Dec. 20, 1949

F. L. BARTRAM

FUEL METERING AND DISTRIBUTING PUMP FOR DIESEL ENGINES

2,491,795

Filed Oct. 2, 1946

2 Sheets-Sheet 1

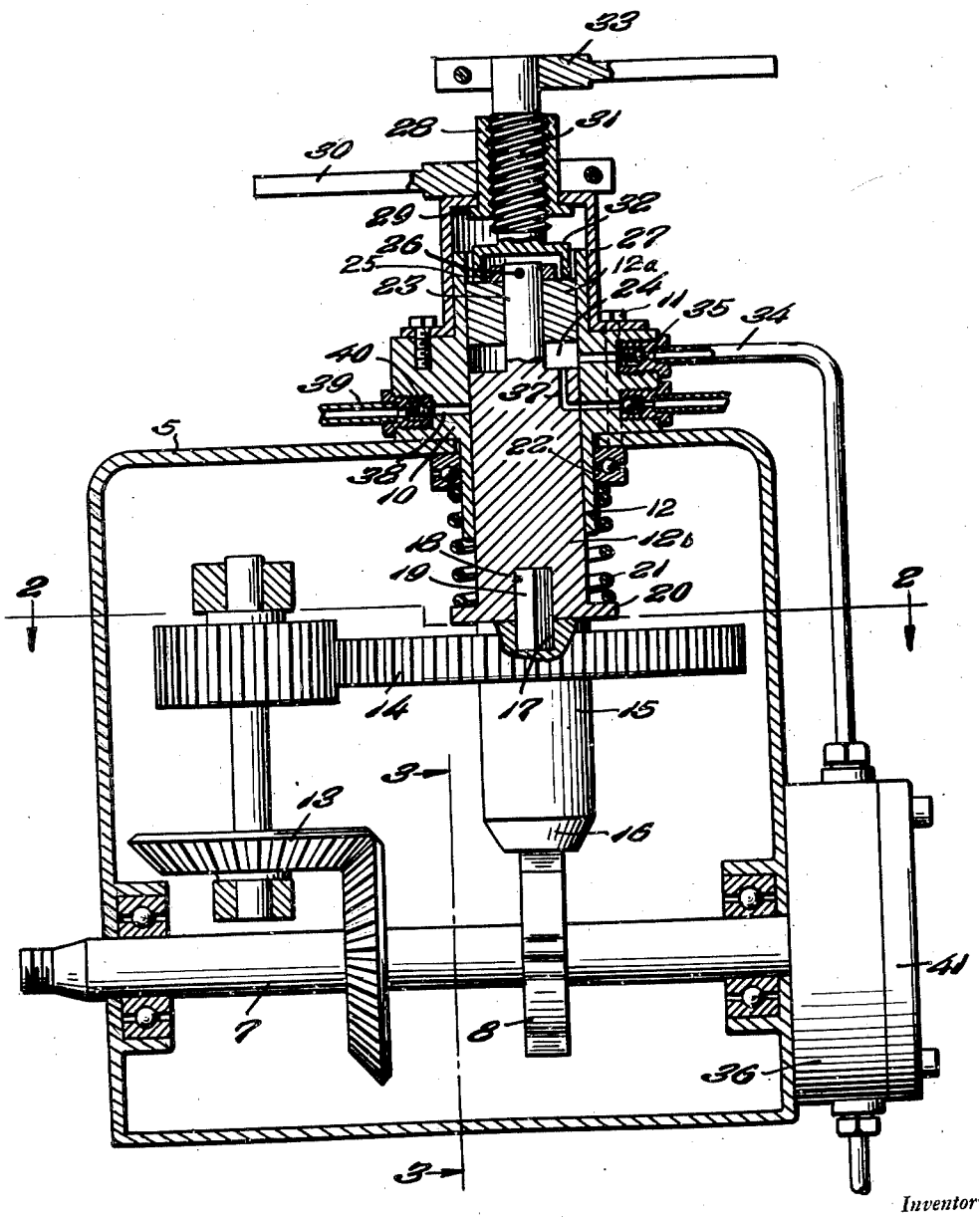


Fig. 1.

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Fig. 2.

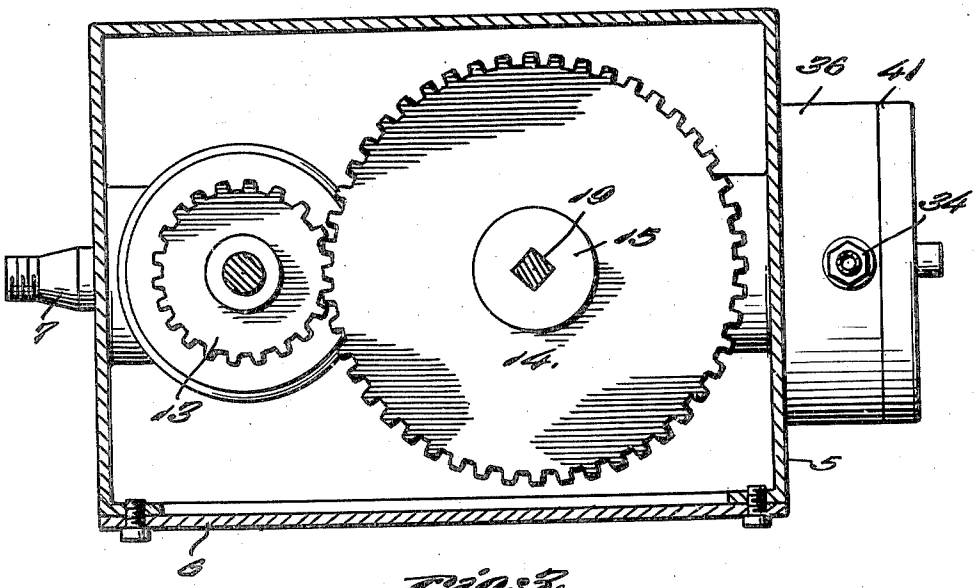
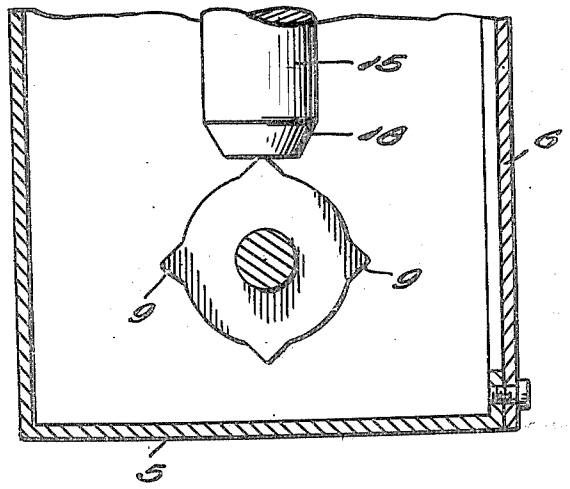


Fig. 3.



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Patented Dec. 20, 1949 2,491,795

UNITED STATES PATENT OFFICE

2,491,795

FUEL METERING AND DISTRIBUTING PUMP FOR DIESEL ENGINES

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Application October 2, 1946, Serial No. 700,627

3 Claims. (Cl. 103—2)

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The present invention relates to new and useful improvements in fuel metering and distributing pumps for Diesel engines.

An important object of the invention is to provide a pump of this character including a reciprocable and rotatable plunger arranged to pump the fuel during its reciprocating movement and arranged to distribute the fuel during its rotary movement.

A further object of the invention is to provide a variable compression chamber for the pump.

Another object is to provide governor control means for the variable compression chamber to control the amount of fuel discharged as well as manual control means independently of the governor control means.

A still further object is to provide a device of this character of simple and practical construction, which is efficient and reliable in operation, relatively inexpensive to manufacture and otherwise well adapted for the purposes for which the same is intended.

Other objects and advantages reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a vertical sectional view;

Figure 2 is a transverse sectional view taken on the line 2—2 of Figure 1, and

Figure 3 is a fragmentary sectional view of the cam shaft taken on the line 3—3 of Figure 1.

Referring now to the drawings in detail, wherein for the purpose of illustration I have disclosed a preferred embodiment of the invention, the numeral 5 designates a gear housing having a cover plate 6 secured to one side and in which a cam shaft 7 is journaled having a cam 8 secured thereto provided with a plurality of cam humps 9.

A pump barrel 10 is secured in the top of the housing by cap screws 11 and in which a sectional plunger 12 is mounted for reciprocating movement. The plunger is driven from a gear train 13 which includes a ring gear 14 having a hub 15 which extends downwardly from the ring gear to form a tappet 16 at its lower end riding on the cam 8. The upper end of the hub is formed with a squared recess 17 and the lower end of the plunger 12 is formed with a similar recess 18 in which a complementary shaped key 19 is fitted to rotate the plunger by the gear 14 while the plunger is reciprocated by the cam 8.

The lower end of the plunger is formed with a flange 20 engaged by a coil spring 21 mounted on

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the lower portion of the plunger, the upper end of the spring engaging a thrust bearing 22 surrounding the lower end of the valve 10 and positioned against the underside of the top of the housing 5.

The plunger is formed of upper and lower sections 12*a* and 12*b*, the upper section being slidable on a stem 23 rising from the lower section 12*b* to provide a variable compression chamber 24 between the sections of the plunger. The top of the stem 23 is provided with a collar 25 secured thereto by a pin 26 to maintain the upper section of the plunger on the stem.

A cap 27 is secured on the upper end of the barrel 10 and rises therefrom and an internally threaded collar 28 is positioned in the top of the cap with a flange 29 at its lower end engaging the underside of the top of the cap and a governor control arm 30 clamped on the collar above the cap against the top of the latter.

A screw 31 is threaded in the collar 28 and is formed at its lower end with an inverted cup 32 forming an adjustable stop for the upward movement of the upper section 12*a* of the plunger. A handle 33 is clamped on the top of the screw 31 to adjust the screw vertically in the collar 28 independently of the governor control arm 30 which also vertically adjusts the screw 31 by rotating the collar 28 while the screw is held stationary.

A fuel supply pipe 34 enters the barrel 10 at a point to communicate with the compression chamber 24 and is provided with a spring biased check valve 35. A fuel pump 36 is connected in the fuel line 34 and is operated by one end of the cam shaft 7 to supply fuel under pressure to the compression chamber.

A fuel discharge passage 37 is formed in the upper portion of the lower section 12*b* of the plunger and extends laterally at one side of the plunger for successive communication with a plurality of radially extending outlet ports 38 in the barrel 10 and to which delivery lines 39 are connected with spring biased check valves 40.

In the operation of the device the upper section 12*a* of the plunger is held spaced above the lower section 12*b* thereof to provide the compression chamber 24 therebetween by fuel admitted under pressure through the fuel line 34.

Upon the upstroke of the plunger 12 by the cam 8 the upward movement of the upper section 12*a* of the plunger is halted by the stop 32 and fuel in the compression chamber 24 is compressed by the lower section 12*b* of the plunger to force the fuel outwardly of the passage 37 and into one of the delivery lines 39. The plunger 12 is likewise

rotated by the ring gear 14 and gear train 13 connected to the shaft 7 and during rotation of the plunger the passage 37 successively registers with the outlet ports 38 in the barrel to thus distribute the fuel to the cylinders of the engine.

The compression area of the chamber 24 is regulated by the vertical adjustment of the stop 32 through the screw 31 and this adjustment may either be accomplished by the governor control arm 30 or the manual control arm 31.

The housing 5 is designed to carry a fuel level high enough to lubricate the cam and gear train on the shaft, the level of fuel being maintained by leakage from the plunger and barrel assembly and excess fuel is removed by a scavenging pump 41 also connected to the shaft 7.

The number of outlet ports 38 provided in the barrel is determined by the number of delivery lines 39 to be supplied by the pump.

In view of the foregoing description taken in conjunction with the accompanying drawings it is believed that a clear understanding of the device will be quite apparent to those skilled in this art. A more detailed description is accordingly deemed unnecessary.

It is to be understood, however, that even though there is herein shown and described a preferred embodiment of the invention the same is susceptible to certain changes fully comprehended by the spirit of the invention as herein described and the scope of the appended claims.

I claim:

1. In a fuel pump, a barrel, a sectional plunger working therein, a hollow threaded collar on said barrel, a stop extending through said collar for engagement by said plunger, a governor control connected to said collar and a handle secured to said stop, whereby said stop is adjusted either by rotation of said collar or by actuation of said handle.

2. In a fuel pump, a barrel, a sectional plunger working in said barrel, a compression chamber between said sections, fuel inlet means in said compression chamber, fuel outlet means in said barrel and a passageway in one of said plungers connecting said chamber and said fuel outlet, said plunger consisting of upper and lower sections, a pin on said lower section on which the upper section slidably seats, tensioning means on said lower plunger and stop means engaging said upper member.

3. The combination of claim 2 wherein said stop is adjustable and means engaging said stop for automatic or manual control.

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