Sept. 30, 1941. W. G. ORZEHOWSKY 2,257,642

OIL DRAIN VALVE FOR INTERNAL COMBUSTION ENGINES

Filed July 25, 1940

Fig. 1.

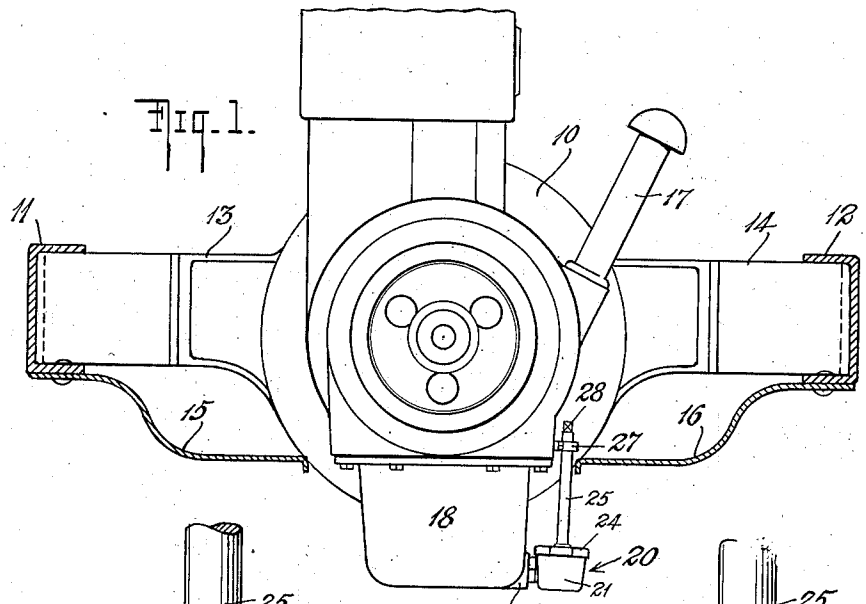


Fig. 2.

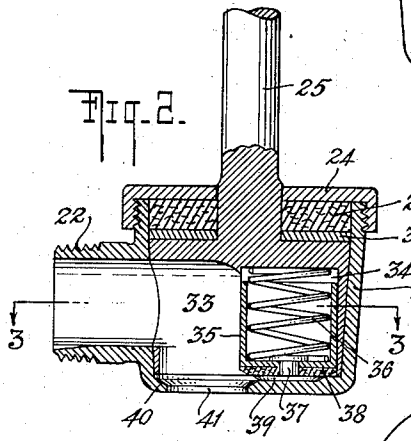


Fig. 4.

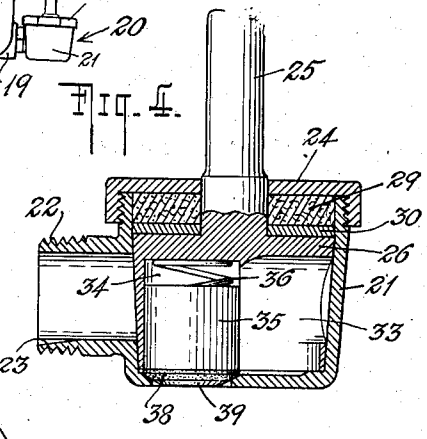


Fig. 7.

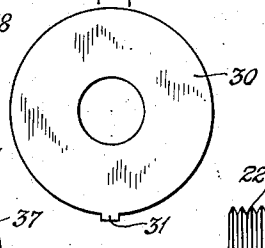


Fig. 3.

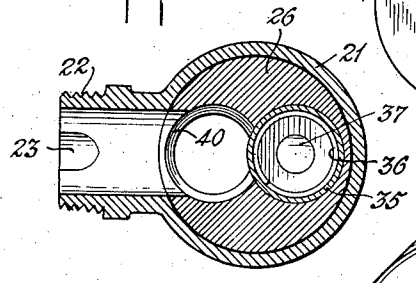


Fig. 5.

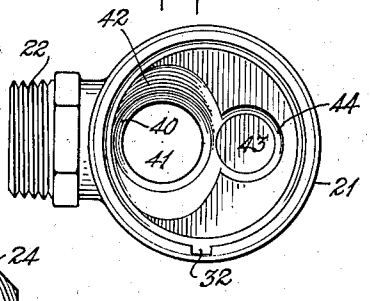
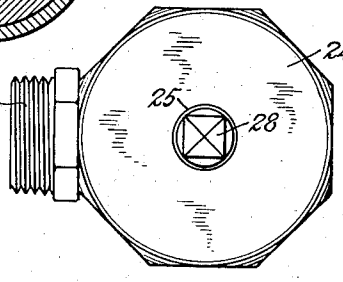


Fig. 6.



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OIL DRAIN VALVE FOR INTERNAL COMBUSTION ENGINES

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Application July 25, 1940, Serial No. 347,405

7 Claims. (Cl. 277—24)

This invention relates to a drain valve designed particularly for use in the draining of oil pans in internal combustion automobile engines.

The drain pan of an internal combustion engine of the type used in automobiles is usually provided with a drain plug which screws into a drain aperture provided in the bottom of the drain pan either in the center of the latter or at one end thereof. In view of the inaccessibleness of this drain aperture and plug it is usually necessary to run the vehicle over a drain pit or to lift the vehicle in order to remove the drain plug and empty the oil from the oil pan of the car. Aside from the inconvenience of access and manipulation of the drain plug in the usual oil pan of an automobile, there are other disadvantages resulting from the usual method of draining an automobile drain pan, such as, the likelihood of the ground or floor and the person of the one removing the plug becoming spattered and covered with oil while removing the drain plug, the likelihood of grit and sand getting onto the threads of the drain plug when laid aside during the draining operation, the leaking of oil from the oil pan due to insufficient or improper seating of the drain plug, etc.

The object of the present invention is to provide a drain valve which will overcome the aforesaid disadvantage of the present method of draining the oil pan of an automobile. More particularly it is an object of the invention to provide a drain valve which will be convenient of access and manipulation, which will automatically become locked in the opened and closed positions and which will be sturdy and inexpensive to construct and reliable in its operations.

Other objects as well as the advantages and novel features of construction of this invention will become more apparent after a perusal of the following description read in connection with the accompanying drawing in which Fig. 1 is a front elevation, partly in section, of a portion of an automobile engine and illustrating the manner of attachment of the drain valve of this invention to such engine; Fig. 2 is an enlarged vertical section of the valve illustrated in Fig. 1, the valve being shown in opened position; Fig. 3 is a horizontal section taken along the line 3—3 of Fig. 2; Fig. 4 is a view similar to Fig. 2 showing the valve in its closed position; Fig. 5 is a top plan view of the valve with the valve and casing cover omitted to show the construction of the interior bottom surface of the valve casing; Fig. 6 is a top plan view of the valve assembly and Fig. 7 is a top plan view of the washers intermediate the valve and the cover of the casing.

Referring more particularly to Fig. 1 of the drawing, the numeral 10 designates a standard type of internal combustion engine employed in automobiles. As is usual, the engine is connected to the chassis frame members 11 and 12 by means of the transverse engine brackets 13 and 14, respectively. Positioned beneath the brackets 13 and 14 are the shield members 15 and 16, respectively, which are bolted at their outer ends to the chassis frame members 11 and 12, respectively, and prevent dust and dirt from getting onto the engine 10 from the bottom of the car. As is usual, the engine 10 is provided with an oil pipe 17 through which oil for lubricating the engine is supplied and an oil pan 18 which functions as a reservoir for the lubricating oil. The oil pan 18 is preferably constructed so that its bottom slopes towards the front of the car and at the forward end thereof is provided with an opening 19 which is internally threaded and adapted to threadedly receive the nipple of the drain valve which is designated generally by the numeral 20 in Fig. 1 of the drawing.

The drain valve 20 includes a valve casing 21 which has integrally formed therewith a nipple 22 provided with external threads adapted to screw into the internal threads provided in the opening 19 of the oil pan and affording a means of communication from the interior of the oil pan into the valve casing. Preferably the bottom surface of the passageway in the nipple 22 is provided with a bevel 23 which slopes toward the outer end of such nipple and enables the draining of the oil pan to be accomplished more completely. The casing 21 is closed by a flanged cover 24 which is in threaded engagement with the upper end of the casing 21 and which is provided with a central aperture through which extends the stem 25 of the valve member 26. The stem 25 is of such length that it extends up through the space between the engine 10 and the shield member 16 and terminates at a point above the shield member 16 at a place adjacent to the oil pipe 17 and in plain sight of and convenient to the mechanic when the engine hood of the car is opened. The upper end of the stem 25 is in the shape of a square arbor 28 which may be engaged by a suitable tool for manipulation of the valve. Preferably the stem 25 extends through a bracket 27 provided on the lower part of the engine 10 to prevent loosening of the valve during the opening and closing thereof and while the car is in operation. The portion of the bracket engaging

the stem 25 may be lined with felt or rubber to reduce vibration of the stem 25 and the noises resulting therefrom to a minimum.

Intermediate the valve member 26 and the cover 24 is a leather washer 29 which is adjacent to the cover 24 and a steel washer 30 which underlies the leather washer 29 and is adjacent to the top surface of the valve member 26. The washers 29 and 30 are each provided with a projection or lug 31 which is keyed in a slot 32 provided in the side wall of the valve casing, as is shown more clearly in Fig. 5 of the drawing, to prevent any rotational movement of the washers 29 and 30 during the operations of the valve. The valve member 26 is provided with a passageway 33 having a horizontal portion adapted to be brought into communication with the passageway in the nipple 22 and a vertical portion adapted to be brought into or out of registration with a discharge port 41 provided in the bottom wall of the casing. Adjoining the vertical portion of the passageway 33 is a cylindrically shaped vertically disposed recess 34 which has its open end at the bottom of the valve member 26. As is shown more clearly in Figs. 2 to 4 of the drawing, the recess 34 and the vertical portion of the passageway 33 are so constructed that the sum of their radii is greater than the distance between the axial centers thereof so that their peripheral surfaces intercept to leave a vertically disposed substantially rectangular opening between the passageway 33 and the recess 34. Slidably mounted in the recess 34 is a cylindrically shaped hollow plug 35 which contains a helical spring 36 having a normal length greater than the length of the recess and having its upper end bearing against the interior surface of the recess 34 to normally bias the plug 35 to its lowermost position so that it latches either with the discharge port 41 in the closed position of the valve or the recess or seat 43 provided in the bottom wall of the casing in the open position of the valve. Attached to the bottom surface of the plug 35 by means of a rivet 37 is a leather washer 38. The peripheral edge of the leather washer 38 is bevelled and the head 39 of the rivet which has an area substantially equal to the area of the bottom surface of the washer 38 likewise is bevelled on its peripheral edge. The peripheral edge of the leather washer 38 is adapted to seat on a bevelled seat 40 surrounding the discharge aperture 41 of the valve casing when the valve is in its closed position, the head 39 of the rivet 37 being in this position of the valve positioned in the annular portion of the aperture 41 below the bevelled seat 40, as is illustrated in Fig. 4 of the drawing. The bottom wall of the casing 21 is provided with a substantially elliptically shaped bevel 42 which enables the plug 35 to be readily unseated from the drain aperture 41 when the valve is actuated to its open position. Similarly the seat 43 provided on the bottom of the casing 21 for receiving the head of the rivet 37 when the valve is in the open position, is provided with a bevel edge 44 to permit the plug 35 to be readily unseated when the valve is operated to the closed position.

It will be evident from the foregoing that in the operation of the above described drain valve, the valve will be either in the opened or closed position. In the opened position of the valve, as illustrated in Fig. 2 of the drawing, the upper horizontal portion of passageway 33 is in alignment with the passageway through the nipple 22 and permits the oil from the oil pan 18 to flow through such passageways and out the discharge aperture or port 41 in the bottom of the valve casing 21. In this position of the valve the plug 35 is seated in the recess 43 in the bottom wall of the casing 21, the head 39 of the rivet 37 being wholly contained within such recess so as to lock the valve in its opened position until positively removed therefrom, as by the application of a proper tool to the square shaped arbor 28 on the upper end of the valve stem 25. When the oil pan of the automobile has been completely drained, the valve is rotated through 180° to close the passageway in the nipple 22 and to bring the plug 35 into seating engagement with the drain aperture 41. In this movement of the valve the head 39 of the rivet 37 rides up the bevelled surface 44 onto the interior surface of the bottom of the casing 21, the plug 35 as a result being cammed upwardly in its recess 34 against the tension of the spring 36. As the plug 35 approaches the bevelled surface 42, the spring 36 which is under increased tension, causes the plug 35 to ride down such bevelled surface and into proper seating engagement with the discharge or drain opening 41, the leather washer 38 seating on the bevelled surface 40 to prevent any possible leakage of the oil through the drain aperture 41 and the head 39 of the rivet 37 interengaging with the annular portion of the drain opening 41 to lock the valve 26 in its closed position until positively removed therefrom by manipulation of the valve stem. In opening the drain, the valve may be rotated either in the same direction or rotated in the opposite direction to bring the inlet end of the passageway 33 into alignment with the passageway of the nipple 22 and the plug 35 into locking engagement with the recess 43, the inclined surface 42 during this movement of the valve operating through the head 39 of the rivet 37 to cam the plug 35 out of its locking position under the force applied to the stem 25 of the valve.

It will be evident from the foregoing that the present invention provides a simply constructed valve of relatively few parts which is sturdy in construction and inexpensive to produce. The valve efficiently performs its functions and prevents any loss of oil when the valve is closed. The valve is constructed so as to be automatically locked in either of two positions, namely the opened position and the closed position, the locking or latching plug 35 being unlocked simply through the force applied to the stem 25 of the valve to either open it or close it. The arrangement of the valve with respect to the oil pan of the engine and the accessibleness of the square shaped arbor 28 on the upper end of the extended stem 25 enable the ready insertion of a pail under the valve and the manipulation of the valve without the necessity of getting under the automobile or the necessity of using a drain pit or a lifting device.

While I have by the foregoing described a preferred embodiment of my invention, it will be evident to those skilled in the art that changes and modifications may be made in such construction without departing from the spirit of the invention and the scope of the appended claims.

I claim:

1. The combination of a valve casing having a drain aperture in the bottom thereof, a valve member contained in said casing and having a passageway communicating with such drain aperture when the valve is in the opened position,

a vertical recess provided in said valve member, said recess having its opening in the lower face of said valve and arranged to overlie the drain aperture in the closed position of the valve, a plug slidably mounted in said recess, resilient means normally biasing said plug towards the bottom of said valve casing, said plug being configured at its lower end to seat in and to interlock with the drain opening of said casing in the closed position of the valve and a locking recess provided on the bottom wall of said casing and adapted to interlock with the lower end of said slidable plug in the opened position of said valve.

2. The combination claimed in claim 1, in which the interior surface of the bottom wall of said casing is provided with a cam surface in the region of said drain aperture and a cam surface in the region of said locking recess and said plug has a bevelled lower end adapted to coact with said cam surfaces in the operation of the valve.

3. The combination claimed in claim 1, in which the inner cylindrical walls of said vertical recess in said valve member and said passageway in said valve member intercept to provide a vertically disposed substantially rectangular opening intermediate said recess and passageway.

4. The combination of a valve casing having a drain aperture in the bottom thereof, a valve member contained in said casing and having a passageway communicating with such drain aperture when the valve is in the opened position, a vertical recess provided in said valve member, a plug slidably mounted in said recess and composed of a hollow cylindrical member having an open end and a closed end, a coiled spring contained in said hollow member and having one end bearing against the inner end of the vertical recess so as to normally urge said plug toward the bottom of said valve casing, a leather washer attached to the closed end of said hollow member and a rivet connecting said washer to said hollow member, said washer and the head of said rivet having beveled peripheral edges to enable said plug to interlock with the drain opening of said casing in the closed position of the valve, and a locking recess provided on the bottom wall of said casing and adapted to interlock with the lower end of said slidable plug in the opened position of said valve.

5. A valve having in combination, a casing provided with an inlet port end and an outlet port, a rotatable valve member contained in said casing and having a pair of chambers provided therein, one of said chambers being formed to provide a passageway between said inlet port and said outlet port when the valve is in the opened position, the other of said chambers being in the nature of a recess and arranged to come into registry with said outlet port when said valve member is rotated to closed position, a stopper member contained in said other chamber and movable longitudinally thereof, resilient means normally urging said stopper member outwardly of said other chamber and into engagement with said outlet port when said other chamber is in registry with the latter, and a recess provided in the interior walls of said casing and adapted to receive said stopper member when the valve member is moved to opened position to lock said valve member in such position until positively removed therefrom.

6. A valve such as is defined in claim 5, in which the two chambers in said valve member intercept within the interior of such member so that a line drawn from a wall of one chamber through the opening therebetween to a wall of the other chamber and passing through the longitudinal axes of said chambers in the region of said valve member adjacent to said outlet port, will have a length less than the combined diameters of such chambers and in which said stopper member has a beveled outer end adapted to seat on a beveled seat provided in the interior surface of said casing around said outlet port.

7. A valve such as is defined in claim 5, in which the two chambers communicate with one another within the interior of said valve member and in which the interior surface portions of said casing defining said outlet port is provided with a beveled valve seat, the outer end of the stopper member having a beveled outer end portion constituted of non-metallic material adapted to seat in the beveled seat provided around said outlet port.

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