

Nov. 8, 1927.

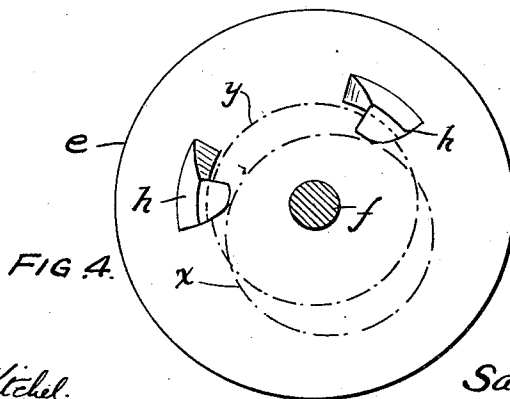
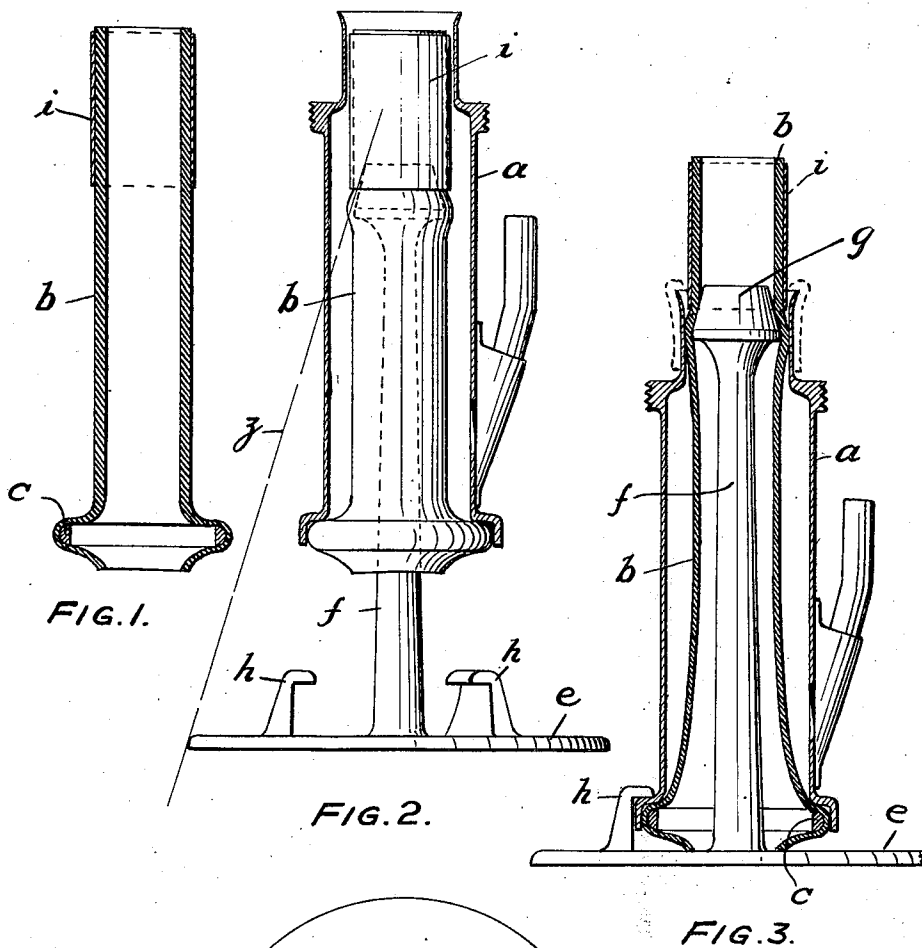
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1,648,436

LINER STRETCHER FOR TEAT CUPS OF MILKING MACHINES

Filed Nov. 17, 1926

2 Sheets-Sheet 1



WITNESS:

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2 Sheets-Sheet 2

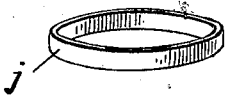


FIG. 5.

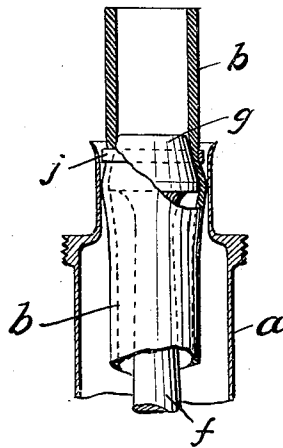


FIG. 6.

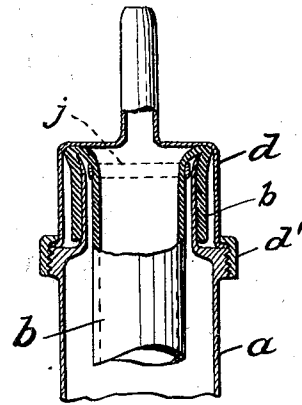


FIG. 7.

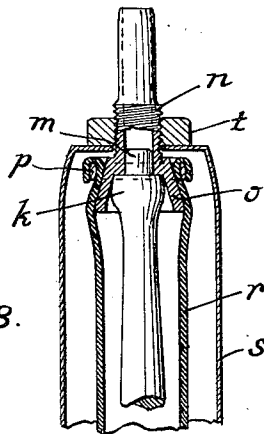


FIG. 8.

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UNITED STATES PATENT OFFICE.

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LINER STRETCHER FOR TEAT CUPS OF MILKING MACHINES.

Application filed November 17, 1926. Serial No. 148,818.

The ordinary teat cup forming part of a milking machine comprises an outer metal shell and a flexible and elastic (rubber) liner extending through the shell and whose ends are in engagement with opposite ends of the shell or with members in fixed relation with the shell. The normal length of a liner may be less than, or slightly greater than, the length of the shell; but the proper functioning of the liner (expansion and contraction under the influence of differential air pressures) requires that the liner shall be substantially stretched longitudinally between its points of engagement with opposite ends of the shell.

To effect this stretching of the liner manually requires much muscular effort, and even those workmen who are accustomed to assemble new teat cups find the work arduous and tedious, while the ordinary user has not only still more difficulty in effecting the stretching but very often fails to do so to the degree required to enable the liner to operate with proper efficiency.

Mechanical means, manually operable, have been devised to facilitate the insertion of liners into teat cups, and such means operate with entire success when applied to new liners, but after a liner has been in use for a time, not sufficiently long to substantially impair its utility, but sufficiently long to materially diminish its flexibility and elasticity, such mechanical means are not dependable and frequently fail to hold the liner taut during the stretching operation.

The object of my invention is to provide new mechanical liner stretcher means that will operate efficiently as applied either to new or old liners.

In the drawings, I show several embodiments embodying my invention.

Fig. 1 is a longitudinal sectional view of a liner having applied thereto the removable ring or sleeve element of one of the devices embodying my invention.

Fig. 2 is a side elevation of said device, the shell of the teat cup being in sectional elevation, and the parts being positioned ready for stretching the liner.

Fig. 3 is a vertical sectional view of the same device with the parts in position after the liner is stretched.

Fig. 4 is a plan of the base of the same device.

Fig. 5 is a perspective view of a modified ring element.

Fig. 6 is an elevation, partly in section, of the upper part of a device modified to adapt it to the ring of Fig. 5, and before bending down the projecting end of the liner and applying the cap.

Fig. 7 is a view of the device of Fig. 6, in sectional elevation, and with the projecting end of the liner bent down over the shell and with the tube-carrying cap applied to the shell.

Fig. 8 is a partial view, in vertical section, of another modification.

An ordinary type of teat cup shell *a* is shown in Figs. 2 and 3, the same being shown in an inverted position compared with the position it occupies when applied to the teat of the cow. The shell is enlarged at its upper end (the lower end in the drawings) and contracted at its lower end (the upper end in the drawings). The flexible and elastic (rubber) liner *b*, after assembly, extends through the shell in a stretched condition, one end being expanded around a ring *c* and engaging the enlarged end of the shell (as shown in Fig. 3) and the other end projecting beyond, and folded down over the outside of, the contracted neck of the shell (as shown also, in Fig. 3, in dotted lines). A cup bottom *d* (shown in Fig. 7 as applied to one of the modifications) encloses the contracted end, or neck, of the shell and carries a ring *d'* threaded on the shell adjacent such contracted end.

In assembling the teat cup, the liner *b*, having inserted therein the ring *c*, is entered within the shell *a*, as shown in Fig. 2, and, in the absence of any mechanical appliance, the operator inserts his finger or thumb through the contracted end of the shell and pulls the free end of the liner a considerable distance beyond this contracted end so as to stretch the liner, and then, while maintaining the liner stretched, folds the projecting part of the liner over this contracted end, as shown in dotted lines in Fig. 3. It is this extremely difficult manual operation which is effected by the aid of my new mechanical means, which I shall now describe.

From a flat base *e* extends a standard *f* provided at the top with a head *g*, preferably, but not necessarily, integral with the standard. The head is of frusto-conical

shape. Secured to and projecting above the base *e* are hooks *h*. A ring *i* (in the construction shown a removable sleeve) is slidable on the end of the liner *b*. The described elements comprise the entire construction, which it will be observed is very simple.

To operate the device, the ring *c* is applied to the liner *b* and the ring *i* is slipped over the opposite end of the liner, as shown in Fig. 1. The liner is then slipped into the shell, through the enlarged end thereof, until it engages such enlarged end. The shell and liner, in the inverted position shown in Fig. 2, are then slipped over the standard *f* until the movement is arrested by the ring *i*, as shown in Fig. 2. The operator then pulls down the shell until its enlarged end extends below the plane of the overhanging hooked ends of the member *h*. It is necessary to tilt the shell very slightly away from a true vertical position to enable its expanded end to clear the hooks, the dotted line circle *x* in Fig. 4 indicating the position of the enlarged end of the shell after it has been so pulled down. The described operation stretches the liner, because the part thereof that engages the conical surface of the head *g* is confined from slipping thereover by compression between such surface and the lower end of the ring *i*. The shell is then restored to a true vertical position by slipping the enlarged end thereof into the position shown by the dotted line circle *y* in Fig. 4, in which position, shown also in Fig. 3, the hooks *h* hold the shell from retraction upward by the elastic force of the liner. The ring *i* is now removed. The part of the liner projecting above the contracted end of the shell is then folded over such end into the dotted line position shown in Fig. 3. After the ring *i* is removed, the liner is prevented from slipping back over the head *g* by being compressed between the large diameter portion of head *g* and the inside of the contracted end of the shell. The shell, with its applied liner, is then tilted laterally to free its enlarged end from the hooks *h* and is slipped off the stand. The tube-carrying cap *d* is then applied, as shown in Fig. 7.

The conical surface of head *g*, especially the rounded edge at the larger diameter thereof, bears against the interior of the rubber liner in its stretched-out condition and should present a perfectly smooth surface to avoid injuring the liner as it is forced up into the neck of the shell. To avoid possible damage to this conical edge of head *g*, the base *e* of the stand is made of large enough diameter to protect said edge from being marred if the stand should be knocked over. This is accomplished as exemplified in Fig. 2 by broken line *z*, tangent to the top head *g* and to the outer edge of base *e*. The base is of such diameter that this line

z forms a greater angle with the axis of the stand than does the conical head.

The modification shown in Figs. 5-7 differs from that shown in Figs. 1-4 in that there is substituted for the long ring, or sleeve, *i* a ring *j*, which performs the same function as ring *i* but is not removable and remains in position after the teat cup is assembled, as shown in Fig. 7.

Fig. 8 shows the application of the invention to a wholly different type of teat cup. In this modification the standard is provided with a detachable frusto-conical head that forms an integral part of the teat cup structure. The standard has preferably a swelled head *k* and a neck *m* projecting beyond it and over which is slipped a threaded tube *n* carrying a frusto-conical head *o* which engages and surrounds the head *k* of the standard. The tube *n*, like the tube carried by the head *d* in Fig. 7, is adapted to be connected with the milk line of the milking machine. To the liner *r* is applied a ring *p*, similar to the ring *j* of Fig. 5. The liner *r* is secured to the enlarged end (not shown) of the shell *s* and the liner and shell are slipped over the standard while the latter carries the tube *n*. The liner is then stretched by pulling down the shell, as before described, the ring *j* functioning, as in the structure of Figs. 5-7, to bind the liner against the head *o*. The ring *p*, like ring *j*, remains in position in the assembled teat cup. A nut *t* is then applied to the tube *n* and is turned until it engages the end of the shell. By means of this nut, the liner may be further stretched, if desired.

Having now fully described my invention, what I claim and desire to protect by Letters Patent is:

1. A teat cup liner stretcher which comprises means for engaging one end portion of the liner with one end of the cup shell, a head over which the liner is adapted to slip, and a ring engageable with the liner and adapted to cooperate with the said head to confine the other end portion of the liner from movement while the shell is moved relative to the head to stretch the liner between the specified points of engagement and confinement.

2. A teat cup liner stretcher which comprises means for engaging one end portion of the liner with one end of the cup shell, a head having a conical face and over which the liner is adapted to slip, and a ring adapted to embrace the liner and confine the liner against the conical face of the head while the shell is moved relative to the head to stretch the liner.

3. A teat cup liner stretcher for stretching a liner one end portion of which is secured to one end of the cup shell, comprising a standard over which the shell and liner are adapted to slip, a head carried by the standard, and a ring engageable with the liner and

adapted to cooperate with the head to grip the liner, whereby further downward movement of the shell will stretch the liner.

4. A teat cup liner stretcher for stretching a liner one end portion of which is secured to one end of the cup shell, comprising a standard over which the shell and liner are adapted to slip, a head carried by the standard, a ring engageable with the liner and adapted to cooperate with the head to grip the liner, whereby further downward movement of the shell will stretch the liner, and means to hold the shell in position to maintain the liner stretched.

5. A teat cup liner stretcher for stretching a liner one end portion of which is secured to one end of the cup shell, comprising a standard over which the shell and liner are adapted to slip, a head carried by the standard, a ring engageable with the liner and adapted to cooperate with the head to grip the liner, whereby further downward movement of the shell will stretch the liner, a base on which the standard is supported, and hooked members on the base under the hooks of which the end of the cup shell to which the liner is secured is adapted to be swung to maintain the liner in stretched condition.

6. A teat cup liner stretcher comprising means for engaging one end portion of the liner with one end of the cup shell, a head

over which the liner is adapted to be slipped, and a removable ring adapted to engage the liner and confine the other end portion of the liner from movement while the shell is moved relatively to the head to stretch the liner, the head and liner being so shaped that the liner, after stretching and after the removal of the ring, will be squeezed between said head and shell.

7. A teat cup liner stretcher for stretching the liner within a teat cup shell provided with a contracted neck, comprising means at one end of the shell engaging one end portion of the liner, a tapered head over which the liner is adapted to be slipped, and a removable ring of smaller diameter than the larger diameter of the head and adapted to engage the other end portion of the liner and confine it from movement while the shell is moved relatively to the head to stretch the liner and draw the contracted neck of the shell toward said head, the liner being squeezed between the large diameter portion of the head and the inside of the contracted neck of the shell and thereby held in stretched condition after removing the ring.

In testimony of which invention, I have hereunto set my hand at city of New York, New York, on this 4th day of November, 1926.

SAMUEL E. ALLEN.