Sept. 11, 1934. H. HUEBER 1,973,482

WINDSHIELD CLEANER MOTOR

Filed June 3, 1932

Fig. 1

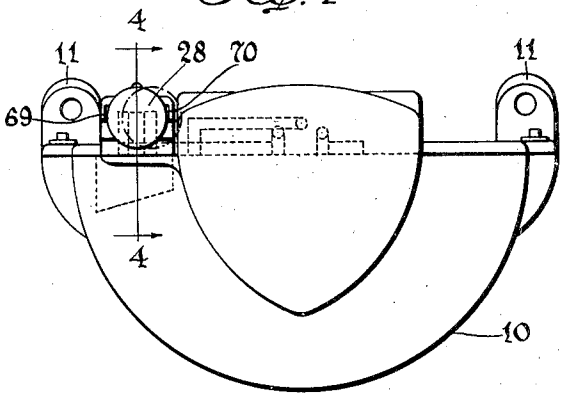


Fig. 2

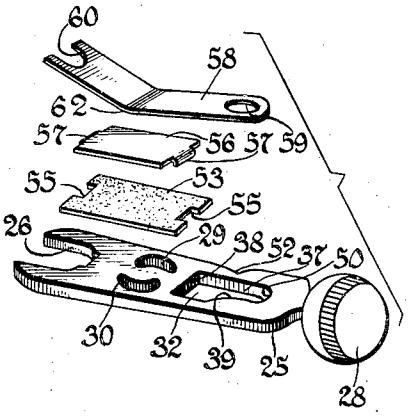


Fig. 3

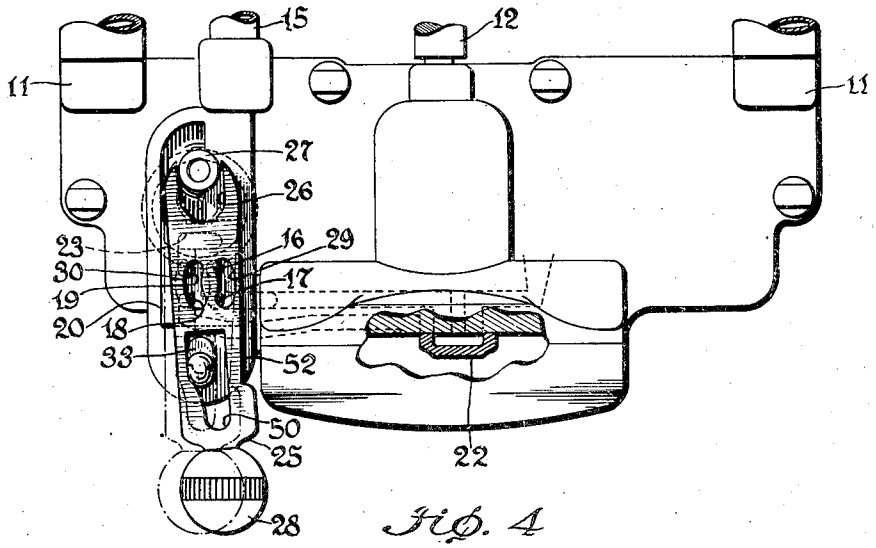
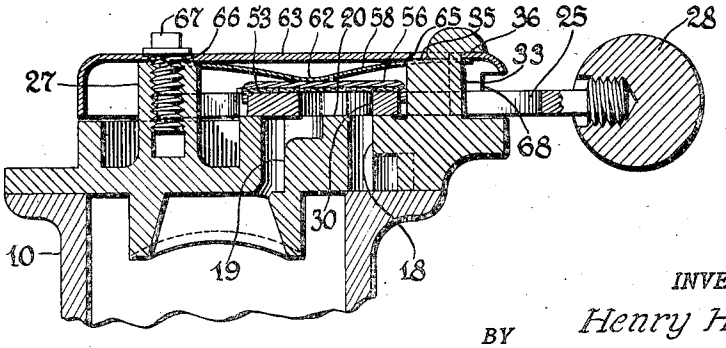


Fig. 4



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WINDSHIELD CLEANER MOTOR

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Application June 3, 1932, Serial No. 615,250

5 Claims. (Cl. 121—97)

This invention relates to windshield cleaner motors for motor vehicles and it has particular relation to controlling means for operating such cleaner motors.

One object of the invention is to provide a mechanism for varying the flow of fluid into a fluid operated cleaner motor whereby the motor may be regulated according to the degree of fluid pressure available during the operation of the motor vehicle.

Another object of the invention is to provide a valve member for controlling the flow of fluid into a cleaner motor and constructed in such manner that it is adjustable for movement in a plurality of directions whereby momentary manual actuation is sufficient to accomplish the various adjustments.

In the operation of windshield cleaner motors which are connected to the intake manifold or suction side of an internal combustion engine, air is exhausted alternately from opposite sides of a vane piston. Suitable ducts communicate with a valve mechanism for automatically directing the flow of fluid from one side of the vane to another and the valve is adapted to be manually manipulated to initiate the operation of the motor. One type of manually manipulated valve is slidable upon a valve seat and is provided with a knob or the like whereby it may be drawn outwardly to establish communication from a source of suction to the interior of the motor for effecting its operation. A full description of a construction of this kind is disclosed in the Hueber Patent No. 1,840,233 of January 5, 1932.

Under different conditions or phases the operation of an internal combustion engine, the pressure or suction varies considerably and at times the cleaner motor is operated at a very rapid rate, while at other times, it operates relatively slowly. According to this invention a manually manipulated valve is provided which is slidable to its normally operable position and subsequently, as the occasion arises, it may be moved at an angle to the direction of initial movement, after it is withdrawn, in order partially to close the fluid ducts and thus vary the speed of the cleaner motor. It is only necessary to move the valve with the fingers in order to establish proper communication with the source of suction and to accomplish these various adjustments.

In the drawing:

Fig. 1 is a front elevation of a windshield cleaner motor in which the invention has been incorporated;

Fig. 2 is an exploded view of a valve mechanism employed in the motor shown in Fig. 1;

Fig. 3 is a plan view of a cleaner motor with portions removed for the sake of clearness; and

Fig. 4 is a cross section, on a larger scale, taken substantially along the line IV—IV of Fig. 1.

In practicing the invention a windshield cleaner motor 10 is provided with vehicle attaching lugs 11, a cleaner shaft 12, and a suction tube 15 for communicating with a source of suction or differential fluid pressure (not shown). The tube 15 communicates with a duct 16 which is disposed adjacent three other ducts 17, 18 and 19 formed in a valve seat 20 on the motor, and the ducts 17 and 19 communicate through an alternating valve 22 with the interior of the motor during its operation. The duct 19 has an integral portion 23 in the valve seat 20 which normally is covered by the manually manipulated valve 25. When the valve 22 is in the position shown in Fig. 3, the air is drawn through the tube 15, ducts 16, slot 29 and duct 17 by means of suction which exhausts air from one side of the motor to actuate the shaft 12 through a predetermined angle. Then the valve 22 is shifted to the left to provide communication from the other side of the motor through the duct 19, slot 30, duct 18, through the valve 22, and back through the ducts 17 and 16 through the air exhausting tube 15. When the valve 25 is pushed inwardly or closed, both slots 29 and 30 communicate with the transverse duct portion 23 to establish communication from one side of the motor through the ducts 19, 16 and tube 15 (but not through the valve 22) to maintain the shaft in a predetermined inoperative or parked position. This operation is according to that set forth in detail in the patent designated above.

One side of the valve is provided with a notch 26 disposed in guiding relation about a boss 27 extending integrally from the motor 10, and the other end is provided with a knob 28. An intermediate portion of the valve rests upon the valve seat and is provided with a pair of substantially parallel slots 29 and 30 which register with the ducts 16, 17, 18 and 19 when the valve is open.

A second slot 32 adjacent the outer end of the valve is disposed about a boss 33 that is oblong in cross section and has a ledge 35 at its rear, together with an integral oppositely disposed lip 36 at its front edge.

One wall 37 of the slot 32 extends longitudinally of the valve 25 and the adjacent wall 38 extends transversely of the wall 37 and of the oblong valve 25. A cam wall portion 39 opposite the wall 37 extends inwardly and defines with the wall 37 a relatively narrow slot portion 50 which is of such width that the boss 33 is adapted to fit snugly in the outer end thereof.

The side of the valve 25 adjacent the slot wall 37 is cut away, as indicated at 52, to provide a taper or incline from the rear end of the valve to a point approximately mid-way the length of the adjacent slot wall 37. A plate 53 composed of fiber, leather or the like, and having end notches 55, is disposed upon the valve over the slots 29

and 30 to close the latter on one side of the valve. A metallic plate 56 having lips 57 disposed in the notches 55 is positioned upon the valve with the lips 57 engaging beyond the plate 53 into the opposed notches 26 and slot 32. In order to provide a firm even seating of the valve upon the seat 20 and a firm engagement of the plate 53 upon the valve, a leaf spring 58 having a slot 59 at one end and a notch 60 at the other end is bent intermediate its end to form an angular portion 62 which yieldably rests upon the plate 56. The slot 59 is disposed about the boss 33 and the notch 60 about the boss 27.

A housing 63 having a slot 65 fitting over the boss 33 to retain the housing end portion underneath the lip 36 surrounds the valve and it has an opening 66 registering with the boss 27 which is internally screw threaded to receive a screw 67 for securing the housing firmly in its proper position upon the motor. The ends of the spring 58 impinge upon the upper inner surface of the housing 63. The front end of the housing is provided with an opening 68 through which the valve 25 extends loosely. The valve 25 is slidable upon the valve seat 20 and is retained and guided in proper relation therewith by the bosses 27 and 33, together with the housing 63 which normally prevents lifting of the valve from its seat.

By withdrawing the valve outwardly from the housing, the slot wall 37 is slidably guided along the boss 33 and one edge 69 of the housing at its opening 68 assists in this guiding action. When the valve 25 has been withdrawn until the slot wall 38 engages the boss 33, which thus serves as a stop, the motor is then connected to the source of suction to operate it. The cut away portion 52 of the valve 25 provides sufficient space between the side of the valve and edge of the housing 63 to permit the valve to be moved laterally to the full line position of Fig. 3 without striking the housing. Thus, if it is desirable to reduce the amount of fluid passing through the ducts, the knob 28 is moved to the full line position shown in Fig. 3. Then the ducts 16, 17, 18 and 19 are partially covered by the valve 25 and restricted flow of fluid results. By forcing the valve back into the housing 63, the cam portion 39 rides upon the side of the boss 33 and the valve is automatically alined in its proper inoperative position. On the other hand, if it is not desired to vary the flow of fluid through the ducts when the valve is open it may remain in the position shown in dot and dash lines of Fig. 3. In this manner immediate variation of the operation of the wiper can be effected.

Although only one form of the invention has been shown and described in detail it will be apparent to those skilled in the art that the invention is not so limited, but that various changes may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

I claim:

1. In a windshield cleaner motor having fluid ducts for admitting fluid to and exhausting fluid from the motor, a slidable valve having openings therein communicating with the ducts to control the flow of fluid through the ducts to and from the motor, means for slidably supporting the valve upon the motor in a plurality of positions, said valve and means having guiding surfaces cooperable to guide the valve into predetermined full open position upon movement of the valve in one direction, said valve and means having other surfaces cooperable to guide the valve transversely of said direction into partially open position to reduce the flow of fluid through the ducts.

2. In a windshield cleaner, a valve seat upon the motor having fluid ducts for admitting fluid to and exhausting fluid from the motor, a valve member slidable on said valve seat and having openings communicating with the ducts to control the flow of fluid through the ducts, valve retaining means on the motor and cooperating with said seat to define limits of movement of the valve member upon the seat, said valve member and retaining means having cooperable guiding portions to guide the valve member in its normal opening operation in a predetermined direction of movement, said valve member and retaining means having other cooperable portions for limiting and guiding the valve member in movement transversely of the normal direction of valve opening movement to vary the flow of fluid through the ducts.

3. In a windshield cleaner motor, a valve seat having fluid ducts communicating through said seat for circulating fluid through the motor, a valve member movable upon said seat, said valve member having openings communicating with the ducts to control the flow of fluid through the ducts, guiding means for slidably receiving and guiding the valve member upon the valve seat whereby the valve member can be guided outwardly in a substantially straight line, said guiding means also constituting a stop for limiting movement of said valve member on said seat, the valve member being movable transversely of said straight line, said valve member and guiding means having cooperable means for guiding the valve member into partially covering relation to the ducts for varying the flow of fluid therethrough while the valve member is in its outwardly guided position.

4. In a windshield cleaner motor having fluid ducts for circulating fluid through the motor, a slotted valve member having openings for communication with the ducts to control the flow of fluid therethrough, a pair of projections for slidably receiving the valve member whereby the valve member can be guided outwardly in a straight line, one of said projections also constituting a stop and guide whereby the valve member can be moved transversely of said straight line from its withdrawn position to a predetermined position to vary the flow of fluid therethrough, and means for guiding the valve member back to its normal position when it is retracted.

5. In a windshield cleaner motor having fluid ducts for circulating fluid throuh the motor, a slotted valve member having openings for communication with the ducts to control the flow of fluid therethrough, a pair of projections slidably receiving the valve member whereby the latter can be guided outwardly in a straight line, one of said projections also constituting a stop and guide whereby the valve member can be moved transversely of said straight line to a predetermined position to vary fluid communication through the ducts, said slotted portion of the valve member having a cam surface for realining the valve member when it is returned to its inoperative position.

HENRY HUEBER.