June 15, 1954 E. B. OGDON 2,681,013

APPARATUS FOR MAINTAINING AIR CUSHIONS IN PUMPS

Filed July 14, 1950 2 Sheets-Sheet 1

Fig. 1.

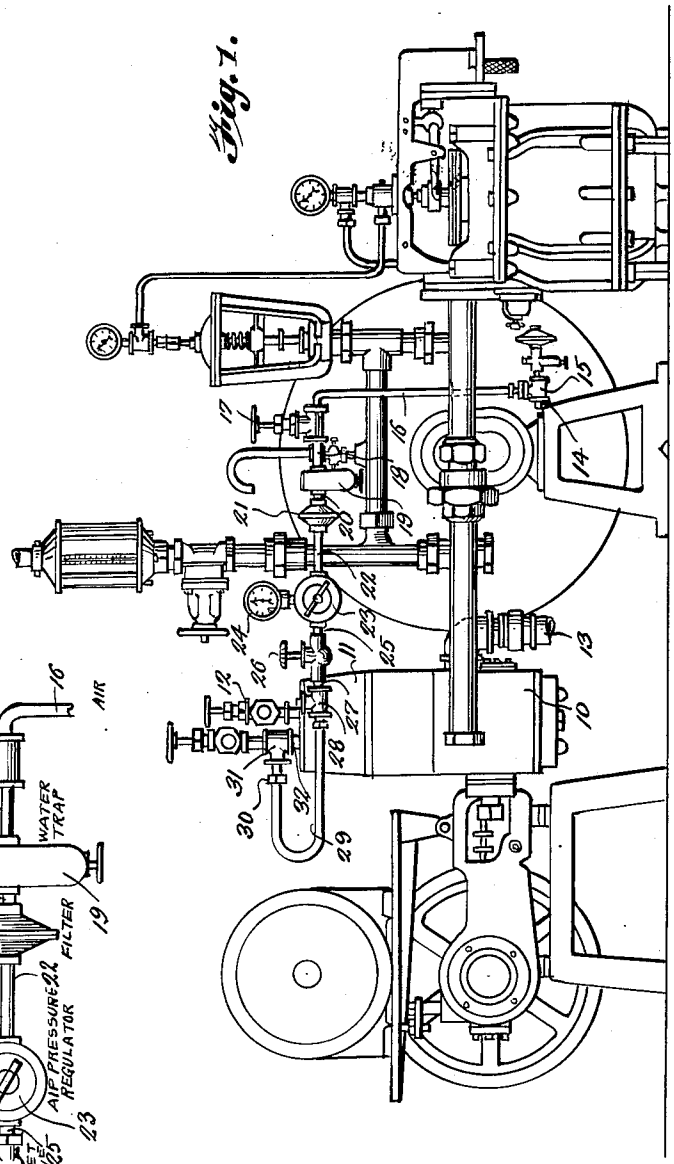
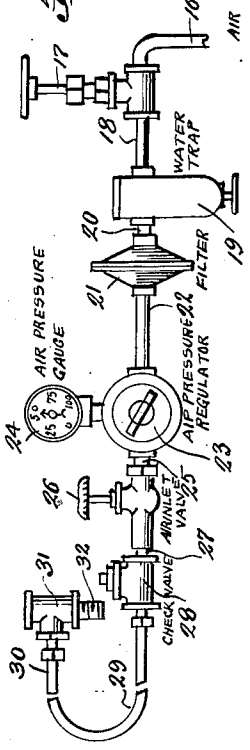


Fig. 2.



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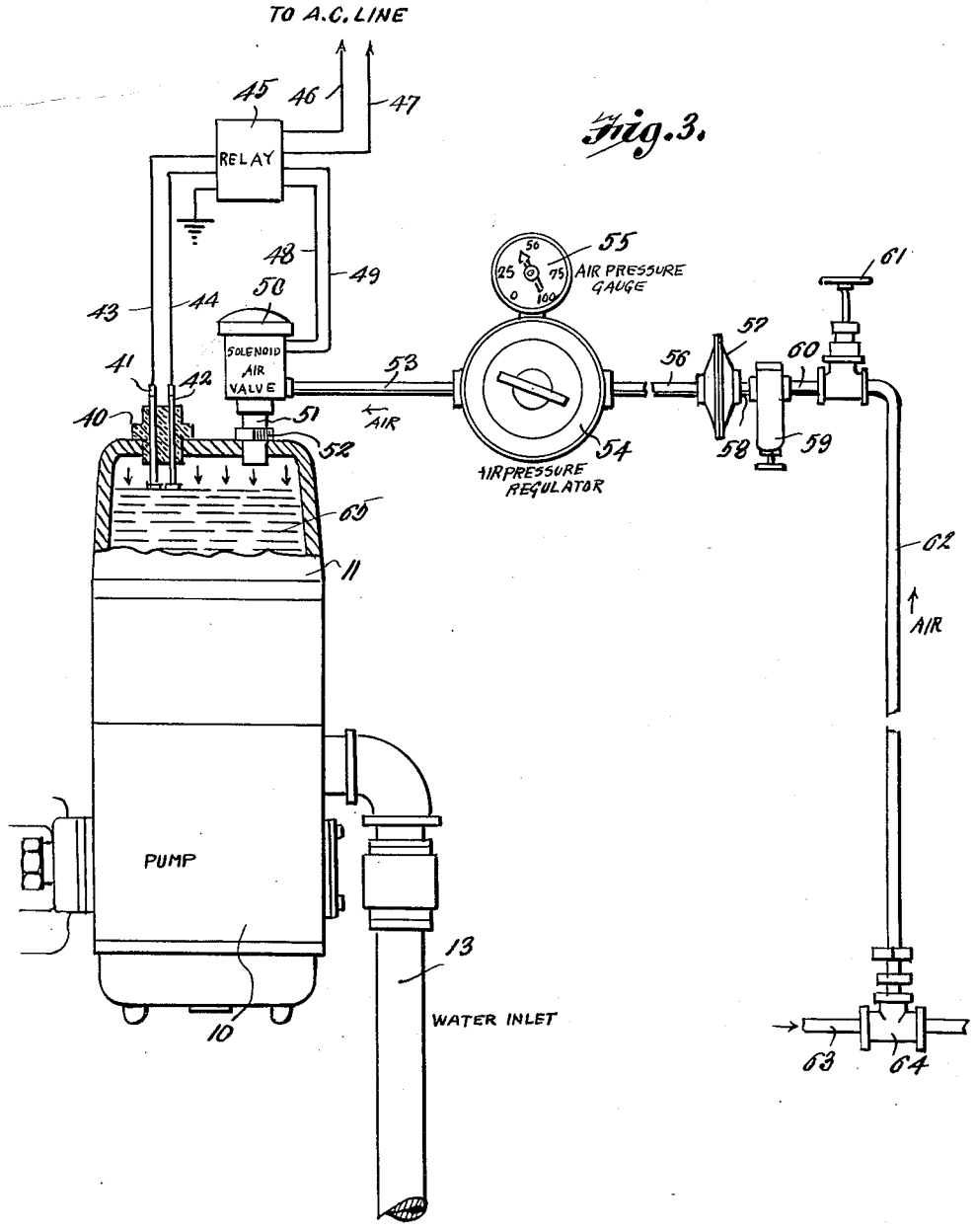

Fig. 3.

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APPARATUS FOR MAINTAINING AIR CUSHIONS IN PUMPS

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2 Claims. (Cl. 103—224)

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The present invention relates to an apparatus for maintaining air cushions in pumps and it consists in the combinations, constructions and arrangements of parts herein described and claimed.

Generally there is provided an apparatus which may be manually operated when necessary or which may be fully automatic in its operation. The apparatus acts to reestablish an air cushion in a pumping unit whenever the same becomes lower than the necessary minimum required for proper operation of the pumping unit.

It is accordingly an object of the invention to provide novel means for maintaining an air cushion in a pump.

A further object of the invention is the provision of novel automatic control means for maintaining an air cushion in a pump.

A still further object of the invention is the provision of novel manually controlled means for maintaining an air cushion as above set forth.

Still another object of the invention is the provision of novel apparatus for performing the objects above-mentioned.

Other and further objects of the invention will become apparent from a reading of the following specification, taken in conjunction with the drawings, in which:

Figure 1 is a side elevational view of an embodiment of the invention shown installed upon an apparatus which includes a pump in which a certain air cushion must be maintained,

Figure 2 is a fragmentary side elevational view illustrating the essential parts of the apparatus forming the present invention wherein the same is manually controlled, and

Figure 3 is a fragmentary elevational view, partly in section and partly schematic, illustrating an automatically operated apparatus embodying the present invention.

Referring more particularly to the drawings, there is shown therein, in Figure 1, a machine known in the trade as a "Syncrometer" and which includes a pump generally indicated at 10 which pump is provided with dome extension chamber 11 in the upper end of which is mounted a globe valve 12. There is also provided a water inlet pipe 13 which leads from a deaerator and an air inlet pipe 14. The remainder of the apparatus is conventional with the exception of the apparatus now about to be described and the machine is one which is utilized in the mechanical bottling of liquids such as "Soft drinks." For a better understanding for the reasons for the present invention, it may be stated that in order

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that the pump run smoothly, it is necessary to have an air cushion within the dome extension 11 and that when such air cushion is lost or diminished it will cause the machine, a pulsation in the water lines leading to and from the pump will occur thereby causing the water lines to vibrate violently which, if not corrected in time, will cause damage to the water lines and also cause faulty metering of the water passing through the pump.

To the air inlet pipe 14 there is connected a T-joint 15 which is, in turn, connected with a pipe 16 which is, in turn, connected with a globe valve 17 and thence by a nipple 18 to a water trap 19.

The trap 19 is, in turn, connected by a nipple 20 to a filter 21 which is, in turn, connected to a nipple 22 which leads to a pressure regulator 23 which is equipped with a pressure gauge 24 and the regulator 23 is connected by means of a nipple 25 to an air inlet valve 26 which latter is connected by a nipple 27 to a check valve 28. The check valve 28 is, in turn, connected by a pipe 29 to a fitting 30 which connects the same with a T-joint 31 which connects it with a pipe 32 leading to the dome extension 11.

In the operation of this form of the invention, it will be apparent that when the air cushion in the dome 11 becomes too small, it is only necessary to open the valve 17 thus allowing air to pass on through the pipe 16, valve 17, nipple 18, thence through the water trap 19 and nipple 20 thence through the filter 21 and nipple 22 to the regulator 23 which may be set to a predetermined pressure, such pressure being indicated upon the pressure indicator 24. At this time the valve 26 may be opened, such valve being preferably of that type requiring merely a downward pressure for its operation and having a spring or other means for the automatic return of the same to closed condition. This action will allow air to pass through the pipe 29, fitting 30, T-joint 31 and pipe 32 into the upper end of the dome 11 thus reestablishing the necessary pressure within the dome 11 and making it unnecessary to shut down the machine for even a short period of time.

In Figure 3 there is illustrated a form of the invention which is wholly automatic in its operation. Here the pump 10 is provided with a dome extension 11 having an insulator 40 extending through the upper end thereof and through which insulator a pair of contact members 41 and 42 extend to a point below the top of the dome 11 at which it is desired to have the lower end of the air cushion maintained. The contact mem-

bers 41 and 42 are connected, respectively, by wires 43 and 44 to a relay 45 which is, in turn, connected by wires 46 and 47 to a source of electrical power and by wires 48 and 49 to a solenoid operated air valve 50 which is connected to a dependent pipe 51 extending through a fitting 52 to a point immediately below the upper end of the dome 11. The valve 50 is also connected with an air pipe 53 which is, in turn, connected with an air pressure regulator 54 having a gauge 55 associated therewith and which regulator 54 is, in turn, connected by a pipe 56 to a filter 57 which latter is connected by a nipple 58 with a water trap 59. The trap 59 is connected by a nipple 60 to a globe valve 61 which is, in turn, connected to a pipe 62 which latter is connected to an air supply pipe 63 by means of a T-fitting 64.

In the operation of the form of the invention just described, it will be apparent that as the air cushion becomes lessened that water, indicated at 65, will rise within the dome 11 and that eventually the water will contact the contact members 41 and 42 thus completing a circuit to the relay 45 and also to the solenoid operated air valve 50 thus opening the valve 50 and allowing additional air to be fed to the upper end of the dome through the pipe 51. The amount of such air and the pressure thereof may be regulated by the air pressure regulator and the amount of such pressure will be indicated upon the gauge 55. Obviously, the valve 61 may be utilized to manually control the supply of air to the air pressure regulator through the air trap 59 and filter 57. Obviously, also, when the pressure of air within the dome 11 increases the water 65 will be depressed and eventually will recede to a point where it is no longer in contact with the members 41 and 42 thus allowing the air valve 50 to close. It will be seen that the apparatus will act to maintain a constant or substantially constant head of air in the upper end of the dome 11 for the purposes above set forth.

While but two forms of the invention have been shown and described herein, it will be

readily apparent to those skilled in the art that many minor modifications may be made without departing from the spirit of the invention or the scope of the appended claims.

What is claimed is:

1. An apparatus of the character described comprising, in combination with a pump having a dome extension, a source of air under pressure, a pipe interconnecting said source and the upper end of said dome, and means for controlling the passage of air through said pipe, said means including a pressure regulator and an electrically operated valve in said pipe, a pair of contact members mounted in the upper end of said dome adapted to be closed by the rise of water in said dome, and an electrical circuit including said contact members, said valve and a source of electrical current.

2. An apparatus of the character described comprising, in combination with a pump having a dome extension, a source of air under pressure, a manually operable valve, a pipe interconnecting said valve and said source of air, a water trap connected with said valve, a filter connected with said trap, an air pressure regulator connected with said filter, a pipe interconnecting said regulator and said dome, an electrically operable valve in said pipe, and automatic means for operating said electrically operable valve, said means including a pair of contact members mounted in the upper end of said dome and adapted to be closed by the rise of water therein, and an electrical circuit including said contact members, said electrically operable valve and a source of electrical current.

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