross		
	Miscellaneous	16.0	60.75	972	Same as Normal Gross		
Note 4	Oxygen Equipment	117.8	69.75	8217	Same as Normal Gross		
Note 5	Bendix Radio						
	Total - Useful Load	1747.0	28.49	49779	873.0	32.51	28379
	Weight Empty - Gear Up	5214.0	4.98	25966	---	---	---
	Weight Empty - Gear Down	---	---	---	5214.0	4.67	24349
	Gross Weight - Normal	6961.0	10.88	75745	6087.0	8.66	52728
	Overload Fuel (46.5 Imp. Gal. add 336 Pounds)						
	Overload Oil (5 Imp. Gal. add 45 Pounds)						

- Note 1 Item 2 CAL. .50 SYN. Guns - Consists of firing solenoids, trunnion bolt and bracket assemblies, trunnion posts, and blast tube assemblies. If any or all of these items cannot be installed, balance of the same amount must be added at the same location.
- Note 2 Item 4 CAL. .30 WING Guns - Consists of firing solenoids, trunnion bolt and bracket assemblies, rear post assemblies, and blast tube assemblies.
- Note 3 Item 6 GUN SIGHT - Consists of Type ST-1A fixed gunsight assembly and reflector assembly.
- Note 4 Item 12 OXYGEN EQUIPMENT - Consists of oxygen bottle only.
- Note 5 Item 13 RADIO - Consists of TA-6A transmitter, MN-26H receiver, MT-31A tuning meter, MN-31A loop control unit, MN-28E & MS-80A remote control units, MT-81A microphone, MN-44A azimuth indicator, MN-36A loop antenna, MS-14C junction box; plus cables, fittings and panels.

WEIGHT EMPTY - 5214#

MAXIMUM GROSS WEIGHT AT WHICH
THIS AIRPLANE HAS BEEN TESTED
FOR ALL FORMS OF FLYING - 7100#

PERMISSIBLE LIMITS OF C.G. TRAVEL
6.3 inches to 11.6 inches aft of
Datum Point.

M.A.C. - 69.18 INCHES

NORMAL C.G.:-
10.88 Inches Aft of Datum

MOST FORWARD C.G.:-
8.66 Inches Aft of Datum

FIG.
8

LOADING CHART

FIG.
8

