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PUMP

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2 Sheets-Sheet 1

Fig. 1

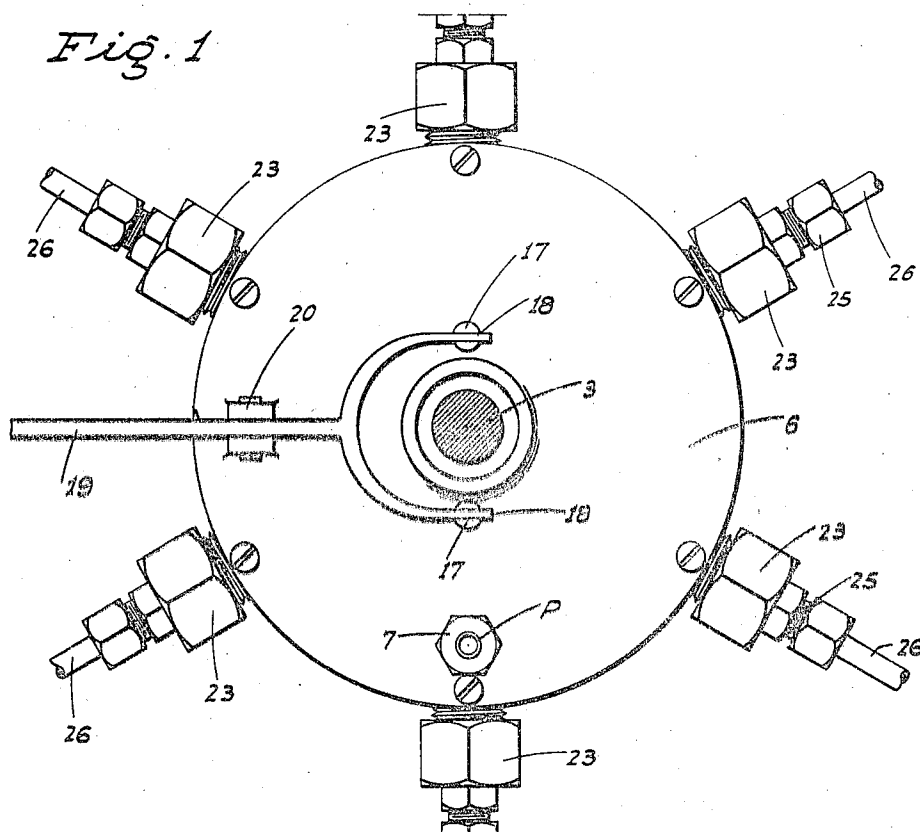
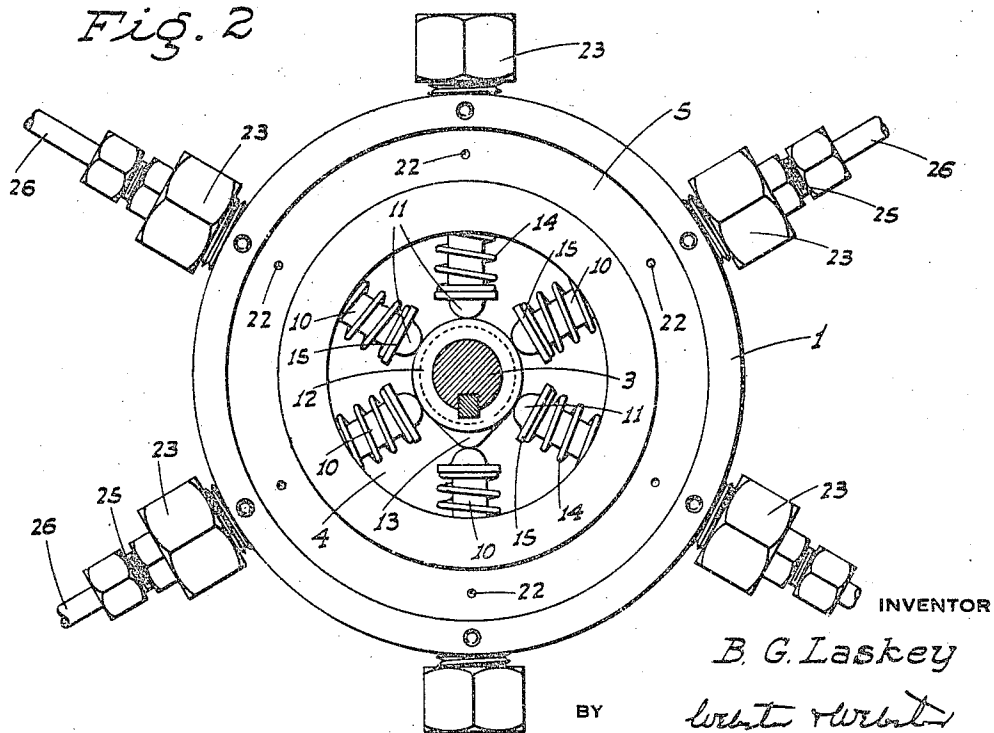


Fig. 2



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3 Claims. (Cl. 103—37)

This invention relates to pumps, and particularly to a pump of the reciprocating plunger type; an object being to provide a pump of this general type especially adapted and intended for use in pumping liquid fuel, such as gasoline, Diesel oil and similar fuels, to the individual cylinders of an internal combustion engine.

Another object is to construct the pump so that with a single rotary plunger actuating member, any desired number of plungers may be actuated, depending on the number of cylinders in any particular engine.

A further object is to provide means, under the ready control of the operator, to simultaneously alter the stroke of the plungers and so alter the volume of fuel pumped, irrespective of the speed of the rotary actuating member.

A still further object is to provide means whereby the volumetric output of any plunger may be altered irrespective of the remainder and without affecting the functioning of the stroke changing feature.

A still further object is to construct the pump so that it is extremely compact, and may be readily connected to the distributor shaft of the engine to be operated therefrom.

A further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purpose for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views:

Figure 1 is an end view of the pump.

Figure 2 is a similar view, with the end cap removed.

Figure 3 is a sectional elevation of the pump, showing the plunger actuating cam as set for the maximum plunger stroke.

Figure 4 is a similar view, showing the cam set for a short plunger stroke.

Referring now more particularly to the characters of reference on the drawings, the pump comprises a circular cup-like body 1 initially open at one end and having a central hub 2 projecting from its opposite end and serving both as a bearing for the drive shaft 3 and as a means for clamping engagement with a suitable supporting bracket.

The body includes an internal chamber 4 concentric with the shaft, and is formed in its outer

or open end with an annular channel 5. Chamber 4, and the channel are closed by an end head 6 through which the shaft projects, and having a fitting 7 registering with the enclosed channel 5 and connected to a fuel supply pipe P.

The body is formed with a plurality of bores 8 radiating from the shaft about the body and in a common transverse plane, there being as many of these bores as there are engine cylinders to be supplied with fuel. A sleeve or bushing 9 is slidably fitted in each bore and forms a cylinder for a close-fitting plunger 10. Each plunger has a rounded head 11 riding on a sleeve 12 slidably keyed on the shaft 3 and formed with a longitudinally extending cam 13 of short arcuate extent which tapers toward the periphery of the sleeve from one end to the other.

The head of each plunger is yieldably held against the cam or sleeve by a compression spring 14, on the plunger extending between a collar 15 on the plunger and a shoulder on cylinder 8.

The cam-sleeve is considerably shorter than the chamber 4 axially of the shaft so that said sleeve may move along the shaft to alter its position relative to the plungers. To effect this shifting, sleeve 12 is rotatably coupled to a shifting disc 16 from which opposed rods 17 slidably project through head 6. Outwardly of said head, the rods are swivelly connected to the forked ends 18 of a shifting lever 19 pivoted intermediate its ends on head 6 as at 20.

A small radial port 21 in the wall of each cylinder 9 just clear of the point of furthest advance of the plunger from each cylinder as shown in Fig. 3, while a registering port 22 extends between the corresponding bore 8 and channel 5, which is a fuel supply manifold.

Each cylinder sleeve 9 is adjustably held in place against the pressure of its spring 14 by a head 23 screwed into the outer end of bore 8 and engaging the cylinder. Each head 23 has an outwardly opening check valve 24 of suitable type therein, and mounts a fitting 25 to which an outlet pipe 26, leading to one of the engine cylinders, is connected.

In operation, it will be seen that with the manifold maintained full of fuel by mechanical or gravity pressure, and upon rotation of shaft 3 and cam 13, the plungers will be successively advanced from their cylinders by spring action, uncovering ports 21 and allowing fuel to enter the cylinders. Upon the plungers being successively engaged by the cam and moved out, the ports will be covered and the fuel confined in the

cylinders forced past the check valves and along pipes 26 to the points of use.

The amount of fuel forced out with each plunger stroke depends on the length of such stroke, which may be instantly altered by sliding the cam one way or the other as will be evident.

This operation of course affects all plungers alike, and if it is desired to alter the volume of fuel taken into (and hence forced from) any one cylinder without affecting the remainder, this may be done by adjusting the corresponding head 23 out from the position at which full register of ports 21 and 22 is obtained.

Such adjustment will, of course, cause the cylinder port 21 to move out of full register with the channel port 22, resulting in a restriction in the size of the opening between the ports. A corresponding reduction in the amount of fuel which can flow into the cylinder in the little time available, is therefore had over the amount which will flow into the other cylinders in the same time.

From the foregoing description it will be readily seen that I have produced such a device as will substantially fulfill the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described my invention, what I claim as new and useful and desire to secure by Letters Patent is:

1. A fuel pump including a body, a drive shaft turnable relative to the body, a plurality of cylinders mounted in the body in radiating relation to the shaft and in a common plane transversely thereof, plungers slidable in the cylinders, a fuel inlet to each cylinder and a checked outlet therefrom, springs urging the plungers radially inward and a cam mounted on and turnable with the shaft and successively engaging the plungers, and means included in part with each cylinder and its inlet to adjust the cross sectional area of the inlet.

2. A fuel pump including a body, a drive shaft turnable relative to the body, the body having a bore radially of the shaft, a cylinder slidable in the bore, a plunger slidable in the cylinder, instrumentalities to move the plunger in and out upon rotation of the shaft, an outlet port from the cylinder, the body having a fuel inlet port leading to the periphery of the bore and the cylinder having a port to register with the body port and positioned to be cleared by the plunger when the latter is fully advanced from the cylinder and means to adjust the cylinder lengthwise of the bore whereby to relatively move the ports into and out of full register.

3. A pump as in claim 2 in which said last named means comprises a head screwed into the outer end of the bore and engaging the cylinder, and a spring yieldably urging the cylinder against the head.

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