W. W. WEITLING.

CENTRIFUGAL PUMP.

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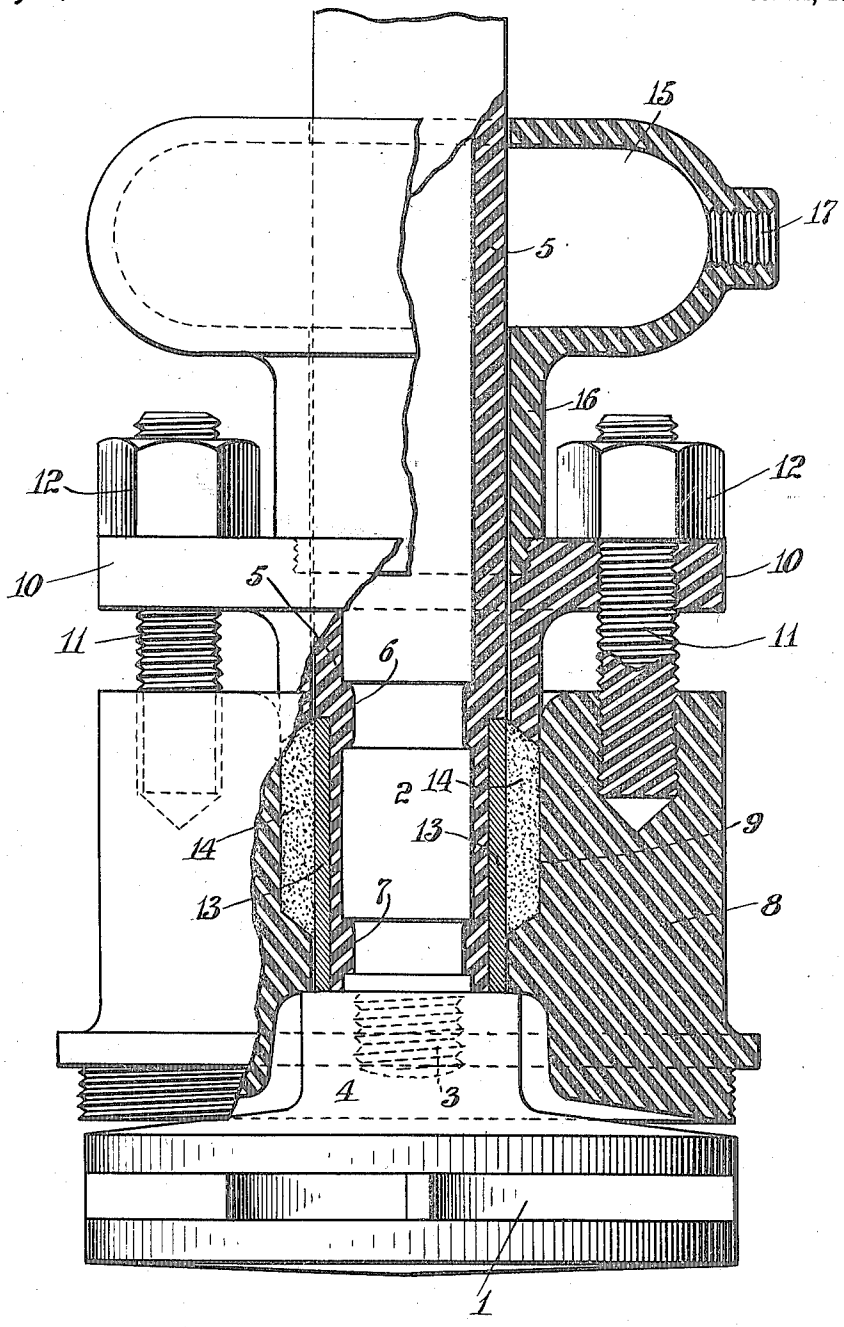
1,249,572. Patented Dec. 11, 1917.



WITNESS

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CENTRIFUGAL PUMP.

1,249,572. Specification of Letters Patent. Patented Dec. 11, 1917.

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To all whom it may concern:

Be it known that I, WILLIAM W. WEITLING, a citizen of the United States, and a resident of College Point, county of Queens, State of New York, have invented certain new and useful Improvements in Centrifugal Pumps, of which the following is a specification.

This invention relates to a centrifugal pump for pumping acids, alkalis or other metal corroding liquids, and the objects of the invention are to provide means for protecting the impeller shaft of said pump from the corroding action of such acids or alkalis by covering the same with hard rubber.

Further objects of the invention are to provide means for protecting the hard rubber covering on the impeller shaft so that an air-tight packing can be provided which will not melt the hard rubber covering on the impeller shaft when the same is rotated at high speeds.

I will now proceed to describe my invention with reference to the accompanying drawings, and will then point out the novel features in claims:

In said drawings:

The figure is a side view partly in cross section with parts broken away, of a portion of a centrifugal pump showing an impeller shaft made in accordance with the invention.

1 designates the impeller disk of a well-known type of centrifugal pump, which in the present instance is made of hard rubber so as to be able to resist the corroding action of acids and alkalis. In this instance the impeller disk 1 is secured to one end of a steel shaft 2 by means of the threaded end portion 3 which fits into the centrally extended side portion or hub 4 of the impeller.

In the present instance, and in accordance with the present invention, the steel shaft 2 is covered with a layer 5 of hard rubber which is held securely in position on the shaft by means of the circular recesses 6 and 7.

The steel shaft 2 with its covering 5 of hard rubber is arranged to be inserted in a suitable hard rubber block or stuffing-box 8 forming part of the impeller casing which is provided with a suitable packing recess 9 in which is arranged to fit a flanged hard rubber gland 10 adjustably held in position by means of the hard rubber studs 11 secured to the stuffing-box. The upper ends of the studs 11 pass through holes in the flanged portion of the gland 10, suitable hard rubber nuts 12 being provided for holding the gland in position.

The hard rubber covering 5 on the end of the shaft 2 adjacent the upper end of the hub 4 of the impeller is partly cut away to permit a sleeve 13, of duriron or similar acid or alkali resisting metal, to be inserted over the hard rubber covering on the end of impeller shaft. The sleeve 13 is made of sufficient length, in the present instance, to extend a short distance above the upper end of the packing recess 9 so that suitable packing 14, in the packing recess can be forced against the surface of the sleeve to make an air-tight joint when the gland 10 is operated to compress the packing.

In the present instance the upper part of the shaft 2 is arranged to pass through an overflow chamber 15 made of hard rubber and provided with a downwardly depending sleeve portion 16, the lower end of which is secured to the gland 10. The sleeve portion 16, together with the gland 10, fits loosely over the shaft 2 and any acid or alkali that may leak past the packing will be caught in the overflow chamber from which it is permitted to escape through the outlet 17.

The upper end of the impeller shaft 2 which extends above the overflow chamber is not provided with a hard rubber covering as the same is mounted in bearings which support the shaft, the shaft being preferably connected to an electric motor which permits of the impeller being rotated at high speed. The impeller casing and other connections, all made of hard rubber, are not shown as their construction and operation are well known.

From the above description it will be seen that a steel impeller shaft is provided which permits the same to be rotated at high speeds without danger of breaking, the hard rubber covering on the shaft protecting the same from the corroding action of acids or alkalis. The hard rubber covering on the shaft does not provide a good bearing surface for an air-tight packing and if the shaft were run at high speeds the heat due to friction would soon destroy the rubber.

In order to overcome this difficulty the sleeve 13 of duriron or similar metal is mounted on the hard rubber covering of the shaft.

Duriron is a metal made to resist the action of acid or alkali, the same being extremely brittle due to its extreme hardness. The means above described for mounting a relatively thin sleeve of duriron or similar metal upon a covering of hard rubber affords a very efficient method for mounting this brittle metal and retaining the same in position. The hard rubber covering not only acts to retain and support the same but also acts to keep the acid or alkali from corroding the impeller shaft.

An air-tight packing in a centrifugal pump of this type is very essential if the pump is to be made efficient. It will readily be seen that if no air-tight packing is provided on the impeller shaft air will be permitted to enter the impeller casing to thereby destroy the vacuum created by the impeller, greatly reducing the efficiency of the pump. The provision of the air-tight packing also prevents to a great extent the acid or alkali from working up the impeller shaft.

From the above description it will be seen that the metal impeller shaft is protected from the acid or alkali by the hard rubber covering on the shaft and the hard rubber covering is in turn protected by an acid and alkali resisting metal sleeve mounted on said hard rubber covering so that an air-tight packing can be made about said shaft by forcing the packing against the metal sleeve.

While the invention has been described with particular reference to the details of construction the same is not to be considered as limited thereto, as many changes can be made and still fall within the scope of the invention set forth in the following claims.

What I claim is:

1. A centrifugal pump for pumping acids, alkalis and the like, comprising in combination an impeller, a metal shaft secured thereto for rotating said impeller at high speeds, a hard rubber covering secured to said impeller shaft for protecting said shaft from the corrosive action of acids and alkalis, an acid and alkali resisting metal sleeve mounted on the hard rubber covering on said impeller shaft, a stuffing-box and packing means in said stuffing-box for engaging said metal sleeve to make an air-tight joint about said impeller shaft.

2. A centrifugal pump for pumping acids, alkalis and the like, comprising in combination an impeller, a metal shaft secured thereto for rotating said impeller at high speeds, a hard rubber covering secured to said impeller shaft for protecting said shaft from the corrosive action of acids and alkalis, a duriron metal sleeve mounted on the hard rubber covering on said impeller shaft, a stuffing-box and packing means in said stuffing-box for engaging said metal sleeve to make an air-tight joint about said impeller shaft.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

WILLIAM W. WEITLING.

Witnesses:

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