

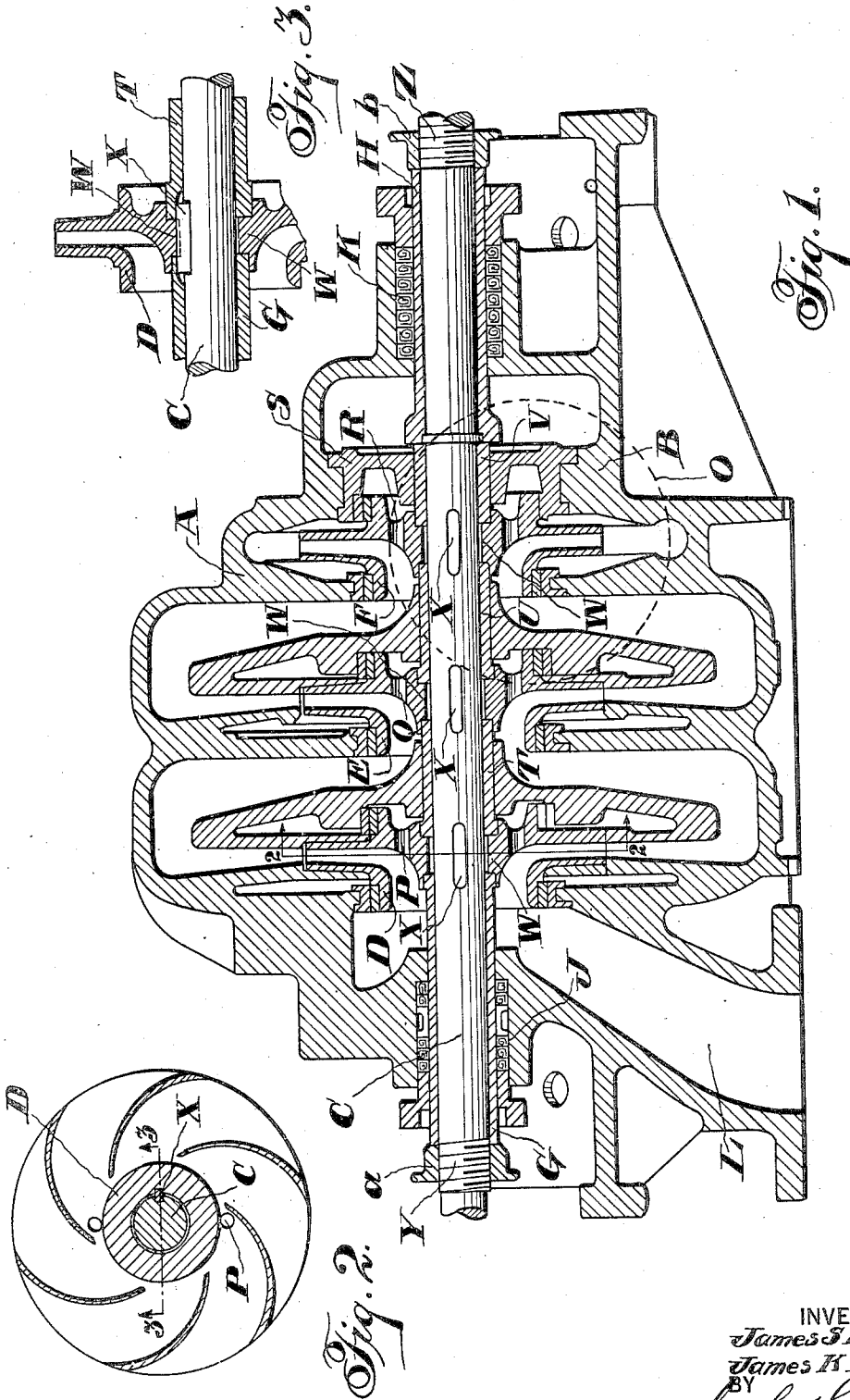
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J. S. FULTON ET AL

IMPELLER MOUNTING FOR CENTRIFUGAL PUMPS

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UNITED STATES PATENT OFFICE.

JAMES S. FULTON, OF PHILLIPSBURG, NEW JERSEY, AND JAMES K. MCINTYRE, OF EASTON, PENNSYLVANIA, ASSIGNORS TO INGERSOLL-RAND COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

IMPELLER MOUNTING FOR CENTRIFUGAL PUMPS.

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To all whom it may concern:

Be it known that we, JAMES S. FULTON, a citizen of the United States, and a resident of Phillipsburg, county of Warren, and State of New Jersey, and JAMES K. MCINTYRE, a subject of the King of England, and a resident of Easton, county of Northampton, and State of Pennsylvania, United States of America, have invented a certain Impeller Mounting for Centrifugal Pumps, of which the following is a specification, accompanied by drawings.

This invention relates to centrifugal pumps but more particularly to an impeller mounting for such type of pumps, and the invention is applicable to either a single or multi-stage pump.

The objects of the invention are to secure a tight joint between the impeller and the shaft sleeve or sleeves, and at the same time provide a support for the impeller at the joint. Our construction substantially prevents the fluid being pumped, from coming in contact with the shaft, so that the shaft is not attacked and pitted by the acids or other chemicals which may be contained in such fluid.

The invention is shown in one of its preferred forms in the accompanying drawings, in which—

Figure 1 is a longitudinal sectional elevation of a centrifugal pump embodying the invention.

Figure 2 is a detail transverse sectional view on the line 2—2 of Figure 1, looking in the direction of the arrows, showing one of the impellers, and

Figure 3 is an enlarged longitudinal detail sectional view on the line 3—3 of Figure 2, showing one of the shaft keys.

Referring to the drawings, A represents the upper part of the pump casing and B represents the lower part of the casing, constructed in any suitable and usual manner, through which the shaft C extends, in this instance having a plurality of impellers D, E and F mounted on the shaft, by means of our improved mounting. The machine may be provided with shaft sleeves G and H in the usual manner and stuffing boxes J and K. The fluid to be pumped is supplied at the inlet L of the machine and discharged at the outlet O in the usual manner.

The impellers D, E and F are shown pro-

vided with the usual holes P, Q and R in their central portions, to aid in equalizing the pressure on the two sides of the impellers. A stationary filling piece S is located within the discharge side of the casing in a machine of this type.

In accordance with our invention, the shaft C is provided with additional shaft sleeves T and U spaced apart from each other and from the sleeve G at one end, and from an intermediate sleeve V at the other end of the shaft. This intermediate sleeve V may or may not be formed as an integral part of the shaft sleeve H as desired, but is preferably separate, as indicated. Each impeller is mounted on two adjacent but separated shaft sleeves and the impellers are provided with ribs W lying in the spaces between the ends of the sleeves, on which the impellers are mounted. Each impeller and the two sleeves on which it is mounted are connected to rotate with the shaft C and for this purpose, we conveniently provide a single key X for each impeller and its two sleeves, as shown in detail in Figure 3, so that one key connects an impeller and two sleeves to the shaft.

The sleeves form a tight joint with the impellers, so that a seal is formed to prevent the fluid being pumped from coming in contact with the shaft. The ribs W are preferably of less height or thickness than the depth or thickness of the shaft sleeves on which the impellers are mounted. The support for each impeller, in accordance with our construction, is formed at the tight joint itself between the impellers and the sleeves, and in order to insure that the joints shall be tight, means are provided for forcing the sleeves against the ribs on the impeller and for holding the sleeves in place. For this purpose, the shaft may be provided with screw threaded portions Y and Z, having nuts a and b, which operate to force the sleeves together against the impellers.

We have found that our construction operates satisfactorily and well, and saves injury to the shaft as well as forming an efficient and strong mounting for the impellers. Obviously the mounting applies to one or more impellers as desired, and if one impeller alone is used, only two sleeves are required, spaced apart at their adjacent ends for the reception of the rib on the impeller.

We claim:

1. A mounting for the impeller of a centrifugal pump comprising in combination with the impeller, an impeller shaft, a pair of shaft sleeves on which said impeller is mounted, an internal circular rib within the impeller hub against which the ends of the sleeves are forced and a key engaging the shaft, sleeves and impeller.
2. A mounting for the impeller of a centrifugal pump comprising in combination with the impeller shaft, a pair of shaft sleeves on the shaft and rotating with the shaft, and an impeller mounted on both of said sleeves to rotate therewith and having a rib lying in the space between the ends of said sleeves and serving to keep said sleeves spaced apart.
3. A mounting for the impeller of a centrifugal pump comprising in combination with the impeller shaft, a pair of shaft sleeves on the shaft and rotating with the shaft, and an impeller mounted on both of said sleeves to rotate therewith and having a rib lying in the space between the ends of said sleeves but out of contact with the shaft.
4. A mounting for the impeller of a centrifugal pump comprising in combination with the impeller shaft, a pair of shaft sleeves spaced apart on the shaft and rotating with the shaft, and an impeller mounted on both of said sleeves to rotate therewith and having a rib lying in the space between the ends of said sleeves but out of contact with the shaft, the said sleeves forming a tight joint with the impeller, whereby a seal is formed to prevent the fluid being pumped, from coming in contact with the shaft.
5. A mounting for the impeller of a centrifugal pump comprising in combination with the impeller shaft, a pair of shaft sleeves spaced apart on the shaft, an impeller mounted on both of said sleeves, and means for connecting both sleeves and the impeller to rotate with the shaft.
6. A mounting for the impeller of a centrifugal pump comprising in combination with the impeller shaft, a pair of shaft sleeves spaced apart on the shaft, an impeller mounted on both of said sleeves and a common key connecting both sleeves and the impeller to the shaft.
7. A mounting for the impeller of a centrifugal pump comprising in combination with the impeller shaft, a pair of shaft sleeves spaced apart on the shaft, and rotating with the shaft, an impeller mounted on both of said sleeves to rotate therewith and having a rib lying in the space between the ends of said sleeves, and means for tightly forcing said sleeves against said rib on the impeller and for holding them in place.

In testimony whereof we have signed this specification.

JAMES S. FULTON.
JAMES K. McINTYRE.