Jan. 27, 1931. J. P. HANSEN 1,790,470

MILK PUMP

Filed April 9, 1928

Fig. 1

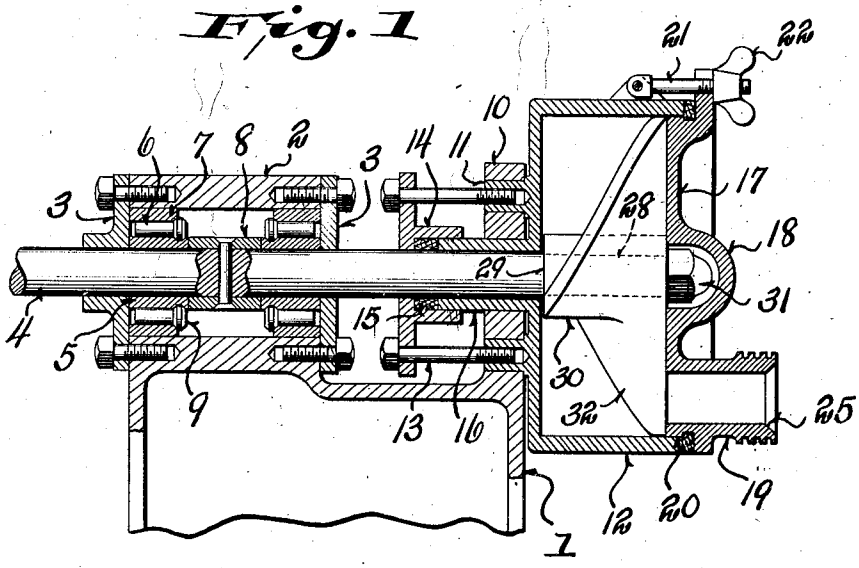
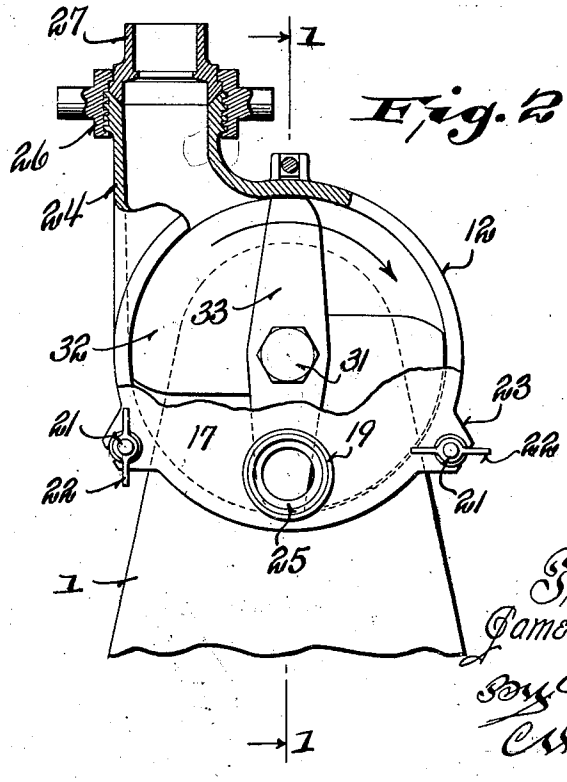


Fig. 2



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UNITED STATES PATENT OFFICE

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MILK PUMP

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This invention relates to milk pumps.

Objects of this invention are to provide a novel form of milk pump which is so constructed that it eliminates foaming and eliminates any possibility of the entrance of oil into the pump chamber, but which is so constructed that the major portion of the pressure for the driving shaft is carried by a separate member from the pump, and this separate member is so constructed that it may contain a lubricant without any chance of the lubricants arriving at the milk chamber which, as stated, is a separate entity.

Further objects are to provide a milk pump which is so constructed that it will not break up the fat particles of the milk, and which is sanitary and may be easily separated into its component parts, and which further is so constructed that the grease in the milk acts as a lubricant for the pump.

An embodiment of the invention is shown in the accompanying drawings in which:

Figure 1 is a longitudinal sectional view through the pump, such view corresponding to a section on the line 1—1 of Figure 2.

Figure 2 is a front view of the pump with parts broken away and in section.

Referring to the drawings, it will be seen that the milk pump is carried by a suitable support 1 which is provided with a hollow projecting bearing portion 2. This bearing portion is provided with removable caps 3 at its ends and the driving shaft 4 projects completely through the bearing portion.

This driving shaft is provided with a pair of inner raceways 5 which cooperate with the roller bearings 6 and with outer raceways 7 carried within the bearing support 2. Preferably the inner raceways 5 are held spaced by means of a collar 8 pinned to the shaft, as shown in Figure 1. It is also preferable to provide the rollers 6 with heads 9 which have conical faces fitting within a correspondingly shaped pair of grooves formed in the inner raceways and cooperating with a conical inner edge formed on the outer raceways to thus definitely position the shaft.

The support 1 also carries an upwardly extending plate 10 which is apertured to receive the internally threaded lugs 11 of the pump chamber 12. These lugs receive bolts 13 which are adapted to draw the packing gland 14 against the packing 15 surrounding the shaft. It is to be noted that the packing 15 is spaced a material distance rearwardly of the elongated bearing 16 for the shaft.

The front of the pump chamber is open and is closed by means of a face plate 17 provided with a bulged hollow portion 18. It is also provided with an inlet 19. It is provided with a shouldered portion 20 which conforms to the inner cylindrical surface of the pump casing 12 and thus centers the plate. The plate is held in place by means of a plurality of regularly spaced pivotally mounted bolts 21 provided with wing nuts 22. The plate is provided with slotted lugs or ears 23 into the slots of which the bolts 21 may be swung.

The pump casing is provided with an outlet pipe or extension 24. Both the outlet pipe and the inlet pipe or extension 24 and 19 respectively, are provided with threads adapted to receive fittings. Further, they are provided with the bevel faces 25. For example, as shown in Figure 2, the fitting cooperating with these members may consist of unions indicated by the reference character 26 which is the movable nut portion thereof and a pipe member 27 held by the union in contact with the bevel faces. The inner ends of the pipe section 27 are similarly bevelled.

The shaft 4 is provided with a reduced portion 28 which forms with the larger portion a shoulder 29. A rotor is carried within the pump casing 12 and is provided with a hub portion 30 apertured to receive the reduced extension 28 of the shaft and locked in place by means of a nut 31 threaded upon the end of the shaft. The nut 31 is received within the hollow projection 18 of the face plate or closure plate 17, as shown in Figure 1. The rotor or impeller is provided with a pair of opposed vanes 32 which extend approximately one quarter of the way around the impeller. These vanes have a flat front face 33, as shown in Figure 2, which is arranged in approximate contact with the face plate 17. It is of sufficient width to prevent the

slipping of the milk between the inner surface of the face plate and the surface 33.

In the operation of the pump, the milk enters the inlet portion 19 and is caught by the impellers and moved rearwardly while at the same time, the milk is spun by the rotating impeller and passes out of the tangentially arranged outlet portion without any shock whatsoever to the milk. The action of the pump differs from a centrifugal pump as the milk is not thrown radially outwardly, but as it is thrown rearwardly and gradually moved outwardly without being subjected to any sudden shock.

The tests conducted with this pump have demonstrated very clearly that there is no churning of the milk nor breaking up of the fat particles, and that there is no foaming produced, as in the ordinary types of pumps.

Further, it will be noted that there is no possibility of the leaking of the lubricant into the milk chamber as the main lubricated bearing for the shaft is an entirely distinct and separate entity from the pump casing.

Further, it is to be noted that the pump is very readily separated into its component parts for cleaning. For example, the face plate may be readily removed and, if desired, the entire pump casing may be readily taken from the apparatus. All that is necessary in this case is to loosen the bolts 13 and the nut 31 (see Figure 1). This permits the entire removal of the pump casing and the impeller so that they may be readily sterilized.

It will be seen that a novel type of milk pump has been provided which depends for its action upon the operation of a screw impeller, which moves the milk rearwardly and outwardly without any violent shock to the milk.

It will be seen further that the apparatus is so constructed that the parts may be sterilized with the utmost ease.

Further than this, it is to be particularly noted that the construction of the pump casing is such that it may yieldingly adjust itself upon the shaft and upon its support 10 (see Figure 1) so that there can be no metal to metal binding of the parts. The pump casing may freely shift to a slight degree upon the shaft to thus accurately adjust the rotor or impeller.

Although the invention has been described in considerable detail, such description is intended as illustrative rather than limiting as the invention may be variously embodied and as the scope of such invention is to be determined as claimed.

I claim:

A milk pump comprising a main support having a hollow bearing portion rising therefrom, a shaft extending through the bearing portion, inner and outer raceways within the bearing portion and surrounding the shaft, roller bearings disposed within said raceways, a collar pinned to the shaft and arranged between the inner portions of the raceways for revolubly supporting said shaft and retaining the same against axial movement, a plate extending laterally from the support and formed with spaced apertures, a pump casing having lugs passing into said apertures and having a floating support with reference to said plate, an impeller carried by said shaft and positioned within said pump casing, a removable face plate having lugs formed with slots, movable bolts carried by the casing and adapted to engage with said slots, winged nuts carried by the bolts and adapted to be tightened against the lugs and said face plate being in approximate contact with the outer face of the impeller.

In testimony that I claim the foregoing I have hereunto set my hand at Kenosha, in the county of Kenosha and State of Wisconsin.

JAMES P. HANSEN.