Feb. 7, 1933. G. WALLACH 1,896,727

PUMP

Filed Dec. 23, 1929 2 Sheets-Sheet 1

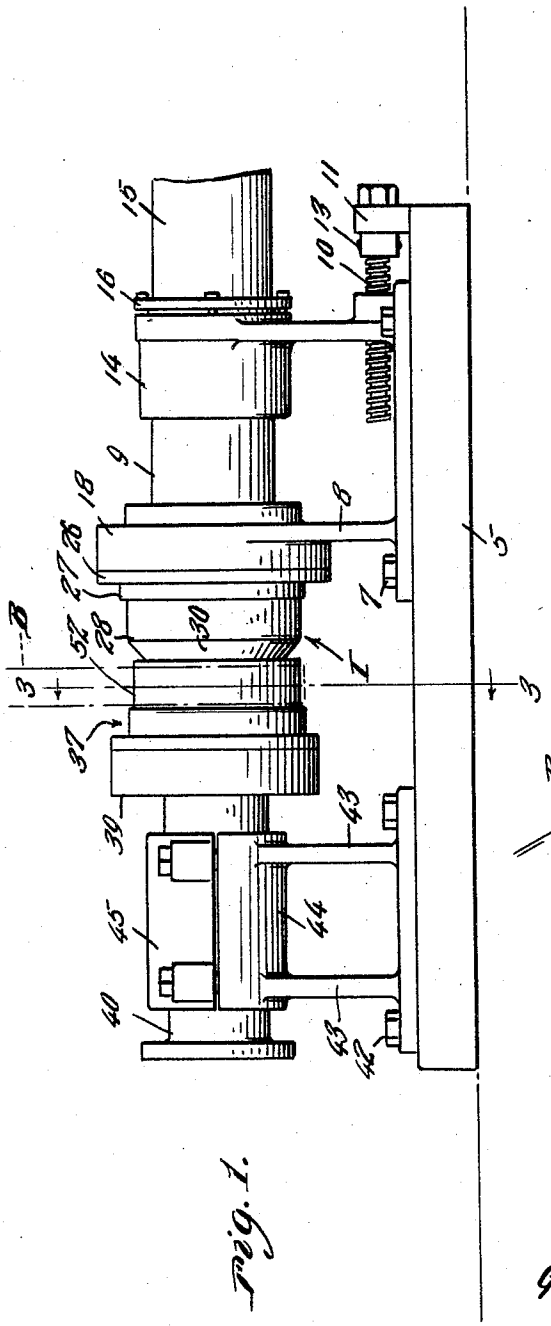


Fig. 1.

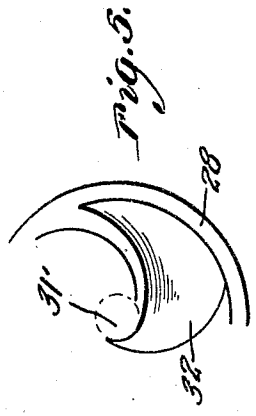


Fig. 3.

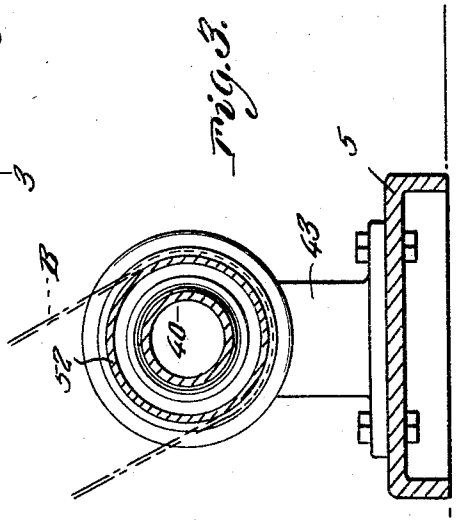


Fig. 2.

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Fig. 2.

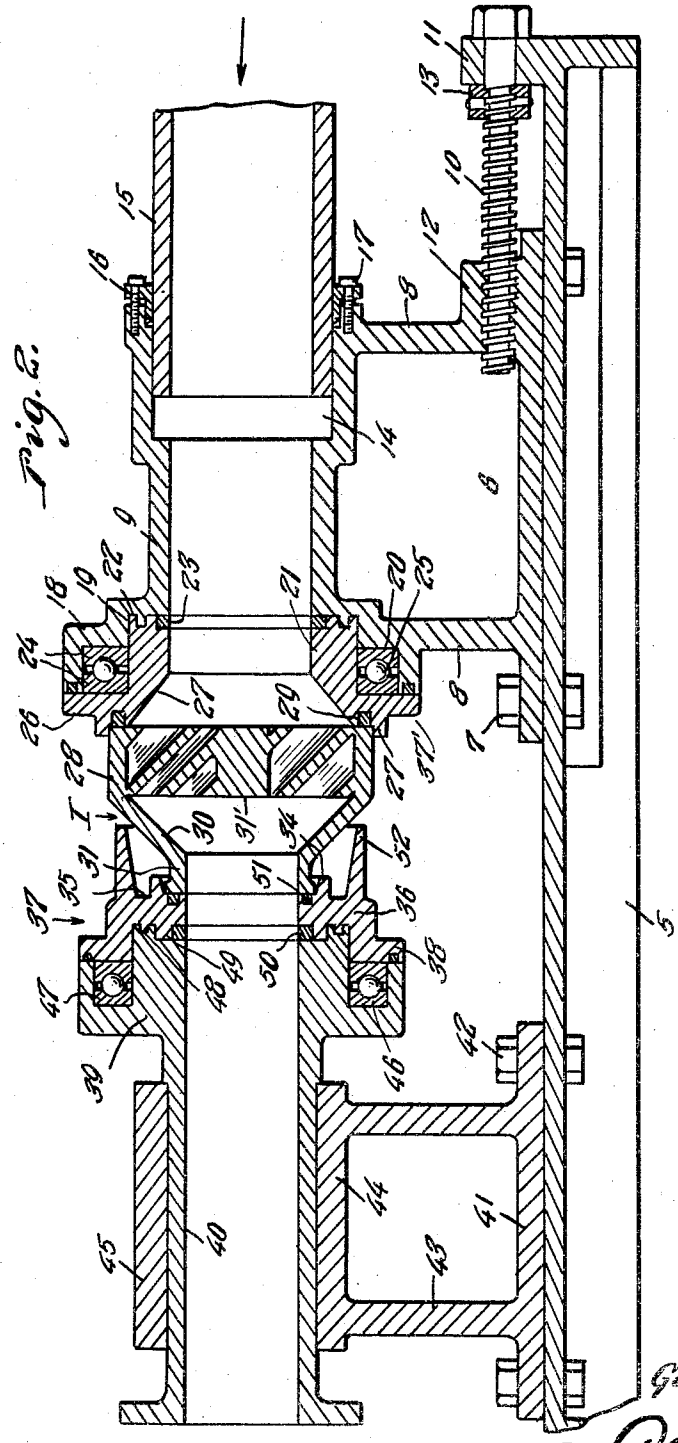
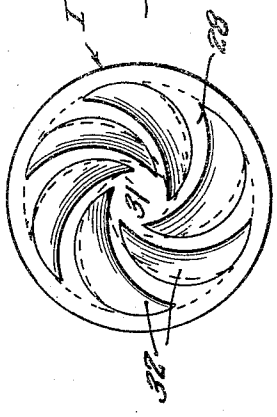


Fig. 4.



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UNITED STATES PATENT OFFICE

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PUMP

Application filed December 23, 1929, Serial No. 416,098, and in Canada October 26, 1929.

This invention relates to certain new and useful improvements in pumps and the primary object of this invention is to provide a pump especially designed for use in metallurgical plants and also capable of use for any hydraulic purposes where coarse material is to be handled, and the parts of the pump subjected to heavy wear.

A still further object of the invention is to provide a pump of the above mentioned character including an impeller which may be readily placed between the intake and outlet pipe of the pump, and which can be readily removed when worn to facilitate the replacing of the impeller with a new one.

A still further object of the invention is to provide an impeller for pumps of the above mentioned character including a spirally arranged blade, the propeller adapted to be driven from any suitable source of power.

A still further object of the invention is to provide a pump of the above mentioned character which is comparatively simple in construction, consists of relatively few parts, is strong, durable, thoroughly reliable, practical, and efficient in operation and otherwise well adapted for the purpose designated.

Other objects and advantages of the invention will become apparent during a study of the following description taken in connection with the accompanying drawings, wherein:

Figure 1 is a side elevational view of my improved pump.

Figure 2 is a longitudinal sectional view therethrough.

Figure 3 is a transverse sectional view taken substantially on the line 3—3 of Fig. 1.

Figure 4 is a front elevational view of the impeller.

Figure 5 is a fragmentary detail view illustrating the arrangement of the impeller blade.

Referring in detail to the drawings, it will be seen that 5 designates an elongated platform upon one end of which is mounted a base 6. Rising from the base 6 are standards 8, the upper ends of which are integral with a horizontally disposed tubular member 9. The base 6 is suitably secured to the platform 5 through the medium of bolt and nut means 7 extending through the base 6 and suitable slots provided therefor in the platform 5.

For moving the base 6 longitudinally of the platform 5 for adjusting the base 6 at any predetermined points on the platform 5 there is provided an elongated adjusting screw 10 which has a non-threaded end rotatable in a suitably apertured lug 11 formed on one end of the platform 5, the threaded end portion of the screw being threaded through an internally threaded portion 12 formed in one of the standards 8 at the lower end of the standard.

A suitable lock nut 13 engages the threaded portion of the screw 10 and bears against the lug 11. The tubular member 9 at one end thereof is counterbored to provide at said one end a suitable socket 14 adapted to receive therein one end of an intake pipe 15 a portion of which is shown fragmentarily in Figures 1 and 2 of the drawings.

A suitable packing ring 16 is disposed circumjacent the intake pipe 15 at the outer end of the socket 14. Suitable screws 17 are utilized for retaining the packing ring 16 in position.

At its opposite end the tubular member 19 is enlarged to provide an enlarged annular head 18. The head 17 at the inner end thereof is provided with an annular recess 19 forming an internal annular shoulder 20.

An intake transmitter member is rotatably mounted in the head 18 and said transmitter member comprises a tubular body portion 21 provided at its inner end with an annular flange projecting forwardly thereof, and said flange is provided with an annular groove for retaining therein an annular tongue formed at the inner end of the head 18 within the recess 19 providing somewhat of a packing structure between the tubular member 9 and body portion 21 of the transmitter as at 22.

Also arranged between the inner end of the body 21 of said intake transmitter and adjacent portion of the tubular member 9, and located within the confines of the last referred to flange is a suitable packing ring 23.

Disposed about the body 21 of said transmitter and arranged between said body and the peripheral wall of the head 18 are suitable antifriction means comprising a pair of annular ball races 24 between which are suitably retained ball bearings 25. The said anti-friction means are retained in position between the shoulder 20 of the head and the outstanding annular flange 26 formed on the outer end of the body of said transmitter.

At said outer flanged end, the body of the transmitter is provided with a conical discharge mouth 27. At the last referred to end thereof the transmitter is provided with a concentric annular flange or extension 27′ which receives within the confines thereof one end of the cylindrical portion 28 of an impeller designated generally by the reference character I. Inwardly from the flange 27′ the body 21 of the transmitter is provided with an annular groove having arranged therein a suitable packing member or gasket 29 one face of which bears against the adjacent end of the impeller I providing a fluid tight connection between the impeller and transmitter.

The cylindrical body portion 28 of the impeller I merges at one end thereof into a conical body portion 30, which body portion 30 at its smallest end merges into an axially disposed tubular neck 31. The impeller I has formed axially of the cylindrical portion 28 a hub 31′ from which radiates a plurality of impeller blades 32.

The blades 32 are preferably of the construction and arrangement suggested in Figures 2, 4 and 5, it being noted that the blades are preferably six in number and are somewhat segmental or moon shaped and the ends of the blades integral with the hub 31′ are arranged somewhat in overlapping relation with the forward ends of the blades welded or otherwise formed integral with the inner face of the cylindrical body portion 28.

The blades 32 are suitably spaced from one another and are disposed substantially at a forty-five degree angle relative to the horizontal axis of the hub 31′ to provide therebetween passages disposed substantially obliquely relative to the horizontal axis of the propeller as suggested in Figure 2.

The flanged free end of the neck 31 is rotatable within the confines of an annular flange 34 that projects from one side of an internal annular shoulder 35 formed within the body portion 36 of a discharge transmitter designated generally by the reference character 37. At that end thereof, remote from the impeller I the body portion of the discharge transmitter 37 is provided with an outstanding annular flange 38.

Extending within said flanged end of the body 36 is the forward end of an enlarged head portion 39 of a discharge pipe 40.

For suitably supporting the pipe 40 in longitudinal alinement with the intake pipe 15 and tubular member 9 there is provided a base member 41 suitably anchored to the platform 5 as at 42. Rising from the base member 41 is a pair of standards 43 that have formed integrally with the upper ends thereof a bearing seat 44.

A suitable bearing cap 45 is provided, and is suitably bolted to the seat 44 for retaining between said cap and seat an intermediate portion of the discharge pipe 40.

The discharge transmitter 37 is of course rotatably mounted on the outer end of the head 39 of said pipe 40. Said head 39 inwardly from the outer end thereof is provided with an annular groove 46 within which are arranged antifriction means in the nature of a bearing 47 similar in every detail to the anti-friction means described as located in the head 18. A more detailed description of the anti-friction means 47 is therefore thought unnecessary.

The anti-friction means 47 is confined within the groove 46 through the medium of the flange 38 on the adjacent end of the transmitter 37, as is apparent from a study of Figure 2.

That end of the head 39 which fits within the body 36 of the discharge transmitter 37 is provided with an annular flange that in turn is provided with an annular groove receiving therein an annular tongue formed on an adjacent face of the shoulder 35 thus providing somewhat of a tongue and groove connection 48 between said head and said transmitter.

Projecting from one face of the shoulder 35 and arranged within the confines of the said grooved flange of the head 39 is an annular flange 49 within the confines of which is arranged a suitable gasket 50 interposed between the opposed faces of the head 39 and shoulder 35.

The shoulder 35 inwardly from the flanged extension 34 is also provided with an annular groove within which is arranged an annular packing member or gasket 51 one face of which bears against the flanged end of the neck 31 of the impeller I.

From the foregoing then it will be seen that suitable fluid tight connections are provided between the pipe 40, transmitter 37, and between the transmitter 37 and the impeller I, as well as between the impeller I and the intake transmitter.

The discharge transmitter 37 at that end remote from the flange 32 has formed integrally with the body 36 thereof an annular pulley wheel 52 into the interior of which extends a portion of the conical body 30 of said impeller I. Any suitable belt means designated generally by the reference character B and shown in broken lines in Figure 1 is trained over the pulley 52, said belt B leading from any suitable source of power for

imparting rotative movement to the transmitter 37.

Obviously, rotary motion from the transmitter 37 is imparted to the impeller I, and through the impeller I transmitted to the intake transmitter, the latter for the sake of clearness being designated generally by the reference character 37'.

It is thought that the operation, of the pump is apparent from the foregoing description, taken in connection with the accompanying drawings. Obviously as the impeller I, and transmitters 37, 37' are simultaneously rotated, vacuum, due to the position of the blades 32 is formed in the spaces between the blades 32 while the impeller is being speedily rotated. The vacuum, notwithstanding the pressure of the atmosphere, causes the fluid to be drawn in through the intake pipe 15 and tubular member 9 through the intake transmitter 37' to discharge from the conical mouthed end 27 of said transmitter into the impeller I, the fluid passing between the blades 32, through the conical body portion 30 and the tubular neck 31 of the impeller to pass from the discharge transmitter 37 into the discharge pipe 40 passing from the pipe 40 to any suitable container or mechanism provided therefor. In the operation of the device, the conical body portion of the impeller provides a cone-like compiler which serves as a reducer for the fluid or material passing from the impeller I into the discharge pipe 40.

When, because of wear, or any other reason it is desired to remove the impeller I to replace the same with a new one, it will be apparent that by rotating the adjusting screw 10, the base member 6 will be moved longitudinally of the platform 5 in a direction away from the base member 41 whereby the impeller I may be readily removed from between the transmitters 37 and 37', and, if desired the transmitters 37 and 37' may be subsequently removed for cleaning, repairing or for any other purpose.

For securing the impeller I between the transmitters 37 and 37' so as to be positioned directly between the intake pipe 15 and discharge or outlet pipe 40 the reverse operation is obviously employed, that is when the impeller is so positioned the screw 10 is operated for moving the base 6 inwardly toward the base 41.

Even though I have herein shown and described the preferred embodiment of my invention, it is to be understood that the same is susceptible to changes fully comprehended by the spirit of the invention as herein described and the scope of the appended claim.

Having thus described my invention, what I claim as new is:

A pump including in combination a pair of opposed rotatably mounted transmitters, each of said transmitters including a body having an opening therethrough, one of said transmitters at one end of its body being provided with a relatively large discharge mouth, an impeller including a casing having a cylindrical part and a conical part, said cylindrical part on said casing at one end of the casing fitted within the mouth of said one transmitter, the other of said transmitters interiorly of its body being provided with an annular shoulder having a circular flange projecting therefrom, and the conical part of said impeller casing at its free end arranged within the confines of said flange and having an outstanding annular flange engaging with the first named flange and blades arranged within the cylindrical part of the impeller casing.

Dated at Chapman Camp, British Columbia, this twenty-second day of November, nineteen hundred and twenty-nine, A. D.

GEORGE WALLACH.