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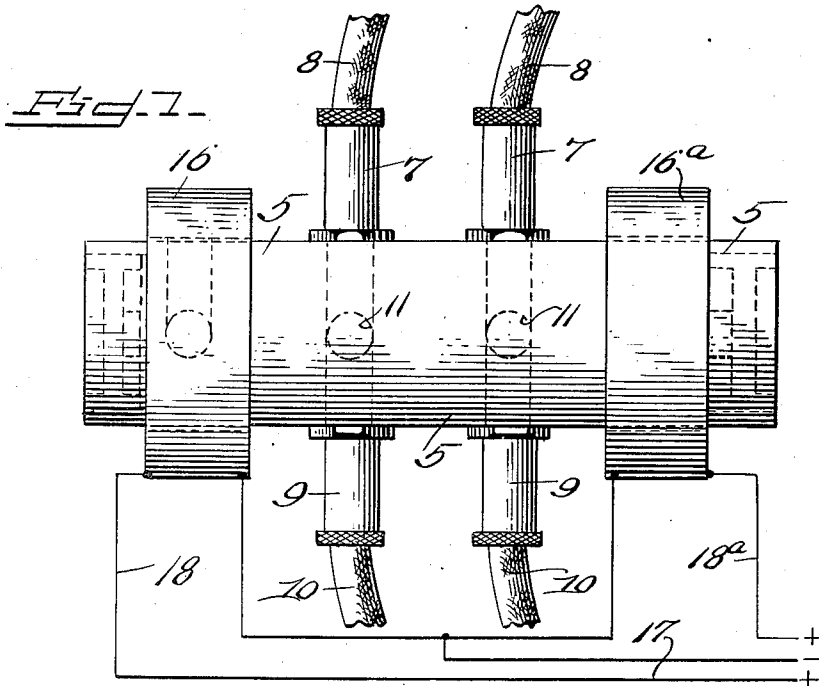
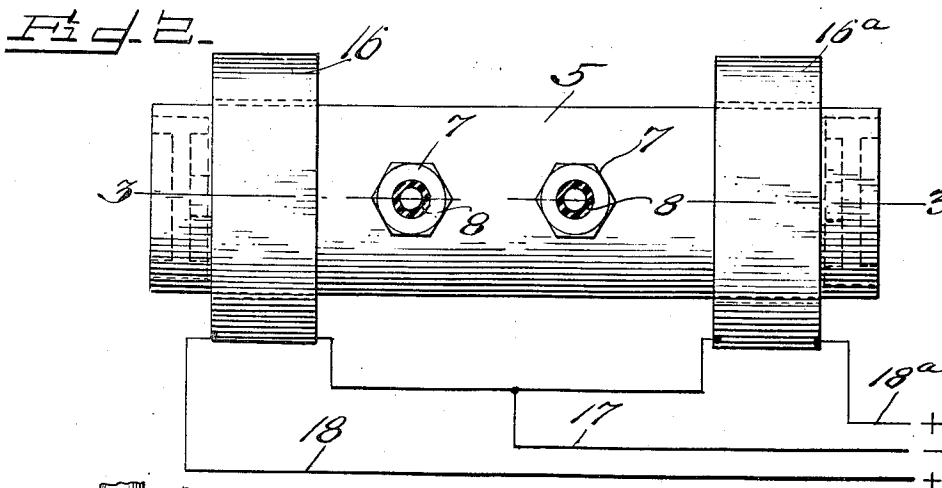
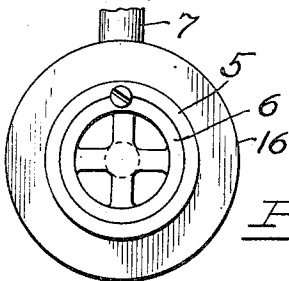
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2,434,586

ELECTROMAGNETIC PULSATOR VALVE

Filed Feb. 6, 1945

2 Sheets-Sheet 1



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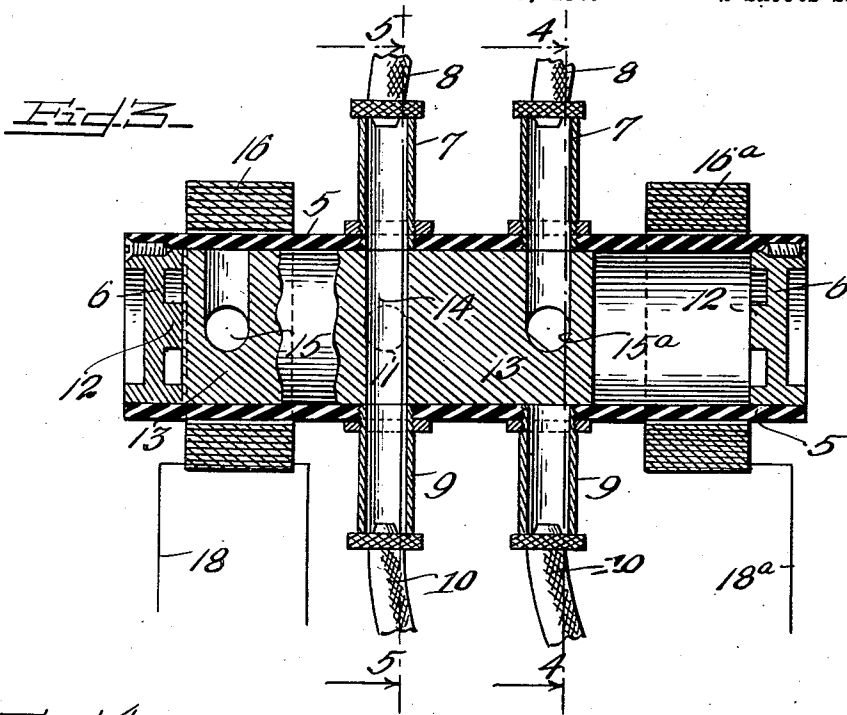
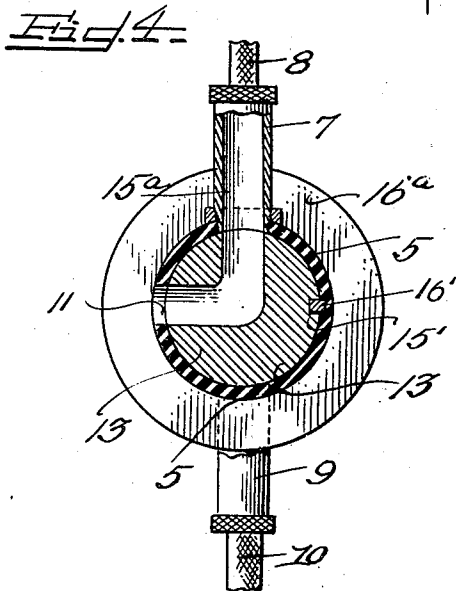
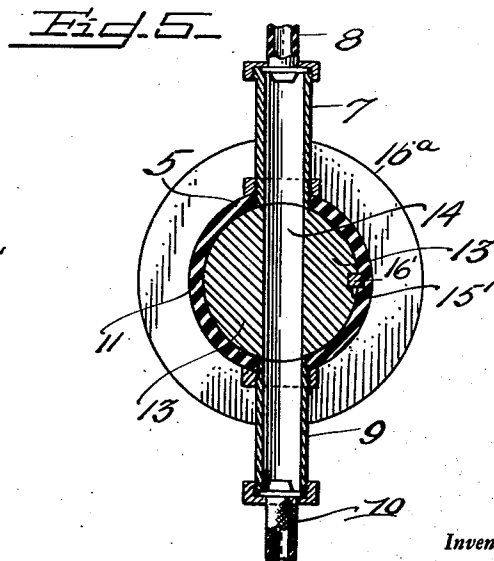
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ELECTROMAGNETIC PULSATOR VALVE

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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ELECTROMAGNETIC PULSATOR VALVE

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4 Claims. (Cl. 31—58)

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This invention relates to an improved electromagnetic pulsator valve for milking machines.

The primary object of the present invention is to provide a pulsator valve of the above kind which is very simple and rugged in construction, easy to take apart for cleaning, and capable of being readily assembled without the exercise of special skill or fine adjustments.

Other objects and features of the invention will become apparent from the following description when considered in connection with the accompanying drawings, and the invention consists in the novel form, combination and arrangement of parts hereinafter more fully described, shown in the drawings and claimed.

In the drawings, wherein like reference characters indicate corresponding parts throughout the several views.

Figure 1 is a fragmentary side elevational view, showing a pulsator valve constructed in accordance with the present invention.

Figure 2 is a plan view of the construction shown in Figure 1.

Figure 3 is a longitudinal section taken substantially on line 3—3 of Figure 2.

Figure 4 is a transverse section taken on line 4—4 of Figure 3.

Figure 5 is a transverse section taken on line 5—5 of Figure 3.

Figure 6 is an end elevational view, with parts broken away and omitted, of the pulsator valve shown in Figure 1.

Referring in detail to the drawings, the present pulsator valve is illustrated as including an elongated cylindrical valve casing 5 of a nickel alloy or other non-magnetic material and having readily removable end plugs 6. Trapping of air in the ends of the casing may be prevented by the common expedient of providing these plugs with suitable vent openings. Intermediate its ends, the casing 5 is provided with a pair of inlet nipples 7 adapted to be connected by suction tubes 8 with the vacuum spaces of ordinary teat cups, not shown. At a point diametrically opposite the inlet nipples 7, the casing 5 is provided with outlet nipples 9 adapted to be connected by suction tubes 10 with the usual suction line, not shown. At points intermediate the nipples 7 and 9, the casing 5 is provided with side air inlet ports 11, and it is noted that the closure plugs 6 are provided with central inwardly projecting stop lugs 12, for a purpose which will presently become apparent.

Reciprocable in casing 5 is a slide valve 13 provided intermediate its ends with a diametrically

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disposed passage 14. The valve member 13 is also provided at opposite sides of the passage 14 and equally spaced from the latter with right angular passages 15 and 15a. It is noted that the valve member 13 is cylindrical and has a snug sliding fit in the casing 5, relative rotation of the valve member and casing 5 being suitably prevented by suitable means, such as a key 16' carried by the casing and engaging in a longitudinal guide groove 15' of the valve member 13, as shown in Figure 5. This insures proper position of the valve member 13 relative to the casing 5 when said valve member is inserted in the latter. It is also pointed out that the plugs 6 are of the same diameter as the valve member 13, so that they may be removed to permit removal of the valve member 13 from the casing 5 through either end of the latter. It will be noted that the valve includes only one moving part, and may be readily taken apart for cleaning, as well as easily assembled without the exercise of special skill or fine adjustments.

It is pointed out that the arrangement of the nipples 7 and 9 and the passages 14, 15 and 15a is such that when the valve member 13 is at one limit of movement, as shown in Figure 3, the passage 14 connects transversely aligned ones of the nipples 7 and 9, while the passage 15a connects the other nipple 7 with an air inlet port 11 which opens to the atmosphere. On the other hand, when the valve member 13 is at its opposite limit of movement, passage 14 connects the other aligned nipples 7 and 9 and passage 15 places the other nipple 7 in communication with the atmosphere through the other air inlet port 11. The opposite ends of the valve member 13 alternately engage the stop lugs 12 to properly limit the movement of said valve member 13 in opposite directions.

The valve member 13 is made partly or wholly of iron or other suitable magnetic material and is adapted to be alternately attracted to opposite ends of the casing 5 by means of magnetic coils 16 and 16a provided on opposite ends of the casing 5. Obviously, if the casing 5 were of magnetic material, energization of the coils would not cause the desired movement of the valve member. Any suitable means may be provided to alternately energize and de-energize the coils 16 and 16a so as to effect the desired reciprocation of valve member 13. Examples of such means are numerous in the prior art, and specific illustration or description of the same is unnecessary herein. It is sufficient to say that corresponding sides of the coils 16 and 16a may be connected to a com-

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mon return wire 17, while the other sides of the coils may be provided with separate feed wires 18 and 18a leading from a suitable circuit maker and breaker. It will be understood, of course, that the ordinary means is provided to maintain a partial vacuum in the suction line with which the tubes 10 communicate.

Assuming that the circuit maker and breaker and the vacuum pump or the milking machine are set in operation, the circuit maker and breaker causes the coils 16 and 16a to be alternately and intermittently energized and de-energized. When the valve member 13 is moved to the position of Figure 3, suction is had in one tube 8 from the associated tube 10, through the nipples 7 and 9 to which they are connected, and the associated passage 14. At the same time, the other tube 8 and nipple 7 are placed in communication with the atmosphere by way of passage 15a, thus relieving the suction in the last-named tube 8. The valve member 13 is then moved to the opposite end of the casing 5 so that the first-named tube 8 is placed in communication with the atmosphere by way of passage 15 and the second tube 8 is placed in communication with its tube 10 by passage 14. Suction is thus alternately had in the respective tubes 8, so that the flexible inner walls of the teat cups are alternately expanded and contracted and milk is supplied to the milk receptacle alternately from one teat cup and then from the other.

From the foregoing description, it is believed that the construction and operation, as well as the advantages of the present invention, will be readily understood and appreciated by those skilled in the art. Minor changes in details of construction illustrated and described are contemplated, such as fairly fall within the spirit and scope of the invention as claimed.

What I claim is:

1. An electromagnetic pulsator valve for milking machines, comprising a cylindrical non-magnetic casing having lateral inlet and outlet nipples and provided at a point between said nipples with a lateral air inlet port, tubes for respectively connecting the inlet and outlet nipples to a teat cup and a suction line, a cylindrical magnetic slide valve reciprocable in said casing and having transverse passages arranged to respectively connect said nipples and to place the inlet nipple in communication with the air inlet port when the valve member is at its opposite limits of movement, and magnetic coils carried by and disposed about opposite ends of said casing and adapted to be alternately energized and de-energized for reciprocating said valve member.

2. An electromagnetic pulsator valve for milking machines, comprising a cylindrical non-magnetic casing having lateral inlet and outlet nipples and provided at a point between said nipples with a lateral air inlet port, tubes for respectively connecting the inlet and outlet nipples to a teat cup and a suction line, a cylindrical magnetic slide valve reciprocable in said casing and having transverse passages arranged to respectively connect said nipples and to place the inlet nipple in communication with the air inlet port when

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the valve member is at its opposite limits of movement, and magnetic coils carried by and disposed about opposite ends of said casing and adapted to be alternately energized and de-energized for reciprocating said valve member, removable closure plugs in opposite ends of the casing permitting removal of the valve member from the casing through either end of the latter, and central inwardly projecting stop lugs for the valve member carried by said closure plugs.

3. An electromagnetic pulsator valve for milking machines, comprising a cylindrical non-magnetic casing having lateral inlet and outlet nipples and provided at a point between said nipples with a lateral air inlet port, tubes for respectively connecting the inlet and outlet nipples to a teat cup and a suction line, a cylindrical magnetic slide valve reciprocable in said casing and having diametric and angular transverse passages arranged to respectively connect said nipples and to place the inlet nipple in communication with the air inlet port when the valve member is at its opposite limits of movement, and magnetic coils carried by and disposed about opposite ends of said casing and adapted to be alternately energized and de-energized for reciprocating said valve member, and means to prevent relative rotation of the valve member and the casing.

4. An electromagnetic pulsator valve for milking machines, comprising a tubular non-magnetic casing of uniform cross section from end to end, said casing having pairs of lateral inlet and outlet nipples and provided at points between the nipples of each pair with a lateral air inlet port, removable plugs in the ends of said casing, tubes for respectively connecting the inlet nipples with teat cups and the outlet nipples with a suction line, a slide valve reciprocable in the casing and formed of magnetic material, said slide valve having an intermediate transverse passage alternately adapted to connect the respective pairs of inlet and outlet nipples when the valve member is reciprocated, said valve member further having angular transverse passages at opposite sides of the first-named passage arranged to connect each inlet nipple with an air inlet port when the other inlet nipple is connected with its associated outlet nipple, and magnetic coils disposed about opposite ends of the casing and adapted to be alternately energized and de-energized for reciprocating said valve member.

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