Aug. 10, 1926. 1,595,624

P. L. SCOTT

ATOMIZER VALVE

Filed March 17, 1924

Fig. 1.

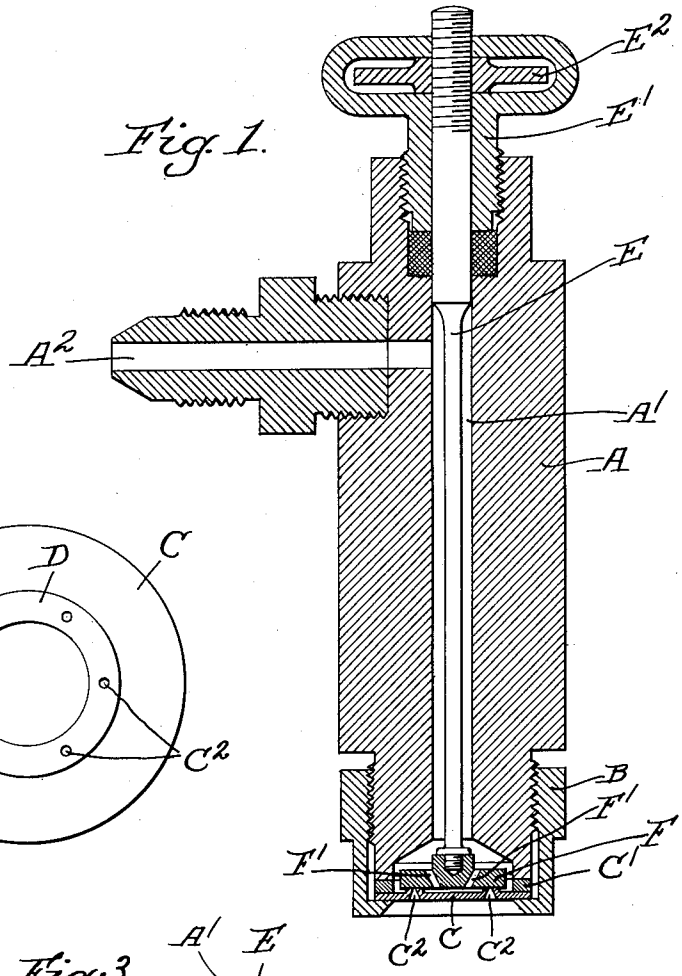
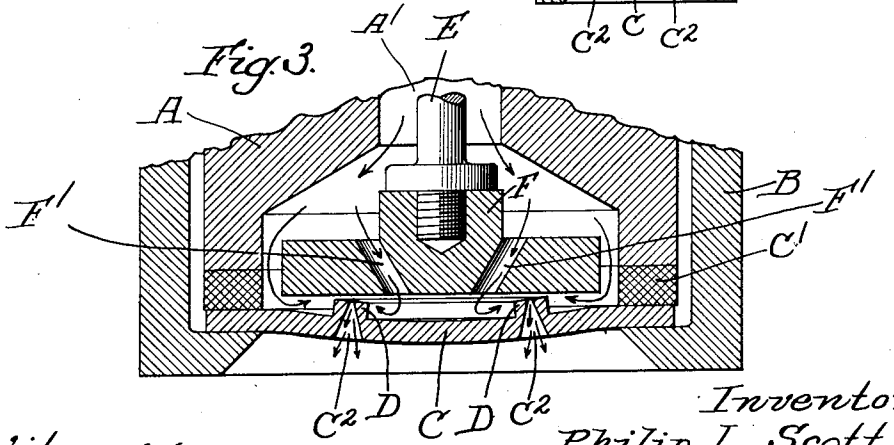



Fig. 2.




Fig. 3.




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# UNITED STATES PATENT OFFICE.

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## ATOMIZER VALVE.

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This invention relates to an atomizing valve, and particularly to an atomizing valve of the type adapted for use in injecting fuel into an internal combustion engine cylinder, although this valve may, of course, be used in any connection in which it is necessary or advantageous to use an atomizing valve. Among the objects of my invention are; to provide a valve which will have an exceedingly minute opening; to provide a valve of such construction that it tends to free itself from dirt and foreign material in general; to provide a valve which will be non-clogging; and to provide a valve having a plurality of separate discharge orifices. Other objects will appear from time to time throughout the specification and claims.

My invention is illustrated more or less diagrammatically in the accompanying drawings, wherein:

Figure 1 is a vertical cross section of my valve;

Figure 2 is a plan view of the valve disc;

Figure 3 is a cross section on an enlarged scale showing the valve construction in detail.

Like parts are indicated by like characters throughout the drawings.

A is a valve body having a central bore $A^1$, with which the feed bore $A^2$ is in communication. By means of this latter liquid is supplied to the valve for atomization.

B is a disc retaining cap, threaded upon the lower end of the valve body A. It is adapted to hold in place the valve disc C. This disc C is resilient so that it will yield slightly under the high pressures to which it is subjected and is positioned against the packing $C^1$, which rests upon the lower end of the valve body A.

On the upstream face of the disc is the raised circular land D. This land may be of any suitable shape or number, but a single one being shown and that of annular shape. Through the land are a number of perforations $C^2$, across the edges of which the liquid is fed and atomized. It will be noticed that these perforations increase in size on the downstream side of the disc.

Positioned within the central bore $A^1$ of the valve body A is the valve stem E mounted in the retaining yoke $E^1$, having threaded upon it the adjusting nut $E^2$ by means of which it is raised or lowered.

On the lower end of the valve stem E is the plug F, which is provided with the inclined perforations $F^1$. It will be understood that these perforations are not necessarily inclined.

Where the expressions "upstream" or "downstream" are used in this specification, or in the claims, they are used respectively to mean the side nearest the source of pressure and the side farthest from the source of pressure. Thus the upstream side of the disc is the inside of the disc when the disc is discussed with reference to the valve body, and it is the side of the disc which is closest to the source of fuel supply and pressure. The downstream side is obviously the other side.

Although I have shown an operative device, still it will be obvious that many changes in size, shape and arrangement of parts might be made without departing materially from the spirit of my invention; and I wish, therefore, that my showing be taken as in a sense diagrammatic.

The use and operation of my invention are as follows:

When the valve is to be used it is connected to a liquid supply system by means of which liquid preferably under heavy pressure is supplied to the interior of the valve body. As the parts are originally assembled and fitted, the valve stem is screwed down until the plug at its downstream end is positively and firmly seated upon the raised land, or lands, of the valve disc. It thus completely closes the perforations through the disc. When the liquid is supplied it passes through the central portion of the valve body and comes in contact with the valve disc, strikes the valve plug and passes through the perforations in it. When the pressure becomes sufficient the valve disc is bent or deflected away from contact with the valve plug as shown in Figure 3. This obviously opens the perforations and atomized liquid is discharged through the disc. When the pressure is decreased, the disc again moves back into sealing contact with the plug and so no further discharge takes place.

Should there be any particles of dirt or foreign material of any nature whatever in the liquid, they will tend to be caught against the land, or lands, and will not pass through the atomizing orifices because the

space between the face of the land and the face of the plug is so exceedingly minute even with maximum opening that no ordinary dirt particle can enter that space and because there is sufficient space between the face of the plug and that of the face from which the land projects for any ordinary accumulation of dirt to be deposited there without building up in front of the sharp edge or discharge spray orifice. While dirt may be caught in this space, it will be free to move around as eddy currents are set up during atomizing movement of the liquid and no matter where a dirt particle places itself, owing to the great length of the opening due to its thickness, dirt particles will not accumulate throughout the length of the orifice in sufficient quantity to interfere with the passage of the liquid and in order to stop the operation of the valve, it will be necessary for the dirt particles to accumulate around the periphery in a solid mass which is a contingency exceedingly unlikely to happen during the life of any spray atomizing disc. In the event that any particles small enough to get into the spray opening should appear, the fact that the discharge passage from the spray point is much larger than the spray opening will make sure that such particles will easily escape and will not remain in the valve or between the atomizing surface or interfere with the valve operation.

It will be understood that the parts as shown are greatly magnified.

I claim:

1. In an atomizing valve, a valve body, and a valve disc, said disc having on its inner face an annular land having a perforation therethrough and a plug seated upon the land and normally closing the perforation therethrough.

2. In an atomizing valve, a valve body, and a yielding valve disc, said disc having on its inner face an annular land, having a perforation therethrough, and a plug seated upon the land and normally closing the perforation therethrough.

3. In an atomizing valve, a valve body, and a resilient valve disc, said disc having on its inner face an annular land, having a perforation therethrough and a plug seated upon the land and normally closing the perforation therethrough.

4. In an atomizing valve, a valve body, and a resilient valve disc, said disc having on its inner face an annular land having a perforation therethrough, said perforation flaring outwardly and a plug seated upon the land and normally closing the perforation therethrough.

5. In an atomizing valve, a valve body, and a resilient valve disc, said disc having on its inner face an annular land having a perforation therethrough and a plug seated upon the land and normally closing the perforation therethrough, said perforation flaring outwardly.

6. In an atomizing valve, a valve body, and a valve disc, said disc having on its inner face an annular land, having a perforation therethrough, in combination with a valve closing member adapted to overlie and close said perforation, said disc adapted to be moved outward away from said member by the influence of hydraulic pressure from within the valve to permit discharge through the perforation.

7. In an atomizing valve, a valve body through one end of which the atomized liquid is discharged, a valve member located near said end of the valve body, said valve member having perforations, in combination with a resilient valve disc provided with an annular land having perforations therethrough, the perforations of said land being out of register with those of the valve member aforesaid the valve member and disk when seated together closing the perforations through the land, and being movable, one with reference to the other under hydraulic pressure from within the valve body, to open the said perforations to permit passage of liquid and its atomization.

8. In an atomizing valve, a valve body through one end of which the atomized liquid is discharged, a valve stem within said body carrying a valve plug member located near said discharge end of the valve body, said plug member provided with a plurality of perforations, in combination with a yielding valve-closing disc provided with an annular raised portion on its inner face, having a plurality of perforations therethrough, said perforations being out of register with the perforations in the valve plug member, and means for adjusting said valve member toward and away from said disc, the valve member and disk when seated together closing the perforaions through the raised portion of the disk.

9. In an atomizing valve, a valve body through one end of which the atomized liquid is discharged, a valve stem within said body carrying a valve plug member located near said discharge end of the valve body, said plug member provided with a plurality of perforations, in combination with a yielding valve closing disc having a plurality of perforations therethrough, said perforations being out of register with the perforations in the valve plug member, and means for adjusting said valve member toward and away from said disc, the valve member and disk when seated together closing the perforations through the yielding disk.

10. In an atomizing valve, a valve body through one end of which the atomized liquid is dscharged, a valve stem within said

body carrying a valve plug member located near said discharge end of the valve body, said plug member provided with a plurality of perforations, in combination with a yielding valve closing disc provided with an annular raised portion on its inner face, having a plurality of perforations therethrough, said perforations being out of register with the perforations in the valve plug member and flaring outwardly and means for adjusting said valve member toward and away from said disc, the valve member and disk when seated together closing the perforations throuh the raised portion of the yielding disk.

11. In an atomizing valve, a valve body, and a valve disc, said disc having on its inner face an annular land having a perforation therethrough, in combination with a valve closing member adapted to close said perforation the two adapted to have relative movement to open the valve.

Signed at Chicago, county of Cook and State of Illinois, this 13th day of March, 1924.

PHILIP LANE SCOTT.