

United States Patent

Walker

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[54] WINDSCREEN WASHING DEVICES

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[58] Field of Search 200/156, 153 T, 153 C, 153 LB, 200/155 A; 15/250.02

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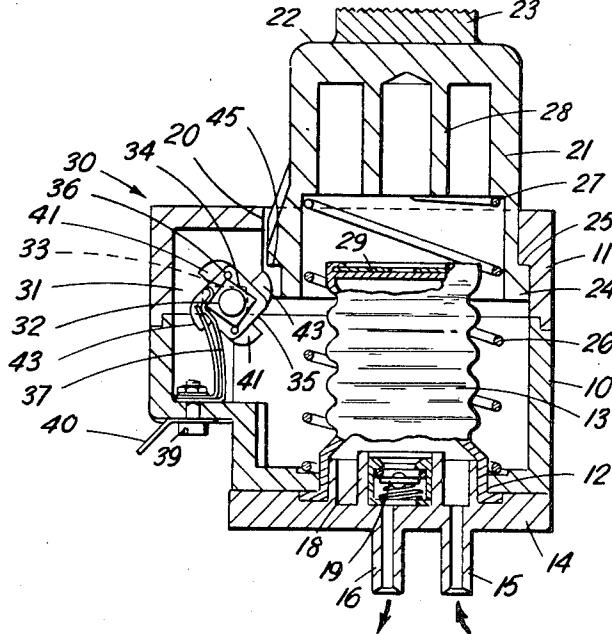
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ABSTRACT

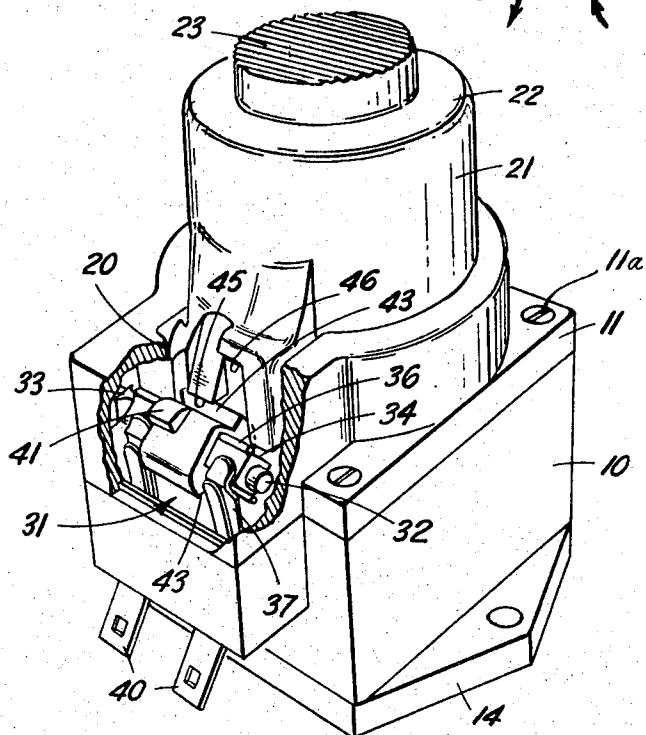
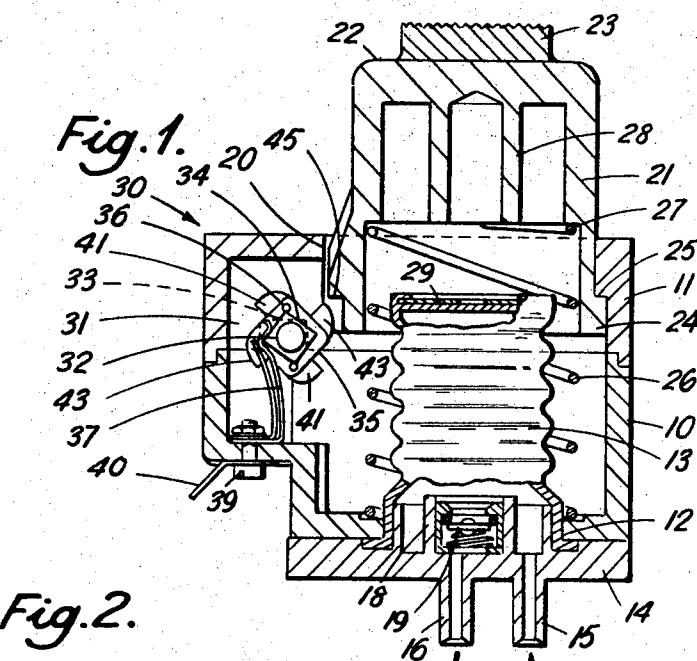
A windscreen washing device comprises a washing fluid pump having an operating member which also opens and closes an electrical switch for a windscreen wiper motor by successive movements of the member from a first to a second position. Detent means are provided for holding the switch in the closed and open positions and the switch can be closed by movement of the operating member to an intermediate position without releasing the detent means so that when the operating member is returned to the first position the detent means re-open the switch.

2 Claims, 2 Drawing Figures



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WINDSCREEN WASHING DEVICES

This invention relates to windscreens washing devices and is particularly applicable to windscreens washing devices as described in British Patent specification No. 1,168,631.

The invention provides a windscreens washing device comprising a washing fluid pump having an operating member for actuating the pump, an electrical switch for a windscreens wiper motor, which switch is opened and closed by successive movements of said operating member from a first to a second position and detent means for holding the switch in the closed and open positions which detent means are released and re-engaged when the switch is either opened or closed by the operating member characterized in that the switch is closed by a movement of the operating member from the first position to an intermediate position between the first and second positions without releasing the detent means so that on return of the operating member to the first position the switch is re-opened.

The following is a description of one specific embodiment 20 of the invention reference being made to the accompanying drawings in which:

FIG. 1 is a sectional view through a combined washing fluid pump and windscreens wiper switch; and

FIG. 2 is a partly cut away perspective view of the device.

Referring firstly to FIG. 1 of the drawings there is shown a combined washer fluid pump and electrical windscreens wiper switch comprising a housing having a lower part 10 to which an upper part 11 is secured by bolts 11a. The bottom wall of the lower part 10 of the housing is formed with an aperture 12 through which a spring loaded bellows 13 mounted on a base plate 14 extends. The base plate 14 is secured to the lower part of the housing 10 by the aforesaid bolts. Integrally formed with the base 14 are conduits 15 and 16 which are located on the underside of the base and communicate through openings formed in the base with the interior of the bellows 13.

The conduit 15 is connected to a reservoir for washing fluid (not shown) and the conduit 16 is connected to a nozzle or nozzles for directing jets of washing fluid onto a vehicle windscreens. Mounted on the upper side of the base 14 over the opening of the outlet conduit 16 is a housing 18 in which a one-way spring biased valve 19 is located to prevent liquid from being drawn from the conduit 16 into the bellows. Alternatively the non-return valve may be located in the system outside of the housing.

The upper wall of the upper part 11 of the housing is formed with a large aperture 20 through which a sleeve 21 extends. The upper end of the sleeve is closed by an end wall 22 on the top of which there is a tread piece 23 which may be integral with or secured to the wall 22. The lower end of the sleeve 21 is encircled by an outwardly projecting rim 24 and the bounding wall of the aperture is formed with a downwardly facing shoulder 25 which overlies the upper surface of the rim 24 and thereby limits upward movement of the sleeve 21. A large helical coil spring 26 which encircles the bellows 13 bears against the bottom wall of the lower part of the housing 10 and a downwardly facing shoulder 27 formed on the inside surface of the sleeve 21 to urge the sleeve 21 into the upper or normal position of its travel. The end wall 22 of the sleeve 21 is formed on its interior with a tubular downwardly projecting spigot 28, the lower end of which is engaged with a metal plate 29 trapped in the top of the bellows 13 and further downward movement of the sleeve 21 squashes the bellows to eject washing fluid through the non-return valve 19 into the conduit 16 and thence to the nozzles. When the sleeve 21 is released to allow it to rise under the action of the spring further washing fluid is drawn in through the conduit 15 from the reservoir.

On the left hand side of the device, as shown in FIG. 1, the upper and lower parts 10 and 11 of the housing are formed with a lateral extension indicated generally at 30, in which a switch for the wiper motor is located.

The switch comprises an armature 31 rotatably mounted at its ends in slots 33 formed in the side walls of the extension housing, which permits lateral movement of the armature. The 75

armature has two short square cross-section parts 34 adjacent both ends thereof and an enlarged central square cross-section part 35. Two conductors 36 extend along two diametrically opposite corners of one part 34 through the central part 35 and along diametrically opposite corners of the other part 34. The parts 34 are engaged by the upper ends of two electric contacts 37 secured at their lower ends to the base of the extension housing by bolts 39 which also secure apertured tabs 40 to the outside of the extension housing. The tabs 40 are connected in an electric circuit including the windscreens wiper motor. The contacts 37 are formed from spring metal and are bent into V-formation at their upper ends to receive corners of the parts 34 to act as detents against rotation of the armature. Thus the armature is held by the detent action of the contacts in one of four positions in which the switch is alternately open and closed. When the switch is closed the windscreens wiper motor is energized.

Two diametrically opposite faces of the central part 35 of the armature are formed with abutments 41 extending half-way across the central part and the other two faces are formed with abutments 43 which extend across the full width of the central part. The lower part of the sleeve 21 adjacent the extension housing 30 is formed with two downwardly facing shoulders 45 and 46 which are spaced both axially and circumferentially around the sleeve. The lower shoulder 45 is aligned to engage both an abutment 41 and an abutment 43 on the central part of the armature whereas the upper shoulder 46 is aligned to engage only an abutment 43 on the central part of the armature.

When it is required to start the windscreens wiper motors and to spray washing liquid onto the windscreens of the vehicle the sleeve 21 is depressed and this will cause the shoulder 45 to engage the abutment 43 and to rotate the armature through 90° in a clockwise direction to close the switch and to operate the windscreens wiper motor. Further depression of the sleeve will then operate the bellows 13 to eject washing liquid onto the windscreens and since the shoulder 46 on the sleeve does not align with the abutment 41 on the armature, the further depression of the sleeve does not cause further rotation of the armature and so the switch remains closed. If the sleeve 21 is then released it returns under the action of the spring 27 and the shoulder 45 displaces the armature laterally without rotating the armature to open the switch. When it is required to switch the windscreens wipers off the sleeve 21 is partially depressed and this causes the shoulder 45 to engage the abutment 41 to rotate the armature through a further 90° to open the switch. If the wipers are on and a further jet of washing liquid is required the sleeve 21 is fully depressed and this causes the shoulder 45 to engage the abutment 41 and rotate the armature through 90° to open the switch and then the shoulder 46 engages an abutment 43 to rotate the armature through a further 90° to re-close the switch.

The sleeve is then released and the armature is deflected laterally without rotation as the shoulders 45 and 46 move past the abutments. The windscreens wiper motor is then switched off by partially depressing the sleeve 21 as described above.

If the windscreens wipers are required to operate for a short duration without a jet of washing liquid the sleeve 21 is depressed by a small amount causing the shoulder 45 to engage the abutment 43 and to rotate the armature 31 until the lower conductor 36 just touches the contacts 37 but without fully displacing the corners of the parts 34 of the armature from the V-formations on the contacts. When the sleeve 21 is released the armature is returned to the open position by the detent action of the resilient contacts 37 to stop the wiper motor.

We claim:

1. A windscreens washing device comprising
 - a housing;
 - b. pump means operatively mounted in said housing and having an intake means from a source of washing fluid and a discharge means for conveying the washing fluid to a windscreens;

- c. operating means for said pump means slidably mounted in said housing for reciprocable operational movement relative to said pump means;
- d. switch means for a windscreens wiper motor carried by said housing and including a switch member rotatably mounted in the housing transversely of the reciprocable path of movement of the operating means; 5
- e. first means carried by said switch member and engaged by the operating means for indexing the switch member to a position for actuating the wiper motor upon a movement of the operating means from a normal position to a first operating position;
- f. said operating means being movable from said first position to a second operating position in which it operates the pump means to eject washing fluid onto the windscreens without operatively engaging the switch member so as to turn off the wiper motor; 15
- g. means for automatically returning said operating means from said second position to its normal position without operatively engaging the switch member so as to turn off 20 the wiper motor;

- h. second means carried by the switch member and engaged by the operating means for indexing the switch member to an open position for turning off the wiper motor upon movement of the operating means from its normal position to said first position when the motor is operating; and,
- i. means carried by the switch member and the operating means for indexing the switch member to effect a continuing operation of the pump motor when the operating means is moved from its normal position to its second position for the purpose of actuating the pump means when the wiper motor is in operation.

2. The invention of claim 1 wherein means is provided for holding the switch member in the selected position in which it is placed by the operating means, said holding means being adapted to permit forced indexing of the switch member by the operating means and being operative upon a release action of the operating means to return the switch member to an open position.

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