June 24, 1924. 1,498,918

C. S. JENSEN

SOLUTION INJECTOR

Filed Sept. 29, 1921 2 Sheets-Sheet 1

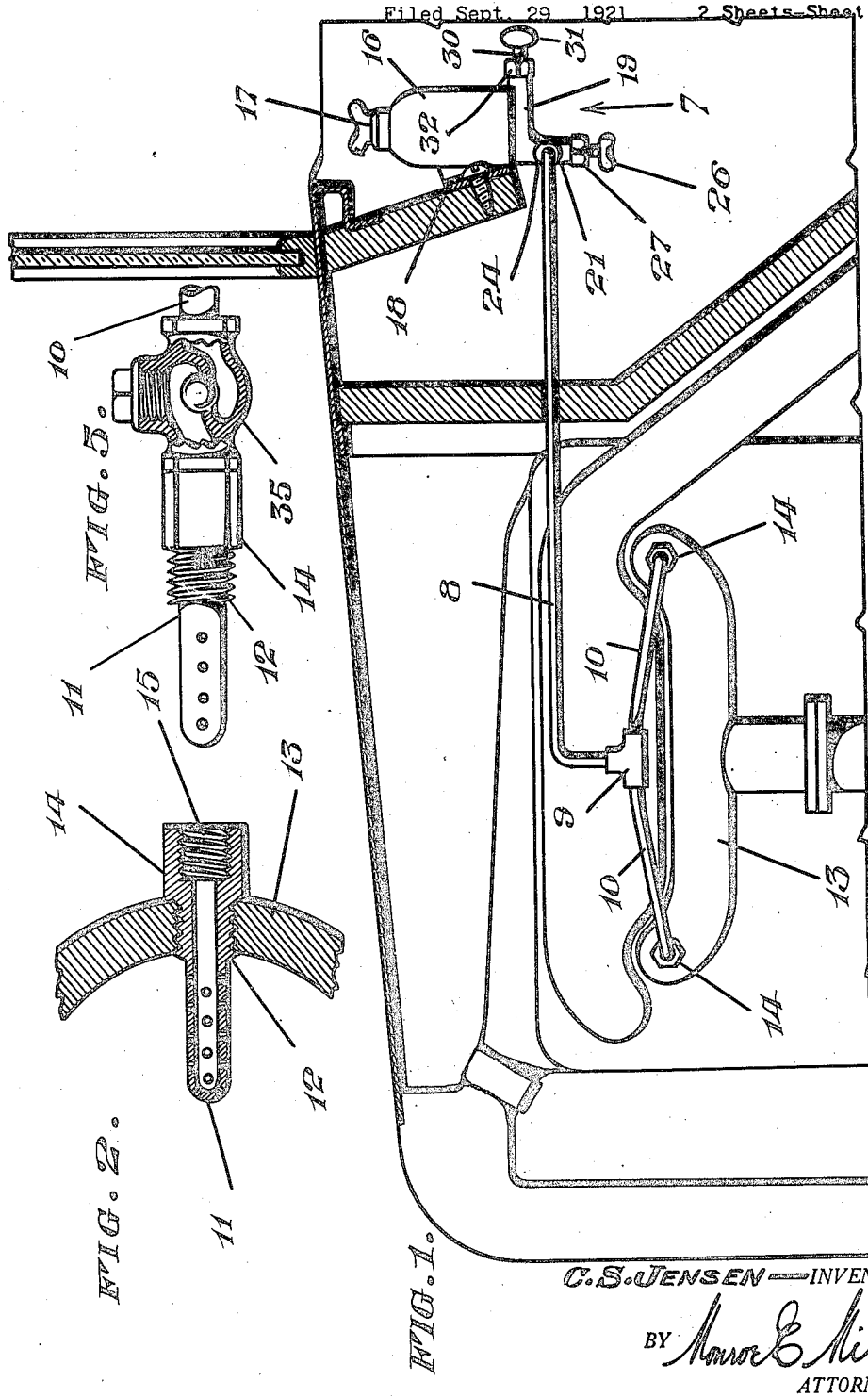


FIG. 5.

FIG. 2.

FIG. 1.

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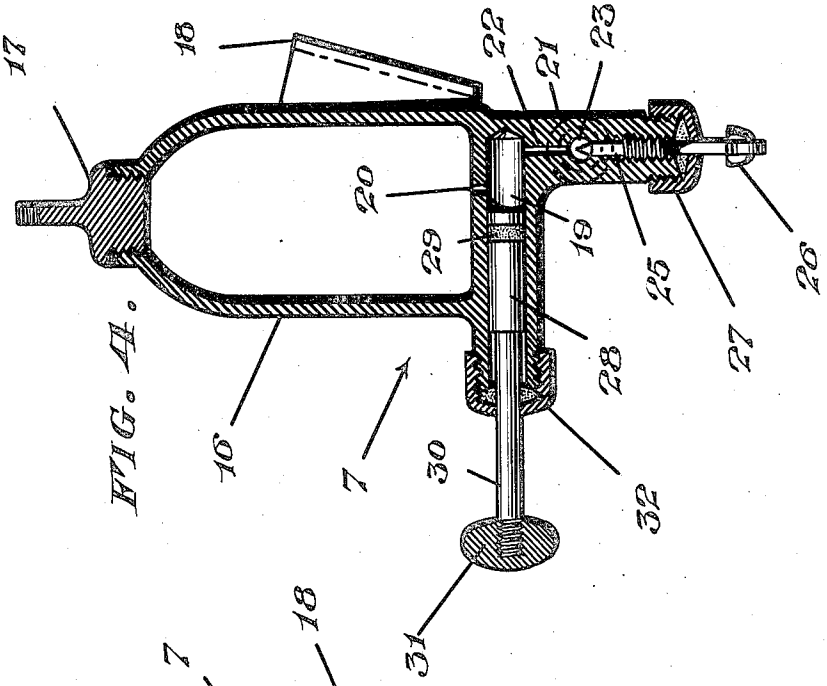


FIG. 4.

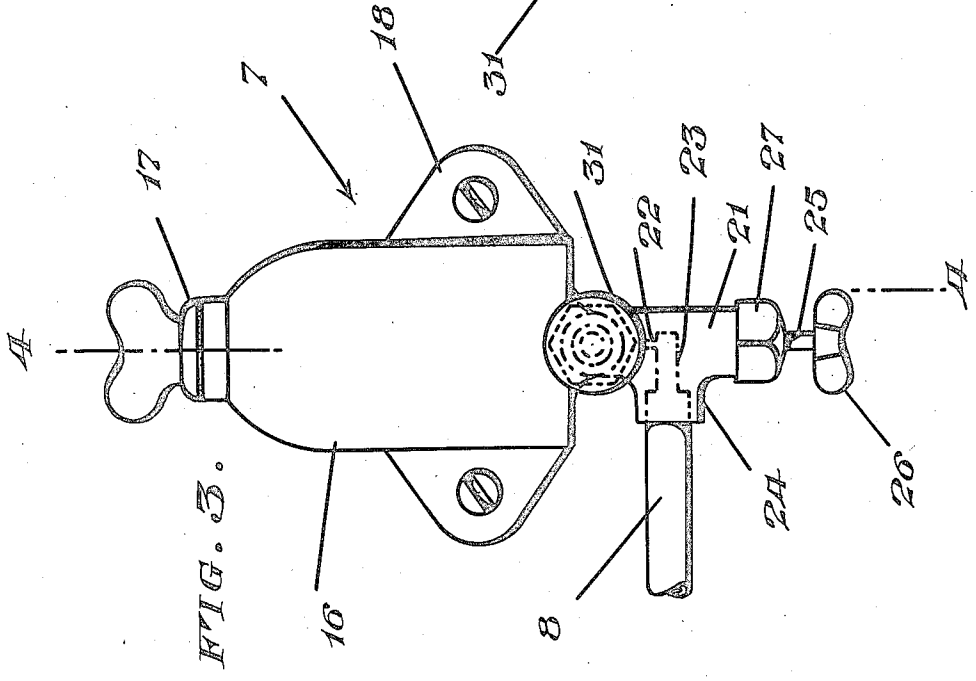


FIG. 3.

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Patented June 24, 1924. 1,498,918

UNITED STATES PATENT OFFICE.

CHRISTIAN S. JENSEN, OF BROOKLYN, NEW YORK, ASSIGNOR TO MARY JENSEN, OF BROOKLYN, NEW YORK.

SOLUTION INJECTOR.

Application filed September 29, 1921. Serial No. 504,132.

To all whom it may concern:

Be it known that I, CHRISTIAN S. JENSEN, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Solution Injectors, of which the following is a specification, reference being had therein to the accompanying drawing.

The present invention relates to a device for injecting a carbon eliminating solution into the intake manifold or combustion chambers of an internal combustion engine, or for similarly injecting a liquid into other machines or devices.

It is the object of the invention to provide a novel and improved device for holding a supply of the solution or liquid and for forcing the same to the engine or other device, and including a novel construction and arrangement of the component elements whereby the device is practical and efficient in use.

With the foregoing and other objects in view, which will be apparent as the description proceeds, the invention resides in the construction and arrangement of parts, as hereinafter described and claimed, it being understood that changes can be made within the scope of what is claimed, without departing from the spirit of the invention.

The invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a side elevation of the device as installed on an automobile.

Fig. 2 is a sectional detail of one of the spray nozzles.

Fig. 3 is a front view of the liquid reservoir and pump.

Fig. 4 is a vertical section on the line 4—4 of Fig. 3.

Fig. 5 is an elevation of one of the spray nozzles showing a check valve used therewith.

The device is particularly intended for use on automobiles or in connection with explosive engines, for injecting a carbon eliminating solution into the intake manifold or combustion chambers of the engine, although the device can be used for other purposes for which it is suited.

The device includes a liquid reservoir and pump, designated generally at 7, from which a tube 8 leads for conducting the liquid or solution to the engine, said tube 8 being connected by a T-fitting with branch tubes 10 connected to the spray nozzles, two of which are used as shown. The spray nozzles 11 are apertured, and have threaded portions 12 to screw into holes drilled in the intake manifold 13 of the engine, although said nozzles can be applied at any suitable points for injecting the solution into the intake manifold or combustion chambers. The nozzles have wrench engaging portions 14 at their outer ends for convenience in applying and removing the nozzles, and there are threaded sockets 15 within said portions 14 for the connection of the tubes 10. The liquid in being forced into the nozzles 11 will be sprayed therefrom through the small apertures, whereby to pass into the engine cylinders or combustion chambers with the air, when the engine is in operation.

The reservoir and pump 7 comprises, in detail, an upstanding reservoir 16 having an upper removable filler cap or plug 17, for convenience in filling the reservoir with the liquid or solution. Said reservoir may be supported in any suitable manner from the dash or instrument board of the automobile, or elsewhere, such as by means of attaching ears 18 at the opposite sides of the reservoir, or the like. The reservoir 16 comprises a casting, as shown, and is formed integrally therewith under and across the bottom, with a pump cylinder 19, the forward end portion of which protrudes beyond the reservoir 16. The bottom of the reservoir has an outlet port 20 leading into the cylinder between the ends thereof, and the cylinder is formed adjacent to its rear end with an integral depending nipple 21. The nipple 21 has a liquid outlet passage 22 for the cylinder 19 extending downwardly from the rear end portion of the cylinder to a lateral port 23 terminating within a connection 24 in which the end of the tube or pipe 8 is secured. The port 20 is located forwardly from the passage 22, or said port and passage are at longitudinally spaced points of the cylinder 19. A needle valve 25 is screw-threaded upwardly into the nipple 21 from the lower end thereof, and its tip is uppermost to cooperate with the lower end of the passage 22, for controlling or shutting off the flow of liquid from the pump into the tube 8. The needle valve has a handle or finger piece 26 at its lower projecting end, and a packing or gland cap 27 is threaded on the end of the nipple

21 around the needle valve and contains packing around said valve, to prevent leakage.

A piston or plunger 28 is slidable in the cylinder 19, and may have a packing ring 29 to prevent leakage past said piston or plunger. The plunger has a stem 30 projecting from its forward end from the cylinder 19, and a handle or knob 31 is secured on the end of the stem 30 for conveniently reciprocating the plunger or piston by hand. A packing or gland cap 32 is screw-threaded on the forward end of the cylinder 19 around the stem 30 and contains packing to prevent leakage.

In using the device, the valve 25 is opened, the cap or plug 17 removed or unscrewed to admit air, and the plunger or piston 28 retracted, as seen in Fig. 4, whereby the liquid or solution will flow from the reservoir down through the port 20 into the cylinder 19. The plunger is then pushed into the cylinder, to force the liquid through the tube 8 to the engine. When the plunger or piston 28 moves across the port 20, the liquid is trapped in the cylinder, and cannot flow back into the reservoir 16, thereby forcing the liquid through the passage 22 past the valve into the tube 8. The pump can be operated several times, for injecting the desired amount of solution into the engine. When using the device for eliminating carbon, the solution is injected into the engine when the engine is running, so that the solution will be drawn with the air into the engine cylinders, and the solution can be supplied to the engine at suitable intervals as required to eliminate the carbon formations. By closing the valve 25, the flow of solution from the reservoir is stopped. The reservoir and pump can be conveniently located on the dash or instrument board of an automobile, and the construction is compact and especially suited for the purpose. It will be noted that when the cap or plug 17 is unscrewed or removed to admit air, when the solution has all passed from the reservoir air will flow through the conduit into the intake manifold, and by pushing the plunger 28 inwardly, the flow of air can be shut off, it being noted that the plunger in being moved inwardly will extend across and close the port 20 and passage 22.

Any number of tubes 8 can extend from the pump, for forcing the solution to several engine cylinders simultaneously, and when the spray nozzles are connected directly to the cylinder head of the engine, check valves 35 are preferably disposed between the spray nozzles and pipes, as suggested in Fig. 5, to prevent the compressed and exploding gases in the engine cylinders from being forced back into the tubes. Such a check valve can also be assembled with the nipple 21, for such purpose, and the check valve or valves, when used, will also prevent the liquid from being drawn back into the pump cylinder 19 when the plunger or piston is pulled outwardly.

Having thus described the invention, what is claimed as new is:—

1. A solution injector for an internal combustion engine comprising a reservoir formed at the bottom thereof with a pump cylinder and a nipple extending from the cylinder, the reservoir having a port leading from the bottom thereof between the ends of said cylinder for the flow of liquid from the reservoir into the cylinder, the nipple having a portion for the connection of a tube leading to the intake manifold of the engine, said nipple having a passage leading from said cylinder to said portion, a plunger working in said cylinder to close said port, and a needle valve adjustable in said nipple and controlling the flow through said passage between said cylinder and portion.

2. A solution injector for an internal combustion engine comprising a reservoir formed at the bottom thereof with a pump cylinder and a nipple extending from the cylinder, the reservoir having a port leading from the bottom thereof between the ends of said cylinder for the flow of liquid from the reservoir into the cylinder, the nipple having a portion for the connection of a tube leading to the intake manifold of the engine, said nipple having a passage leading from said cylinder to said portion, a plunger working in said cylinder to close said port, and a needle valve adjustable in said nipple and controlling the flow through said passage between said cylinder and portion, said port and passage being spaced apart longitudinally of the cylinder so that the plunger forces the liquid from the cylinder through said passage when the plunger is moved beyond said port.

In testimony whereof I hereunto affix my signature.

CHRISTIAN S. JENSEN.