

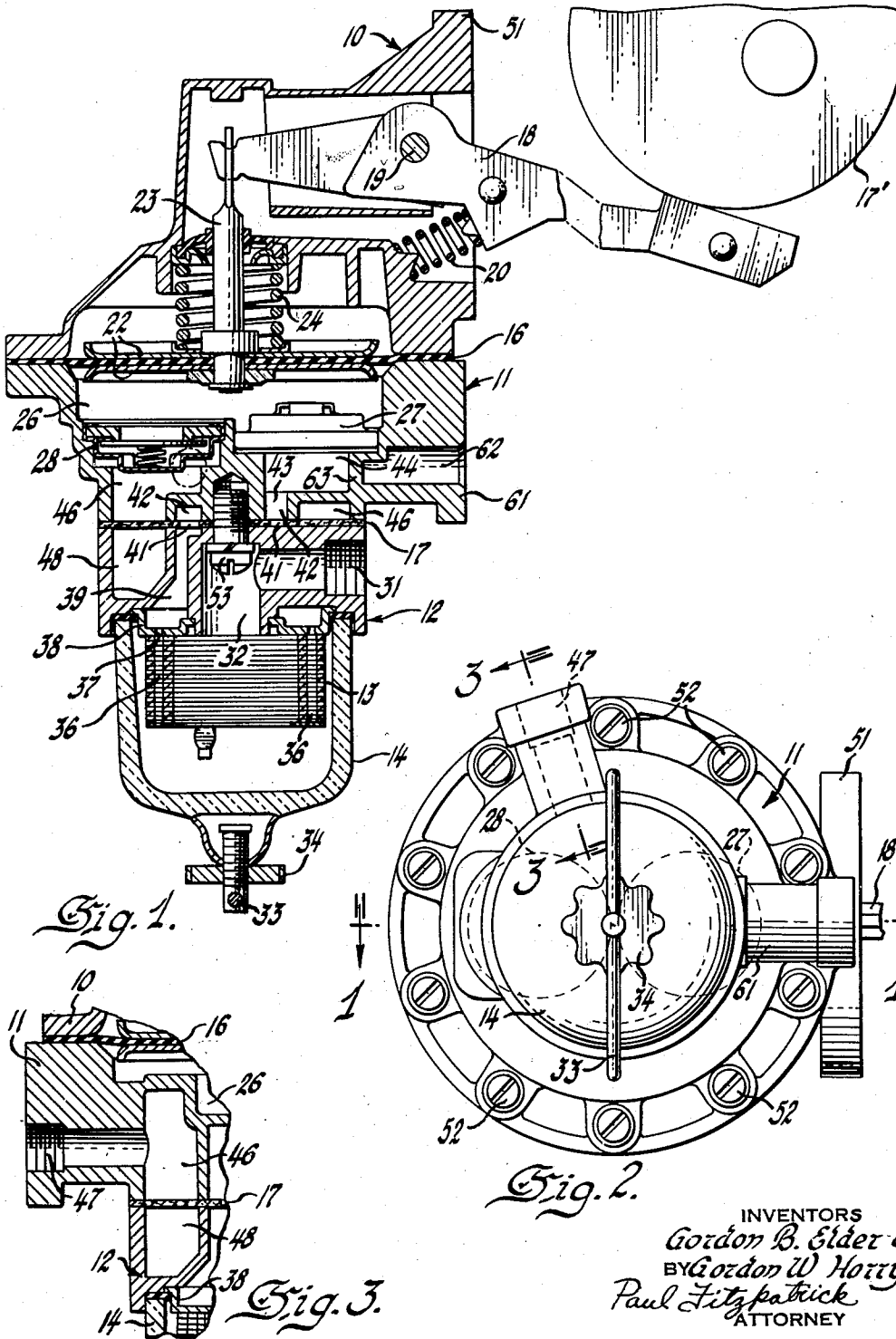
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FUEL PUMPS OF THE DIAPHRAGM TYPE

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FUEL PUMPS OF THE DIAPHRAGM TYPE

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3 Claims. (Cl. 103—150)

Our invention relates to fuel pumps of a well known type commonly used in automobiles and is primarily directed to providing, in a pump having the numerous advantages of the well known, widely used commercial fuel pump of the type hereinafter described, advantages of flexibility of installation by virtue of a construction such that the orientations of the fuel inlet and outlet ports with respect to the mounting flange or support of the pump and with respect to each other may be widely varied.

The principal object of the invention is to provide a pump suitable for automotive and other power plants adapted for a variety of installations without modifications of the parts, the diversities of installation requirements being satisfied by shifting the positions of parts of the pump.

The nature of the invention and the advantages thereof will be more clearly apparent from the succeeding detailed description of the preferred embodiment and the accompanying drawings, in which:

Figure 1 is a vertical sectional view of a fuel pump embodying the invention, taken on the plane indicated in Figure 2;

Figure 2 is a bottom plan view of the same; and

Figure 3 is a fragmentary sectional view taken on the plane indicated in Figure 2.

Referring first to Figure 1, the major fixed parts of the pump are a support body 10, an outlet cover 11, an inlet cover 12, a filter 13, and a bowl 14. A pump diaphragm 16 is interposed between the case parts 10 and 11, serving as a gasket between them, and a pulsator diaphragm or yielding membrane 17 is similarly mounted between the parts 11 and 12. The pump diaphragm may be oscillated by a suitable mechanism of known type such as a rotating cam 17' and a lever assembly 18 pivoted at 19 on the body 10 and biased by spring 20.

The lever assembly 18 is coupled to the diaphragm 16, which is mounted between plates 22, by a pull rod 23, and a compression spring 24 urges the diaphragm downwardly in opposition to the movement imposed by the pull rod. The pump chamber 26 immediately below the diaphragm in the cover 11 is in communication with an inlet valve 27 and an outlet valve 28 of known type.

Fuel is supplied to the pump through radial passage 31 in the inlet cover 12 and axial passage 32 which discharges the fuel into the bowl 14 retained in the usual manner by a bail 33 and thumbscrew 34.

The filter is of known type and may be held seated against the lower surface of the inlet cover 12 by the bowl. Filtered fuel rises through passages 36 in the filter and 37 in the upper plate 38 of the filter into a cored ascending passage or second inlet chamber 39 in the cover 12. The second inlet chamber 39 is arcuate in horizontal section so that it registers with one or more of a circumferential series of holes 41 in the pulsator gasket 17. Fuel flowing through the holes 41 enters an annular chamber 42 in the lower face of the outlet cover

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11 which communicates through a passage 43 and inlet chamber 44 with the inlet valve 27 of the pump. The chambers 42 and 44 may be considered together as an annular inlet chamber as they freely communicate at all times through the vertical passage 43.

Fuel discharged through valve 28 enters a discharge or annular outlet chamber 46 above the diaphragm 17, which chamber extends completely around the vertical axis of the pump radially outwardly of chamber 42. Fluid flows from the annular outlet chamber 46 through an outlet 47 in the cover 11. An air chamber or pulsator chamber 48 in the cover 12 below the diaphragm 17 is defined by walls registering radially with the walls which define the annular outlet chamber 46. Chamber 48 extends around the axis of the pump except for provision for inlet 31. Yielding of the diaphragm 17 smooths the pulsations of the pump output.

The pump body 10 comprises a suitable mounting flange 51 by which it is attached to the engine. The outlet cover 11 is fixed to the body by a number of machine screws 52. Specifically, as illustrated, there are ten such screws so that the cover 11 and thus the pump outlet 47 may be rotated in increments of 36° to dispose the outlet most suitably for a particular installation.

The inlet cover 12 is mounted on the outlet cover 11 by a machine screw 53 which is on the central axis of the pump and is accessible before the bowl is installed. Since only the single screw on the axis is used to hold these parts together, the orientation of cover 12 about the axis of the pump is infinitesimally adjustable.

The outlet cover 11 includes a boss 61 (Figures 1 and 2) in which is diecast a cavity 62 which may be connected to the pump inlet chamber 44 by breaching the wall 63 and which may be tapped for connection of an inlet line. This connection is not used in the pump arrangement shown, but makes it possible to use the part 11 in certain other types of installations where the strainer and bowl are not included in the pump, in which case the lower face of the cover 11 is closed by a suitable cover plate.

The description herein of the preferred embodiment of the invention to illustrate the principles thereof is not to be considered as limiting or restricting the invention, since modifications may be made by exercise of skill in the art.

We claim:

1. A fuel pump comprising a support body, a first cover attached to said body, a pumping diaphragm interposed between said support body and said first cover, means in said body and connected to said diaphragm for actuating said diaphragm, said first cover and said diaphragm defining a pumping chamber having inlet and outlet ports, one-way valves controlling said ports, an annular inlet passage formed in the lower face of said first cover and communicating with said inlet port, an annular outlet passage formed in the lower face of said first cover substantially concentric with and radially outwardly of said inlet passage and communicating with said outlet port, a second cover, means attaching said second cover to said first cover for rotational adjustment, an inlet passage formed in said second cover opening axially thereof and registering with a portion of said annular inlet passage in said first cover, a pulsator chamber formed in said second cover radially outwardly of said inlet passage in said second cover and in substantial axial alignment with said annular outlet passage, and a pulsator diaphragm interposed between said first and second covers, said pulsator diaphragm having a plurality of circumferentially spaced openings therein at least one of which provides communication between said inlet passage in said second cover and said annular inlet passage in said first cover.

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2. A fuel pump as defined in claim 1 wherein said means for attaching said second cover to said first cover for rotational adjustment comprises a single fastening means at substantially the central axis of said pump.

3. A fuel pump comprising a support body, a first cover attached to said body, a pumping diaphragm interposed between said support body and one face of said cover means connected to said diaphragm for actuating the same, said first cover and said diaphragm defining a pumping chamber having inlet and outlet ports, one-way valves controlling said ports, an annular inlet passage formed in the other face of said first cover and communicating with said inlet port, an annular outlet passage formed in said other face of said first cover radially outwardly of said inlet passage and communicating with said outlet port, a second cover attached to said first cover,

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an inlet passage formed in said second cover opening axially thereof and registering with a portion of said annular inlet passage in said first cover, a pulsator chamber formed in said second cover radially outwardly of said inlet passage in said second cover and in substantial alignment with said annular outlet passage, and a pulsator diaphragm interposed between said first and second covers, said pulsator diaphragm having at least one opening therein providing communication between said inlet passage in said second cover and said annular inlet passage in said first cover.

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