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WORKSHOP INSTRUCTIONS

WINDSCREEN WIPERS

MODELS

CR and CRT

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WINDSCREEN WIPERS

MODELS CR and CRT

1. GENERAL

The CR and CRT electric windscreen wipers combine a powerful and silent action with unobtrusive mounting. There are several different arrangements, as described below, but all consist essentially of a motor and gearbox mounted under the bonnet, and a flexible cable rack mechanism which transmits the drive from the motor to the wiper spindles, which are mounted at the bottom of the screen.

The motors of model CRT wipers incorporate a protective device in the form of a thermostat which, under conditions of excessive heating, cuts off the current supply to the motor until normal conditions are restored. If the blades are prevented from moving (as for example by ice or packed snow on the windscreen, in extreme winter conditions) the thermostat will operate as soon as the motor becomes hot; normal working will be resumed, if the obstruction has been removed, when the motor has cooled. The cooling-down period will depend on general operating conditions, and may be as long as ten minutes. Excessive heating from any other cause will also temporarily stop the wiper, but again the wiper will automatically restart as soon as the temperature falls.

The flexible cable rack consists of an inner core of steel wire around which is wound a wire helix forming the rack. The rack, which is contained in an armoured outer casing, is given a reciprocating motion by means of a crank in the wiper gearbox, and engages with gears on the wiper spindles to drive the wiper arms.

MODELS CR1 AND CRT11

These wipers consist of motor and gearbox, a control box and two wheelboxes, one for each of the two wiper arms. The control box incorporates the switch for the motor, and is also fitted with a large knob for hand wiping and parking of the blades. (Note that rotation of this knob in a clockwise sense turns the blades to the left, anti-clockwise, and *vice versa*).

To start the wiper, the control knob must be rotated until the drive engages. To switch off, the control knob is pushed in and turned until the arms lie on the scuttle.

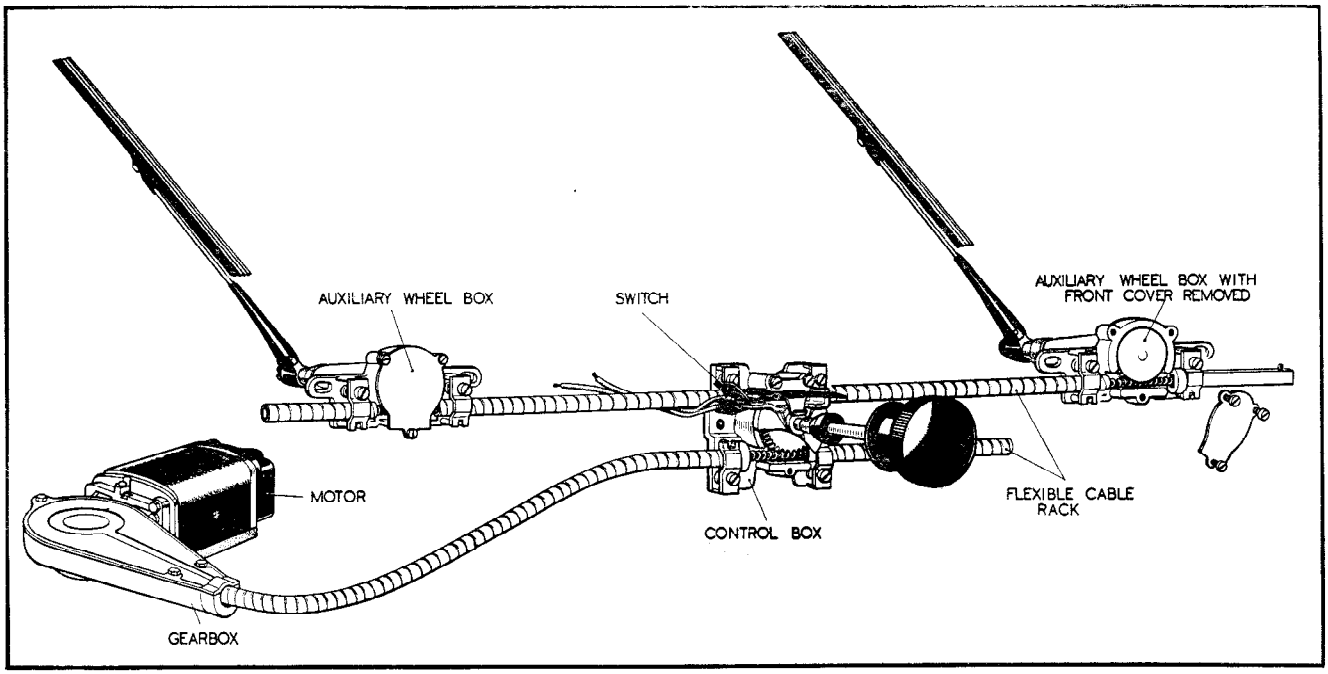

Fig. 1.
General arrangement of models CR1 and CRT11

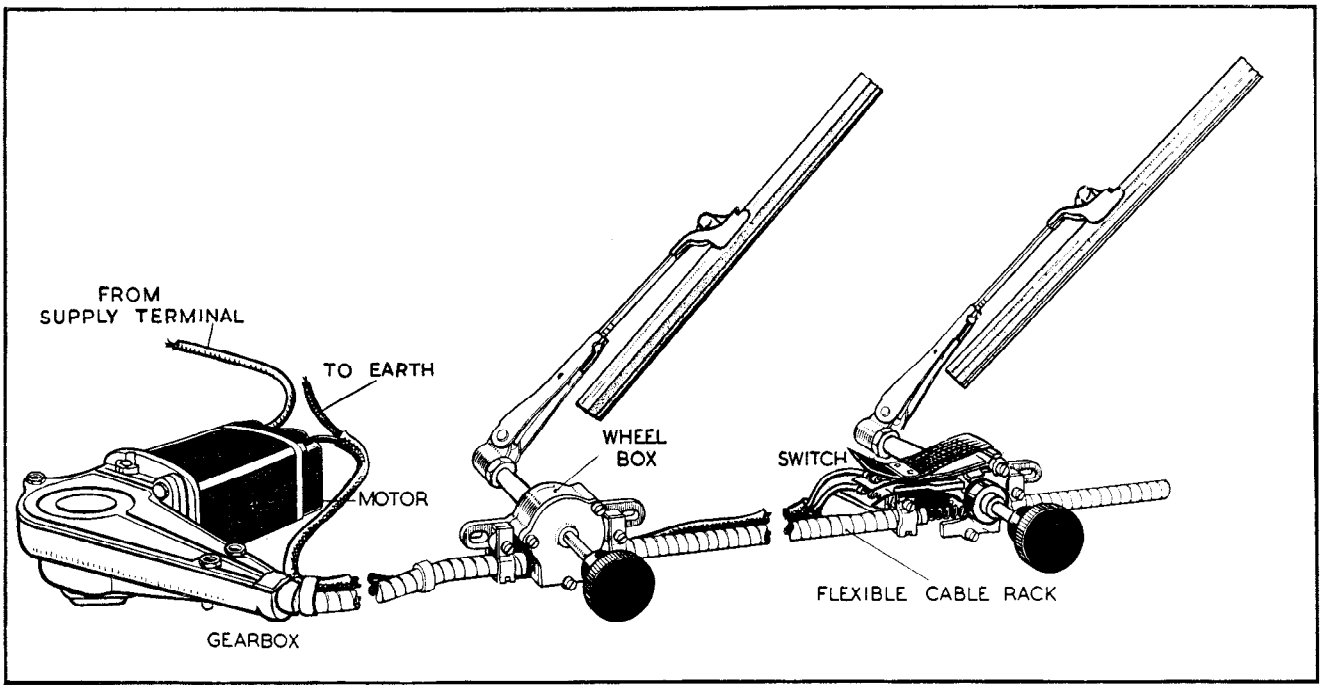

Fig. 2.
General arrangement of models CR2 and CRT12

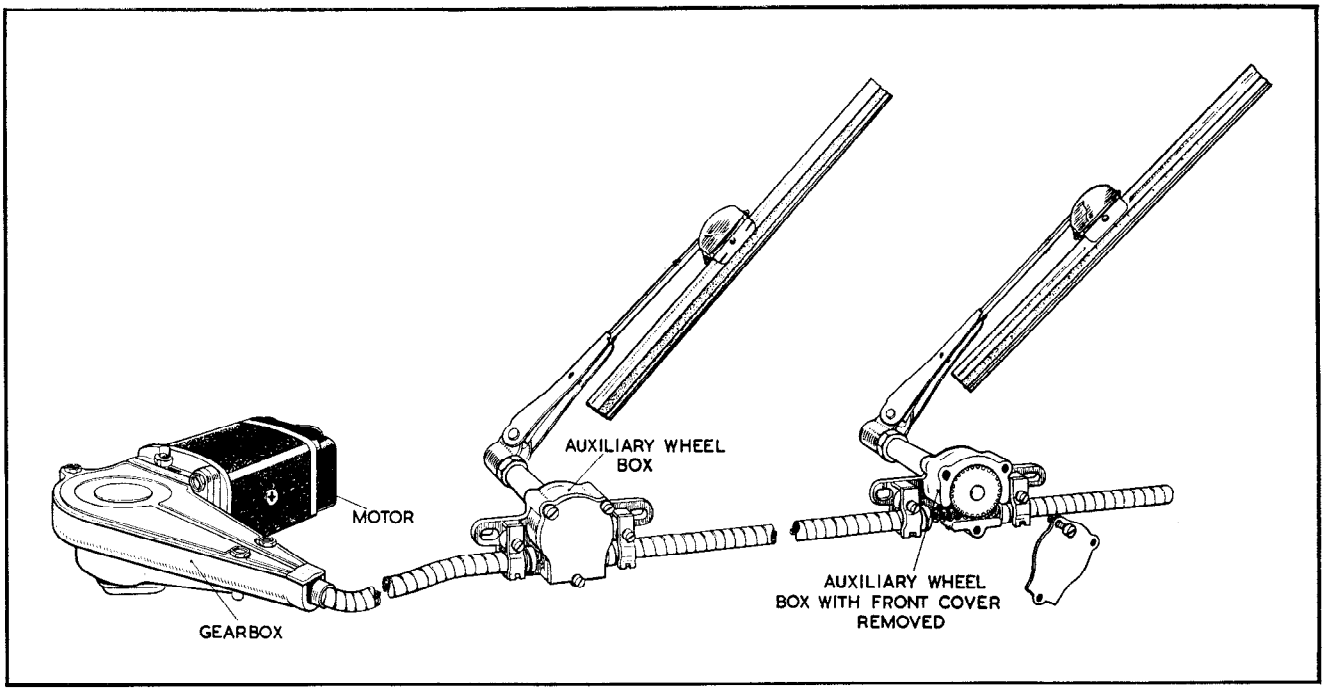

Fig. 3.
General arrangement of models CR4 and CRT14

MODELS CR2 AND CRT 12

In these models each wheelbox is fitted with a knob for parking the blades and for hand wiping, and the switch is incorporated in the wheelbox on the driver's side. To switch on the wiper, push in the knob on the driver's side, and turn it away from the parked position. Release the knob, thus operating the switch, but continue to turn until the driving dogs engage. Engage the drive to the arm on the passenger's side in the similar manner. To switch off, push in the knob and turn it until the arm lies on the scuttle.

MODELS CR4 AND CRT14

The wheelboxes have no control knobs, the motor being controlled by a separately mounted switch. Parking is effected by switching off at the end of a stroke.

MODELS CR5 AND CRT15

These wipers are similar to models CR4 and CRT14, but the wheelbox spindle housings are threaded so that the wheelboxes may be screwed directly to the scuttle or windscreen by means of a suitable nut and packing pieces.

Other wipers in this range are designed to conform to manufacturers' particular requirements, and will be found to resemble one or other of the types described above.

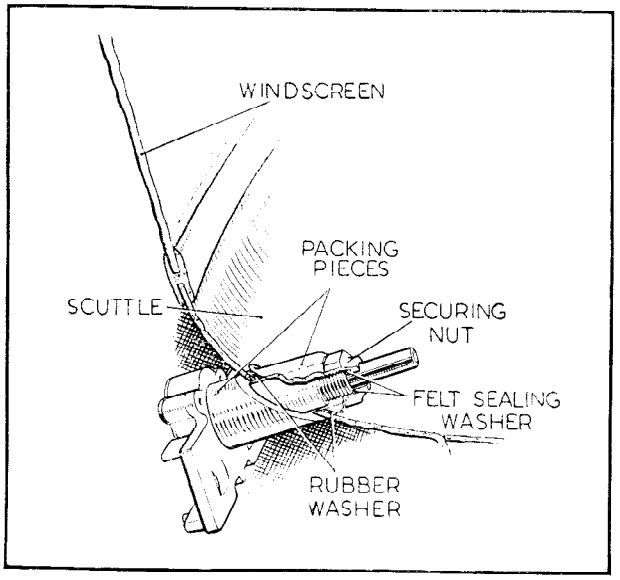

Fig. 4.
Model CR5 or CRT15 wheelbox in position on typical scuttle

2. ROUTINE MAINTENANCE

The moving parts, being packed with grease before assembly, need no lubrication, and no adjustment is necessary. Thus the only maintenance consists of the occasional inspection of the rubber wiping blades, which become worn after long service and have to be renewed (see Para. 5b).

3 TEST DATA

	Models CR			Models CRT		
	6 Volt	12 Volt	24 Volt	6 Volt	12 Volt	24 Volt
(a) Normal current consumption (Motor cold and driving both blades, if dual-arm wiper, on wet screen):	3.5-6.0 amps.	1.75-3.0 amps.	0.8-1.5 amps.	4.0-6.5 amps.	2.0-3.25 amps.	1.0-1.7 amps.
(b) Stall current (motor cold):	8.5-10.0 amps.	5.5-6.5 amps.	2.4-3.0 amps.	15.0-17.0 amps.	7.5-8.5 amps.	3.7-4.2 amps.
(c) Armature resistance (between adjacent commutator segments):	0.16-0.22 ohms	0.85-1.05 ohms	5.4-6.8 ohms	0.16-0.22 ohms	0.8-1.0 ohms	3.5-4.5 ohms
(d) Field coil resistance:	2.65-2.85 ohms	15-16 ohms	60-64 ohms	1.85-2.0 ohms	8.4-9.0 ohms	32-34 ohms
(e) Field current (approx.)	2.2 amps.	0.8 amps.	0.4 amps.	3.0 amps.	1.4 amps.	0.7 amps.
(f) Protective thermostat (models CRT only) opens the circuit at 90°-95°C. and must reclose before the temperature has fallen to 60°C.						

4. SERVICING

If the wiper fails to operate, or operates unsatisfactorily, switch on the wiper and note the current being supplied to the motor, either on the instrument panel ammeter or preferably on a moving-coil ammeter, 0 — 20 amps., connected in the wiper circuit. Then proceed as follows :—

(a) WIPER TAKES NO CURRENT

Examine the fuse protecting the wiper. If it has blown, examine the wiring of the motor circuit, and that of all other circuits protected by the fuse, for evidence of chafed leads or short circuits. Replace any leads which are badly worn or chafed, if necessary fitting protective sleeving over the leads to prevent a recurrence of the fault. For internal faults causing blown fuse, see Para. 4(c).

On model CR1, CRT11, CR2 or CRT12, the switch in the control box or driver's side wheelbox may be at fault. To gain access to this switch it will generally be necessary to remove the control knob and all or part of the facia panel. See whether the contacts open and close with the movement of the control spindle, and also whether the contacts are clean. The switch contacts should open just as the driving clutch disengages: if necessary, bend the switch blade until this is the case. After re-setting the switch, make sure that the contacts are at least $\frac{1}{32}$" apart when the wiper spindle is in the parked position.

(b) WIPER TAKES ABNORMALLY LOW CURRENT

First ensure that the battery is not discharged, as this will obviously result in a falling off in performance of the motor.

If the current is that normally taken by the field coils only (Para. 3e), a fault in the armature, commutator or brushgear must be suspected.

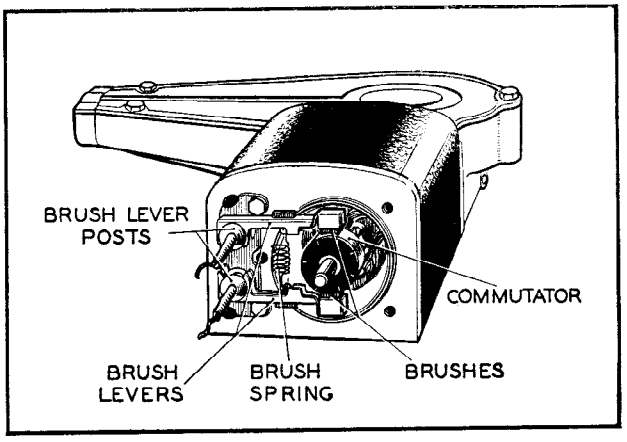

Fig. 5.
Motor with commutator cover removed

Remove the screws securing the commutator end cover, and lift off the cover. Clean the commutator with a cloth moistened with petrol, and carefully remove any carbon dust from between the commutator segments.

Check that the brushes bear firmly on the commutator. If they are loose, and do not make contact, the tension spring must be renewed. The brush levers must move freely on their pivots. If they are stiff, they should be freed by working them backwards and forwards by hand.

(c) WIPER TAKES ABNORMALLY HIGH CURRENT

The normal current consumption of the wiper is given in Para. 3a. If the ammeter reading is greatly in excess of this value, the armature windings, commutator or bearings may be at fault.

Check that the armature can revolve freely, and that a blow on the motor end bracket has not thrown the bearings out of line. A screw and lock nut are provided in the commutator end cover to take up the end thrust of the armature. The screw has a special hard alloy tip, and under normal conditions should not require adjustment.

Remove the commutator end cover and clean the commutator, paying particular attention to any pieces of carbon that may be short-circuiting adjacent segments.

Remove the brushgear, and withdraw the two screws securing the fibre plate. Pull the plate carefully away from the motor body, and examine the two leads to the field coil for chafed insulation, burning and other signs of a short circuit (This, a very occasional fault,

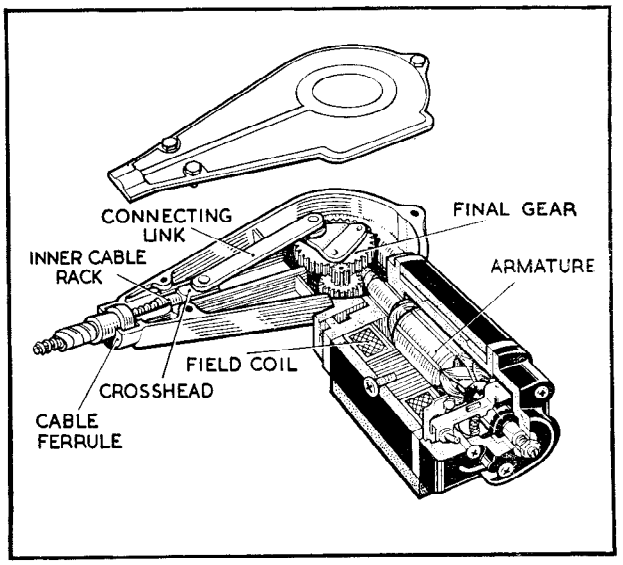

Fig. 6.
Sectioned view of motor and gearbox

will be indicated either by repeated blowing of the fuse with the circuit wiring in order, **or** by the motor operating even when the switch is in the "OFF" position. An insulation test from each terminal of the motor to the body will confirm the fault). If a short-circuit has occurred, remove the fibre plate by softening the solder at the top of the brush lever posts and freeing the leads. Slip a new piece of sleeving over the chared leads, and arrange them so that they do not rub against sharp edges.

When reassembling, care must be taken that both the wire from the field coil and the thicker lead to the terminal are correctly held by the solder at the top of the brush lever posts.

Finally re-check the insulation of each motor terminal to earth.

If the performance of the motor is still unsatisfactory, the fault may be due to the armature. Check by substitution, and if necessary fit a new armature.

Sluggish operation with excessive current consumption may also be caused either by frictional losses in a badly-positioned driving cable or by the wiper spindle binding in its hole in the scuttle. See that the run of the driving cable contains no sharp bends (minimum radius of bend 9 inches), and if necessary add suitable distance pieces under the motor mounting bolts to straighten the run of the cable. Inspect the wheel box spindles: on some cars it is possible for a blow on the spindle to bend the wheelbox support bracket so that the spindle fouls the hole in the scuttle.

(d) MOTOR OPERATES BUT DOES NOT DRIVE THE WIPER ARMS

Examine the wiper arms, making sure that they are firmly secured to the wheelbox spindles. Remove the cover of the gearbox and examine the mechanism. Rotation of the armature should cause a push-pull motion of the cable rack. When overhauling, the gears must be lubricated by packing the gearbox with a grease of the zinc oxide type.

To detach the cable rack from the gearbox, proceed as follows:—

Remove the gearbox cover.

On earlier wipers, remove the split pin and washer from the crank pin on the final gear.

Lift off the connecting link.

Disengage the outer casing, cable rack and crosshead, from the gearbox.

Replace the gearbox cover to prevent the ingress of dirt.

Remove the wiper arms from the wheelbox spindles. The flexible cable rack can now be withdrawn from the outer casing for inspection.

See that the gears in the wheelboxes are undamaged and can engage correctly with the flexible rack.

Before refitting the flexible cable rack into the outer casing, grease it thoroughly with Duckham's H.B.B. or an equivalent grease.

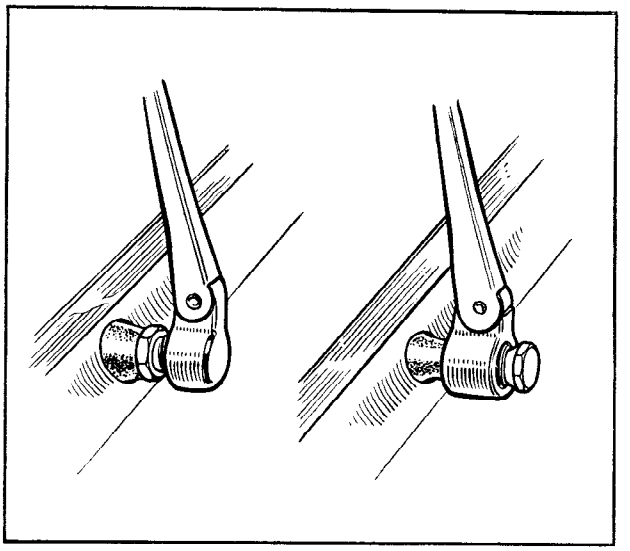

Fig. 7.
Collet fixing of arms to spindles

5. ARMS AND BLADES

A variety of arms and blades are supplied for use with this wiper, in order to meet the requirements of various sizes of curved or flat screens.

(a) WIPER ARMS

The arms are made in various lengths, and either straight or with the upper portion cranked to provide unobtrusive parking. There is also an adjustable arm, which may be pulled out to the desired length, and an adjustable, universal arm which can be used to replace any arm in the range.

The arms are fixed to the wheelbox spindles by means of a collet. This may take either of the forms shown, but the action is the same in each case, the hexagonal-headed nut serving to tighten the collet.

To remove the arm, slacken the collet nut, tap sharply to loosen the collet and pull the arm off the spindle. (The arm shown on the left of Fig. 7 embodies an extracting device: to remove the arm, slacken the collet nut and continue to rotate it until the arm is freed from the spindle).

When replacing the arm, do not fully tighten the collet nut until the arm is positioned to wipe over the correct area of the screen, and the blades lie unobtrusively at the bottom of the screen when in the parked position.

(b) BLADES

A number of types are available, suitable for both flat and curved windscreens. They are secured to the arms by one of the two methods described below.

(*i*) RUBBER BUSH FIXING

A tongue on the blade passes through a slot in the arm, and is secured by means of a rubber bush. To

free the blade from the arm, remove the bush, pull the arm away from the windscreen and disengage the tongue.

In some cases a thin slotted rubber washer is fitted over the tongue, between the blade and the arm, in order to eliminate any clicking between the metal surfaces.

When refitting the blade to the arm, the rubber bush can be more easily fitted if it is first moistened slightly.

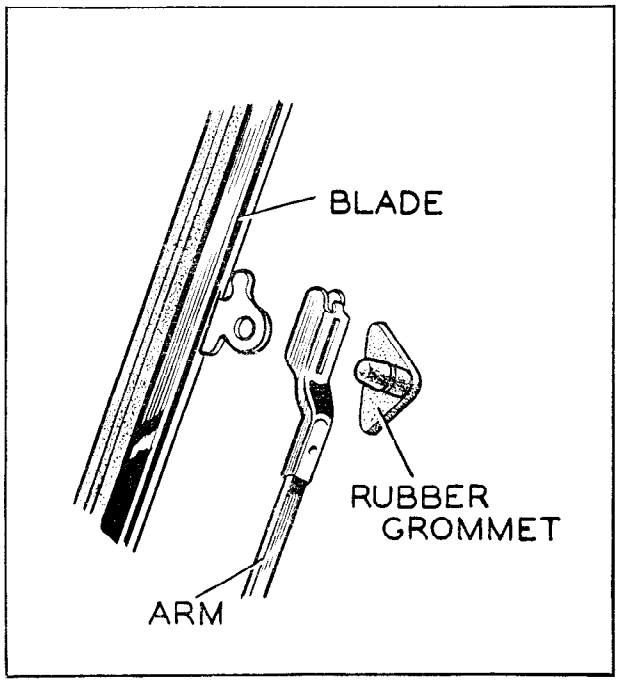

Fig. 8.
Rubber bush blade fixing

(*ii*) WRIST-ACTION FIXING

In this method, a curved 'wrist' on the end of the arm enters a slot in the blade, and clips into position. To remove the blade, pull the arm away from the windscreen and disengage the blade by swivelling it upwards.

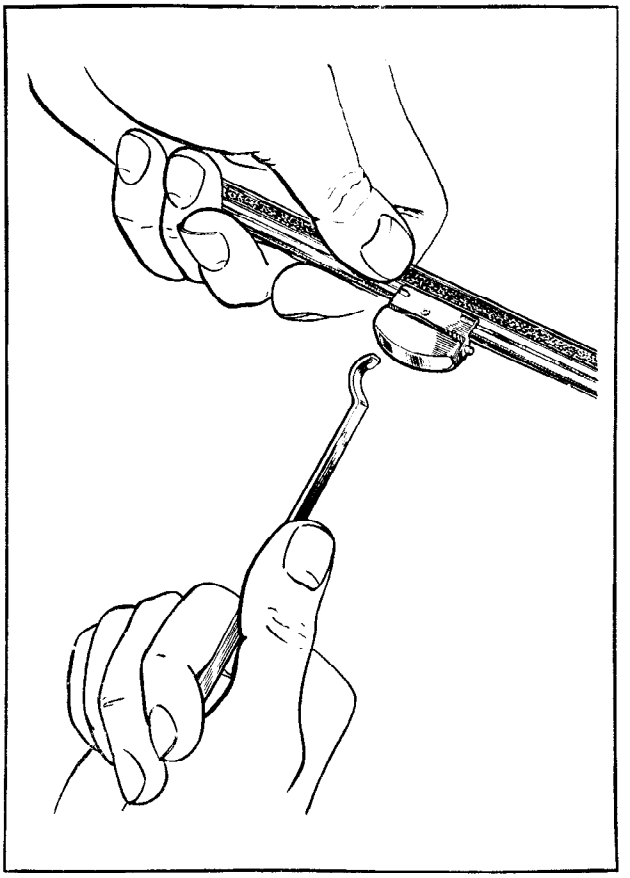

Fig. 9.
'Wrist-action' fixing