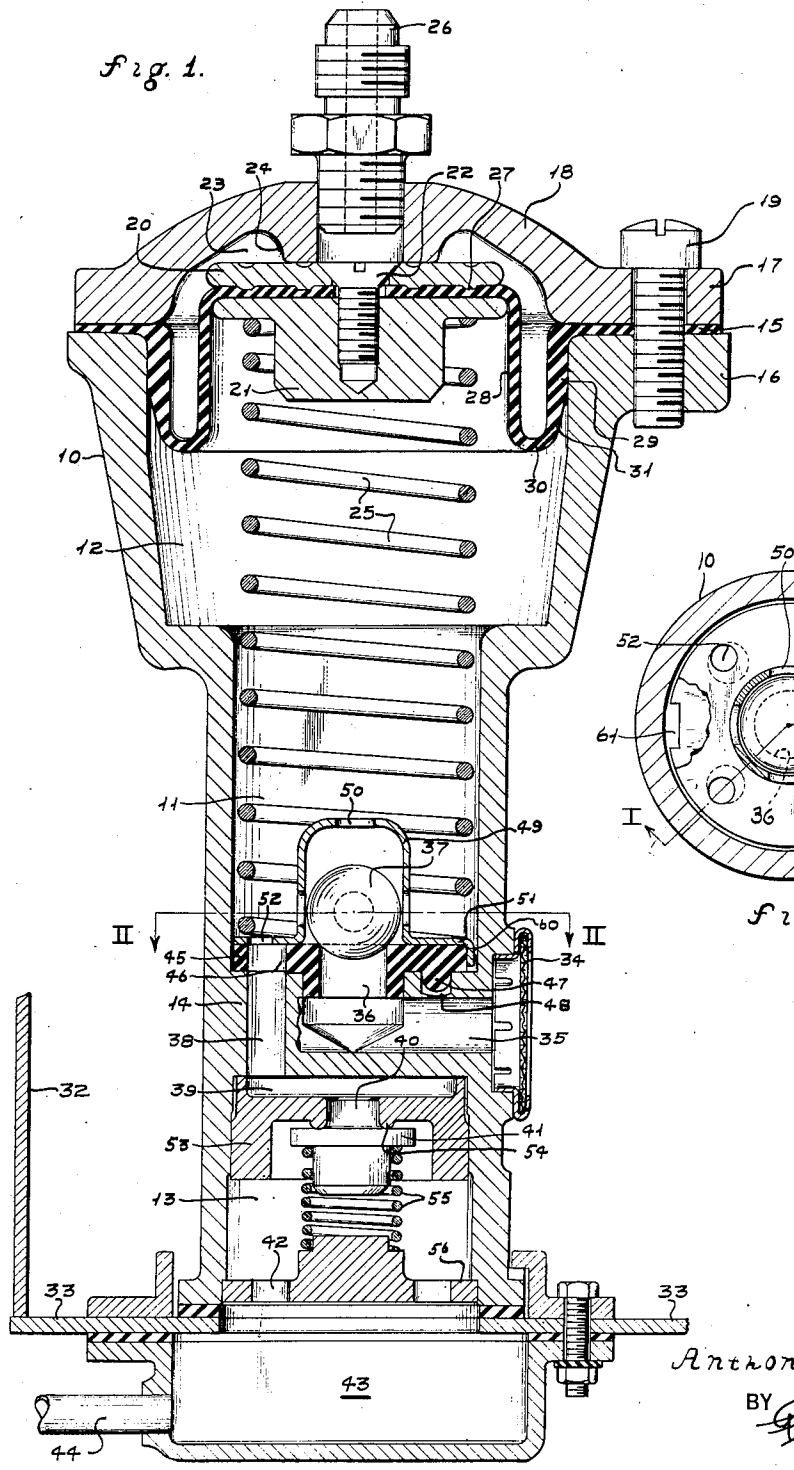
May 2, 1950 A. A. QUIMPER 2,506,434

PUMPING MECHANISM

Filed Jan. 18, 1946

Fig. 1.



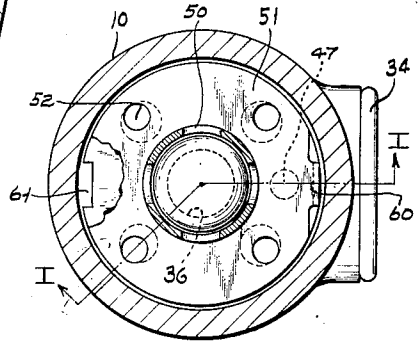


Fig. 2.

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PUMPING MECHANISM

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1 Claim. (Cl. 103—44)

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This invention relates to pumps and particularly to a pump designed for the purpose of pumping predetermined quantities of syrup from a container thereof into a mixing chamber or vessel in which the syrup is diluted with a predetermined quantity of water or other diluent for beverage purposes.

The pump made according to this invention is particularly adapted for use in an automatic dispensing machine where the pumping mechanism is under control of an automatic timing device, although it will be apparent from the following description that in certain aspects the pumping mechanism is adaptable to more general pumping purposes.

An object of the invention is to provide a novel and useful pumping mechanism of the character described.

More particularly an object is to provide a pumping mechanism adapted to be disposed in a body of refrigerated syrup maintained at a suitably controlled temperature with all the working parts of the pump including the valve mechanisms disposed in the pump body so that the entire pumping mechanism is maintained at a uniformly low temperature. This is particularly important in ensuring the dispensing of a constant quantity of syrup at each dispensing stroke, as the quantity of syrup dispensed varies with its viscosity which is in turn affected by temperature.

Another object is to provide an improved flexible diaphragm for a pump of the character described.

Still another object is to provide a simplified valve mechanism for such a pump.

Another object is to provide a pumping mechanism which can be readily assembled and disassembled for cleaning and repair.

A further object is to provide a pumping mechanism, the major parts of which can be made from bar stock on screw machines.

These and other objects are effected by my invention as will be apparent from the following description and claims taken in connection with the accompanying drawings, forming a part of this application, in which:

Fig. 1 is a vertical section of an embodiment of the pumping mechanism taken generally on the line I—I of Fig. 2 and including a fragmentary portion of the syrup tank in which the pump is disposed; and

Fig. 2 is a section taken on line II—II of Fig. 1 in the direction of the arrows.

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The pump shown in the drawings is twice the actual size of the pump as it was built.

The main pump body is indicated at 10. This may be cast and machined or may be turned out of bar stock on a screw machine. Its main portions comprise a generally cylindrical middle chamber 11, an enlarged and slightly flared upper chamber 12, a generally cylindrical lower chamber 13, and an apertured portion 14 between the lower chamber 13 and the middle chamber 11.

The pump is of the diaphragm type, the diaphragm 15 being clamped between a flange 16 provided on the upper end of the main pump body 10 and a flange 17 provided on the closure cap 18. The pump body and the closure cap are held together by a plurality of circumferentially-spaced screws, one of which is shown at 19. The central portion of diaphragm 15 is supported by and clamped between an upper plate or washer 20 and a lower plate or nut 21, by a screw 22.

The top wall of cap 18 is curved upwardly as shown to provide a chamber 23 above the diaphragm for receiving the impelling medium which discharges the contents of the pump by depressing the diaphragm. Centrally, the cap 18 is provided with a depending flange 24 to limit upward movement of the diaphragm under the influence of spring 25 when the pressure of the impelling medium is relieved from the chamber 23. The impelling medium which may be liquid or gas under pressure is supplied to chamber 23 from a suitable source through an apertured coupling member 26. Preferably, plate 20 has concentric rings 27 embossed on its under surface to provide a good seal between the plate and the flexible diaphragm.

The diaphragm 15 is preferably made of rubber or an equivalent flexible and resilient material initially molded into the shape shown in Fig. 1. Thus, when the pump is static, as shown, the diaphragm is not distorted and thereby subjected to forces leading to creasing and cracking. It should be noted that the central portion 28 of the diaphragm which is the portion moved under the influence of pressure, has a thinner wall than the outer portion 29 which is relatively immovable, that the radius of curved portion 30 is ample to allow free movement of the central portion 28 without friction or distortion and that the portion 31 joining portions 30 and 29 is tapered. The whole construction is such that when the diaphragm is distended by pressure, its walls conform easily and naturally with the walls of upper pump chamber 12 without undue distortion or stresses.

As has been stated, the pumping mechanism is preferably immersed in the liquid to be pumped. A portion of a syrup tank is indicated by a side wall 32 and a bottom wall 33. The intake of syrup to the pump is through a screen 34, a substantially horizontal passageway 35 and a vertical portion 36 past inlet check valve 37 to the chamber 11. The discharge from chamber 11 is through four spaced vertical ports 38 leading to a common chamber 39, then through port 40, past outlet check valve 41 into chamber 13, and then through port 42 into chamber 43 and out discharge conduit 44.

Referring to the inlet check valve 37 and its cooperating parts, there is provided a seat in the form of a rubber or rubber-like disc 45 having four apertures 46 to coincide with the vertical discharge ports 38 and a central aperture forming the intake port 36 on the edges of which ball 37 seats tightly on the discharge stroke of the pump. The disc 45 is centered by a projection 47 near its periphery which extends into an aperture 48 formed in the pump body. Movement of the ball valve 37 is restrained by a cage 49 provided with apertures 50 through which syrup may flow into the chamber 11, and having a horizontal flange 51 provided with four openings 52 corresponding to and aligned with the openings 46 in disc 45 and with the discharge ports 38. The cage 49 is properly aligned by lugs 60 which fit into diametrically opposite recesses 61 formed at the periphery of disc 45. I have found that a ball 37 made of glass is very satisfactory for the purpose described although other materials may be used.

Now referring to the discharge valve 41 and its associated parts, a ring 53 of the general shape shown is pressed into the lower part of the pump body. Centrally, this ring carries the discharge port 40. The discharge check valve 41 seats against the projecting rim 54 formed around port 40, this valve being normally seated by a spring 55 disposed between the valve and a retainer plate 56 in which are disposed the discharge ports 42. Preferably, though not necessarily, the valve 41 is made of rubber or rubber-like material.

The exact manner of fastening the pump to the bottom of the syrup tank forms no part of the present invention and is shown only schematically. Preferably, the pump is detachably connected so that it becomes easily accessible for cleaning and repairs.

The operation of the pump is believed apparent from the foregoing description but will be briefly summarized. It is primarily intended for use in a "one shot" system, that is, where the requisite volume of syrup for each drink is discharged on a single downstroke of the diaphragm. Assuming that a suitable mechanism has been actuated to admit fluid under pressure to the upper side of the diaphragm the diaphragm moves downwardly, forcing syrup through ports 38 into chamber 39 through port 40 and past check valve 41 into

chamber 13, through ports 42 into chamber 43 and out conduit 44 to the mixing chamber or vessel (not shown). During this operation ball check valve 37 is firmly seated.

When the pressure is relieved on diaphragm 15, as by a suitable timing mechanism, the spring 25 forces the diaphragm up to the position shown in Fig. 1 and simultaneously, valve 41 seats while valve 37 is unseated by the incoming syrup which flows into chamber 11, whereupon the pump is ready for the next dispensing operation. The amount of syrup discharged on a single stroke of the diaphragm depends on the pressure applied and the duration of its application.

It will be apparent from the foregoing description that the invention provides a simple, compact, rugged and readily assembled pump, particularly useful for the purpose described but also capable of other applications.

While I have shown my invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof.

What is claimed is:

In a pump of the type having a pressure-responsive operating member, the combination of a main pump body, an intake valve assembly disposed in the body axially thereof, said intake valve assembly comprising a valve member normally seated by gravity, a discharge valve assembly also disposed in the pump body below and in vertical alignment with the intake valve assembly, said pump body having an inlet port located in a side wall of the pump body between the inlet and discharge valve assemblies, said discharge valve assembly comprising a seat member closely fitting the lower interior wall of the pump body, said seat member being provided with a port centrally thereof, a discharge valve member cooperating with said port on the lower side thereof, a retainer ring having a close fit with the lower interior wall of the pump body, said retainer ring having at least one port therethrough through which the contents of the pump are discharged when the discharge valve member is opened under pressure, said port being substantially parallel to the vertical axis of the main pump body, and spring means disposed between the retainer ring and the discharge valve member to normally seat said member.

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