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J. B. KEATING

COMPRESSION SLEEVE SEAL

Filed Oct. 5, 1922

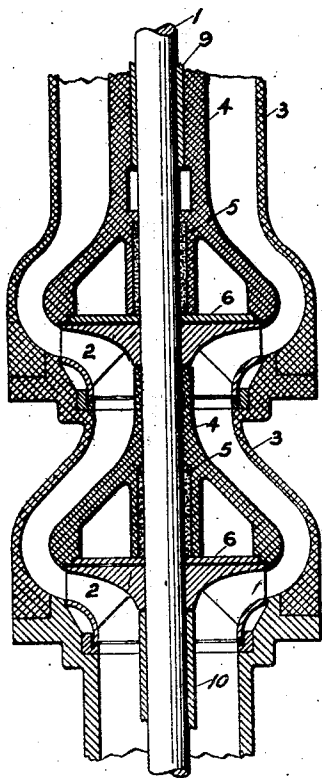


Fig. 1

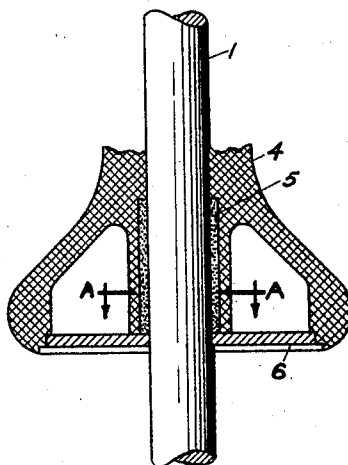


Fig. 2

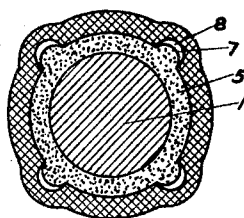


Fig. 3

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UNITED STATES PATENT OFFICE.

JOHN B. KEATING, OF PIEDMONT, CALIFORNIA. ASSIGNOR TO BYRON JACKSON PUMP MFG. CO., OF BERKELEY, CALIFORNIA, A CORPORATION OF CALIFORNIA.

COMPRESSION-SLEEVE SEAL.

Application filed October 5, 1922. Serial No. 592,547.

To all whom it may concern:

Be it known that I, JOHN B. KEATING, a citizen of the United States, residing at Piedmont, in the county of Alameda and State of California, have invented a new and useful Compression-Sleeve Seal, of which the following is a specification.

The present invention relates to improvements in seals for pumps in general, and in particular to a sealing sleeve for deep well turbine centrifugal pumps.

In a centrifugal pump there is a constant suction at the center of the pump, due to its revolving impeller, and a constant back pressure due to the head or column of water pumped. This is especially true in deep-well turbine pumps, in which there is a high static pressure to overcome. Resulting from these causes there is a constant leakage of water at the region of the impellers, through the shaft bearings and along the shaft back to the impellers of the pump, which water must again be forced onward by the impellers. Hence, there follows an appreciable reduced efficiency of the pump.

The main objects of my invention are to prevent the above leakage and to increase the efficiency of the pump.

I attain these objects by positioning between the metallic bearing of the shaft and the impeller, a sleeve of rubber, or other soft, conforming material, which will effectually seal the parts against the above described leakage.

In the accompanying sheet of drawings, I have shown part of a deep-well turbine centrifugal pump, with my invention applied thereto, thus fully illustrating the invention.

Figure 1 is a vertical section of the above part, showing two impellers, casing members therefor, and drive shaft, and my sealing sleeves in place.

Figure 2 is a similar section on a larger scale, showing only the pump shaft, a sealing sleeve, and the contiguous parts of the pump casing.

Figure 3 is a cross-section at the line A--A of Figure 2 and shows more especially the means for preventing rotation of the sealing sleeve.

Referring to the drawings: The shaft 1 drives the impellers 2, housed in their respective casings, and of which 3 is the outer column wall and 4 the inner column wall. The sealing-sleeve 5 is supported in a recess and is compressively maintained therein by the bottom plate 6. The sleeve 5 is preferably made of soft rubber, which compressively embraces the shaft 1 and fills its containing recess, and effectively seals this region against leakage. As a further precaution I provide the sleeve 5 with longitudinal ribs or knobs 7, shown to advantage in Figure 3, and engaging longitudinal channels or depressions 8, in the adjacent member. These molded projections, function to prevent rotation of the sleeve with reference to that member.

9 and 10 represent metallic sleeve bearings, which are generally positioned above and below the impellers and within close proximity thereof.

In the drawings, I have shown only one specific form of my invention, and it is to be understood that the invention may be embodied in other forms, each being a species of my invention.

What I claim as new and desire to secure by Letters Patent of the United States, is the following:

In a deep well turbine pump, the combination in each set of one inner and one outer casing with one impeller housed between, the inner casing of each set formed with a central bore and counterbore and with a concentric offset shoulder at the base of said inner casing, a shaft for the bore and a sealing sleeve of rubber for the counterbore, and a plate adapted to seat in the said offset shoulder and compress the sleeve around the shaft, and said plate having an opening through which the shaft extends.

In testimony whereof I affix my signature.

JOHN B. KEATING.