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DIESEL ENGINE INJECTOR

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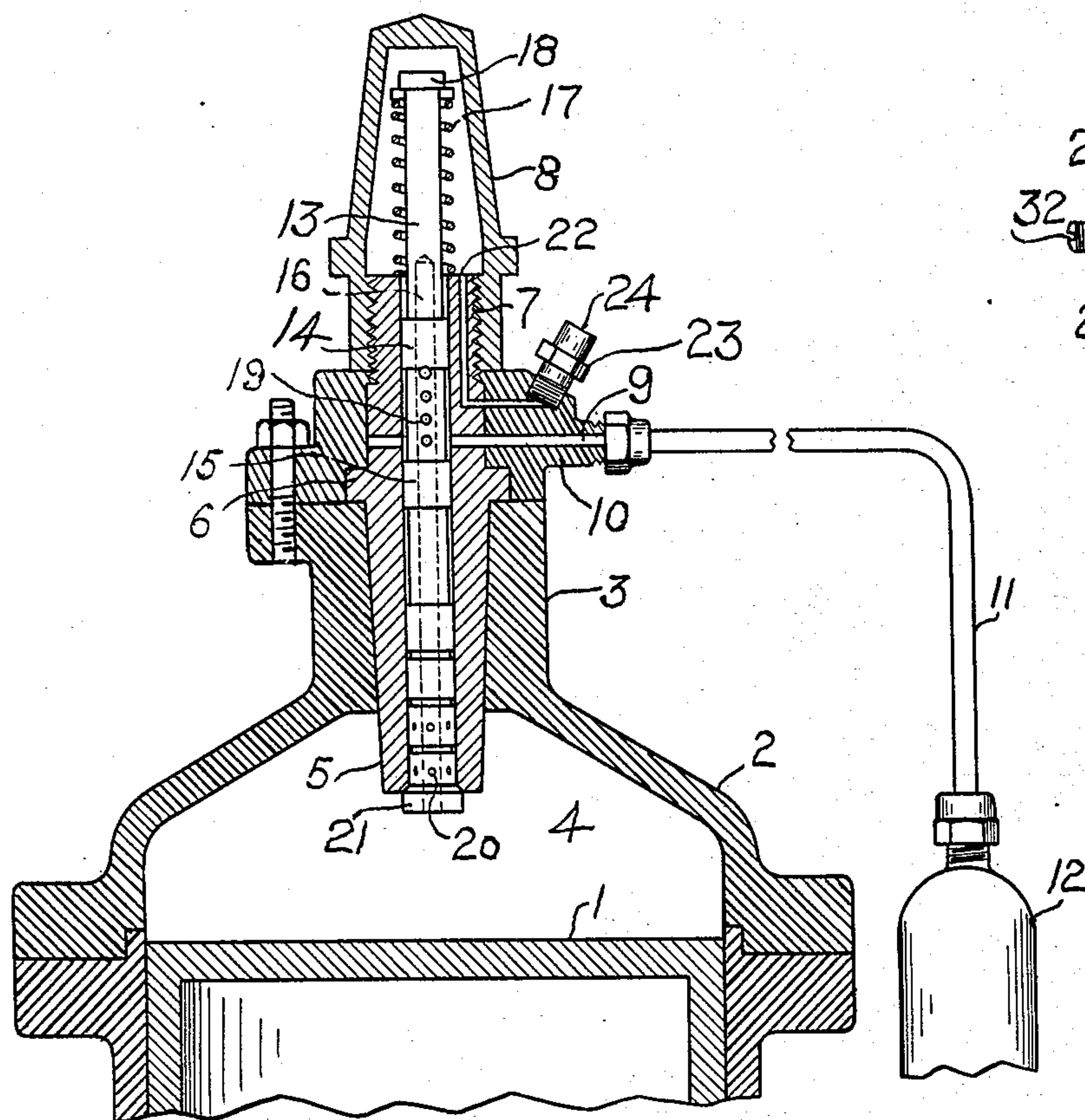


Fig. 1

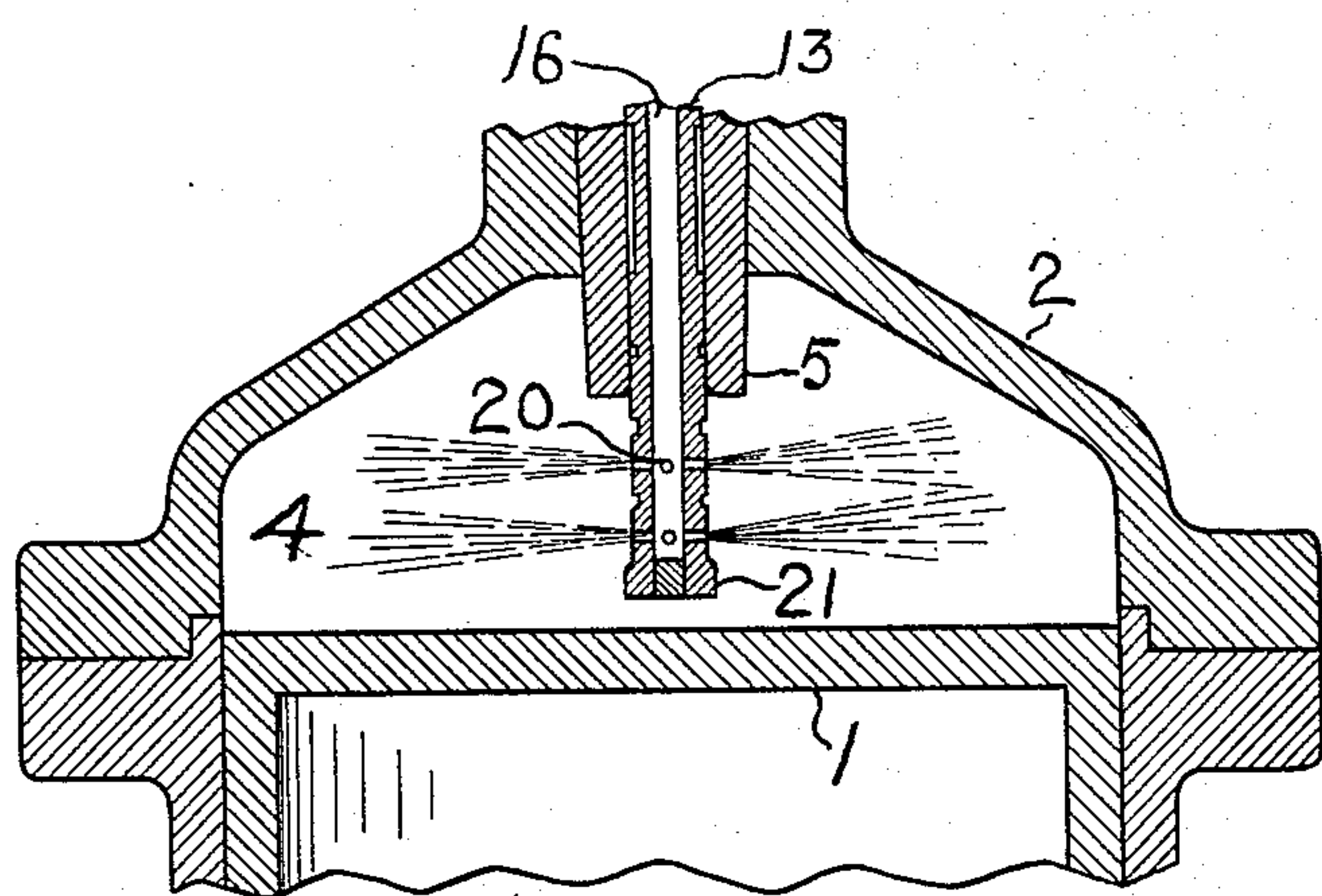


Fig. 2

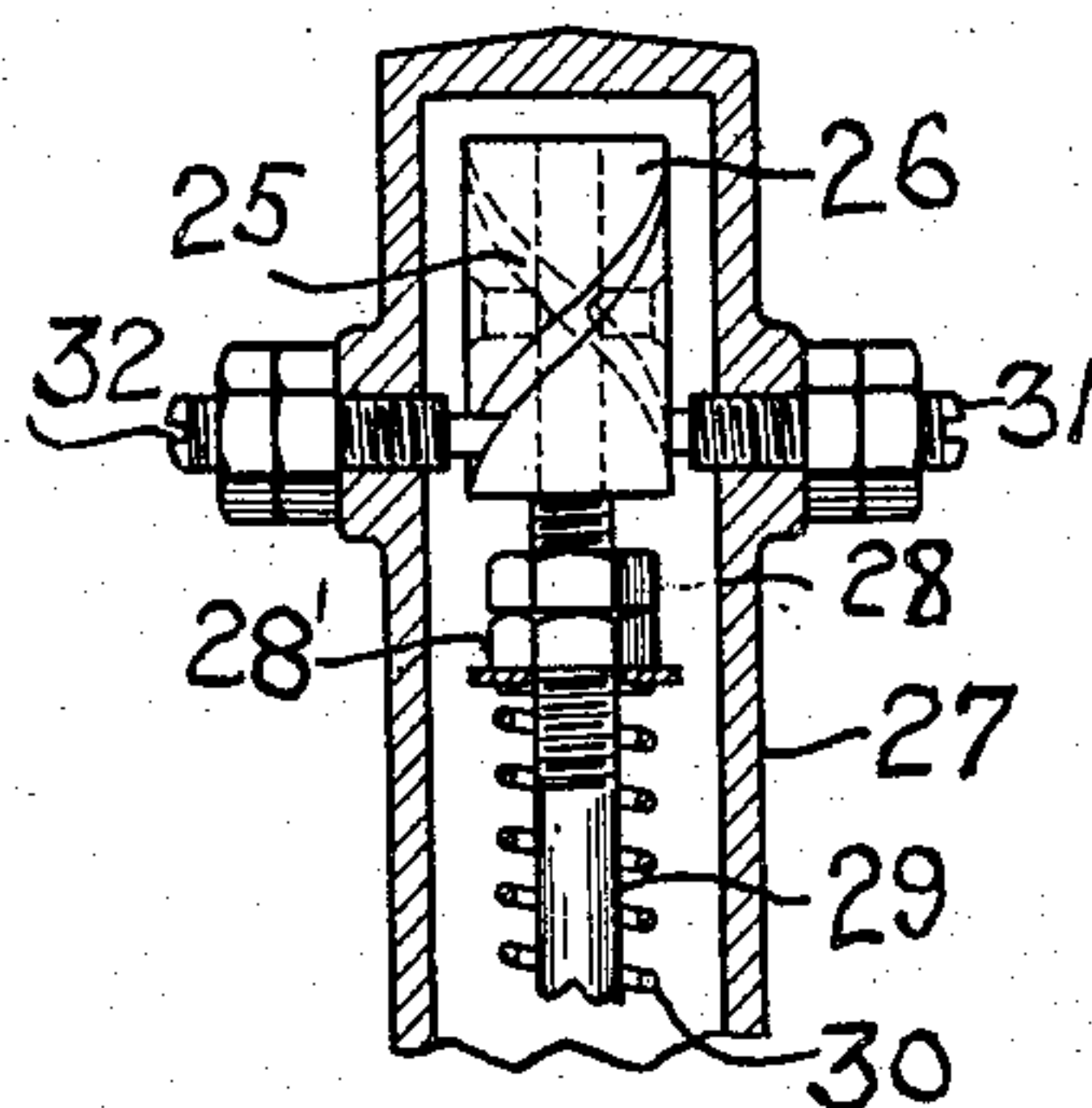


Fig. 3

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## UNITED STATES PATENT OFFICE

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## DIESEL ENGINE INJECTOR

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1 Claim. (Cl. 299—107.5)

This invention relates to oil injectors more particularly adapted for connection with internal combustion engines of the Diesel type.

The object of this invention is the construction of an injector of an improved character, the structural elements being of a special and individual formation whereby it is found the fuel oil introduced under pressure is reduced to finer spray and more thoroughly distributed in the combustion chamber than by the customary injecting devices for like purpose with which this applicant is familiar.

To illustrate the construction and to explain the manner in which this invention operates the accompanying drawing is made a part of this application for patent. On the drawing, Fig. 1 represents a vertical section of the upper part of an engine cylinder with the cylinder head thereon constructed and bearing the parts as set forth also in section, all the parts being shown.

Fig. 2 is a fragmentary sectional view as in Fig. 1 and represents the plunger of the invention in its depressed or lower position.

Fig. 3 is a modified form of the screw cap topmost element of this invention, illustrating devices whereby the plunger may be rotated back and forth as it moves up and down.

Throughout the drawing and description the same number is used to refer to the same part.

In the drawing an engine cylinder upper portion is shown with a piston 1 therein, each of any desired shape, closed by the cylinder head 2, which in this explanation is made to form a space above the piston 1. The head 2 has an upwardly extending portion 3. The space above the piston 1 is termed the combustion chamber in this description and is given reference number 4.

In Fig. 1 will be noted the vertical upright tube 5, usually of conical shape as to its lower part, and constructed to fit in a corresponding passage in the upwardly extending portion 3 of the cylinder head 2. Tube 5 has an encircling shoulder ridge 6 and a screw threaded upper end 7. A hollow screw cap 8 engages the threaded end of the tube. In Fig. 1 will be noted the oil duct 9 which passes into the bore of the tube 5 and through the intermediate body member 10 which fits around the tube and is located between the screw cap 8 and the upwardly extending portion 3 of the cylinder head 2. Oil under pressure is directed by pipe 11 from an injection pump 12 of suitable construction provided with operating mechanism not shown. It will be understood that the injection pump 12, the con-

struction of which forms no part of this invention, is provided with devices for only serving fuel gas mixture succeeding the explosion down stroke and exhaust up stroke of the piston 1 into the passage 9 common to the body and tube as stated.

A plunger 13 is constructed with enlargements 14 and 15 which fit slidably in the tube, and the tube has an axial bore 16 as indicated. The upper portion of the plunger is encircled by the coil spring 17 which presses against the top head 18 of the plunger and holds the plunger in its upper position in yielding relation. The lower end of the spring rests upon the top end of the tube 5.

The plunger 13 is provided with an upper set of perforations 19 between the enlargements 14 and 15, and a lower set of perforations 20 adjacent to the head 21 on the lower end of the plunger. When the plunger is pressed upwardly by the coil spring 17 as illustrated in Fig. 1, the lower head 21 of the plunger strikes the lower end of the tube 5 and limits the upward movement of the plunger 13.

In Fig. 1 will be noted a passage 22 leading downwardly from the interior of the screw cap 8 and formed in the top of the tube 5 and extending outwardly in the intermediate body part 10. This passage is to permit the escape of any oil that may be forced up into the hollow screw cap, and the passage 22 common to the tube wall and to the body member leads to a relief valve 23 borne by the body member and having a pipe 24 through which the oil thus relieved from the cap may be returned to the fuel pump 12.

In the construction illustrated in Fig. 3 spiral grooves 25 are made in a rotatory block 26 located with a modified screw cap 27. By means of the fellow nuts 28, 28' the end of a plunger 30 is adjustably secured to the rotary block. The adjustable screws 31 and 32 pass radially into the cap 27 and engage the spiral grooves 25. As the plunger is moved up and down during the operation of the engine, it is rotated and the oil issuing from the perforations previously described is discharged in a fine spray in various directions in the combustion chamber.

The operation of this invention is thought to be readily understood from the drawing. The oil forced through the upper set of perforations in Fig. 1 into the bore of the plunger in its upper position is sprayed through the lower set of perforations when the plunger is drawn down into its lower position illustrated in Fig. 2, and the oil is delivered in a very fine spray into the combus-

tion chamber, that being the purpose of the special structure herein disclosed.

Having now described this invention, I claim:

In an oil injector of the character described, in combination with an engine cylinder, a guiding tube in the head of the cylinder, a spring controlled plunger movable reciprocally in the tube, said plunger having an axial bore, upper and lower perforations communicating with said bore of the plunger, devices having inlet passages for serving oil to the tube and upper perforations

5 of the plunger, said plunger having a valve head on its lower end closing the guiding tube on the upward movement of the plunger, a cap extending above said tube, a rotative block in the cap constructed with spiral grooves and attached to the upper end of the plunger, and bolts in the cap engaging the grooves in the cap whereby the plunger is rotatively moved during its up and down movements.

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