

This is A.L. No. 36 to A.P.4343E, Vol. I

Section 7. List of Chapters : delete " (to be issued later) " after the title of Chapter 6 and write " (A.L. 36) " in the outer margin against the deletion. Insert this Chapter 6 to follow Chapter 5, and record the incorporation of this A.L. in the Amendment Record Sheet.

Chapter 6

TAXYING LAMP, TYPE B

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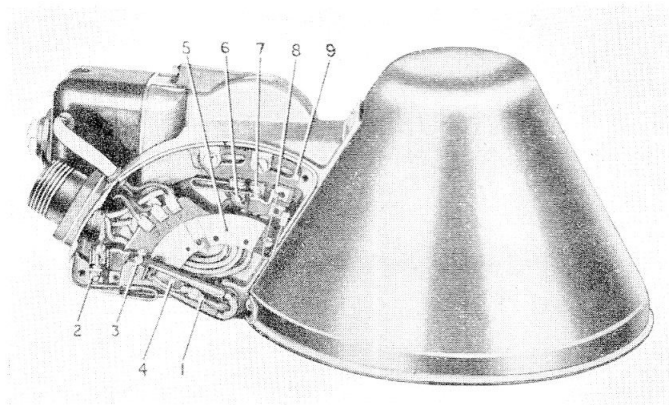
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LEADING PARTICULARS

Lamp, taxiing, Type B	Stores Ref. 5C/4090
Lamp, filament, 24V, 100W	Stores Ref. 5L/651
Socket, Type M, 6-pole, No. 1	Stores Ref. 5X/766
Operating unit	Stores Ref. 5U/1517
Mounting rig	Stores Ref. 5C/1518



- 1 SWITCH ARM
- 2 RETRACT LIMIT SWITCH
- 3 STRIKER PIN
- 4 CARBON BRUSH
- 5 CONTACT QUADRANT
- 6 PROJECTION
- 7 LOW POSITION SWITCH
- 8 EXTEND LIMIT SWITCH
- 9 CONTACT MOUNTING PLATE

Fig. 1. General view showing switch mechanism

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Introduction

1. This lamp is of the retractable type. It is designed to provide illumination in the region ahead of the aircraft and thus give warning of the presence of obstructions or obstacles when the aircraft is being taxied.

DESCRIPTION

General

2. The Type B lamp (fig. 1 and 2) consists of a pivoted lamp assembly housed within a conical outer casing to which is fitted a motor assembly, complete with reduction gear for operating the lamp on its pivot. When mounted on the aircraft, in its retracted position, the front glass lies practically flush with the underside of the wing structure.

Lamp assembly

3. The lamp assembly comprises a conical casing fitting with a reflector, pre-focus lampholder and a 100-watt filament lamp. A split bezel ring accommodates the lamp glass and is secured to the rim of the casing by tightening the screw in the bezel ring. A rubber sealing ring, accommodated in the bezel ring and seating on the rim of the casing, renders the lamp weatherproof. A bracket, secured to the side of the casing, is provided with a toothed quadrant which engages with a pinion on the motor assembly to permit the lamp to be extended, or retracted within the outer casing.

Outer casing

4. The outer casing is of conical form and has a small flange at its open end. This

flange is clamped between the two rings of the mounting rig on the aircraft when the lamp is installed. A slot in the side of the cone allows the quadrant bracket of the lamp assembly to extend into and engage with the motor drive of the motor assembly.

Motor assembly

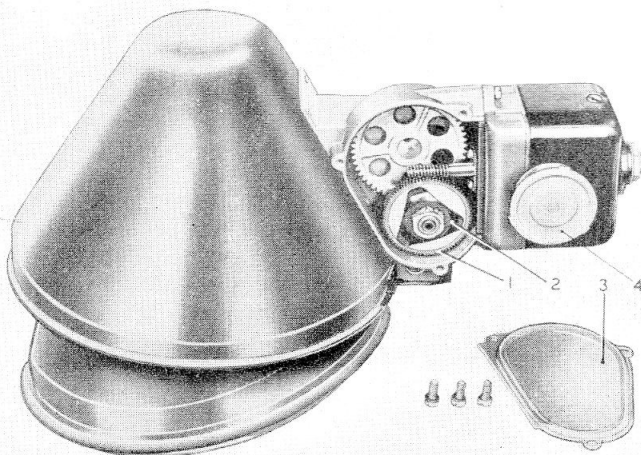
5. The motor assembly of the Type B taxiing lamp comprises a small electric motor, mounted on a casting in which is housed a reduction gear train and the lamp switch mechanism. The circuit of the motor and switch mechanism is shown in fig. 3. The complete assembly is riveted on the side of the lamp outer casing, over the slot through which the lamp quadrant extends.

6. The motor is housed within a moulded casing and is fitted with an electro-magnetic brake. This brake is incorporated to prevent overrun of the motor. The spring-loaded brake plunger is the armature of the electro-magnet and has a rubber pad which bears directly on the motor armature when the magnet solenoid is not energized. The solenoid is connected in series with the motor windings so that when the motor is switched on the solenoid is energized and the brake is lifted from the motor armature.

7. The motor is of the series wound type and has two operational windings, one to drive the motor in a direction to extend the lamp and the other to cause the lamp to be retracted. The motor shaft is wormed to drive the reduction gear train. The worm wheel of the gear train is fitted with a clutch in the form of a triangular-shaped spring plate. This clutch is fitted to prevent undue strain being thrown on the aircraft wing structure by extending the lamp at too high an aircraft speed. Normally the clutch is set to slip when the pressure at the middle of the front glass is 38 lb. (equivalent to approximately 200 m.p.h.) but may, under specific instruction, be set to slip at any other aircraft speed by adjusting the hexagonal nut which bears on the clutch plate.

Switch mechanism

8. The switch mechanism, which is shown in fig. 1, is housed in a compartment of the



1 WORM WHEEL
2 CLUTCH PLATE
3 COVER PLATE
4 BRAKE

Fig. 2. Partly extended view showing reduction gear

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casting upon which the motor is mounted. There are two make-and-break switches and one single-pole change-over switch as shown in the circuit diagram. These switches are operated by the movement of the switch arm, driven by the gear train. It should be noted that terminal 2 of the lamp is not normally connected and therefore, together with the change-over switch, may be disregarded in the description of the operation of the lamp.

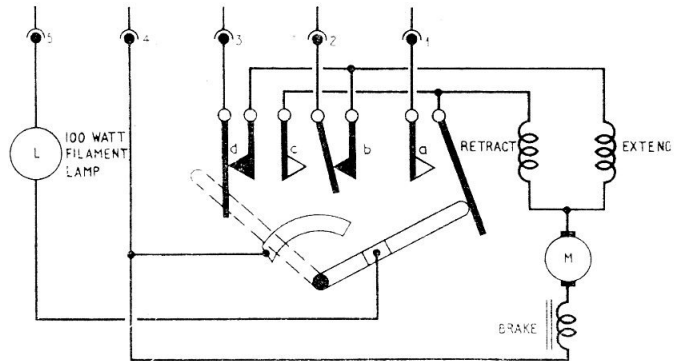


Fig. 3. Circuit diagram

Operation

9. The operation of the lamp may more easily be followed by reference to fig. 3. When the lamp is installed in the aircraft, terminals 1 and 3 are connected respectively to the retract and extend positions on the appropriate aircraft switch (in the +ve line). Terminal 2 is not used; terminal 4 is connected to E, and terminal 5 is connected to the aircraft lights master switch.

10. When the aircraft switch is operated to extend the lamp, d.c. is applied to the "extend" winding of the motor via terminal 3 and contact "d" in the switch mechanism. The motor brake is automatically lifted and the motor rotates to extend the lamp. At the same time the switch arm is caused to travel from the position shown towards the dotted line position in fig. 3. This causes contact "a" to close (which has no effect since no potential is applied to terminal 1) and the switch arm makes contact with the switch mechanism quadrant plate, thereby lighting the filament lamp. At the end of its travel the arm causes contact "d" to open and this switches off the motor and applies the automatic brake. The lamp is thus left in the extend position with the light switched on.

11. To retract the lamp the aircraft switch is operated to the retract position. This removes the electric supply from lamp terminal 3 and applies it to terminal 1 and the now closed contact "a" to energize the motor "retract" winding. The ensuing operation is then in reverse of that described in the preceding paragraphs.

INSTALLATION

Mounting position

12. Two Type B taxiing lamps each mounted on a mounting rig (*Stores Ref. 5C/1518*), will normally be fitted in aircraft, one in each wing, and fig. 4 shows typical arrangements for single and multi-engined aircraft. The distance between the pilot's viewpoint and the lamp should be as great as can be conveniently arranged. The blanking plates supplied with the mounting rigs should be carefully stored pending the removal of the lamps for any reason.

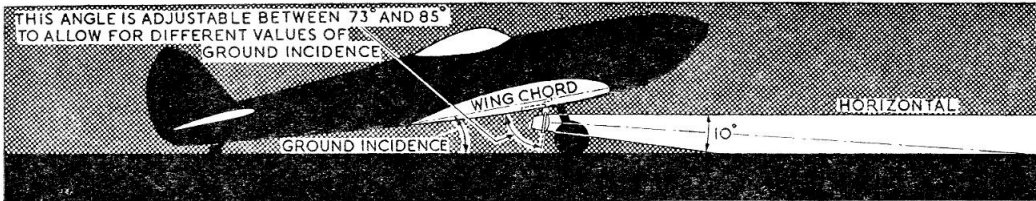
Angle of offset

13. This is the angle between dead ahead and the axis of the beam with the lamp in the extended position. The setting of this angle will vary with aircraft types, and will depend upon the view obtainable from the cockpit and the mounting position of the lamps, but the maximum angle of offset, or "toe-in," will not exceed 20 deg.

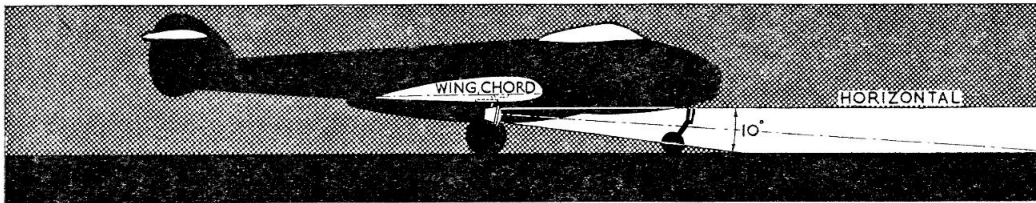
Horizontal plane adjustment

14. In general, aircraft with good forward and downward views when taxiing will have the lamps toed-in more than will aircraft with poor views. In the absence of specific setting instructions the best means of obtaining optimum settings is by practical tests undertaken at night.

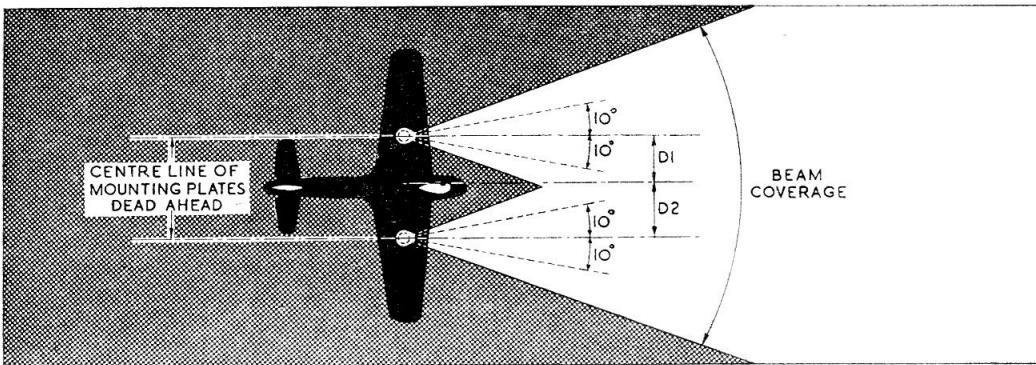
15. The method of adjustment is to slacken the twelve securing screws around the periphery of the lamp mounting rig, turn the lamp to the requisite angle of offset and re-tighten the securing screws. A graduated scale, reading 0-10 deg. to either side of a



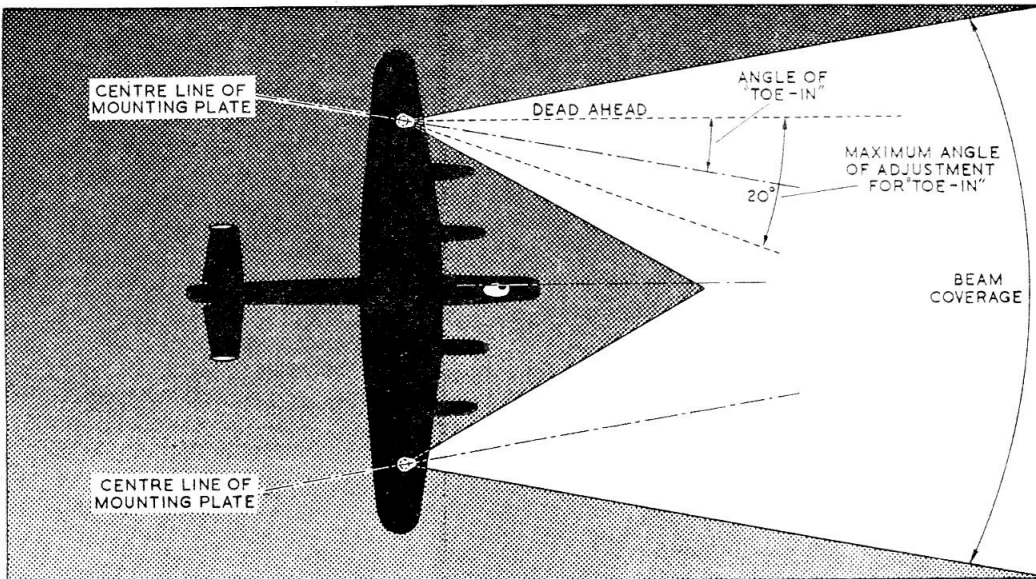
TAIL WHEEL UNDERCARRIAGE



NOSE WHEEL UNDERCARRIAGE



SINGLE ENGINE



MULTI - ENGINE

Fig. 4. Typical beam adjustment diagram

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zero mark on the mounting rig will assist in this operation which should be done with the lamp in the extended position.

Vertical plane adjustment

16. The angle traversed by the lamp from its retracted to its extended position is adjustable between 73 to 85 deg. to allow for different values of ground incidence. When mounted on large aircraft, where the mounting position is high, the lamp should be adjusted so that the top of the beam is horizontal when the lamp is in the fully extended position. On aircraft where the mounting position is low it is usually desirable to arrange for the top of the beam to be slightly above the horizontal.

17. Where the lamp switch mechanism is not accessible from inside the aircraft it will be necessary to remove the lamp to make any adjustments. To do this, remove the twelve securing screws in the lamp mounting rig, ease the lamp from the wing and then uncouple the supply cable from the plug on the lamp. When this has been done remove the cover plate over the switch mechanism of the lamp.

18. To effect adjustment of the total angle through which the lamp extends, slacken the two screws securing the contact mounting plate (*fig. 1*), and then move the mounting plate to the new position. The range of movement permits the angle to be adjusted to any angle between 73 deg. and 85 deg. as indicated by the graduated scale on the edge of the mounting plate.

SERVICING

General

19. The lamp should be serviced periodically to ensure that it has sustained no mechanical damage. The electrical connections should at all times be secure and free from corrosion.

Filament lamp

20. The filament lamp (*Stores Ref. 5L/651*) has a high wattage for its size and the heat developed may occasionally cause the glass seal of the envelope to crack after the lamp has been in service for a time. This may not cause immediate failure, but when the lamp is switched off a small quantity of air will be drawn into the envelope as it cools. This air will cause some oxidization of the filament and when the lamp is next switched on will cause a slight deposit of white tungsten oxide to appear on the envelope near the filament. During inspection a lamp showing traces of this white oxide should be removed and be replaced by a new lamp.

Reflector

21. The metal reflector may occasionally require cleaning. It should be washed with soap and water, finally polishing with a soft cloth. Do not use metal polish.

Motor assembly

22. In the event of motor failure, the lamp should be removed from the aircraft by removing the securing screws, lowering the lamp, and disconnecting the supply plug. The motor and its associated gearing should be regarded as a rotary actuator, for which general servicing instructions are given in A.P.4343, Vol. 1, Sect. 17. If the fault cannot be readily rectified, the whole unit should be returned to a Maintenance Unit and a serviceable lamp fitted in replacement. The clutch and brake must not be interfered with, but the switch contacts should be periodically cleaned and the wiring checked to ensure that it is in good condition.

Blanking plate

23. In the event of it being necessary to remove the lamp for an indefinite period, the blanking plate referred to in para. 12 must be used to cover the opening in the wing.

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