W. D. NICHOLS.

APPARATUS FOR MILKING COWS.

No. 32,379. Patented May 21, 1861.

Fig: 2.

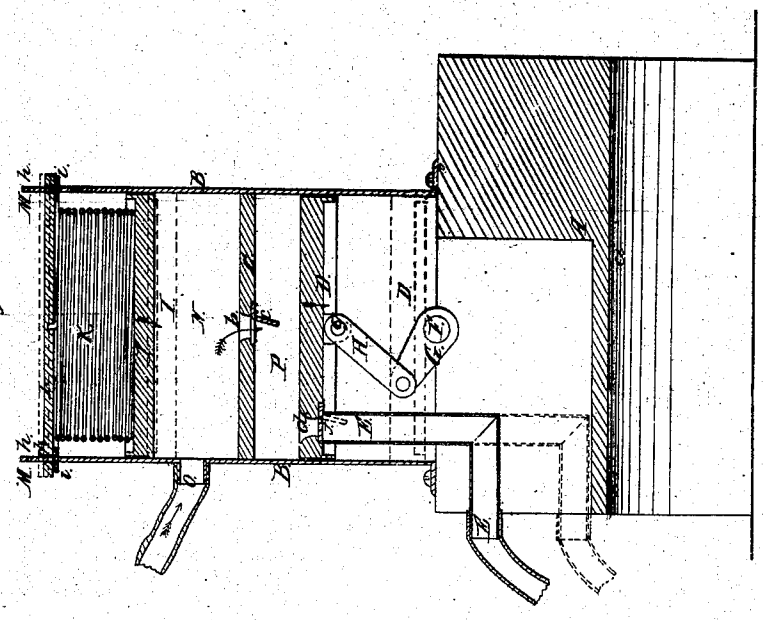


Fig: 3.

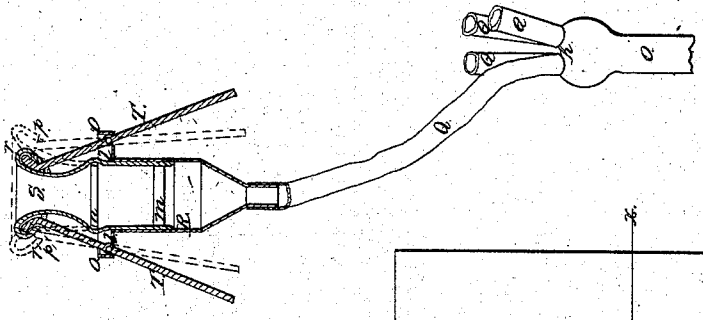
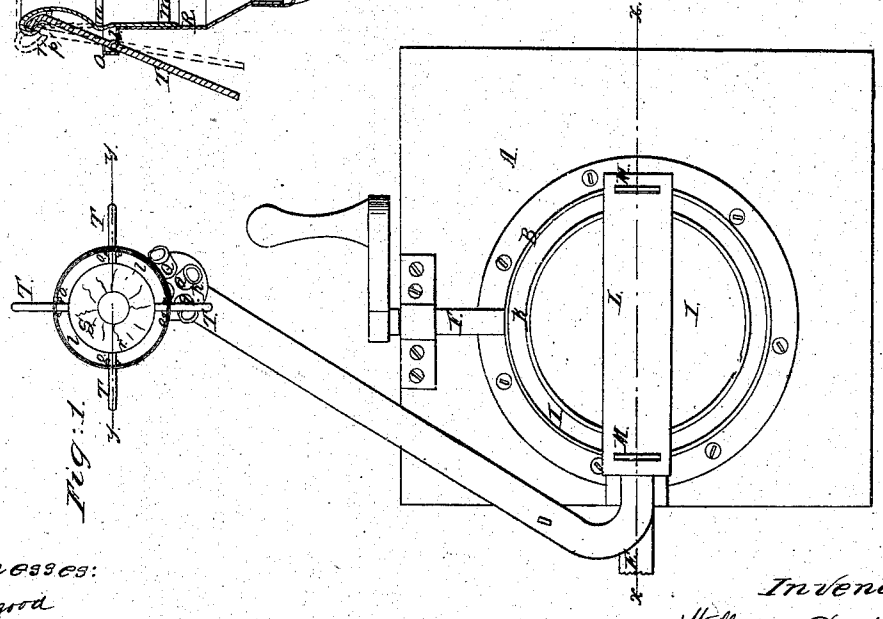


Fig: 1.



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UNITED STATES PATENT OFFICE.

WILLIAM D. NICHOLS, OF DAVENPORT, IOWA.

DEVICE FOR MILKING COWS.

Specification of Letters Patent No. 32,379, dated May 21, 1861.

To all whom it may concern:

Be it known that I, WILLIAM D. NICHOLS, of Davenport, in Scott county and State of Iowa, have invented a new and Improved Apparatus for Milking Cows; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

Figure 1, is a plan of the apparatus, showing but one of the teat cups, the others being removed; Fig. 2, a central vertical section of the pump cylinder, and the parts connected therewith, in the plane indicated by the line *x*, *x* Fig. 1; Fig. 3, a central vertical section of one of the teat cups, in the plane indicated by the line *y*, *y*, Fig. 1, and showing a portion of the connecting tubes.

Like letters designate corresponding parts in all the figures.

My improvement relates more particularly to the arrangement of the pistons in the interior of the pump cylinder; and to the arrangement of the parts composing the teat cups, whereby they are more easily and expeditiously attached to the cow's teats, and more effectual in use.

The apparatus is of such a nature as to be easily secured to the top of the pail in milking, or to be held by one hand while it is actuated by the other; but I prefer to have it so arranged as to be fastened to the leg of the operator just above the knee, so as to allow him to pass easily from one cow to another in the yard without its being detached. For this latter purpose, I provide a block A, of suitable size to sustain the pump cylinder B, and the bottom of this block is made concave as represented at *a*, Fig. 2, so as to fit the leg, to which it is attached by straps, or by any convenient means. The pump cylinder B, may be secured to this block A, either horizontally or vertically; but I prefer the latter position. This cylinder is made of suitable size for the purpose designed, and is provided midway, or thereabout, with a transverse rigid diaphragm C, (Fig. 2,) having a proper passage or way *b*, through it, connecting the upper and lower chambers of the cylinder; said passage being covered on the underside with an ordinary valve *c*, opening downward, as represented.

Below the diaphragm is situated the main actuating piston D, made in any convenient manner, so as to work freely but closely in the cylinder. This piston has a passage or way *d*, covered on its underside by a valve *f*, and opening into an eduction pipe E, secured to the piston, and rising and falling with it in its upward and downward strokes. This piston may be actuated by any desirable means; that represented in the drawings being a crank G, on the end of a winch shaft F, turned from the outside; and a pitman H, jointed at *g*, to the piston, and connecting it with the crank.

At a suitable distance above the diaphragm C, is situated an auxiliary piston I, to the top of which is secured a spiral spring K, or its equivalent, of suitable size and stiffness for the purpose designed; said spring being also secured to an adjusting support L, above it, as represented most clearly in Fig. 2. This adjusting support rests on projections M, M, from the upper end of the cylinder, said projections being respectively provided with a set of corresponding holes *h*, *h*, into which fit pins *i*, *i*. By means of these holes and pins, the support L, and consequently the auxiliary piston I, are adjusted higher or lower as may be desired. Any equivalent means of producing this adjustability may be used. Into the receiving chamber N, thus formed between the auxiliary piston and the diaphragm, opens the induction tube O, which is connected with the cow's teats.

The main piston D, being actuated, its downward motion draws the milk into the discharging chamber P, through the diaphragm, while its upward motion forces the milk out from the discharging chamber P, through the eduction tube E, into the pail or receptacle. This action of the main piston and diaphragm does not differ materially from other known devices; but by their use alone, the suction is obtained only during the downward motion of the piston. By my arrangement, I not only obtain a suction by the upward as well as the downward stroke of the main piston, but the intensity of the suction is self regulated, and perfectly adapted to the speed at which the main piston is driven. This result is accomplished by the use of the auxiliary piston I. When the main piston is forced downward, its action in exhausting the air causes the auxiliary piston I, to be likewise drawn downward, as indicated by the red lines in Fig. 2; thus expanding the spiral spring; and when the main spring is forced upward,

closing the diaphragm valve *c*, the reaction of the spring causes the auxiliary piston to be drawn back, thereby causing a gentle suction through the induction tube O.

This device is far superior to any arrangement of double acting pistons for producing a constant suction, since the force of the pistons, in such arrangements, has to be regulated by the hand, and is frequently so great as to render the operation painful and injurious to the cow. A quicker motion of the actuating piston D, produces a corresponding quicker motion of the auxiliary piston I; and by means of the adjusting support L, said auxiliary piston is so arranged that any undue velocity of the main piston will cause the auxiliary piston to be drawn down sufficiently in its downward stroke, to partially or entirely cover the induction orifice, thereby lessening the suction through the tube O, or entirely stopping it. Thus the intensity of the suction is regular and uniform, whether the main piston is driven with a greater or less velocity.

Some cows milk much harder than others, and this requires the auxiliary piston to be raised higher so that the increased motion of the actuating piston will not cause said auxiliary piston to be drawn down too far so as to close the induction opening, before there is sufficient suction to cause the milk to flow.

At a sufficient distance from the pump cylinder, as at *k*, the induction tube is divided into four branch tubes Q, Q, Q, Q, each of which connects at its top end, with a teat cup, arranged and operated as follows:—The lower part R, of each cup, is usually made of tin or other metal, of suitable size and depth to receive the cow's teat therein; and the top thereof has a flange *l*, substantially as represented in Figs. 1, and 3. To this receptacle, is secured an elastic compressor S, made of rubber or other suitable material. This compressor may be fastened to the cup R, in any convenient manner, that represented in the drawing being by extending down into the cup a sufficient distance and held air tight against the inner surface, by a ring or collar *m*, as represented most clearly in Fig. 3. A similar ring or collar *n*, is also fitted in the compressor, at a suitable position just above the flange *l*, of the cup, to expand it, thereby preventing the compressor from pressing upon the ends of the teats. The top of the elastic compressor is of such size, as, when fitted on the cow's teats, it will make the cup air tight; and of such shape as to fit most closely and easily thereto. To the top of the compressor S, are secured in any desirable manner, the upper ends of a suitable number of levers, T, T, said levers being jointed to the flange *l*, of the cup, as represented at *o*, *o*, and extending downward a sufficient distance to be easily operated by the hand, as shown most clearly in Fig. 3. I find that four of these levers are most effectual; but a greater or less number may be used. The upper ends *p*, *p*, of the levers, fitting the top of the compressor, are usually somewhat flattened, to obtain a greater bearing surface, and more effectually expand the compressor; and I find that the most convenient way of fastening the flattened ends of the levers to the compressor, is by turning the upper edge of the compressor over the ends of the lever as represented at *r*, Figs. 1 and 3, forming thereby a band outside of the levers against which the levers operate to expand the compressor.

The use of this device is to more effectually and expeditiously secure the cup to the cow's teats. In all other devices of this class with which I am acquainted, no provision is made for expanding the compressors when adjusting them for use, and consequently it is a difficult act to insert the teats, and one which occupies considerable time. By my arrangement, all that is necessary to accomplish this is to grasp the lower ends of the levers T, T, in one hand and compress them, thereby expanding the top of the compressor S, as indicated by red lines in Fig. 3, when the teat is easily inserted. The levers do not in any manner interfere with the effective action of the cup, as the said levers are outside of the compressor.

What I claim as my invention and desire to secure by Letters Patent, is—

1. The elastic auxiliary piston I, in combination with the actuating piston D, and diaphragm C, substantially as and for the purposes herein specified.

2. The combination of the levers T, T, with the top of the elastic compressor S, for the purpose of easily adjusting the cups to the cow's teats, substantially as herein described.

WILLIAM D. NICHOLS.

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