Sept. 13, 1938. F. G. HODSON 2,129,765

PULSATOR FOR MILKING MACHINE

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Fig. 1.

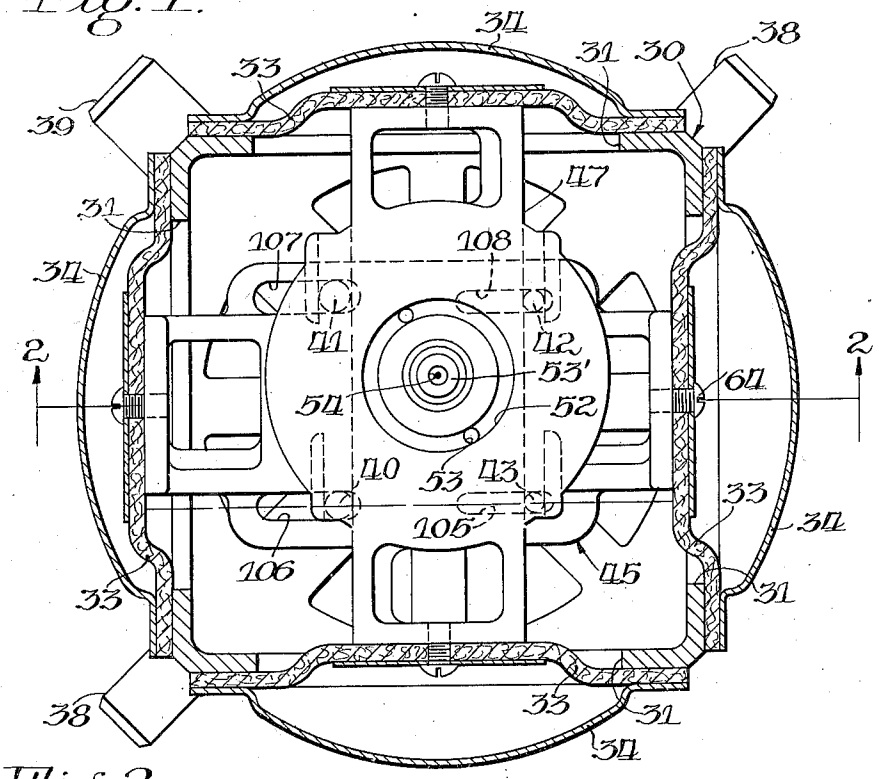
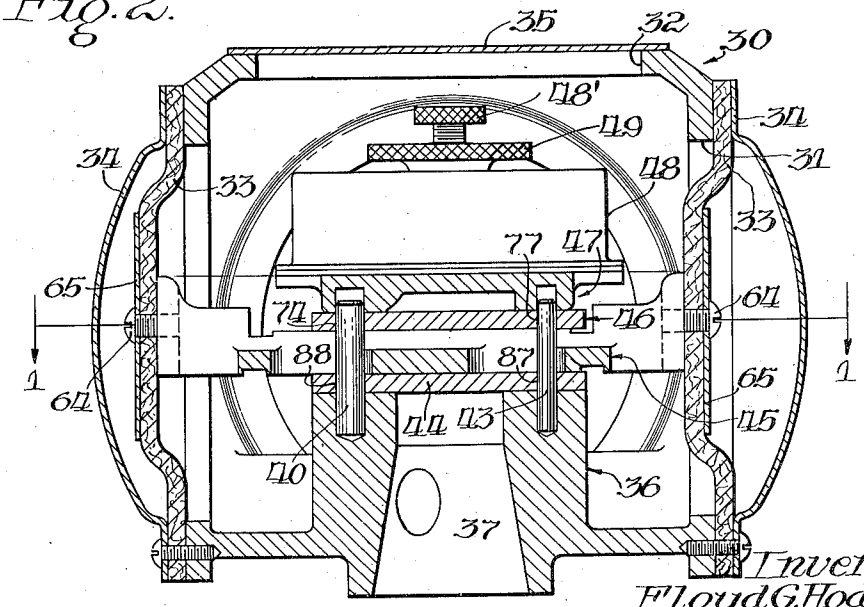


Fig. 2.



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Fig. 3.

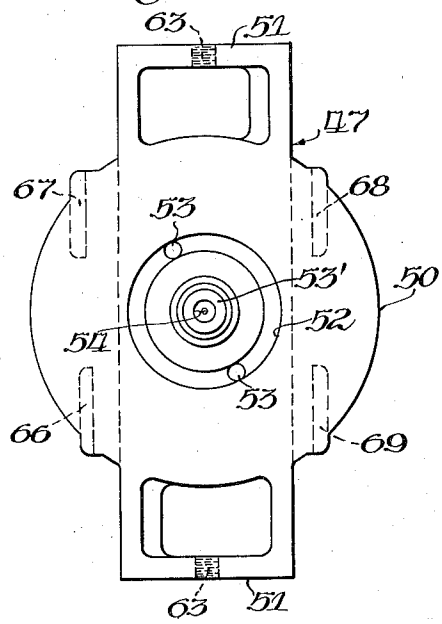


Fig. 4.

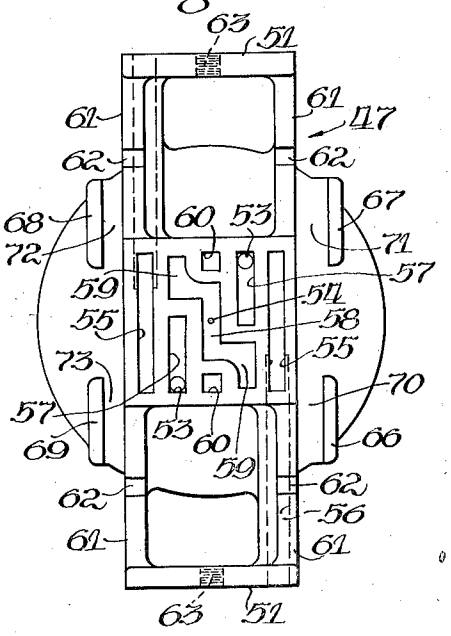


Fig. 5.

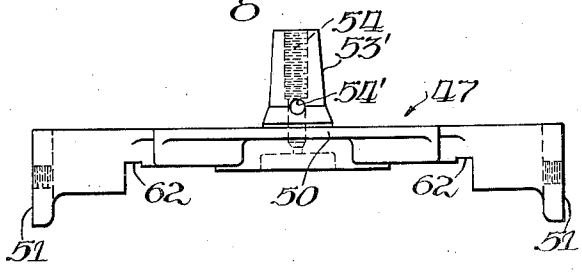


Fig. 6.

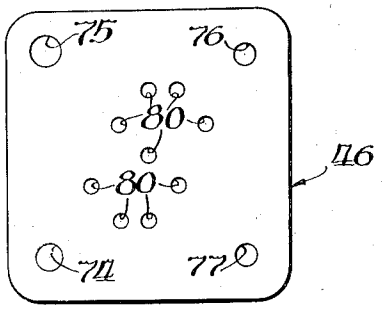
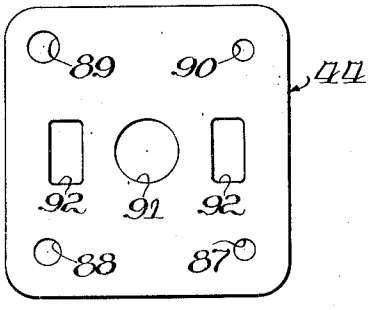


Fig. 7.



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Fig. 8.

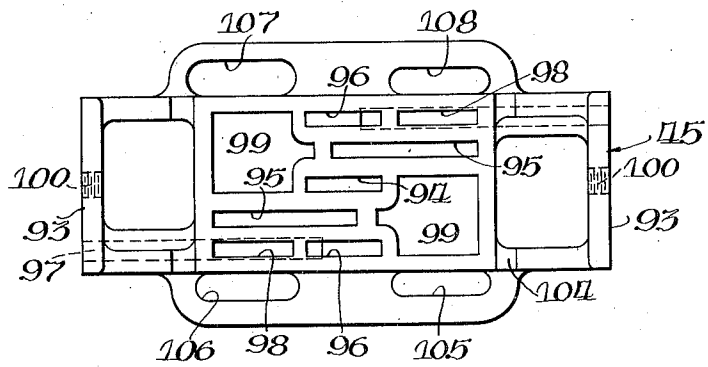


Fig. 9.

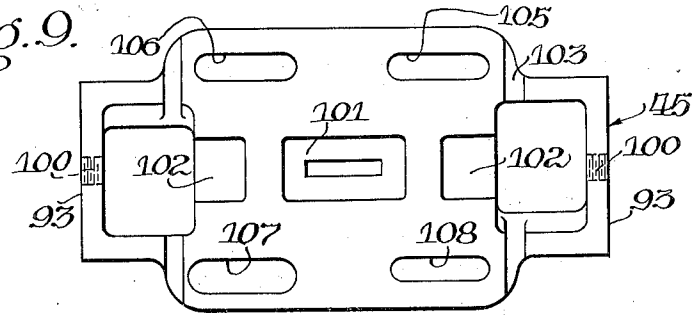
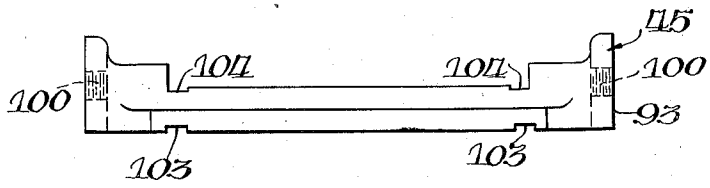


Fig. 10.



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UNITED STATES PATENT OFFICE

2,129,765

PULSATOR FOR MILKING MACHINES

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Application August 2, 1937, Serial No. 156,857

8 Claims. (Cl. 31—61)

This invention relates to a pulsator for milking machines of the type shown in applicant's prior Patent 1,844,853 issued February 9, 1932, and is an improvement over the construction disclosed in this patent. The pulsator of the present application is intended to operate in exactly the same way as that of the patent, but carries features which make it possible to assemble the various parts of the pulsator in only one way with respect to one another.

The pulsator consists essentially of a hollow cube-shaped pulsator body having a center table portion, a stationary valve plate mounted on the table portion, a milker valve plate mounted on top of the stationary plate and adapted to reciprocate, a second stationary valve plate, and a control valve plate mounted on top of the second stationary valve plate and adapted to reciprocate in a line at right angles to the line of reciprocation to the milker valve plate. Diaphragms are fastened to the ends of the reciprocal plates and to the body. Caps are fastened to the body across the diaphragms. The application of vacuum and air to the spaces between the diaphragms and the caps effects the reciprocation of the milker valve plate and the control valve plate. After operation of the pulsator for some time, the reciprocal valve plates and the stationary valve plates wear into one another. Consequently, if for any reason the parts have been taken apart, care must be exercised to insure that the parts are reassembled in exactly the same relation which they originally had in the pulsator.

The object of the invention is, therefore, to shape the parts in such a way that they can be assembled in only one way with respect to one another.

In the prior patent, the stationary valve plates were provided adjacent their corners with holes of unequal diameters adapted to receive posts of corresponding diameters extending from the table portion of the body. This insured that the valve plates be assembled in only one position with respect to the body. The present invention insures also that the reciprocal valve plates be assembled in only one position with respect to the body, and this is accomplished by providing milker valve plates with slots of different widths to receive the posts, and the control valve with grooves of different widths to receive the ends of the posts.

In the drawings,—

Figure 1 is a horizontal cross-sectional view as seen along the section line 1—1 of Figure 2;

Figure 2 is a vertical cross-sectional view of the pulsator taken along the line 2—2 of Figure 1;

Figure 3 is a top plan view of the control valve plate, or upper slide valve;

Figure 4 is a bottom plan view of the same;

Figure 5 is a side elevation of the same;

Figure 6 is a plan view of the upper stationary valve plate;

Figure 7 is a plan view of the lower stationary valve plate;

Figure 8 is a top plan view of the milker valve plate, or lower slide valve;

Figure 9 is a bottom plan view of the same; and,

Figure 10 is a side elevation of the same.

As shown in Figures 1 and 2, the pulsator body 30 comprises an integrally formed frame in hollow cube form, having four sides and a top. In each of the sides there is a large circular opening 31 and in the top, a circular opening 32. Each of the side openings is closed by a diaphragm 33 and a cover 34. The opening in the top is closed by a plate 35. A centrally disposed table portion 36 of substantially square shape extends upwardly from the base of the body and has a central opening 37. Nipples 38 extend outwardly from opposite corners of the base. A nipple 39 of a larger size extends from a third corner. Mounted in the table portion 36, at the corners of an imaginary quadrilateral, in this case a square, are posts 40, 41, 42 and 43. Posts 40 and 41 are of different diameter from one another and from the remaining posts 42 and 43. These latter posts are shown as being of the same diameter, but it will be understood that they may also be of different diameter from one another. Mounted on the table portion is a lower stationary valve plate 44, and on top of it, a reciprocal milker valve plate 45, hereinafter referred to as a lower slide valve. On top of the lower slide valve is a second stationary valve plate 46, and on top of it, a reciprocal control valve plate 47, hereinafter referred to as an upper slide valve. A cup 48, which houses an air filter pack (not shown) is positioned on the upper slide valve. Extending outwardly from the cap is an adjusting screw 48', on which is positioned a lock nut 49.

The upper slide valve 47, which is shown in detail in Figures 3, 4 and 5, consists of a central circular portion 50 and end portions 51 spaced outwardly in opposite directions from the circular portion. In the upper face of the central circular portion is a groove 52. Diametrically opposed holes 53 in the groove extend

through the plate. A central tubular portion 53' extends upwardly from the circular portion of the plate and is provided with a longitudinal bore 54, adapted to receive the end of the adjusting screw 48, and a transverse bore 54' in communication with the bore 54. On the bottom of the central portion of the control plate are similarly disposed grooves 55, and, in communication with the ends thereof, are passages 56 extending through to opposite ends of the plate. Adjacent the grooves 55 are grooves 57 into which the through openings 53 extend. In the center of the plate, a groove 58 with offset end portions 59 is provided.

In line with the central part of the groove 58 are depressions 60. The ends 51 are connected by means of longitudinally extending portions 61, in which are notches 62. In the ends 51 are openings 63 threaded to receive screws 64, which along with washers 65 hold the diaphragms 33 against the ends 51. Projections 66, 67, 68 and 69 extend parallel to the longitudinal portions 61 and are spaced outwardly therefrom. The projections 66 and 67 are spaced different distances from the longitudinal portion 61, from one another, and from the remaining projections 68 and 69. The projections 68 and 69 are shown as spaced the same distance from the longitudinal portion 61, but it will be understood that these distances may also be different. Thus, grooves are provided for the reception of the ends of the pins 40, 41, 42 and 43, of which grooves 70 and 71 are of different widths from one another and from remaining grooves 72 and 73, and the latter are of the same, or of different, width.

In Figure 6, the upper stationary valve plate 46 is shown. It is substantially square in shape and has openings 74, 75, 76 and 77 of diameters respectively adapted to receive the posts 40, 41, 42 and 43. Centrally of the plate, a plurality of openings 80 are provided, which cooperate with the passages and grooves in the reciprocal valve plates in effecting their reciprocation.

Figure 7 shows the lower stationary valve plate. This is also square in shape and has openings 87, 88, 89 and 90 of proper diameters to receive the posts 40, 41, 42 and 43. There is also a central circular opening 91 and rectangular openings 92.

Figures 8, 9 and 10 show the reciprocal lower slide valve. This consists essentially of a rectangular, central portion and end portions 93 spaced therefrom. Centrally of the plate is an elongated through opening 94. On the upper side of the plate are longitudinally extending grooves 95, as well as grooves 96, the ends of which are in communication with openings 97 extending through the ends 93. Grooves 98, in line with the grooves 96, are also provided, as well as depressions 99. Threaded openings 100 in the ends 93 are adapted to receive the screws 64, which along with the washers 65 hold the diaphragms 33 against the ends 93.

As seen in Figure 9, the under side of the lower slide valve is provided with a central depression 101 in communication with the opening 94. There are also depressions 102 spaced from and in line with the depression 101, as well as notches 103 in the bottom, and notches 104 in the top of the plate adjacent its sides. Slots 105, 106, 107 and 108 are provided, of the proper sizes, to receive the posts 40, 41, 42 and 43. As in the case of the grooves in the upper slide valve, the slots 106 and 107 are of different widths from one another and from the slots 105 and 108. These latter slots are shown as being of the same width, but it is understood that they may be of different widths.

It will be seen that, since the openings, slots and grooves in the plates are of proper sizes to receive the posts, the plates may be assembled in only one way with respect to one another and to the table portion. Thus, after the parts have been disassembled for any reason, such as for inspection or cleaning, they can be reassembled only in the relative positions which they originally occupied. This is very important since the parts wear into one another during usage, and, in case they are reassembled in any other relative positions, they will not fit or operate properly.

The operation of the pulsator is exactly the same as that of the pulsator of applicant's prior patent and will be referred to only briefly. A tapered plug of the milk receiver cover fits into the opening 37. Vacuum is applied to the nipple 39 and to the nipples 38, and the nipples 38 are attached to the teat cup clusters. Thus, because of the arrangement of the grooves and passages, vacuum is applied to the space between a cover and a diaphragm attached to one end of the upper slide valve, and air is allowed to enter between the diaphragm and cover in the opposite end of the control valve plate. The plate will move toward the end to which the vacuum is applied. When it has reached the limit of its stroke in one direction, vacuum is applied to the opposite end, and air, to the end which originally had the vacuum. Thus, the upper slide valve is caused to move back and forth. The lower slide valve reciprocates in line at right angles to the line of reciprocation of the control valve plate because of application of vacuum and air alternately to each diaphragm and cover at its ends. Each movement of the lower slide valve is effected quickly at the end of each movement of the control valve plate. Thus, vacuum is applied intermittently to the teat cup clusters attached to the nipples 38, and milking is effected.

Several other changes over the construction of applicant's prior patent will now be referred to. As seen in Figure 4, the grooves 55 have been made coextensive in length with the central groove 58. The lengths of these grooves are approximately double what they were in applicant's prior patent. Also, the depressions 60 have been provided. Thus, it will be seen that the contact area of the plate has a uniform grill-like appearance, there being no large area of bare surfaces, as in the case of applicant's prior patent. This made it difficult to lap the contact area because the bare surfaces would not lap as fast as the remainder of the surfaces.

Also, from Figure 4 it will be noted that depressions 62 have been provided. Previously, there was danger of burrs developing at these points, which would interfere with putting the proper amount of slack in the diaphragms during reassembling. The depressions prevent the formation of burrs. Similarly, as seen in Figures 8 and 9, the upper and lower surfaces of the milker valve plate have been provided with depressions 103 and 104, which also prevent the formation of burrs.

The upper contact surface has grooves 98 and depressions 99, which, as in the case of the depressions 60 and the extended grooves 55 in the control valve plate, eliminate large surface areas which would make the plate difficult to lap.

It is intended to limit the invention only in the terms of the appended claims.

What is claimed is:

1. A milker valve plate adapted to reciprocate across a table portion within a milking machine pulsator body and between positioning posts secured in the table portion at the corners of an imaginary square, at least two posts being of different cross-sectional size from one another and from the remaining two posts, said milker valve plate having grooves and passages and a pair of slots on each side of proper widths to receive the posts, at least two adjacent slots being of different width from one another and from the remaining two slots, the said arrangement of slots serving to insure that the plate be assembled in only one position with respect to the pulsator body.

2. A control slide valve adapted to reciprocate across a table portion within a milking machine pulsator body and between positioning posts secured in the table portion at the corners of an imaginary square, at least two adjacent posts being of different cross-sectional size from one another and from the remaining two posts, said control slide valve having grooves and passages for air and vacuum during operation of the pulsator, and a pair of grooved portions on each side of proper widths to receive the ends of the posts, at least two adjacent grooved portions being of different widths from one another and from the two remaining grooved portions, the said arrangement of slots serving to insure that the plate be assembled in only one position with respect to the pulsator body.

3. In a milking machine pulsator including a hollow cube-shaped body having a centrally disposed table portion within the body and a plurality of upstanding guide posts secured in the table portion and disposed at the corners of an imaginary quadrilateral, at least two adjacent posts being of different cross-sectional size from one another and from the two remaining posts, the combination with said posts of a lower stationary valve plate in contact with said table portion having openings, each of proper size to receive a particular post, a lower slide valve arranged to reciprocate across the stationary plate and having slots each of proper size to receive a particular post, an upper stationary valve plate in contact with the lower slide valve having openings each of proper size to receive a particular post, and an upper slide valve arranged to reciprocate across the upper stationary valve plate in a line transverse to the line of reciprocation of the lower slide valve and having grooves, each of the proper size to receive the end of a particular post.

4. In a pulsator including a hollow cube-shaped body portion, a centrally disposed base portion within the sides of the body portion, and a plurality of upstanding guide pins of uniform height carried in said base portion, at the corners of an imaginary square, at least two of the guide pins at one side of the square being of different cross-sectional size, the combination with the guide pins of, a lower slide valve mounted on the base portion and between the pins for movement with respect thereto, a perforated plate provided with openings of sizes corresponding with certain guide pins and disposed above the slide valve, and an upper slide valve mounted on the plate and between the pins for movement with respect thereto and at right angles to the lower slide valve, said slide valves being provided with means cooperating respectively with the different cross-sectional sizes of the guide pins to insure proper installation thereof.

5. In a milking machine pulsator including a hollow cube-shaped body having a centrally disposed table portion within the body and a plurality of upstanding guide posts secured in the table portion and disposed at the corners of an imaginary square, at least two of the posts being of different diameter from one another, the combination with said posts, of a control slide valve arranged to reciprocate across said table portion and having grooved portions in which the ends of the posts fit, each grooved portion being of proper width to receive the end of a particular post and serving to insure that the valve plate be assembled in only one position with respect to the table portion.

6. In a milking machine pulsator including a hollow cube-shaped body having a centrally disposed table portion within the body and a plurality of upstanding guide posts secured in the table portion and disposed at the corners of an imaginary square, at least two of the posts being of different cross-sectional size from one another, the combination with said posts of a milker valve plate, adapted to reciprocate across said table portion and having slotted portions through which the posts extend, each slot being of a proper width to receive a particular post and serving to insure that the valve plate be assembled in only one position with respect to the table portion.

7. In a milking machine pulsator comprising a hollow cube-shaped body having a centrally disposed table portion and a plurality of spaced guide posts secured in the table portion, at least two of the posts being of different cross-sectional size from one another, the combination with said posts, of a slide valve adapted to reciprocate across the table portion and having slots of proper widths to receive the posts whereby the plate may be assembled with respect to the table portion in only one way.

8. In a milking machine pulsator including a hollow cube-shaped body having a centrally disposed table portion within the body and a plurality of spaced posts secured in the table portion, at least two of the posts being of different cross-sectional sizes from one another and from the remaining posts, the combination with said posts of a valve plate adapted to reciprocate across said table portion and having slotted portions through which the posts extend, each slot being of the proper width to receive a particular post whereby the valve plate may be assembled in only one position with respect to the table portion.

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