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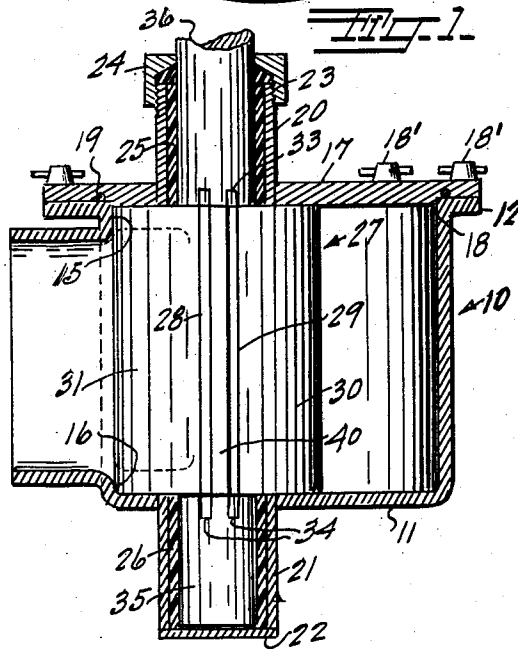
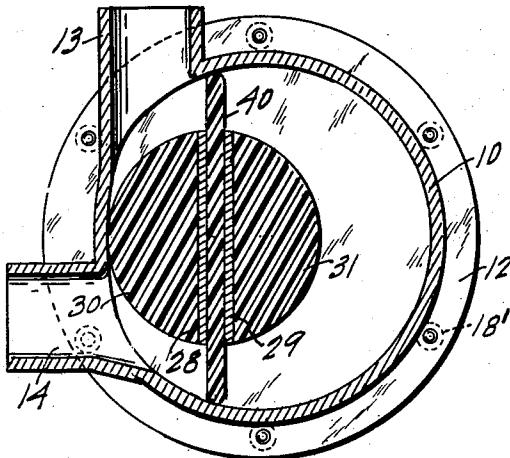


Fig. 2

Fig. 3

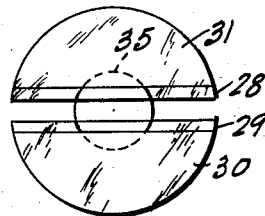


Fig. 4

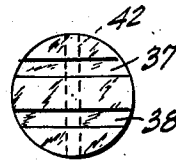
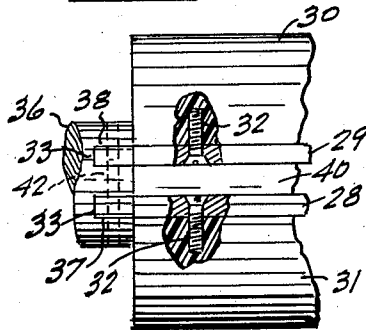


Fig. 5

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PUMPS

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4 Claims. (Cl. 103-137)

This invention relates to pumps for use in the processing of foods, and provides a pump which is unaffected by foods or food acids or any of the products which are incorporated in the foods, or by water or detergents, one which is composed of an absolute minimum of parts and which is quickly and easily assembled and disassembled to permit rapid washing and sterilization after each operation, a pump which will not mash or otherwise damage the foods in view of the substantially free and unobstructed passages.

It is known that pumps of the oscillating type, or eccentric piston with reciprocating blade have been made, but so far as known, the assemblies are relatively fixed and requiring tools for assembly and disassembly, while in my pump all parts are designed for quick disassembly, cleaning and reassembly, the pump being self-lubricating through the medium of the liquid content of the substance being pumped, and therefore requiring no added lubrication and which might contaminate the food.

The pump is secured in its assembled form by thumb nuts or thumb screws or similar manually operable securing means, removal of the one head permitting withdrawal of shaft, piston, bushings and vane for thorough cleaning and sterilization.

The objects and advantages of the invention are as follows:

First, to provide a pump for transfer of food products, one which is sanitary and unaffected by the food elements and which is self-lubricating through the medium of the liquids contained in the food elements.

Second, to provide a pump as outlined which has only two moving parts including a rotating part and a reciprocating part.

Third, to provide a pump as outlined with only one removable head and which head is removable without the use of tools of any kind, removal of the head permitting complete disassembly of the pump for cleaning and sterilization.

Fourth, to provide a pump as outlined which permits substantially free and unobstructed flow of material through the pump.

Fifth, to provide a pump as outlined which is constructed of non-corrosive material so as to be unaffected by the foods, or affect the foods in any way.

In describing the invention reference will be had to the accompanying drawings, in which:

Fig. 1 is a vertical sectional elevation through the invention.

Fig. 2 is a plan view with the cylinder shown in section.

Fig. 3 is an end view of the piston with the adjacent end shaft removed.

Fig. 4 is a fragmentary view drawn to an enlarged scale showing the connection between one end shaft and the piston bearing plates.

Fig. 5 is an end view of the shafts.

This particular type of pump is well known in the art but the type of construction and arrangement, the ease

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and rapidity of assembly and disassembly, and the economical use of non-corrosive materials, to provide an easily and quickly cleaned and sterilized unit are believed to be new, and consists of a cylinder or housing 10 having an integral head 11 at one end and a flange 12 at the other end, and may be formed in various ways, such as by the use of a punch to distort a tube, by forming the cylinder from sheet metal about a mandrel of proper form, or by drawing or spinning from sheet metal.

By drawing the cylinder, the fixed head 11 is formed integrally with the cylinder and the same applies to spinning. When formed by other means, the head must be welded, brazed or otherwise fixed to the end of the cylinder after forming. The same applies also to the flange 12.

After the cylinder has been formed to proper shape, the intake and discharge connections 13 and 14 are applied to the cylinder, and these passages through the connections open into the cylinder throughout almost the entire length of the cylinder leaving only a relatively narrow bearing area for the vane as indicated at 15 and 16 for the free flow of material in and out of the cylinder.

The removable head 17 is provided with a suitable pilot 18 for positive alignment with the cylinder, and is also provided with sealing means such as the O-ring, and any suitable quick-acting manually operable securing means, such as thumb screws or thumb nuts 18', is provided, the O-ring 19 being set in the head and being compressed against the flange 12 when the thumb nuts are tightened.

Each head is provided with a bearing sleeve 20 and 21 respectively and may be formed integrally with the heads or may consist of a section of tubing fixed in or to the heads as shown, the sleeve 21 being closed at the end as indicated at 22, the head 20 on the removable head having the terminal end threaded as indicated at 23 for the packing gland 24.

Slidably fitting in each bearing sleeve is a bushing respectively 25 and 26, and which are formed of a synthetic plastic such as that obtainable under the trade name of "Nylon" which provides excellent bearing characteristics and is perfectly lubricated by any of the liquids inherent in any of the various food products and requiring no added lubrication at any time.

The piston 27 is formed of two substantially semi-cylindrical lengths of the same synthetic plastic as the bushings and are faced on their flat surfaces with suitable stainless and non-corrosive metal plates as indicated at 28 and 29 which are fixed to the piston sections 30 and 31 by any suitable securing means such as screws 32, the plates 28 and 29 extending beyond both ends of the piston as indicated at 33 and 34.

The stub shaft 35 and drive shaft 36 are each slotted at one end with two spaced slots 37 and 38, the intervening material between the slots being equal to the thickness of the vane 40 plus sliding clearance, the projecting ends of the plates 28 and 29 being a force fit in these slots and being secured by suitable means such as the pin driven into the diametric hole 42.

As will be noted, by removing the cover or head 17, the piston with its reciprocating vane 40 and bushings 25 and 26 are removable since the bushings are slidable in the bearing sleeves and the shafts are rotatable in the bushings, thus also reducing friction as either the bushing or the shaft or both can rotate depending on the area of least frictional resistance.

Thus a pump is provided which is sanitary, non-corrodable, one which can be disassembled quickly, easily cleaned and sterilized, and just as quickly reassembled; one which is most economical to manufacture considering the high quality of material used; and one which will

handle food materials with an absolute minimum of marring, squeezing or otherwise damaging the material being pumped.

I claim:

1. An eccentric pump having a rotor and having a vane slidable diametrically through the rotor, comprising two substantially semicylindrical members each having a chordal face, a bearing plate removably mounted on each chordal face and having an end portion extending beyond each end of the rotor, a drive shaft and a stub shaft each having spaced parallel grooves formed in one end to receive said end portions, a bore formed diametrically through the one end of each shaft and inserted end portions, and a pin removably securable in each bore, providing a rotor completely disassemblable for cleaning and sterilization and reassemblable at will for pumping of food products, said pump having bearings and a bushing for each bearing and formed of a synthetic plastic material for self-lubrication through the medium of the liquid content of the food material being pumped to maintain the food material against contamination by externally supplied lubricants, said bushings being slidably supported in said bearings and rotatably supporting said shafts, whereby the entire rotor unit is completely and quickly disassemblable at will for washing and sterilization.

2. A pump comprising a cylinder having a removable head for one end of the cylinder and including manually operable securing means for quick removal and replacement of said removable head, a fixed head integral with the other end of said cylinder, bearings eccentrically located in said heads, a bushing for each bearing and slidable therein for removal and replacement at will, a rotor comprising two substantially semi-cylindrical members each having a plane chordal face and including a bearing plate removably secured to each chordal face, coaxial shafts including a drive shaft for one end and a stub shaft for the other end of the rotor and respectively rotatable in said bushings, said shafts each having a pair of spaced parallel grooves formed in one end, said bearing plates each having an extension at each end and fitting in said grooves and thereby being spaced to provide a slot therebetween and including means for removably securing said extensions in said grooves, a reciprocable vane slidable in said slot and having a length equal to that of the rotor, said rotor having a length equal to the interior length of the cylinder, an intake passage and a discharge passage for said cylinder and each extending throughout the major portion of the length of the cylinder for substantially unrestricted intake and discharge of pulp, said rotor cooperating with the wall of the cylinder

throughout the length thereof between the intake and discharge passages, thereby providing a pump which is completely disassemblable for cleaning and sterilization and reassemblable in an absolute minimum of time.

3. In a pump having an eccentrically mounted rotor and a vane slidable diametrically through said rotor, said rotor comprising two substantially semi-cylindrical members each having a chordal face, a bearing plate removably secured to each chordal face and each having an extension at each end beyond the terminal ends of the rotor, coaxial shafts including a drive shaft for one end and a stub shaft for the other end of the rotor, spaced parallel grooves formed in one end of each shaft to a depth equal to the length of the extensions with the bearing plate extensions fitting in said grooves with the said one ends of the shafts contacting the ends of the rotor, the bearing plates thereby being spaced to slidably receive the vane, means for removably securing said extensions in said grooves to provide an integral rotor and shaft assembly, with said substantially semi-cylindrical members being formed of a synthetic plastic material for self-lubrication.

4. A rotor for an eccentric pump having a vane slidable diametrically through the rotor comprising, two substantially semi-cylindrical members each having a chordal face, a bearing plate removably mounted on each chordal face and having an end portion extending beyond each end of the rotor, a drive shaft and a stub shaft each having spaced parallel grooves formed in one end to receive said end portions, a bore formed diametrically through the one end of each shaft and inserted end portions, and a pin removably securable in each bore, providing a rotor completely disassemblable for cleaning and sterilization and reassemblable at will for pumping of food products.

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