April 28, 1925. 1,535,474

O. JACOBSEN

PUMP

Filed Jan. 18, 1924 2 Sheets-Sheet 1

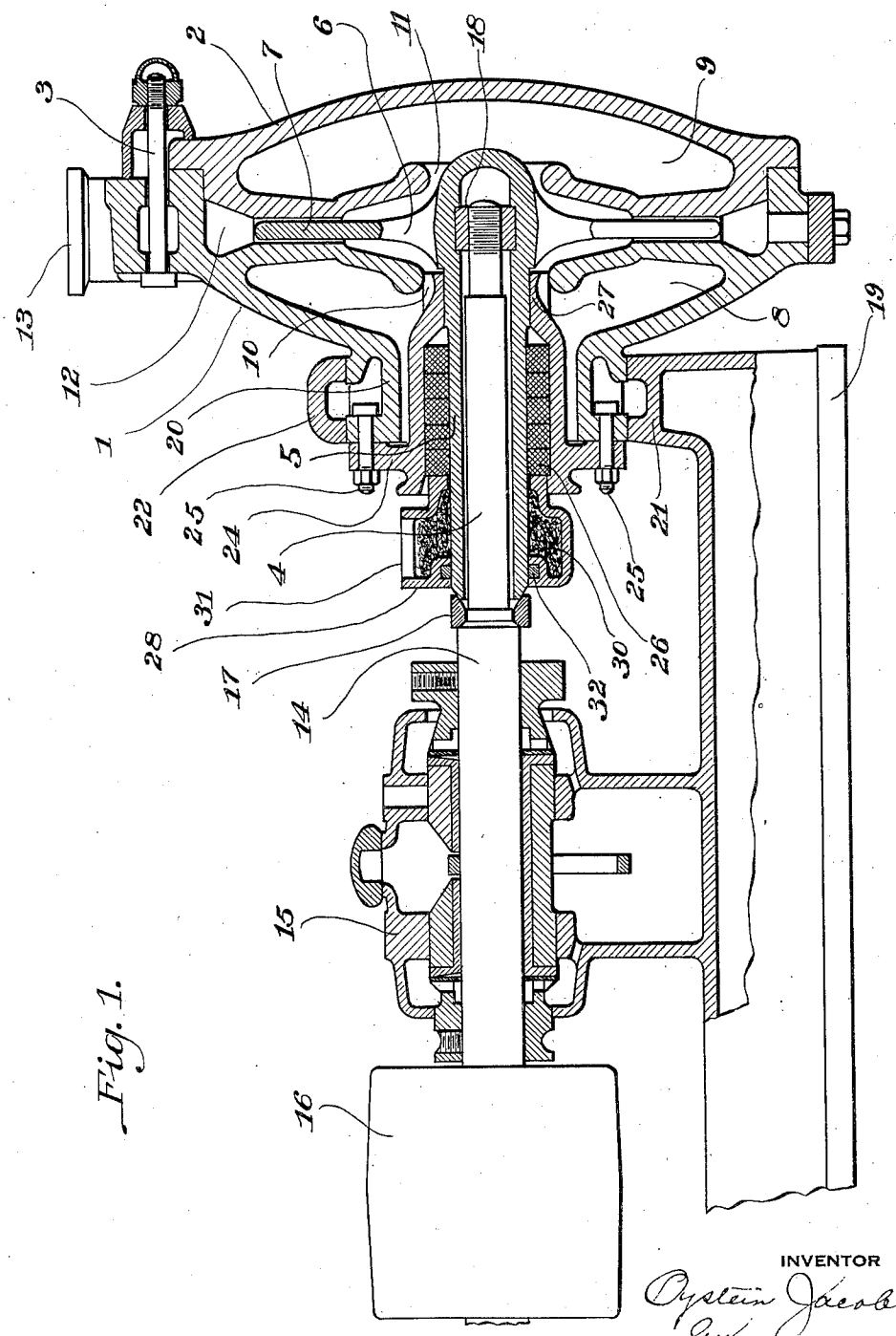


Fig. 1.

INVENTOR

Oystein Jacobsen

by James C. Bradley

atty

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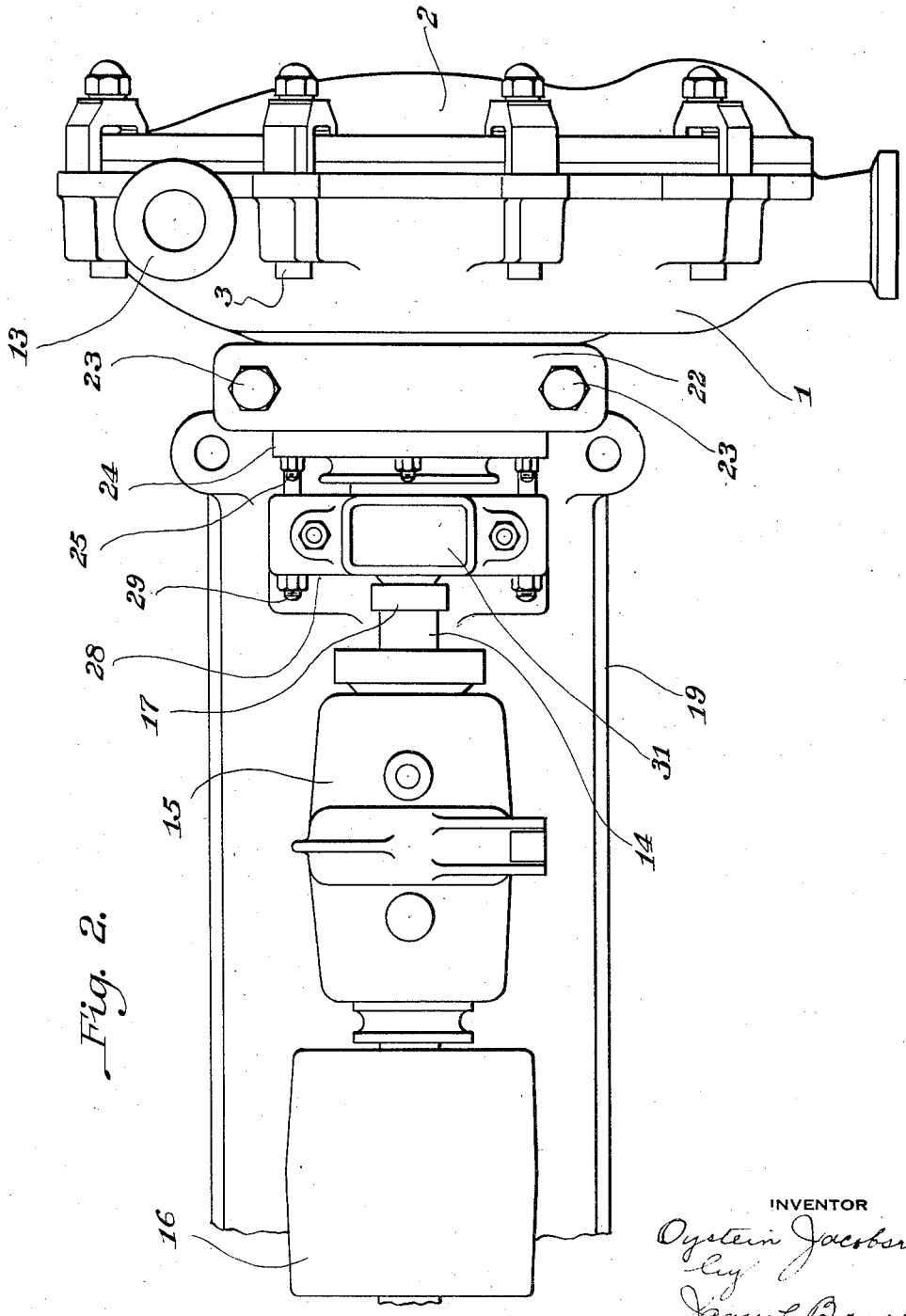


Fig. 2.

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Patented Apr. 28, 1925. 1,535,474

UNITED STATES PATENT OFFICE.

OYSTEIN JACOBSEN, OF DAYTON, OHIO, ASSIGNOR TO THE DURIRON COMPANY, INC., A CORPORATION OF NEW YORK.

PUMP.

Application filed January 18, 1924. Serial No. 687,107.

To all whom it may concern:

Be it known that I, OYSTEIN JACOBSEN, a citizen of the United States, and a resident of Dayton, in the county of Montgomery and State of Ohio, have made a new and useful invention in Improvements in a Pump, of which the following is a specification.

The invention relates to pumps, and particularly to centrifugal pumps for handling corrosive liquids, in which the material contacting with the liquid is of acid resisting composition, such as, high silicon iron. It has for its principal objects; (1) the provision of an improved packing arrangement wherein the suction of the pump is utilized to minimize the liability to leakage, (2) the provision of an improved driving shaft construction for the runner, (3) the provision of improved means for giving a bearing support to the shaft in proximity to the runner, and (4) the provision of improved means for lubricating the runner shaft and runner sleeve. One embodiment of the invention is illustrated in the accompanying drawings wherein:

Figure 1 is a longitudinal section through the pump. And Fig. 2 is a plan view of the pump.

Referring to the drawings, 1 and 2 are the parts of the pump casing, which are clamped together by means of the bolts 3, such casing being preferably formed of a corrosion resisting material, such as high silicon iron. Extending through the part 1 of the casing is the drive shaft for the impeller or runner, such shaft comprising the central member 4, which is a piece of ordinary steel shafting and the sleeve 5 surrounding the member 4, such sleeve being also preferably formed of the same corrosion resisting material as the casing. Preferably integral with the sleeve 5 is the impeller or runner 6 comprising the usual blades 7, which may be of any approved form fitting in the annular space between the two parts of the casing. The liquid handled by the pump is drawn into the spaces 8 and 9 in the two parts of the casing, and thence through the annular spaces 10 and 11, from which it is discharged by centrifugal force to the space 12 around the outer periphery of the impeller, leaving the casing through the outlet 13.

The shaft member 4 in the particular construction shown, has an enlarged portion 14, supported in the bearing 15 and carries at its outer end the pulley 16 by means of which power is applied to operate the pump. Intermediate the enlarged portion 14 of the shaft and the sleeve 5 is the collar 17, while the right hand end of the shaft is threaded into the nut 18 rigidly secured in the end of the sleeve, such nut being of steel, and having the metal of the sleeve cast around it. The collar 17 acts as a stop for the end of the sleeve, when the sleeve and shaft are assembled by screwing the end of the shaft into the nut 18, the shaft being rotated until a sufficiently tight clamping action between the collar, sleeve and shaft is secured to prevent the loosening of these parts during the operation of the pump.

The bearing 15 and the pump casing are mounted upon a suitable base 19, the casing part 1 being provided with a collar or neck 20, which is clamped to a seat 21 on the base by means of the part 22 held in position by the stud bolts 23 (Fig. 2). Secured to the face of the neck or collar 20 is the stuffing box member 24 held in place by the bolts 25. This member has a recess for the packing 26, and extends back into the interior of the pump casing to a point closely adjacent the impeller, at which point it is formed into a bearing 27. This bearing not only gives a support for the drive shaft at the point most advantageous from a mechanical standpoint (since it lies at a minimum distance from the impeller), but also involves the additional advantage of reducing the liability of leakage. Due to the action of the impellers, the water flows inward through the passage 10 and past the end of the bearing 27 at a high rate of speed, thus acting as an ejector for the joint between the bearing and sleeve 5, and producing a suction at this point. As later pointed out, this suction has the further function of drawing in a certain amount of lubricant from the packing recess, so that proper lubrication is secured at this bearing, which it is highly important should be kept from undue wear.

The packing 26 is tightened and held in place by means of the gland or follower 28 which is secured and adjusted by means of the bolts 29 (Fig. 2) screwed into the member 24 at their inner ends. This follower is provided with an annular cavity 30 filled

with a fibrous material, preferably asbestos, and this material is soaked in petrolatum or paraffine oil. This petrolatum or oil acts as a lubricant for the packing 26 in contact with the sleeve 5, and also for the bearing 27. The movement inward along the sleeve 5 of this lubricant, is promoted by the suction heretofore referred to as induced at the inner end of the bearing 27 by the water of the pump moving at a high velocity inward through the annular space 10. The follower 28 has an opening 31 on its upper side through which fresh lubricant may be supplied from time to time, and leakage outward from the cavity 30 is guarded against by means of a felt ring 32 seated in an annular recess in the follower.

What I claim is:

1. In combination in a centrifugal pump, a casing provided with an opening through its side, a composite drive shaft, comprising an inner rod of strong, tough metal and a surrounding sleeve of corrosion resisting composition extending through such opening, an impeller or runner carried by the inner end of said sleeve, a stuffing box member carried by the casing extending into said opening to a point adjacent the impeller, and constituting a bearing for said sleeve at such point, and packing lying in said member and engaging said sleeve.

2. In combination in a centrifugal pump, a casing provided with an opening through its side, a composite drive shaft, comprising an inner rod of strong, tough metal, and a surrounding sleeve of corrosion resisting composition extending through such opening, a screw connection between the inner ends of said inner rod and the sleeve, a collar swivelled on the rod and engaging the outer end of the sleeve, an impeller or runner carried by the inner end of said sleeve, a stuffing box member carried by the casing extending into said opening to a point adjacent the impeller, and constituting a bearing for said sleeve at such point, and packing lying in said member and engaging said sleeve.

3. In combination in a centrifugal pump, a casing of corrosion resisting material provided with an opening through its side, a composite drive shaft comprising an inner rod of strong, tough metal and a surrounding sleeve of corrosion resisting composition extending through such opening, an impeller or runner of corrosion resisting material carried by the inner end of said sleeve, a stuffing box member of corrosion resisting composition carried by the casing extending into said opening to a point adjacent the impeller, and constituting a bearing for said sleeve at such point, and packing lying in said member and engaging said sleeve.

4. In combination in a centrifugal pump, a casing provided with an opening through its side, a composite drive shaft, comprising an inner rod of strong, tough metal, and a surrounding sleeve of corrosion resisting composition extending through such opening, an impeller or runner at the inner end of said sleeve and integral therewith, a stuffing box member carried by the casing extending into said opening to a point adjacent the impeller and constituting a bearing for said sleeve, and packing lying in said member and engaging said sleeve.

In testimony whereof, I have hereunto subscribed my name this 15th day of January, 1924.

O. JACOBSEN.