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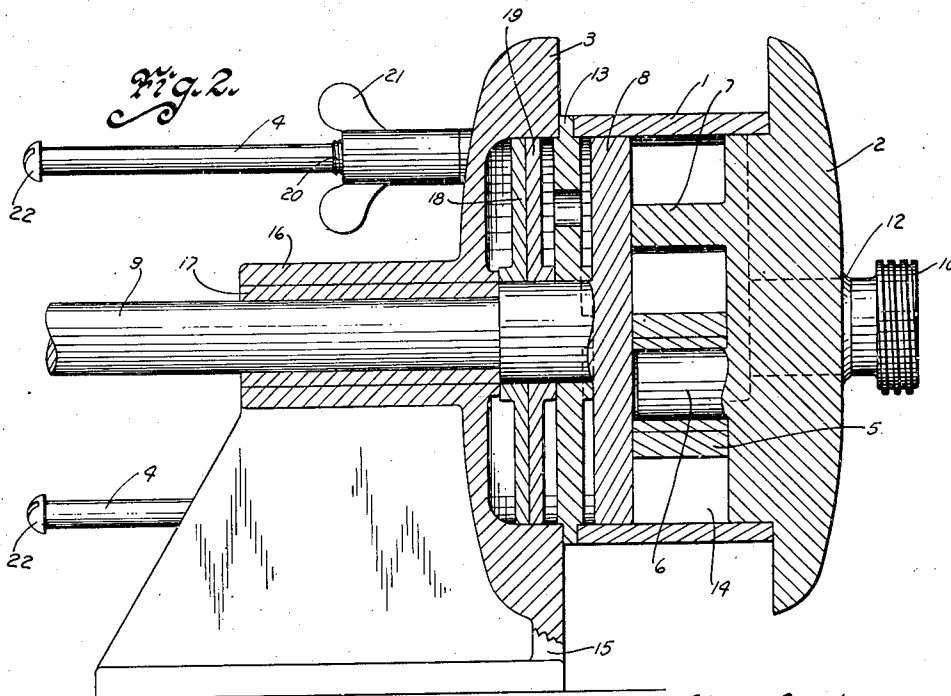
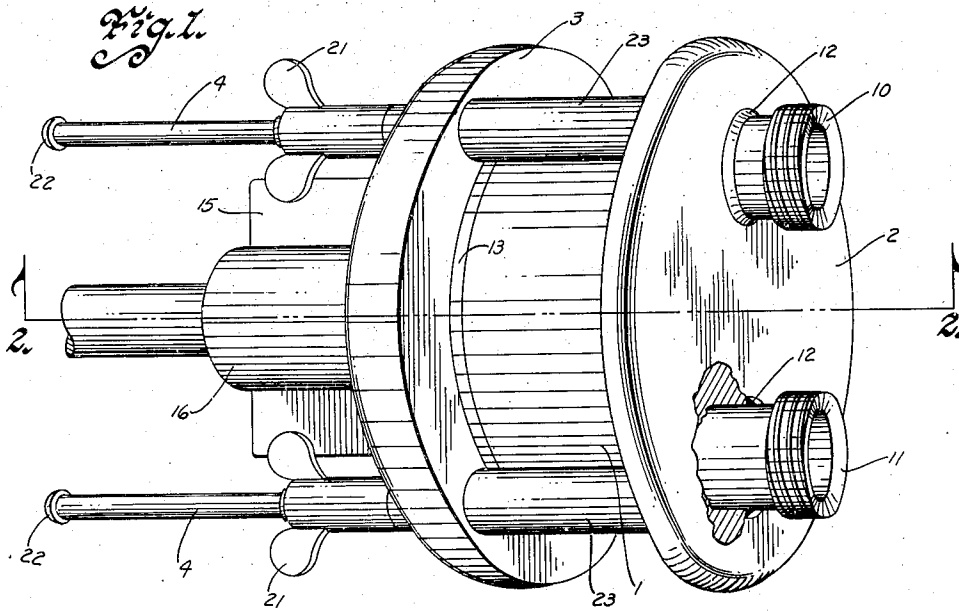
W. E. BAKEWELL

2,481,560

SANITARY PUMP

Filed May 31, 1947

4 Sheets-Sheet 1



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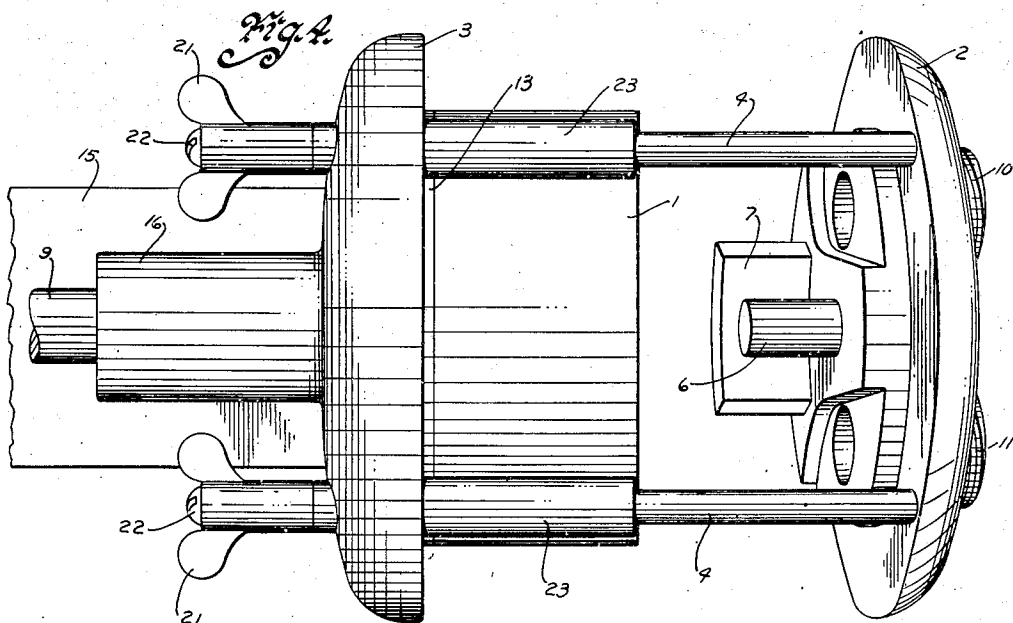
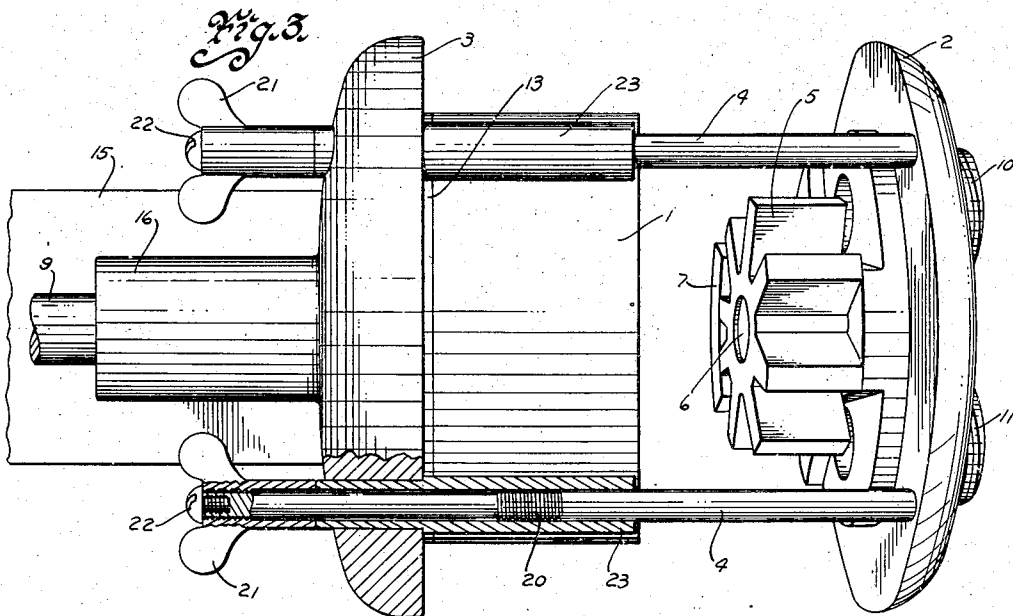
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4 Sheets-Sheet 2



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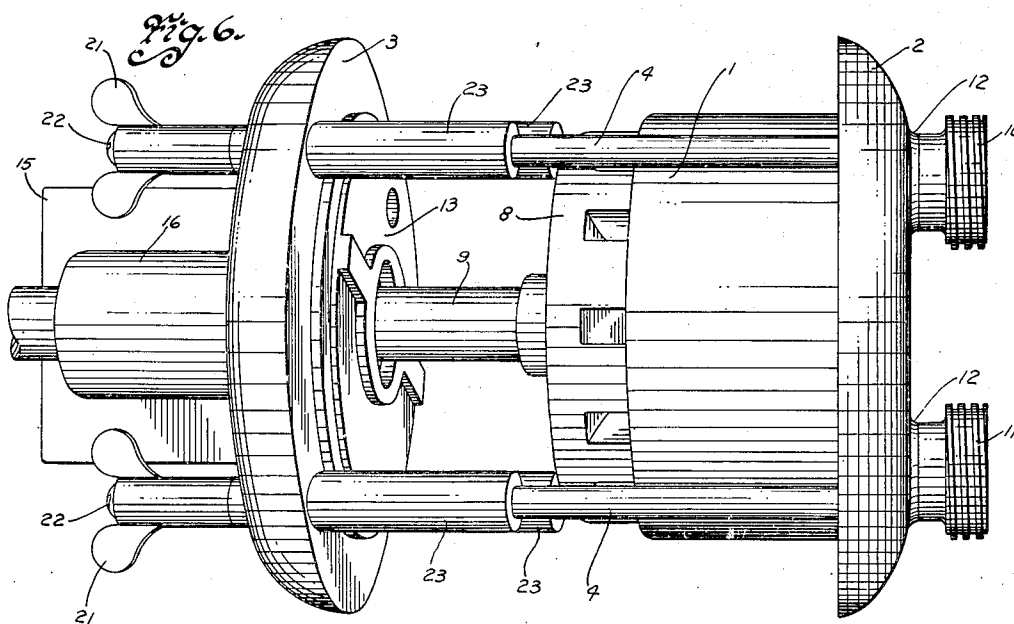
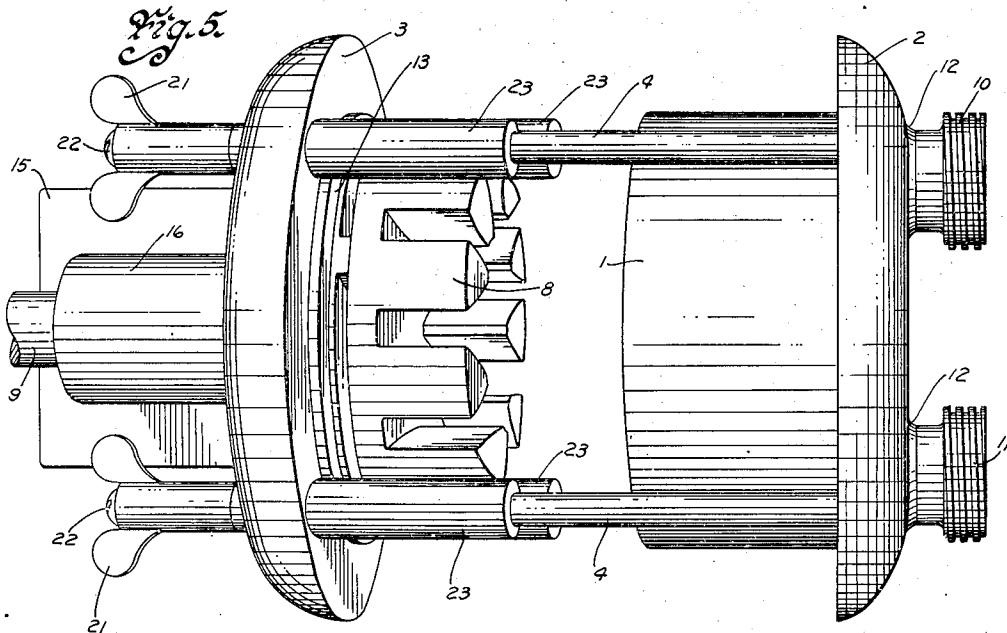
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W. E. BAKEWELL
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4 Sheets-Sheet 3



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4 Sheets-Sheet 4

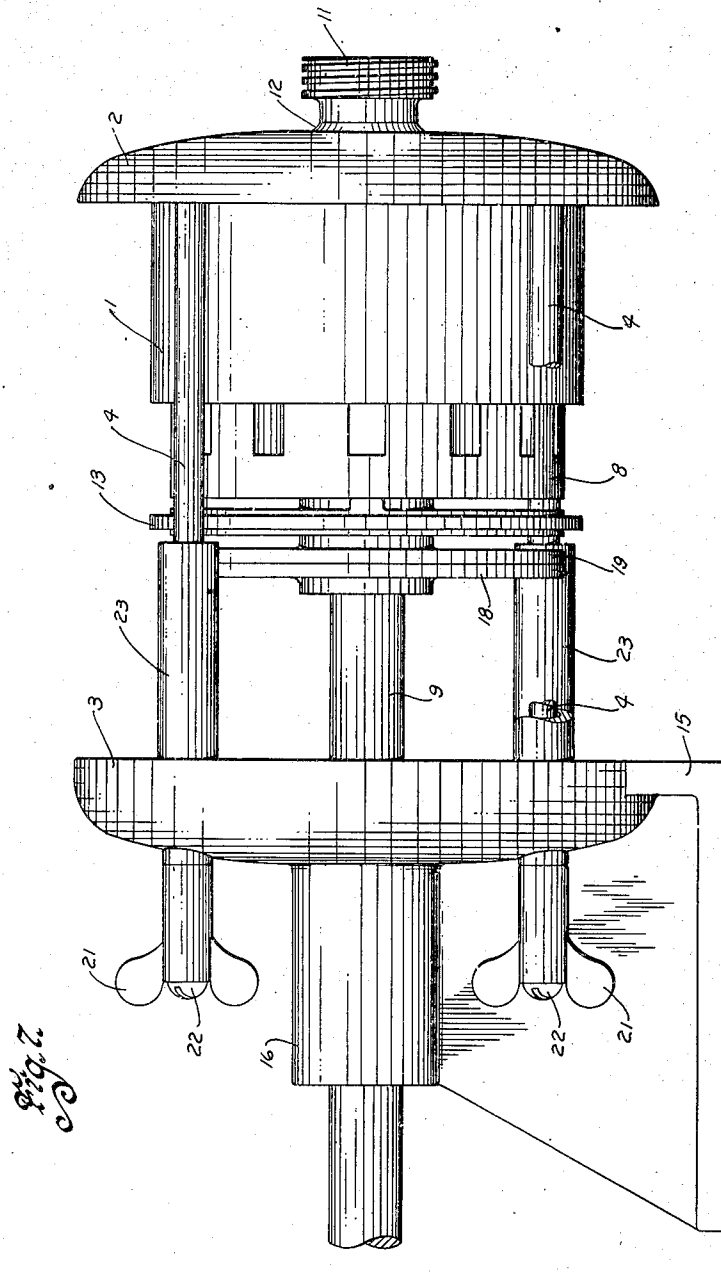


Fig. 7

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UNITED STATES PATENT OFFICE

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SANITARY PUMP

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Application May 31, 1947, Serial No. 751,555

8 Claims. (Cl. 103—126)

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This invention relates to a pump for use with a liquid, such as milk, wherein the pump must be kept clean and sanitary and more particularly to a pump that is separable without being dis-assembled, for cleaning and sanitary purposes.

In the use of so-called sanitary pumps in the art, to pump milk and other liquids that sour, all States have rigid health requirements surrounding the sanitary conditions of the pump. In most States, gaskets are not allowed for sealing purposes, hence all sealing surfaces must be metal to metal. No corners or places to catch and hold liquid are allowed. The pump must be dis-assembled or separable and every part of the pump reached for cleaning purposes. If the pump is entirely dis-assembled, there is great danger when the separate parts are washed in a bucket of the finely ground surfaces of the sealing parts becoming injured from bumping and hitting other parts and of the pump leaking when it is re-assembled. It is with manufacturing a pump that the metal to metal sealing surfaces will receive the maximum protection in cleaning that the present invention is concerned.

It is an object of the invention, among others, to provide a pump that can be washed and made sanitary by separating the different parts of the pump and washing but not having to dis-assemble the pump; a pump whose separate parts thereof can be separated on a supporting structure connected with the pump and sufficient space provided to wash each separate part; a pump of longer life because the parts do not suffer injury in washing; a pump wherein washing of the pump parts and reassembly of the parts can be accomplished in a minimum length of time; a pump having replaceable inlets and outlets; a pump simple of construction and operation and economical both in construction and operation; and a pump requiring no special skill on the part of an operator to separate and wash the parts making up the pump and to re-assemble after washing.

In carrying out the objects of the invention there is provided a pump structure including a pump casing with a head portion at one end of the pump casing sealing with the pump casing and a support bracket closing the other end of the pump casing. Bolts pass from the head portion to the support bracket, on the outside of the pump casing, to keep the pump casing, head portion and support bracket assembled. The bolts may be anchored in the head portion and have a portion of the bolts screw threaded to receive nuts to draw the pump casing, head portion and

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support bracket into assembled position. The pump casing contains internal-external gears and a shaft extends through the support bracket and connects to the external gear. The head portion has a replaceable inlet therein leading into a pump chamber and also a replacement outlet from the pump chamber. The bolts extend beyond the support bracket for a substantial distance and the head portion and bolts are extensible with respect to the support bracket when the nuts on the bolts abutting the support bracket are loosened to allow the bolts to slip through the supporting bracket to space the head portion from the supporting bracket and pump casing a sufficient distance to allow cleaning of the head portion without removal from the bolts. The bolts also form a cage in which the pump casing can be moved from the support bracket to the head portion. The bolts pass through sleeve portions attached to the support bracket with the bolts movable within the sleeves. The bolts, in extended position, form a support and spacing means for the different parts of the pump for cleaning purposes. The pump casing, internal-external gears and support bracket are separable from each other and movable on the bolts. The pump parts, after cleaning, are reassembled on the bolts into a working unit.

With the foregoing and other objects in view, the invention will be more fully described herewith and will be particularly pointed out in the claims appended hereto.

In the drawings, wherein like symbols refer to like or corresponding parts throughout the several views;

Figure 1 is a side elevational view of the assembled pump structure with the connection of the outlet in the head portion broken away.

Figure 2 is a sectional view taken on the line 2—2 of Figure 1.

Figure 3 is a side elevational view with part thereof in section showing the head portion and internal gear separated and spaced on the bolts from the pump casing and support bracket.

Figure 4 is a side elevational view showing the head portion separated and spaced on the bolts from the pump casing and support bracket and the internal gear removed from the head portion.

Figure 5 is a side elevational view showing the head portion separated and spaced on the bolts from the support bracket and the pump casing moved within the bolts to contact the head portion thus exposing the external gear.

Figure 6 is a side elevational view showing the

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head portion separated and spaced on the bolts from the support bracket with the pump casing moved within the bolts to abut the head portion and the external gear moved to the right within the pump casing exposing the equalizer ring.

Figure 7 is a side elevational view with the head portion, pump casing and external gear in the position of Figure 6 and with the equalizer ring and wear rings moved to the head portion leaving the support bracket alone on the left.

The pump structure is shown in Figure 1 as having a pump casing 1, a head portion 2 and a support bracket 3. The parts 1, 2 and 3 are separable from each other and are held in assembled position by bolts 4.

The pump casing 1 is cylindrical and the pump parts are within the pump casing 1 when the pump is in assembled position. The pump casing 1 may be cut from a pipe of considerable length and of a metal that will meet the health requirements set by the different states and need not be a special casing. The pump structure is the internal-external gear type pump, made and sold now by the Viking Pump Company of Cedar Falls, Iowa. The internal gear 5 is an idler gear and rotates on idler shaft 6. The idler shaft 6 is a part of the head portion 2 and a crescent 7 is also a part of the head portion 2 and extends therefrom. The external gear 8 has a shaft 9 connected thereto which connects to a power source (not shown) to rotate the external gear 8.

The head portion 2 has an inlet coupling 10 and an outlet coupling 11 mounted in the head portion 2 by welding 12. If the threads on the coupling members 10 and 11 become worn, the coupling members 10 and 11 can be removed from the head portion 2 and new coupling members inserted by welding. The pump casing 1 fits over the head portion 2 and seals with the head portion 2 when bolts 4 are tightened. An equalizer ring 13 is placed between the support bracket 3 and the end of the pump casing 1 to act as a seal when the bolts 4 are tightened. When assembled, a pump chamber 14 is formed into which inlet 10 leads and the outlet 11 leads from the chamber 14.

The support bracket 3 is carried on a supporting pedestal 15 which in turn serves as a supporting structure for the whole pump structure. The support bracket 3 has a projecting sleeve 16 with a bearing 17 within the sleeve 16 for the shaft 9 which rotates the external gear 8. Also within the support bracket 3 are wear rings 18 and 19 to space and support the shaft 9 within the support bracket 3.

The function and operation of the equalizer ring 13 is fully set forth and claimed in applicant's copending application Serial Number 738,183 filed March 29, 1947 and is the same in the present instance as in that application.

The bolts 4 extend beyond the support bracket 3 when the parts of the pump are attached in operative relationship. The bolts 4 have one end thereof attached or embedded in the head portion 3 while the mid-portion of each bolt is screw threaded as at 20 and wing nuts 21 screw on the screw threads 20 to pull the pump casing 1 into sealing engagement with the head portion 2 and the support bracket 3.

In the assembled position of Figures 1 and 2, the inlet 10 is connected to a source of milk supply that it is desired to move and the outlet 11, from the pump delivers the milk under pressure from the pump to a distribution conduit (not shown). The shaft 9 is rotated, as by an electric motor (not shown) which in turn rotates the

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external gear 8. The operation of the internal-external gear type pump is old and well known and the present pump does not operate in any different manner.

When the pump is stopped, or when a time interval has expired that is determined by law necessary to clean the pump, cleaning operations are started. Turning now to Figure 3, the wing nuts 21 are loosened and slipped to the rear of each bolt 4 until the wing nuts 21 contact the heads 22 of each bolt 4. A sleeve 23 surrounds the bolts 4 between the head portion 2 and the support bracket 3 when the pump is in the assembled position of Figure 1. The sleeves 23 pass through the support bracket 3 and the bolts 4 are slidable through the sleeves 23. The bolts 4 slide through sleeves 23 until wing nuts 21 contacting bolt heads 22 contact the end of sleeves 23 at which point, the head portion 2 will be spaced from the support bracket 3 as shown in Figure 3. It will be noted that in this position the screw threads 20 are within the sleeve 23 and fully protected from damage.

With the parts in the position of Figure 3 it is seen that the internal gear 5 is carried by the head portion 2. The internal gear 5 is the beginning of the cleaning operation. The operator may have a hose nozzle attached to water under pressure, a bucket of water with a cleaning fluid or soap and brushes and implements for cleaning. The gear 5 may be removed by moving gear 5 to the left on idler shaft 6 and removing the gear 5 from the assembly through the bolts 4. The gear 5 may then be washed in the bucket with a brush and rinsed in a suitable manner. With the gear 5 removed, the head portion 2 with idler shaft 6, crescent 7, and outlet 11 and inlet 10 can be washed while supported on bolts 4. A cleaner can get in around the different parts with a brush and then rinse with water from the hose nozzle.

Figure 5 shows the pump casing 1 moved to the right and into contact with the head portion 2. The bolts 4 and sleeves 23 form a cage for the pump casing 1 which also allows the pump casing to move horizontally within the cage. With the pump casing in the position shown in Figure 5, an operator can get into the interior of pump casing 1 to thoroughly clean the pump casing 1. After pump casing 1 has been moved to the right, the external gear 8 is exposed at the left of Figure 5 and can be separated from equalizer ring 13 and cleaned after which the external gear 8 is moved to the right within the pump casing 1 as clearly shown in Figure 6.

The equalizer ring 13 can then be moved to the right slightly and cleaned before being moved to the right to contact external gear 8. The wear rings 18 and 19 can then be separated and cleaned and moved to the right as shown in Figure 7. The interior of support bracket 3 is now accessible for cleaning purposes.

It can readily be seen that the pump structure can be separated for cleaning purposes, with sufficient space to allow a cleaner to reach all parts of the pump and without taking the pump apart except for removing the idler gear 5. It is only necessary to push the respective parts back into position after cleaning with no possibility of getting the parts mixed in assembly. The polished sealing surfaces of the respective parts are not placed in a washing vessel where they will bump and abrade each other by movement in the water hence while the present structure gives more life

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to the pump it further does not require an experienced operator to wash the pump.

It will be understood that the invention has been described for purposes of illustration and explanation and that changes and variations are possible without departing from the scope of the invention; all such modifications and changes are intended to be included in the appended claims.

I claim:

1. A pump structure comprising a pump casing, a head portion at one end of the pump casing sealing with the pump casing, a support bracket closing and sealing with the other end of the pump casing, bolts anchored in the head portion and passing through the support bracket and extending beyond the support bracket a substantial distance and nuts on the bolts drawing the pump casing, head portion and support bracket into assembled position.

2. A pump structure readily assembled and separable for cleaning purposes comprising a pump casing, a head portion at one end of the pump casing sealing with the pump casing, a supporting bracket closing and sealing with the other end of the pump casing, bolts attached to the head portion and passing through the supporting bracket, said bolts extending beyond the support bracket for a substantial distance, tightening means on the bolts which abut the support bracket to keep the pump casing, head portion and support bracket in assembled relation and said head portion and bolts being extensible with respect to the supporting bracket when the tightening means is loosened to allow the bolts to slip through the supporting bracket to space the head portion from the supporting bracket and pump casing a sufficient distance to allow cleaning of the head portion without removal from the bolts.

3. A pump structure readily assembled and separable for cleaning purposes comprising a pump casing, a head portion at one end of the pump casing sealing with the pump casing, a supporting bracket closing and sealing with the other end of the pump casing, bolts attached to the head portion and passing through the supporting bracket, said bolts extending beyond the support bracket for a substantial distance, tightening means on the bolts which abut the support bracket to keep the pump casing, head portion and support bracket in assembled relation and said bolts forming a cage in which the pump casing can be moved from the support bracket to the head portion.

4. A pump structure comprising a pump casing, rotating internal-external gears within the pump casing, a head portion at one end of the pump casing sealing with the pump casing, a support bracket through which a shaft extends connecting to the external gear, said support bracket closing and sealing with the other end of the pump casing, headed bolts anchored in the head portion and passing through the support bracket; on the outside of the pump casing, said bolts extending beyond the support bracket for a substantial distance, nuts on the bolts fastened to screw threads on the bolts with the nuts abutting the support bracket to draw the pump casing, head portion and support bracket into assembled position and said bolts forming a cage in which the pump casing can be moved from the support bracket to the head portion.

5. A pump structure readily assembled and separable for cleaning purposes comprising a pump casing, a head portion at one end of the

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pump casing sealing with the pump casing, a supporting bracket closing and sealing with the other end of the pump casing, bolts attached to the head portion and passing through the sleeve portions attached to the supporting bracket, said bolts extending beyond the support bracket for a substantial distance, tightening means on the bolts which abut the support bracket to keep the pump casing, head portion and support bracket in assembled relation, said head portion and bolts being extensible in the sleeves with respect to the supporting bracket when the tightening means is loosened to allow the bolts to slip through the sleeves to space the head portion from the supporting bracket and pump casing a sufficient distance to allow cleaning of the head portion and said bolts and sleeves forming a cage in which the pump casing can be moved from the support bracket to the head portion.

6. A pump structure readily assembled and separable for cleaning purposes comprising a pump casing, rotating internal-external gears within the pump casing, a head portion at one end of the pump casing sealing with the pump casing, a support bracket through which a shaft extends connecting to the external gear, said support bracket closing and sealing with the other end of the pump casing, headed bolts anchored in the head portion and passing through sleeve portions attached to the supporting bracket and passing through and beyond the supporting bracket for a substantial distance, nuts on the bolts fastened to screw threads on the bolts with the nuts abutting the support bracket to draw the pump casing, head portion and support bracket into assembled position, said head portion and bolts being extensible in the sleeves with respect to the supporting bracket when the nuts are unscrewed to allow the bolts to slip through the sleeves to space the head portion from the supporting bracket and pump casing a sufficient distance to allow cleaning of the head portion and said bolts and sleeves forming a cage in which the pump casing can be moved from the support bracket to the head portion.

7. A pump structure readily assembled and separable for cleaning purposes comprising a pump casing, a head portion at one end of the pump casing sealing with the pump casing, a support bracket closing and sealing with the other end of the pump casing, bolts attached to the head portion and passing through the supporting bracket, said bolts extending beyond the support bracket for a substantial distance, tightening means on the bolts which abut the support bracket to keep the pump casing, head portion and support bracket in assembled relation, said head portion and bolts being extensible with respect to the supporting bracket when the tightening means is loosened to allow the bolts to slip through the supporting bracket to space the head portion from the supporting bracket and pump casing a sufficient distance to allow cleaning of the head portion, said bolts forming a support and spacing means for the different parts of the pump for cleaning purposes, said pump casing and support bracket being separable and movable on the bolts and said pump after cleaning being reassembled on the bolts into a working unit.

8. A pump structure readily assembled and separable for cleaning purposes comprising a pump casing, rotating internal-external gears within the pump casing, a head portion at one end of pump casing sealing with the pump casing, a support bracket through which a shaft extends

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connecting to the external gear, said support bracket closing and sealing with the other end of the pump casing, bolts attached to the head portion and passing through the support bracket, said bolts extending beyond the support bracket for a substantial distance, tightening means on the bolts which abut the support bracket to keep the pump casing, head portion and support bracket in assembled relation; said head portion and bolts being extensible with respect to the support bracket when the tightening means is loosened to allow the bolts to slip through the support bracket to space the head portion from the support bracket and pump casing a sufficient distance to allow cleaning of the head portion, said bolts forming a support and spacing means for the different parts of the pump for cleaning purposes; said pump casing, internal-

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external gears and support bracket being separable and movable on the bolts; and said pump, after cleaning, being re-assembled on the bolts into a working unit.

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