RESTRICTED

THE LOCKER PROVIDED FOR CLASSIFIED DATA IN THIS AIRPLANE GIVES CLASS "C" STOWAGE AS DEFINED BY ARTICLE 112 OF R.P.S. - 6

PILOT'S HANDBOOK
MODEL SBD-3
1942

IMPORTANT

THIS INFORMATION IS FOR SERVICE PILOTS ONLY AND MUST NOT FALL INTO UNAUTHORIZED HANDS
(SEE ESPIONAGE ACT SECTION 31)

COPY NO. 132

PREFACE

THE INFORMATION CONTAINED HEREIN IS THE RESULT OF FACTORY AND OPERATOR'S EXPERIENCE AND CONSTITUTES THE GENERALLY ACCEPTED PRACTICE OF OPERATION FOR THIS PARTICULAR AIRPLANE.

THESE INSTRUCTIONS ARE FURNISHED FOR THE OPERATORS' INFORMATION AND WITHOUT ANY WARRANTY INCIDENT THERETO. FURTHERMORE, THE DOUGLAS AIRCRAFT COMPANY RESERVES THE RIGHT TO MAKE CHANGES (APPROVED BY THE BUREAU OF AERONAUTICS) TO THIS INFORMATION AT SUCH TIME THAT ADVANCED METHODS OF OPERATION MAY BE FORTHCOMING FROM THE ABOVE SOURCES.

DOUGLAS AIRCRAFT CO., INC.

FOREWORD

THIS HANDBOOK CONTAINS THE INFORMATION NECESSARY TO ACQUAINT THE SERVICE PILOT WITH ALL CONTROLS, CHARACTERISTICS, AND EQUIPMENT OF THE SBD-3 AIRPLANE. IT SHOULD BE THOROUGHLY STUDIED BEFORE THE PILOT'S FIRST FLIGHT.

INDEX

PAGE

1. GENERAL DATA
   - WEIGHTS (NON-COMBAT) 2
   - USEFUL LOAD 2
   - WEIGHTS (COMBAT) 3
   - GROSS WEIGHTS (COMBAT) 4
   - USEFUL LOADS (COMBAT) 4
   - CHARACTERISTICS 4
   - PERFORMANCE CHARACTERISTICS (NON-COMBAT) 6
   - PERFORMANCE CHARACTERISTICS (COMBAT) 7

2. FLYING CHARACTERISTICS
   - TAXIING 8
   - TAKE-OFF 9
   - LANDING 10
   - CHECK-OFF LIST, TAKE-OFF 11
   - CHECK-OFF LIST, LANDING 12

3. COCKPIT ARRANGEMENT AND LIST OF CONTROLS
   - PILOT'S COCKPIT 13
   - FLYING CONTROLS 13
   - POWER PLANT CONTROLS 13
   - AUXILIARY CONTROLS 14
   - USEFUL LOAD CONTROLS 14
   - INSTRUMENTS 15
   - GUNNER'S COCKPIT 16
   - FLYING CONTROLS 16
   - POWER PLANT CONTROLS 16
   - AUXILIARY CONTROLS 16
   - USEFUL LOAD CONTROLS 16
   - INSTRUMENTS 16

PAGE

4. Operation and Function of Controls
Ailerons 18
Aileron Tab 18
Elevators 18
Elevator Tabs 18
Rudder 18
Rudder Tab 19
Landing Flaps 19
Diving Flaps 20
Carburetor Air Control 21
Cowling Flaps Control 22
Throttle 23
Approach Light 23
Arresting Gear 23
Automatic Pilot 23
Brakes and Parking Brake 26
Distribution Panel 26
Enclosure Latches 27
Fire Extinguisher 27
Flight Controls Lock 27
Flotation System 28
Engine Hydraulic Pump Control Valve 29
Hand Hydraulic Pump 29
Landing Light 29
Landing Gear 30
Oxygen Equipment 32
Pilot's Headrest 32
Rudder Pedal Adjustment 32
Seat Adjustments 33
Tail Wheel Lock 33
Windshield Hot Air Control 33
Bomb Arming Lever 33
Bomb Release 34

PAGE

PARACHUTE FLARE RELEASE 34
ROUNDS COUNTER 34
TRIGGER SWITCH 34
VERY PISTOL 34
FLOAT LIGHTS 34
SMOKE GRENADES 34
SMOKE TANK CONTROLS 35
COCKPIT VENTILATOR 35
LIFE RAFT 35
CHARTBOARD 35
HOISTING SLING 35
EMERGENCY RATIONS AND FRESH WATER. 36
SPARE FUSES 36
STARTER CRANK 36
FLASHLIGHTS 36

5. POWER PLANT
ENGINE 37
STARTING 38
WARM-UP 40
STOPPING 41
MANIFOLD PRESSURE 42
MIXTURE CONTROL 42
SUPERCHARGER CONTROL 43
FUEL SYSTEM 46
OIL SYSTEM 50
PROPELLER 53
CRUISING CHART - USE OF 72
AUTO PILOT GROUND CHECK 86
AUTO PILOT FLIGHT CHECK 88

LIST OF ILLUSTRATIONS

PAGE

COMPLETE AIRPLANE - PHOTO 1
CHECK-OFF LIST, TAKE-OFF 11
CHECK OFF LIST, LANDING 12
FUEL SYSTEM DIAGRAM 49
OIL SYSTEM DIAGRAM 52
PILOT'S SEAT - PHOTO 54
PILOT'S INSTRUMENT PANEL - PHOTO ... 55
PILOT'S COCKPIT, FRONT - PHOTO 56
PILOT'S COCKPIT, LEFT - PHOTO 57
PILOT'S COCKPIT, RIGHT - PHOTO 58
PILOT'S COCKPIT, REAR - PHOTO 59
SURFACE CONTROLS, PILOT'S COCKPIT - PHOTO 60
AFTER COCKPIT SEAT - PHOTO 61
AFTER COCKPIT, FRONT - PHOTO 62
AFTER COCKPIT, LEFT - PHOTO 63
AFTER COCKPIT, RIGHT - PHOTO 64
AFTER COCKPIT, REAR - PHOTO 65
SURFACE CONTROLS, AFTER COCKPIT - PHOTO 66
FUEL CONSUMPTION - FULL RICH 67
FUEL CONSUMPTION - CRUIS. LEAN 68
MIXTURE RATIO AND FLOW 69
PROPELLER LOAD CURVE 70
AIRSPEED CORRECTION CHART 71
CRUISING SPEED CHARTS (NON-COMBAT)
1000 LB. BOMBER 75
310 GAL. SCOUT 76
180 GAL. SCOUT 77

PAGE

CRUISING SPEED CHARTS (COMBAT)
1000 LB. BOMBER 78
260 GAL. SCOUT 79
150 GAL SCOUT 80
LANDING SPEED CHART 81
SPEED FOR MAX. RATE OF CLIMB 82
LOW BLOWER CHARACTERISTICS - S.L. AND ALTITUDE 83
HIGH BLOWER CHARACTERISTICS - ALTITUDE 84
MAX. PERMISSIBLE OPERATING CONDITIONS 85
ANGLE OF ATTACH (NORMAL) 90
ANGLE OF ATTACH (COMBAT) 91
MANIFOLD PRESSURE CURVE 92
MAX. PERMISSIBLE OPERATING CONDITIONS (CURVE) 93
ENGINE OPERATING CURVES 94

PHOTO NO. 41424 - FINAL ASSEMBLY - LEFT FRONT

1. GENERAL DATA

THE WEIGHT EMPTY IS THE ACTUAL WEIGHT OF THE FIRST AIRPLANE AS WEIGHED ON 1-19-41.

WEIGHTS - NON-COMBAT CONDITION

WEIGHT EMPTY ..... (AS A CARRIER LANDPLANE)	5669.5
BOMBER ..... (1000# BOMB & 100 GAL. FUEL)	8339.0
BOMBER ..... (500# BOMB & 140 GAL. FUEL)	8094.0
SCOUT ..... (180 GAL. FUEL)	7784.8
SCOUT ..... (MAX FUEL 310 GAL.)	8617.3

USEFUL LOAD

USEFUL LOAD AS A DIVE BOMBER WITH ONE 1000# BOMB	2669.5
CREW (2)	400.0
FUEL (100 GAL.)	600.0
OIL (8 GAL)	60.0
ARMAMENT	1291.4
EQUIPMENT	318.1

USEFUL LOAD AS A DIVE BOMBER WITH ONE 500# BOMB	2424.5
CREW (2)	400.0
FUEL (140 GAL.)	840.0
OIL (10 GAL.)	75.0
ARMAMENT	791.4

EQUIPMENT 318.1

USEFUL LOAD AS A SCOUT WITH 180 GAL.
FUEL 2115.3
CREW (2) 400.0
FUEL (180 GAL.) 1080.0
OIL (12 GAL.) 90.0
ARMAMENT 227.2
EQUIPMENT 318.1

USEFUL LOAD AS A SCOUT WITH 310 GAL.
FUEL (MAX.) AND 19 GAL. OIL
(MAX.) 2947.8
CREW (2) 400.0
FUEL (310 GAL.) 1860.0
OIL (19 GAL.) 142.5
ARMAMENT 227.2
EQUIPMENT 318.1

WEIGHTS - COMBAT CONDITION

THE INCREASES IN WEIGHT EMPTY, WITH THE AIRPLANE IN THE COMBAT CONDITION, ARE AS FOLLOWS:

INCREASE IN OIL TANK FOR
GUNFIRE PROTECTION ..... +30 LBS.
INCREASE IN CENTER SECTION
FUEL TANKS FOR GUNFIRE
PROTECTION .....+232 LBS.
INCREASE IN OUTER WING FUEL
TANKS FOR GUNFIRE PROTEC-
TION ..... +218 LBS.
INCREASE FOR FURNISHINGS
FOR ARMOR PLATE PROTECTION .. +212 LBS.

GROSS WEIGHT AS A: (COMBAT CONDITION)

BOMBER (1000# BOMB AND 100 GAL. OF FUEL)	9031.0 LBS.
BOMBER (500# BOMB AND 140 GAL. OF FUEL)	8786.0 LBS.
SCOUT (150 GAL. OF FUEL)	8289.3 LBS.
SCOUT (260 GAL. OF FUEL).....	8986.8 LBS.

USEFUL LOAD AS A: (COMBAT CONDITION)

1000#	BOMBER - SAME AS NON-COMBAT		
500#	BOMBER - SAME AS NON-COMBAT		
150	GAL. SCOUT		
30	GAL. LESS FUEL	-180.0	LBS.
1	GAL. LESS OIL	-7.5	LBS.
260	GAL. SCOUT		
50	GAL. LESS FUEL	-300.0	LBS.
3	GAL. LESS OIL	-22.5	LBS.

CHARACTERISTICS

FUEL CAPACITY (NON-COMBAT)

MAIN TANKS (90 GAL. EA.) ..	180.0	GAL.
AUX. TANKS (65 GAL. EA.) ..	130.0	GAL.
TOTAL	310.0	GAL

RESERVE (INCLUDED IN L.H. MAIN TANK) ..... 37.0 GAL.

WING AREA	323.9 SQ. FT.
WING SPAN	41 FT. 6 1/8 IN.
LENGTH, OVER-ALL ..	31 FT. 8 3/4 IN.
HEIGHT, OVER PROPELLER, TAIL ON GROUND ...	12 FT. 10 13/16 IN.

PERFORMANCE CHARACTERISTICS (NON-COMBAT)

		1000# BOMBER	180 GAL. SCOUT	310 GAL. SCOUT
GROSS WEIGHT	LBS.	8327.0	7772.8	8605.3
WING LOADING	#/FT.²	25.7	24.0	26.6
POWER LOADING NORMAL RATED POWER AT S.L.	#/HP	8.77	8.19	9.06
HIGH SPEED AT S.L.	KNOTS	194	202	201
HIGH SPEED AT 16000 FT.	KNOTS	214	223	222
STALLING SPEED AT S.L.- POWER OFF- FLAPS FULL DOWN	KNOTS	63.5	60.6	63.6
STALLING SPEED AT S.L.- POWER OFF- FLAPS UP	KNOTS	73.0	69.2	73.0
TIME TO CLIMB TO 15000 FT.	MIN.	11.0	9.55	11.0
SERVICE CEILING	FT.	26720	28800	26680
TAKE-OFF DISTANCE- S.L.	FT.	701	609	778
CRUISING SPEED AT 65% POWER (618 HP) AT 5000 FT.	KNOTS	174	182	181
CRUISING SPEED AT 65% POWER (618 HP) AT 16000 FT.	KNOTS	192	203	200

PERFORMANCE CHARACTERISTICS (COMBAT)

		1000# BOMBER	150 GAL. SCOUT	260 GAL. SCOUT
GROSS WEIGHT	LBS.	9019.0	8277.3	8974.9
WING LOADING	#/FT.^{2}	27.8	25.5	27.7
POWER LOADING (NORMAL RATED POWER AT S.L.)	#/HP	9.49	8.72	9.45
HIGH SPEED AT S.L.	KNOTS	194	202	201
HIGH SPEED AT 16000 FT.	KNOTS	212	223	221
STALLING SPEED AT S.L.- POWER OFF- FLAPS FULL DOWN	KNOTS	66.1	62.5	65.1
STALLING SPEED AT S.L.- POWER OFF- FLAPS UP	KNOTS	76.0	71.6	73.8
TIME TO CLIMB TO 15000 FT.	MIN.	12.3	10.9	12.1
SERVICE CEILING	FT.	25200	27620	26100
TAKE-OFF DISTANCE AT S.L.	FT.	853	711	862
CRUISING SPEED AT 65% POWER (618 HP) AT 5000 FT.	KNOTS	173	182	181
CRUISING SPEED AT 65% POWER (618 HP) AT 16000 FT.	KNOTS	190	202	199

2. Flying Characteristics

The Model SBD-3 airplane is a single engine, low wing, monoplane, designed for dive bombing or scouting operations from either shore stations or aircraft carriers. This airplane performs all ground and flight maneuvers with the normal characteristics of its type. As a land plane, this airplane will take off from the ground or carrier deck with or without the aid of a catapult, and will land on an ordinary landing field with or without landing flaps, or on a carrier deck in an arresting gear. Dive bombing maneuvers may be made with or without the use of the diving flaps.

Check-off lists are provided in the pilot's cockpit indicating the operations which must be completed before attempting take-offs, landings, ground operations or air maneuvers, including dives.

The information contained in the following paragraphs is also of importance, and should be thoroughly studied by the service pilot, and followed in addition to the check-off lists.

Taxiing

Refer to pilot's check-off list for operations and adjustments to be made during taxiing of the airplane. The wheel

BRAKES ARE ADEQUATE FOR SATISFACTORY CONTROL OF THE AIRPLANE DURING ALL GROUND MANEUVERS.

TAKE-OFF

A LOAD OF 200 LBS., EITHER PASSENGER OR BALLAST, SECURED TO THE REAR SEAT IS ADVISABLE, BUT NOT ESSENTIAL TO MAINTAIN PROPER BALANCE FOR TAKE-OFF AND LANDING.

CHECK STOWAGE OF FLIGHT CONTROL LOCK, HOISTING SLING, ARRESTING HOOK AND STARTER CRANK. THE COCKPITS SHOULD BE CHECKED FOR ANY LOOSE GEAR, AND SUCH ITEMS AS AMMUNITION, LIFE RAFT, AND BAGGAGE COMPARTMENT DOORS SHOULD BE INSPECTED FOR SECURITY.

WHEN THOROUGHLY FAMILIAR WITH THE AIRPLANE, THE PILOT MAY SET THE CONTROL TABS TO ANY DEVIATION FROM NEUTRAL.

THE AIRPLANE RETAINS NORMAL FLYING CHARACTERISTICS WITH EITHER THE LANDING OR DIVING FLAPS IN THE CLOSED, PARTIALLY, OR FULLY OPENED POSITIONS, EXCEPT THAT READJUSTMENT OF THE FLIGHT CONTROL TABS MAY BE NECESSARY TO MAINTAIN PROPER TRIM AT DIFFERENT AIRSPEEDS. THE LANDING FLAPS MAY BE OPENED APPROXIMATELY 15^{o} TO ASSIST IN TAKE-OFFS FROM CARRIER DECKS AND SMALL LANDING FIELDS.

NOTE: AFTER TAKE-OFF AND PRIOR TO RETRACTING THE LANDING GEAR, THE PILOT SHOULD APPLY THE BRAKES TO STOP ROTATION OF THE WHEELS.

LANDING

REFER TO PILOT'S CHECK-OFF LIST FOR RESTRICTIONS, OPERATIONS AND ADJUSTMENTS NECESSARY DURING LANDING OF THE AIRPLANE.

THE USE OF THE LANDING FLAPS IS RECOMMENDED DURING ALL LANDING OPERATIONS. HOWEVER, FAST LANDINGS ON IMPROVED AIRPORTS MAY BE SUCCESSFULLY ACCOMPLISHED WITHOUT THE USE OF THE FLAPS. THE LANDING FLAPS SERVE TO INCREASE THE GLIDING ANGLE OF THE AIRPLANE AS THEY ARE OPENED.

ARRESTED LANDINGS MAY BE MADE WITH ANY COMBINATION OF BOMB LOADING, PROVIDING THE FUEL LOAD HAS BEEN REDUCED TO SUCH AN EXTENT THAT THE GROSS WEIGHT DOES NOT EXCEED THE GROSS WEIGHT OF THE AIRPLANE IN THE FULLY LOADED SCOUT CONDITION.

THE INDICATED LANDING OR STALLING AIRSPEED OF THE AIRPLANE INCREASES WITH THE WEIGHT, BUT DOES NOT INCREASE WITH ALTITUDE.

THE INDICATED LANDING OR STALLING AIRSPEED FOR VARIOUS WEIGHTS AND BOTH FLAP POSITIONS AND ALSO AN AIRSPEED CORRECTION CHART WILL BE FOUND IN THE LIST OF ILLUSTRATIONS.

CHECK-OFF LIST
FOR TAKE OFF

PROPELLER----------HIGH R.P.M.

MIXTURE ------AUTOMATIC RICH

FUEL----------RIGHT TANK

CHECK TRIM TABS

CARBURETOR AIR--------DIRECT

TAIL WHEEL---------LOCKED

COWLING FLAPS--------- OPEN

OIL COOLER

AIR SCOOP--------OPEN

LOW BLOWER SPEED

CHECK–OFF LIST
FOR LANDING

WHEELS DOWN_____140KN. MAX.

PROPELLER_____HIGH R.P.M.

FUEL_____ON RESERVE

MIXTURE _____FULL RICH

TAIL WHEEL_____LOCKED

CARBURETOR AIR_____.DIRECT

LOW BLOWER SPEED

LANDING FLAPS_____DOWN
(140 KN. MAXIMUM)

OIL COOLER
AIR SCOOP_____.OPEN

COWLING FLAPS_____CLOSED
(OPEN AFTER LANDING)

3. Cockpit Arrangement & List of Controls

The following is a tabulation of the various controls and instruments.

Pilot's Cockpit

Page

Flying Controls

Aileron Control 18
Aileron Tab Control 18
Elevator Control 18
Elevator Tabs Control 18
Rudder Control 18
Rudder Tab Control 19
Landing Flaps 19
Diving Flaps 20

Power Plant Controls

Supercharger Control 43
Carburetor Air Control 21
Cowling Flaps Control 22
Engine Primer 39
Fuel Tank Selector Valve 47
Ignition Switch 39
Mixture Control 42
Oil Cooler Scoop Control 50
Propeller Control 53
Starter Meshing Pull 56
Throttle 23
Wobble Pump Handle 39

PAGE

AUXILIARY CONTROLS

APPROACH LIGHTS 23
ARRESTING GEAR CONTROL 23
AUTOMATIC PILOT 23
BRAKES & PARKING BRAKE 26
BRAKE PEDAL ADJUSTMENT 26
DISTRIBUTION PANEL 26
EMERGENCY LANDING GEAR LOWERING VALVE 31
ENCLOSURE LATCH 27
FIRE EXTINGUISHER 27
FLIGHT CONTROLS LOCKING DEVICE 27
FLOTATION GEAR RELEASE 28
ENGINE HYDRAULIC PUMP CONTROL VALVE 29
HAND HYDRAULIC PUMP 29
LANDING LIGHT 29
LANDING GEAR 30
LANDING GEAR WARNING HORN 31
OXYGEN RE-BREATHER REGULATOR 32
PILOT'S HEADREST RELEASE 32
RUDDER PEDAL ADJUSTMENT 32
SEAT ADJUSTMENT 33
TAIL WHEEL LOCK 33
WINDSHIELD HOT AIR CONTROL 33

USEFUL LOAD CONTROLS

BOMB ARMING LEVER 33

PAGE

BOMB RELEASE 34
PARACHUTE FLARE RELEASE 34
ROUNDS COUNTERS 34
TRIGGER SWITCH 34
VERY PISTOL 34

INSTRUMENTS

AIRSPEED INDICATOR 55
ALTIMETER 55
AUTOMATIC PILOT PRESSURE GAGE 55
BANK & CLIMB CONTROL UNIT 55
BANK & TURN INDICATOR 55
CHECK-OFF INSTRUMENT 55
CLOCK 55
DIRECTIONAL GYRO CONTROL UNIT 55
ENGINE GAGE UNIT 55
FLAP POSITION INDICATOR 58
FUEL QUANTITY GAGE 55
LANDING GEAR POSITION INDICATOR 57
MANIFOLD PRESSURE GAGE 55
AIR SCOOP POSITION INDICATOR 56
RATE OF CLIMB INDICATOR 55
TACHOMETER 55
ENGINE TEMPERATURE GAGE 55
OUTSIDE AIR THERMOMETER 55

GUNNER'S COCKPIT

PAGE

FLYING CONTROLS

AILERONS 66
ELEVATORS 66
RUDDER 66

POWER PLANT CONTROLS

THROTTLE 63
WOBBLE PUMP 63

AUXILIARY CONTROLS

ENCLOSURE LATCH 27
FLOTATION GEAR RELEASE 28
FOOT PEDAL FOR SEAT TILT 33

USEFUL LOAD CONTROLS

FLOAT LIGHTS 34
SMOKE GRENADES 34
SMOKE TANK CONTROL 35
TAIL PIPE CONTROL 35

INSTRUMENTS

AIRSPEED INDICATOR 62
ALTIMETER 62
CLOCK 62
COMPASS 62

PAGE

DRIFT INDICATOR 64
LATERAL INCLINOMETER 62

4. Operation & Function of Controls

Flying Controls

THE AILERONS ARE DIFFERENTIALLY CONTROLLED IN THE CONVENTIONAL MANNER BY A CONTROL STICK (ITEM 1, PAGE 56) WHICH IS CONNECTED TO THE MOVABLE SURFACES THROUGH A TORQUE TUBE, PUSH-PULL RODS, AND CABLES.

THE AILERON TAB IS LOCATED ON THE LEFT AILERON ONLY. IT HAS SUFFICIENT MOVEMENT TO ADJUST THE LATERAL BALANCE OF THE AIRPLACE DURING FLIGHT. THE TAB CONTROL (ITEM 10, PAGE 57) SUITABLY MARKED, IS ONE OF THE UNIT OF THREE TAB CONTROLS LOCATED TO THE LEFT OF THE PILOT.

THE ELEVATORS ARE ALSO CONTROLLED FROM STICKS IN THE USUAL MANNER BY A PUSH-PULL TUBE AND CONNECTING CABLES. THE STICK MOVEMENT IS THE SAME IN E!THER COCKPIT. THE ELEVATORS ARE STATICALLY BALANCED.

THE ELEVATOR TABS ARE FITTED INTO THE TRAILING EDGE OF THE ELEVATORS FOR ADJUSTING THE LONGITUDINAL BALANCE OF THE AIRPLANE. THE OPERATING MECHANISM IS POSITIVE AND HOLDS THE TABS IN ANY DESIRED POSITION IN FLIGHT. THE TAB CONTROL (ITEM 11, PAGE 57) IS IN THE CONTROL UNIT ON THE PILOT'S LEFT.

THE RUDDER IS STATICALLY BALANCED AND IS OPERATED BY FOOT PEDALS (ITEM 1, PAGE 60), FROM EITHER COCKPIT IN THE CUSTOMARY

MANNER.

THE RUDDER TAB, IN THE TRAILING EDGE OF THE RUDDER, IS TO MAINTAIN THE DIRECTIONAL TRIM OF THE AIRPLANE. ITS CONTROL (ITEM 12, PAGE 57) IS OPERATED FROM THE TAB CONTROL UNIT ON THE PILOT'S LEFT.

NOTE: FOR ALL FLIGHT CONDITIONS THE TAB CONTROLS SHOULD BE SET IN NEUTRAL UNTIL THE PILOT IS FAMILIAR WITH THE AIRPLANE.

LANDING FLAPS, OF THE HYDRAULICALLY OPERATED, SPLIT EDGE TYPE, ARE FITTED TO EACH WING AND CENTER SECTION. THEY ARE OPERATED BY THE PILOT TO STEEPEN THE GLIDING ANGLE AND DECREASE THE LANDING SPEED OF THE AIRPLANE.

TO LOWER THE FLAPS, MOVE THE LANDING FLAP SELECTOR LEVER (ITEM 4, PAGE 58) TO THE "DOWN" POSITION, AND DEPRESS THE ENGINE PUMP CONTROL VALVE HANDLE. WHEN THE INDICATOR SHOWS THE DESIRED POSITION OF THE FLAPS, MOVE THE SELECTOR VALVE HANDLE TO THE NEUTRAL POSITION.

TO RAISE THE FLAPS, MOVE THE SELECTOR VALVE LEVER TO THE "UP" POSITION AND DEPRESS THE CONTROL VALVE HANDLE.

TO RAISE OR LOWER THE FLAPS WITH THE ENGINE PUMP INOPERATIVE, MOVE THE SELECTOR VALVE LEVER TO THE DESIRED POSITION AND OPERATE THE HAND PUMP. THE LANDING FLAP VALVE LEVER MUST BE PLACED IN NEUTRAL TO

LOCK THE FLAPS IN ANY INTERMEDIATE POSITION. ALSO (WITH FLAPS DOWN), PLACE THIS LEVER IN NEUTRAL WHEN OPERATING THE LANDING GEAR; OTHERWISE, LOSS OF PRESSURE IN THE SYSTEM MAY ALLOW THE FLAPS TO CLOSE MOMENTARILY.

WARNING: MAKE SURE THE DIVING FLAPS ARE COMPLETELY CLOSED BEFORE EXTENDING THE LANDING FLAPS. DO NOT PARK THE AIRPLANE WITH LANDING FLAP SELECTOR VALVE IN THE NEUTRAL POSITION.

DIVING FLAPS, HYDRAULICALLY OPERATED, ARE BUILT IN THE UPPER TRAILING EDGE OF THE WINGS, JUST ABOVE THE LANDING FLAPS. THESE ARE DESIGNED TO ACT, IN CONJUNCTION WITH THE LANDING FLAPS, AS AIR BRAKES TO RETARD THE SPEED OF THE AIRPLANE IN A DIVE; THUS GIVING THE PILOT MORE TIME TO PERFECT HIS AIM AND MORE CLOSELY APPROACH HIS TARGET.

TO OPERATE THE DIVING FLAPS, MOVE THE SELECTOR VALVE LEVER (ITEM 6, PAGE 58) TO THE "OPEN" POSITION. DEPRESS THE CONTROL VALVE HANDLE AND WHEN THE INDICATOR SHOWS THE DESIRED POSITION OF THE DIVING FLAPS, MOVE THE SELECTOR VALVE LEVER TO THE NEUTRAL POSITION. THEY ARE HELD IN THIS SELECTED ATTITUDE BY MEANS OF A CHECK VALVE.

TO CLOSE THE DIVING FLAPS, MOVE THE SELECTOR VALVE LEVER TO THE "CLOSED" POSITION AND DEPRESS THE CONTROL VALVE HANDLE.

WHEN DIVING WITH FLAPS OPEN, THE HANDLE SHOULD BE KEPT IN THE "OPEN" POSITION. AFTER CLOSING THE DIVING FLAPS, THE HANDLE SHOULD BE LEFT IN THE "CLOSED" POSITION.

THE DIVING FLAPS MAY BE OPENED AT ANY SPEED UP TO THE MAXIMUM LEVEL FLIGHT SPEED OF THE AIRPLANE.

WARNING: DO NOT OPEN THE DIVING FLAPS UNLESS THE LANDING FLAPS SELECTOR VALVE IS IN THE "CLOSED" POSITION. IF IT IS NECESSARY TO LEAVE THE DIVING FLAPS IN THE OPEN POSITION FOR ANY LENGTH OF TIME, ON THE GROUND, THE SELECTOR VALVE HANDLE SHOULD BE RETURNED TO THE "CLOSED" POSITION.

POWER PLANT CONTROLS

THE CARBURETOR AIR CONTROL (ITEM 2, PAGE 56) IS FOR THE ALTERNATE AIR INTAKE VALVE. THE VALVE PERMITS PROTECTED AIR TO ENTER THE CARBURETOR AIR INTAKE AFTER PASSING AROUND THE CYLINDER HEAD FINS. NO PRONOUNCED TEMPERATURE RISE IS REQUIRED FOR THE CARBURETOR USED. THE CONTROL SHALL BE IN THE DIRECT POSITION FOR TAKE-OFFS, LANDINGS AND NORMAL OPERATION, EXCEPT IN CASE OF HEAVY RAIN (OUTSIDE TEMPERATURE -1 ^{o}C., TO 20 ^{o}C., 30 ^{o}F. TO 70 ^{o}F.), SNOW, SLEET, ICING CONDITIONS, OR INADVERTENT CLOGGING OF THE EXTERNAL AIR INTAKE, IN WHICH CASE THE ALTERNATE AIR SHALL BE USED. WHEN IN DOUBT USE "ALTERNATE" AIR PRIOR TO ENTERING "ICING CONDI-

TIONS". THE ONLY DISADVANTAGE OF THE ALTERNATE AIR IS LOSS OF RAM, WHICH IS NOT OF SERIOUS CONSEQUENCE EXCEPT FOR HIGH OUTPUT OR HIGH ALTITUDE OPERATION. THE CONTROL SHALL BE IN EITHER EXTREME POSITIONS AND SHALL NOT BE LEFT IN ANY INTERMEDIATE POSITION.

IN DIVING, THE CARBURETOR AIR SHALL BE IN THE DIRECT POSITION, SUFFICIENT THROTTLE OPENING SHALL BE MAINTAINED TO PREVENT TOO RAPID COOLING OF THE ENGINE.

THE COWLING FLAP CONTROL (ITEM 3, PAGE 56), IN THE PILOT'S COCKPIT, CONTROLS THE HYDRAULICALLY OPERATED FLAPS PROVIDED ON THE TRAILING EDGE OF THE OUTER ENGINE COWLING TO REGULATE CYLINDER TEMPERATURES.

TO OPEN THE COWLING FLAPS, MOVE THE SELECTOR VALVE HANDLE TO THE "OPEN" POSITION. DEPRESS THE ENGINE PUMP VALVE HANDLE. WHEN THE FLAPS ARE OPEN TO THE PROPER POSITION FOR DESIRED ENGINE TEMPERATURE, MOVE THE SELECTOR VALVE LEVER TO THE "NEUTRAL" POSITION.

TO CLOSE THE FLAPS, MOVE THE SELECTOR VALVE TO "CLOSED" POSITION AND DEPRESS THE CONTROL VALVE HANDLE. THE FLAPS MAY ALSO BE OPERATED BY THE HYDRAULIC HAND PUMP.

A "NEUTRAL" POSITION IS PROVIDED TO HOLD THE COWLING FLAPS IN THE SELECTED

POSITION WHEN HYDRAULIC SYSTEM IS IN USE FOR OTHER UNITS.

THE THROTTLE (ITEM 2, PAGE 57) IS THE CENTER LEVER OF THE ENGINE CONTROL UNIT. THE EXTREME POSITIONS ARE PLAINLY MARKED ON THE UNIT.

AUXILIARY CONTROLS:

A TYPE A-1 APPROACH LIGHT IS MOUNTED IN THE LEADING EDGE OF THE LEFT WING. IT IS CONTROLLED FROM THE PILOT'S ELECTRICAL DISTRIBUTION PANEL.

THE ARRESTING HOOK OPERATING LEVER (ITEM 7, PAGE 57) - EQUIPPED WITH A LATCH, IS OPERATED BY THE PILOT TO RAISE OR LOWER THE ARRESTING HOOK. MOVE THE LEVER AFT FOR THE "HOOK DOWN" POSITION: FORWARD FOR THE "HOOK UP" POSITION.

NOTE: THE PILOT SHALL INSURE THAT THE HANDLE IS SECURELY LOCKED IN THE "HOOK DOWN" POSITION PRIOR TO LANDING ABOARD A CARRIER.

THE AUTOMATIC PILOT OPERATES FROM THE HYDRAULIC SYSTEM OF THE AIRPLANE. WHEN THE ENGINE PUMP CONTROL VALVE IS IN THE NORMAL (UP) POSITION, THE FLUID IS PASSED TO THE AUTO PILOT PRESSURE REGULATOR WHICH MAINTAINS A CONSTANT PRESSURE OF APPROXIMATELY 120 LBS./SQ. IN. IN THE AUTO PILOT SYSTEM. THE SERVO UNITS ARE RENDERED

INACTIVE BY MEANS OF A BY PASS ON EACH UNIT. WHEN AUTO PILOT CONTROL VALVE (ITEM 4, PAGE 56) IS TURNED "ON" THE SYSTEM PRESSURE OF 120 LBS./SQ. IN. OPERATES VALVES TO CLOSE THE BY-PASS ON EACH SERVO UNIT, PUTTING THEM IN OPERATION TO CONTROL FLIGHT ACCORDING TO THE SETTINGS OF THE BANK AND CLIMB CONTROL UNIT, AND THE DIRECTIONAL GYRO CONTROL UNIT.

THE AUTO PILOT CONTROL VALVE MUST BE FULL "ON" OR "OFF".

WHEN AUTO PILOT IS "ON", THE HYDRAULIC SYSTEM WILL HAVE APPROXIMATELY THE SAME PRESSURE AS OPERATING PRESSURE OF AUTO PILOT SYSTEM (APPROXIMATELY 120 LBS./SQ. IN.). AS THIS PRESSURE IS INSUFFICIENT TO OPERATE UNITS IN NORMAL FLIGHT, THE PILOT MAY DEPRESS THE ENGINE PUMP CONTROL VALVE, DIRECTING ALL FLUID TO THE DESIRED UNIT FOR THE PERIOD OF OPERATION (USUALLY 5 TO 10 SECONDS).

HOWEVER, WHEN THE CONTROL VALVE IS DEPRESSED AND ALL FLUID DIRECTED TO THE UNIT BEING OPERATED, THE AUTO PILOT IS RENDERED INOPERATIVE. SUBSEQUENT RELEASE OF THE CONTROL AGAIN ALLOWS FLUID TO FLOW THROUGH AUTO PILOT AT ITS NORMAL PRESSURE.

WITH AUTO PILOT IN OPERATION, HYDRAULIC UNITS MAY BE OPERATED BY USE OF THE HYDRAULIC HAND PUMP. THE OPERATION OF UNITS WITH THE HAND PUMP WILL NOT EFFECT THE AUTO PILOT OPERATION.

PRIOR TO ENGAGING THE AUTO PILOT, SEVERAL DETAILS SHOULD BE CHECKED:

OIL PRESSURE.

PUSH IN AND TURN THE CAGING KNOB ON THE DIRECTIONAL GYRO UNIT AND SET THE LOWER OR DIRECTIONAL CARD TO MAGNETIC COMPASS HEADING.

UNCAGE DIRECTIONAL GYRO BY PULLING CAGING KNOB STRAIGHT OUT.

TURN COURSE SETTING KNOB UNTIL UPPER, OR REFERENCE CARD COINCIDES WITH DIRECTIONAL CARD.

UNCAGE BANK AND CLIMB GYRO CONTROL UNIT BY PULLING OUT THE CAGING KNOB AND TURNING IT AS FAR AS POSSIBLE COUNTER-CLOCKWISE. PUSH IN TO LOCK IN THIS POSITION.

TURN AILERON AND ELEVATOR TRIM KNOBS TO BRING THE POINTERS ON THEIR RESPECTIVE INDEX DIALS TO ZERO.

TRIM AIRPLANE FOR "HANDS OFF" CONDITION.

ENGAGE AUTO PILOT BY TURNING MAIN "ON-OFF" VALVE TO "ON". AFTER THE AUTO PILOT IS IN OPERATION, THE COURSE SETTING KNOB AND THE AILERON AND ELEVATOR TRIM KNOBS MAY BE ADJUSTED SLIGHTLY, IF NECESSARY, TO

PUT THE AIRPLANE IN STRAIGHT, LEVEL FLIGHT.

FOR GROUND AND FLIGHT CHECK LISTS, SEE PAGES 86 AND 88. REFER TO SPERRY INSTURC-TION MANUAL, NO. 15-731 ON AUTO PILOT, MK. IV.

THE BRAKES (ITEM 2, PAGE 60), ARE OPERATED ON EACH LANDING GEAR WHEEL BY MEANS OF A BRAKE TREADLE MOUNTED ON EACH RUDDER PEDAL. THESE TREADLES MAY BE AD-JUSTED BY THE PILOT FOR COMFORT.

THE PARKING BRAKE, (ITEM 5, PAGE 56), IS OPERATED BY PRESSING BOTH BRAKE TREAD-LES, PULLING OUT THE PARKING BRAKE HANDLE, AND GIVING IT A QUARTER TURN CLOCKWISE.

TO RELEASE THE PARKING BRAKE, APPLY PRESSURE TO THE BRAKE TREADLES AND TURN THE PARKING BRAKE HANDLE A QUARTER TURN COUNTER-CLOCKWISE, THEN RELEASE PRESSURE ON TREADLES.

THE ELECTRICAL DISTRIBUTION PANEL (ITEM 10, PAGE 58) FOR THE PILOT, CONTAINS THE VOLT-AMMETER WITH SELECTOR SWITCH, GUN SWITCHES, LIGHT SWITCHES AND RHEOSTATS, BATTERY SWITCH AND GENERATOR SWITCH. THE RIGHT SECTION OF THE PANEL CONTAINS THE FUSES (SPARE FUSES ARE CARRIED WITH THE FUSES IN USE BY MEANS OF NEOPRENE CONTAIN-ERS). SPARE LAMPS ARE CARRIED IN A CON-TAINER ON THE INBOARD SIDE OF THE DISTRI-BUTION PANEL.

THE GUNNER'S SWITCH PANEL (ITEM 4, PAGE 62) CONTAINS SWITCHES AND RHEOSTATS FOR ALL REAR COCKPIT LIGHTS.

THE PILOT'S ENCLOSURE LATCH, (ITEM 1, PAGE 59), RELEASES OR LOCKS THE FORWARD ENCLOSURE WHICH MOVES AFT OVER THE OVER-TURNING STRUCTURE. IT MAY BE LATCHED OPEN IN ANY OF THREE POSITIONS. THE ENCLOSURE MAY ALSO BE OPENED FROM THE OUTSIDE BY OPERATING THE LATCH LEVER EXTENDING THROUGH THE LOWER FORWARD END OF THE ENCLOSURE.

THE GUNNER'S COCKPIT ENCLOSURE IS IN TWO SECTIONS. THE FORWARD SECTION MAY BE UNLATCHED UNDER THE OVERTURN STRUCTURE AND MOVED FORWARD INTO THIS STRUCTURE. THE AFTER DOME SECTION HAS A HANDLE ON THE RIGHT SIDE WHICH SERVES TO UNLOCK AND TILT THE SECTION. IT MAY THEN BE MOVED FORWARD UNDER THE FORWARD SECTION.

THE FIRE EXTINGUISHER SYSTEM, MAY BE OPERATED BY PULLING THE CONTROL HANDLE (ITEM 14, PAGE 57) WHICH SPRAYS CO_2 GAS INTO THE ENGINE SECTION AND CARBURETOR AIR INTAKE. A HAND FIRE EXTINGUISHER (ITEM 7, PAGE 63) IS LOCATED IN THE GUNNER'S COCKPIT.

THE FLIGHT CONTROLS LOCKING DEVICE (ITEM 6, PAGE 60) CONSISTS OF A YOKE AFFIXED TO THE PILOT'S COCKPIT FLOOR AT

ITS TWO EXTREMITIES BY PINS ABOUT WHICH IT IS PIVOTED. TWO C.M. STEEL RODS, ATTACHED TO THE BASE, CONNECT TO THE RUDDER PEDAL LOCKING ARMS.

TO LOCK THE CONTROLS, RAISE THE YOKE AND FASTEN NEAR THE BASE OF THE CONTROL STICK WITH THE PIN PROVIDED. THE RUDDER PEDALS ARE AUTOMATICALLY LOCKED BY THE LOCKING LEVER ARMS. THE YOKE IS STOWED BY SECURING TO THE FLOOR FORWARD OF THE STICK.

THE FLOTATION SYSTEM CONSISTS OF WATERTIGHT COMPARTMENTS BUILT INTO THE OUTER WINGS AND HORIZONTAL STABILIZERS, AND ALSO FLOTATION BAGS STOWED ON EACH SIDE OF THE ENGINE ACCESSORY COMPARTMENT. EACH WING COMPARTMENT IS VENTED ABOVE THE DECK WITHIN THE OVERTURN STRUCTURE.

THE FLOTATION BAGS ARE INFLATED WITH CO_2 GAS WHICH IS RELEASED FROM THE BOTTLE BY AUTOMATIC ACTION OF ACTUATORS LOCATED ON THE UPPER AND LOWER SURFACE OF THE FUSELAGE WHEN EITHER ACTUATOR IS SUBJECT TO A PRESSURE OF FROM 18 TO 30 INCHES OF WATER. THE GAS MAY ALSO BE RELEASED MANUALLY BY PULLING HANDLES (ITEMS 6 AND 2, PAGES 62 AND 59) UNDER THE OVERTURN STRUCTURE MARKED "PULL ONLY AFTER LANDING ON WATER". THE PRESSURE OF THE CO_2 GAS OPERATES ACTUATING CYLINDERS (LOCATED DIRECTLY

BELOW EACH STOWAGE COMPARTMENT) WHICH RELEASES AND INFLATES THE FLOTATION BAGS.

NOTE: COWLING FLAPS MUST BE CLOSED BEFORE LANDING ON WATER TO PREVENT CHAFING FLOTATION BAGS.

THE ENGINE PUMP CONTROL VALVE IS MANUALLY OPERATED TO PROVIDE MEANS OF OPERATING THE LANDING GEAR AND FLAP SYSTEM FROM THE PRESSURE OF THE ENGINE DRIVEN PUMP. THE VALVE IS PRESSURE LOADED, AND IS NORMALLY IN THE "OFF" (UP) POSITION. DEPRESSING THE HANDLE FORCES THE PRESSURE TO ENTER LINES TO THE VARIOUS UNITS AND HENCE TO OPERATE THEM. AFTER THE HANDLE HAS AUTOMATICALLY RETURNED TO THE NORMAL POSITION, THE FLUID RETURNS TO THE RESERVOIR. SEE AUTOMATIC PILOT SECTION IN REFERENCE TO THAT UNIT.

WARNING: IF THE CONTROL VALVE SHOULD BECOME INOPERATIVE WHEN IN "ON" (DOWN) POSITION, BY APPLYING AN UPWARD PRESSURE ON THE HANDLE THE FLUID WILL BE FORCED FROM THE CHAMBER, ALLOWING THE HANDLE TO RETURN TO THE NORMAL (UP) POSITION.

THE HYDRAULIC HAND PUMP (ITEM 8, PAGE 58) MAY BE USED FOR OPERATIONS OF UNITS OF THE HYDRAULIC SYSTEM WHEN ENGINE DRIVEN PUMP IS INOPERATIVE OR WHEN AUTO PILOT IS IN USE.

THE LANDING LIGHT IS EXTENDED OR RETRACTED BY A MOTOR, CONTROLLED FROM A SWITCH OF THE ELECTRICAL DISTRIBUTION PANEL. THE UNIT WILL AUTOMATICALLY STOP IN ITS FULLY EXTENDED OR RETRACTED POSITION, OR MAY BE STOPPED IN ANY INTERMEDIATE POSITION. THE LIGHT WILL AUTOMAT-

ICALLY TURN ON OR OFF WHEN ABOUT 10° FROM THE FULLY RETRACTED POSITION. THE LAMP MUST NOT BE EXTENDED AT AIRSPEEDS IN EXCESS OF 140 M.P.H.

THE LANDING GEAR IS A FULLY RETRACTABLE, PNEUMATIC, OLEO, SHOCK ABSORBING STRUT, WHEEL TYPE ASSEMBLY. THE HYDRAULICALLY OPERATED RETRACTING MECHANISM, WITH A MECHANICAL LOCK IN BOTH THE UP AND DOWN POSITION, IS CONTROLLED FROM THE PILOT'S COCKPIT. DURING RETRACTION, THE LANDING GEAR STRUTS SWING INWARD, AND WHEN COMPLETELY RETRACTED, THE WHEELS ARE HOUSED WITHIN SMOOTHLY LINED WELLS IN THE WING CENTER SECTION.

TO RETRACT THE WHEELS, MOVE THE LANDING GEAR SELECTOR VALVE LEVER (ITEM 7, PAGE 58) AFT, TO THE "UP" POSITION AND OPERATE THE ENGINE DRIVEN PUMP BY MEANS OF THE CONTROL VALVE OR OPERATE THE HYDRAULIC HAND PUMP UNTIL THE MECHANICAL INDICATOR SHOWS THAT THE WHEELS ARE FULLY RETRACTED.

TO EXTEND THE LANDING GEAR, MOVE THE SELECTOR VALVE FORWARD TO THE "DOWN" POSITION AND OPERATE EITHER PUMP.

MOVING THE SELECTOR VALVE LEVER ADJUSTS THE VALVE PORTS WHICH DETERMINES THE DIRECTION OF FLOW OF HYDRAULIC FLUID FOR THE REQUIRED OPERATION OF THE GEAR, AND ALSO OPERATES THE POSITIVE MECHANICAL LATCH FOR HOLDING THE GEAR IN THE EXTENDED

OR RETRACTED POSITION.

A LANDING GEAR WARNING HORN, LOCATED IN THE OVERTURN STRUCTURE NEAR THE DECK, OPERATES IN CONJUNCTION WITH THE THROTTLE. THIS HORN OPERATES WHEN THE THROTTLE IS IN ANY POSITION LESS THAN 1/8 OPEN AND THE WHEELS ARE IN ANY POSITION EXCEPT FULLY EXTENDED AND LOCKED.

WARNING: HORN WILL NOT OPERATE UNLESS CHECK-OFF INSTRUMENT IS SET FOR "LANDING".

THE LANDING GEAR MECHANISM IS SO CONSTRUCTED THAT WHEN THE SELECTOR VALVE LEVER IS MOVED TO THE FORWARD OR "DOWN" POSITION THE GEAR WILL NORMALLY EXTEND AND LATCH DOWN, DUE TO ITS OWN WEIGHT, WITHOUT THE USE OF HYDRAULIC PRESSURE. THIS FEATURE IS INCORPORATED AS A SAFETY MEASURE IN THE EVENT OF DAMAGE TO THE HYDRAULIC SYSTEM. DURING THE EXTENSION OF THE GEAR, WITHOUT HYDRAULIC PRESSURE, IF THE GEAR DOES NOT LATCH DOWN WITHIN TWO MINUTES, MANEUVERS OR INCREASED AIRSPEED WILL TEND TO FORCE THE WHEELS TO THE EXTENDED POSITION AND LATCH THE MECHANISM. IN AN EMERGENCY THE AIRSPEED OF THE AIRPLANE WITH THE GEAR EXTENDED MAY BE INCREASED TO 200 KNOTS WITHOUT DANGER.

AN ADDITIONAL SAFETY FEATURE IS ALSO PROVIDED IN THE FORM OF AN EMERGENCY VALVE (ITEM 3, PAGE 58). IN THE EVENT OF FREEZING OF THE SELECTOR VALVE, THE SELECTOR VALVE CONTROL LEVER MAY BE FORCED, RE-

LEASING THE MECHANICAL LANDING GEAR LATCH. BY OPENING THIS EMERGENCY VALVE, THE HYDRAULIC PRESSURE WILL BE RELIEVED, ALLOWING THE GEAR TO EXTEND. MANEUVERS OR INCREASED AIRSPEED MAY ALSO BE REQUIRED TO LATCH THE GEAR.

THE OXYGEN REBREATHER REGULATOR FOR THE PILOT, IS MOUNTED ON THE RIGHT SIDE OF THE COCKPIT, AND ATTACHED TO THE OXYGEN BOTTLE IN THE RIGHT REAR OF THE GUNNER'S COCKPIT. THE GUNNER'S REGULATOR, ATTACHED TO THE SAME BOTTLE, IS MOUNTED ON HIS RIGHT. OXYGEN EQUIPMENT SHOULD BE CARRIED AT ALL TIMES.

WARNING: OXYGEN EQUIPMENT MUST BE KEPT FREE OF GREASE AND OIL AT ALL TIMES.

THE PILOT'S HEADREST RELEASE (ITEM 1, PAGE 58) ADJUSTS THE PILOT'S HEADREST FOR USE IN CATAPULT TAKE-OFFS. IT MAY BE RETURNED TO THE STOWED POSITION BY OPERATING THE RELEASE AFTER TAKE-OFF. NO HEADREST IS PROVIDED FOR THE GUNNER. HE SHOULD BE CAUTIONED TO FACE FORWARD, WITH CHIN DOWN, AND WELL BALANCED DURING CATAPULT TAKE OFFS.

THE RUDDER PEDAL ADJUSTMENT (ITEM 3 AND 1, PAGES 60, AND 66) ON THE INBOARD EDGE OF BOTH PILOT'S AND GUNNER'S RUDDER PEDALS, PROVIDES MEANS OF ADJUSTING THESE PEDALS. THEY ARE FOOT OPERATED AND PROVIDE

ADJUSTMENTS FOR THE MOST COMFORTABLE POSITION.

THE SEAT ADJUSTMENT (ITEM 1, PAGE 54) FOR THE PILOT, ENABLES HIM TO ADJUST THE SEAT TO THE PROPER HEIGHT.

THE GUNNER'S SEAT HAS THREE ADJUSTMENTS: A HAND OPERATED ADJUSTMENT FOR VERTICAL REQUIREMENTS, A FOOT OPERATED ADJUSTMENT FOR TILT, AND A HAND OPERATED ADJUSTMENT FOR LOCKING THE SEAT ASSEMBLY IN EITHER THE DIRECTLY FORWARD OR AFTER POSITION.

THE TAIL WHEEL LOCK (ITEM 15, PAGE 57) OPERATED BY THE PILOT, CONTROLS A PIN WHICH LOCKS THE WHEEL IN A STRAIGHT AFTER POSITION. THE WHEEL IS UNLOCKED BY MOVING THE LEVER FORWARD. WHEN RELEASED, THE TAIL WHEEL MAY SWIVEL THROUGH 360°. A SPRING CENTERING DEVICE CAUSES THE WHEEL TO TRAIL STRAIGHT AFT WHEN OFF THE GROUND.

THE WINDSHIELD HOT AIR CONTROL (ITEM 12, PAGE 56) ALLOWS HOT AIR TO BE CONDUCTED FROM A MUFF ON THE COLLECTOR RING, THROUGH FLEXIBLE TUBING, TO THE PROTECTIVE WINDSHIELD, TO PREVENT FOGGING.

USEFUL LOAD CONTROLS

THE BOMB ARMING LEVER (ITEM 6, PAGE 57) CONTROLS THE ARMING AND SAFE CONDITIONS OF BOMB LOADING. THE LEVER POSITIONS ARE CLEARLY INDICATED ON THE UNIT.

THE BOMB RELEASE LEVER (ITEM 5, PAGE 57) CONTROLS THE SELECTIVE RELEASE OF THE RIGHT OR LEFT RACKS OR THE SALVO RELEASE OF ALL RACKS. IF IT IS DESIRED TO RELEASE BOMBS INDIVIDUALLY, THE WING RACKS SHOULD BE RELEASED FIRST AND THE CENTER SECTION LAST. THE VARIOUS LEVER POSITIONS ARE CLEARLY INDICATED ON THE UNIT.

THE PARACHUTE FLARE RELEASES (ITEM 13, PAGE 57) OPERATED BY THE PILOT, ARE PULLED TO RELEASE THE FLARES.

A ROUNDS COUNTER (ITEM 13, PAGE 58) FOR THE FIXED GUN ENABLES THE PILOT TO GAGE HIS AMMUNITION.

A TRIGGER SWITCH (ITEM 6, PAGE 56) FOR THE FIXED GUN AND GUN CAMERA, IS LOCATED ON THE CONTROL STICK. PROVISIONS ARE ALSO MADE FOR THE INSTALLATION OF GUN TRIGGER OPERATING CABLE ASSEMBLIES WHEN MANUAL CONTROL IS DESIRED.

THE VERY PISTOL (ITEM 9, PAGE 58) IS PROVIDED FOR AND MAY BE FIRED BY THE PILOT WITHOUT REMOVAL FROM ITS BRACKET.

FLOAT LIGHTS (ITEM 6, PAGE 65) ARE PROVIDED FOR IN THE GUNNER'S COCKPIT. FOUR LIGHTS ARE THE NORMAL LOAD, BUT FOUR MORE MAY BE CARRIED AS REQUIRED.

TWO SMOKE GRENADES (ITEM 1 & 4, PAGE 64 & 63) ARE PROVIDED FOR IN THE GUNNER'S

COCKPIT. THEY ARE HOUSED IN WATERTIGHT CYLINDERS.

THE SMOKE TANK RELEASE AND THE TAIL PIPE CONTROL ARE LOCATED IN THE REAR OF THE GUNNER'S COCKPIT ON THE LEFT. THESE ARE PLAINLY MARKED FOR "ON" AND "OFF" FOR THE SMOKE, AND "UP" AND "DOWN" FOR THE TAIL PIPE. (ITEMS 5 AND 6, PAGE 63.)

MISCELLANEOUS EQUIPMENT

THE COCKPIT VENTILATOR IS A SCOOP TYPE WHICH CONDUCTS COLD AIR INTO THE PILOT'S COCKPIT. THE AMOUNT OF AIR ADMITTED TO THE COCKPIT IS CONTROLLED BY THE PILOT BY MEANS OF A BUTTERFLY VALVE (ITEM 7, PAGE 56) ON THE VENTILATOR.

THE LIFE RAFT IS STOWED IN A COMPARTMENT THROUGH THE FUSELAGE UNDER THE FLEXIBLE GUN TUNNEL. THE COMPARTMENT IS OPENED FROM OUTSIDE THE AIRPLANE BY RELEASING THE LATCH ON THE DOOR IN THE LEFT HAND SIDE OF THE FUSELAGE.

THE CHARTBOARD (ITEM 2, PAGE 54) IS SECURED IN ITS STOWED POSITION UNDERNEATH THE INSTRUMENT PANEL BY A LATCH ON THE LEFT SUPPORTING GUIDE. THE PILOT MAY RELEASE THE LATCH AND PULL THE BOARD BACK OVER HIS LAP FOR NAVIGATING CALCULATION.

A HOISTING SLING (ITEM 3, PAGE 54) OF THE SINGLE LOOP TYPE IS ATTACHED TO THE

FUSELAGE AND STOWED BACK OF THE PILOT'S SEAT. CARRIED AT ALL TIMES, IT IS DESIGNED TO HOLD THE AIRPLANE AT A SPECIFIED ANGLE OF TRIM WHEN LOADED AS A SCOUT WITH NO BOMBS.

EMERGENCY RATIONS AND FRESH WATER ARE CONTAINED IN A BAG WHICH IS SECURED TO THE LIFE RAFT IN THE STOWAGE COMPARTMENT.

SPARE FUSES ARE CLIPPED TO THE FORWARD SIDE OF THE FUSE BOX COVER, WHICH IS LABELED "FUSE PANEL" (ITEM 11, PAGE 58). THIS BOX MAY BE OPENED BY LOOSENING THREE FASTENERS. FOR CONVENIENCE SMALL RUBBER GRIPS ARE PROVIDED TO HANDLE THE FUSES.

THE CRANK FOR WINDING THE STARTER IS STOWED IN THE BAGGAGE COMPARTMENT.

FLASHLIGHTS ARE PROVIDED WITH SUITABLE CLIPS FOR PILOT AND GUNNER.

5. Power Plant

Engine

The Model SBD-3 Airplane is powered by a Wright Cyclone Engine, Model R-1820-52, manufactured by the Wright Aeronautical Corporation. The engine has a two-speed supercharger. The carburetor is a Holly Model 1375H.

ENGINE RATING

Condition	Blower Ratio	B.H.P.	R.P.M.	Altitude
Take-off	Low	1000	2350	Sea Level
Normal	Low	950	2300	S.L.-5000
Normal	High	800	2300	9,600-16,000
Maximum Diving Speed			2900	

FUEL - 100 OCTANE: AN SPEC. NO. 9531. REQUIRED PRESSURE AT ENTRANCE TO CARBURETOR: 6 TO 7 LBS./SQ. IN.
OIL - GRADE 1120: AN SPEC. NO. 9532. REQUIRED PRESSURE 75 TO 90 LBS. /SQ. IN.
OIL INLET TEMPERATURE: SEE T.O. 35-38.

CYLINDER HEAD AND BASE TEMPERATURE LIMITS

	CYL. HEAD		BASE	
	^{o}C	^{o}F	^{o}C	^{o}F
AT TAKE-OFF POWER (5 MIN.)	260	500	163	325
AT NORMAL RATED POWER (CONTINUOUS)	218	425	149	300
AT NORMAL RATED TO 90% NORMAL RATED POWER (1 HOUR)	235	455	149	300
AT AND BELOW 70% NORMAL RATED POWER (CONTINUOUS)	205	400	136	277

STARTING

TURN THE ENGINE OVER AT LEAST 3 REVOLUTIONS OF THE PROPELLER BY HAND, TO INSURE THAT THE CYLINDERS ARE CLEAR OF OIL AND FUEL. THIS IS UNNECESSARY WHEN THE ENGINE HAS BEEN RUNNING WITHIN AN HOUR OF INTENDED START.

THROTTLE SET FOR 600-800 R.P.M.

PROPELLER CONTROL SET IN HIGH PITCH, (LOW R.P.M. POSITION).

FUEL MIXTURE SET TO AUTOMATIC "RICH".

SET FUEL TANK SELECTOR VALVE TO "RIGHT MAIN" OR TO THE "RESERVE" TANK.

CARBURETOR AIR TO "DIRECT".

IGNITION SWITCH TURNED "OFF" (ITEM 10, PAGE 56).

BLOWER CONTROL SET TO "LOW".

OPEN COWLING FLAPS. FLAPS MUST BE KEPT OPEN DURING WARM-UP.

OPERATE THE WOBBLE PUMP (ITEM 8, PAGE 57) SLOWLY UNTIL 6 OR 7 LBS/SQ. IN. OF PRESSURE IS INDICATED.

PRIME WITH ENGINE PRIMER (ITEM 8, PAGE 56) APPROXIMATELY 3 STROKES, DEPENDING ON WEATHER AND ENGINE TEMPERATURES. OVER PRIMING SHOULD BE AVOIDED.

THE PRIMER HANDLE MUST BE IN THE OFF POSITION AT ALL TIMES EXCEPT WHEN OPERATING THE PLUNGER.

IF POSSIBLE, PRIMING OF THE ENGINE SHOULD BE DONE WHILE THE STARTER IS BEING ENERGIZED, AS IT IS DESIRABLE TO HAVE THE RAW FUEL REMAIN IN THE CYLINDERS AS SHORT A TIME AS POSSIBLE.

THE THROTTLE SHOULD NOT BE PUMPED WHILE STARTING THE ENGINE OR IN AN ATTEMPT TO

KEEP IT RUNNING.

AFTER THE ENGINE HAS FIRED, OPERATE THE PRIMER AS NECESSARY TO KEEP THE ENGINE RUNNING UNTIL IT OPERATES SMOOTHLY ON THE CARBURETOR.

NOTE: REFER TO MANUAL OF BU. OF AERO. AND CURRENT BUAERO. T.O. FOR STARTER OPERATING INSTRUCTIONS.

WARM-UP

TO WARM UP, RUN AT 800-1000 R.P.M. WITH PROPELLER IN POSITIVE HIGH PITCH. A NORMAL OIL PRESSURE OF 30 LBS. SHOULD BE INDICATED WITHIN 30 SECONDS AFTER STARTING. AFTER NORMAL OIL PRESSURE IS OBSERVED, SHIFT TO LOW PITCH (HIGH R.P.M.) AND COMPLETELY WARM UP AT FROM 1000 TO 1200 R.P.M.

TO CHECK MAGNETOS, RUN ENGINE UP TO 1900 R.P.M. (25" Hg. MANIFOLD PRESSURE) AND SWITCH FROM "BOTH" TO "RIGHT" AND TO "LEFT" MAGNETO. A NORMAL DROP OF APPROXIMATELY 50 R.P.M. MAY BE EXPECTED. A FAULTY MAGNETO OR FOULED PLUGS WILL BE INDICATED BY A ROUGHNESS OF OPERATION AND AN EXCESSIVE MOMENTARY DROP IN R.P.M.

MOVE PROPELLER CONTROL FROM LOW TO HIGH PITCH A FEW TIMES TO WARM UP OIL IN HUB CYLINDER.

DURING ALL GROUND CHECK TESTS (FOR MAG-

NETOS, INSTRUMENTS, ETC.) EXCEPT FULL POWER TEST, THE MANIFOLD PRESSURE SHOULD NOT EXCEED 30" HG. FOR THE FULL POWER TEST ONLY SET MANIFOLD PRESSURE TO 41" HG. THE PROPELLER SHOULD TURN AT 2350 R.P.M. WHEN SET IN HIGH R.P.M POSITION.

WARNING:

NEVER EXCEED 41" HG. MANIFOLD PRESSURE.
CHECK GENERATOR.
KEEP ENGINE COWLING FLAPS OPEN.
CHECK BOTH SWITCHES (MAGNETOS).
OBSERVE INSTRUMENT READINGS.
CARBURETOR AIR DIRECT.

STOPPING

STOP THE ENGINE WITHOUT CLOSING THE FUEL VALVE BY FIRST RUNNING AT NOT LESS THAN 1000 R.P.M. FOR 30 SECONDS (PROPELLER IN POSITIVE HIGH PITCH POSITION IF PRACTICABLE) AND THEN SETTING THE MIXTURE CONTROL LEVER TO THE FULL LEAN POSITION. THIS ACTUATES THE IDLING CUT-OFF VALVE WHICH CAUSES THE ENGINE TO STOP. TURN OFF THE IGNITION SWITCH WHEN PROPELLER CEASES TO TURN.

SINCE THE CARBURETOR IS NOT DRAINED, LEAVE THE MIXTURE CONTROL LEVER IN THE FULL LEAN POSITION AS A PRECAUTION AGAINST ACCIDENTAL STARTING.

WHENEVER POSSIBLE, BEFORE STOPPING ENGINE, SHIFT SUPERCHARGER AS OUTLINED ON PAGE 45.

MANIFOLD PRESSURE

THE PROPER MANIFOLD PRESSURES WITH THEIR CORRESPONDING ALTITUDES AND ENGINE SPEEDS FOR POSITIVE HIGH PITCH ARE SHOWN ON PAGE 85.

MIXTURE CONTROL (ITEM 3, PAGE 57)

THE HOLLY MODEL 1375 H CARBURETOR IS EQUIPPED WITH AN AUTOMATIC MIXTURE CONTROL. THE THREE DEFINITE POSITIONS OF THE MIXTURE CONTROL ARE: "AUTOMATIC RICH", "AUTOMATIC LEAN", AND "IDLE CUT-OFF". THE MANUAL CONTROL SHOULD BE KEPT IN THE "AUTOMATIC RICH" POSITION FOR CRUISING ABOVE 70% RATED POWER. FOR 70% RATED POWER OR BELOW, THE MIXTURE CONTROL MAY BE LEANED OUT FOR SMOOTH OPERATION.

IF IN LEVEL FLIGHT, WITH THE MIXTURE IN THE "AUTOMATIC RICH" POSITION, THE ENGINE IS ROUGH DUE TO AN OVER RICH MIXTURE, IT IS PERMISSIBLE TO LEAN OUT THE MIXTURE BY OPERATING THE CONTROL MANUALLY, ONLY TO THE POINT OF SMOOTH OPERATION. THE MAXIMUM CYLINDER HEAD TEMPERATURES MUST NOT BE EXCEEDED.

FOR OPERATING ABOVE RATED ALTITUDE, THE THROTTLE SHOULD BE SET TO THE DESIRED MANIFOLD PRESSURE AND THE MIXTURE LEANED OUT ONLY UNTIL THE ENGINE OPERATES SMOOTHLY.

THE LAST 10^{o} OF THE MIXTURE CONTROL

SEGMENT IN THE LEAN POSITION IS MARKED IN RED TO INDICATE THE POSITION OF THE MIXTURE CONTROL FOR STOPPING THE ENGINE THROUGH THE IDLE CUT OFF VALVE.

A WHITE MARK IS PROVIDED ON THAT PORTION OF THE MIXTURE CONTROL SEGMENT CORRESPONDING APPROXIMATELY TO THE "CRUISING LEAN" POSITION.

SUPERCHARGER CONTROL (ITEM 1, PAGE 57)

THE ENGINE IS EQUIPPED WITH A TWO-SPEED SUPERCHARGER. NORMALLY, THE LOW SUPERCHARGER SPEED SHALL BE USED AT ALL TIMES. THE HIGH SUPERCHARGER SPEED MAY BE USED ABOVE 10,500 FEET ALTITUDE TO OBTAIN MAXIMUM AIRPLANE SPEEDS AND RATES OF CLIMB. THE HIGH SUPERCHARGER SPEED SHALL NOT BE USED FOR CRUISING AT ALTITUDES AT WHICH CRUISING POWER IS AVAILABLE IN THE LOW SUPERCHARGER SPEED, AS FUEL ECONOMY IS INFERIOR TO THAT OF LOW SUPERCHARGER SPEED OPERATION, AND THE TENDENCY TO DETONATE IS GREATER. 70% RATED POWER IS MAINTAINED TO APPROXIMATELY 12,000 FEET IN LOW SPEED SUPERCHARGER. LESSER POWERS ARE MAINTAINED TO CORRESPONDING HIGHER ALTITUDES. IN USING THE HIGH SUPERCHARGER SPEED, THE CONTROL SHALL BE SHIFTED AT OR ABOVE THE ALTITUDE AT WHICH 31" Hg. MANIFOLD PRESSURE IS OBTAINED WITH FULL THROTTLE AND LOW SUPERCHARGER SPEED (APPROXIMATELY 10,500 FEET ALTITUDE WITHOUT RAM). PAGE 85 SHOWS MAXIMUM PERMISSIBLE OPERATING

LIMITS FOR BOTH LOW AND HIGH SUPERCHARGER SPEEDS.

IN CHANGING FROM ONE SUPERCHARGER SPEED TO THE OTHER IN EITHER DIRECTION, THE ENGINE SHALL BE PARTLY THROTTLED TO AVOID ROUGH ENGAGEMENT OF THE CLUTCHES. NORMALLY, SUPERCHARGER SPEED CHANGES SHALL NOT BE MADE AT INTERVALS OF LESS THAN FIVE MINUTES, IN ORDER TO PROVIDE OPPORTUNITY FOR DISSIPATION OF HEAT GENERATED DURING CLUTCH ENGAGEMENTS. CHANGING FROM ONE SUPERCHARGER SPEED TO THE OTHER IN EITHER DIRECTION SHALL BE DONE WITHOUT PAUSING IN THE NEUTRAL POSITION TO AVOID ROUGH OPERATION DURING THE PERIOD OF CLUTCH ENGAGEMENT.

DURING A CHANGE IN SUPERCHARGER SPEED A SLIGHT CHANGE IN ENGINE R.P.M. MAY BE OBSERVED. THIS IS NORMAL FOR AN ENGINE EQUIPPED WITH A TWO-SPEED SUPERCHARGER AND HAS NO DETRIMENTAL EFFECT.

CAUTION: CARE SHOULD BE EXERCISED TO MAKE SURE THAT THE SUPERCHARGER CLUTCH CONTROL IS AT THE EXTREME END OF ITS TRAVEL AT ALL TIMES, IN ORDER THAT RATED POWER MAY BE ALWAYS AVAILABLE. IF THE CONTROL IS PLACED INADVERTENTLY IN THE NEUTRAL POSITION, THE RATED ENGINE POWER OUTPUT WILL NOT BE AVAILABLE. SUCH A SITUATION WOULD BE PARTICULARLY HAZARDOUS DURING TAKE-OFF.

330
270

WHEN OPERATING FOR EXTENDED PERIODS IN EITHER BLOWER RATIO, THE CLUTCHES SHOULD BE SHIFTED ONCE EVERY TWO HOURS. THE USUAL SHIFTING PROCEDURE AS DESCRIBED ON PAGE 44 SHALL BE FOLLOWED AND IT IS ONLY NECESSARY TO REMAIN IN THE OPPOSITE BLOWER RATIO FOR FIVE MINUTES.

WHENEVER POSSIBLE BEFORE STOPPING THE ENGINE, THE FOLLOWING CLUTCH SHIFT SHOULD BE MADE:

A. WITH THE PROPELLER ON THE GOVERNOR, AND THE BLOWER IN THE LOW POSITION, SET THE PROPELLER CONTROL FOR AN ENGINE SPEED, ABOVE 1000 R.P.M., AT WHICH A MINIMUM OIL PRESSURE OF 60 LBS./SQ. IN. IS MAINTAINED. THE THROTTLE SHOULD BE SET AT SOME POSITION BELOW HALF OPENED.

B. MOVE THE BLOWER CONTROL FROM THE LOW POSITION TO THE HIGH POSITION RAPIDLY AND ALLOW THE BLOWER TO REMAIN IN THE HIGH POSITION FOR APPROXIMATELY ONE MINUTE.

C. MOVE THE BLOWER CONTROL RAPIDLY FROM THE HIGH POSITION TO THE LOW POSITION.

D. MAKE CERTAIN THAT THE BLOWER IS IN THE LOW POSITION WHEN THE ENGINE IS STOPPED.

E. SUCH PROCEDURE PREVENTS EXCESSIVE SLUDGE FORMATION IN THE CLUTCHES.

330
270

Fuel System

The Fuel System is shown diagrammatically on page 49.

Fuel is supplied to the engine from two main fuel tanks located in the wing center section, and two auxiliary tanks, one located in each outer wing. The total fuel capacity of 310 gallons is divided as follows: (Non-Combat Condition)

R.H. Main (Inboard) Tank	90 gal.
L.H. Main (Inboard) Tank	90 gal.
R.H. Auxiliary (Outboard) Tank.	65 gal.
L.H. Auxiliary (Outboard) Tank.	65 gal.
Total	310 gal.

A fuel reserve of 37 gallons is included, by means of a standpipe, in the Left Main Tank.

The fuel capacity for the Combat Condition is 260 gal., divided as follows:

R.H. Main (Inboard) Tank	75 gal.
L.H. Main (Inboard) Tank	75 gal.
R.H. Auxiliary (Outboard) Tank.	55 gal.
L.H. Auxiliary (Outboard) Tank.	55 gal.
Total	260 gal.

All fuel tanks must be filled separately and all have separate engine supply lines. There are no interconnections between tanks.

A FUEL SELECTOR VALVE (ITEM 9, PAGE 57) CONTROLS THE FLOW OF FUEL FROM THE L.H. MAIN, R.H. MAIN, L.H. AUX., R.H. AUX. TANKS, OR THE RESERVE SUPPLY. THIS VALVE ALSO SHUTS OFF ALL FUEL SUPPLY TO EITHER THE ENGINE DRIVEN PUMP OR THE HAND OPERATED WOBBLE PUMP.

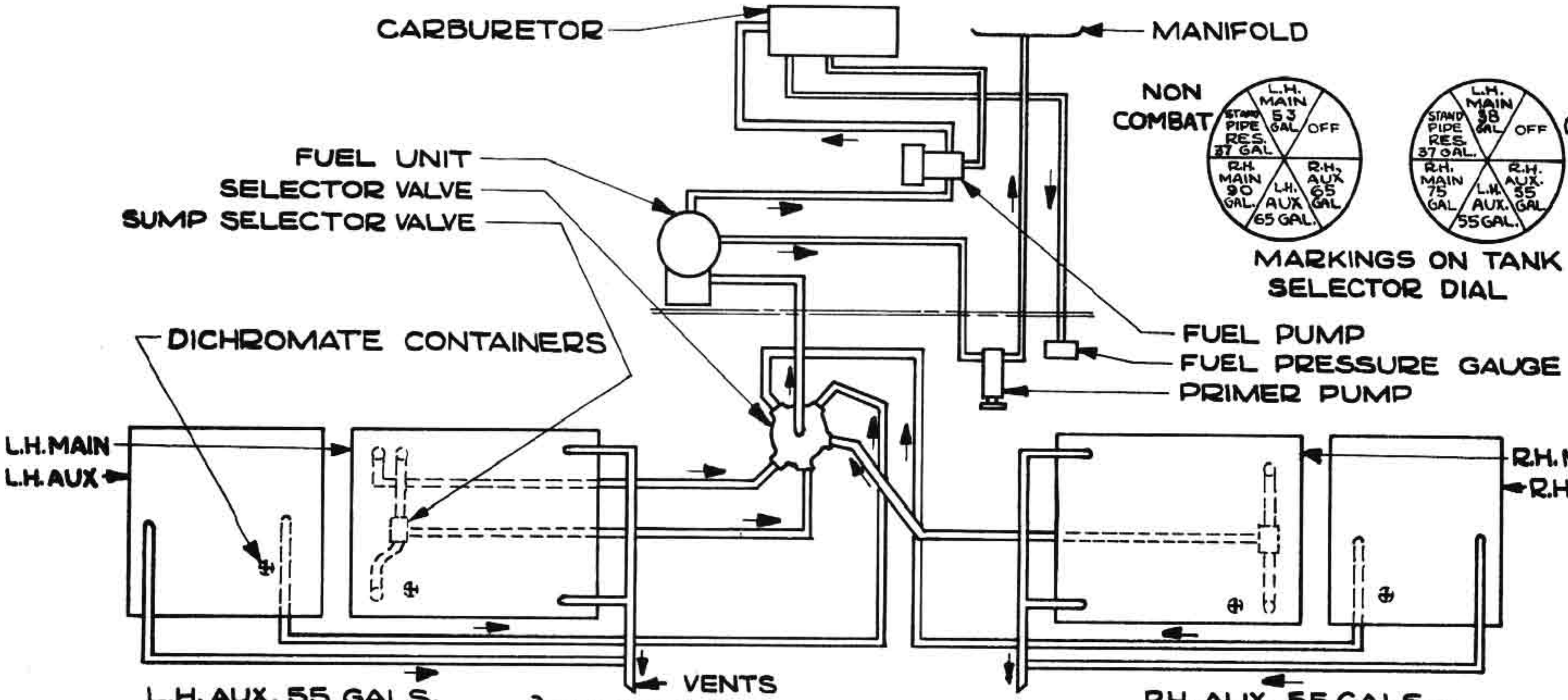
FUEL IS WITHDRAWN FROM THE R.H. MAIN TANK AND THE RESERVE SUPPLY IN THE LEFT MAIN TANK THROUGH SUMPS LOCATED NEAR THE FORE AND AFT CORNERS OF THE TANKS. THESE SUMPS ARE CONNECTED TO SUMP SELECTOR VALVES WHICH CONTROL THE FLOW OF FUEL FROM ONE SUMP OR THE OTHER DEPENDENT ON THE ATTITUDE OF THE AIRPLANE DURING CLIMBS, DIVES OR OTHER MANEUVERS. THIS IS TO PREVENT AIR BEING DRAWN INTO THE SYSTEM THROUGH UNCOVERED OUTLETS. ALL OTHER TANKS HAVE A SINGLE OUTLET.

DO NOT TAKE-OFF, LAND, OR DIVE WITH FUEL BEING SUPPLIED FROM THE LEFT MAIN OR AUXILIARY TANKS. FUEL FROM AUXILIARY TANKS IS TO BE USED DURING LEVEL FLIGHT ONLY.

TWO ELECTRICAL FUEL GAGES, OPERATING OFF THE MASTER SWITCH GIVE THE CONTENTS OF THE TANKS DIRECTLY IN GALLONS DURING FLIGHT. GAGE CALIBRATION TABLES ARE MOUNTED IN THE PILOT'S COCKPIT TO SECURE CORRECT READINGS WHEN THE AIRPLANE IS AT REST. THE RESERVE PORTION OF THE LEFT MAIN TANK (INBOARD) IS DESIGNATED IN RED

ON THE GAGE.

FUEL IS NORMALLY DELIVERED TO THE CARBURETOR BY AN ENGINE DRIVEN FUEL PUMP. FOR STARTING AND EMERGENCY OPERATION A HAND OPERATED WOBBLE PUMP IS PROVIDED WHICH MAY BE OPERATED FROM EITHER COCKPIT. THE DESIRED FUEL PRESSURE IS 6 TO 7 LBS. /SQ. IN.



NON COMBAT

COMBAT

MARKINGS ON TANK SELECTOR DIAL

REFER TO DWGS. 5091587 & 5094708

FUEL SYSTEM FLOW

Oil System

THE OIL SYSTEM IS SHOWN DIAGRAMMATICALLY ON PAGE 52.

THE OIL TANK HAS A "NON-COMBAT" SERVICE CAPACITY OF 19.5 GALS. PLUS A 3 GALS. EXPANSION SPACE. IN THE "COMBAT" CONDITION THE TANK HAS A SERVICE CAPACITY OF 16.5 GALS. AND EXPANSION SPACE OF 3 GALS. MOUNTED BELOW THE TANK IS AN AUTOMATIC OIL TEMPERATURE CONTROL AND CHECK VALVE, DIRECTING THE RETURN OIL TO THE BOTTOM OF THE OIL TANK WHEN THE ENGINE INLET OIL IS COLD, AND TO THE TOP OF THE OIL TANK, VIA THE OIL COOLER OR OIL COOLER BY PASS, WHEN THE ENGINE INLET OIL IS HOT. THE CHECK VALVE, INCORPORATED IN THE AUTOMATIC OIL TEMPERATURE CONTROL VALVE, PREVENTS SEEPAGE OF OIL INTO THE ENGINE WHEN THE AIRPLANE IS AT REST. THE OIL TEMPERATURE GAGE IS CONNECTED TO THE ENGINE INLET OIL LINE.

A GRAVITY CONTROL SELECTOR VALVE, MOUNTED ON THE OIL TEMPERATURE CONTROL VALVE, ALLOWS OIL TO FLOW TO THE ENGINE FROM EITHER THE BOTTOM OR THE TOP OF THE OIL TANK AS REQUIRED BY THE ATTITUDE OR ACCELERATIONS OF THE AIRPLANE DURING DIVES OR OTHER MANEUVERS IN ORDER TO PREVENT THE LOSS OF OIL PRESSURE DURING SUCH MANEUVERS.

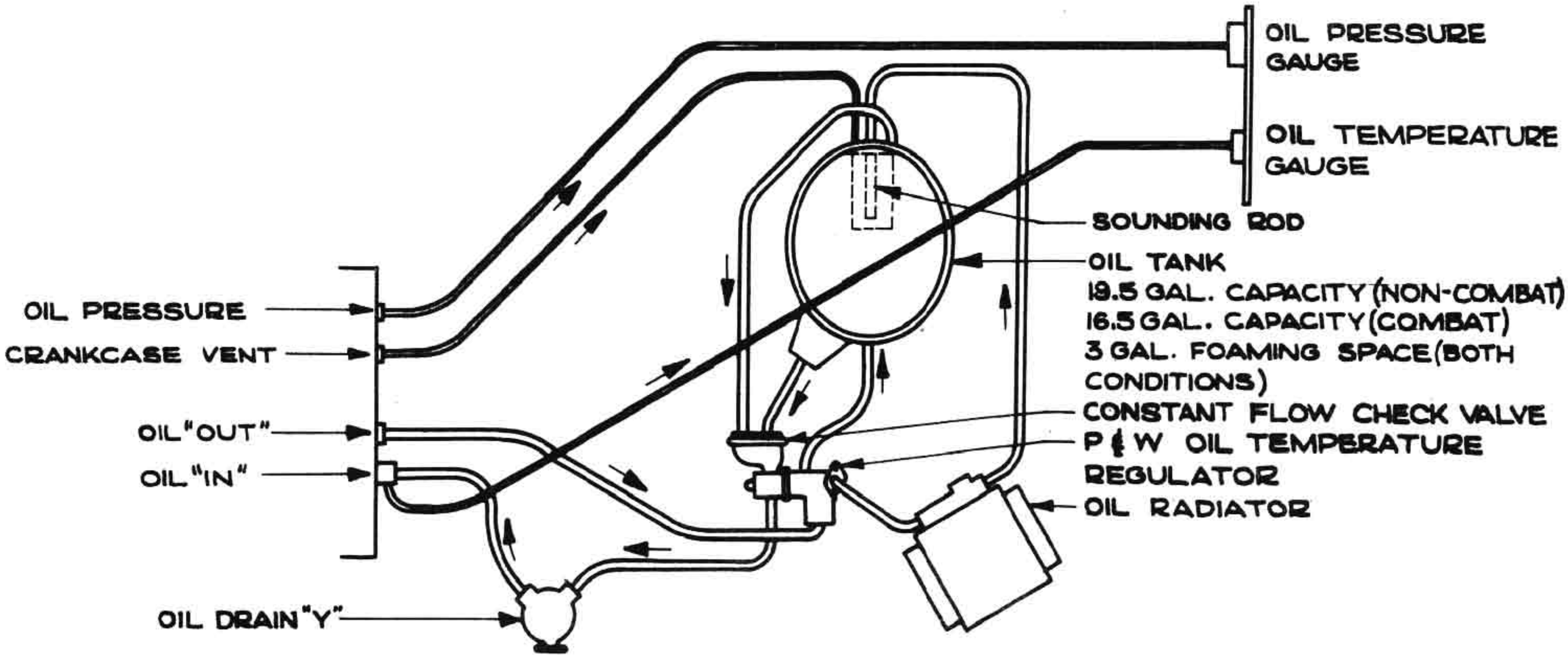
THE RETRACTABLE AIR SCOOP FOR THE OIL RADIATOR IS MECHANICALLY CONTROLLED FROM THE PILOT'S COCKPIT. (ITEM 9, PAGE 56).

IT IS PROVIDED WITH A MECHANICAL POSITION INDICATOR.

OIL TEMPERATURE

EMERGENCY ONLY ..... 102°C.
DESIRED OIL TEMPERATURE .. 70° - 80°C.
NORMAL OIL PRESSURE ..... 65 LB./SQ.IN.

(SEE CURRENT BUAERO. T.O.)



REFER TO DWG. 5094727 & DWG. 5094734

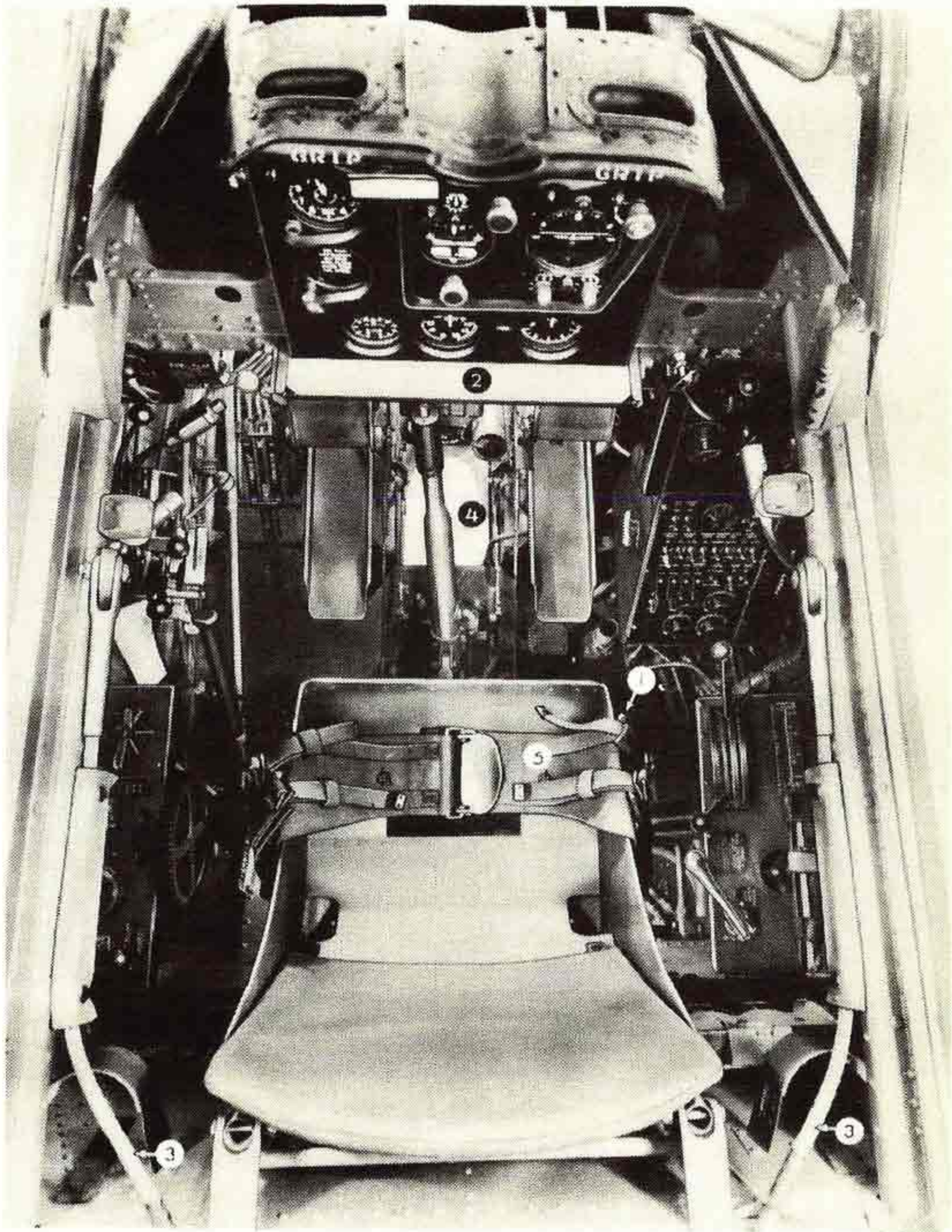
OIL SYSTEM

PROPELLER

THE HAMILTON STANDARD PROPELLER IS A THREE-BLADE CONSTANT SPEED TYPE, 10' 9" IN DIAMETER; HUB 3-E-50-345; BLADES 6103A-9. THE PROPELLER HAS A PITCH RANGE OF 20^{o}. POSITIVE LOW PITCH SETTING 19^{o}; POSITIVE HIGH PITCH SETTING 39^{o}; INDEX SETTING 39^{o}; GOVERNOR UNIT 1P12.

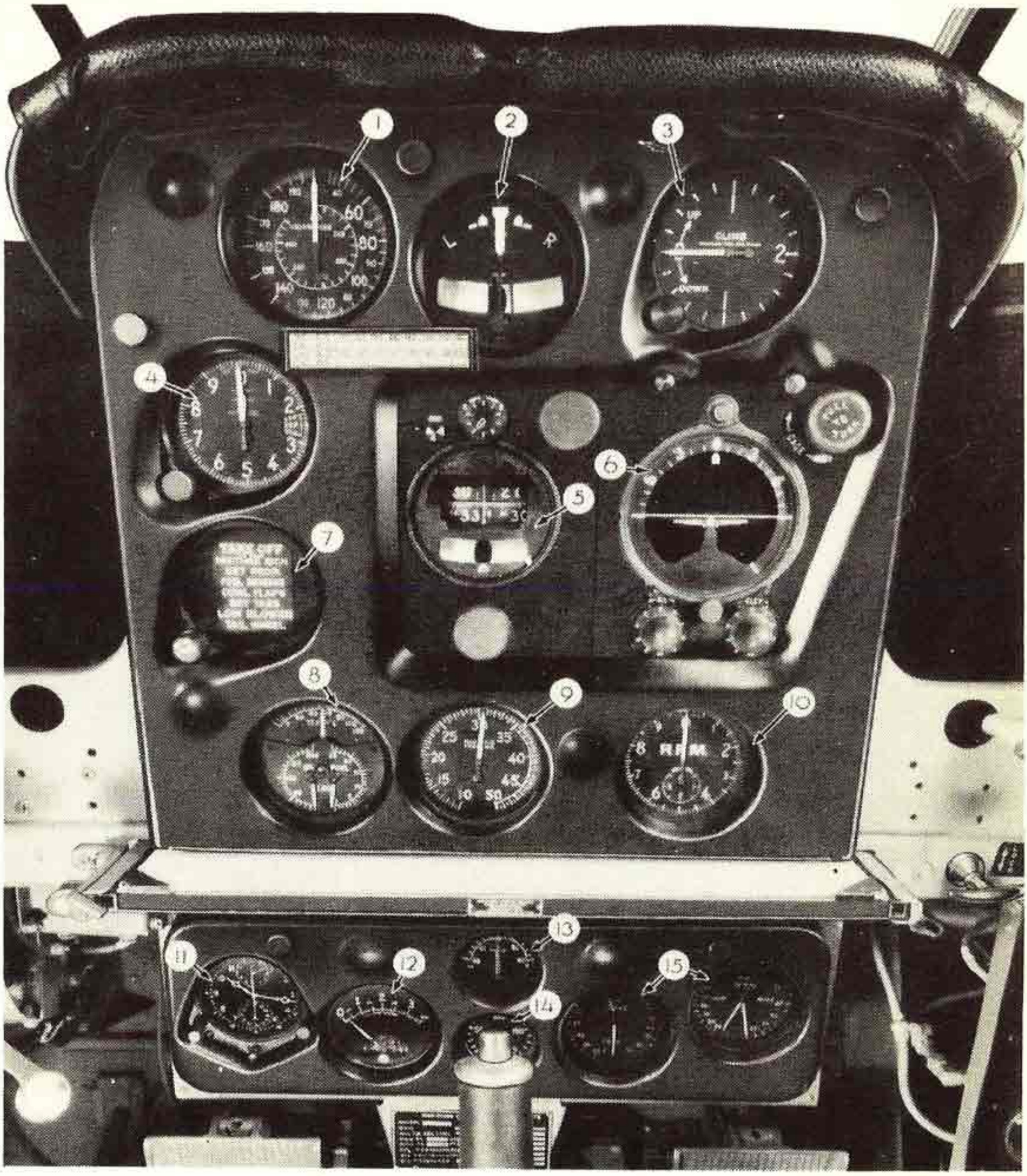
THE CONSTANT SPEED PROPELLER CONTROL LEVER (ITEM 4, PAGE 57) IS LOCATED ON THE ENGINE CONTROL UNIT ON THE LEFT SIDE OF THE PILOT'S COCKPIT.

TO OPERATE THE PROPELLER CONTROL, THE LEVER IS MOVED IN THE DIRECTION DESIRED UNTIL THE TACHOMETER INDICATES THE SELECTED R.P.M. THE QUADRANT - THROTTLE TYPE CONTROL IS FINELY ADJUSTABLE TO ENGINE R.P.M. FOR CONSTANT SPEED GOVERNING. WHEN LEVER IS MOVED TO FULL DOWN POSITION (AGAINST STOP), THE GOVERNOR IS SET FOR CONSTANT SPEED OPERATION AT RATED TAKE-OFF R.P.M. WHEN MOVED TO FULL UP POSITION THE GOVERNOR IS SET TO LOCK THE PROPELLER IN POSITIVE HIGH PITCH POSITION (DESIRED FOR CRUISING, AND REQUIRED TO ASSURE AGAINST OVERSPEEDING ENGINE IN DIVE).



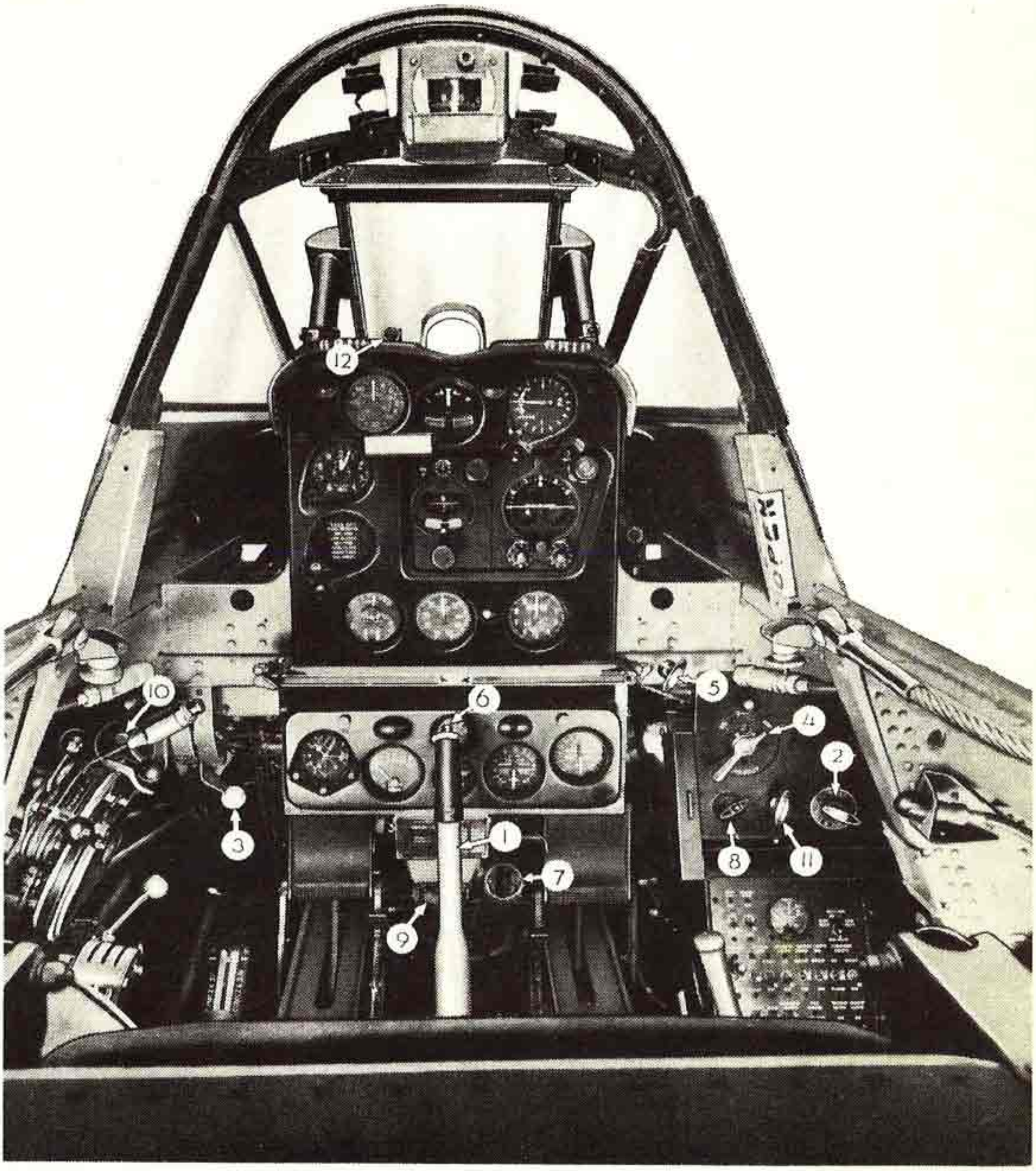
1. SEAT ADJUSTMENT LEVER
2. CHARTBOARD
3. HOISTING SLING
4. BOMBING WINDOW
5. SAFETY BELT

PHOTO NO. 11437 - PILOT'S SEAT INSTALLED



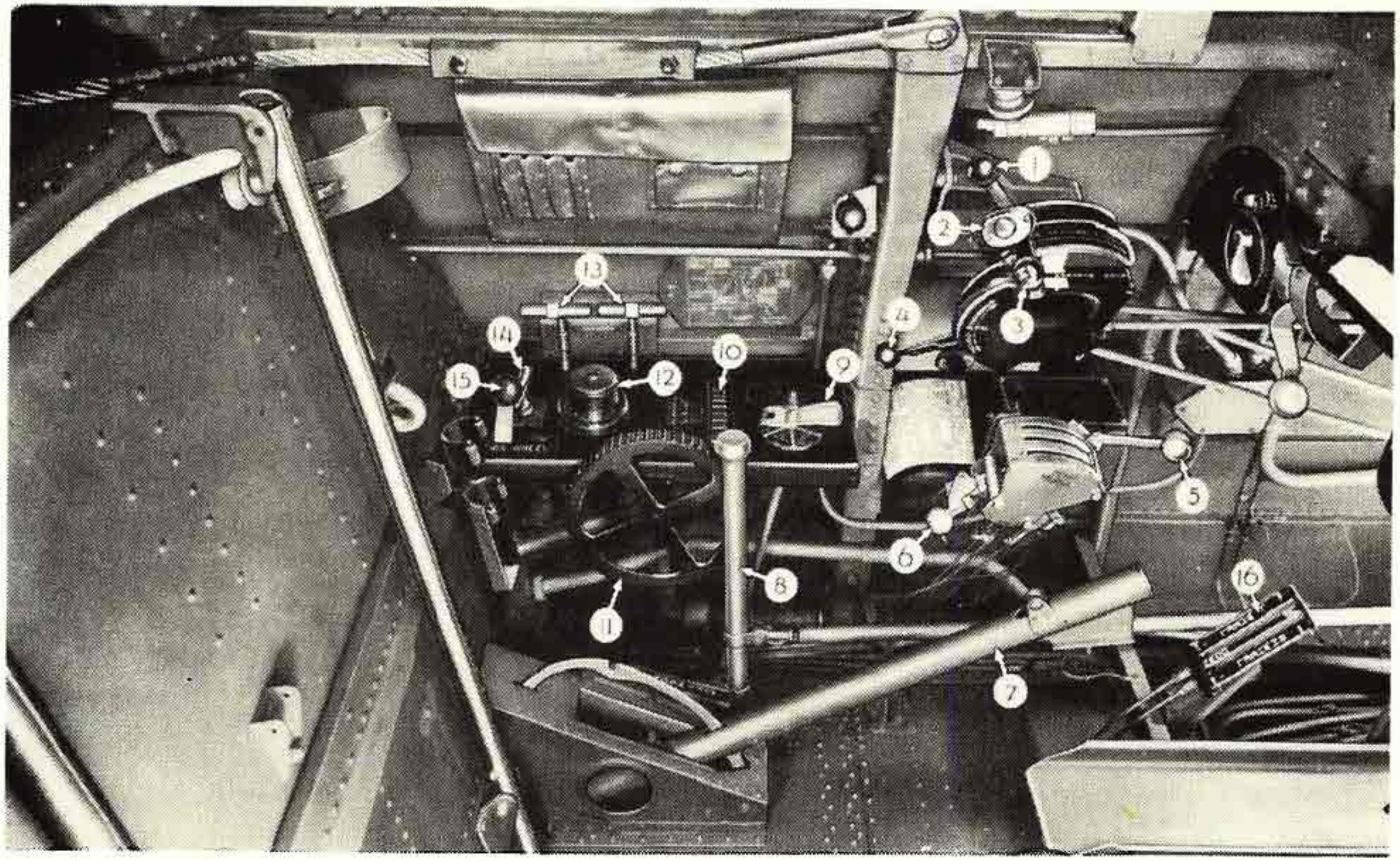
1. AIRSPEED INDICATOR
2. TURN AND BANK INDICATOR
3. RATE OF CLIMB INDICATOR
4. ALTIMETER
5. DIRECTIONAL GYRO CONTROL UNIT
6. BANK AND CLIMB CONTROL UNIT
7. CHECK-OFF INSTRUMENT
8. ENGINE GAGE UNIT
9. MANIFOLD PRESSURE GAGE
10. TACHOMETER
11. CLOCK (ELAPSED TIME)
12. ENGINE TEMPERATURE GAGE
13. OUTSIDE AIR THERMOMETER
14. AUTO PILOT PRESSURE GAGE
15. FUEL QUANTITY GAGES

PHOTO NO. 11045 - PILOT'S INSTRUMENT PANEL



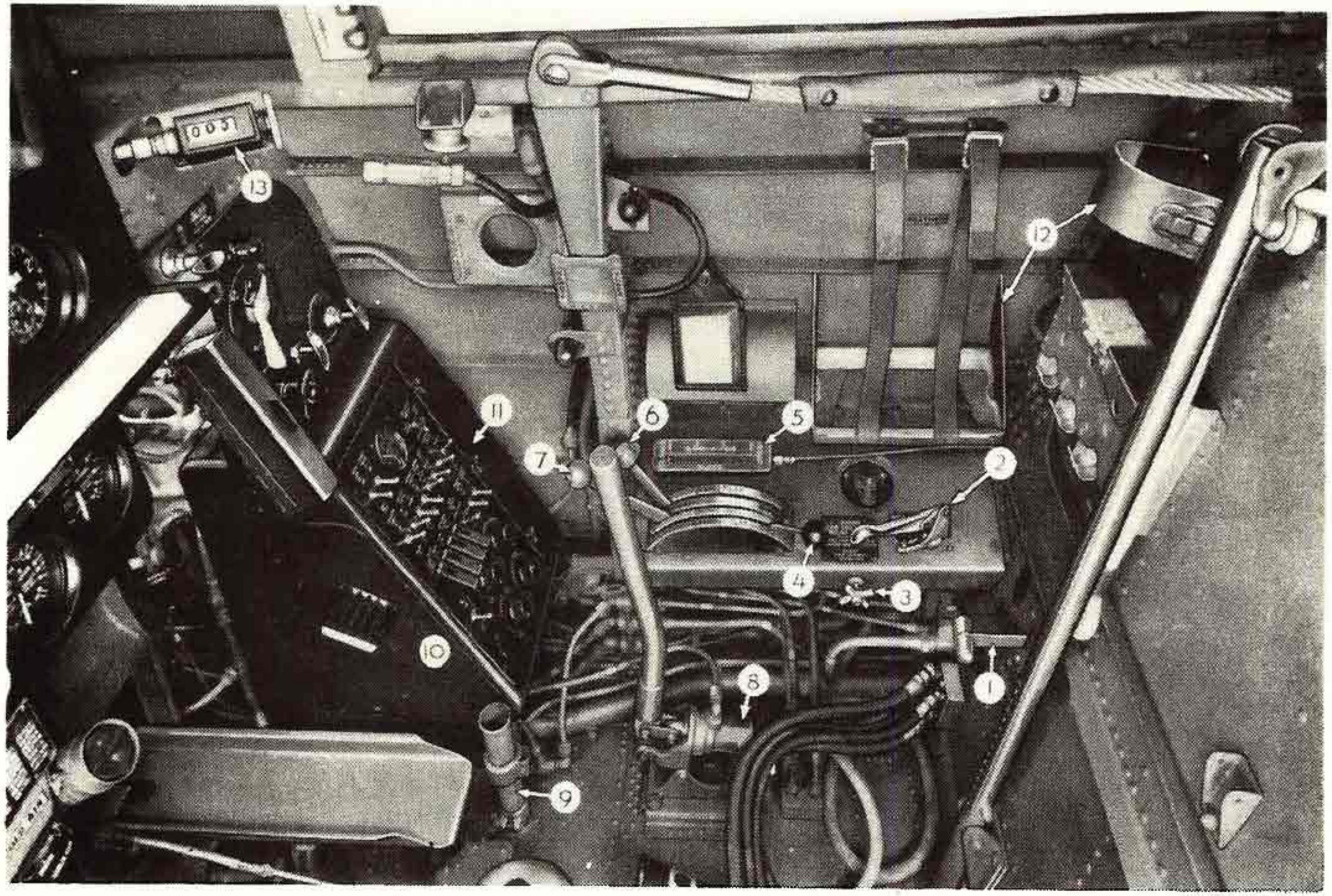
1. CONTROL STICK
2. CARBURETOR AIR CONTROL
3. COWLING FLAP CONTROL LEVER
4. AUTO-PILOT "ON-OFF" SWITCH
5. PARKING BRAKE HANDLE
6. TRIGGER SWITCH
7. COCKPIT VENTILATOR
8. ENGINE PRIMER
9. OIL COOLER AIR SCOOP CONTROL
10. IGNITION SWITCH
11. STARTER MESHING PULL
12. WINDSHIELD HOT AIR CONTROL

PHOTO NO. 12942 - PILOT'S COCKPIT - FRONT

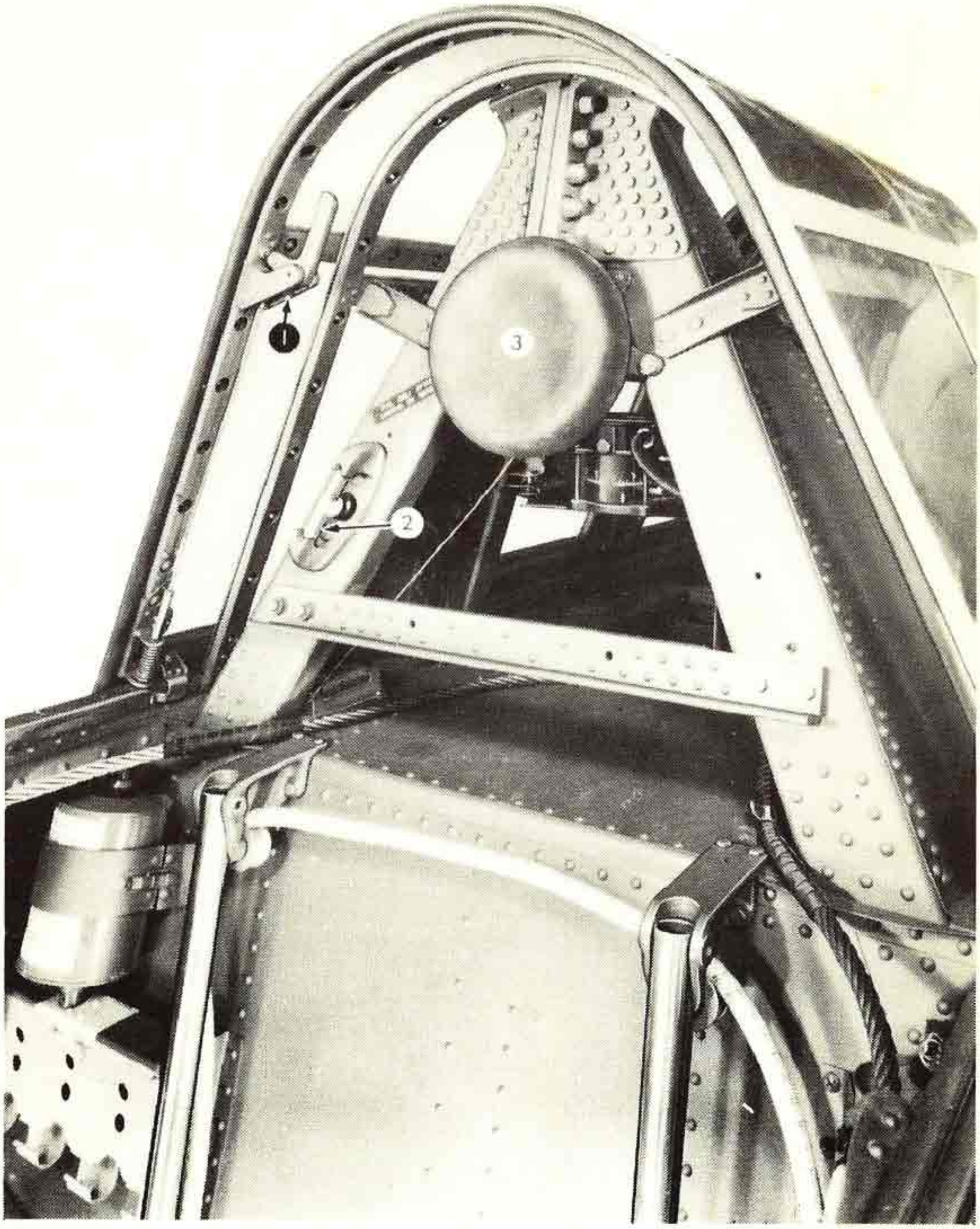


1. Blower Control
2. Throttle
3. Mixture Control
4. Propeller Control
5. Bomb Release Lever
6. Bomb Arming Lever
7. Arresting Hook Operating Lever
8. Wobble Pump Handle
9. Fuel Tank Selector Valve
10. Aileron Tab Control
11. Elevator Tab Control
12. Rudder Tab Control
13. Parachute Flare Release
14. Fire Extinguisher Release
15. Tail Wheel Lock
16. Landing Gear Position Indicator

PHOTO NO. 10732 - PILOT'S COCKPIT - LEFT SIDE

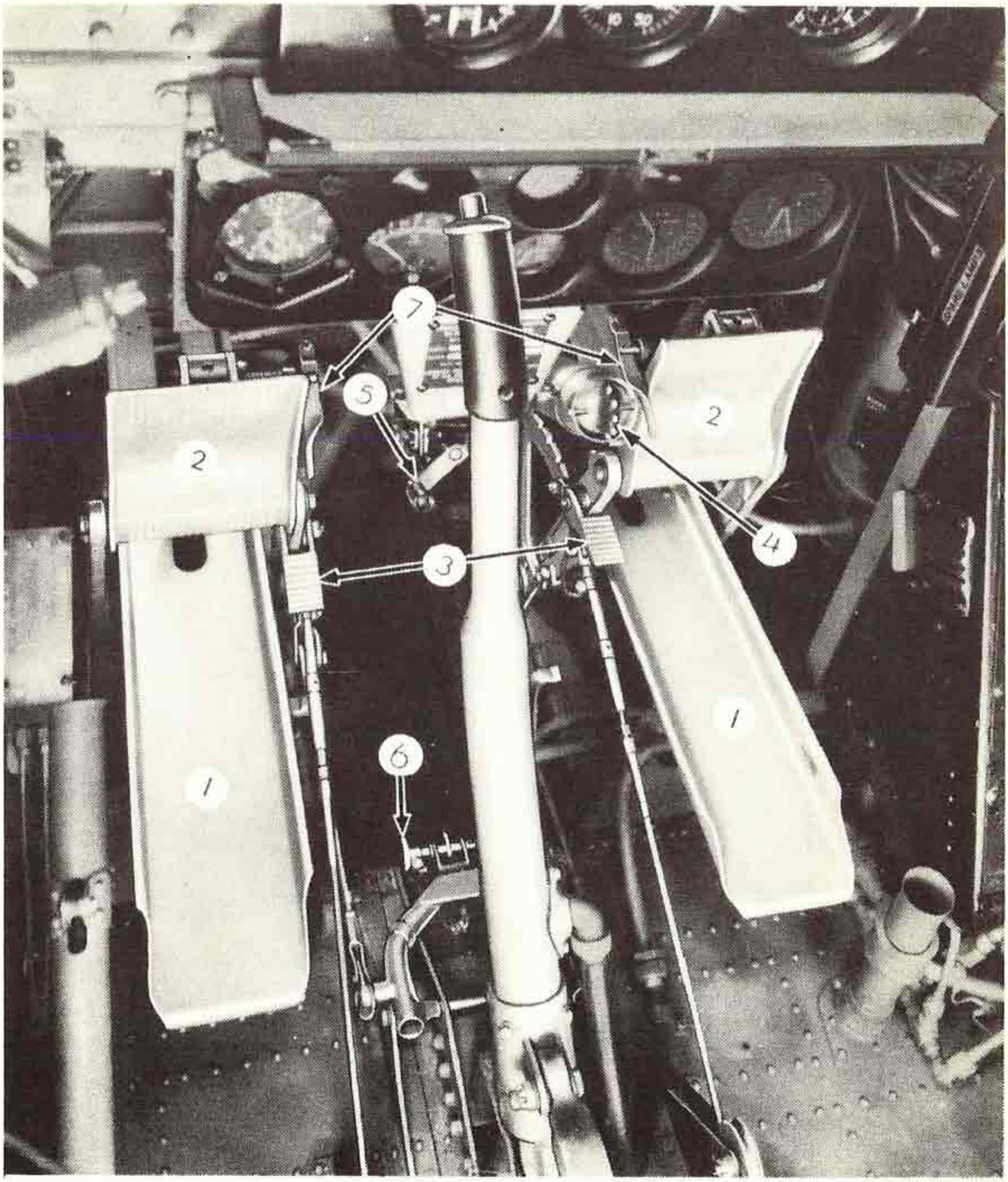


1. Headrest Release
2. Engine Hydraulic Pump Control
3. Landing Gear Emergency Lowering Valve
4. Landing Flaps Selector Lever
5. Flap Position Indicator
6. Diving Flaps Selector Lever
7. Landing Gear Selector Lever
8. Hand Hydraulic Pump
9. Very Pistol Bracket
10. Distribution Panel
11. Fuse Panel
12. Oxygen Rebreather Racks
13. Rounds Counter



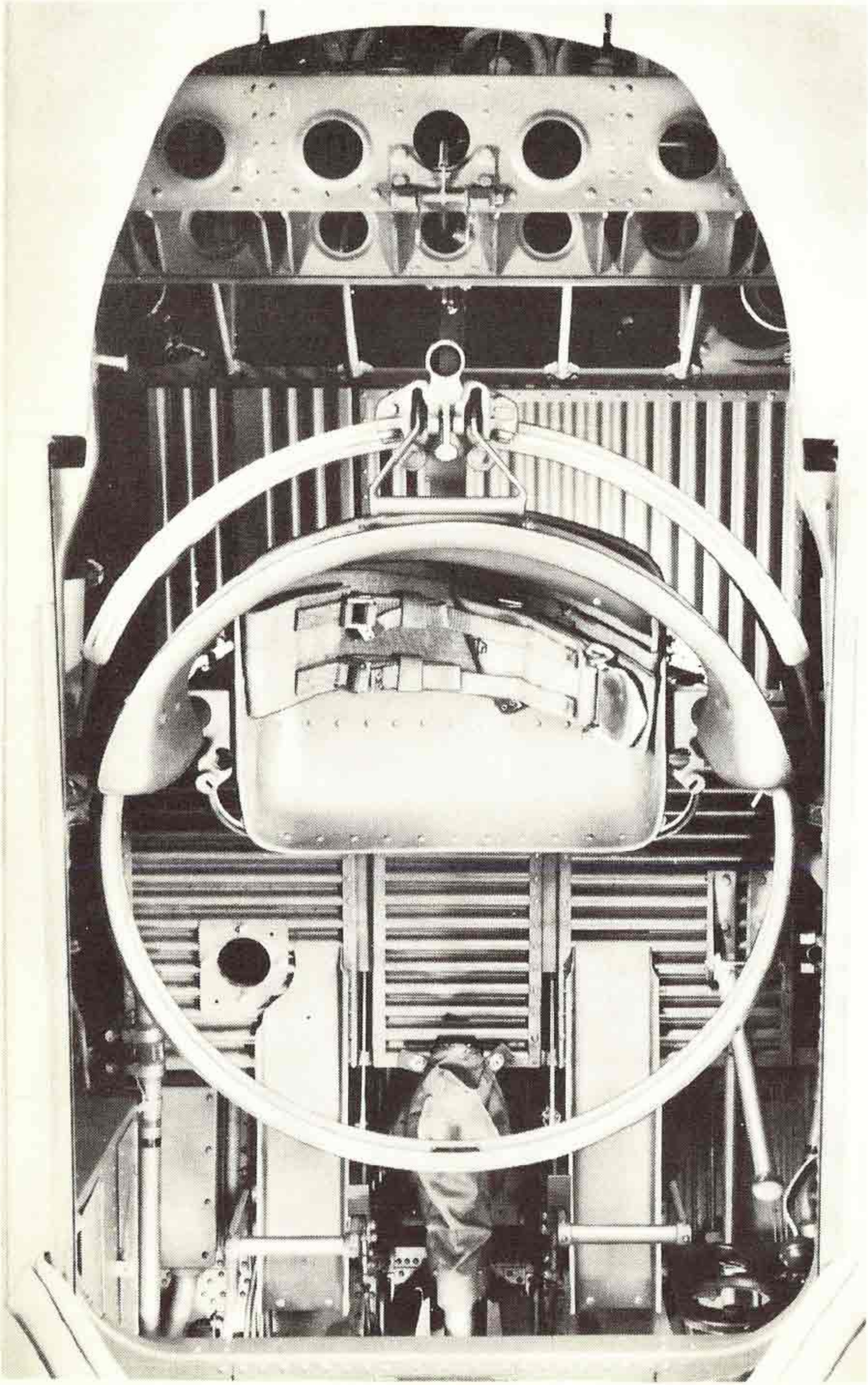
1. PILOT'S ENCLOSURE LATCH
2. FLOTATION MANUAL RELEASE
3. HEADREST

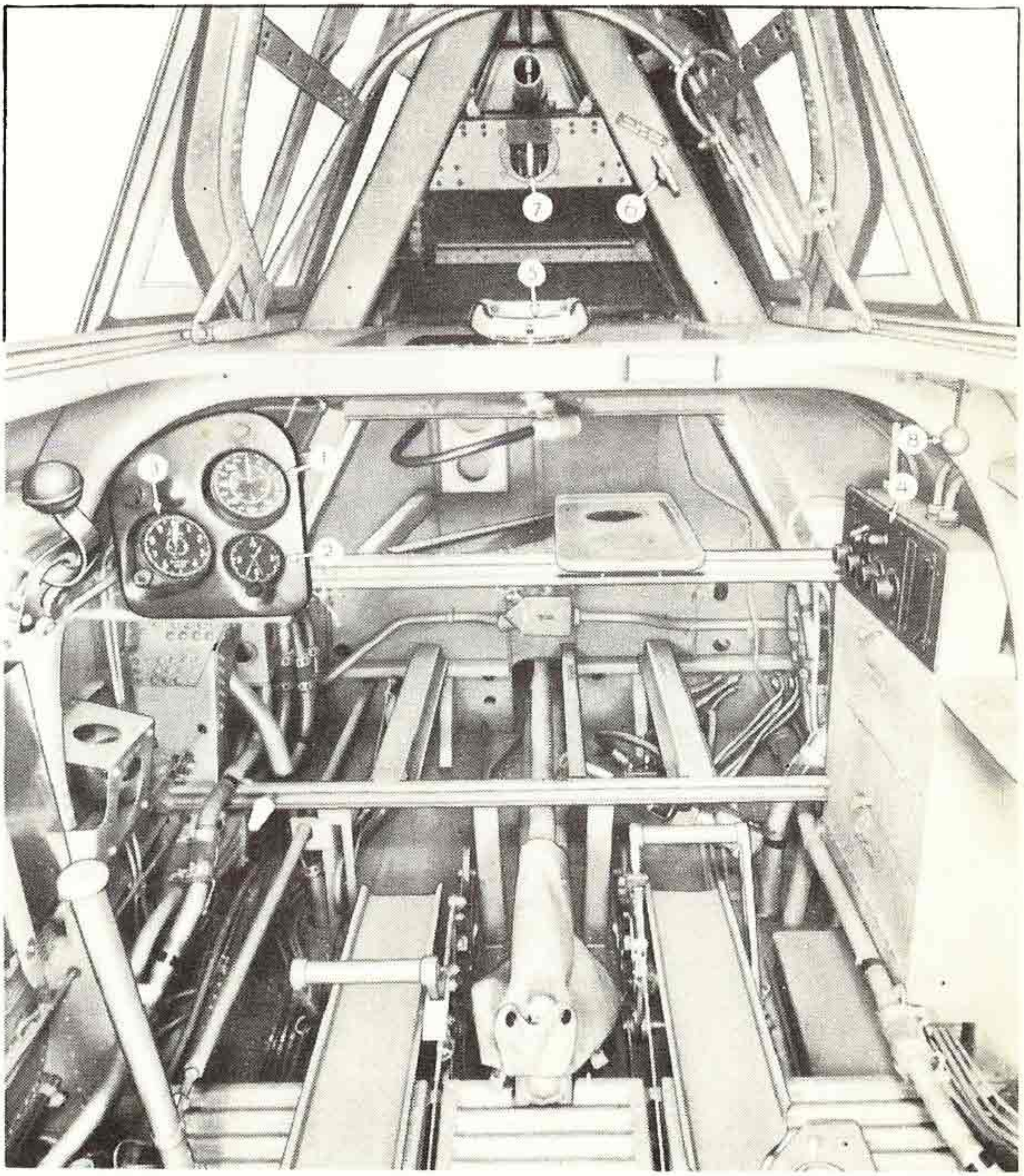
PHOTO NO. 9662 - PILOT'S COCKPIT - REAR



1. RUDDER PEDALS
2. BRAKE TREADLES
3. RUDDER PEDAL ADJUSTMENT
4. COCKPIT VENTILATOR
5. OIL COOLER AIR SCOOP OPERATING LEVER
6. SURFACE CONTROLS LOCKING DEVICE
7. BRAKE TREADLE ADJUSTMENT

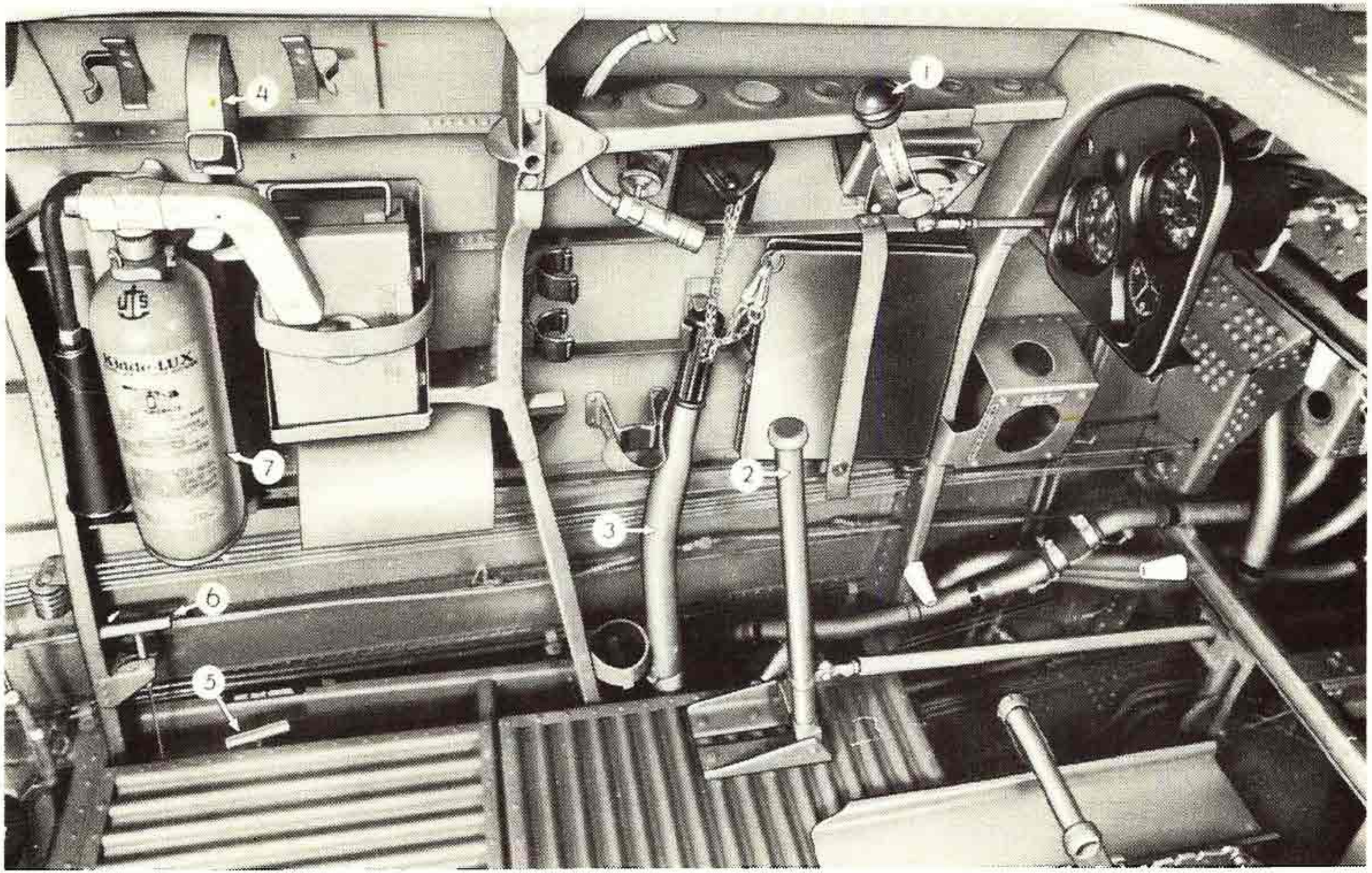
PHOTO NO. 9664 - SURFACE CONTROLS - PILOT'S COCKPIT





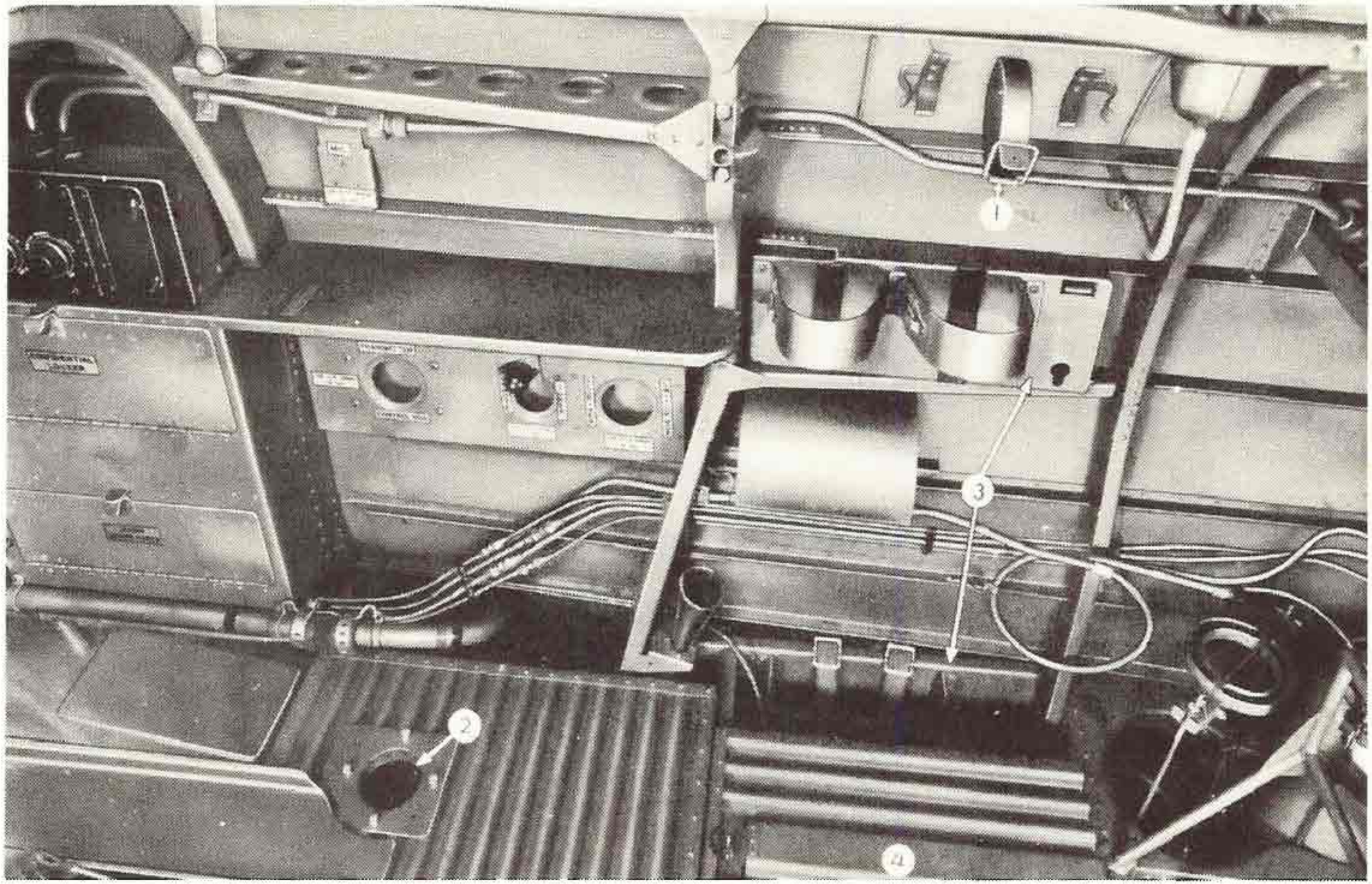
1. AIRSPEED INDICATOR
2. CLOCK
3. ALTIMETER
4. SWITCH PANEL
5. LATERAL INCLINOMETER
6. FLOTATION PULL
7. COMPASS
8. ENCLOSURE LATCH

PHOTO NO. 10744 - AFTER COCKPIT- FRONT



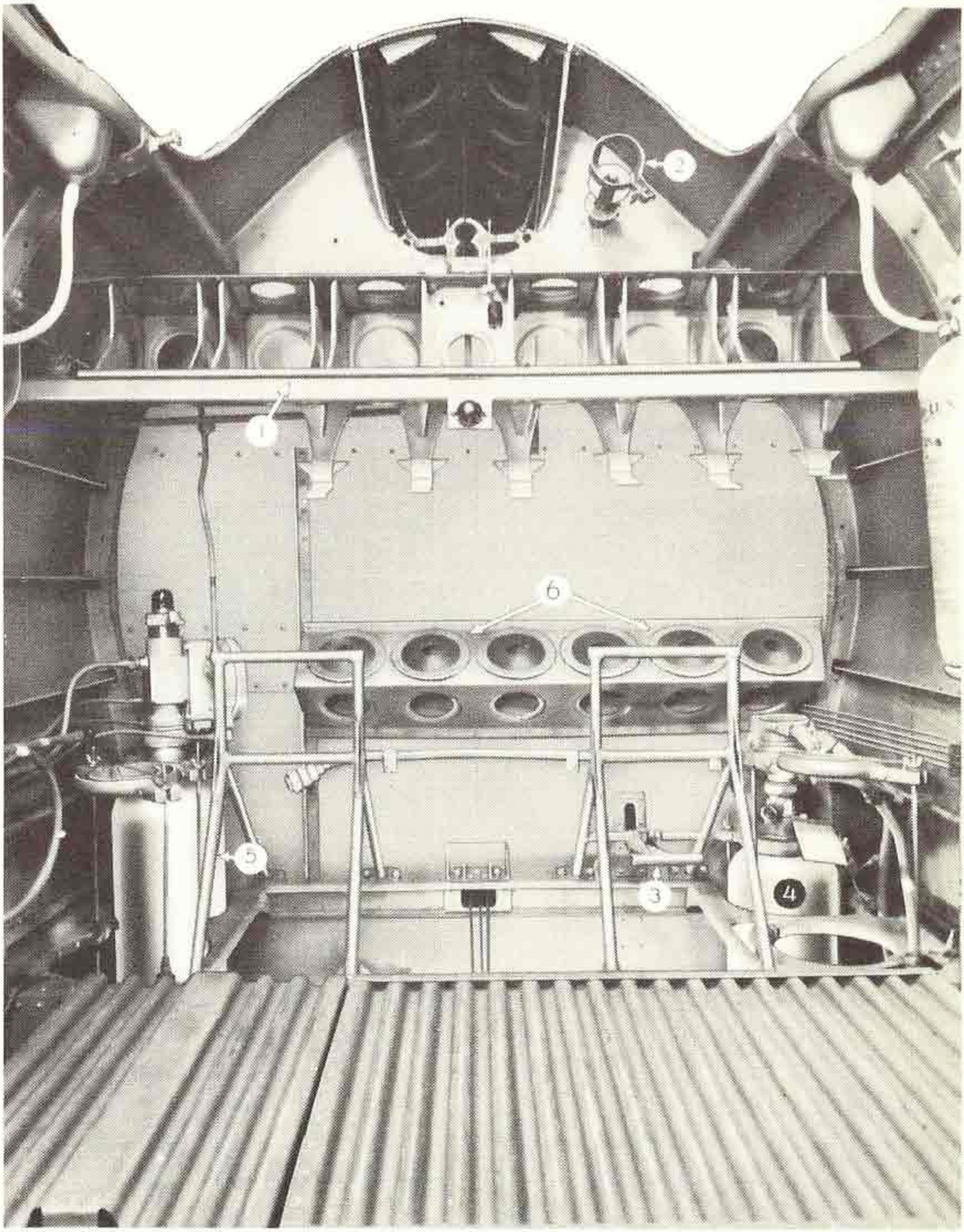
1. THROTTLE
2. WOBBLE PUMP HANDLE
3. CONTROLLED STICK (STOWED)
4. SMOKE GRENADE RACK
5. GATE VALVE CONTROL
6. TAIL PIPE CONTROL
7. HAND FIRE EXTINGUISHER

PHOTO NO. 10734 - AFTER COCKPIT - LEFT SIDE



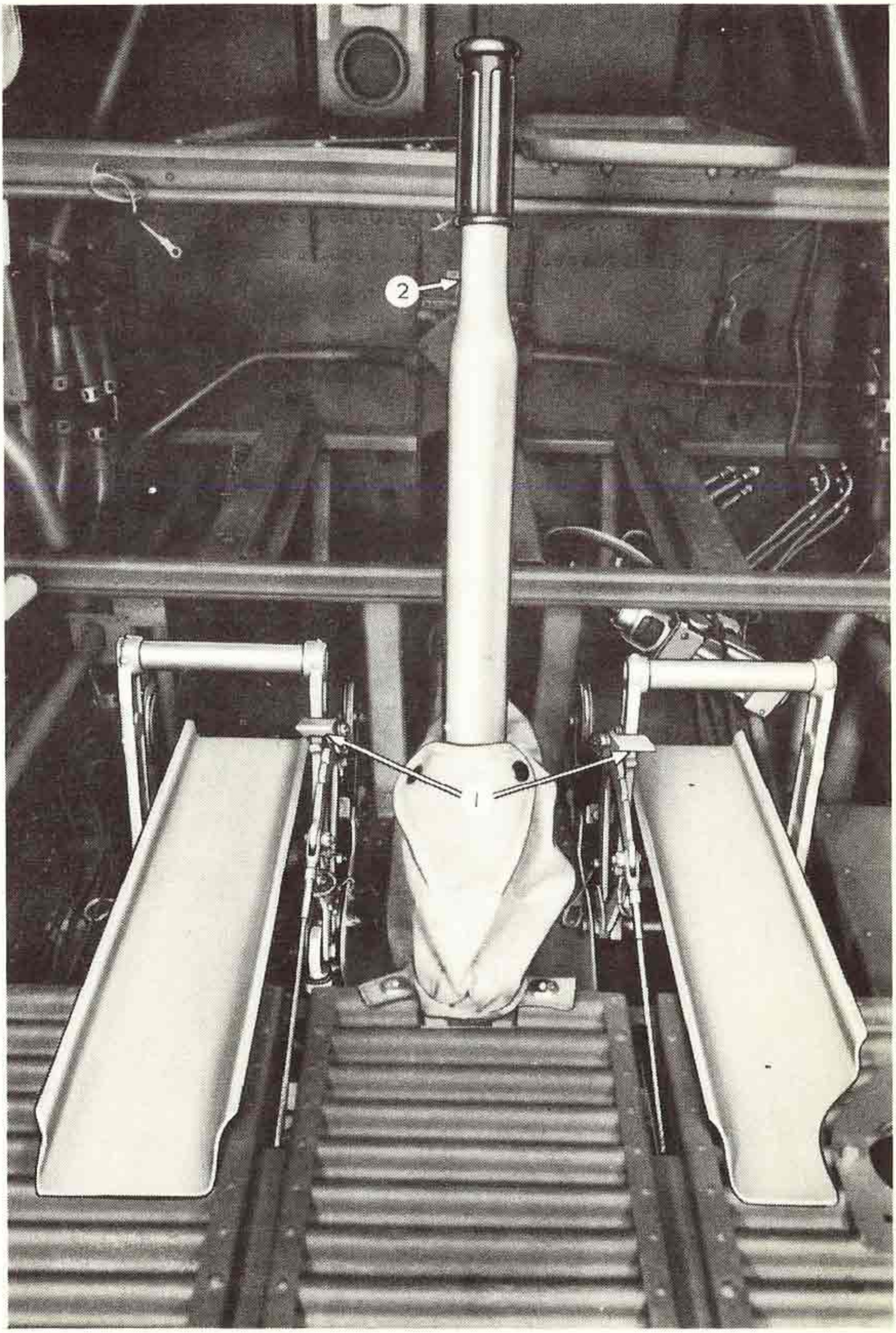
1. SMOKE GRENADE RACK
2. DRIFT SIGHT CUTOUT
3. OXYGEN REBREATHER RACKS
4. SPARE TRANSMITTER COIL STOWAGE

PHOTO NO. 10733 - AFTER COCKPIT - RIGHT SIDE



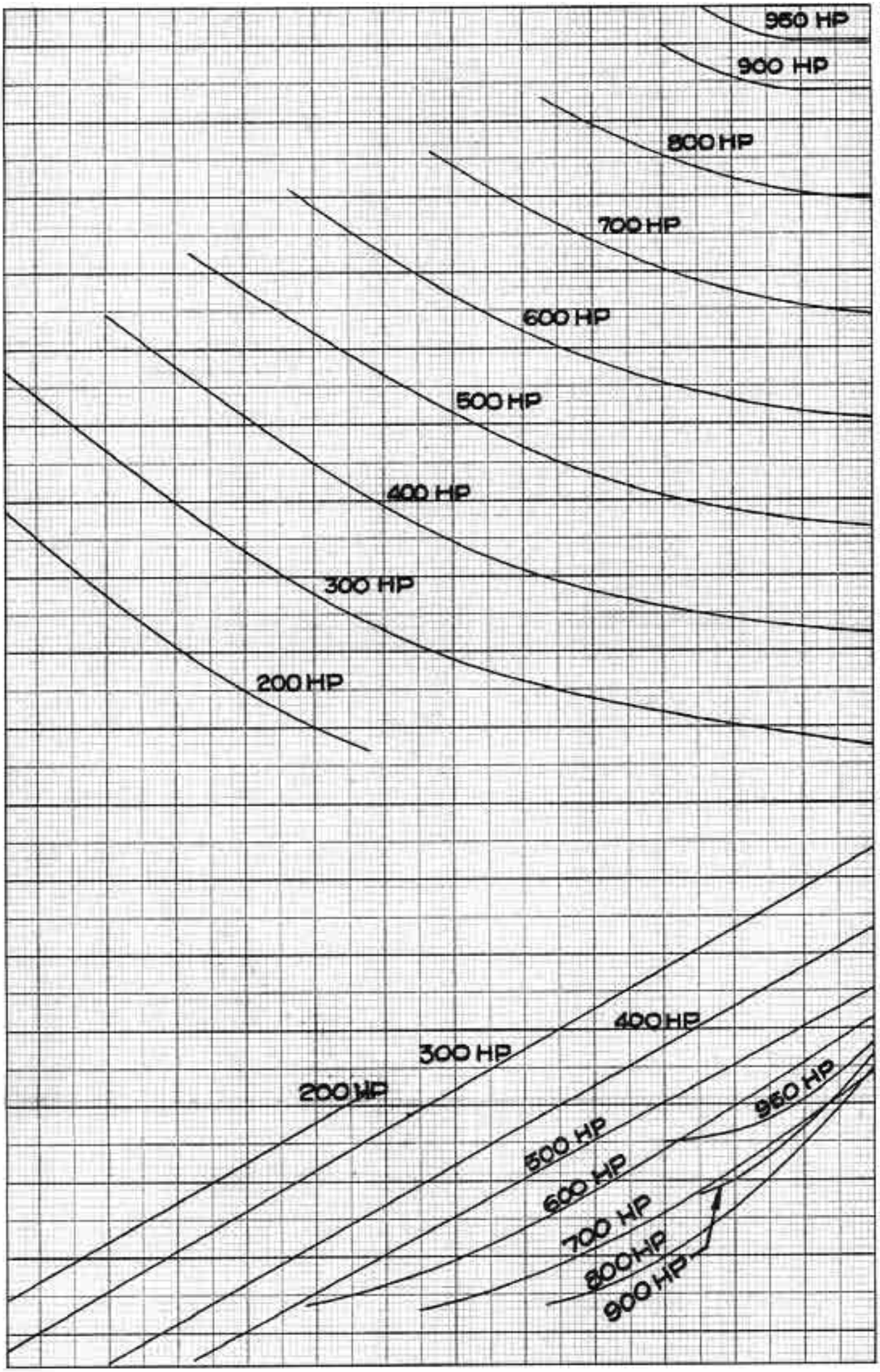
1. AMMUNITION RACK
2. SMOKE GRENADE HANDLE
3. GUN TUNNEL DOOR RELEASE
4. CO_2 FIRE EXTINGUISHER BOTTLE
5. FLOTATION SYSTEM BOTTLE
6. FLOAT LIGHT RACKS

PHOTO NO. 10743 - REAR COCKPIT - REAR

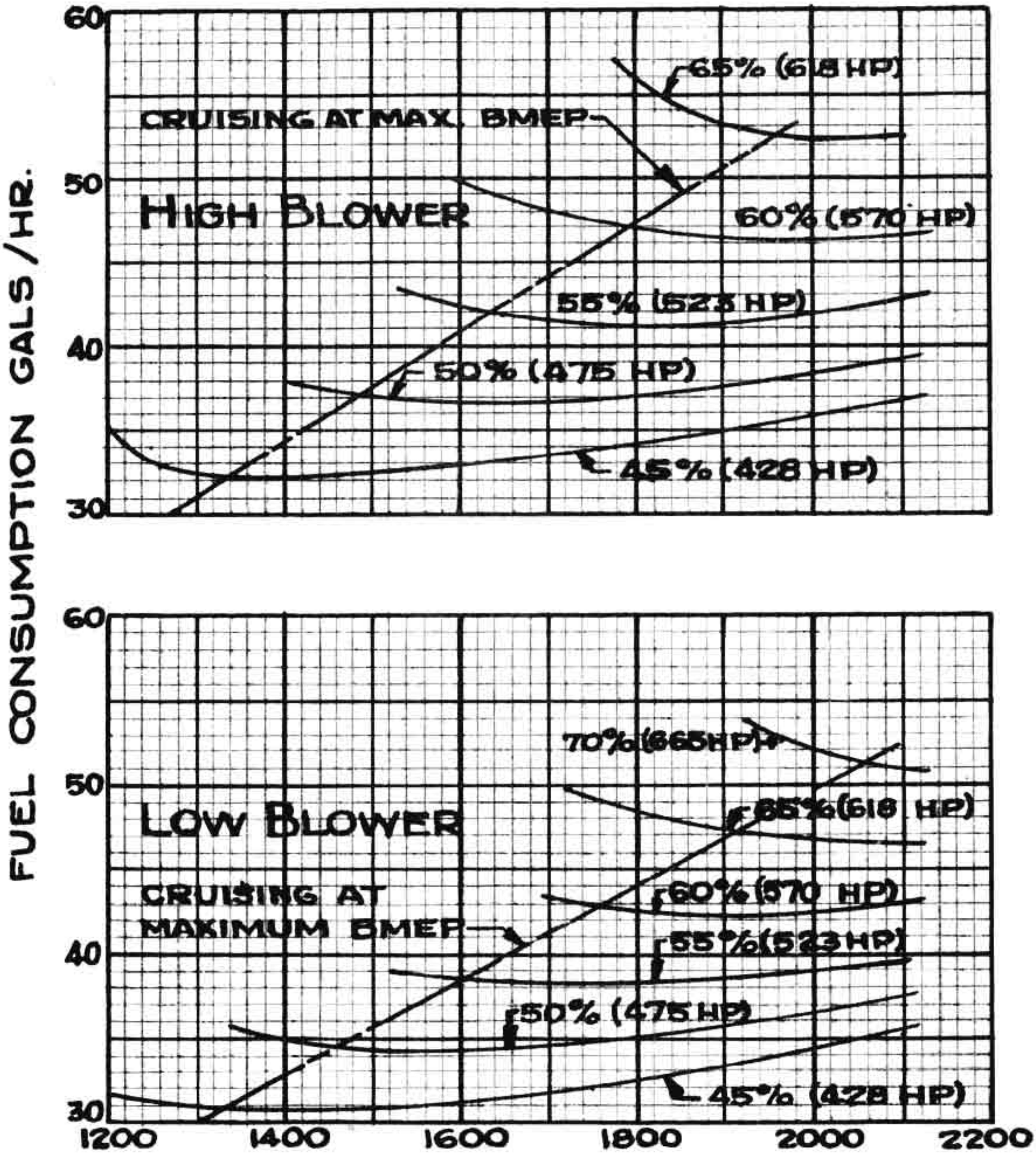


1. Rudder Pedal Adjustment
2. Removable Control Stick

PHOTO NO. 10745 - SURFACE CONTROLS - REAR COCKPIT

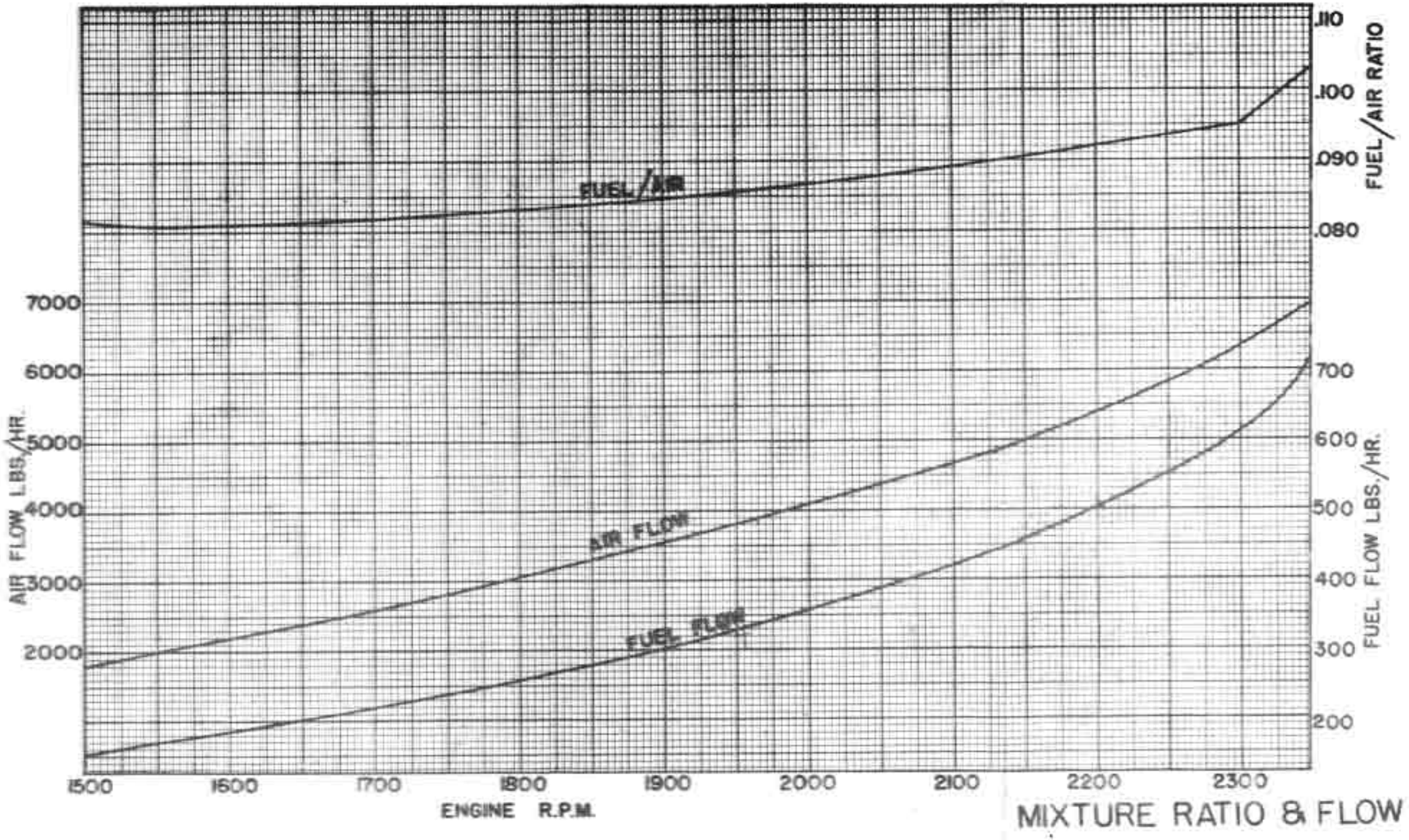


FULL RICH FUEL CONSUMPTION

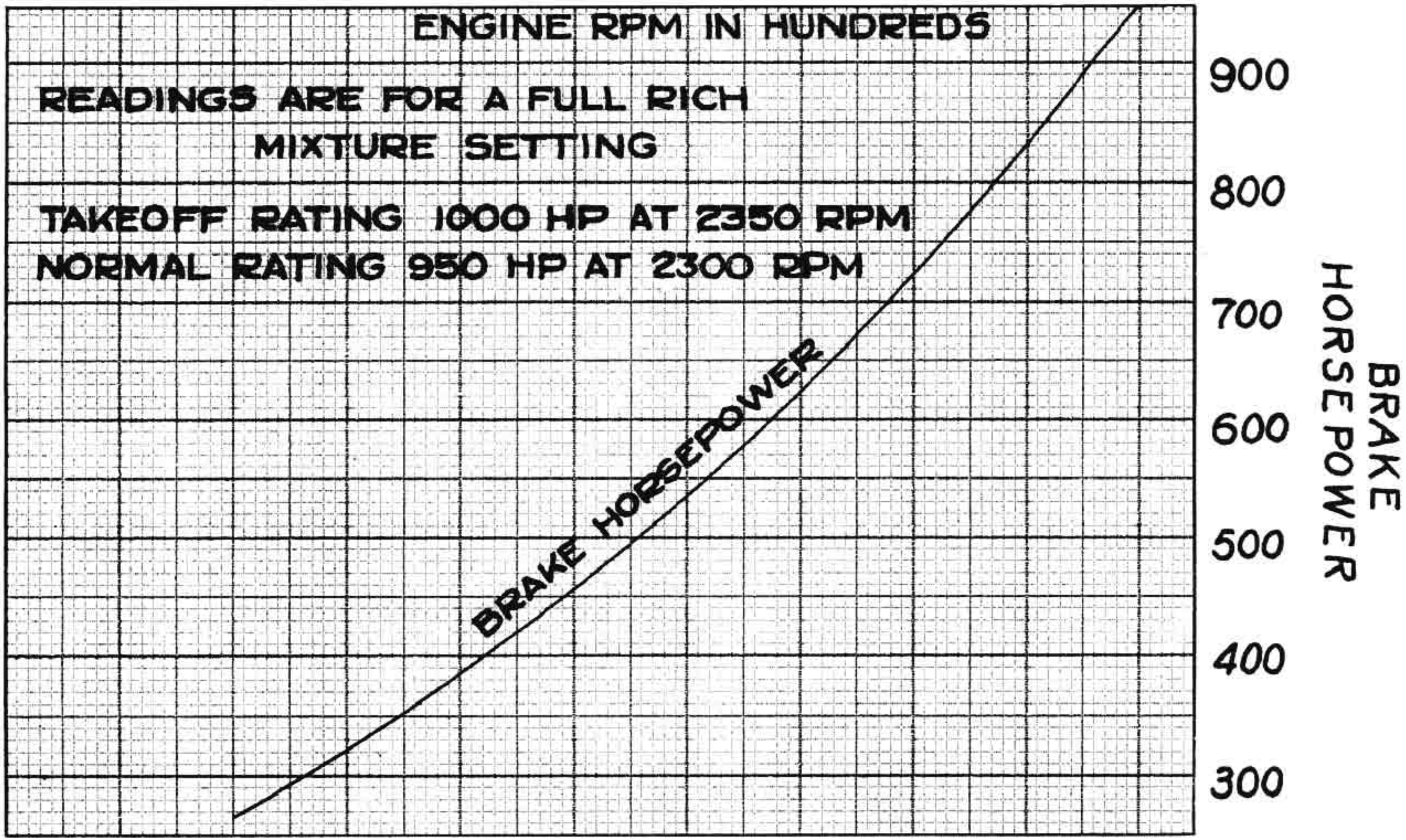


CRUISING LEAN FUEL CONSUMPTION

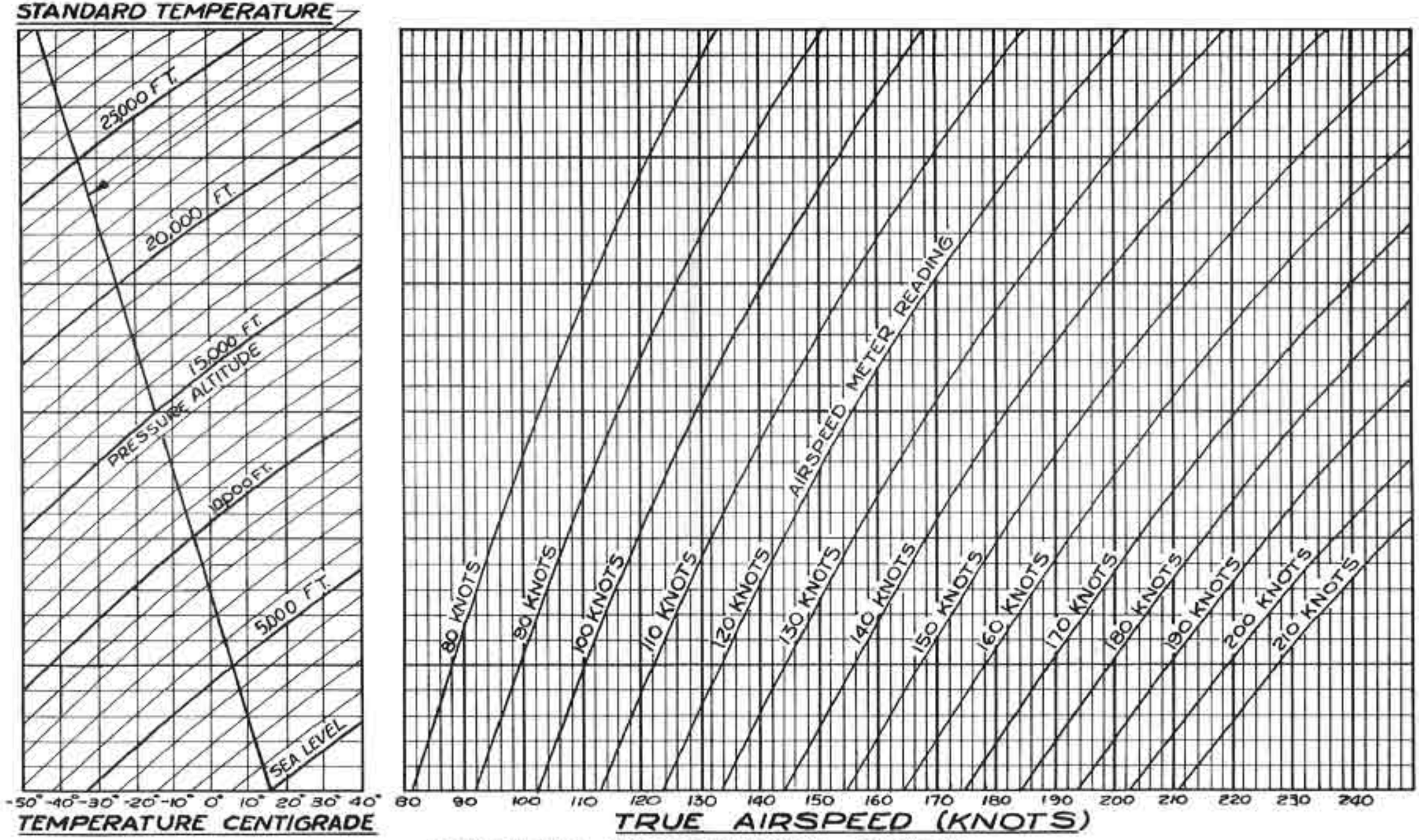
READINGS ARE FOR A FULL RICH MIXTURE SETTING



MIXTURE RATIO & FLOW



PROPELLER LOAD CURVE



AIRSPEED CORRECTION CHART

Cruising Chart

The cruising chart is provided so the engine control required for cruising at a particular speed and altitude may be readily determined. It also shows the limits of engine operation for cruising.

This chart is based upon limitation of the brake mean effective pressure (BMEP) in the cylinders to a certain value. Below the heavy line marked "BMEP Limiting Altitude", the BMEP is held at a constant value, and the power and R.P.M. are proportional to each other. Above this line, the limiting value of the BMEP cannot be reached, and the engine is operated at full throttle; the power and speed decrease with altitude along the constant R.P.M. lines as shown.

A small auxiliary chart is provided at the left of the sheet to be used in determining the density altitude, from the pressure altitude and the outside air temperature.

The use of the chart in determining the engine settings required, when it is desired to fly at a certain speed and pressure altitude, is as follows:

1. Proceed vertically from the outside air temperature to the pressure altitude line. This gives the density altitude.

2. GO HORIZONTALLY TO THE DESIRED TRUE AIRSPEED. INTERPOLATE BETWEEN THE LINES ON THE CHART TO FIND THE R.P.M. AND THE MANIFOLD PRESSURE WHICH ARE REQUIRED.

3. IF THE OUTSIDE AIR TEMPERATURE DIFFERS FROM STANDARD. THERE IS AN ADDITIONAL CORRECTION TO BE MADE.

(A) IN THE REGION OF CONSTANT BMEP OPERATION, INCREASE THE MANIFOLD PRESSURE BY .35 IN. FOR EACH 10^{o}C. THAT THE OUTSIDE AIR TEMPERATURE IS ABOVE STANDARD.

(B) IN THE REGION OF FULL THROTTLE OPERATION, INCREASE THE R.P.M. BY 41 R.P.M. FOR EACH 10^{o}C THAT THE OUTSIDE AIR TEMPERATURE IS ABOVE STANDARD.

OPERATING EXPERIENCE HAS SHOWN THAT SATISFACTORY CONTROL IS OBTAINED IN THE CONSTANT BMEP REGION BY ENTERING THE CHART DIRECTLY WITH PRESSURE ALTITUDE CORRESPONDING TO STANDARD TEMPERATURE AND NEGLECTING ALL CORRECTIONS DUE TO DEVIATION OF AIR TEMPERATURE FROM STANDARD. IN THE FULL THROTTLE REGION IT IS RECOMMENDED THAT THE TEMPERATURE CORRECTIONS ALWAYS BE APPLIED.

EXAMPLES

1. IT IS DESIRED TO FLY AT A TRUE AIRSPEED OF 175 KNOTS AT A PRESSURE ALTITUDE OF

5,000 FT. AND AN OUTSIDE AIR TEMPERATURE OF 20°C. THIS GIVES POINT "A" ON THE CHART. THE UNCORRECTED ENGINE SETTINGS ARE: R.P.M. 1870: M.P. 27.3 IN. SINCE THE TEMPERATURE IS 16°C. ABOVE STANDARD TEMPERATURE AT THIS PRESSURE ALTITUDE, THE MANIFOLD PRESSURE IS INCREASED BY .6 IN., GIVING A CORRECTED M.P. OF 27.9 IN.

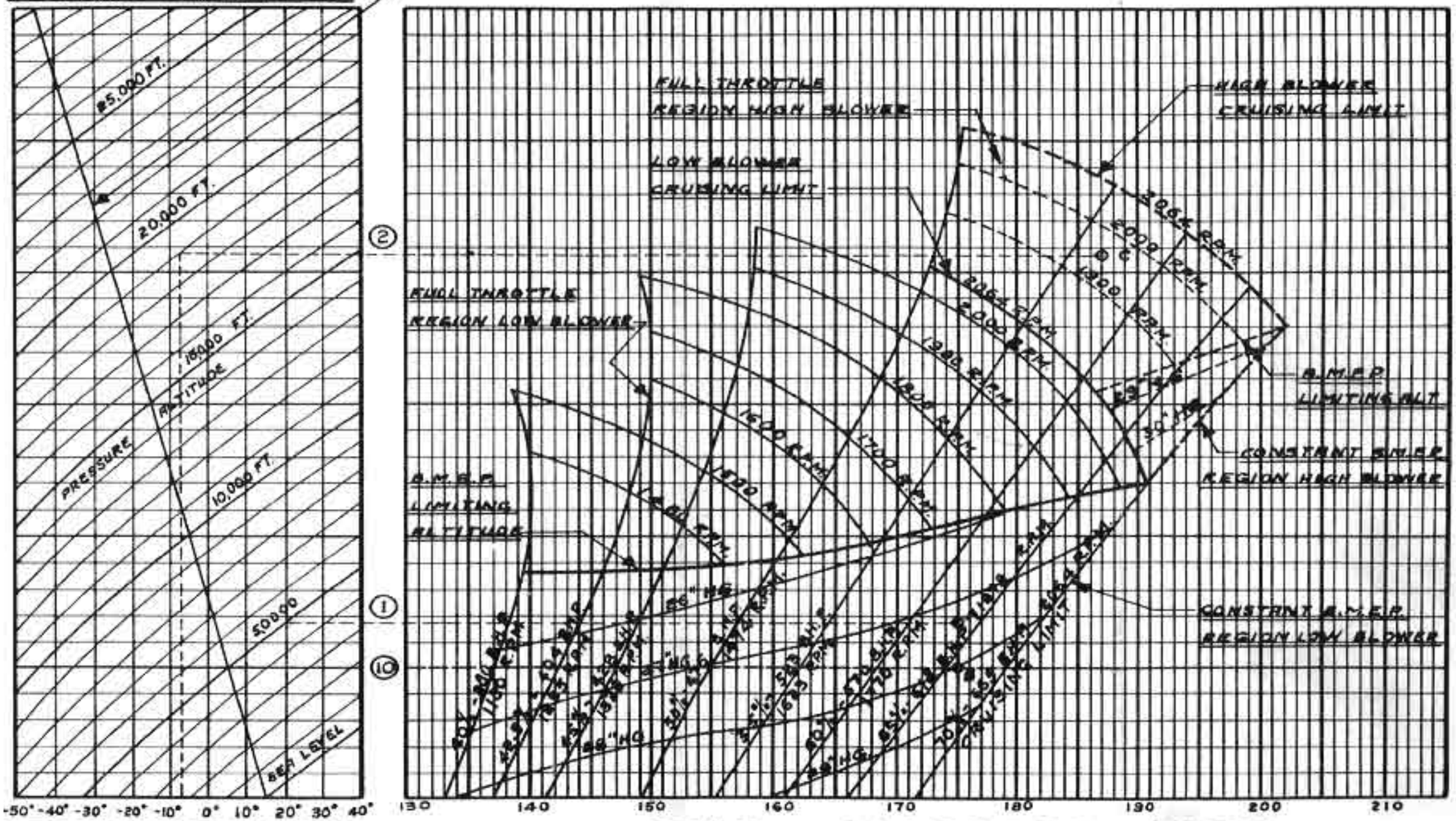
(A) USING THE SIMPLIFIED PROCEDURE, THE FOLLOWING RESULTS ARE OBTAINED:

POINT "B" GIVES 1936 R.P.M. AND 28.0 IN. M.P.

BOTH PROCEDURES RESULT IN A TRUE ENGINE POWER VERY NEAR TO WHAT IS ACTUALLY DESIRED.

2. IT IS DESIRED TO FLY AT A TRUE AIRSPEED OF 187 KNOTS AT A PRESSURE ALTITUDE OF 19,000 FT. AND AN OUTSIDE AIR TEMPERATURE OF -7.5°C. AT POINT "C" ON THE CHART, THE UNCORRECTED ENGINE R P.M. SETTING IS 1950 R.P.M. IN HIGH BLOWER. SINCE THE TEMPERATURE IS 17° ABOVE STANDARD TEMPERATURE AT THIS PRESSURE ALTITUDE, THE R.P.M. IS INCREASED BY 70, GIVING A CORRECTED R.P.M. OF 2020.

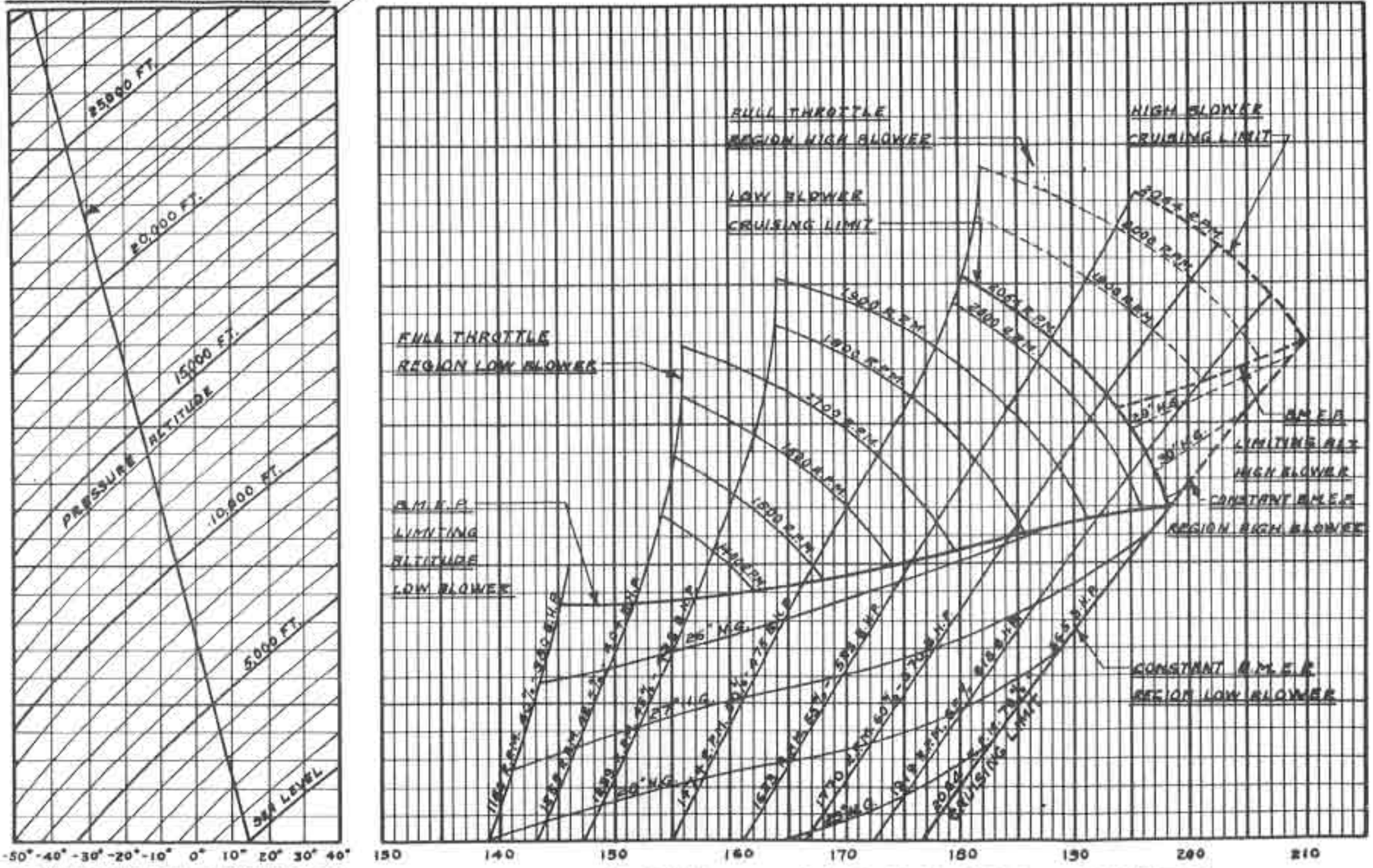
STANDARD TEMPERATURE



1000# BOMBER GROSS WEIGHT 8303.9 LBS.

CRUISING SPEED CHART

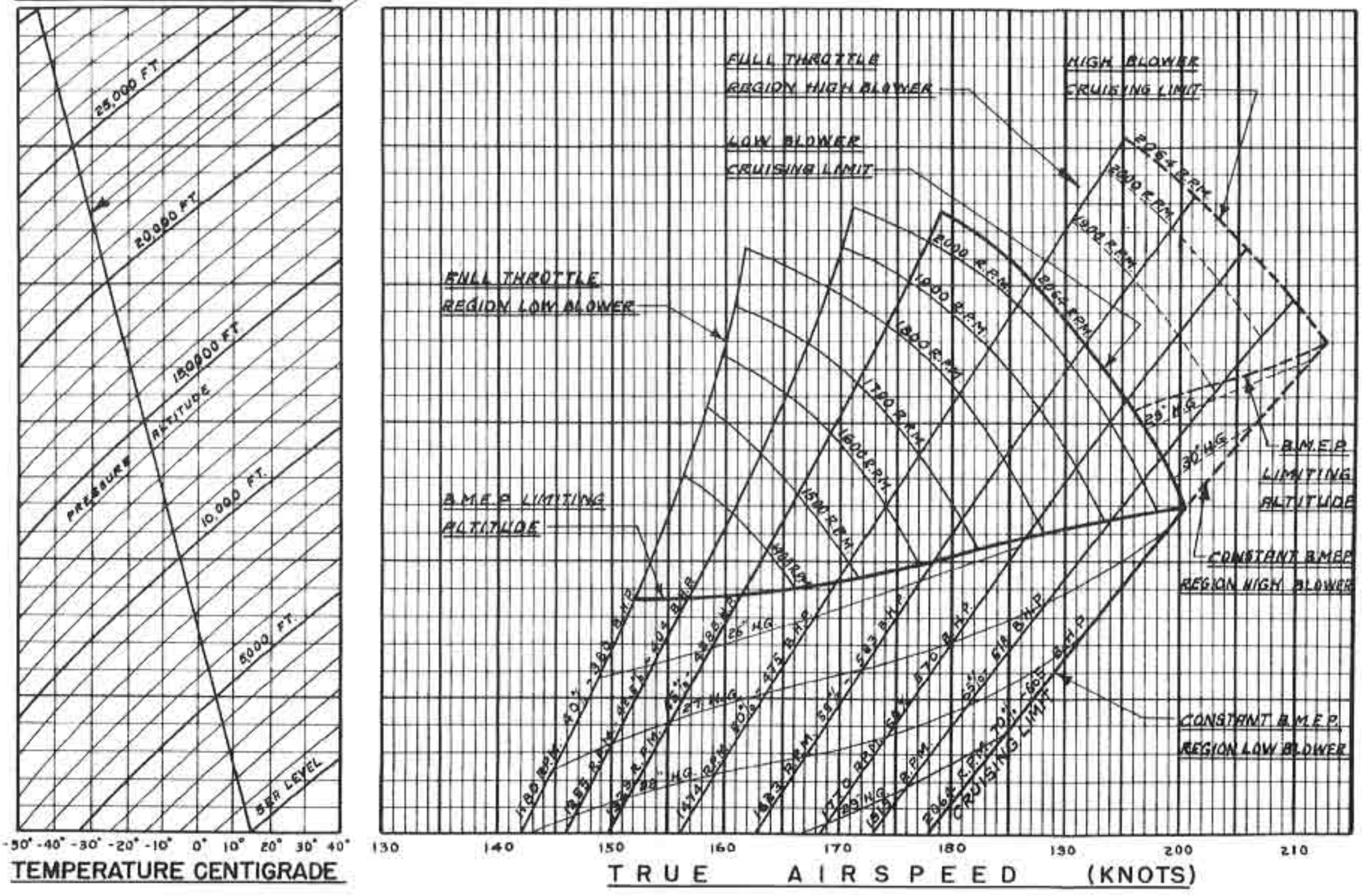
SBD-3 NON-COMBAT



310 GAL. SCOUT GROSS WEIGHT 8594.6 LBS.

CRUISING SPEED CHART

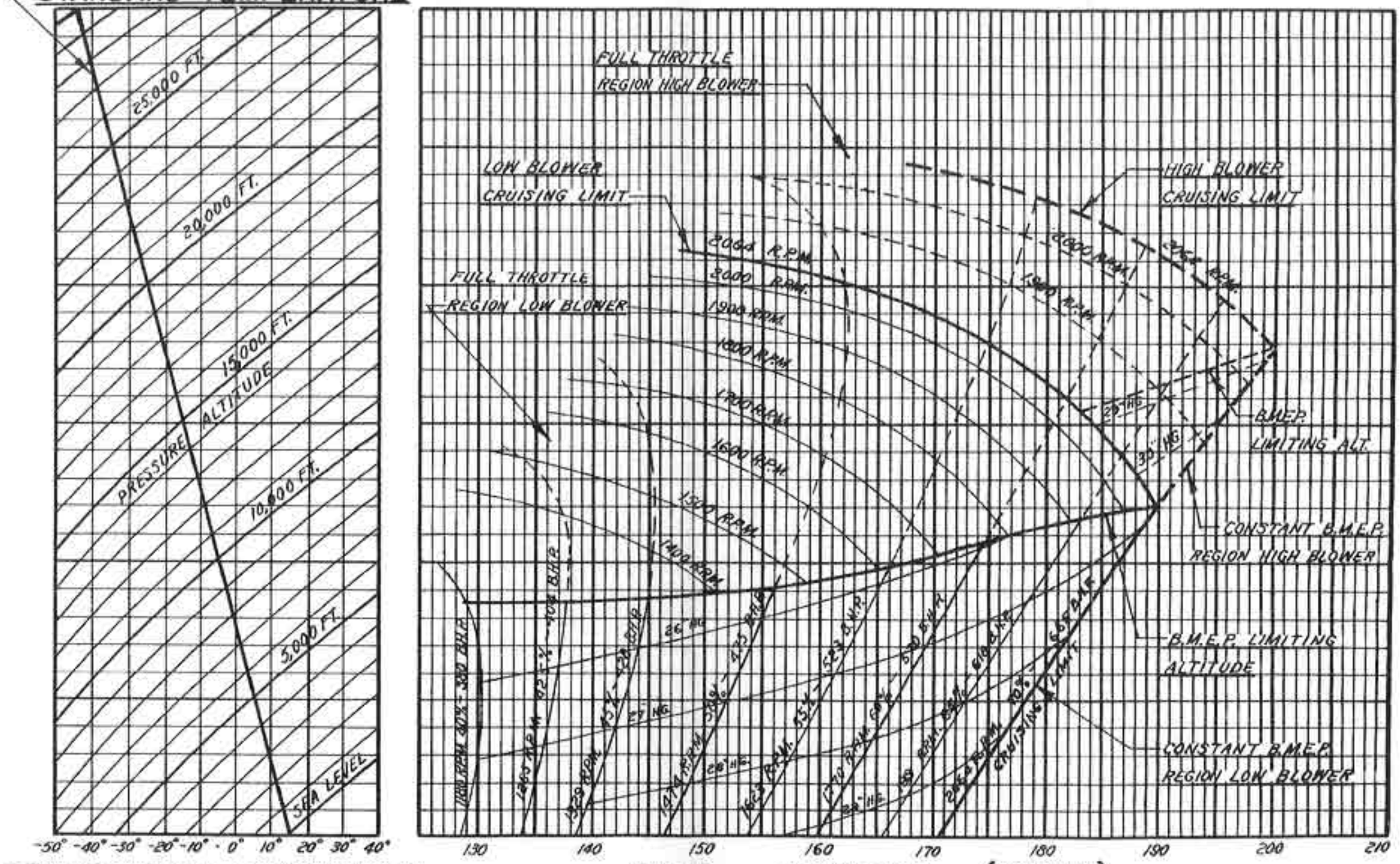
SBD-3 NON-COMBAT



180 GAL. SCOUT GROSS WEIGHT 7762.1 LBS.

CRUISING SPEED CHART

SBD-3 NON-COMBAT



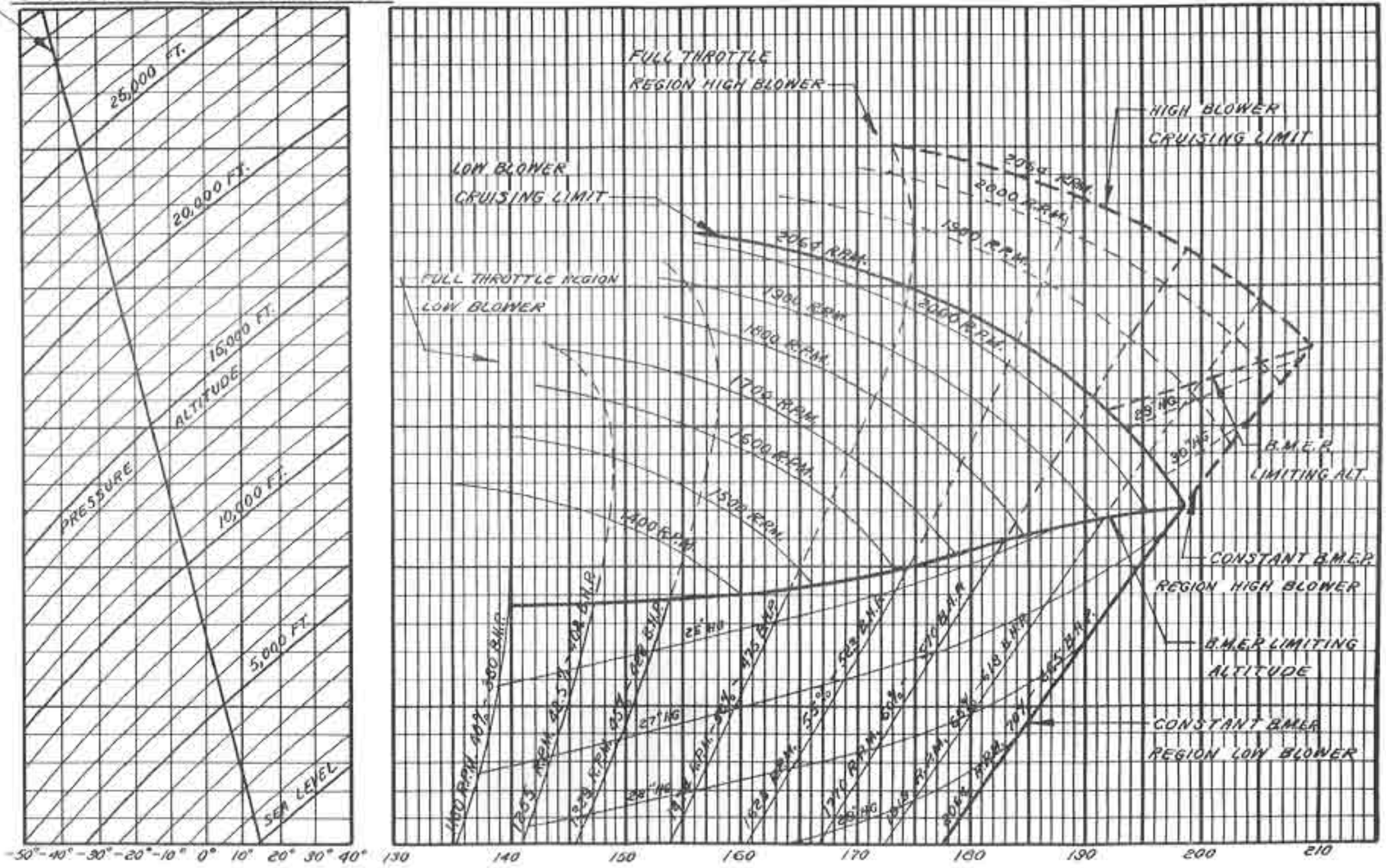
1000# BOMBER

GROSS WEIGHT 9019 LBS.

CRUISING SPEED CHART

SBD-3 COMBAT

STANDARD TEMPERATURE

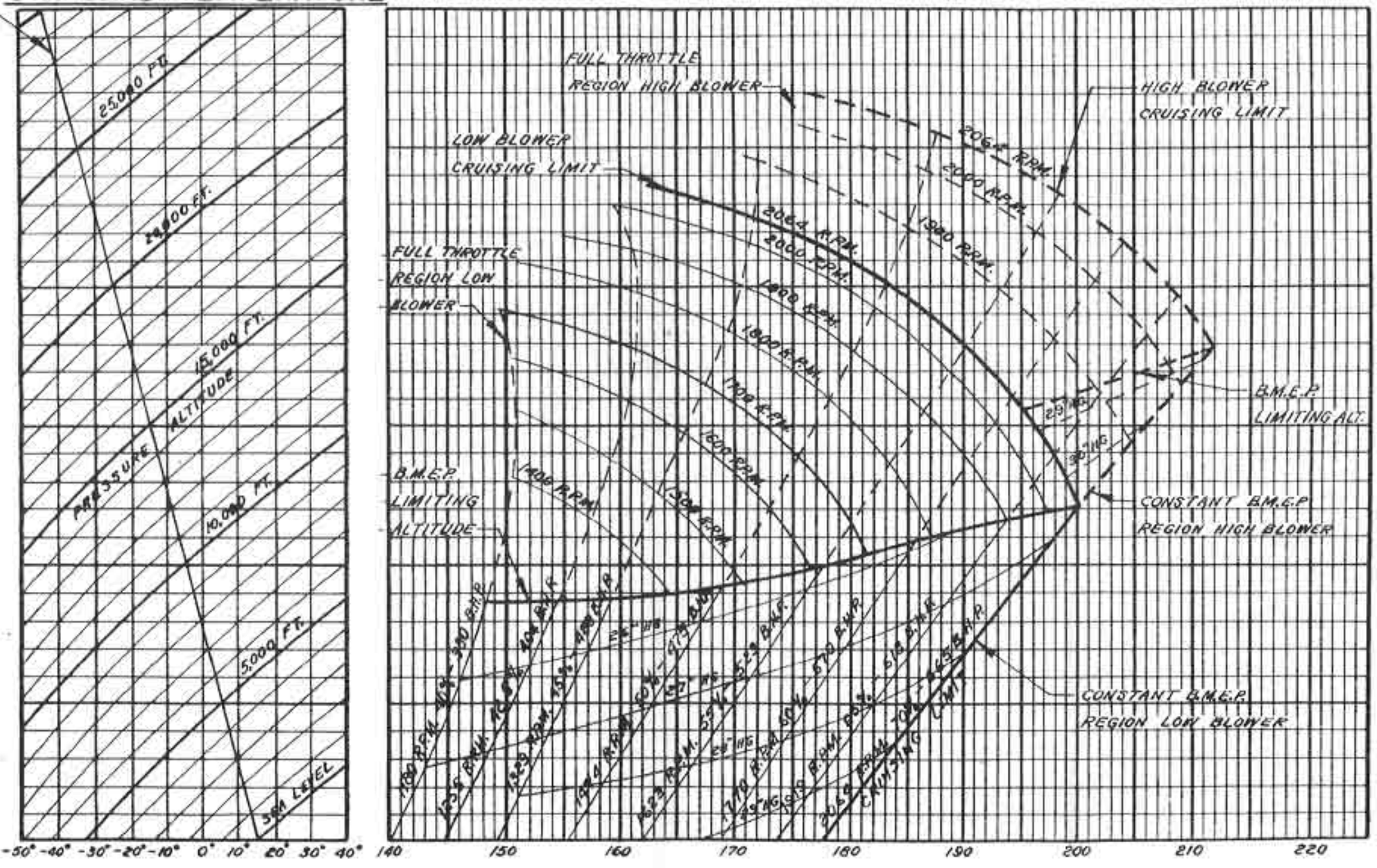


260 GAL. SCOUT GROSS WEIGHT 8975 LBS.

CRUISING SPEED CHART

SBD-3 COMBAT

STANDARD TEMPERATURE



TEMPERATURE CENTIGRADE

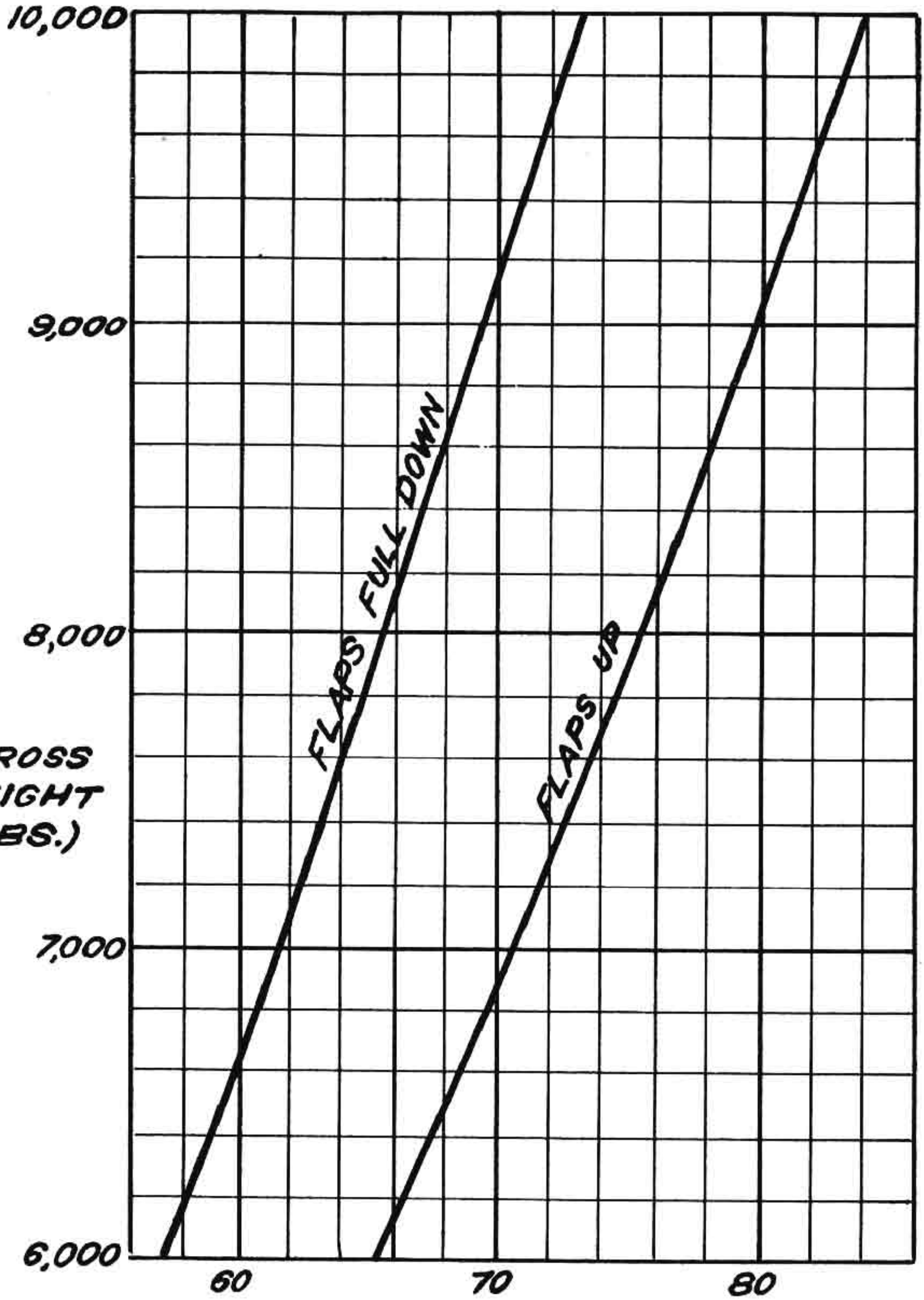
TRUE AIRSPEED (KNOTS)

150 GAL. SCOUT

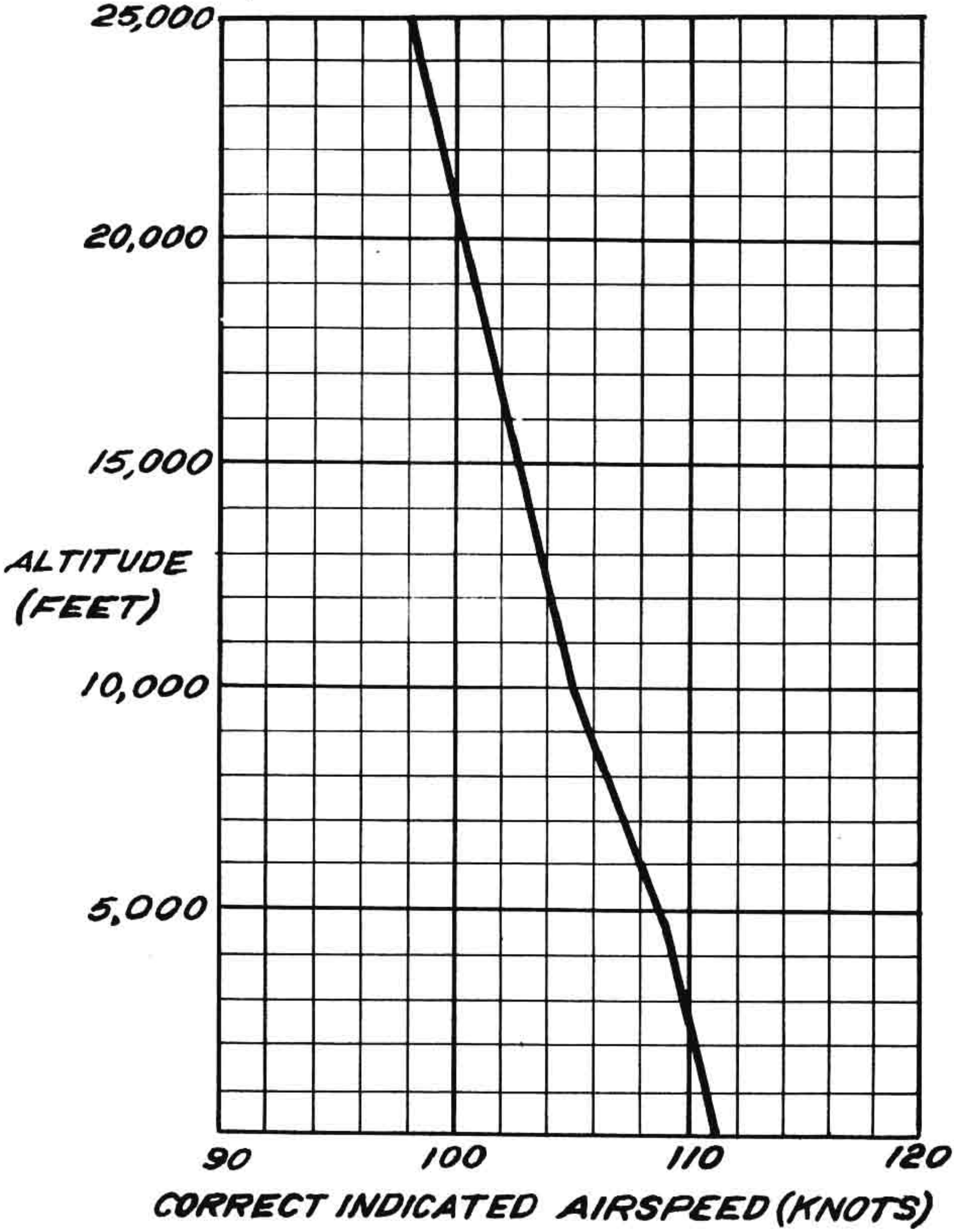
GROSS WEIGHT 8277 LBS.

CRUISING SPEED CHART

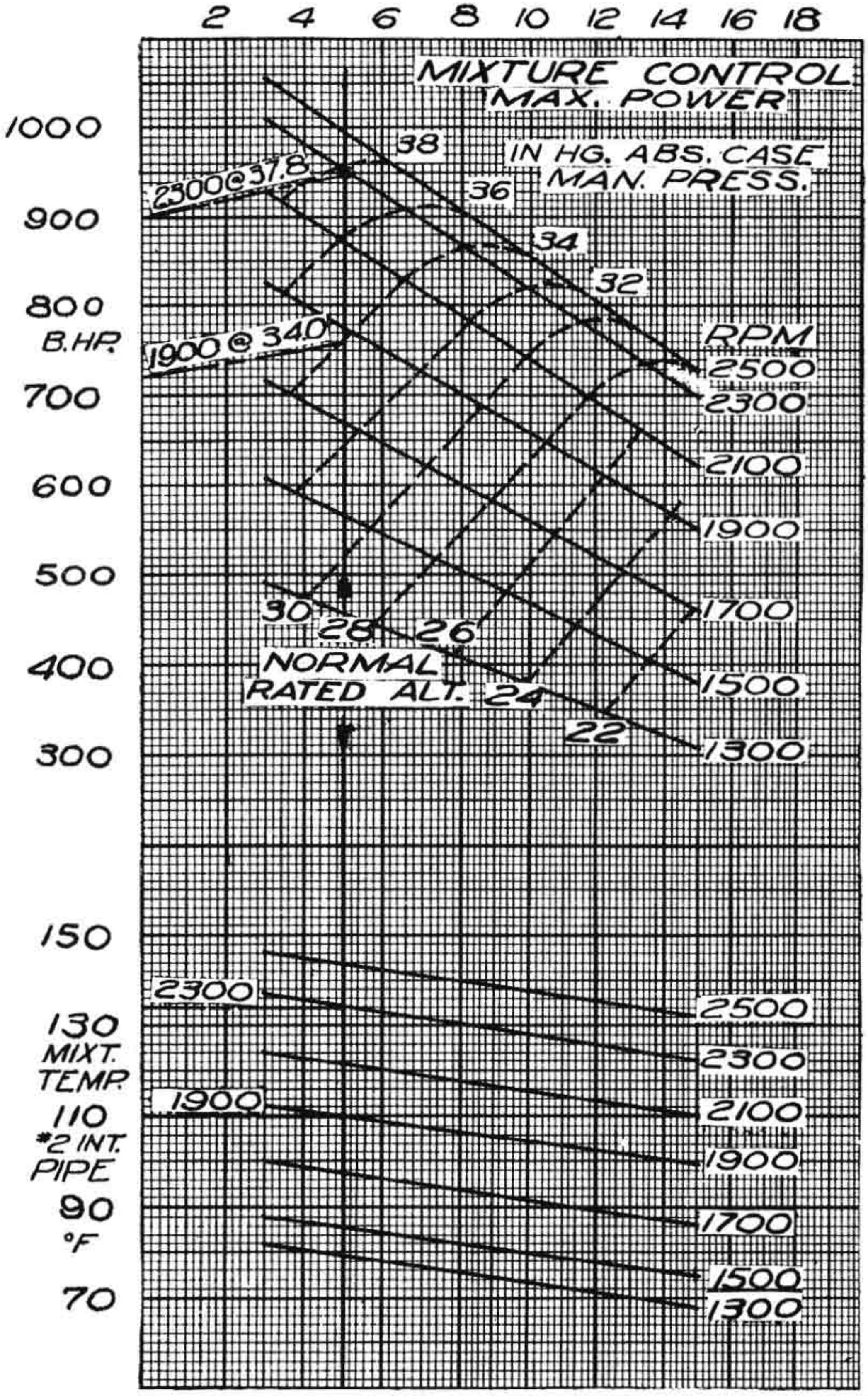
SBD-3 COMBAT



LANDING SPEED CHART

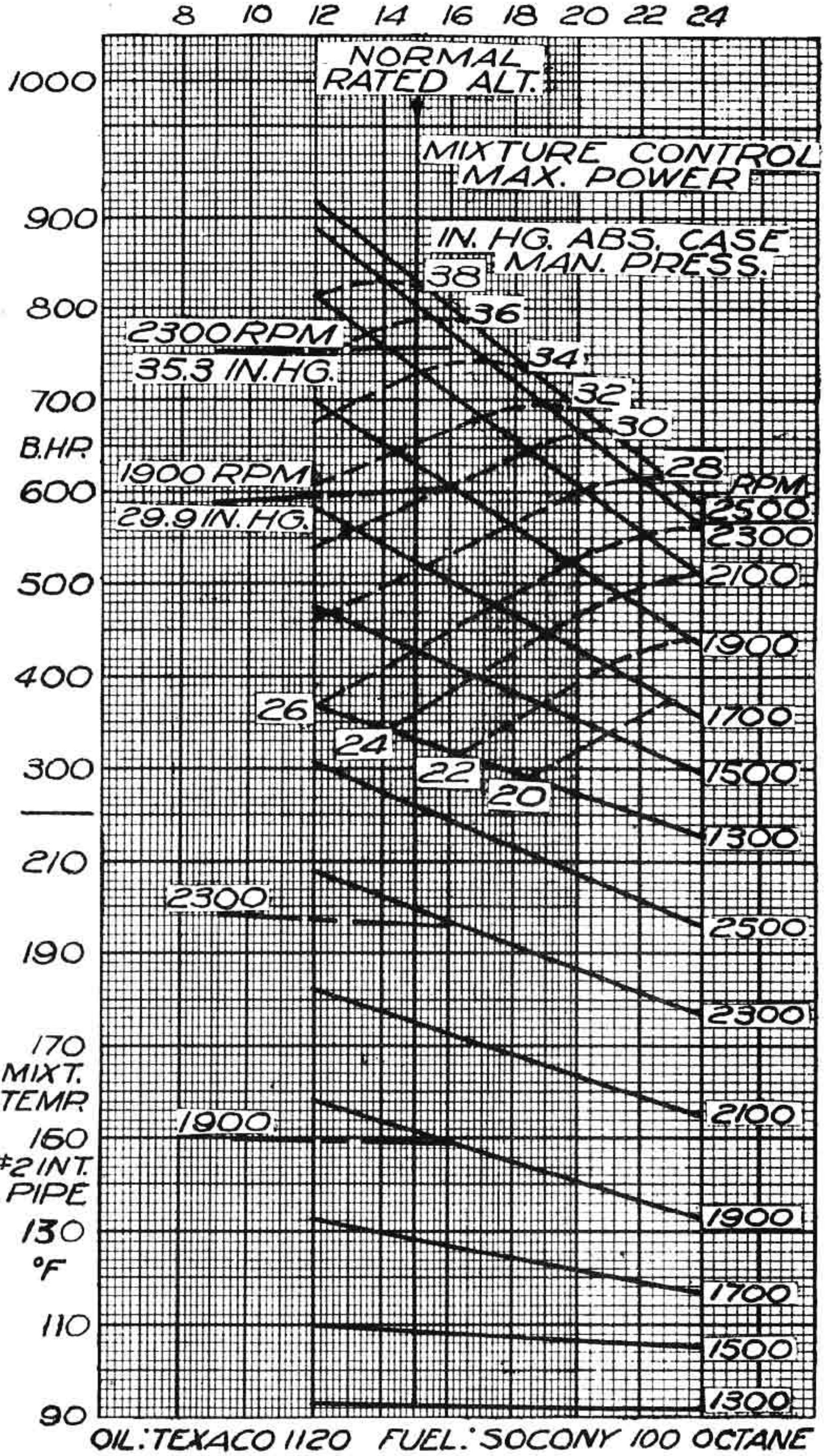


SPEED FOR MAXIMUM RATE OF CLIMB



OIL: TEXACO 1120. FUEL: SOCONY 100 OCTANE

SEA LEVEL & ALTITUDE
LOW BLOWER CHARACTERISTICS



HIGH BLOWER ALTITUDE CHARACTERISTICS

MAXIMUM PERMISSIBLE OPERATING CONDITIONS
(1,000 LB. BOMBER CONDITION)

MAX. PERMISSIBLE MANIFOLD PRESSURE	CONDITION	SUPERCHARGER	R.P.M.	MIXTURE CONTROL POSITION
41.0" HG.	SEA LEVEL TAKE-OFF	LOW GEAR	2350	AUTOMATIC RICH
38.8" HG.	CLIMB S.L. TO 2,000 FEET	LOW GEAR	2300	AUTOMATIC RICH
38.2" HG.	CLIMB 2,000 TO 4,000 FEET	LOW GEAR	2300	AUTOMATIC RICH
37.8" HG.	CLIMB 4,000 TO 5,000 FEET	LOW GEAR	2300	AUTOMATIC RICH
FULL THROTTLE	CLIMB 5,000 TO 10,700 FEET	LOW GEAR	2300	AUTOMATIC RICH
	SHIFT TO HIGH BLOWER AT 10,700 FEET ALTITUDE			
37.4 -	CLIMB 10,700 TO 12,000 FEET	HIGH BLOWER	2300	AUTOMATIC RICH
37.0 -	CLIMB 12,000 TO 14,000 FEET	HIGH BLOWER	2300	AUTOMATIC RICH
36.8 -	CLIMB 14,000 TO 16,000 FEET	HIGH BLOWER	2300	AUTOMATIC RICH
36.7 - ABOVE 16,000 FEET - FULL THROTTLE * *				
30.7 - SEA LEVEL	CRUISING 70% (665 HP)	LOW BLOWER	* 2060	AUTOMATIC LEAN
30.2 - 2000 FEET	CRUISING 70%	LOW BLOWER	* 2060	AUTOMATIC LEAN
29.5 - 4000 FEET	CRUISING 70%	LOW BLOWER	* 2060	AUTOMATIC LEAN
28.9 - 6000 FEET	CRUISING 70%	LOW BLOWER	* 2060	AUTOMATIC LEAN
28.3 - 8000 FEET	CRUISING 70%	LOW BLOWER	* 2060	AUTOMATIC LEAN
27.7 - 10,000 FEET	CRUISING 70%	LOW BLOWER	* 2060	AUTOMATIC LEAN
27.2 - 12,000 FEET	CRUISING 70%	LOW BLOWER	* 2060	AUTOMATIC LEAN
	CRUISING 70% (560 HP)	HIGH BLOWER	* 2060	AUTOMATIC LEAN

	TAKE-OFF	RATED POWER	MIN. CRUISING
FUEL-AIR RECOMMENDED RATIO	.106 TO .114	.102 TO .108	.069 TO .071

FUEL PRESSURE LBS.	6 TO 7
OIL PRESSURE LBS.	65
"OIL IN" TEMP.	70 TO 80 °C
OIL TEMP., MAX., EMERGENCY	102° C
CYLINDER HEAD, MAX. ALLOWED, TAKE-OFF, 5 MIN.	260° C
CYLINDER HEAD, MAX. ALLOWED, CONTINUOUS	218° C
CYLINDER HEAD, MAX. ALLOWED, CRUISING	205° C

	INDICATED AIRSPEED (KNOTS) S.L.	16,000'
SPEED FOR BEST CLIMB	111	102
MAXIMUM SPEED	194	167
CRUISING SPEED AT 65% POWER	166 (618 HP)	150 (618 HP)

* MAXIMUM RECOMMENDED R.P.M.

** BELOW 70% POWER, MIXTURE MAY BE AUTOMATIC LEAN
ABOVE 70% POWER, MIXTURE SHALL BE AUTOMATIC RICH UNLESS MIXTURE IS EXCESSIVELY RICH, IN WHICH CASE IT MAY BE LEANED OUT MANUALLY ONLY TO POINT OF SMOOTH ENGINE OPERATION (DO NOT EXCEED ALLOWABLE CYLINDER TEMPERATURES)

AUTO PILOT GROUND CHECK

1. CHECK QUANTITY OF OIL IN RESERVOIR. SHOULD BE AT "NORMAL" MARK.

2. CHECK OPERATION OF VACUUM AND OIL PUMPS BY NOTING GAGE READINGS WITH ENGINE RUNNING 600 TO 700 R.P.M. (USE PORTABLE GAGE FOR VACUUM.)

3. CHECK FOR 4" TO 5" Hg., AND 115 TO 125 LBS./SQ. IN. OIL PRESSURE WITH AUTO PILOT VALVE "ON" AND ENGINE RUNNING AT 1000 R.P.M.

4. CHECK FOR AIR IN THE HYDRAULIC SYSTEM BY TURNING AUTO PILOT "ON" WITH GYRO TRIM KNOB SET NEUTRAL AND NOTING SPONGINESS IN CONTROLS. CONTROLS SHOULD ACT AS IF LOCKED UNDER LIGHT CONTROL FORCE.

5. TO BLEED AIR FROM SYSTEM, TURN AUTO PILOT "OFF", SET GYRO TRIM KNOBS 1/2 TURN OFF NEUTRAL AND HOLD CONTROLS AT EXTREME POSITIONS EACH WAY FOR ABOUT 30 SECONDS.

6. RUN ENGINES AT 1000 R.P.M., CENTER AIRPLANE CONTROLS, UNCAGE GYROS, SET GYRO TRIM KNOBS AT NEUTRAL, AND TURN AUTO PILOT "ON". AIRPLANE CONTROLS SHOULD REMAIN IN POSITION.

7. MOVE GYRO TRIM KNOBS BACK AND FORTH, NOTING DIRECTION AND SPEED OF MOVEMENT OF CONTROL SURFACES.

(A) TURNING AILERON TRIM KNOB CLOCKWISE SHOULD GIVE RIGHT AILERON UP.

(B) TURNING ELEVATOR TRIM KNOB CLOCKWISE SHOULD GIVE DOWN ELEVATOR.

(C) TURNING COURSE SETTING KNOB 'CLOCK-WISE SHOULD GIVE RIGHT RUDDER.

8. CHECK OPERATION OF SERVO OVERPOWER RELIEF VALVES.

(A) APPLY A LIGHT PRESSURE TO THE CONTROLS AT THE SAME TIME APPLYING AN OPPOSITE AUTO PILOT FORCE BY MEANS OF THE GYRO TRIM KNOBS. THE AIRPLANE CONTROLS SHOULD MOVE AGAINST A LIGHT PRESSURE ON THE CONTROLS.

(B) CHECK THE FORCE REQUIRED TO OVERPOWER THE AUTO PILOT. WITH THE SERVO UNIT RELIEF VALVES SET FOR 105 LBS./SQ. IN. PRESSURE, THE AUTO PILOT SHOULD BE OVERPOWERED WITH THE FOLLOWING APPROXIMATE FORCES OF THE AIRPLANE CONTROLS:

AILERON - 28.5 LBS. ON STICK.
ELEVATOR - 28.5 LBS. ON STICK.
RUDDER - 103.0 LBS. ON RUDDER PEDAL.

330
270

AUTO PILOT FLIGHT CHECK

1. FLY AIRPLANE TO 2000 FT. ALTITUDE USING GYROS AS REGULAR FLIGHT INSTRUMENTS.

2. CHECK OIL PRESSURE (115 TO 125 LBS./SQ. IN.).

3. TRIM AIRPLANE FOR STRAIGHT AND LEVEL FLIGHT.

4. TURN AUTO PILOT "ON-OFF" VALVE "ON" SLOWLY.

5. OVERPOWER EACH CONTROL IN EACH DIRECTION TO ASSURE OVERPOWERING.

6. ADJUST AUTO PILOT SIGNAL AT MAXIMUM (CLOCKWISE) AND REDUCE SLOWLY AS REQUIRED TO ELIMINATE HUNTING OR OVER CONTROLLING.

7. FLY AIRPLANE TO ALTITUDE WHERE VARYING AIR CURRENTS AND ROUGH AIR IS PRESENT FOR A CHECK OF SIGNAL ADJUSTMENTS.

8. CLIMB TO MAXIMUM CEILING AT WHICH AUTO PILOT IS TO BE USED AND CHECK OPERATION. CHECK FOR REQUIRED OIL PRESSURE AT THIS ALTITUDE.

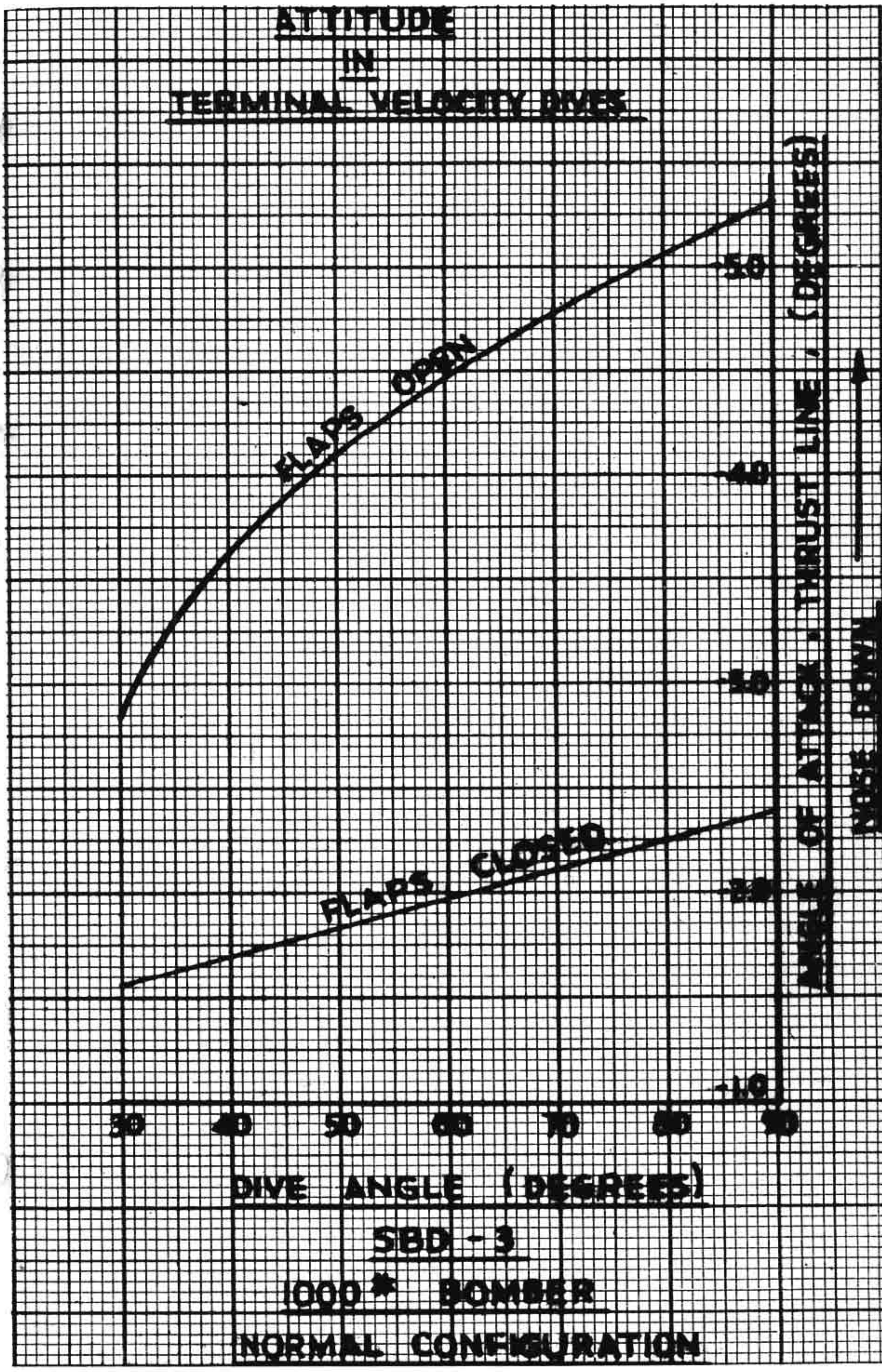
9. RETARD THROTTLE TO APPROXIMATELY 1000 R.P.M. AND CHECK AUTO PILOT IN A GLIDE. NOTE MINIMUM R.P.M. REQUIRED FOR SATISFACTORY OPERATION.

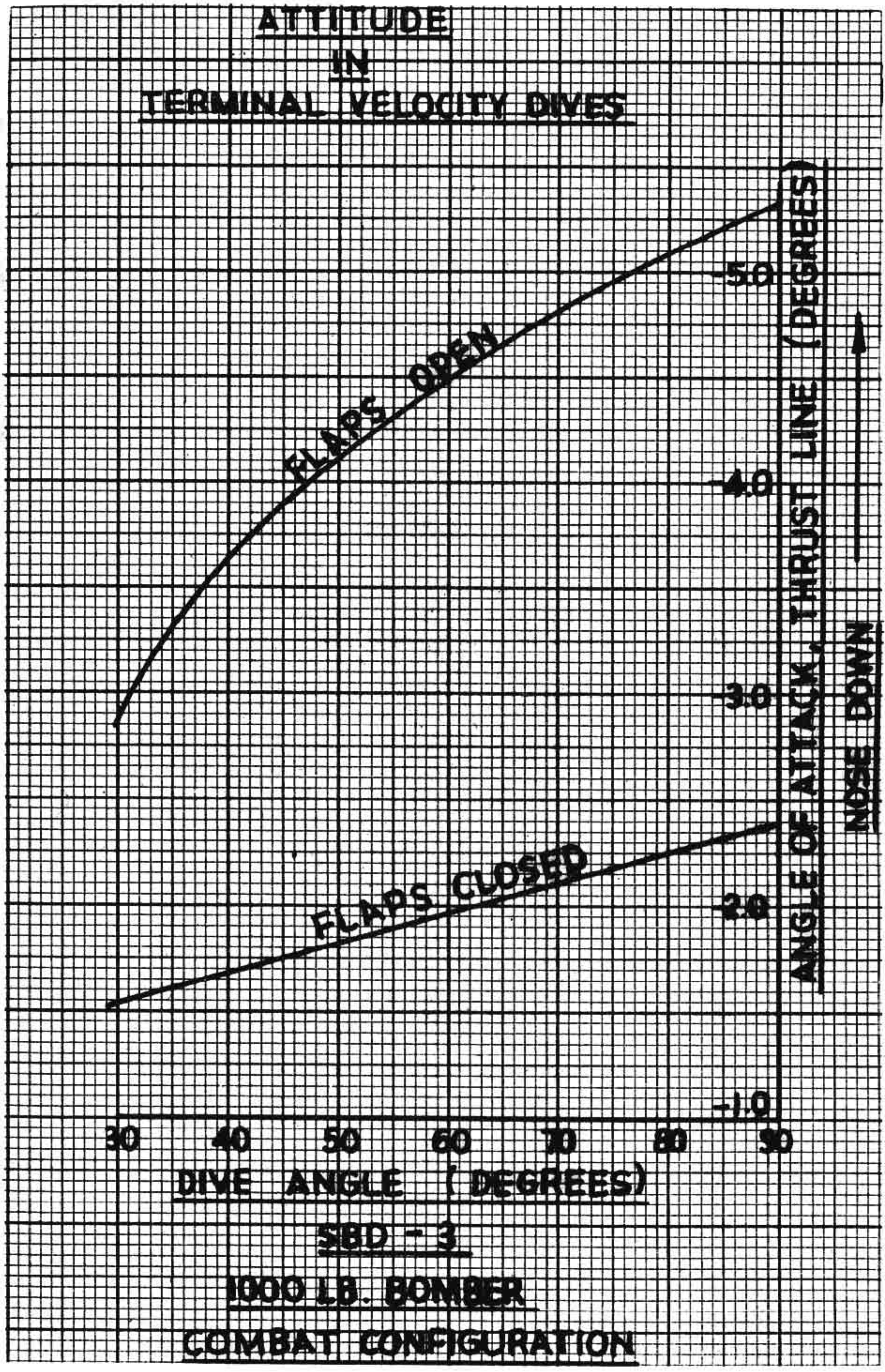
10. FLY A STRAIGHT COURSE USING THE MAGNETIC COMPASS AND AT INTERVALS CHECK DIRECTIONAL GYROS. THE PERMISSIBLE DEVIATION IS 3^{0} IN 15 MINUTES.

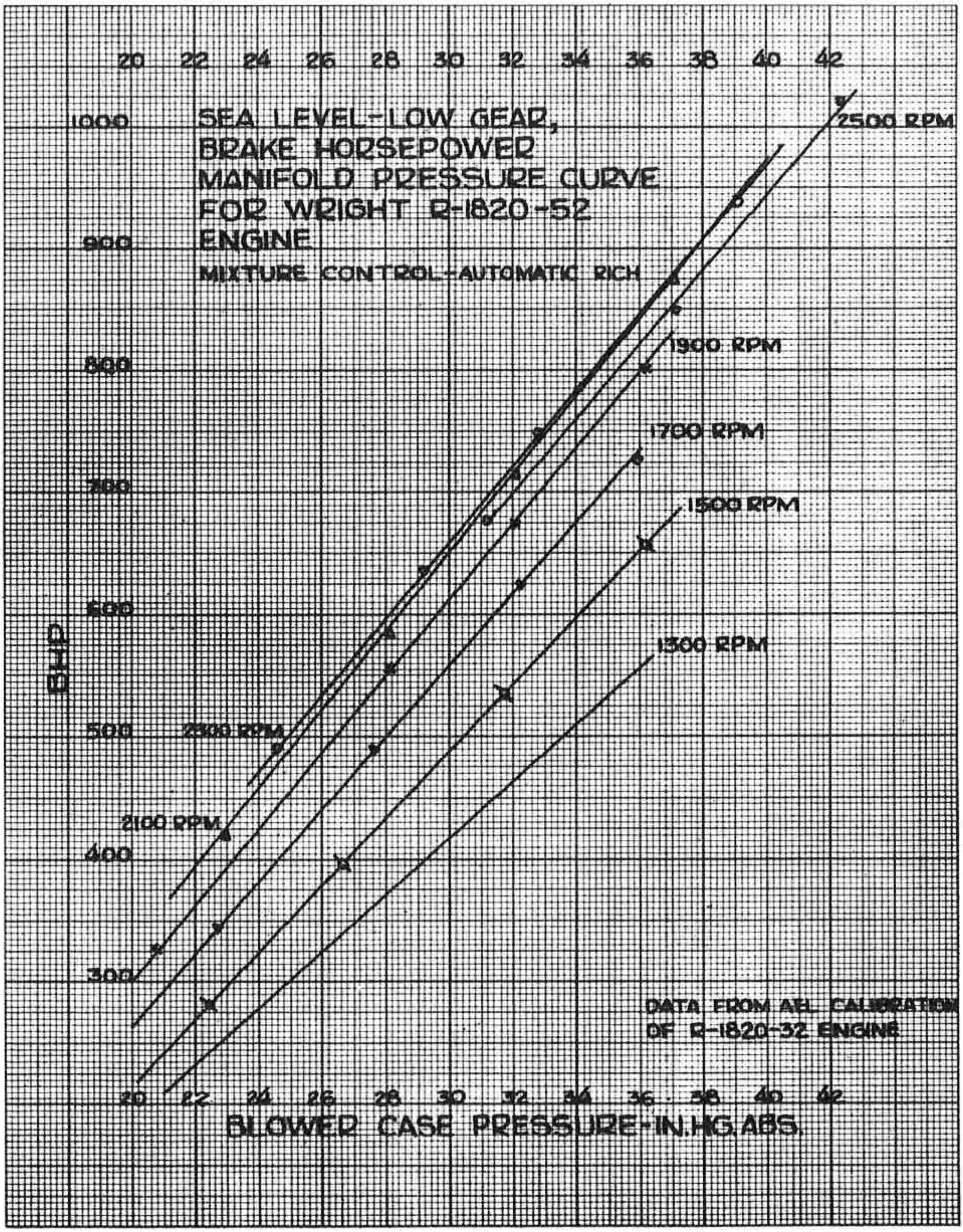
11. CHECK ON SLOW 180^{0} TURNS FOR PRECISION OF THE GYROS BY ROTATING RUDDER KNOB.

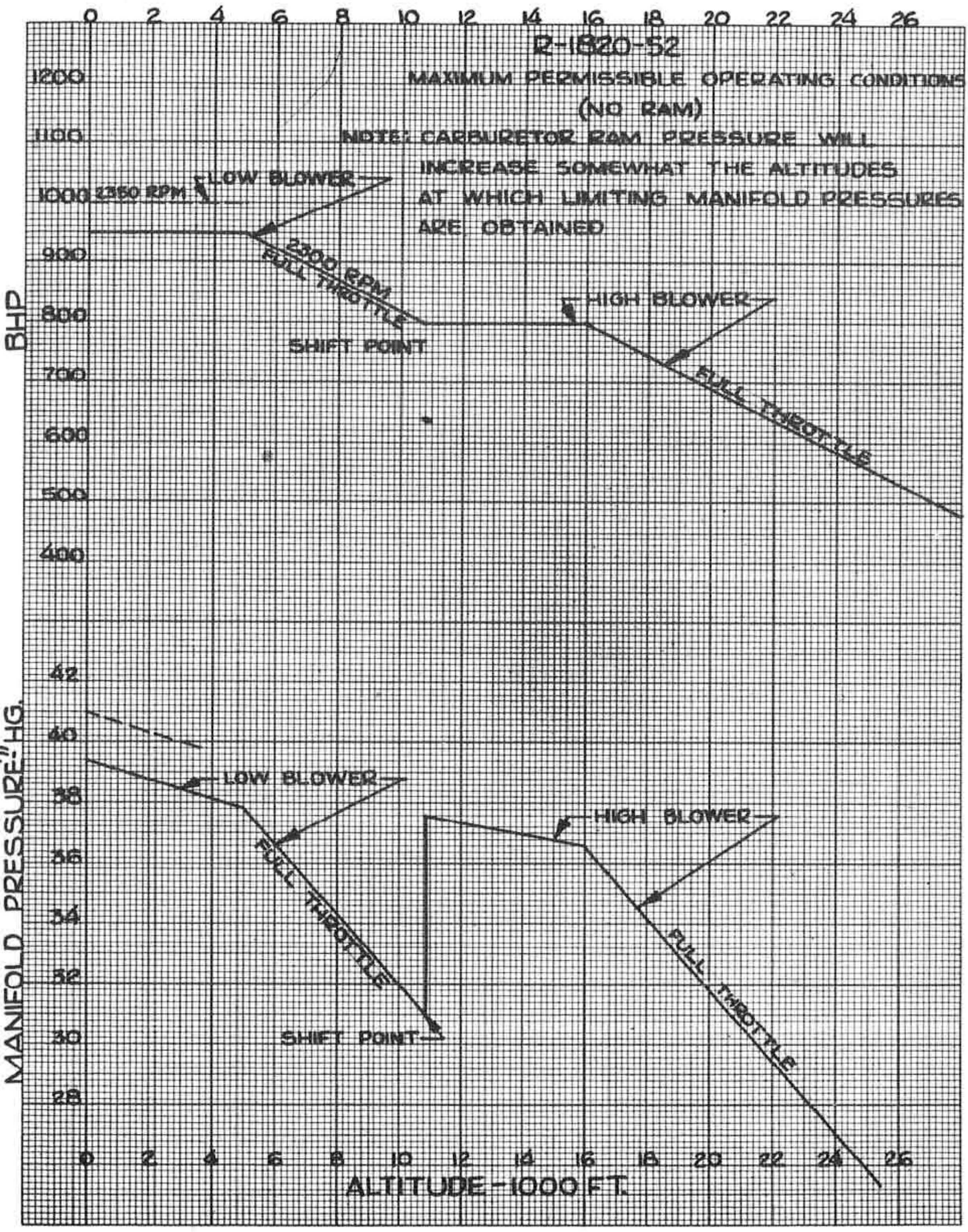
12. CHECK ON SLOW 360^{0} TURN. CHECK FOR RETURN OF ARTIFICIAL HORIZON TO NORMAL.

13. AUTO PILOT GYROS MUST BE KEPT COMPLETELY CAGED DURING SEVERE MANEUVERS.


ATTITUDE
IN
TERMINAL VELOCITY DIVES
FLAPS CLOSED
FLAPS OPEN
PULL-OUT ALTITUDE (1000 FEET)
50
40
30
20
10
0
-10
DIVE ANGLE (DEGREES)
SBD - 3
1000 # BOMBER
NORMAL CONFIGURATION

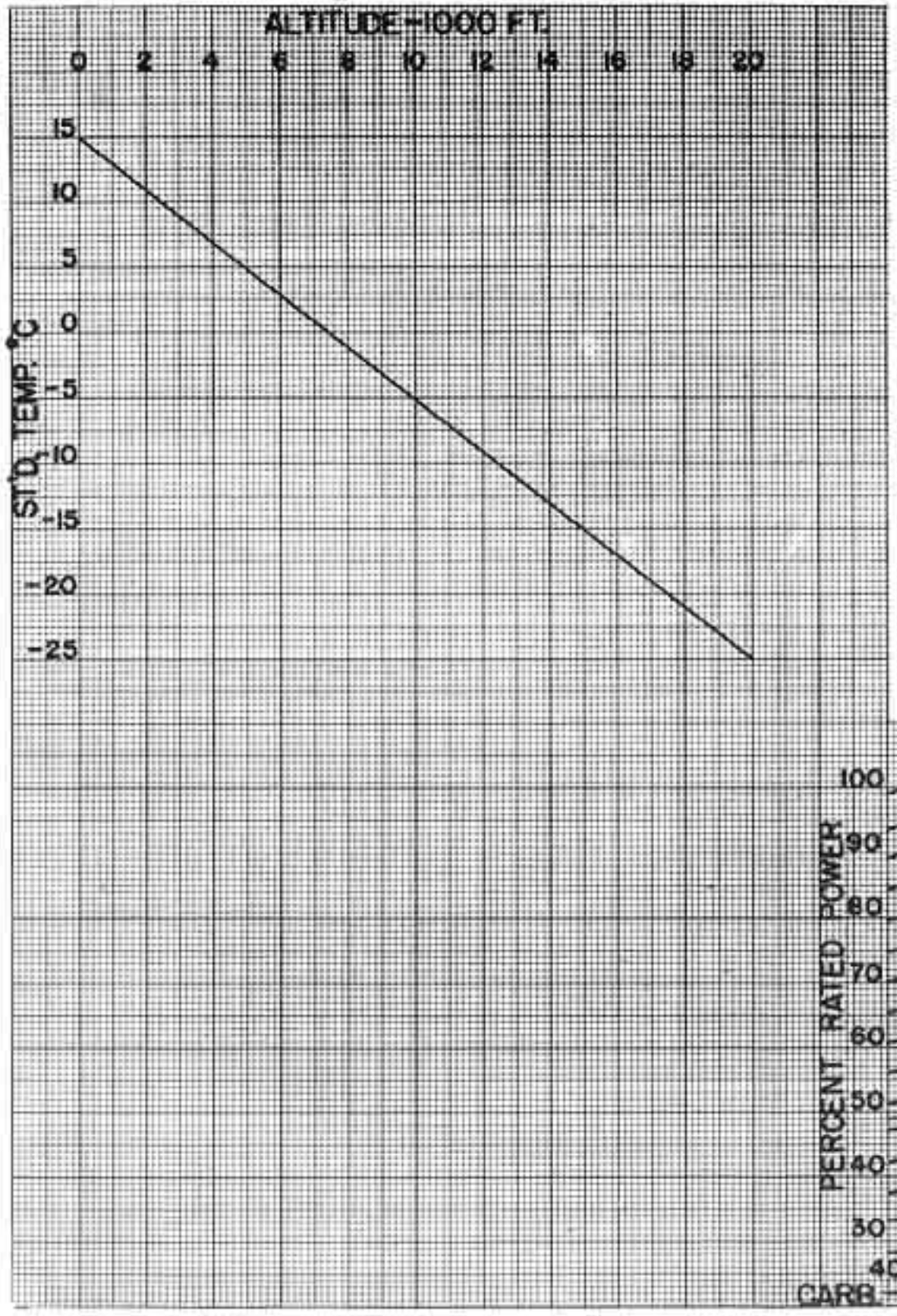

ATTITUDE
IN
TERMINAL VELOCITY DIVES
FLAPS OPEN
FLAPS CLOSED
5.0
4.0
3.0
2.0
1.0
-1.0
LOAD FACTOR (NORMAL ACCELERATION)
PULL-OUT LINE
30
40
50
60
70
80
90
DIVE ANGLE (DEGREES)
SBD - 3
1000 LB. BOMBER
COMBAT CONFIGURATION

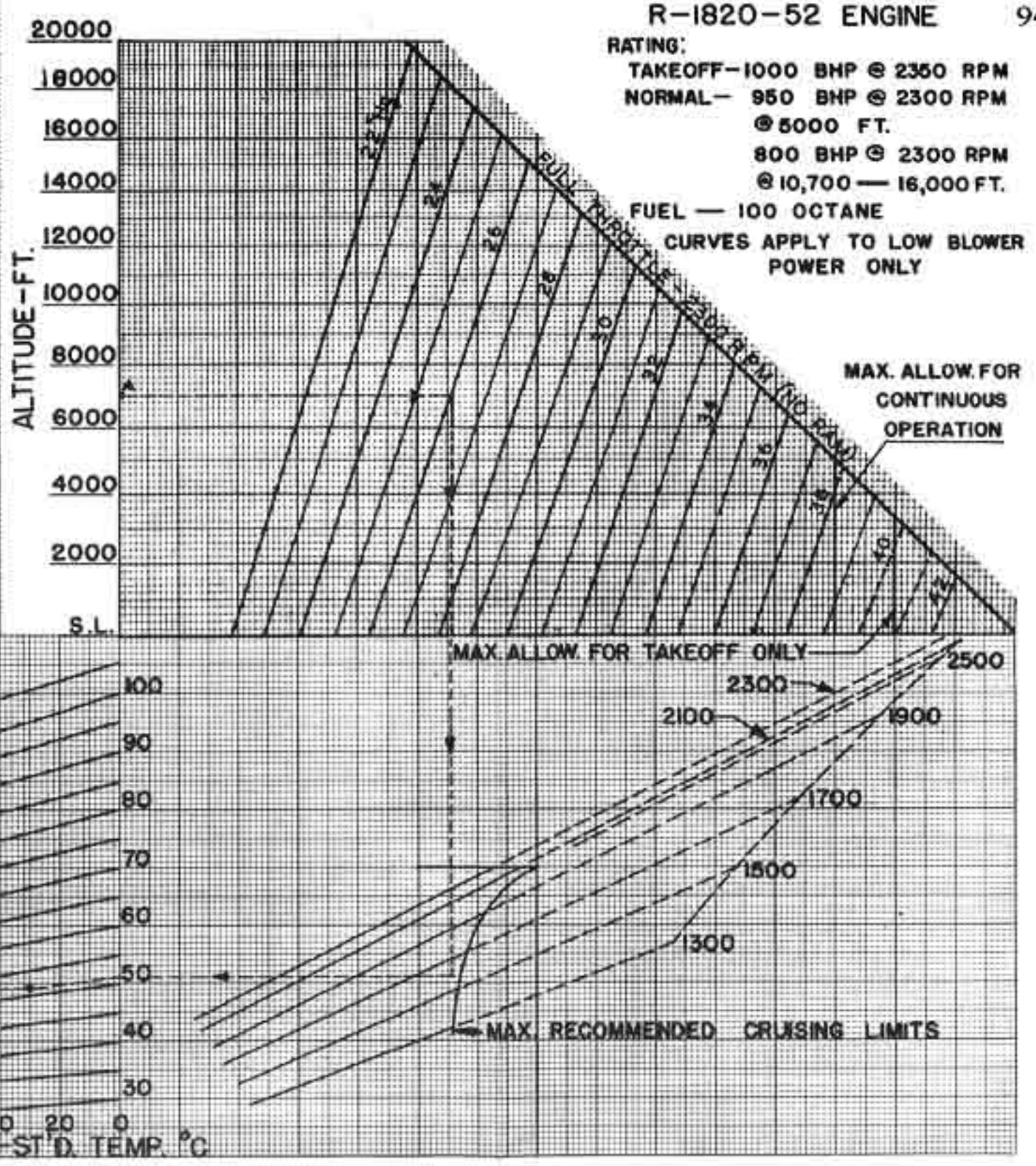

SEA LEVEL - LOW GEAR,
BRAKE HORSEPOWER
MANIFOLD PRESSURE CURVE
FOR WRIGHT R-1820-52
ENGINE
MIXTURE CONTROL - AUTOMATIC RICH
2500 RPM
1900 RPM
1700 RPM
1500 RPM
1300 RPM
2300 RPM
2100 RPM
BHP
1000
900
800
700
600
500
400
300
20
22
24
26
28
30
32
34
36
38
40
42
DATA FROM AEL CALIBRATION
OF R-1820-32 ENGINE
BLOWER CASE PRESSURE - IN. HG. ABS.


R-1820-52
MAXIMUM PERMISSIBLE OPERATING CONDITIONS
(NO RAM)
NOTE: CARBURETOR RAM PRESSURE WILL INCREASE SOMEWHAT THE ALTITUDES AT WHICH LIMITING MANIFOLD PRESSURES ARE OBTAINED
BHP
1200
1100
1000 2350 RPM
900
800
700
600
500
400
LOW BLOWER
2300 RPM FULL THROTTLE
SHIFT POINT
HIGH BLOWER
FULL THROTTLE
MANIFOLD PRESSURE "HG. +
42
40
38
36
34
32
30
28
LOW BLOWER
FULL THROTTLE
SHIFT POINT
HIGH BLOWER
FULL THROTTLE
0 2 4 6 8 10 12 14 16 18 20 22 24 26
ALTITUDE - 1000 FT.

R-1820-52 ENGINE

RATING:
TAKEOFF — 1000 BHP @ 2350 RPM
NORMAL — 950 BHP @ 2300 RPM @ 5000 FT.
800 BHP @ 2300 RPM @ 10,700 — 16,000 FT.
FUEL — 100 OCTANE
CURVES APPLY TO LOW BLOWER POWER ONLY





NOTES