VACUUM OPERATED WINDSCREEN WIPER

GENERAL DESCRIPTION

848. The wiper is vacuum operated, being driven by the engine inlet depression through a reservac tank, as described in para. 805. When a depression is created on one side of the wiper motor vane (paddle) it causes the vane to swing across the housing. At the end of the stroke a valve reverses the air flow and the vane is moved back in the form of a complete arc. This movement is transmitted to the blade through a shaft and arm.

849. The unit comprises three main parts:-

(a) The motor.

(b) The shaft and bracket.

(c) The arm and blade.

MOTOR (Fig 154)

(Windscreen wiper No.1, Mk.1)

850. The motor can be sub-divided into three parts as follows: The vane and housing, the cover and transfer ports, and the valve gear.

851. The vane housing (1) is a semi-circular mazak casting having part of the valve chamber (4) and two mounting lugs (22) for the bracket cast integrally with it.

852. The vane (2) is an assembly comprising a rectangular vane of composite construction and a shaft by means of which it is pivoted in two bronze bearings in the housing. The vane comprises two inner plates held apart by three spacing washers and a shouldered stud, the shaft being trapped between these plates by two driving pins. Outside each inner plate there is an outer plate and sandwiched between the two there is a rubber packing sheet. The whole assembly is clamped together by three rivets which pass through the spacing washers and by the shouldered stud which is cross-staked at each end.

853. A flat driving lever is riveted to the front of the driving shaft. Between the lever and the front bearing there is an "O" seal. Pressed into the valve chamber is a pivot (6) for the kicker arm. Each mounting lug is lined with a flanged rubber bush (23) at the front and a rubber washer (21) at the back. A tapped eyelet (20) is fitted through the washer into the bore of the bush and swaged over at the front.

854. The cover (19) is also a mazak casting which is secured to the housing by eight screws. It forms the lower half of the bearings and also completes the valve chamber. The cover is accurately positioned on the housing by five integral dowels. A paper gasket (18) to Specification D.T.D.776 or, alternatively, a neoprene gasket, fitted between the housing and cover, acts as a seal. When a paper gasket is fitted, the edges are sealed with Fungicide varnish to Specification T.S.191.

855. Running through the superstructure on the cover is a series of ports. Opening into the bottom face there are five ports, as shown at A, B, C, D and E in Fig 155. Ports A and E connect with the outlet port (F) to the reservac, port B connects with a port R opening into the top face of the cover at one side of the vane, while ports

C and D are connected respectively to ports X and Y in the valve chamber. A third port (Z) in the valve chamber connects with a port S opening into the top face of the cover at the other side of the vane.

856. A synthetic-rubber lined slide valve (Fig 154(16)) covers the bottom face. It can be slid into either of two positions by means of the control lever (17). (In the original design of motor, as fitted to some early vehicles, there is a control knob in place of the control lever). The movement of the slide valve is restricted by the valve guide (15). The centre port (Fig 155(Y)) in the valve chamber has a short copper tube protruding into the chamber. This tube forms a pivot for a nylon valve (Fig 154(12)). The nylon valve connects the centre port to either of the outer ports and at the same time uncovers the remaining port. The uncovered port is then open to the atmosphere via the valve chamber.

857. The valve is actuated by a mazak kicker (13) which pivots through a restricted arc on the end of the vane shaft. Free to slide on the pivot pressed in the valve chamber, and hinged on a pin in the kicker, there is a spring-loaded kicker arm (5). This applies pressure to the top of the kicker through a backing plate (14) and imparts a quick movement to the valve via the kicker. The kicker in this motor is a 107 deg kicker, i.e., its action gives the motor a wiping arc of 107 degrees.

858. The valve chamber cover (9) has a stepped air inlet hole (A) bored through two concentric bosses which house a dry felt filter. This filter is secured by peening over the end of the inner boss. Two flat retaining springs are secured to the inside of the cover by a single peg riveted over. One spring retains the nylon valve and the shorter one retains the kicker. A rubber plug (8) is attached to a lug on the cover by a short chain. This is pushed into the air inlet when the vehicle is being forded. The cover is assembled to the valve chamber with a thin paper or neoprene gasket (10) and secured with six screws.

859. When the control lever (17) is horizontal (or when the control knob of the early design motor is turned clockwise) it is in the "parked" position. The slide valve now connects the depression of the reservac to that port in the cover which is contacted by the lift washer (3) on the vane, and the other port to the atmosphere i.e., ports A and B coupled and ports C and D coupled, port E sealed by the slide valve as shown in Fig 155(a). This draws the vane over to its parked position irrespective of the position of the vane. When the lift washer comes into contact with its port, the washer seals the port and the vane is held there until the control lever is moved.

860. When the control lever is depressed (or when the early type control knob is turned anti-clockwise), the slide valve is moved along to connect the centre port Y in the valve chamber with the outlet port F i.e., ports B and C coupled and ports D and E coupled, port A sealed by the slide valve, as shown in Fig 155(b). Thus as the nylon valves moves from side to side, the two outer ports X and Z are alternatively at atmosphere or depression and the vane is thus drawn to and fro.

SHAFT AND BRACKET (Fig 156)

(Wiper shaft and bracket assembly No.1, Mk.2)

861. The bracket (4) consists of a steel plate having one plain hole at each end for attaching it to the vehicle and, inside this, two pairs of countersunk holes providing a mounting for either a vacuum or pressure operated motor. A sleeve (14), threaded externally, is secured to the centre of the bracket by a nut and through this passes the shaft (7). At its inner end the shaft is riveted to a paper lined dog (2), which

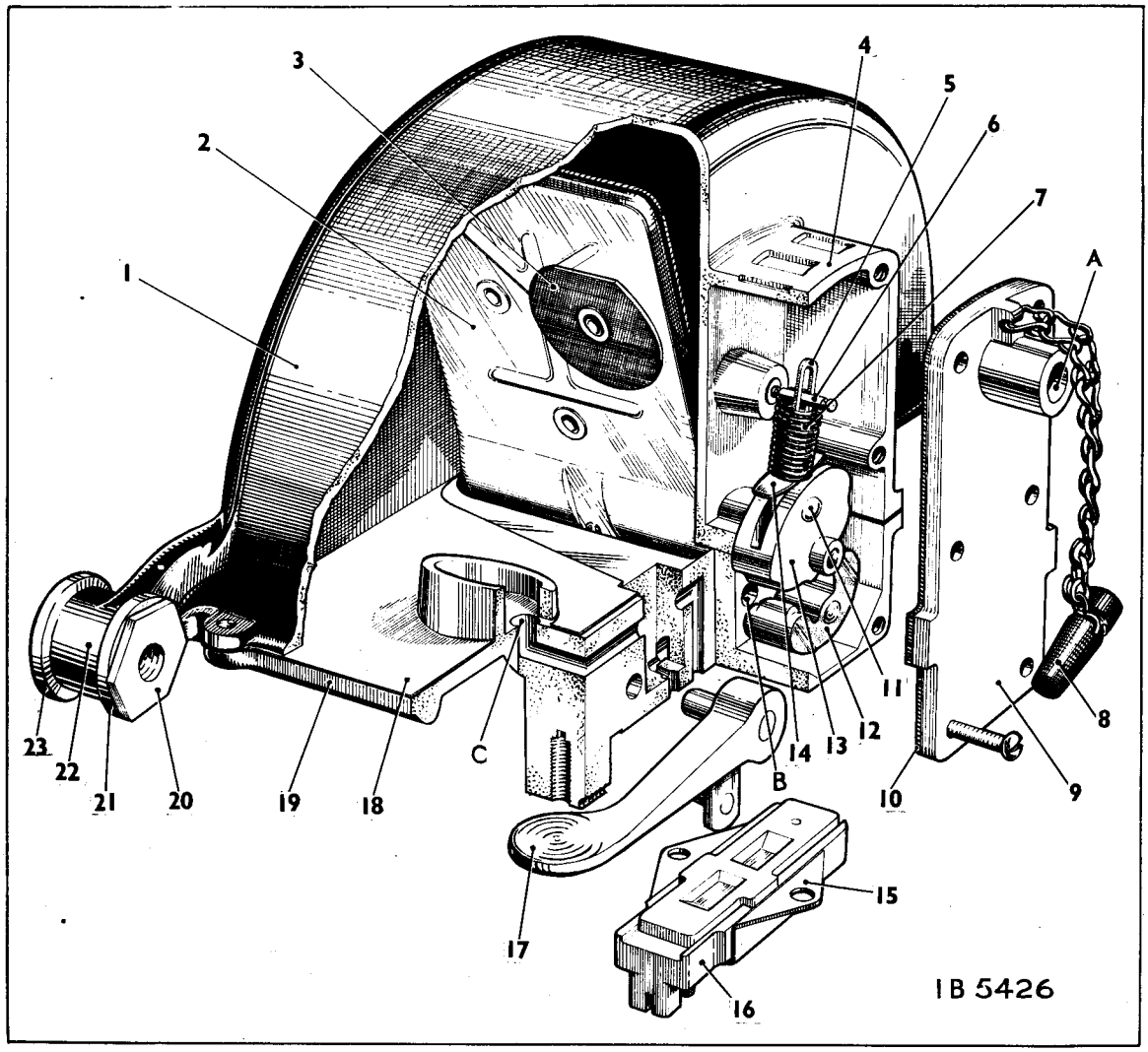
engages with the driving lever on the vane shaft. Between the dog and the bracket there is an oil-soaked felt washer (3). Towards the front end of the shaft, just clear of the sleeve, a groove containing a locking ring prevents excessive end play. A rubber washer (16), plain washer (15) and nut are used to secure the sleeve through the windscreen. A gland nut (5) on the end of the sleeve contains a rubber sealing ring (13) which, when compressed by tightening the gland nut, acts as a seal for the shaft.

ARM AND BLADE (Fig 156)

(Adjustable wiper arm No.1, Mk.2 and Squeegee, 9-in.)

862. The arm (9) has a flat steel rod with a blade attachment clamped on one end and the other end slid into the pressure plate (11) which is pivoted on the head (12). The arm is adjustable in length by about 1 1/2 in.; this is done by sliding the arm in or out of the pressure plate. The arm is retained in its normal position by the pressure plate spring (10), but it can be lifted through 75° - 80° against spring pressure for cleaning purposes. The pressure plate and arm are attached to the head by a pivot pin (8). The head in turn is attached to the shaft by means of a collet and hexagonal-headed clamp screw (6).

863. The blade comprises five flat rubber strips securely clamped together in a U-shaped brass backing strip. A steel lug in the centre of the backing strip hooks into the blade attachment.



1	Vane housing	15	Valve guide
2	Vane	16	Slide valve
3	Lift washer	17	Control lever
4	Valve chamber	18	Gasket
5	Kicker arm	19	Cover
6	Kicker arm pivot	20	Tapped eyelet
7	Kicker arm spring	21	Rubber washer
8	Rubber plug	22	Mounting lug
9	Valve chamber cover	23	Rubber bush
10	Gasket		
11	Pin	A	Air inlet port
12	Nylon valve	B	Outer port in valve chamber
13	Kicker		
14	Backing plate	C	Lift washer port

Fig 154 Windscreen wiper motor

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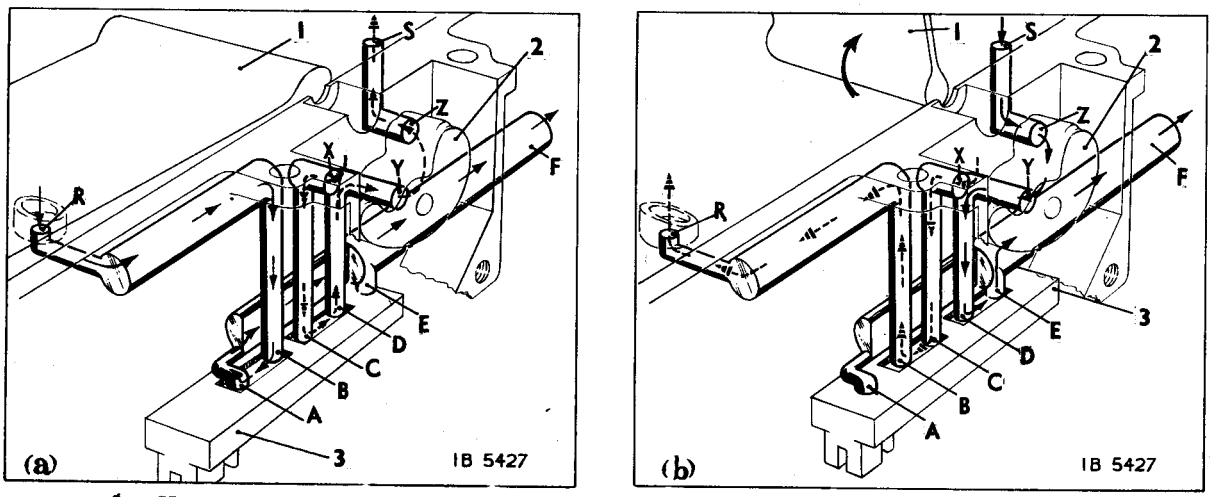


1	Vane	A,B,C,D and E	Ports in bottom face of cover
2	Nylon valve	F	Outlet port to reservac
3	Slide valve	R and S	Ports in top face of cover
		X,Y and Z	Ports in valve chamber

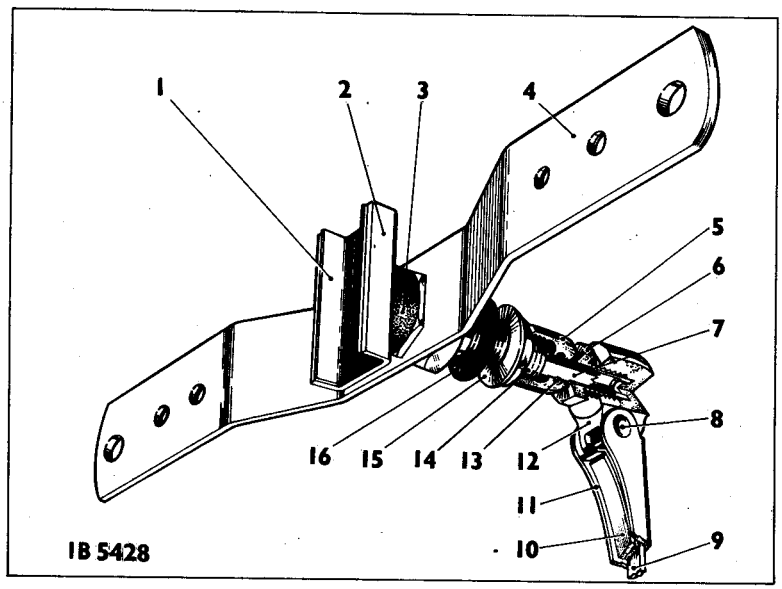
(a) Wiper parked

(b) Wiper operating

Air flow shown thus- (Free air ---→ ---→ ---→ ---→

(To reservac (depression) →→→

Fig 155 Air flow diagram



1	Paper lining	9	Arm
2	Dog	10	Spring
3	Felt washer	11	Pressure plate
4	Bracket	12	Head
5	Gland nut	13	Rubber sealing ring
6	Clamp screw	14	Sleeve
7	Shaft	15	Steel washer
8	Pivot pin	16	Rubber washer

Fig 156 Windscreen wiper shaft, bracket and arm