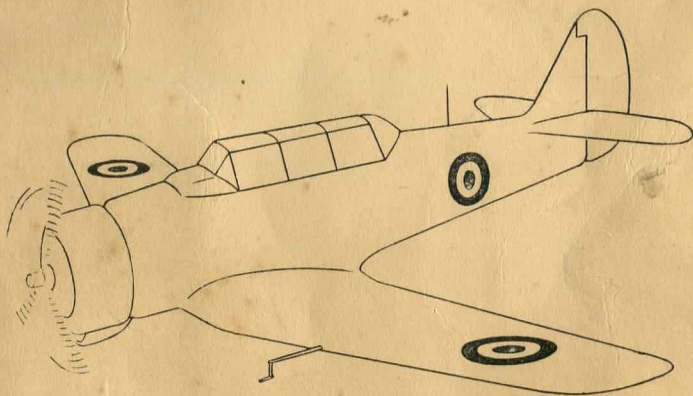


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Australian Air Publication 109
3rd Edition, April, 1956

PILOT'S NOTES
FOR
WIRRAWAY
DUAL TRAINER



Issued for the Information, Guidance and necessary action
of all concerned.

By Command of The Air Board,

A handwritten signature in cursive script, appearing to read "G. W. Hicks". The signature is written in black ink and is positioned above the title "Secretary".

Secretary.

Department of Air,
Melbourne, S.C.1

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Lcdr T. E. K. Wisbar

ANAM. 2000 409

AMENDMENTS

Amendment Lists will be issued as necessary. Incorporation of an Amendment List must be certified by inserting date of incorporation and initials below.

| A.L. No. | INITIALS | DATE | A.L. No. | INITIALS | DATE |
|----------|----------|------|----------|----------|------|
| 1 | | | 8 | | |
| 2 | | | 9 | | |
| 3 | | | 10 | | |
| 4 | | | 11 | | |
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| 6 | | | 13 | | |
| 7 | | | 14 | | |
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NOTES TO USERS

These Notes are complementary to A.P. 2095 Pilot's Notes General and assume a thorough knowledge of its contents.

Reference should also be made to A.P. 129 (5th Edition) Pilot's Flying Manual or A.P. 129 (6th Edition) Flying.

Comments and suggestions should be forwarded through the usual channels to Department of Air.

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LIST OF
ASSOCIATED PUBLICATIONS

| | |
|-------------|--|
| AIRFRAME | A.A.P. 76 — Wirraway Overhaul and Repair Manual. |
| ENGINE | A.A.P. 71 — Manual of Operation Instructions for Wasp (C.A.C.) Aircraft Engines. |
| INSTRUMENTS | A.P. 1275 — Vol. 1, Sect. 6. A.A.P. 76. |
| ELECTRICAL | A.P. 1095 — Vol. 1, Elect. Equip. Manual. A.A.P. 76. |
| ARMAMENT | A.P. 1666 — Bomb Carrier. A.P. 1641c — Vol. 2, Browning Gun. A.A.P. 76. |
| RADIO | AN16-40 SCR.522-2 — Operating Instructions. |

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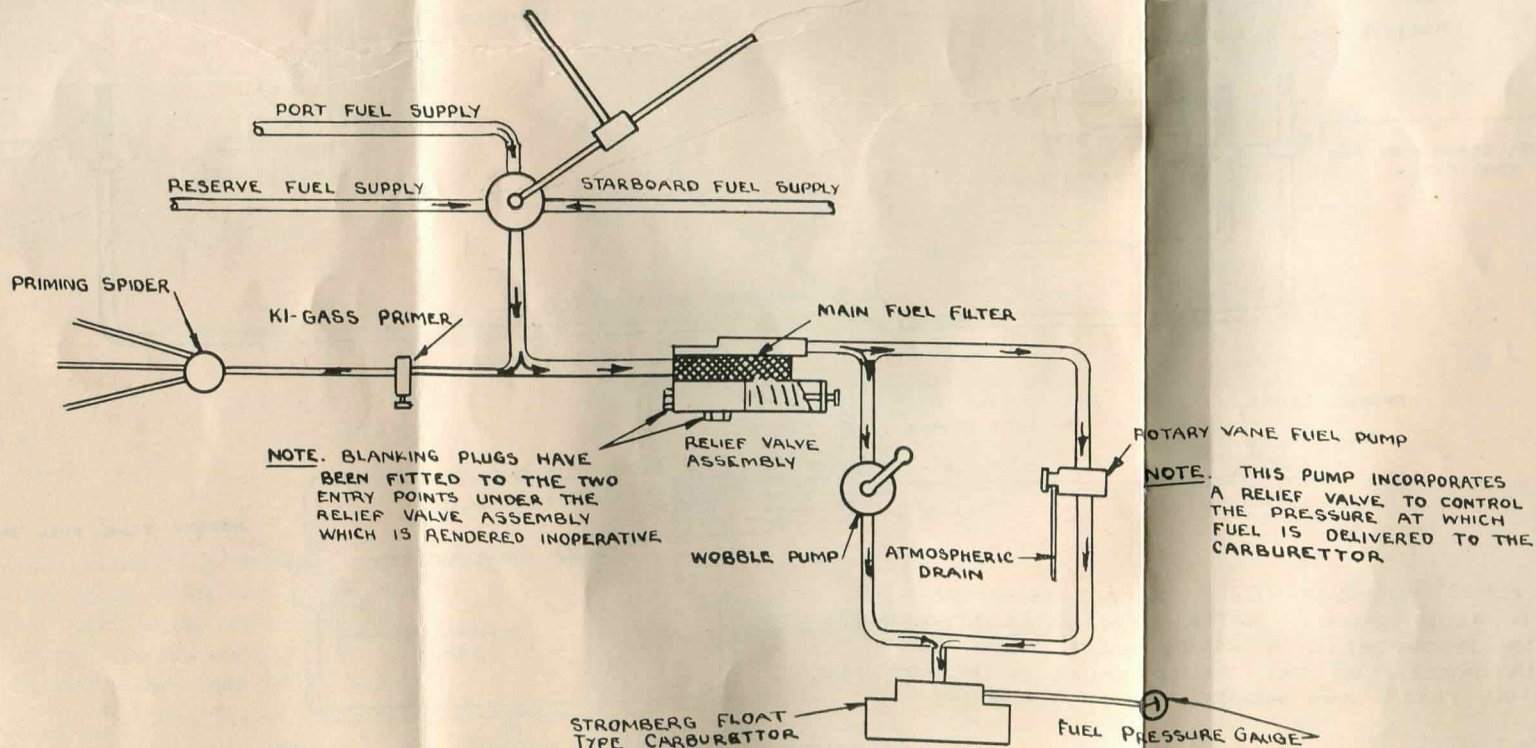
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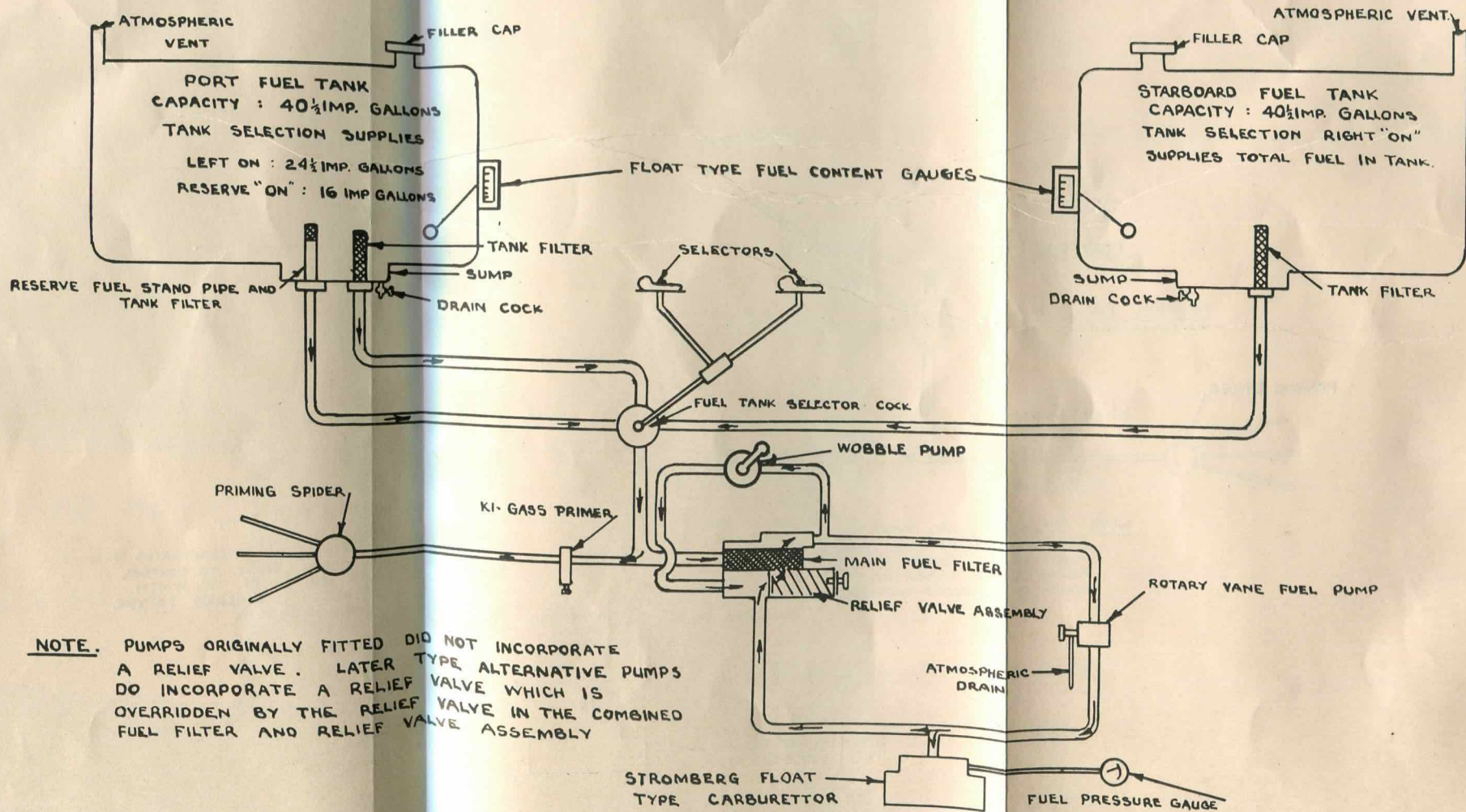
WIRRAWAY FUEL SYSTEM (DIAGRAMMATIC)

FOR AIRCRAFT IN WHICH WASP POWER PLANT MODIFICATION ORDER 3 HAS BEEN INCORPORATED.



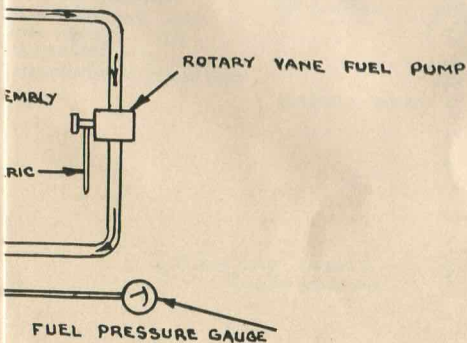
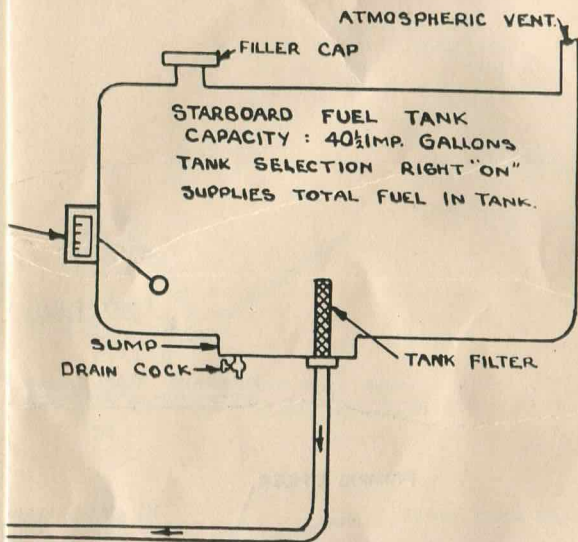
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FOR AIRCRAFT IN WHICH WASP POWER PLANT MODIFICATION ORDER NO 3 HAS NOT BEEN INCORPORATED



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PART 1 DESCRIPTIVE

Note.—Throughout this publication the following conventions apply:—

- (a) Words in capital letters indicate the actual markings on the controls concerned.
- (b) The numbers quoted in brackets after items in the text refer to the illustrations in Part 5.
- (c) All speeds quoted are "Indicated".

INTRODUCTION

1. The Wirraway is a tandem two-seater dual control advanced trainer, powered by a 9 cylinder Single Row Wasp S3H1-G radial engine fitted with dural three blade Hamilton hydraulic constant speed airscrew with a 10' diameter and a pitch range from 19° to 39°. The front seat is normally occupied by the pupil.
2. The airframe dimensions are:—

| | |
|----------------------------|-------------|
| Span | 43'0" |
| Length | 27'5" |
| Height | 8'3 1/2" |
| Track | 8'6 1/4" |
| Gross Wing Area | 256 sq. ft. |
| Airscrew Clearance | 11-5/8" |

FUEL AND OIL SYSTEMS

3. **Fuel Tanks** — Fuel is carried in two tanks within the wing centre section. Each holds 40 1/2 gallons, but the port tank has two outlet pipes, one drawing 24 1/2 gallons and the "Reserve" the remaining 16 gallons. One tank only may be used at one time, but in the case of the port tank, the full 40 1/2 gallons may be obtained by selecting RESERVE ON.
4. **Fuel Cock** — The tanks are not directly connected, but are controlled by a single four-way cock. The fuel

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is drawn from the cock through a filter to an engine driven pump and relief valve, and thence to the carburettor. The cock can be operated from either cockpit and the pilot, after selecting a tank must check that the cockpit indicators (17) coincide. The right tank should be used first, then the left and finally the reserve. The position marked "Belly Tank" is not connected and studs prevent its selection.

5. **Fuel Pressure** — A fuel pressure gauge is mounted in the front instrument panel. Normal pressure in flight should be between 4 and 5 lb. per square inch. A hand FUEL PUMP (18) is used to apply fuel pressure at the carburettor before starting. The hand fuel pump is capable of delivering sufficient fuel to the engine in the event of failure of the engine driven pump.
6. **Fuel Tank Contents Gauges** — The content of each tank is indicated by a float type gauge built into the tank. The gauges, on the cockpit floor on either side of the front seat, are visible from both cockpits. With the tail on the ground the gauges under-state the contents by 5 gallons.
7. **Priming System** — The KI-GAS priming pump (5) on the top port side of the instrument panel draws fuel from the filter and delivers it to the priming spider. To operate, turn handle counter-clockwise to unlock, then withdraw handle and pump. To lock, push handle home and turn clockwise.
8. **Oil System** — The capacity of the oil tank is $11\frac{3}{4}$ gallons, $8\frac{3}{4}$ gallons oil, 3 gallons airspace.

MAIN SERVICES

9. **Hydraulic System**
 - (a) An engine driven hydraulic pump supplies hydraulic pressure for operation of:—
 - Undercarriage
 - Flaps

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- (b) Normal operating pressure is 850 lb. per square inch. The pressure gauge (33) on the front cockpit indicates the pressure in the undercarriage down lines. The relief valve actuates a switch which operates a hydraulic power warning light (8) in each cockpit, indicating that operation of the service selected is complete.
 - (c) The valve (21) actuating the system is on the port side of each cockpit. The valve in the front cockpit is hydraulically balanced and must be withdrawn after operation of the selected service. The valve in the rear cockpit is spring loaded and must be held in while a service is being operated from the rear cockpit.
 - (d) A hand hydraulic pump, integral with the selector box, is situated on the port side of the cockpit and is operated by a lever (29) on the port side of each cockpit to provide pressure in event of failure of the engine-driven pump. With a service selected, the hand pump will transmit hydraulic fluid direct from a reserve supply in the reservoir to operate the desired service.
 - (e) The hydraulic brakes (13) are operated from a separate system. The brakes master cylinder is on the cockpit floor adjacent to the firewall.
10. **Electrical System**
 - (a) An engine driven generator, the charge rate of which is automatically controlled, and a 80 amp. hour battery mounted in front of the firewall, supply electrical power at 12 volts for:—
 - Undercarriage warning
 - Pitot head heating
 - Bomb release, gun firing
 - Cameras
 - Radio
 - Engine starter
 - Cockpit and external lighting

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- (b) The master electrical switch is accessible through a flap in the removable cowling on the starboard side of the engine. This should always be turned OFF when the aircraft is not in use, so preventing accidental discharge of the battery. An external starter socket is accessible through a flap near the master electrical switch flap.
- (c) An ammeter (34) is on the starboard side of the front cockpit. A generator field switch (44) wired in the ON position is mounted on the front electrical panel. This is provided to switch off the generator should the charging rate become excessive (i.e. remain at over 50 amps.) due to a failure in the voltage regulator. The Generator should "cut-in" between 1200 and 1300 r.p.m.
- (d) A toggle type circuit breaker (40) is mounted on the front electrical control panel and controls the V.H.F. power supply. Fuses are carried under a hinged cover (35) near the electrical control panel and can be replaced in flight; spare fuses are clipped inside the cover.
- (e) Red, ultra-violet and emergency cockpit lighting is installed. The ultra-violet lighting illuminates the instrument panels and is controlled by individual rheostats. The red lighting is used for general cockpit illumination.
- (f) The emergency lighting illuminates the flying instruments in the front and rear cockpits, and is controlled by a switch (42) adjacent to the generator switch in the front cockpit and a switch adjacent to the lamp in the rear cockpit.

11. **Vacuum System**

- (a) The gyroscopic instruments are operated by vacuum derived from an engine driven vacuum pump and two

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- venturis installed within the engine cowl. The engine driven vacuum pump supplies 3 to 4 inches of mercury when the aircraft is operating at normal cruising R.P.M. This pump has insufficient capacity to satisfactorily operate vacuum operated instruments in aircraft equipped with full gyro instrumentation in both cockpits. The venturis installed within the engine cowl supplement the vacuum obtained from the vacuum pump and will partially supply the vacuum required to operate the instruments in the event of vacuum pump failure.
- (b) A 3 way selector valve (9) fitted to the right of the instrument panel permits selection of either vacuum pump, venturis or both together. The selector valve is to be selected at BOTH ON prior to take-off and during all stages of a flight. In the event of vacuum pump or engine failure the selector valve is to be selected to VENTURIS ON. This will only partially supply the vacuum capacity required to operate the gyro instruments, therefore, all gyro instrument indicators should be treated with caution.
 - (c) A gauge registering the vacuum pressure being applied across the gyro instruments is situated on the instrument sub-panel.

AIRCRAFT CONTROLS

12. **Flying Controls** — The flying controls are conventional. The front control column incorporates a cine-camera (10) and gun firing/bomb release button (11). The rudder pedals in each cockpit are adjustable for length by pulling out the stud fitted at the bottom of each pedal. Wood blocks may or may not be fitted to the pedals.

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13. **Flying Control Locking Gear** — The flying controls are locked by centralising the control surfaces and pulling up the red handle at the base of the front control column.
14. **Trimming Tab Controls** — The elevator (19) and rudder (20) trimming tab control wheels are on the left side of each cockpit, clockwise rotation of the controls applies nose down elevator trim and right rudder trim. The setting of the tabs is indicated by the position of the studs on the wheel rims. The aileron tabs are not adjustable from the cockpit.
15. **Undercarriage Controls and Position Indicators**
- (a) The undercarriage selector lever (16) is on the left hand side of the cockpit; the lever in the front cockpit has three positions—UP, DOWN and EMERGENCY; the lever in the rear cockpit has two positions—UP and DOWN.
- (b) Position indicators (32) for both wheels are on the port side of the front cockpit. A warning horn and red lights (7) on either instrument panel operate when the engine is throttled back to less than 15" manifold pressure with the wheels not locked down. Visual inspection covers, fitted in the centre section skin above the down locks, enable the locks to be seen from the cockpit.
- (c) *To raise the undercarriage:—*
- (i) Select up, by depressing the ferrule on the top of the lever to disengage the safety catch and moving the lever fully back to the UP position.
 - (ii) Engage the hydraulic power valve.
 - (iii) When the indicators show UP and the hydraulic warning light comes to withdraw the power valve.
 - (iv) After a few seconds check that the undercarriage has not dropped.

Note.—The undercarriage cannot be raised from the rear cockpit.

- (d) *To lower the undercarriage:—*
- (i) Select DOWN.
 - (ii) Engage the hydraulic power valve.
 - (iii) When the indicators shown DOWN and the undercarriage is spring locked, place the selector lever in the EMERGENCY position to positively lock the undercarriage.
 - (iv) Disengage the power valve.
 - (v) Test audible warning.

Note.—It is essential that EMERGENCY is selected *only* after the wheels have reached the DOWN position. Selection of EMERGENCY DOWN operates a mechanical linkage which moves the spring loaded locking plunger into the locked DOWN position. If EMERGENCY is selected before the undercarriage enters the down lock forgings, the locking lug on top of the oleo leg will strike against the down lock plunger, which being mechanically locked, cannot move back and prevents the locking lug entering the down lock forging. Therefore, if at any time the lever is inadvertently moved to EMERGENCY before the wheels have reached the DOWN position the locking pin should be freed by moving the lever back to the DOWN position. Positive locking can then be ensured by moving the lever to the EMERGENCY position.

16. **Flap Controls and Position Indicator**

- (a) The flap selector lever (15) on the left hand side of the cockpit, has three positions—UP, LOCK and DOWN. A flap position indicator (30) is fitted alongside the undercarriage indicators.
- (b) *To lower flaps fully:—*
- (i) Select DOWN.
 - (ii) Engage hydraulic power valve.
 - (iii) When fully down disengage power valve.
 - (iv) Promptly move lever to the LOCK position.

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(c) *To lower flaps to an intermediate position:—*

- (i) Select DOWN.
- (ii) Engage hydraulic power valve.
- (iii) When indicator shows the desired setting, move the selector to the LOCK position.
- (iv) Disengage power valve.

Note.—If it is desired to lower further flap from an intermediate position, first engage the power valve, then select down.

- (d) To raise the flaps in flight move the selector lever back gently until resistance is felt. Move the lever into this resistance and allow air pressure to blow the flaps up; a restrictor in the down line prevents the flaps coming up too quickly. The flaps should be raised in three stages, to 30°, then 15°, then fully up.
- (e) A thermal expansion valve prevents excessive pressure build up in the flap lines when the aircraft is parked with the lever in the LOCK position.

17. **Wheel Brakes Control** — The hydraulic wheel brakes are of the conventional toe-operated design. The parking brake knob (4) is on the upper left hand side of the front cockpit. To lock the brakes in the on position depress the pedals and pull out the parking knob, while still holding the knob out release the pedals and then the knob. To release the brakes depress the pedals.

Note.—Should the aircraft be parked facing uphill, or against strong winds, the brakes will not prevent the aircraft from rolling backwards.

18. **Tailwheel**

- (a) The tailwheel is steerable, being connected to the rudder cables by springs. Movement is transmitted through a friction damper pad which unlocks when the tailwheel has moved through approximately 20° and then permits the tailwheel to be fully castoring.

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- (b) The tailwheel is locked after straightening up for take-off, and should not be unlocked until after completion of the landing run. The tailwheel locking control (36) is mounted on the right hand side of each cockpit.

ENGINE CONTROLS

19. **Throttle** — The throttle (24) moves in a quadrant marked OPEN, THROTTLE, CLOSED. An adjustable gate on the quadrant is set to give 32.5 inches of mercury manifold pressure for take-off.
20. **Mixture Control and Exhaust Gas Analyser**
- (a) The mixture control is used in conjunction with the exhaust gas analyser to operate the engine at the correct mixture strength. The control lever (23) moves in a quadrant integral with the throttle quadrant and marked RICH—MIXTURE—LEAN. The indicator of the exhaust gas analyser (3) is on the front instrument panel and is switched ON when the carburettor outside air temperature switch (2) is at No. 1 position.
- (b) When the analyser is switched on the pointer will be deflected to the end of the scale and then swing slowly back. It should indicate a fuel-air ratio of $.077 \pm .0005$ within 30 seconds. The scale of manifold pressure should be ignored.
- (c) As the aircraft climbs the fuel-air ratio becomes progressively richer and the mixture control must be opened to maintain a fuel-air ratio of .072-.078. Below 2,000 ft. general flying can be carried out in full rich without rough running of the engine.
- (d) The cylinder head temperature must be checked to guard against overheating due to a fuel-air ratio that is too lean. If detonation occurs the pointer of the exhaust gas analyser will move erratically, generally

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toward the rich end of the scale. The mixture control should be closed sufficiently to remove the condition.

- (e) Cruising should be carried out at a fuel-air ratio of .072-.078. If extreme range is required use .072.
- (f) If the exhaust gas analyser is unserviceable the mixture may be controlled by either of the following methods:—
 - (i) *General Flying* — Use the mixture for smoothest running. As the control is moved from a too rich to a too lean position engine vibration decreases to a minimum and then increases.
 - (ii) *For Range or Endurance* — Lean further consistent with reasonable smoothness of running. Another method of setting the mixture control involves the utilisation of the lag in the constant speed unit to locate the mixture control setting for maximum power. The lever is at the maximum power position when forward and backward movements of the lever both produce a momentary drop in r.p.m., before the C.S.U. asserts itself and restores the r.p.m.

Note.—The idle cut-off operates at approximately three inches of mixture control movement. Exercise caution when making adjustments in this region.

- (g) When carburettor heat is applied the fuel air ratio is enriched, and adjustment is made with the mixture control lever. Before moving the carburettor air lever back to the COLD position, the mixture should be enriched to avoid the possibility of detonation.

- 21. **Propeller Control** — The propeller control (25) moves in a quadrant integral with the mixture control quadrant marked DECREASE, PROPELLER R.P.M., INCREASE. Maximum governed r.p.m. with the lever fully forward is 2,250 r.p.m.

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22. Carburettor Air Heat Control

- (a) The carburettor air heat control (31), located on the left of the front cockpit near the undercarriage indicators, moves in a quadrant marked HOT, CARBURETTOR AIR, COLD, and is used to prevent or remove ice formation in the carburettor.
- (b) Icing of the induction system is likely to occur when flying in or under clouds, in fog, rain, sleet or super-saturated vapour. Ice may form in the carburettor on clear days when the free air temperature is as high as 32°C if the relative humidity is high.
- (c) Induction icing is usually detected by a gradual decrease in manifold pressure. The initial application of hot air may produce momentary engine cuts and rough running.
- (d) To prevent carburettor icing the heat control should be used to keep the carburettor air temperature between 7°-15°C. Carburettors which have not had the thermometer bulb repositioned (Wasp Order No. 38) should be operated in the fully HOT position whenever carburettor icing or rough running due to carburettor icing are suspected.

Note.—The modified carburettor can be differentiated from the unmodified by applying four notches of heat control. The repositioned thermometer bulb will record a rise of approximately 1°C whereas the bulb in the old position will record a rise of approximately 25°C.

- (e) For take-off the carburettor air control should be in the fully COLD position except that when the local ambient air temperature is less than 5°C the control should be in the fully HOT position.

COCKPIT EQUIPMENT

- 23. **Canopy** — The canopy locking control is located on the left hand side of each canopy. The canopies can be locked at intermediate positions between open and closed.

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24. **Cooling** — A cold air valve is located in the front cockpit between the rudder pedals and is operated with the foot by rotating the notched control.
25. **Seat Adjustment** — Both seats can be adjusted for height by releasing the catch on the right hand side of the seat. The rear seat can be rotated by releasing the catch under the seat. The rear control column must be stowed before the seat is rotated.
- Note.*—The rear seat in aircraft fitted with ZC safety harness cannot be rotated.
26. **Harness** — The release control (22) for the type ZC harness is located on the port side of each cockpit immediately below the canopy runner.
- Note.*—Unmodified aircraft that still have the "Lap strap" harness are not fitted with a harness release.
27. **Signal Pistol** — A signal pistol may be stowed on the right hand side of the front cockpit.

OPERATIONAL CONTROLS

28. **Radio Controls** — The control unit type 5003 for the T.R. 5043 (6) is located on port side of the front cockpit above the instrument panel. The T.R. 5043 and power unit type 15 is carried in the rear fuselage. The mic-tel socket (41) and audio control (43) is on the starboard side of each cockpit. The press-to-transmit switch (26) is on the port side of each cockpit. Press-to-mute switches are located on the port side of the rear cockpit, and on the rear control column.
29. **Gun Sights** — The front cockpit is fitted with a reflector sight Mk. 2 and the rear cockpit with a reflector sight MK3A, the brilliance of both being controlled by rheostats, on the right hand side (38) in the front cockpit, and on the sight in the rear cockpit. The front sight has an ON/OFF switch (37) on the right hand side of the cockpit.

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30. **Cine Camera** — A cine camera can be mounted on the starboard wing and is operated by a push button (10) on the front control column.
31. **Gun Firing** — The gun firing push button (11) is located on the front control column. A safety switch (39) marked GUNS, OFF, BOMBS is fitted on the electrical control box in the front cockpit.
32. **Bomb Release** — The gun firing push button is used to release bombs when the safety switch is set at BOMBS. The bomb selector switches are located on the right hand side of the front cockpit. Switches No. 1-4 are inoperative.
33. **Armament Stores**
- (a) The ammunition bins for the two .303" Browning guns mounted externally beneath the wings each hold 210 rounds and are fitted inside the wings.
 - (b) Six practice bombs may be carried on light series carriers built into the centre section.
 - (c) A rack for 8 signal cartridges (28) is located to the left of the front instrument panel.

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PART 2

HANDLING

Note.—Avoid standing on the canopy runners when entering the cockpit.

34. External Check

- (a) Enter cockpit and check that:—
 - (i) Ignition switches (27) are OFF
 - (ii) Undercarriage lever is in the EMERGENCY position.
 - (iii) Controls are unlocked
 - (iv) Set the trim at take-off position:
- (b) Start at the port wing root and work clockwise around the aircraft, checking as below.

| Item | Check |
|------------------------------|------------------------------------|
| Port Mainplane top surface | Condition |
| Port Fuel Cap | Secure—Check contents |
| Port Flap | Condition |
| Port Aileron and Tab | Condition |
| Port Wing Tip | Condition |
| Port Navigation lights | Condition |
| Port Mainplane lower surface | Condition |
| Port Landing light cover | Condition |
| Port Undercarriage | Tyre for cuts, creep and pressure. |
| | Extension of oleo. |
| | Security of fairing. |
| | Brake lead secure. |
| | Chock in position. |
| Port Front Fuselage | Cowling secure |
| Engine Cowls | Secure |
| Airscrew | Condition |
| Starboard Front Fuselage | Cowling secure |

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PART 2 — HANDLING

| Item | Check |
|--------------------------------------|--|
| Starboard Undercarriage | As for Port Undercarriage |
| Starboard Landing Light Cover | Condition |
| Pitot Head | Condition Cover removed |
| Starboard Mainplane lower surface | Condition |
| Starboard Navigation lights | Condition |
| Starboard Wing Tip | Condition |
| Starboard Mainplane Upper Surface | Condition |
| Starboard Aileron and Tab | Condition |
| Starboard Flap | Condition |
| Starboard Fuel Cap | Secure—Check contents |
| Starboard Fuselage | Condition |
| Starboard Lifting Bar | Locked |
| Tailwheel | Tyre for cuts, creep and pressure. Extension of oleo. |
| Tailplane and Fin | Condition |
| Navigation and Identification lights | Condition |
| Elevator and Tab | Condition — Tab sense and deflection |
| Port Fuselage | Condition |
| Port Lifting Bar | Locked |
| Fuselage Access | First Air Kit stowed. Starter handle stowed. V.H.F. secure. Access door locked. |
| Rear Fire Extinguisher | Secure |
| Hydraulic Filter Cap | Secure |
| Canopy | Condition and cleanliness |

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PART 2 — HANDLING

| Item | Check |
|--|---|
| Rear Cockpit (when flying solo) | Control column stowed. Instruments caged. Seat locked facing forward. All switches OFF. Canopy locked shut. Harness secure |
| 35. Cockpit Check Before Starting | |
| | Check no loose articles in cockpit. Adjust harness, seat and rudder pedals; have master switch turned on then check left to right:— |
| Canopy | Lock and movement |
| Undercarriage emergency globe valve (14) | Ensure free and closed. |
| Flaps | Check hydraulic hand pump by lowering and raising part flap. Check indicator. RESERVE |
| Fuel Cock | Full free movement and set for take-off |
| Trim Tab Controls | DOWN COLD |
| Undercarriage Indicators | Full INCREASE R.P.M. |
| Carburettor Air Control | RICH $\frac{1}{2}$ " OPEN |
| Propellor Control | OFF OFF OFF |
| Mixture Control | ON |
| Throttle | Instrument readings. Note Static Manifold Pressure. |
| Press-to-transmit | Gyros caged. |
| Ki-Gas primer | Carburettor Air Switch No. 1 position. |
| V.H.F. Controller | Compass serviceability. |
| Park Brake | Altitude setting |
| Instrument Panel | |

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PART 2 — HANDLING

| | |
|-------------------------|--|
| Vacuum Selector | VAC Pump |
| Tail wheel lock Control | LOCKED |
| Electrical Panel | Bomb switches OFF. Light switches as required. |
| | Fuel Light (47) ON. Generator Field switch ON. |
| | T.R. 5043 Circuit "Breaker" ON. |
| Signal Pistol | Secure |
| Fire Extinguisher | Secure |
| Fuel Gauges | Contents |
| Controls | Full free movement in correct sense. Aileron Balance tab sense. |

36. Starting

- (a) Ensure that a responsible airman is standing by to operate the battery master switch, withdraw the external battery cart plug and close access panels after starting. The airman should have a serviceable CO2 fire extinguisher available in case of fire.
- (b) Operate the hand fuel pump with full smooth strokes until a pressure of 5 lbs. per square inch is indicated while pumping.

Note.—Excessive and harsh pumping will result in flooding and risk of fire, besides damage to the fuel pressure gauge.

- (c) Prime the cylinders with full slow strokes of the Ki-Gas primer as follows:—
- When cold — 6 to 7 strokes
When warm — 2 to 3 strokes
When hot — 1 to 2 strokes

Note.—It is essential that the primer be fully locked after priming otherwise fuel will be by-passed to the engine causing rich mixture, rough running, and fire risk.

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PART 2 — HANDLING

- (d) When all clear switch the ignition on to BOTH and press the starter button (12). Do not release the starter button until the engine is firing regularly. If the engine does not fire after 4 or 5 seconds reprime as before.

Notes.—(i) Do not pump the throttle if the engine is misfiring as this will flood the carburettor and cause fire.

(ii) If, on pressing the starter button, the engine backfires, but does not commence to run, a fire may develop at the base of the engine, keep the engine turning over with the starter and turn the petrol OFF.

(iii) If, after starting, the engine backfires after every few revolutions, slowly reduce the throttle setting.

37. Hand Starting

- (a) The end of the starter shaft protrudes through the starboard engine cowl.
- (b) As the booster coil is energised by the starter button, it is necessary to disconnect the starter motor by removing the larger of the three plugs on the electrical power supply box on the front left side of the firewall.
- (c) Prepare for starting in the normal manner and while the engine is being turned by hand engage the starter button to energise the booster coil.

38. **Warming Up Check** — If the oil pressure does not rise within 30 seconds stop the engine. When engine is running smoothly set throttle for 1100 r.p.m. then check left to right:—

| | |
|-----------------|--|
| Flaps | Lower, raise and lock to check engine-driven pump, hydraulic pressure and warning. |
| Fuel Cock | Select LEFT tank |
| Carburettor Air | As required (See para. 22 (d)). |
| Ki-gas Primer | Locked |
| V.H.F. Control | Select channel required |

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Instrument Panel Vac. Pump—Both ON
 Gyros Uncaged and syn-
 chronised
 Engine Instruments
 readings

39. **Running Up** — The engine is not to be run up until the cylinder head temperature is 150°C and the oil temperature 40°C. Set carburettor air as required (see paragraph 22 (d)), select RIGHT or fullest tank, then.—
- (a) Check ignition switch at L and R to ensure both magnetos are working satisfactorily.
 - (b) Open throttle to 20" H.G. Note generator charging.
 - (c) Move propellor control to full DECREASE r.p.m. and check r.p.m. decrease 2-300. Return lever to full increase and check r.p.m. return to original figure.
 - (d) Check oil pressure 90-100 lb./sq. in. (at 40°C.) and fuel pressure 4-5 lb./sq. in.
 - (e) Open throttle to static Manifold Pressure, test ignition switch. A drop of 150 r.p.m. on one magneto is permissible providing the other does not exceed 100 and the engine runs smoothly. Check static r.p.m. 1950 ± 50; check engine pressures and temperatures, suction pressure and generator charge.
 - (f) Close throttle, check idling r.p.m. 500-600. Re-set 1100 r.p.m.
 - (g) Fuel Cock — select RIGHT TANK.
40. **Taxying**
- (a) Ensure that all obstacles have been removed from in front of the aircraft.
 - (b) Test brakes after rolling a few feet, then unlock tail-wheel. While turning finish check of gyroscopic instruments.
 - (c) Short periods of idling below 800 r.p.m. are permissible.

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Wirraway

FINAL CHECKS FOR TAKE-OFF

| | |
|----------------|---|
| HATCHES ... | ... LOCKED OPEN |
| HARNESSES ... | ... SECURE AND LOCKED |
| HYDRAULICS ... | ... CHECK PRESSURE VALVE DISENGAGED |
| TRIM ... | ... ELEVATOR 11 O'CLOCK RUDDER 3 O'CLOCK |
| MIXTURE ... | ... RICH KI-GASS LOCKED CARB. AIR — AS REQUIRED |
| PROPELLOR ... | ... FULL INCREASE R.P.M. |
| FUEL ... | ... SELECTION CONTENTS AND PRESSURE |
| FLAPS ... | ... UP AND LOCKED OR AS REQUIRED |
| GYROS ... | ... UNCAGED AND SYNCHRO- NISED |
| SWITCHES... | ... CHECK |

FINAL CHECKS FOR LANDING

| | |
|---------------|--|
| BRAKES ... | ... CHECK OPERATION THEN OFF |
| UNDERCARRIAGE | DOWN CHECK INDICATORS LEVER TO EMERGENCY CLOSE THROTTLE AND CHECK VISUAL AND AUDIBLE WARNINGS |
| MIXTURE ... | ... RICH |
| PROPELLOR ... | ... FULL INCREASE R.P.M. |
| FLAPS ... | ... LOWER AS REQUIRED ON FINAL |

PART 2 — HANDLING

41. **Vital Actions Before Take-off**

- H Hatches — locked OPEN
- Harness — secure and locked
- Hydraulics — pressure checked; valve disengaged
- T Trim — elevator 11 o'clock; rudder 3 o'clock
- M Mixture — RICH, Ki-gas locked, carburettor air as required (see para. 22 (e))
- P Propeller — full INCREASE r.p.m.
- F Fuel — selection, contents and pressure
- F Flaps — UP and LOCKED unless required for take-off
- G Gyros — uncaged and synchronised
- S Switches — ignition BOTH, others as required.

42. **Take-off**

- (a) Minimum engine temperatures for take-off are 160°C. Cylinder head and 50° C. oil.
- (b) If engine was not run up immediately before completing take-off checks, check ignition switch at 1600 r.p.m.
- (c) Check controls for full free movement.
- (d) Make sure tail wheel is straight before locking it, and then open throttle smoothly to the gate. There is a slight tendency to swing to the left, which is easily controlled with rudder.
- (e) The aircraft becomes airborne at 65-70 kts. Allow the aircraft to climb slowly while the speed builds up to correct climbing speed — 95 knots.
- (f) When comfortably airborne:—
 - B Brakes — apply momentarily
 - U Undercarriage — raise
 - M Mixture — RICH, carburettor air as required
 - P Power — at a safe height reduce power to 28" and 2100 r.p.m.
 - F Flaps — check UP and locked.

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43. **Short Take-off**

- (a) Select 20° of flap. Air pressure during take-off will blow them back to the maximum lift position of 15°. Set elevator trim at 10 o'clock.
- (b) Open throttle to gate with brakes on and control column back.
- (c) The aircraft will become airborne at 50-55 knots.
- (d) Brake the wheels, raise undercarriage and climb at an angle which will clear obstructions allowing the speed to slowly build up to 85 knots.
- (e) When clear and at a safe height carry out the remainder of checks:—
- M Mixture — RICH and carburettor air as required
P Power — reduce power to 28 inches of mercury and 2100 r.p.m.
F Flaps — raise and lock.

44. **Climbing**

- (a) Climbing speeds are:—
- 95 knots normal
85 knots for Maximum Rate Climb.
85 knots with 15° flap on take-off or normal climbing power
75 knots with full flap and undercarriage down on take-off power.
- (b) As no automatic boost control is fitted it is necessary to progressively open the throttle during a climb to maintain the desired manifold pressure. The mixture control is used to maintain the correct fuel/air ratio.

45. **General Flying**

- (a) *Controls* — The controls are light and responsive. The aircraft is stable.

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PART 2 — HANDLING

(b) *Changes of trim*

| | |
|--------------------|------------------|
| Undercarriage down | Nose down |
| Flaps down | Nose down |
| Power increases | Nose up and left |

(c) *Compass Error* — When making a departure:—

- (i) With undercarriage lowered, synchronise direction indicator with compass and maintain desired heading.
- (ii) Raise undercarriage.
- (iii) Maintain heading on direction indicator and re-align compass grid wires on P8 type compass or note new heading on B.16 type compass.
- (iv) Repeat procedure with every large change of heading.

46. **Flying at Reduced Airspeed in Bad Visibility** — Lower 25° Flap, set 2100 r.p.m. and adjust manifold pressure (approximately 17 inches of mercury) to maintain height at 95 knots.

47. **Flight in Icing Conditions** — Carburettor air temperature should be kept between 7° to 15° (C). In aircraft in which Wasp Order No. 38 has not been embodied, the full HOT position should be selected whenever icing is suspected. If ice has accumulated, momentary engine cuts and rough running may occur for a short period following the application of hot air (see para. 22).

48. **Range and Endurance**

- (a) Ensure that every drag producing feature of the airframe is in its minimum drag position; with a canopy open the specific air range may be reduced by 0.75 A.N.M.P.G.

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PART 2 — HANDLING

- (b) Use cold carburettor air unless absolutely unavoidable; 1500 r.p.m. and weakest useable mixture (see para. 20).
- (c) For range maintain 105 knots I.A.S. on about 19-20 inches of mercury.
- (d) For endurance maintain 85 knots I.A.S. on about 16-18 inches of mercury.
See Part 5 for fuel consumption figures.

49. **Pressure Error Correction**

| | | | | | | | | |
|--------|----|-----|-----|-----|-----|-----|-----|------|
| | | | | | | | | kts. |
| I.A.S. | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 |
| ADD | | 2.0 | 4.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 |

50. **Stalling** — The approximate stalling speeds under normal loading are:—

- Undercarriage and Flaps up, engine off 56 kts.
- Undercarriage and Flaps down, engine off . . . 52 kts.
- Undercarriage and Flaps down, engine on . . . 45 kts.

Note.—Before stalling, spinning and aerobatics carry out the normal pre-aerobatic check.

51. **Spinning**

- (a) The spinning and recovery characteristics are normal. When the throttle is closed move the propeller control to full DECREASE r.p.m.
- (b) After recovering from the dive, move the propeller control approximately half way forward. Open the throttle to about 25 inches of mercury then finally adjust the r.p.m. and manifold pressure.
- (c) The recovery from the dive must be effected before reaching 3000 feet.

52. **Diving** — In a dive the aircraft yaws to the right and becomes tail heavy.

PART 2 — HANDLING

53. **Aerobatics**

- (a) All aerobatics must be commenced at such a height that at no stage of the manoeuvres does the aircraft descend below 3,000 feet. Power is to be maintained at 25 inches of mercury at 2,000 r.p.m. The fuel tank containing the greatest quantity of fuel is to be selected before carrying out aerobatics (see Note below).

(b) Recommended speeds are:—

| | |
|-------------------------------------|----------|
| Loop | 170 kts. |
| Aileron Turn | 170 kts. |
| Slow Roll | 140 kts. |
| Half Roll off top of loop | 190 kts. |
| Stall Turn | 140 kts. |
| Inverted Gliding | 105 kts. |
| Barrel Roll | 150 kts. |

(c) Flick manoeuvres are not permitted.

Note.—Partial engine failure or "cutting" may occur during inverted manoeuvres. The time taken for the engine to recover is influenced by the quantity of fuel in the tank selected and also by the nose attitude of the aircraft when inverted. The time required to drain the fuel lines of air is longer when fuel is low in the tank selected. Even with wobble pump assistance engine recovery may occasionally take up to 40 seconds. In such circumstances, notwithstanding possible complete engine recovery, action should always be taken immediately to position the aircraft so that a forced landing may be carried out.

54. **Descending** — The following speeds and approximate power settings are used:—

| | |
|--------------------------------|---------|
| Gliding — Flaps up | 85 kts. |
| Gliding — Flaps down | 80 kts. |

Note.—Increase speed 5 knots in steep gliding turn.

Powered descent in Bad Visibility

25° Flap down, 2100 r.p.m. approximately
17 inches of mercury or 21 inches with wheels
down on G.C.A. final 95 kts.

PART 2 — HANDLING

55. Approach and Landing

- (a) Before entering the circuit check:—
 Fuel — sufficient for overshoot in tank in use
 Mixture — RICH
 Carburettor air — Full COLD or HOT (see para. 22 (c))
 Tailwheel — LOCKED
 Canopy — OPEN
 Harness — secure.
- (b) Check before landing:—
 B Brakes, check operation and then OFF
 U Undercarriage, lower, check visual indicators, lever to EMERGENCY
 Close throttle to check that undercarriage visual and audible warning do not operate then.
 M Mixture — RICH
 P Propeller — move to full INCREASE r.p.m.
 F Flaps — on final approach lower flap when desired.
- (c) Approach Speeds:—
- (i) Engine assisted — Flaps fully down. Maintain 90 knots until completion of turn onto final approach. After lowering flap slowly reduce speed to 75 knots at the runway threshold.
 - (ii) Engine assisted — Flaps up. Maintain 90 knots until completion of turn onto final approach and then slowly reduce speed to 75 knots at runway threshold.
 - (iii) Glide Approach. — Maintain 90 knots until completion of the turn onto final approach. After lowering flap slowly reduce speed to 80 knots at the runway threshold.
 - (iv) Short Landing — Maintain 90 knots until completion of the turn onto final. After lowering flap slowly reduce speed to 65 knots at runway threshold.

PART 2 — HANDLING

56. Going Round Again

- (a) Open throttle to gate. Application of power produces a nose up and left change of trim, but this can be held without trimming.
- (b) Maintain 75 knots.
- (c) Raise half flap.
- (d) Raise undercarriage.
- (e) Raise flap to $\frac{1}{4}$ increasing speed to 85 kts.
- (f) Raise remainder of flap and assume a normal climb.

57. Check After Landing

- (a) Unlock tail wheel and clear landing area then
- (b) Flaps — UP and LOCKED.

58. Stopping Engine

- (a) At 1600 r.p.m. check magneto serviceability by switching to L and R.
- (b) Check cylinder head temperature less than 200°C., then move the mixture control to the full LEAN position to operate the idle cut-off.
- (c) When the engine has stopped check left to right.—

| | |
|------------------------------------|--------|
| Fuel | OFF |
| Carburettor Air | COLD |
| Mixture | RICH |
| Ignition Switch | OFF |
| Radio | OFF |
| Instruments | Caged |
| Carburettor Air Temperature Switch | OFF |
| Electrical Switches | OFF |
| Flying Controls | Locked |
| Canopy | Shut |
| Master Switch | OFF |

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PART 3 — LIMITATIONS

PART 3

LIMITATIONS

59. Engine Data — S3HI — G Engine

The principal engine limitations are as follows:—

| | H.P. | Man. Press. ins. of Mercury | R.P.M. | Max. Temperatures | |
|-------------------|------|-----------------------------------|--------|-------------------|-----------|
| | | | | Cyl. Head °C | Oil °C |
| Take-Off Maximum | 600 | 35.6 | 2,250 | 290 | 85 |
| Normal | 526 | 32.5 | 2,250 | 290 | 85 |
| Rated Power | 515 | 32.5 | 2,200 | 260 | 85 |
| Climbing Maximum | 480 | 31.5 | 2,100 | 285 | 85 |
| Normal | 460 | 28.0 | 2,100 | 285 | 85 |
| Cruising Maximum | 475 | 30.5 | 2,100 | 230 | 85 |
| Normal | 290 | 25.0 | 2,000 | 230 | 80 |

Oil Pressure—Normal 70-90 lb./sq. in.

Oil Pressure—Minimum 50 lb./sq. in.

Cylinder Head Temperature in Flight—

Maximum 285°C.

Minimum 90°C.

Take-off Minimum 160°C.

Oil Temperature—

Maximum 85°C.

Minimum Take-off 50°C.

Run-up 40°C.

Normal Cruising 70-80°C.

Fuel Pressure—

4-5 lb./sq. in.

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PART 3 — LIMITATIONS

R.P.M.—

Maximum while diving, 2400 r.p.m. for not more than 30 seconds with Manifold pressure between 15 and 20 inches of mercury.

Fuel and Oil Specifications—

Fuel 91/98 Octane — Alternative 100/130octane
Oil 100 seconds viscosity, R.A.A.F. ident. K2/128
Key Letter OM-270.

60. **Flying Limitations**

- (a) (i) Flick manoeuvres are prohibited.
- (ii) Due to loss of oil pressure when inverted, sustained inverted gliding is prohibited.
- (b) *Maximum Speeds*

| | |
|---------------------------------|----------|
| A20-3 to A20-42 | 280 kts. |
| A20-43 and subsequent | 310 kts. |
| Undercarriage down | 140 kts. |
| Flaps down | 105 kts. |
| Canopy Open | 140 kts. |
- (c) *Maximum Weight and C.G. Data*
 - (i) The maximum permissible weight for all forms of flying — 6,000 lb.
 - (ii) The Datum line is situated at the leading edge of the centre section.
 - (iii) The maximum permissible forward and aft limits of the Centre of Gravity are respectively 27.1 and 35.1 inches aft of datum with undercarriage up or down.

PART 4

EMERGENCIES

EMERGENCY CONTROLS AND EQUIPMENT

61. **Undercarriage and Flaps Emergency Operation**

- (a) In the event of failure of the engine driven hydraulic pump, the hand-pump can be used to operate the undercarriage and flaps after selecting the desired service in the normal manner. Operate the hand-pump with full deliberate strokes.
- (b) If the hand-pump fails to lock the undercarriage (due to control valve failure), with DOWN selected, open the undercarriage emergency globe valve to balance the pressure in the up and down lines. Rock the aircraft in the pitching and lateral planes to move the wheels to the fully down position. Place selector in EMERGENCY check warning devices, and close the emergency globe valve.
- (c) If the warning devices appear to be unserviceable, with the undercarriage down, the selector in the EMERGENCY position, and the power valve disengaged, hold the aircraft on its back or side and check the visual indicators for movement. If no movement is seen it is safe to assume that the undercarriage is down and locked and the warning devices are unserviceable. Land with the power valve engaged as an added precaution.
- (d) Should the undercarriage lower, but the locks not engage, indicated by the undercarriage visual indicator being in the DOWN position but the audible warning continuing to sound, and it not being impossible to select EMERGENCY with the undercarriage selector lever, an emergency landing may be carried out on an aerodrome the surface of which is known to be smooth, as follows:—

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PART 4 — EMERGENCIES

- (i) With undercarriage down and hydraulic power valve engaged return the undercarriage selector lever to midway between the UP and DOWN positions.
 - (ii) Release the hydraulic power valve. A pressure of 850 lb./sq. in. should now be locked in the undercarriage down line and indicated on the pressure gauge.
 - (iii) Should the valves be leaking and the pressure fall off, repeat the operation.
 - (iv) Make a wheel landing being careful not to swing or apply brakes harshly. After completion of landing run do not taxi away.
 - (v) If possible repeat (ii) and (iii) until the undercarriage down lock can be inspected through the perspex panel above the lock forging.
62. **Canopy Jettisoning** — In the event of canopy jamming in the shut position the side panels may be jettisoned by pulling the toggle set in the top centre of each pair of panels.
63. **Fire Extinguishers** — A hand operated fire extinguisher is stowed on the inner side of the door on the left side of the fuselage in the rear cockpit. Later aircraft have an additional extinguisher stowed on the right hand side of the front seat. On the ground the rear extinguisher is accessible by opening the door.
64. **First Aid Pack** — A first aid pack is stowed in the rear fuselage on the port side.

EMERGENCY HANDLING

65. **Engine Failure in Flight**

- (a) Should there be engine failure in flight and the cause of the failure cannot be rectified:—
 - (i) Turn fuel OFF, set mixture control to idle cut off and set ignition switch to OFF.

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PART 4 — EMERGENCIES

- (ii) Lock canopy open and ensure harness LOCKED.
- (b) (i) Maintain a speed of 85 knots while manoeuvring with flaps and undercarriage up.
- (ii) The undercarriage should not be lowered unless landing on a recognised aerodrome.
- (c) Do not use flap until it is clear that the field will be comfortably reached. Reduce speed to 80 knots with flaps fully down. On final excess height may be lost by lowering the nose but the speed should not be permitted to exceed 95 knots.
- (d) If oil pressure is available, the glide can be lengthened considerably by setting the propeller control to full DECREASE r.p.m.
- (e) During practice forced landings clear the engine every 1,000 feet by opening throttle to 20 inches of mercury. Do not allow the cylinder head temperature to drop below 90°C.
66. **Ditching** — Whenever possible it is preferable to bale out, but if ditching is unavoidable:—
- (a) Lock canopy open, check harness locked.
 - (b) Lower flap 15°; disconnect R/T leads. If power is available it should be used to make the touchdown speed as low as possible.
 - (c) Ditching should be along the swell or into wind if the swell is not steep.
67. **Abandoning Aircraft** — If time permits the following procedure should be adopted:—
- (a) Close throttle and trim for glide.
 - (b) Open canopy; disconnect R/T lead and undo harness.
 - (c) Slide over the right hand side head foremost and facing the tail.
 - (d) The Captain should remain strapped in until the other occupant has cleared the aircraft.

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PART 5

ILLUSTRATIONS & FLIGHT PLANNING CHART

68. General Notes

- (a) Wirraway aircraft are fitted with either a NA-Y9H-36 AUS or NA-Y9E1-37 AUS carburettor. Of these, the Y9H gives a slightly poorer performance. Figures quoted therefore apply to the Y9H carburettor.
- (b) The figures for absolute still air range have been computed with an allowance of 15 gallons for variations in nautical air miles per gallon (N.A.M.P.G.) on the climb and descent and an overshoot reserve.
- (c) The figures for 5000 feet are those for full rich mixture. The figures are safe for all heights up to 5000 feet.
- (d) Use of full HOT carburettor air will reduce the range by about .5 N.A.M.P.G.

69. Range and Endurance

(a) 5000 FEET — FULL RICH

| R.P.M. | I.A.S. (Kts.) | Approx. Man. Press. | Fuel G.P.H. | A.N.M.P.G. | Still Air Range |
|--------|---------------|---------------------|-------------|------------|-----------------|
| 1500 | 85 | 17.5 | 12.5 | 6.6 | 435 |
| 1500 | 90 | 18 | 13 | 6.8 | 448 |
| 1500 | 95 | 19 | 13.5 | 7.0 | 462 |
| 1500 | 100 | 20 | 14.5 | 7.2 | 473 |
| 1500 | 105 | 21.5 | 16 | 7.2 | 473 |
| 1500 | 110 | 23.5 | 17 | 6.9 | 451 |
| 1500 | 115 | 24 | 19 | 6.4 | 422 |
| 2000 | 134 | 25 | 30.5 | 4.4 | 290 |

Note.—Use of mixture control will increase the range by approximately .3 N.A.M.P.G. and still air range by approximately 25 N.M.

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PART 5 — ILLUSTRATIONS AND
FLIGHT PLANNING CHART

(b) 10,000 feet WEAKEST USEABLE MIXTURE

| R.P.M. | I.A.S. (Kts.) | Approx. Man. Press. | Fuel G.P.H. | A.N.M.P.G. | Still Air Range |
|--------|------------------|------------------------|----------------|------------|--------------------|
| 1500 | 85 | 19.5 | 12.2 | 8.2 | 541 |
| 1500 | 90 | 20 | 12.6 | 8.4 | 554 |
| 1500 | 95 | 20.5 | 13.2 | 8.5 | 561 |
| 1500 | 100 | 21.5 | 13.8 | 8.6 | 567 |
| 1500 | 105 | 22.5 | 14.6 | 8.6 | 567 |
| 1540 | 110 | F.T. | 15.6 | 8.45 | 557 |
| 1620 | 115 | F.T. | 16.9 | 8.2 | 541 |
| 1720 | 120 | F.T. | 18.4 | 7.8 | 514 |
| 1840 | 125 | F.T. | 19.2 | 7.4 | 488 |
| 1980 | 130 | F.T. | 21.4 | 7.0 | 462 |
| 2160 | 135 | F.T. | 25.25 | 6.5 | 429 |

Note.—If the mixture control is used at the maximum power position (see para. 20 (f) (ii)) the A.N.M.P.G. and S.A.R. will be reduced to approximately those applying to 5,000 feet in FULL RICH.

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ILLUSTRATIONS

| | Fig. |
|--|------|
| Front Cockpit — Forward view | 1 |
| Front Cockpit — Forward view (Mod. 173 embodied) | 2 |
| Front Cockpit — Left hand side | 3 |
| Front Cockpit — Right hand side | 4 |
| Rear Cockpit — Left hand side | 5 |

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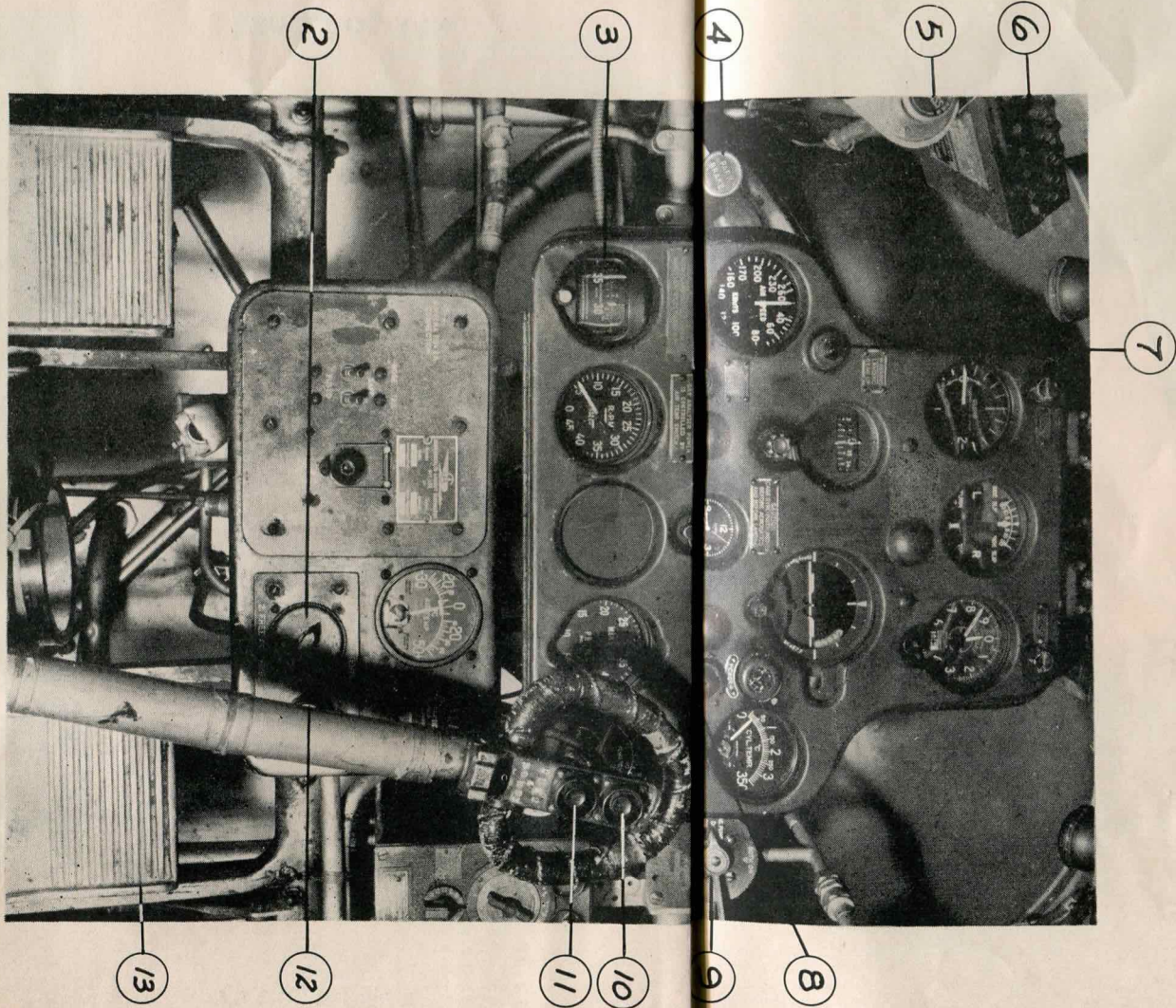
KEY TO FIGURE 1

- 2 Carburettor/Outside Air Temperature Switch
- 3 Exhaust Gas Analyser Indicator
- 4 Park Brake Control
- 5 Ki-gas Primer
- 6 V.H.F. Controller
- 7 Undercarriage Warning Light
- 8 Hydraulic Power Warning Light
- 9 Vacuum Selector
- 10 Camera Firing Button
- 11 Bombs/Guns Firing Button
- 12 Starter Button
- 13 Toe Brakes

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Figure 1.—Front Cockpit Forward View.



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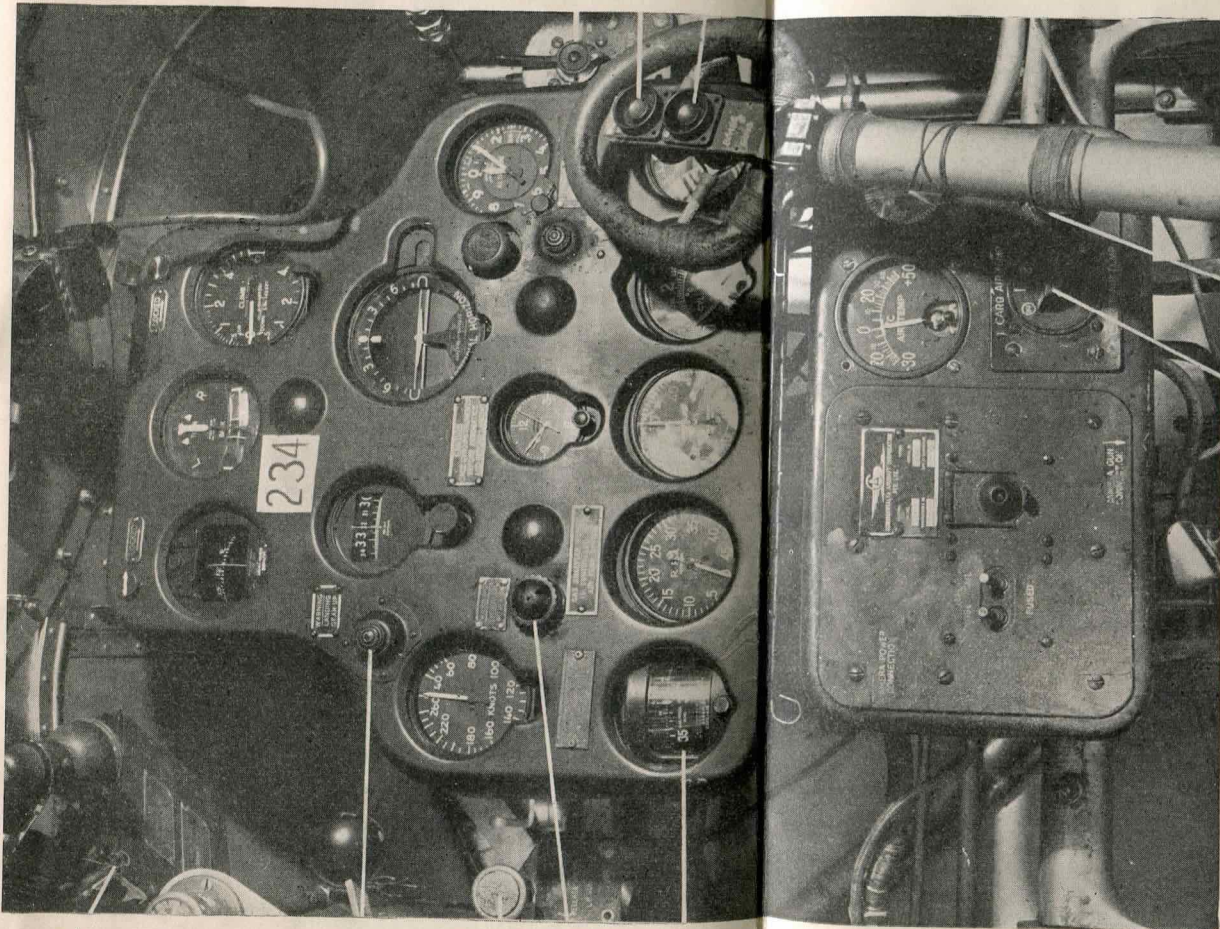
KEY TO FIGURE 2

- 2 Carburettor/Outside Air Temperature Switch
- 3 Exhaust Gas Analyser Indicator
- 4 Park Brake Control
- 5 Ki-gas Primer
- 6 V.H.F. Controller
- 7 Undercarriage Warning Light
- 8 Hydraulic Power Warning Light
- 9 Vacuum Selector
- 10 Camera Firing Button
- 11 Bombs/Guns Firing Button
- 12 Starter Button

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9 10 11



2 12

6 5 7 4 8 3

Figure 2.—Front Cockpit Forward View, Model 173

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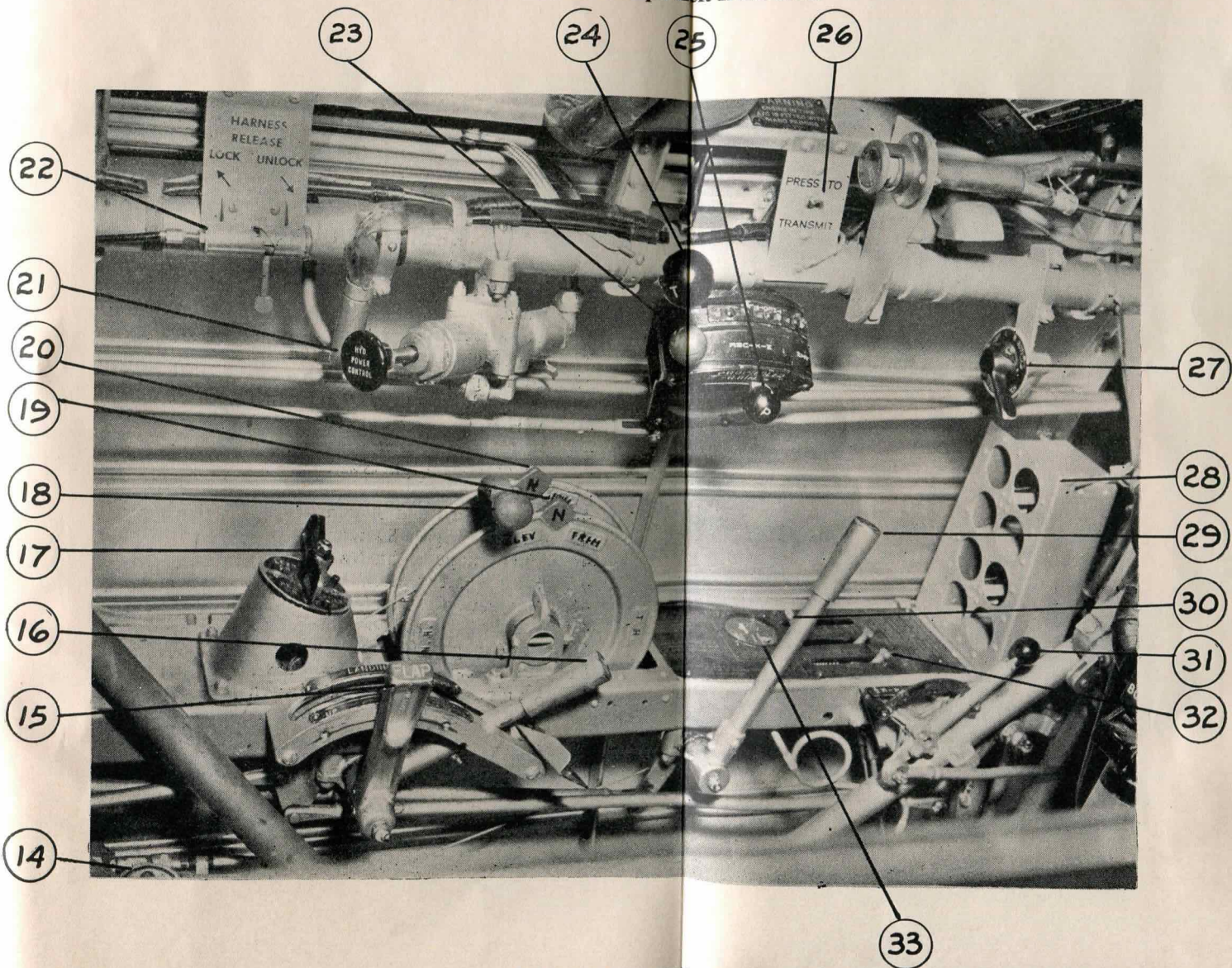
KEY TO FIGURE 3

- 14 Undercarriage Emergency Globe Valve
- 15 Flap Selector
- 16 Undercarriage Selector
- 17 Fuel Selector
- 18 Hand Fuel Pump
- 19 Elevator Trim Control
- 20 Rudder Trim Control
- 21 Hydraulic Power Valve
- 22 Harness Release
- 23 Mixture Control
- 24 Throttle Control
- 25 Propeller R.P.M. Control
- 26 Press to Transit Switch
- 27 Ignition Switch
- 28 Signal Cartridge Stowage
- 29 Hand Hydraulic Pump
- 30 Flap Position Indicator
- 31 Carburettor Air Heat Control
- 32 Undercarriage Position Indicators
- 33 Hydraulic Pressure Gauge

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Figure 3.—Front Cockpit Left Hand Side.



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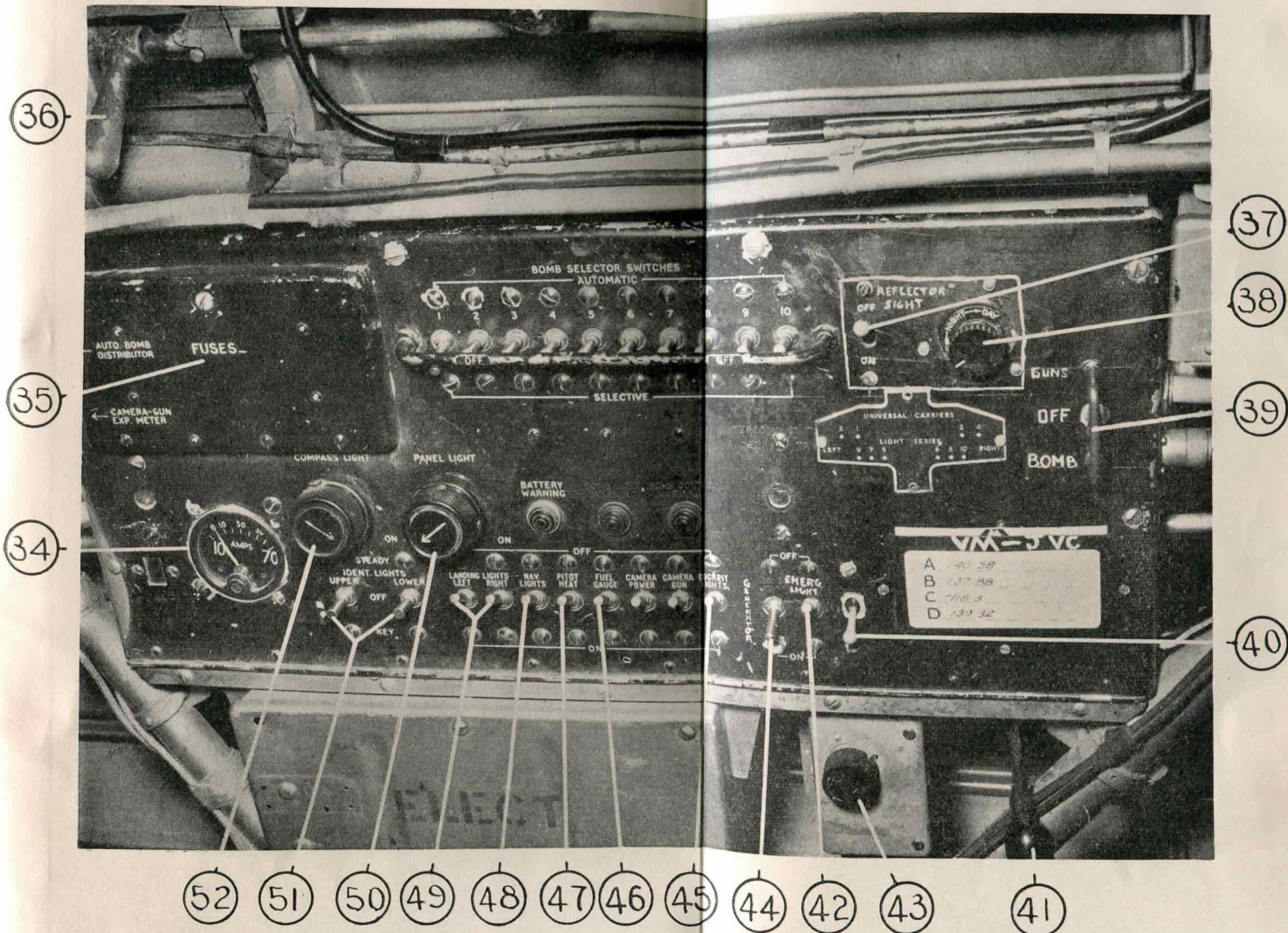
KEY TO FIGURE 4

- 34 Ammeter
- 35 Fuses
- 36 Tailwheel Lock
- 37 Gun Sight ON/OFF Switch
- 38 Gun Sight Dimmer Switch
- 39 Guns/Bombs ON/OFF Switch
- 40 V.H.F. Circuit Breaker
- 41 MIC-TEL Socket
- 42 Emergency Light Switch
- 43 Audio Control
- 44 Generator Field Switch
- 45 Cockpit Lights Switch
- 46 Fuel Gauge Lights Switch
- 47 Pitot Heater Switch
- 48 Navigation Lights Switch
- 49 Landing Lights Switch
- 50 Panel Lights Dimmer Switch
- 51 Identification Lights Switches
- 52 Compass Light Dimmer Switch

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Figure 4.—Front Cockpit Right Hand Side.



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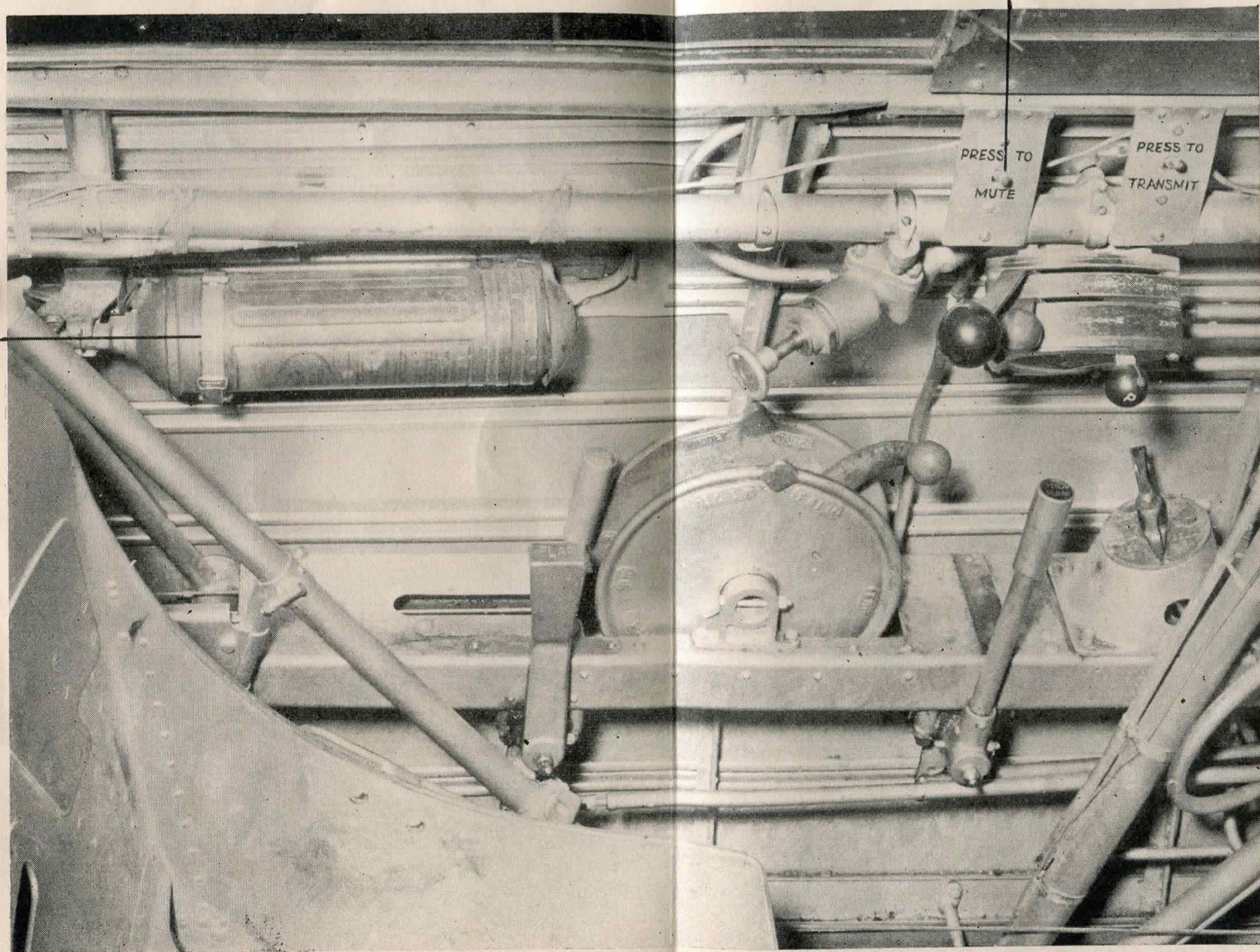
KEY TO FIGURE 5

- 53 Fire Extinguisher
- 54 Press to Mute Switch

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Figure 5.—Rear Cockpit Left Hand Side.



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