

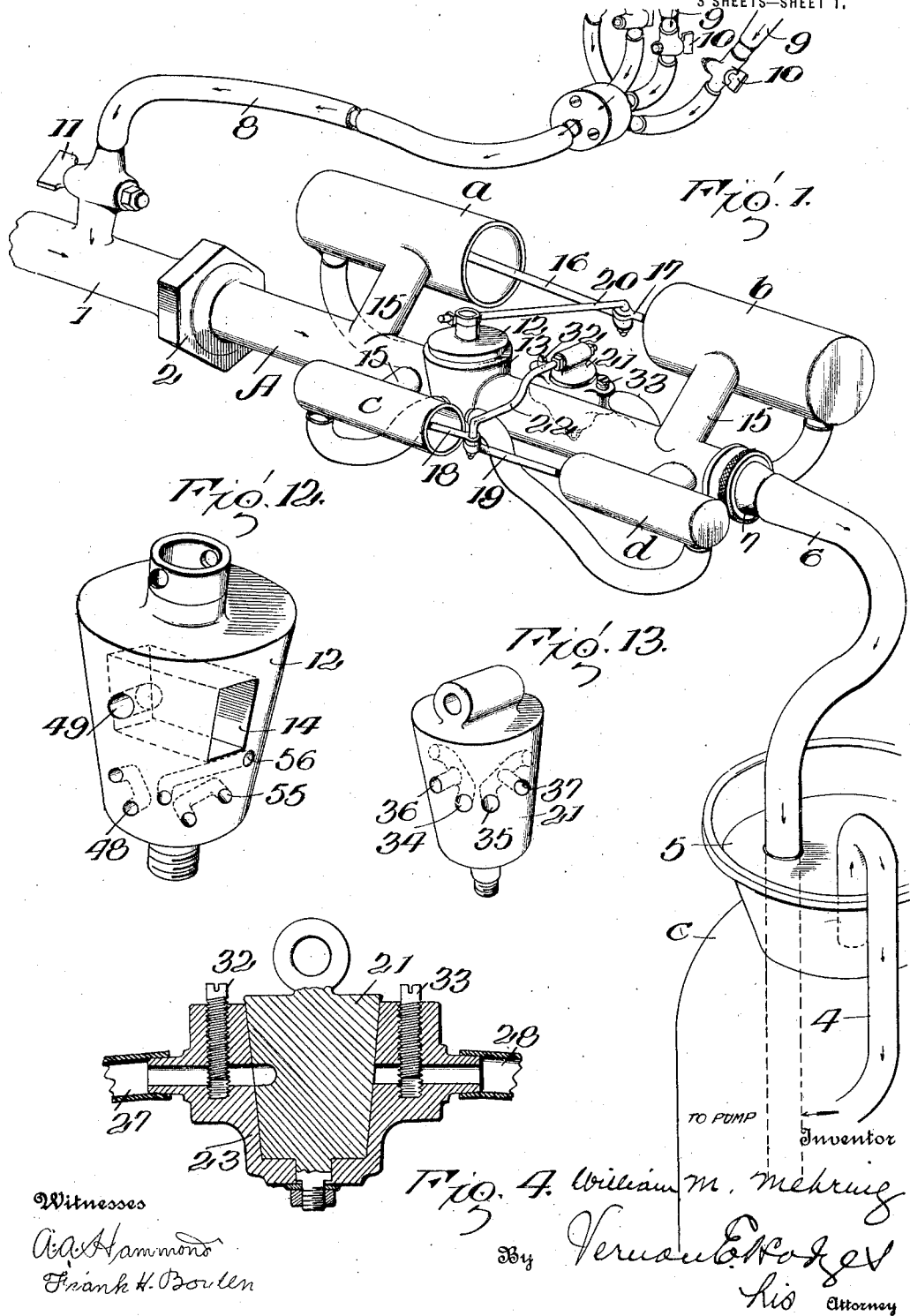
W. M. MEHRING.
PULSATOR.

APPLICATION FILED FEB. 17, 1915.

1,355,839.

Patented Oct. 19, 1920.

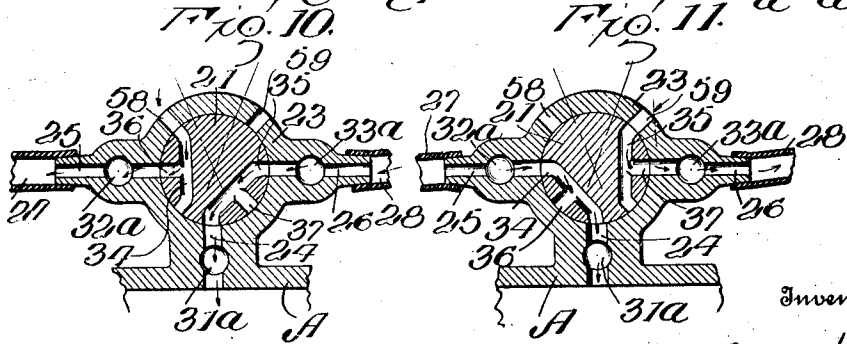
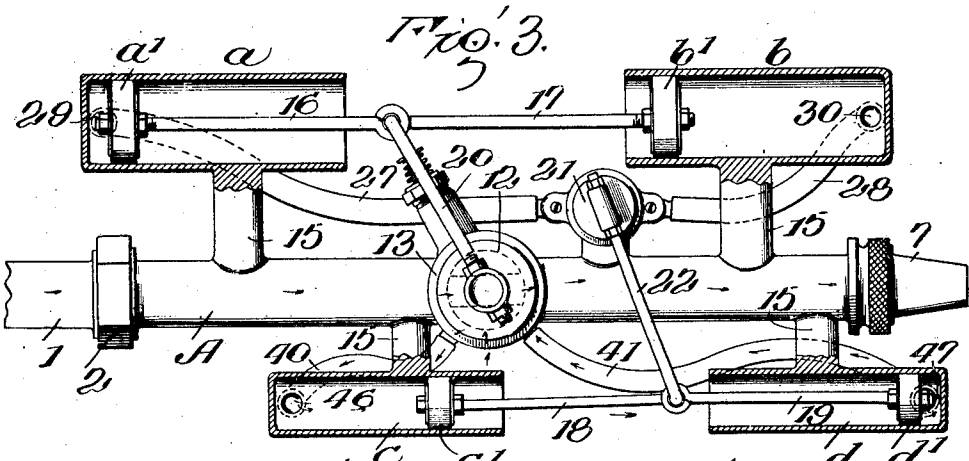
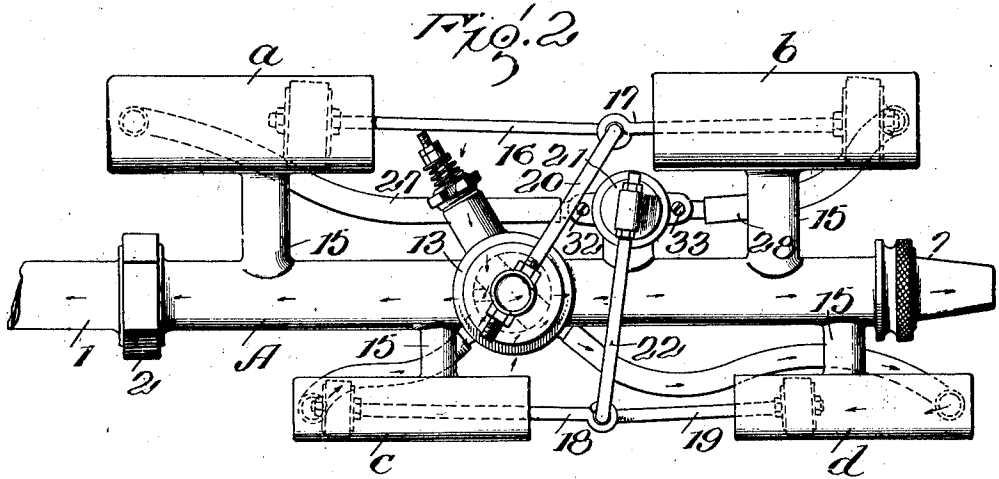
3 SHEETS—SHEET 1.



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Witnesses
A. A. Hammond
Frank H. Borden

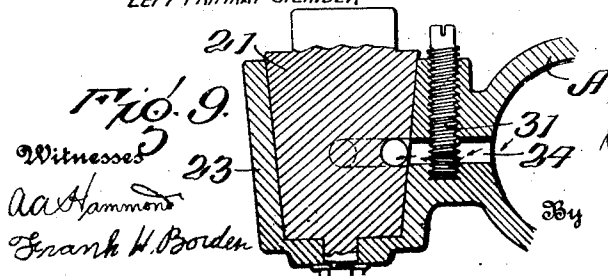
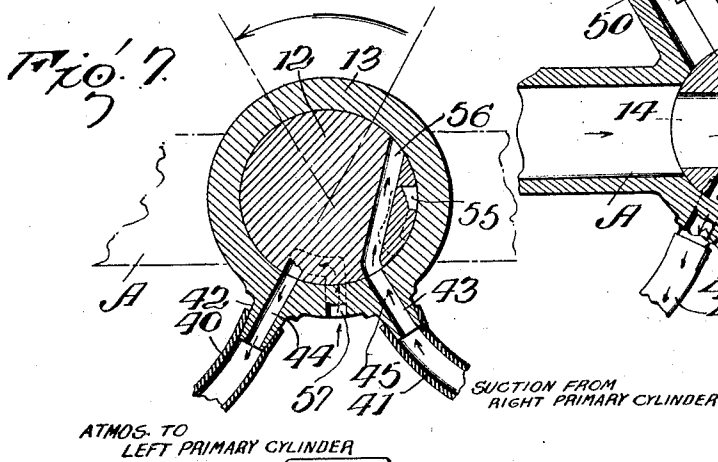
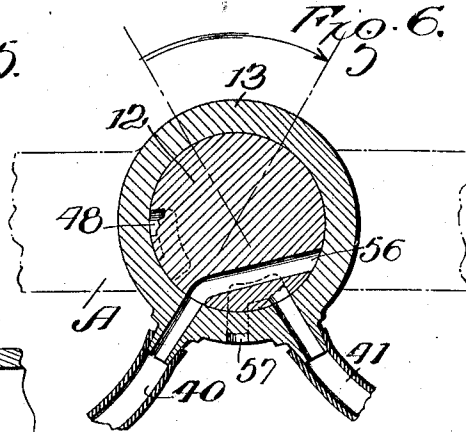
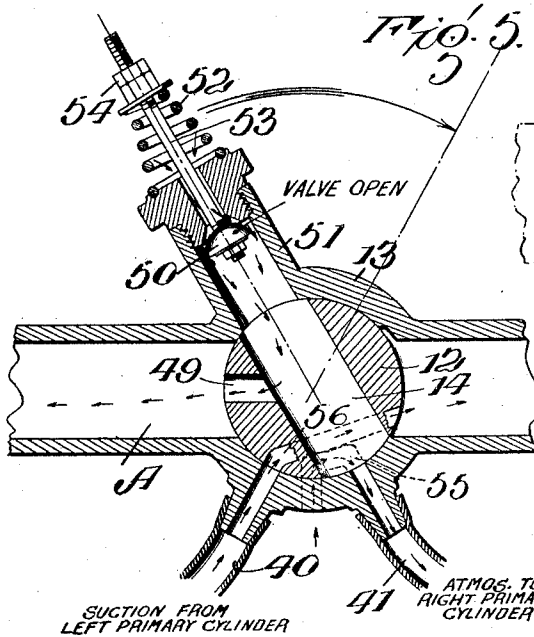
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UNITED STATES PATENT OFFICE.

WILLIAM M. MEHRING, OF KEYMAR, MARYLAND.

PULSATOR.

1,355,839.

Specification of Letters Patent.

Patented Oct. 19, 1920.

Application filed February 17, 1915. Serial No. 8,738.

To all whom it may concern:

Be it known that I, WILLIAM M. MEHRING, a citizen of the United States, residing at Keymar, in the county of Carroll and State of Maryland, have invented certain new and useful Improvements in Pulsators, of which the following is a specification.

My invention relates to an improvement in pulsators, such as are used more particularly with cow-milkers, its function being to partially or wholly interrupt the vacuum, thus creating an intermittent suction upon the cow's udder as in the sucking of a calf.

A further object is to provide a simple, light and effective pulsator of such construction that it may be cheaply constructed and quickly assembled and easily cleaned at all times to make it sanitary, provision being made to create a direct passage for the milk, in the main without coming in contact with the working parts of the pulsator.

In the accompanying drawings:—

Figure 1 is a view in perspective of my improved pulsator;

Fig. 2 is a plan view with the pistons shown in dotted lines in one position;

Fig. 3 is a view in plan and partly in horizontal section showing the pistons moved to their opposite positions;

Fig. 4 is a longitudinal vertical section through the secondary suction-valve;

Figs. 5, 6, 7 and 8 are horizontal sections through the central gate or valve taken in different planes, and with the gate in different positions;

Fig. 9 is a view through the secondary valve at right-angles to the view shown in Fig. 4;

Figs. 10 and 11 are horizontal sections through the secondary valve showing it turned in two different positions;

Fig. 12 is a view in perspective of the central valve or gate; and

Fig. 13 is a similar view of the secondary valve.

A, represents a straight brass pipe or tube, it being the main pipe of the pulsator, through which the milk is drawn by suction from the pipe 1, which is fastened thereto by any approved form of coupling 2, the suction of course being from a suitable suction-pump (not shown) through the hose or pipe 4 in the cover 5 of the can C,

a short hose 6 extending from the nipple 7 of the pulsator to the cover of the milk-can.

Of course it is understood that the pipe 1 is kept supplied from the hose 8, of which there are several connected with pipe 1, but only one illustrated in Fig. 1; and these hose are connected with the teat-cups 9, and each of these is provided with valve or gate 10 and a main cock 11 for controlling the suction through the cups 9, 9, and the hose 8.

At or near the center of the main pipe A, the tapering gate or primary valve 12 is fitted to turn in its valve-seat 13. This valve or gate 12 has the main central port 14 extending directly and diametrically therethrough, as shown in full lines in Figs. 5, 8 and 12, and in dotted lines in Figs. 2 and 3. When the primary gate or valve 12 is turned to its normal position, as shown in dotted lines in Fig. 3, and full lines in Fig. 8, the full force of the suction created by the pump is being exerted, and the milk is flowing through the pulsator to the can, as indicated by the arrows in Fig. 8.

This primary gate or valve is intermittently oscillated, and this oscillation is automatically controlled by the following mechanism, to wit:—Cylinders *a*, *b*, *c*, *d* are mounted in pairs on opposite sides of the main pipe A by means of the arms 15, 15, all four cylinders being closed at their outer ends and open at their inner ends as shown in Fig. 3, and the two cylinders *a* and *b* on one side preferably being somewhat larger in diameter than cylinders *c* and *d* on the other side of the main pipe A, as illustrated.

The pistons *a'*, *b'*, *c'*, *d'*, are fitted respectively to the cylinders *a*, *b*, *c*, *d*, and these pistons are connected in pairs by means of the rods 16, 17, 18 and 19. The inner ends of the piston-rods 16 and 17 come together, and are pivotally connected with the stem 20 of the central gate or primary valve 12, as shown in Figs. 1, 2 and 3.

A secondary valve 21 shown in Fig. 13 has a stem 22 which in similar fashion is connected with the inner ends of the piston rods 18 and 19. This secondary valve 21 controls the oscillations of the central gate or primary valve 12. This secondary valve 21 preferably tapers also and is fitted to a tapering valve-seat 23.

The secondary valve 21 is located at the juncture of the three air-ducts 24, 25 and 26, as best shown in Figs. 10 and 11. Tubes 27 and 28 preferably of rubber extend from the nipples at the outer ends of the ducts 25 and 26 to the ports 29 and 30 located respectively at the outer ends of the cylinders *a* and *b*, and the duct 24 leads directly into the main pipe A, as shown in Figs. 10 and 11. Screws 31, 32 and 33 are placed in the holes 31^a, 32^a, and 33^a in these several ducts 24, 25 and 26 respectively, for adjusting the size of the passage therethrough. The secondary valve 21 is provided with the two ducts 34 and 35, each having a lateral duct 36 and 37 respectively at the center.

Tubes 40 and 41, preferably of rubber similar to tubes 27 and 28, extend from the nipples 42 and 43 at the outer ends of the ducts 44 and 45 in the central or primary valve casing to the ports 46 and 47 located at the outer ends of the cylinders *c* and *d* respectively, and the primary valve or gate 12 is provided with the ports 48, 49, 55 and 56 for a purpose which will be explained.

A relief-valve 50 is located in a lateral chamber 51 opening into the primary valve-seat 13, and the tension of the spring 52 sleeved on the stem 53 of this valve 50 is regulated by the nuts 54 screwed on the threaded outer end of the stem 53. The purpose of this valve 50 is to prevent the absolute interruption to the suction, in other words to maintain a partial vacuum even with the pulsations, so as to afford sufficient suction to keep the cups from dropping from the cow to the floor, even when the passage through the pipe is intermittently closed, and the lateral duct 49 is in communication with the pipe A when the main port 14 is closed, as shown in Fig. 5; and as the air enters through the valve 50 to restore equilibrium, as shown in Fig. 5, there is just sufficient vacuum to hold the cups in place.

Now in the operation of the pulsator, the parts we shall say are normally in the position shown in Fig. 3. This means that the port 14 is wide open, as shown in Figs. 3 and 8, and the suction from the pump is drawing the milk through the pipes A, 1 and 6 into the can, the valve 50 being closed, due to the tension of the spring 52. The duct 35 is in registry with the ducts 24 and 26, and the ducts 34 and 36 with the air inlet 58 and the duct 25 respectively, as shown in Fig. 10, which causes a suction through the tube 28 and port 30 in the outer end of cylinder *b*, creating a vacuum or partial vacuum therein, and at the same time restoring atmospheric pressure from air-inlet 58 through ducts 34, 36, 25, tube 27, and port 29 at the outer end of cylinder *a*. This causes the pistons *b'* and *a'* to move toward said port 30, due to the atmospheric

pressure on the opposite end of piston *b'*.

This swings the primary valve-stem 20 into the position shown in Fig. 2, reversing the primary valve or gate 12, shutting off the flow of milk through pipe A (as shown in Fig. 5), and resulting in the valve 50 opening and allowing air to flow into pipe A, as indicated by the arrows at the left in Fig. 5. This causes the duct 56 in the primary gate or valve 12 to establish communication between the suction pump at the right-hand side of the primary valve or gate 12 and the tube 40, which causes a suction at the outer end of cylinder *c*, and at the same time causes duct 55 to register with the air-inlet 57 and the tube 41 at the outer end of cylinder *d*, thus equalizing the pressure on the two sides of piston *d'*, pistons *c'* and *d'* moving to the left and swinging the secondary valve-stem 22 to the position shown in Fig. 2, and causing the reversal of the secondary valve 21, or its movement to the position shown in Fig. 11, which means that communication is established through duct 34 between the tube 27 and the pipe A. This causes the air to be sucked out of cylinder *a*, and atmospheric pressure to be restored in cylinder *b* through tube 28 and ducts 37 and 35 in secondary valve 21, atmospheric air being admitted through the air-inlet 59, as shown in Fig. 11. This causes the pistons *a'* and *b'* to return to the left as shown in Fig. 3, carrying the stem 20 of the primary valve 12, and re-opening the passage through pipe A, as shown in Figs. 3 and 8. This again applies suction to tube 41 through registry of duct 56 therewith (and the exhaustion of air from the right-hand end of cylinder *d*) and with the pipe A, and it restores atmospheric air pressure through tube 40 to cylinder *c*, thereby moving the pistons *c'* and *d'* to the right as indicated by the arrow in Fig. 3, and the secondary valve-stem to the position therein indicated, thus completing a full cycle of operations, and restoring all parts to the position shown in Fig. 3, after which the operation repeats itself as long as the suction-pump is in operation and the milking operation continues, thus causing the desired pulsation or intermittent suction upon the udder and the holding of the cups in place.

Thus it will be seen that the milk is confined in its passage to the pipe A, and through the port 14 of the primary gate or valve 12. In other words, the milk is thus confined and kept from contamination by contact with any of the other parts of the pulsator. In consequence, the passage for the milk can be easily cleaned at any time, and be kept sweet and hygienic. Consequently the valve 21 and the pistons *a'*, *b'*, *c'*, *d'*, can at all times be kept well oiled, as the milk does not come in contact with them.

I claim:

1. A pulsator comprising a main pipe, a primary valve or gate located therein and having ports, means for actuating said
5 primary valve, a relief valve located in a lateral chamber opening into the primary valve-seat, and adapted to communicate with the ports thereof, teat-cups in communication with the main pipe, and means
10 for creating an air circulation through the main pipe and causing a circulation through the valve, whereby said relief valve is automatically actuated.
2. A pulsator including a main pipe, a
15 primary valve in said pipe, a secondary

valve or gate subject to the pneumatic pressure in said pipe, suction means comprising cylinders and pistons operated by the pneumatic pressure in said pipe under control of the primary and secondary valves, for ac- 20
tuating said valves, and means for regulating the size of the ports of one of the valves for controlling the passage of fluid there-
through.

In testimony whereof I affix my signature, 25
in the presence of two witnesses.

WILLIAM M. MEHRING.

Witnesses:

S. RAYMOND SEWARD,
W. H. B. ANDERS.