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REGULATING DEVICE FOR PULSATORS

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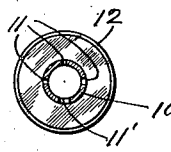
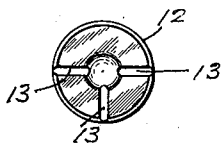
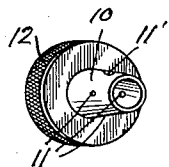
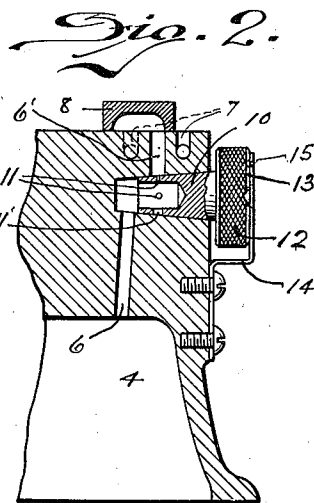
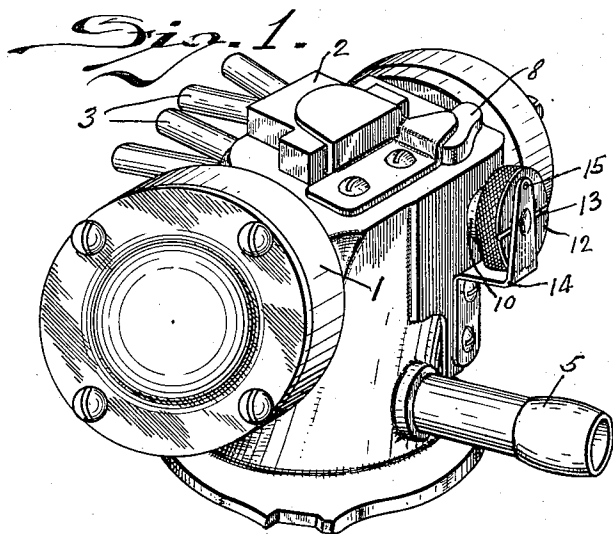


Fig. 3. Fig. 4. Fig. 5.

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REGULATING DEVICE FOR PULSATORS

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3 Claims. (Cl. 251—92)

This invention relates to pulsators for milking apparatus, and more particularly to an adjustable governor or control valve by which the speed of operation may be accurately controlled.

Such pulsators are ordinarily fluid pressure operated and include a chamber or cylinder having therein a vibratory piston to the opposite sides of which the actuating fluid is alternately admitted under control of a reversible control valve. Ordinarily the actuating fluid is air at atmospheric pressure admitted first to one side and then to the other of the piston from the opposite side of which the air is exhausted by a suction or vacuum pump. It is quite usual to provide a needle valve or adjustable regulating device for controlling the periodic reversal of the control valve.

The adjustment of such needle valve to effect the operation of the pulsator mechanism at a predetermined speed necessitates rather delicate and careful adjustment.

The present invention pertains to a governing valve capable of being easily and quickly adjusted to predetermined position to effect different speeds of operation. To this end the regulating valve consists of a hollow tapered plug capable of revoluble adjustment, the interior of which is in constant communication with one passage or channel while radial openings of different sizes in the wall of the hollow tapered plug or valve are successively brought into communication with a second passage by the revoluble adjustment of the device, thus placing such passages in direct communication through intermediate orifices of different capacity. One of these orifices is of considerably larger area than the others and is adapted to overlap the communicating passages to greater or less degree, thus varying the effective opening. The head of the revoluble valve or regulator plug is provided with a series of radially disposed grooves, one for each of the lateral communicating openings with the exception of the larger openings. A detent is engageable in these grooves to hold the valve in its adjusted position. However no such detent or locking means is provided for the valve or plug when the larger opening is in operative position, thus permitting variation of the effective opening at will.

The object of the invention is to simplify the structure as well as the means and mode of operation of governing devices for fluid pressure operated pulsator mechanisms whereby they will not only be cheapened in construction but will be more efficient in operation, uniform in ac-

tion, capable of being easily and quickly adjusted to vary the operating speed of the pulsator, and unlikely to get out of order.

A further object of the invention is to provide a governing or control valve for a pulsator mechanism having predetermined positions of adjustment for effecting corresponding changes of pulsator speed.

A further object of the invention is to provide such regulating device having in addition to predetermined speed regulating positions an additional position wherein the speed of operation may be regulated at will throughout a considerable range.

A further object of the invention is to provide simple but efficient means for automatically holding such valve in various positions of adjustment.

With the above primary and other incidental objects in view, as will more fully appear in the specification, the invention consists of the features of construction, the parts and combinations thereof and the mode of operation or their equivalent as hereinafter described and set forth in the claims.

Referring to the accompanying drawing wherein is shown the preferred but obviously not necessarily the only form of embodiment of the invention, Fig. 1 is a perspective view of a typical form of pulsator apparatus to which the present invention has been applied. Fig. 2 is a vertical sectional view of a portion of the pulsator mechanism illustrated in Fig. 1 showing the relative location of the speed regulator or control valve and its detent. Fig. 3 is a perspective view of the speed regulator removed from the pulsator mechanism. Fig. 4 is an end elevation of the head of the regulator device or valve. Fig. 5 is a transverse sectional view through the speed regulator or valve in the plane of the radial ports.

Like parts are indicated by similar characters of reference throughout the several views.

While the present invention is applicable to any pulsator of the suction or fluid pressure operated type, for illustrative purposes, but without intent to limit or restrict the application of the invention, it has been shown embodied in a pulsator of the character shown and described in my copending application Ser. No. 312,545 filed Oct. 15, 1928, now Patent No. 1,827,405, Oct. 13, 1931.

Referring to the drawing the pulsator comprises a cylinder having therein a reciprocatory piston which by its to and fro movement

actuates a pulsator valve 2 which operates to alternately connect the teat cup conduits 3 with the suction or exhaust and with atmosphere. Located in the base of the pulsator is a suction or vacuum chamber 4 from which leads a conduit 5 connecting with a pump or other exhaust apparatus. Leading through the body of the pulsator from the vacuum chamber 4 is a passage 6 which is connected alternately with ducts 7—7 leading to the opposite ends of the cylinder 1 beyond the piston therein by means of a control valve 8 which is intermittently shifted to open one of the ducts 7 to atmosphere and at the same time interconnect the other duct 7 with the passage 6 as is shown particularly in Fig. 2. Such construction forms no part of the present invention per se.

Interposed in the passage 6 is a speed regulating valve comprising a hollow tapered plug 10, the axial bore of which is in constant communication with one portion of the passage 6. Located in the peripheral wall of the tapered plug 10 is a plurality of small radial ports 11 of different sizes which by rotation of the plug 10 are successively positioned in registry with the continuation 6' of the passage 6 thereby varying the capacity of such passage. The rapidity with which air is exhausted from first one end of the cylinder 1 and then from the other through the duct and passage 6 to the vacuum chamber 4 and through the outlet conduit 5 determines the speed of operation of the mechanism. The relative size of the minute port or opening in the side of the tapered plug 10 in turn determines the rapidity with which the air is exhausted from the cylinder. By making these ports 11 of different sizes, the capacity of the passage 6 may be varied to predetermined degree thus giving to the pulsator mechanism different predetermined operating speeds.

In the particular pulsator mechanism illustrated one of the lateral ports 11 being .015 of an inch in diameter permits exhaustion of air at a rate which will induce a pulsator speed of forty strokes per minute. The second lateral port 11 in such construction being .016 of an inch in diameter enables a pulsator speed of forty-five strokes per minute. The third lateral port 11 which is 0.17 of an inch in diameter by allowing a more rapid exhaustion of air from the cylinder effects an operating speed of approximately fifty strokes per minute. These sizes of ports 11 and corresponding pulsator speeds are mentioned for illustrative purposes only and not as implying any limitation upon either the size of the port or the pulsator speed.

In addition to the several ports 11 of different size, there is also provided in the lateral wall of the tapered plug 10 an additional port 11' of somewhat larger size. By rotary adjustment of the valve or plug 10, this port 11' may be made to overlap to greater or less extent the orifice of the passage 6' thereby enabling the speed of the pulsator to be varied to various undetermined degrees within the maximum capacity of such port 11'.

The tapered plug or valve 10 is provided with an enlarged head 12 in the face of which are located indentations or notches 14 in different radial positions. A spring finger 14 secured to the body of the pulsator is provided with a projection or boss 15 engageable in any one of the notches or indentations 13 upon rotation of the valve or plug 10. The indentations 13 are so located in relation with the ports 11 that the detent will engage such indentation to releas-

ably detain the valve or plug in its adjusted position when one of the ports 11 is in registry with the passage 6'. There is no indentation or groove 13 in the head of the valve or plug corresponding to the enlarged port 11'. Consequently the valve is free for minute adjustment as may be necessary to enable the desired degree of overlapping relation of such enlarged port 11' with the orifice of the passage 6'.

By the construction heretofore described, the adjustment of the speed regulating valve or plug 10 to present the different ports 11 in registry with the passage 6' enables the speed of operation of the pulsator to be adjusted through predetermined steps or to predetermined rates of operation. The regulator valve is capable of further adjustment to vary such pulsator speed throughout undetermined degrees of variation by varying the overlapping relation of the enlarged port 11'. By registering the enlarged port 11' with the passage 6', the pulsator may be permitted to operate as rapidly as desired. By turning the valve or regulator to greater or less degree the speed may be reduced. This renders the regulating device very flexible. There are established speeds of operation which are most effective under certain conditions of use. Such fixed speed can be achieved by selecting one of the ports 11 which by controlling the escape of air from the cylinder will accurately determine the rate of operation of the pulsator.

There is a slight variation in the speed of different pulsators even though the exhaust ports of the same size are employed. This is due to the fact that the piston packing may be tighter in one instance than in another, thus increasing friction and reducing the speed while a loose piston would tend to increase the speed of operation. Friction in other parts of the apparatus will also have a retarding effect. A difference of three or four strokes per minute is deemed immaterial.

The spring detent 14 possesses a double function. It not only serves to releasably detain the regulator valve in its adjusted position but by exerting a degree of pressure upon the head 12 of such valve, it holds the valve or plug tightly within its tapered seat to prevent air leakage thereabout but at the same time permits it to be manually adjusted as may be necessary to secure a desired speed of operation.

From the above description it will be apparent that there is thus provided a device of the character described possessing the particular features of advantage before enumerated as desirable but which obviously is susceptible of modification in its form, proportions, detail construction and arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute the invention has been described in language more or less specific as to structural features, it is to be understood that the invention is not limited to the specific details shown, but that the means and construction herein disclosed comprise the preferred form of several modes of putting the invention into effect and the invention is, therefore, claimed in any of its forms or modifications within the legitimate and valid scope of the appended claims.

Having thus described my invention, I claim:

1. A speed regulator for a pulsator mechanism including a hollow revoluble regulator valve the interior of which is in constant communication with one portion of a passage and having in its

lateral walls a plurality of radial ports of different size to be separately registered with the other portion of the passage by the rotation of said regulating valve, and a spring finger exerting

engageable in any one of said indentations to releasably detain the valve in its adjusted position with the corresponding port in registry with the passage.

5 axial pressure on the valve and also having operative engagement therewith in different positions of revoluble adjustment for automatically arresting the rotation of the regulator valve when a lateral port is in registering position with said

3. A speed regulating valve for pulsator mechanisms comprising a revoluble tapered plug having an axial bore and having a plurality of lateral ports of different diameters communicating with the axial bore, a head on said plug having therein a plurality of radially disposed indentations respectively corresponding to the several lateral ports, and a spring finger exerting constant axial pressure upon the plug and operatively engageable with any one of the several indentations for locating the plug with its corresponding port in 15 predetermined position.

10 passage.
2. A speed regulator for a pulsator mechanism including a multiway valve controlling a passage to vary the speed of operation of the mechanism, a head for said valve having in its terminal face a plurality of radially extending indentations corresponding to different ports to be registered with the passage, and a spring detent overlying the terminal face of the valve and eccentrically en-

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CERTIFICATE OF CORRECTION.

Patent No. 2,017,807.

October 15, 1935.

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It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, first column, line 48, for "0.17" read .017; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 19th day of November, A. D. 1935.

(Seal)

Leslie Frazer
Acting Commissioner of Patents.