June 12, 1951 H. HOGEMAN 2,556,369

ACCUMULATOR TYPE INJECTION NOZZLE

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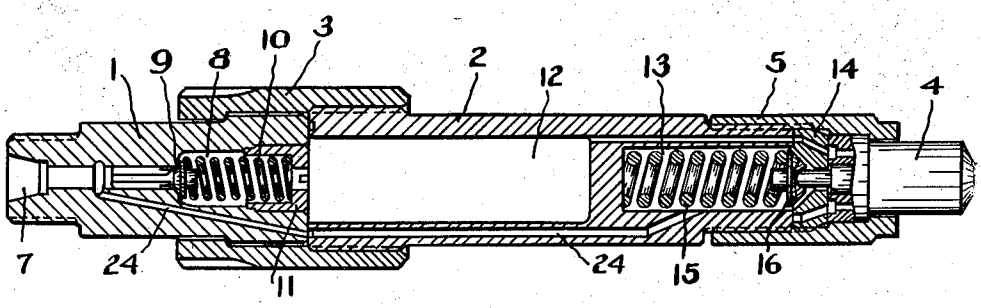


Fig. 1.

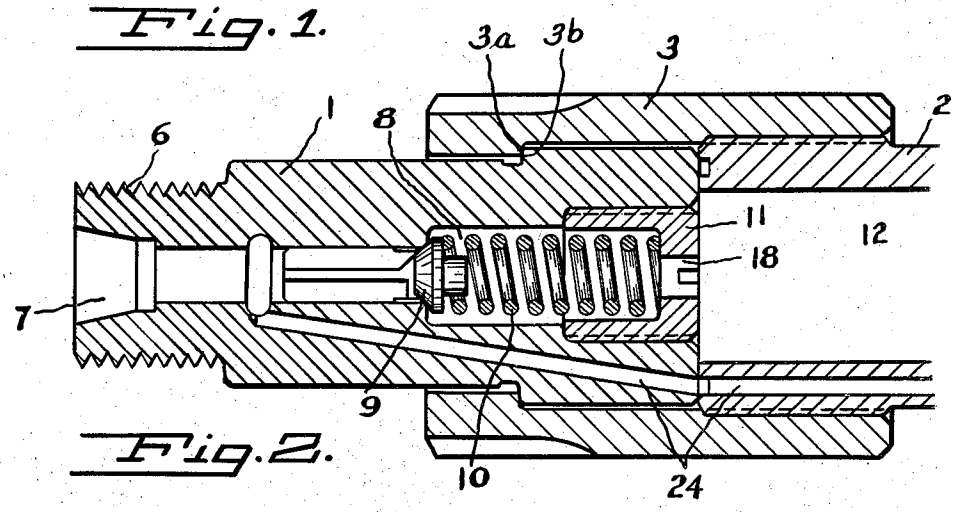


Fig. 2.

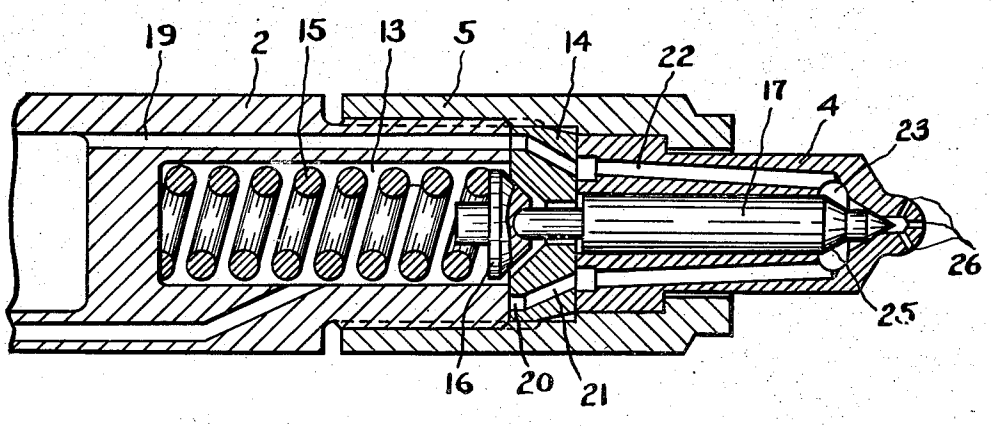


Fig. 3.

INVENTOR.
HANS HOGEMAN

BY Raymond A. Paquin

ATTORNEY.

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ACCUMULATOR TYPE INJECTION NOZZLE

Hans Hogeman, Longmeadow, Mass., assignor to American Bosch Corporation, Springfield, Mass., a corporation of New York

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2 Claims. (Cl. 299—107.5)

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This invention relates to fuel injection apparatus and has particular reference to a simplified and relatively economical nozzle holder assembly and accumulator system for such apparatus.

An object of the invention is to provide a relatively simple and economical fuel injection apparatus.

Another object of the invention is to provide a fuel injection apparatus which may be satisfactorily employed with pumps having various outputs and on various size engines.

Another object of the invention is to provide a device of the type set forth wherein pressure surges during fuel injection by the nozzle are substantially eliminated.

Another object of the invention is to provide a device of the type set forth which allows the positioning of the fuel injection pump at a position remote from the fuel injection nozzle.

Another object of the invention is to provide a device of the type set forth wherein it is possible to employ a fuel injection pump without the usual delivery valve.

Other objects of the invention will be apparent from the following description taken in connection with the accompanying drawings and it will be understood that changes may be made in the details of construction and arrangement of parts, as the preferred form has been shown by way of illustration only.

Referring to the drawings:

Fig. 1 is a side view, partially in section, of a nozzle and nozzle holder embodying the invention;

Fig. 2 is a fragmentary view of the construction shown in Fig. 1 but on an enlarged scale; and

Fig. 3 is a fragmentary view of the construction shown in Fig. 1 taken on an enlarged scale but showing a section through the nozzle.

Referring more particularly to the drawings wherein similar reference characters designate corresponding parts throughout the several views, the construction shown embodying the invention comprises the inlet stud 1 and the nozzle holder body 2 which are secured together in aligned relation by the retaining nut 3, a flange 3a adapted to engage a shoulder 3b on the inlet stud 1 and which also has an interior threaded portion adapted to engage a threaded portion on the exterior surface of the nozzle holder body 2 adjacent the end thereof for retaining said parts in assembled, aligned relation.

Adjacent the opposite end of the nozzle holder

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body 2 there is secured the nozzle 4 by means of the cap nut 5 which has a threaded portion engaging a threaded portion adjacent the end of the nozzle holder body 2 to retain the parts in assembled, aligned relation.

The nozzle 4 shown is of the conventional hole type, but it will be understood that other conventional types of nozzles such as the usual pintle type nozzles may be employed instead of the type of nozzle shown for the purpose of illustration.

The inlet stud 1 has the threaded portion 6 for connection to the fuel supply line, not shown, from which fuel is supplied to the nozzle holder body and nozzle from the usual fuel supply pump, also not shown. Fuel from the fuel supply line enters the inlet stud 1 through the opening 7.

Within the opening 8 in the inlet stud 1 is positioned the check valve 9 which is retained on its seat to close the passageway 7 by the coil compression spring 10 which, in turn, is retained in position by the hollow cap 11 forming a spring seat and which cap is threaded for adjustment within the inlet stud 1 to adjust the tension of the spring 10.

The nozzle holder body 2 is provided with the chambers 12 and 13 and between the adjacent ends of the nozzle holder body 2 and the nozzle 4 is positioned the intermediate disc 14.

Within the chamber 13 is positioned the coil spring 15 engaging the spring seat 16 which, in turn, engages the end of the nozzle valve 17 whereby the spring 15 normally urges the nozzle valve 17 into closed position to prevent discharge of fuel through the nozzle.

When fuel is supplied to the system from the fuel injection pump, such fuel enters the inlet stud through the opening 7 and as the pressure of such fuel is greater than the pressure of the spring 10, the check valve 9 is lifted from its seat and fuel enters the chamber 8 and passes through the opening 18 in the cap 11 and fills the accumulator chamber 12 from which fuel passes through the duct 19 in the nozzle holder body 2 to the annular groove 20 in the intermediate disc 14 from which it passes through a number of holes 21 and corresponding holes 22 in the nozzle 4 to the annular groove 23 adjacent the end of the nozzle valve 17.

At the same time fuel passes through the duct 24 in the inlet stud and nozzle holder body 2 to the spring chamber 13. As the fuel supplied to both the chamber 12 and the chamber 13 is from the same source and, therefore, under the same pressure, there is no pressure deviation between the fuel in these two chambers.

When the fuel injection pump spills, pressure in the fuel supply line and the inlet 7 in the inlet stud 1 is relieved, thereby allowing closing of the check valve 9 by the action of the spring 10 due to the pressure difference across said check valve and at the same time pressure in the chamber 13 is relieved and the pressure of the fuel from the accumulator chamber 12 in the annular groove 23 engages the area 25 on the nozzle valve 17, thereby raising said valve against the pressure of the spring 15 and allowing the discharge of fuel from the nozzle through the openings 26 until the pressure against the area 25 is reduced through the discharge of fuel to a point where the action of the spring 15 is sufficient to close the nozzle valve at which time discharge of fuel through the nozzle ceases and the action is repeated.

From the foregoing, it will be seen that I have provided a new and improved, relatively simple and economical accumulator apparatus and system for fuel injection.

Having described my invention, I claim:

1. An accumulator system comprising a nozzle holder having a nozzle holder body and a separate fuel inlet stud secured in aligned relation, an accumulator chamber in said nozzle holder body, a fuel inlet line in said fuel inlet stud communicating with said chamber and adapted to supply fuel thereto, a check valve in said fuel inlet stud adapted to control the passage of fuel to said chamber, a separate nozzle, means for supporting said nozzle in operative relation relative to said nozzle holder body, a fuel line extending between said chamber and said nozzle, a spring chamber in said nozzle holder body between said accumulator chamber and said nozzle, a spring in said chamber normally urging the nozzle valve into closed position and a fuel duct connecting said fuel inlet line and said spring chamber.

2. An accumulator system comprising a nozzle holder having a nozzle holder body and a separate fuel inlet stud secured in aligned relation, an accumulator chamber in said nozzle holder body, a fuel inlet line in said fuel inlet stud communicating with said chamber and adapted to supply fuel thereto, a check valve chamber in said fuel inlet stud, a check valve in said check valve chamber in said fuel inlet stud adapted to control the passage of fuel to said chamber, a separate nozzle, means for a nozzle holding member secured to said nozzle holder body for supporting said nozzle in operative relation relative to said nozzle holder body, a fuel line extending between said chamber and said nozzle, a spring chamber in said nozzle holder body between said accumulator chamber and said nozzle, a spring in said chamber normally urging the nozzle valve into closed position and a fuel duct connected to said fuel inlet line outside of said check valve and connecting said fuel inlet line and said spring chamber.

HANS HOGEMAN.

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