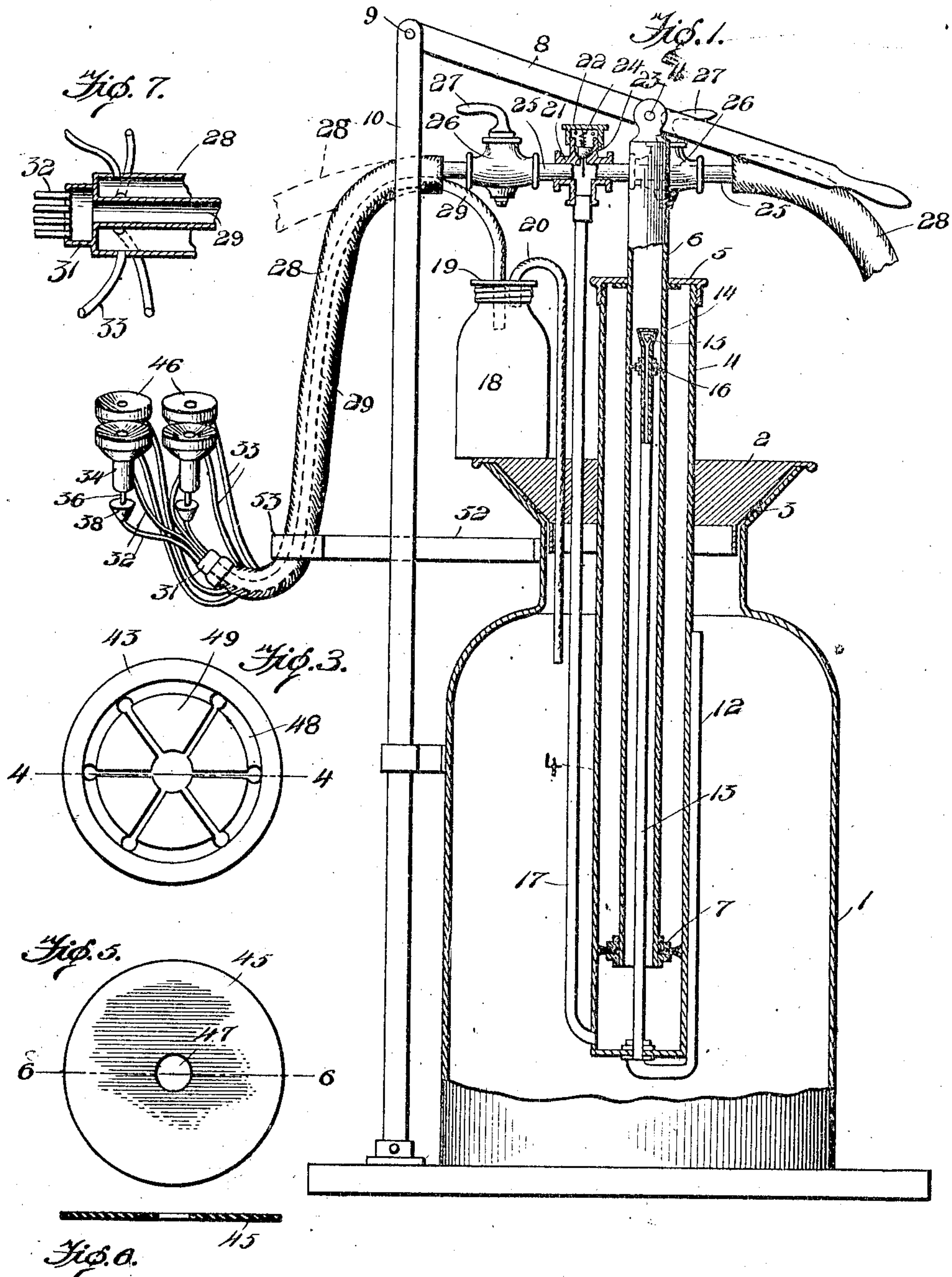


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PATENTED APR. 9, 1907.

F. M. WORCESTER.
COW MILKING MACHINE.
APPLICATION FILED JAN. 28, 1907.

2 SHEETS—SHEET 1.



Witnesses.

E. E. Vrooman

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Inventor.

Fred M. Worcester

By

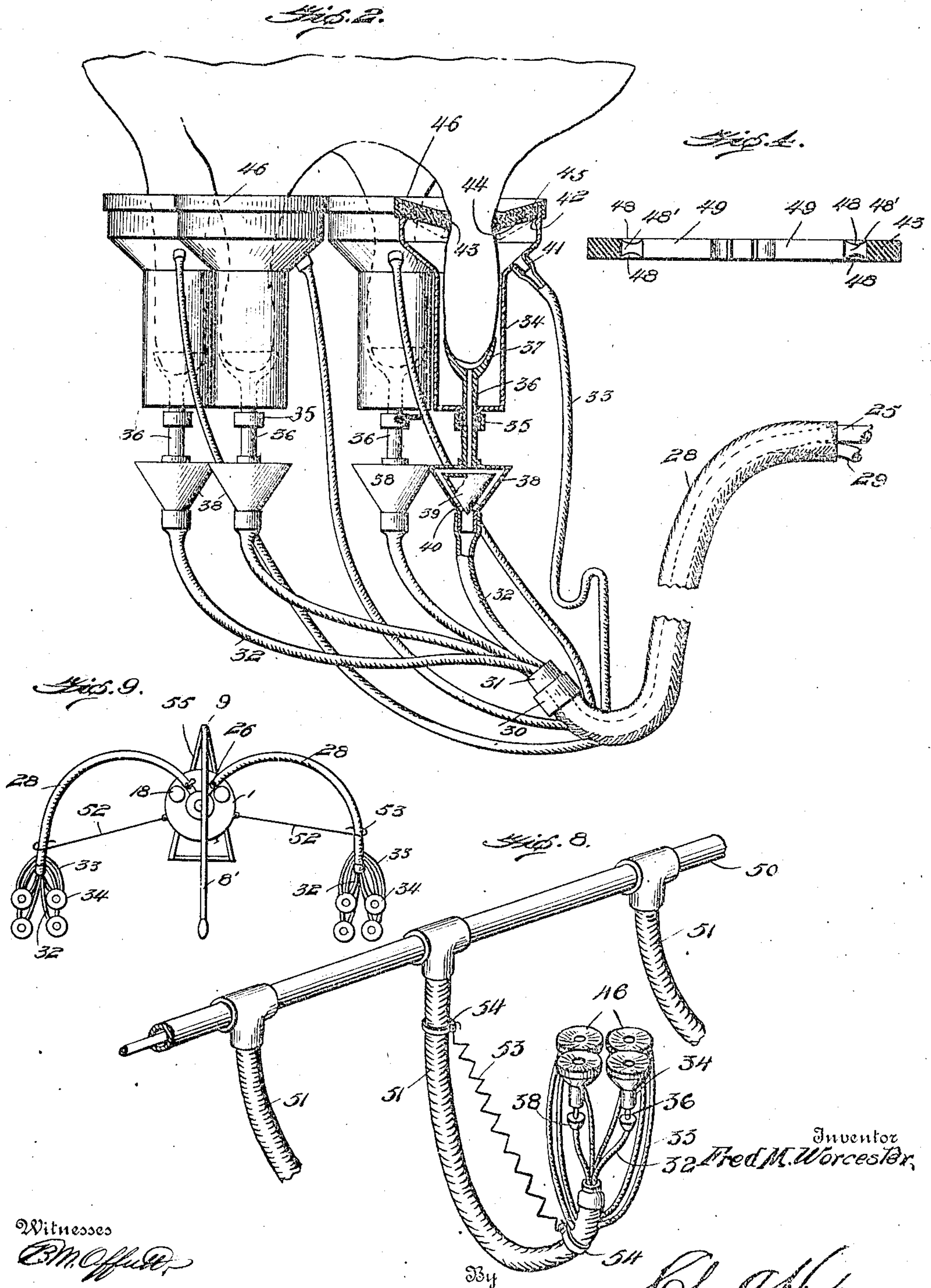
Chas. A. Harpman Atty.

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2 SHEETS—SHEET 2.



Witnesses

E. M. Offutt

E. E. Trooman

Inventor
Fred M. Worcester

Chas. A. Hoffman
Attorney

UNITED STATES PATENT OFFICE.

FRED M. WORCESTER, OF MONROE CENTER, ILLINOIS.

COW-MILKING MACHINE.

No. 849,521.

Specification of Letters Patent.

Patented April 9, 1907.

Application filed January 28, 1907. Serial No. 354,444.

To all whom it may concern:

Be it known that I, FRED M. WORCESTER, a citizen of the United States, residing at Monroe Center, in the county of Ogle and State of Illinois, have invented certain new and useful Improvements in Cow-Milking Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention is an improvement in cow-milking machines, and has for its object the provision of means for facilitating the milking of a cow by mechanical means.

Another object of the invention is the improvement of the construction of the teat-casings of a cow-milking machine.

A further object of the invention is the improvement of the construction of the pumping device of a milking-machine.

With these and other objects in view the invention consists of certain other novel constructions, combinations, and arrangements of parts, as will be hereinafter fully described and claimed.

In the drawings, Figure 1 is a view of a machine constructed in accordance with the present invention, showing part in perspective and part in vertical section. Fig. 2 is a fragmentary view of a machine constructed in accordance with the present invention, showing one of the teat-casings in vertical section. Fig. 3 is a top plan view of the primary diaphragm member or washer. Fig. 4 is a transverse sectional view taken on line 4 4, Fig. 3. Fig. 5 is a plan view of one of the auxiliary members or disks employed in constructing the diaphragms of the teat-casings. Fig. 6 is a transverse sectional view taken on line 6 6, Fig. 5. Fig. 7 is a fragmentary sectional view of the machine or apparatus, showing particularly the outer end of the flexible primary air-tube and the primary milk-tube. Fig. 8 is a fragmentary perspective view of another embodiment of my invention. Fig. 9 is a top plan view of another embodiment of my invention, showing a device or machine particularly adapted for milking two cows.

Referring to the drawings, 1 designates a receptacle, preferably a milk-can, which is provided with a cap or top 2. A flexible or rubber gasket 3 is positioned between the top of the can 1 and the top or cover 2 for forming an air-tight joint between said can and cap. A pump-casing 4 is provided with a removable cap 5, which cap 5 supports a hol-

low plunger 6. The plunger 6 is open at its lower end. Upon the plunger 6 and near the lower end thereof is formed a plunger-head 7, which head comprises washers provided with flexible means normally engaging the inner face or surfaces of the pump-casing 4. The hollow plunger 6 is reciprocated within the casing 4 by any suitable means, which means is preferably illustrated in Fig. 1 as a handle 8, pivotally supported at 9 upon a support or standard 10. The handle 8 is pivotally connected at 11 to the upper end of the hollow plunger 6.

A tube or hollow casing 12 is secured contiguous to the pump-casing 4 and has its upper end opening into the receptacle or can 1 near the cap. The tube 12 is connected to a stationary tube 13, positioned within the pump-casing and extending between the walls of the hollow slidable piston 6. The upper end of the tube 13 is provided with an apertured valve-casing 14, within which is a movable valve 15. Secured contiguous to the valve-casing and upon the hollow tube 13 is an auxiliary piston-head 16. The piston-head 16 comprises an upper preferably iron washer and a lower metallic resilient washer, preferably formed of brass. The lower washer is of greater diameter than the upper iron washer, and between the lower and upper washers a leather washer is secured. Upon the upper stroke of the piston 6 valve 15 will be raised from its seat within casing 14, and atmosphere in the can or receptacle 1 will be drawn into the hollow piston 6. Upon the downward stroke of the piston 6 the valve 15 will be seated, thereby closing the tube 13, and the air within the piston-rod between its upper end and the piston-head 16 will be forced past the spring-piston 16 and subsequently pass from within the piston 6 and pump-casing 4 into the primary outlet tubing or pipe 17, which tubing 17 is connected to and in communication with the interior of the pump-casing 4 near its lower end, as clearly seen in Fig. 1.

One or more receptacles—as, for instance, bottle 18—is supported contiguous to or upon the can or receptacle 1, and the receptacle or bottle 18 is provided with a cap 19, through which cap a tubing 20 extends, the tubing 20 opening at one end into the bottle or receptacle 18 and at its opposite end into the receptacle or can 1, thereby preventing the milk which is discharged into the bottle, as hereinafter described, from being exposed

to the air. Through the medium of the pump a partial vacuum is formed in the can or receptacle 1. If a number of bottles or receptacles 18 are employed at a time, they may be connected by any suitable means, so that the milk overflowing from one will flow into the next or the remainder. Furthermore, the milk may be sucked through pipe 20 and discharged into the receptacle or can 1.

Secured to the upper end of the primary tubing 17 and outside of the receptacle or can 1 is a coupling 21, which is provided with a valve-casing 22. The valve-casing comprises a lower body provided with a removable apertured cap. Within the valve-casing 22 there is a vertically-movable valve 23. Between the upper end of the valve 23 and the cap there is a spring 24, the tension of which may be increased or decreased. Said spring will permit the valve 23 to be raised from its seat and relieve the pressure in the teat-casings, hereinafter described, when it is too great. It will therefore be seen that I have provided a relief-valve upon the coupling 21. Leading from the coupling 21 is a plurality of horizontal pipes or tubes 25, each of which tubes 25 is provided with an ordinary valve-casing 26, within which is journaled, preferably, a rotatable stop-cock or valve member 27. The passage of air through either of the pipes or tubes 25 can be controlled through the medium of the stop-cock 27, journaled in casing 26 thereof.

Each of the pipes or tubes 25 is provided with a flexible main air and vacuum tubing or conduit 28, within which air-tubing 28 is a milk-tubing 29. The inner end of the tubing 28 is sealed so as to prevent the escape of atmosphere from said end, and the milk-tubing extends through this end into said receptacle or bottle 18, Fig. 1. The milk-tubing 29 can be moved to different positions for facilitating the positioning of the teat-casings upon the teats of the cow.

Referring particularly to Fig. 2, the outer end of the flexible air-tubing 28 is closed, as at 30, and secured to the closed end 30 is an auxiliary cap 31, to which is secured the four auxiliary milk-tubes 32. The auxiliary air-tubes 33 are connected near the outer end of and to the main primary air-tube 28.

All of the teat-casings are similarly constructed, and therefore I will only specifically describe one of the same. Each teat-casing comprises a main cylindrical hollow body 34, which is provided at its lower end with a stuffing-box 35. Slidably mounted within the stuffing-box 35 is a hollow stem 36, to the upper end of which stem there is secured a teat-cup 37. By reason of the adjustable structure of the teat-cup 37 the same can be adjusted to accommodate different-size teats. The teat-cup 37 is adapted to receive the lower end of a teat, and as milk

is discharged from the teat it passes through the hollow stem 36 into valve-casing 38 and thence into the auxiliary milk-tube 32 and subsequently into the primary milk-tube 29, from which it is discharged into the receptacle or bottle 18. The valve-casing 38 is preferably conical shape for facilitating the discharge of the milk into the auxiliary milk-tube 32, and within said valve-casing 38 there is an inverted conical flat valve 39, which valve will close the hollow stem 36 upon the back pressure of milk or air in the tube 32. Within the valve-casing 38 there are lugs 40, which constitute a valve-seat for conical float-valve 39, preventing said valve 39 from closing the lower end of the valve-casing 38 and auxiliary milk-tube 39. A hollow extension 41 is integral with the upper portion of the teat-casing, and this hollow extension 41 is secured to the upper end of the auxiliary air-tube 33. Within the teat-casing and contiguous to its upper end there is preferably formed a ledge or annular flange 42 for supporting the diaphragm, which diaphragm comprises a primary member or disk 43 and a lower auxiliary member or disk 44 and an upper auxiliary member or disk 45. A concavo-convex removable cap 46 is secured upon the upper end of the teat-casing and securely holds the sectional diaphragm in an operable position upon the same. The primary and auxiliary members of the diaphragm are preferably formed of flexible material—as, for instance, rubber—and the lower and upper disks 44 and 45, respectively, are similarly constructed. Each disk is provided with a central aperture 47, (see Fig. 5,) through which the teat extends when the teat-casing is upon the teat, as shown in Fig. 2. The primary member or disk of the diaphragm is provided with parallel annular grooves 48 upon its upper and lower faces. The grooves 48 constitute a hinge 48' for the integral teeth 49. The teeth 49 are comparatively thick; but through the medium of the hinge 48' said teeth are permitted to swing.

When the piston 6 is drawn upward within the pump-casing, a partial vacuum will be caused in the teat-casings, as they are in direct communication with the interior of the pump-casing 4, which will draw the lower disk 44 and the teeth 49 downwardly and slightly away from the teat, which will permit the same to fill with milk, and upon the downward stroke of the piston 6 air will be forced into the teat casing or casings, and thereby force the teeth against the teat or teats, which will prevent the milk in the teat from flowing back into the udder, and as the pressure increases in the teat casing or casings the milk will be discharged into the vertically-adjustable teat-cup 37 and through the milk-tubing to the receptacle or receptacles 18. It will therefore be seen that the

diaphragms in the pneumatic teat-casings of each set which are in communication with the pump-casing will be automatically actuated to permit milk to enter the teats and subsequently to cut off the backflow therefrom upon each complete movement of the piston 6, which movement consists in the upward and downward stroke thereof.

The upper disk 45 constitutes a seal, preventing air from entering in vacuum, while the lower disk 44 prevents its escape under compression, or, in other words, when the air is compressed in the teat-casing by the pump. The central or primary disk provided with teeth acts as a filling and prevents the light rubber risks from bulging.

In the embodiment depicted in Fig. 8 I have shown a main horizontal conduit 50, provided with downwardly-extending branches 51. Each branch 51 is provided at its lower end with a set of teat-casings. The structure depicted in this embodiment is particularly adapted for a dairy where a series of milking devices are to be employed for milking a number of cows, using other than manual power.

In my preferred structure (depicted in Fig. 1) I have shown a spring-bracket 52, suitably secured to the side of the can or receptacle 1 and extending outwardly, and at its lower end 53 it is looped around the tubing 28. This bracket or support 52 is adapted only to support one set of milk-casings, while in Fig. 8 I have provided a spring 53, connected to clamps 54, for supporting each set of teat-casings. The spring 53 and clamps or collars 54 will hold the teat-casings against the udder of the cow when said casings are positioned on the teats.

In Fig. 9 I have shown an embodiment of my machine particularly adapted for milking two cows. The lever-arm 8' in this embodiment is carried by a frame 56, which frame supports the can 1.

By alternately forcing the air into the teat-casing and then forming a vacuum therein the rubber diaphragms are caused to move upward on the teats, thereby pressing against the udder and causing the cow to give down the milk, or a relaxation of the muscles of the udder, as in the case when the cow is being milked by a person or a calf.

What I claim is—

1. In a milking-machine, the combination with a receptacle, a cap or top carried by said receptacle, means hermetically sealing said cap upon said receptacle, of a pump-casing carried by said cap and extending into said receptacle, a hollow plunger positioned within said pump-casing, a hollow tubing carried by said pump-casing and extending into said hollow plunger and through said pump-casing and opening at one end into said receptacle, a bottle or receptacle positioned contiguous to said first-mentioned

receptacle, a teat-casing provided with a diaphragm, means connecting said teat-casing to said bottle and pump-casing, and means for reciprocating said hollow piston within said pump-casing.

2. In a milking-machine, the combination with a receptacle, of a pump-casing carried by said receptacle and extending into the same, a piston operating in said pump-casing, a teat-casing provided with a diaphragm, a tubing connected to said teat-casing and pump-casing, a relief-valve carried by said tubing, and means for operating said piston.

3. In a milking-machine, the combination of a receptacle, a pump-casing carried by and extending into said receptacle, a hollow tubing carried by said pump-casing, one end of said tubing extending into said pump-casing and provided with a valve-casing and its opposite end extending through the said pump-casing and opening into said receptacle, a hollow piston positioned within said pump-casing and surrounding said hollow tubing, a teat-casing, and means connecting said teat-casing to said pump-casing.

4. In a milking-machine, the combination with a primary receptacle or can, an auxiliary receptacle or bottle contiguous to said can, of a pump-casing carried by and extending into said can, means hermetically sealing said can, a piston operating in said pump-casing, means for causing a vacuum in said bottle and can when said piston is operated, a teat-casing, and means connecting said teat-casing to said pump-casing.

5. In a milking-machine, the combination with a pump, of a valved tubing connected to said pump, and a teat-casing in communication with said tubing, said teat-casing provided with a flexible diaphragm.

6. In a milking-machine, the combination of a receptacle or can provided with a hermetically-sealed cap, a pump-casing extending into said can, a hollow, reciprocating piston mounted in said pump-casing, a valved tubing extending into said pump-casing and positioned between the inner walls of said piston, one end of said tubing opening into said can, a teat-casing, means connecting said teat-casing to said pump-casing, whereby the atmosphere from said can can be forced into said teat-casing through said tubing and pump-casing.

7. In a milking-machine, the combination with a can or receptacle, of an auxiliary receptacle positioned contiguous to said first-mentioned receptacle, a pump-casing extending into said first-mentioned receptacle, a hollow piston operating in said pump-casing, a teat-casing, and means connecting said teat-casing to said pump-casing, and said auxiliary receptacle to said first-mentioned receptacle, whereby atmosphere from said auxiliary receptacle may be passed through the pump-casing and into said teat-casing.

8. In a milking-machine, the combination of a can, a pump carried by said can, a horizontal bracket extending from said can and provided at its outer end with a loop, a teat-casing, and means supporting said teat-casing within the loop of the bracket and connecting said casing in an operable position with said pump-casing.

9. In a milking-machine, the combination with a receptacle, of a pump operating with said receptacle, said pump provided with a coupling having an opening, a relief-valve carried by said coupling, a tubing positioned in the opening of said coupling, a valve formed upon said tubing, and a teat-casing in communication with said tubing.

10. In a milking-machine, the combination with a pump, of a flexible tubing connected at one end to said pump, a teat-casing provided with a flexible diaphragm, a teat-cup in said teat-casing, said flexible tubing provided with a plurality of compartments, means connecting one of said compartments to said teat-casing, and means connecting the other compartment to said teat-cup, whereby when said pump is actuated, movement of the diaphragm will be controlled.

11. In a milking-machine, the combination of a pump provided with a flexible air-tubing, a milk-tubing carried by said air-tubing, a teat-casing, said teat-casing provided with a flexible diaphragm, a teat-cup carried by said teat-casing, a tubing connecting said teat-cup to said milk-tubing, and a tubing connecting said teat-casing to said air-tubing.

12. In a milking-machine, the combination with a pump, of a teat-casing provided with a flexible diaphragm, positioned contiguous to said pump, means connecting said teat-casing to said pump, said diaphragm comprising a flexible, primary member provided with teeth, and flexible, auxiliary members positioned upon opposite sides of said primary member.

13. In a milking-machine, the combination with a pump, of a teat-casing, a slidable teat-cup positioned within said teat-casing, and means connecting said teat-casing to said pump.

14. In a milking-machine, the combination with a pump, of a teat-casing, a teat-cup provided with a valve-casing, carried by said teat-casing, and means connecting said teat-casing to said pump.

15. In a milking-machine, the combination with a pump, of a teat-casing, a cup carried by said teat-casing, a valve-casing connected to said cup, a valve within said valve-casing, and means connecting said teat-casing to said pump.

16. In a milking-machine, the combination with a pump, of a teat-casing, a teat-cup carried by said casing, a valve-casing connected in a communicating position with

said teat-cup, a float-valve in said valve-casing, a receptacle, a tubing connecting said valve-casing and receptacle, and means connecting said teat-casing to said pump.

17. In a milking-machine, the combination with a pump, of a teat-casing, a slidable teat-cup positioned within the bottom of said teat-casing, a valve-casing provided with a float-valve, secured to said teat-cup, a receptacle, means connecting said valve-casing to said receptacle, and means connecting said teat-casing to said pump.

18. In a milking-machine, the combination with a pump, of a teat-casing, a conical valve-casing adjustably mounted upon said teat-casing, means connected to said valve-casing and adapted to receive the lower end of a teat, a receptacle, means connecting said valve-casing to said receptacle, and means connecting said teat-casing to said pump.

19. In a milking-machine, the combination with a pump, of a teat-casing, an adjustable valve-casing carried by said teat-casing, a valve in said valve-casing, a receptacle, a tubing connecting said receptacle to said valve-casing, and a tubing connecting said teat-casing to said pump.

20. In a milking-machine, the combination with a pump, of a teat-casing, an adjustable stem extending into said teat-casing, a valve secured to one end of said stem and a teat-cup to the opposite end of said stem, valve means positioned within said valve-casing, a receptacle means connecting said valve-casing to said receptacle, and means connecting the teat-casing to said pump.

21. In a milking-machine, the combination with a pump, of a plurality of teat-casings, a tubing connected to said pump, a compartment formed upon the outer end of said tubing, and a plurality of tubes connected at one end to said teat-casings and at their opposite end to said first-mentioned tubing and opening into said compartment.

22. In a milking-machine, the combination with a pump, of an air-tubing connected at one end to said pump, a milk-tubing in said air-tubing, said air-tubing provided with a compartment at its outer end, said compartment opening only into said milk-tubing, a teat-casing contiguous to said outer end, said teat-casing provided with a teat-cup, means connecting said teat-cup to said compartment and milk-tubing, and means connecting the teat-casing to said air-tubing.

23. In a milking-machine, the combination with a pump, of an air-tubing cooperating with said pump, a milk-tubing carried by said air-tubing, a plurality of teat-casings, each casing provided with a teat-cup, tubes connected to said teat-cups and to the outer end of said milk-tubing, and tubes connected to the teat-casings and to the air-tubing near its outer end.

24. A teat-cup for a milking-machine.

comprising a casing provided at one end with a flexible diaphragm, said diaphragm comprising a primary and auxiliary members, said primary member comprising a disk provided with annular grooves formed upon opposite sides, producing teeth formed upon said primary member, the annular grooves constituting a hinged portion for said teeth.

25. A teat-casing for a milking-machine, provided with a flexible diaphragm, said diaphragm provided with a primary flexible member, said member provided with a comparatively rigid tooth hinged upon the main portion of said member, and flexible members positioned upon opposite sides of said primary member.

26. A teat-casing for a milking-machine, provided with a flexible diaphragm, said diaphragm provided with a primary, central member and with flexible disks upon opposite sides thereof; each disk provided with a central opening, said primary member provided with a central opening and with a plu-

ality of comparatively rigid teeth, said primary member provided with a groove upon one side forming a hinged portion for said teeth.

27. A teat-casing for a milking-machine, comprising a body provided at its upper end with a removable concavo-convex cap, a flexible diaphragm positioned against said cap and within said body, and means for holding said diaphragm against said cap.

28. A teat-casing for a milking-machine, comprising a body, a dished cap carried by the upper end of said body, a diaphragm positioned beneath said cap and in engagement therewith, and means for holding said diaphragm in an operative position against said cap.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

FRED M. WORCESTER.

Witnesses:

CHARLES R. TAYLOR,
N. P. ANDERSON.