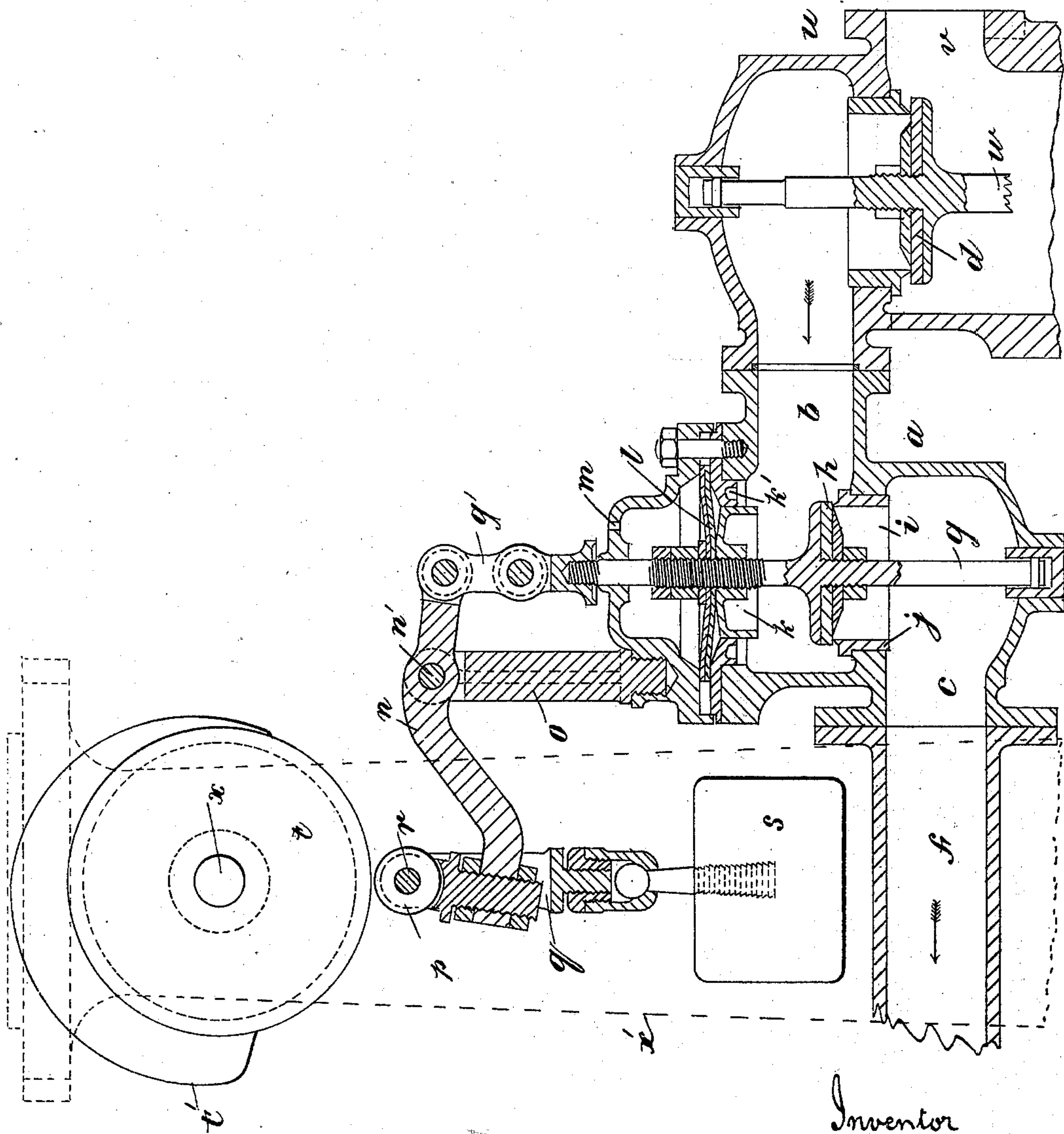


(No Model.)

A. SHIELDS.
MILKING MACHINE.

No. 558,666.

Patented Apr. 21, 1896.



Witnesses

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UNITED STATES PATENT OFFICE.

ALEXANDER SHIELS, OF GLASGOW, SCOTLAND.

MILKING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 558,666, dated April 21, 1896.

Application filed September 27, 1895. Serial No. 563,914. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER SHIELS, M. B., C. M., B. Sc., a subject of the Queen of Great Britain, and a resident of the city of Glasgow, Scotland, have invented certain new and useful Improvements in Milking-Machines, of which the following is a specification.

In my prior application, Serial No. 560,421, dated August 24, 1895, I have described a vacuum pulsating device which is operated by means of a cam on the main driving-shaft of the machine. The "pulsator" has acting in conjunction with it a "by-pass" valve—*i. e.*, a valve for supplying additional vacuum to the teat-cups of the milking-machine at certain times—a "vacuum-destroying valve" for destroying, at certain times, any excess of vacuum at the teat-cups, and also a "constant" valve for giving a regular supply of vacuum from the vacuum-reservoir to the pulsator. The arrangement and operation of these devices are fully explained in the specification of my aforesaid application.

This invention has for its object to combine in one device the pulsator and the by-pass valve, so that the parts of the machine can be reduced and simplified and a better action produced.

The annexed drawing shows the new pulsating device.

As will be seen, the device consists of a casing *a*, having two passage-ways *b c* in it, the one, *b*, communicating with the valve *d*, which is the constant valve for regulating the supply of vacuum from the vacuum-reservoir and is of the same construction as in my prior invention, and the other, *c*, communicating with the pipe *f*, leading to the teat-cups of the milking-machine. Passing up through the casing and out at its upper end is a spindle *g*, on which a disk valve *h* is fitted capable of closing an opening *i*, having a ring-seat *j* in it, establishing communication between the aforesaid passages *b c*. There is also fitted on the spindle, above the valve *h*, a cup-shaped piston *k*, which works in a liner *k'*, secured in the casing, and a double or single diaphragm *l*, held in place between the cover of the casing and said liner and which is open to atmospheric pressure on its upper side through the hole *m* in the casing. The spindle *g* is

connected by the link *g'* at its upper end to one end of the cross-lever *n*, fulcrumed at *n'* on the pillar *o*, secured to the casing or its cover, and which lever has at its other end the wheel or roller *p*. Slung, by means of a jaw *q*, upon the lever *n* or to the spindle *r* of the wheel or roller is a weight *s*. The spindle with its valve *h* is operated by the cam *t t'* in the same manner as the spindle and valve of the pulsator described with reference to Fig. 7 of the specification of my prior application aforesaid.

The weight *s* is so arranged relatively to the area of the diaphragm *l* and the suction, when the machine is working, on the under side of the valve *h* that, apart from the action of the cam *t*, the valve *h* will remain closed so long as the vacuum at the teat-cups is at or above the minimum, but will immediately open automatically whenever the vacuum at said teat-cups is reduced below the minimum; and the whole arrangement is such that when the cam *t t'* begins to operate on the roller *p* the pulsating valve *h* is slowly opened to the full extent and gradually supplies vacuum from the constant valve *d* to the teat-cups until the maximum is reached, when the valve *h* suddenly closes sufficiently to reduce the vacuum down again to the minimum. So long as the milking is going on the valve *h* never closes entirely, as the weight *s* is so adjusted that a minimum vacuum sufficient to retain the teat-cups on the cow's teats is always supplied from the valve *d*. It will thus be readily seen that the arrangement serves both as a by-pass valve to prevent the vacuum at the teat-cups falling below the minimum and as a pulsator.

u is the casing of the constant valve *d*.

v is the passage leading from the vacuum-reservoir of the milking-machine to the constant valve.

w is the constant-valve spindle.

x is the cam-shaft, driven from the driving-shaft of the machine.

The dotted lines *x'* indicate one of the standards or pillars for carrying the driving-shaft of the machine.

The arrows indicate the direction of the vacuum-flow from the constant valve to the pipe *f* and teat-cups.

Having now fully described my invention,

what I claim, and desire to secure by Letters Patent, is—

1. In combination, the suction-pipe, a pulsator-valve therein and means for operating
5 the pulsator-valve, said valve having capacity for opening movement independent of said means so as to act when necessary as a by-pass valve, substantially as described.
2. In combination, the suction-pipe, a pulsator-valve, means for operating the same
10 positively to produce the pulsations and a diaphragm exposed to the air and a weight for controlling the valve independent of said operating means.
3. In combination, the suction-pipe, the
15 pulsator-valve therein, means for operating the same to produce the pulsations and means for operating the valve when the vacuum-pressure at the teat-cups falls below a minimum,
20 substantially as described.

4. In combination, the suction-pipe, the pulsator-valve and means for operating the same, said valve being weighted to open automatically whenever the vacuum-pressure at the teat-cups falls below a minimum. 25

5. In a milking-machine the combination with the valve-casing and valve therein with its spindle, of a diaphragm fitted on the valve-spindle and acted on by the atmosphere, a weighted cross-lever attached to the valve-spindle and a rotating cam for pressing down
30 the lever and gradually opening the valve, substantially as hereinbefore set forth.

Signed at Glasgow, Scotland, this 19th day of August, A. D. 1895.

ALEXANDER SHIELS.

Witnesses:

WILLIAM FLEMING,
WILLIAM GALL.