April 29, 1924. 1,492,456

J. C. HANSEN-ELLEHAMMER

ROTARY PUMP

Filed April 12, 1923

Fig. 1.

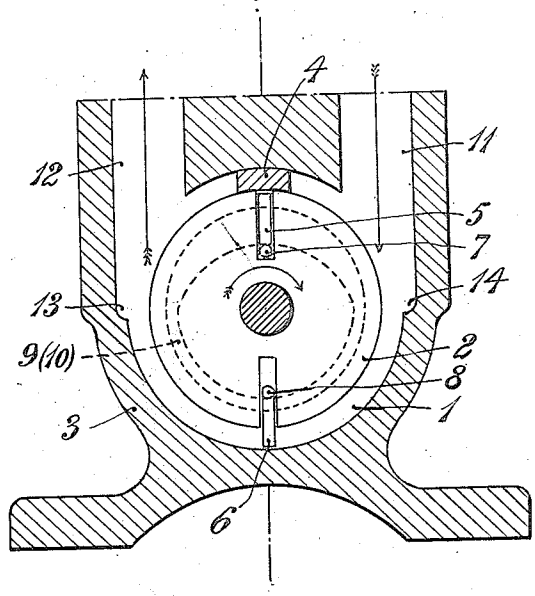
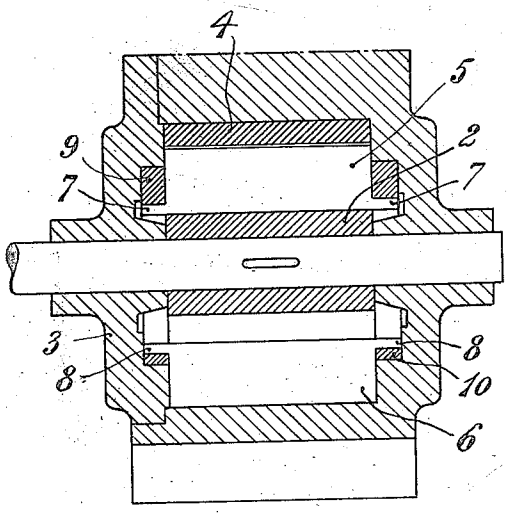


Fig. 2.



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UNITED STATES PATENT OFFICE.

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ROTARY PUMP.

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To all whom it may concern:

Be it known that I, JACOB CHRISTIAN HANSEN-ELLEHAMMER, subject of the King of Denmark, residing at Hellerup, Denmark, have invented certain new and useful Improvements in Rotary Pumps, of which the following is a specification.

The present invention relates to a rotary pump having an essentially circular fluid passage between the piston cylinder and the pump body which in the inoperative section has a projection separating the suction side from the delivery side.

The pumps of this kind heretofore employed show the disadvantage that they would quickly wear on the guiding surfaces which are situated within the range of the fluid when the pump is employed for conveying impure water. This becomes particularly apparent when such water contains essential quantities of sand or grit which within a very short time will completely wear out the guiding surfaces.

The present invention aims at obviating this disadvantage by disposing the entire controlling mechanism towards the center, outside of the range of the fluid so that the centrifugal forces on the fluid will hold sand particles and the like away from the guiding surfaces.

Furthermore, the enclosing walls of the pump body are made with pockets or recesses at such points where the pistons pass from the inoperative section to the operative section. It is thereby obtained that the pistons are practically instantly relieved, as immediately on the pistons leaving the said pockets, the fluid can flow from the one side of the pistons to the other side.

It is clear from the above description that a pump like the one in question is particularly adapted to be used as a fire pump, the fact that the pump can deal with impure water being of the greatest importance in this respect.

In the accompanying drawing—

Fig. 1 is a vertical section through a constructional form of the pump and at right angles to the spindle of the pump, and

Fig. 2 is an axial section through the pump.

The pump has an essentially circular fluid passage 1 between the piston cylinder 2 and the pump body 3. The latter has on the inoperative section a projection 4 separating the suction side 11 of the pump from the delivery side 12.

Within the piston cylinder 2 are disposed radially slidable pistons 5 and 6 having tenons 7 and 8, respectively, outside of the fluid passage, and the axes of which are parallel to the axis of rotation of the jump.

These tenons are controlled by guide surfaces formed by the inner sides of cylindrical bodies 9 and 10 which have on their outside a circular cylindrical surface and on their inside a cylindrical surface, the axes of these two cylindrical surfaces being parallel to the axis of rotation of the pump.

The guide surfaces are formed in such a manner that they will produce an even displacement of the piston or pistons from their outer position, the operative position, to their receded position and back again to the operative position.

In the wall of the pump body 3 are formed pockets or recesses 13, 14 at such points where the pistons pass from the inoperative position into operative position, and from operative position to inoperative position.

The operation of the pump is readily understood by regarding Figure 1 where the fluid which, for example, at a given moment enters into the suction part 11 of the pump will by means of the piston 5 be carried downwards and round to the delivery side 12.

From the foregoing it will be seen that the casing has inlet and outlet ports 11 and 12 and has a circular bore forming with a circular piston cylinder 2 a circular fluid passage 1, the rotary piston cylinder 2 within said casing is co-axially with the bore and the circular fluid passage uninterruptedly surrounds the piston cylinder 2 to 180° of its circumference. The wall of the casing at both ends of said 180° fluid passage is provided with outwardly extending recesses 13 and 14 located substantially in a horizontal plane at the axial center line of the casing. The discharge port channel at the outlet end of the 180° fluid passage in direct continuation thereof is tangentially arranged with the outlet end of the 180° fluid passage. The barrier 4 is arranged between the suction and delivery ports 11 and 12 and extends towards the piston cylinder 2. The piston 5 is readily movable in the piston cylinder 2 and is directed outwardly from the same to operative position by centrifugal force when

passing through and crosses said 180° fluid passage. The piston 5 is limited in its outward radial movement by means 7 or the like, which prevents frictional wearing contact of said piston on the wall forming the 180° fluid passage and in cooperating with the parts 9, 10 is retracted within the periphery of said cylinder to inoperative position during the remaining 180° travel of said cylinder 2.

The change from operative to inoperative, and inoperative to operative position of the piston 5 takes place when the piston is in radial line with one of the recesses 13 or 14.

Furthermore it will be seen that the other channel 11 is substantially tangential with the circular fluid passage 1 and with the recesses 13 and 14 and arranged on the juncture of the 180° fluid passage with the inlet and outlet channels 11 and 12, the walls of the inlet and outlet channels forming continuations of the recesses.

This invention may be developed within the scope of the following claims without departing from the essential features of the same and it is desired that the specification and drawings be read as being merely illustrative and not in a limiting sense except as necessitated by the prior art.

I claim:

1. In a rotary pump, the combination of a casing having inlet and outlet ports and having a circular bore, a rotary piston cylinder within said casing and co-axially with the bore forming therebetween a circular fluid passage uninterruptedly surrounding said cylinder 180° of its circumference, the wall of said casing at both ends of said 180° fluid passage being provided with outwardly extending recesses located substantially in a horizontal plane at the axial center line of the casing, a discharge port channel at the outlet end of the 180° fluid passage in direct continuation thereof tangentially with the oulet end of the 180° fluid passage, a barrier between the suction and delivery ports extending to the cylinder, a piston radially movable in the cylinder and directed outwardly from the same to operative position by centrifugal force when passing through and across said 180° fluid passage, means in said casing relatively stationary to said piston limiting the outward radial movement of the piston to prevent frictional wearing contact of said piston with the bore forming the 180° fluid passage, and retracting the piston within the periphery of said cylinder to inoperative position during the remaining 180° travel thereof, the change in operative to inoperative, and inoperative to operative position of the piston taking place when the piston is in radial line with one of said recesses.

2. In a rotary pump, the combination of a casing having a circular bore, a rotary piston cylinder within said bore and arranged co-axially with the same so as to form an essentially circular fluid passage of 180° surrounding said cylinder, suction and delivery channels extending tangentially from opposite sides of said bore in parallel relation to each other, a barrier between the suction and delivery channels extending across said fluid passage and smaller than the circular wall of the cylinder between said ports, the wall of said casing at the ends of the 180° fluid passage portion being provided with recesses extending outwardly, said recesses being provided at the juncture of the 180° fluid passage with the inlet and outlet channels, and the walls of the inlet and outlet channels forming continuations of the recesses where the piston passes from the inoperative to the operative position and vice versa and said recesses being located substantially in a horizontal plane of the axial center line of the casing and spaced 180° apart, pistons radially movable in the cylinder and directed outwardly by the rotation of the same by centrifugal force across said 180° fluid passage portion, and means in said casing relatively stationary in respect to said piston limiting the outward radial movement of the piston to prevent frictional wearing contact of said piston with the bore of the 180° passage portion, said means co-acting with the piston to retract the same within the periphery of said cylinder during the remaining 180° travel thereof between the delivery and suction channels.

In testimony whereof I affix my signature.

JACOB CHRISTIAN HANSEN-ELLEHAMMER.