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WASHING AND COOLING MEANS FOR THE PLUNGERS OF
HIGH-PRESSURE HOMOGENIZER PUMPS AND THE LIKE
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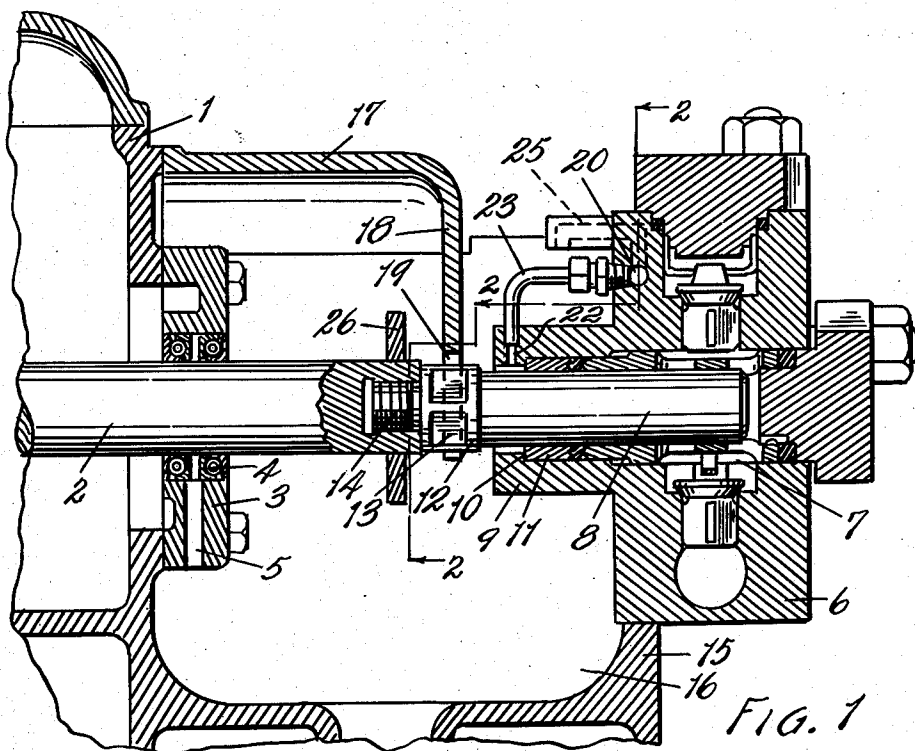


FIG. 1

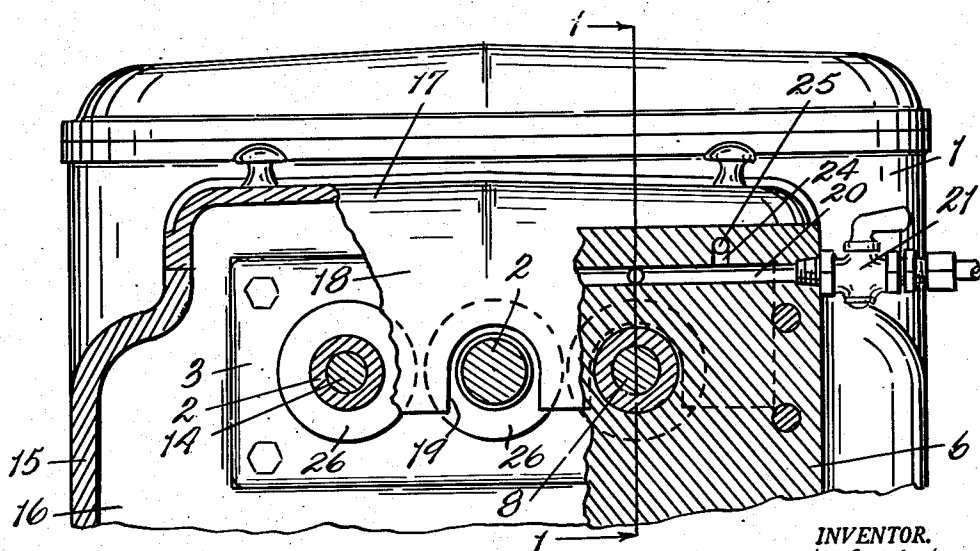


FIG. 2

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UNITED STATES PATENT OFFICE

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WASHING AND COOLING MEANS FOR THE
PLUNGERS OF HIGH-PRESSURE HOMO-
GENIZER PUMPS AND THE LIKEReinhard A. Yohpe, Battle Creek, Mich., assignor
to Union Steam Pump Company, Battle Creek,
Mich.Original application October 22, 1947, Serial No.
781,420. Divided and this application January
10, 1949, Serial No. 70,046

6 Claims. (Cl. 103—204)

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This invention relates to improvements in washing and cooling means for the plungers of high pressure homogenizer pumps and the like.

The subject matter of this invention has been divided from my copending application for Homogenizer Pumps and the Like Adapted for Pumping Food Materials and Other Materials Requiring Sterile Conditions, Serial No. 781,420, filed October 22, 1947.

The principal objects of this invention are:

First, to provide novel means for supplying a cooling and lubricating fluid to the plungers of a homogenizer pump so that the plungers are effectively cooled, lubricated and washed of any of the material being pumped as the plungers are retracted from the pump cylinders.

Second, to provide novel and effective means for preventing the entrance of lubricating and cooling fluid into the driving mechanism of a homogenizer pump.

Third, to provide means for supplying cooling fluid to a homogenizer pump which means is readily controllable to assure the supply of the correct amount of fluid at all times and which compensates for minor variations in the pressure of the cooling fluid as supplied to the pump.

Other objects and advantages relating to details of my coolant supply system will be apparent from a consideration of the following description and claims.

The drawings, of which there is one sheet, illustrate a preferred form of coolant supply and control mechanism associated with a homogenizer pump.

Fig. 1 is a fragmentary vertical cross sectional view taken longitudinally through one of the pump cylinders and along the plane of the line 1—1 in Fig. 2.

Fig. 2 is an end elevational view of the pump shown in Fig. 1, partially broken away in vertical cross section along the planes of the broken line 2—2 in Fig. 1.

In the structure illustrated the housing 1 is designed to contain the power unit including the motor and transmission and other parts the details of which form no part of the present invention. 2 represents a plunger rod operated from the power unit within the housing and reciprocable thereby through a packing gland 3. The plunger rod extends forwardly through the gland

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which is provided with a pair of packings 4. A drip opening 5 opens from between the packings to the bottom of the gland. The packings 4 and drip opening 5 function to prevent the entrance of any residue of cooling fluid on the plunger rod into the housing 1 as it is of primary importance that no foreign substance such as the cooling or lubricating fluid or the material being pumped shall be permitted to reach the power unit.

A cylinder block 6 is mounted on the front end of the housing 1, the mounting means not being illustrated. This cylinder block is provided with three cylinder bores 7 within which the plungers 8 are reciprocable to exert high pressure on the material being pumped. The details of the construction and operation of the plungers and their associated valves is more particularly described and claimed in my copending application referred to above. So far as the present invention is concerned it is sufficient to point out that the cylinder block 6 is provided with an extension 9 on its rear side through which the bores 7 extend. Since the several plungers and bores are identical only one will be described.

The rear end of the bore 7 is shouldered as at 10 forming a seat for the packing throat 11. The rear end of the plunger 8 is provided with an enlarged collar 12 which is of such a size as to pass through the bore 7 and may be used as a tappet for forcing the packing throat 15 forwardly through the bore. The collar 12 is flattened as at 13 to receive a wrench and the extreme rear end of the plunger is formed as a threaded stud 14 adapted to engage a threaded socket in the forward end of the plunger rod 2.

It will be noted that the cylinder block 6 is spaced substantially forwardly of the packing gland 3 on the plunger rod and that the housing 1 is provided with a forward extension 15 forming a drip well 16. A removable cover 17 for the drip well is provided with a depending apron 18 spaced to the rear of the extension 9 on the cylinder block. The apron 18 is provided with half round notches 19 through which the rear end of the plunger 8 reciprocates.

The cylinder block 6 is bored transversely as at 20 to form a fluid supply conduit extending across the tops of the cylinder bores 7. The supply of cooling and lubricating fluid to the conduit 20 is controlled by a valve 21. The rear extension 9

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of the cylinder block 6 is vertically bored as at 22 to form a delivery conduit opening to the rear end of the bore 7 and a pipe 23 connects the conduit 22 with the supply conduit 20. Lubricating and cooling fluid such as water admitted through the valve 21 is thus directed to the plunger 8 immediately to the rear of the packing throat 10 and within the rear end of the bore 7 so that the fluid is effectively directed around all sides of the plunger to wash, cool and lubricate the plunger before the fluid escapes from the rear end of the bore into the drip well 16.

In order to assure an adequate supply of fluid to the plunger and still prevent an oversupply of fluid which might splash rearwardly into the housing 1 the cylinder block 6 is bored vertically as at 24 and rearwardly as at 25 to form an overflow passage elevated above the supply conduit 20. In operation the valve 21 will be opened sufficiently to cause a small overflow through the passages 24 and 25 which overflow can readily be observed by the operator. Should the pressure at the valve 21 be reduced or increased, change in pressure will be readily apparent by observing the overflow and can be compensated for by adjustment of the valve.

It will thus be seen that my coolant supply mechanism assures an adequate and easily controllable supply of lubricating and cooling fluid to the plunger 8 so that the plunger is effectively washed without creating any splash or jet of fluid which might work its way rearwardly and overload the packing gland 5 and packings 4. The apron 18 on the cover 17 further protects the forward end of the plunger rod 2 from excess fluid and a collar 26 is preferably mounted on the forward end of the plunger rod to cooperate with the apron 18 in preventing fluid from reaching the packing gland.

I have thus described a highly practical commercial embodiment of my lubricating and cooling mechanism so that others may reproduce the mechanism with such minor modifications as may appear desirable to different persons.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a pump, the combination of a cylinder block provided with a cylinder bore, said cylinder block having a boss-like extension on its rear side into which the cylinder bore extends, a power unit for said pump comprising a housing on which said cylinder block is mounted, a plunger rod, said housing being provided with a packing through which said plunger rod reciprocates, a drip well between said cylinder block and plunger rod packing, a plunger reciprocable in said cylinder bore and having a threaded coupling stud at its rear end, said plunger rod having an internally threaded bore in its front end adapted to receive the said threaded stud of said plunger, the plunger having a portion at its rear end adapted for engagement by a wrench, a cover for said drip well having a front wall spaced from the rear end of the cylinder block extension and provided with an opening through which the plunger reciprocates, a water supply conduit in said cylinder block, a delivery connection from said conduit to said bore within said extension to discharge water upon the plunger, said water supply conduit being provided with an overflow disposed in a plane above said delivery connection, and a control valve for said water supply conduit.

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2. In a pump, the combination of a cylinder block provided with a cylinder bore, a power unit for said pump comprising a housing on which said cylinder block is mounted, a plunger rod, said housing being provided with a packing through which said plunger rod reciprocates, a drip well between said cylinder block and plunger rod packing, a plunger reciprocable in said cylinder bore and connected to the front end of said plunger rod, a cover for said drip well having a front wall spaced from the rear end of the cylinder block and provided with an opening through which the plunger reciprocates, an enclosed water supply conduit in said cylinder block, and a delivery connection from said conduit discharging water upon the plunger and within the rear end of said bore.

3. In a pump, the combination of a cylinder block provided with a cylinder bore, a power unit for said pump comprising a housing on which said cylinder block is mounted, a plunger rod, said housing being provided with a packing through which said plunger rod reciprocates, a drip well between said cylinder block and plunger rod packing, a plunger reciprocable in said cylinder bore and removably connected to said plunger rod, a cover for said drip well having a front wall spaced from the rear end of the cylinder block and provided with an opening through which the plunger reciprocates, a baffle mounted on said plunger rod adjacent its front end, a water supply conduit in said cylinder block, and a delivery connection from said conduit to within the rear of said bore for discharging water upon the plunger.

4. In a pump, the combination of a cylinder block provided with a cylinder bore, a power unit for said pump, a plunger rod operated by said power unit and provided with a packing, a drip well between said cylinder block and plunger rod packing, a plunger reciprocable in said cylinder bore and detachably connected to said plunger rod, a cover for said drip well having a front wall spaced from the rear end of the cylinder block and provided with an opening through which the plunger reciprocates, a baffle mounted on said plunger rod at the outer side of said packing, a fluid supply conduit associated with said block, and a delivery connection from said supply conduit discharging upon the plunger within the rear end of said bore.

5. In a pump, the combination of a cylinder block provided with a cylinder bore, a power unit for said pump comprising a housing on which said cylinder block is mounted, a plunger rod, said housing being provided with a packing through which said plunger rod reciprocates, a drip well between said cylinder block and plunger rod packing, a plunger reciprocable in said cylinder bore and connected to the front end of said plunger rod, a cover for said drip well having a front wall spaced from the rear end of the cylinder block and provided with an opening through which the plunger reciprocates, an enclosed water supply conduit in said cylinder block, and a delivery connection from said conduit discharging water upon the plunger and within the rear end of said bore, the rear end of said bore wherein said delivery connection opens being of larger diameter than said plunger.

6. In a pump, the combination of a cylinder block, a power unit for said pump, a drip well between said cylinder block and said power unit, a plunger operated reciprocally within said cyl-

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inder block and having a rear portion projecting therefrom for actuation by said power unit, means for supplying liquid to said projecting portion of said plunger outside of said block, and a cover for said drip well having a wall extending downward below top of said plunger and spaced from said block at a point toward the power unit from the point at which liquid is supplied to the plunger and provided with an opening through which said plunger reciprocates.

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