TRIPLE COVER FUEL PUMP
Dimitar Toschkoff, Flint, Mich., assignor to General Motors Corporation, Detroit, Mich., a corporation of Delaware.
Filed Sept. 22, 1965, Ser. No. 489,104
6 Claims. (Cl. 103—150)

ABSTRACT OF THE DISCLOSURE
A diaphragm type fuel pump having a pump head presenting a baffle in the pump inlet, a large inlet chamber and a large outlet chamber with these features in the head contributing to pump performance.

Specification
This invention relates to liquid pumps and more particularly to diaphragm type pumps.

Diaphragm type pumps have numerous fields of use and among these fields is the field of automobile internal combustion engine fuel pumps. Attempts have been made in the past to improve performance of such pumps with special attention being paid to volume discharge, smoothness of fluid flow, ruggedness in structure, and cost of manufacture. Complex castings and/or at least one diaphragm in addition to a pumping diaphragm have been utilized in these attempts which have met with substantial success but further improvement has become desirable.

An object of the present invention is to provide an improved diaphragm pump suitable for a variety of fields of use and which is characterized by excellent performance, long life expectancy, simplicity and low cost.

To this end, a feature of the present invention is a single diaphragm pump having triple covers with one or the first of those covers cooperating with a second of those covers to define an inlet chamber and with the second and third of those covers to define an outlet chamber, the third cover being fitted with inlet and outlet valves for controlling flow through the pump and a baffle being arranged upstream from an inlet valve.

This and other important features will now be described in detail in the specification and then pointed out more particularly in the appended claims.

In the drawings:
FIGURE 1 is an elevation view of a pump embodying the present invention, portions being broken away better to illustrate the construction;
FIGURE 2 is a sectional view looking in the direction of the arrows 2—2 in FIGURE 1 with a portion broken away to show an outlet valve; and
FIGURE 3 is a sectional view of a portion of the pump and looking in the direction of the arrows 3—3 in FIGURE 1.

In FIGURE 1, the supporting body 10 of a fuel pump is shown as having a flange 12 by means of which the body 10 may be attached to the side of an internal combustion engine.

As is conventional, the pump is provided with a protruding rocker arm 14 which is adapted to be oscillated by a reciprocable plunger 16 actuated by the engine. The pump body 10 has an underside opening 17 which is traversed by the flexible pumping diaphragm 18, and, as will be understood, this diaphragm is adapted to be reciprocated to cause a fluid flow through a pumping chamber 22 which is defined by the diaphragm 18 and an inner or third cover 24. An outer or second cover 26 is also utilized and intermediate of the two covers 24 and 26 is placed a first cover 28. In the following description and for conveni- ence, the intermediate cover 28 is termed the “first cover” and the outside cover 26 is called the “second cover” whereas the inner cover 24 is called the “third cover.” These covers are all preferably made of sheet metal with the second cover 26 being flanged as at 30 for holding the third cover 24 as well as the periphery of the diaphragm 18 in sealed engagement with the rim around the pump opening 17.

The intermediate or first cover 28 is elongated and flanged as at 31 to fit upon the continuous shoulder 32 formed within the second cover 26. It will be noted that the length of the first cover 28 fits or extends a substantial distance across the width of the second or outside cover 26.

The third cover 24 is formed with two cylindrical and depending portions 40 and 42. The portion 40 tightly encloses an inverted cup 44 having a series of ports 46 therein and these ports surround a rivet-like deflector 48 which in turn acts through a coil spring 50 to urge a disk valve 52 down and in closed position with relation to the ports 46. The portion 42 carries a deflector 43 action by means of a spring 42’ to urge a disk valve 45 upwardly and to a closed position.

The cylindrical portion 57 is in the form of a baffle 54 which is a horizontal wall having a circular series of four ports 56 therein.

The intermediate or first cover 28 has a cylindrical portion 57 which cooperates with the cylindrical portion 40 in tightly retaining an annular sealing washer 58 between them. The cylindrical portion 57 is apertured as at 60 so that free communication is had between an inlet fitting 62 and the baffle 54.

The outer or second cover 26 encloses the first and third covers 24 and 26 and also carries an outlet fitting 64 which is located to one side of the first or intermediate cover 28 and a corresponding protruding portion 26 of the outside or second cover 26.

With the above described construction, it would be noted that the inlet fitting 62 leads to an elongated inlet channel 70 defined by the first and second covers and that the outlet fitting 64 leads from an outlet channel 72 of circular proportions and defined by the first or intermediate cover 28 and the second or outer cover 26 on the bottom side and by the third or inner cover 24 on the top side.

In operation of the pump, fluid is drawn in through the fitting 62 into the elongated inlet channel 70 and then around the baffle 24 to the ports 46 and then by the inlet valve 52 into the pumping chamber 22. On the down stroke of the diaphragm 18, the fluid in the chamber 22 is forced downwardly and by the one-way outlet valve disk 45 into the circular outlet channel 72 then out from the pump by way of the outlet fitting 64.

A smoothness and quietness of flow not only occurs by virtue of the large configuration of the inlet channel 70 and the time delay action of the baffle 54 but also by virtue of the large circular outlet channel 72 which encompasses not only the outlet valve 45 but also the cylindrical protrusion 40 of the inner of third cover 24. The three covers are easily and conveniently fixed in their relative positions and on the pump body 10 thereby appreciably reducing the cost factor.

I claim:
1. A diaphragm pump having a body with an opening closed by a reciprocable pumping diaphragm, three sheet metal covers on said pump, a first of said covers cooperating with a second of said covers to define an inlet chamber and with the second and third of said covers to define an outlet chamber, said first cover being positioned and supported by the second and third covers, the said second cover enclosing said first and third covers, and the said
3. A diaphragm pump having a supporting body with an opening closed by a reciprocable pumping diaphragm, three covers on said pump, a first of said covers cooperating with a second of said covers to define an inlet chamber and with the second and third of said covers to define an outlet chamber, said first cover being positioned and supported by the second and third covers, said third cover having an inlet valve and an outlet valve for controlling fluid flow through the pump and including a baffle upstream of said inlet valve, and said second cover having an inlet directed toward said baffle and the inlet valve of said third cover.

4. A diaphragm pump having a supporting body with an opening closed by a reciprocable pumping diaphragm, three covers on said pump, a first of said covers cooperating with a second of said covers, to define an inlet chamber and with the second and third of said covers to define an outlet chamber, said first cover being positioned and supported by the second and third covers, the said third cover being fitted with inlet and outlet valves, said first cover being interposed between the said third cover and a wall of said second cover, and a cupped portion on said first cover extending toward said third cover to form an enlargement of said inlet chamber.

5. A diaphragm pump having a body with an opening closed by a reciprocable pumping diaphragm, three covers on said pump, a first of said covers cooperating with a second of said covers, to define an inlet chamber and with the second and third of said covers to define an outlet chamber, said first cover being positioned and supported by the second and third covers, the said third cover being fitted with inlet and outlet valves, and said second cover being an outside cover enclosing the said first and third covers and defining an inlet to said inlet chamber and an outlet from said outlet chamber.

6. A diaphragm pump as set forth in claim 5, said outlet chamber being circular, said inlet chamber having a width substantially less than that of said outlet chamber and being elongated with a length extending substantially across the diameter of said outlet chamber.

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ROBERT A. O'LEARY, Primary Examiner.
DONLEY J. STOCKING, Examiner.
W. L. FREEH, Assistant Examiner.