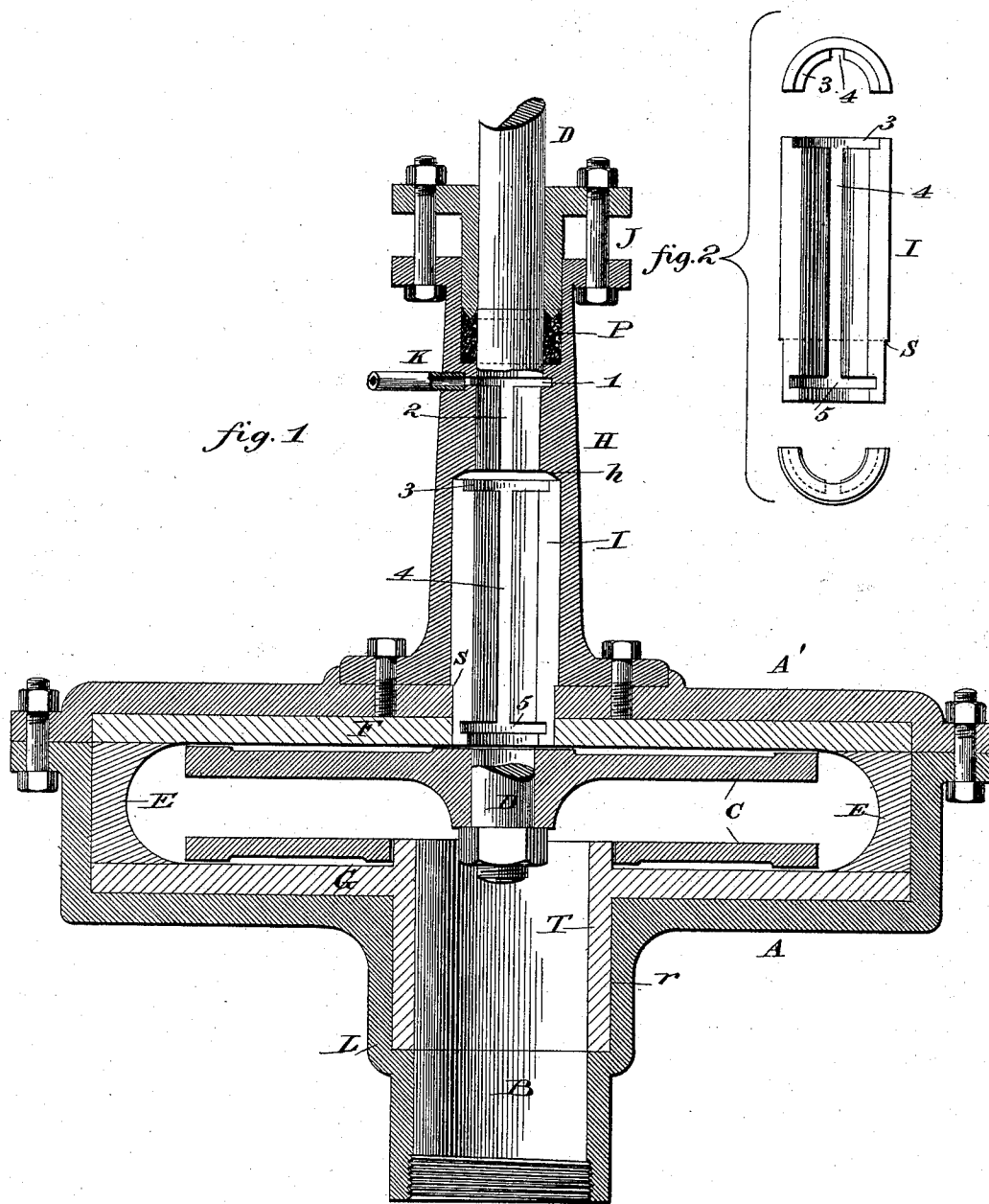


(No Model.)

E. J. HAWLEY.  
CENTRIFUGAL PUMP.

No. 505,790.

Patented Sept. 26, 1893.



Witnesses.

J. A. Chasman  
M. C. Massie

Inventor

Eli J. Hawley  
By W. Hunter Meyer.  
Att'y.

# UNITED STATES PATENT OFFICE.

ELI J. HAWLEY, OF MANCHESTER, VERMONT.

## CENTRIFUGAL PUMP.

SPECIFICATION forming part of Letters Patent No. 505,790, dated September 26, 1893.

Application filed July 29, 1892. Serial No. 441,560. (No model.)

*To all whom it may concern:*

Be it known that I, ELI J. HAWLEY, a citizen of the United States of America, residing at Manchester, in the county of Bennington and State of Vermont, have invented certain new and useful Improvements in Centrifugal Pumps, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to an improvement in centrifugal pumps of the class in which the pump is provided with a removable lining in the piston-casing and a removable bearing in the journal, such a pump being shown in Patent No. 367,911, granted to me August 9, 1887.

One object of my present invention is to improve the construction of the inlet and of the side lining on the inlet side of the pump; and another object is to improve the construction of the journal and to render the bearing in the journal capable of removal and replacement without necessitating the removal of the linings and the piston.

The invention will first be described in connection with the accompanying drawings, and then pointed out in the claims.

Figure 1 of the drawings is a sectional elevation of my improved pump. Fig. 2 is a sectional view of one section of the journal-bearing.

Referring to the drawings, A A' represent the casing, the letter A' indicating the cap-plate; B, the water-inlet; C, the piston; D, the piston-shaft; E, the annular concave lining; F G the side lining plates; H, the journal, bolted to the cap-plate; I, the bearing in the journal; J, the gland, movably secured in the outer end of the journal; and K, the pipe through which water is admitted to the interior of the journal.

I have found by experience that in the use of a pump for elevating water mixed with sand or other gritty substance there is excessive wear at the inner portion of the inlet, owing to the violent whirl there imparted to the ingoing mixture, resulting in an early cutting away of that part of the inlet-pipe, after which the shot or sand is free to act with destructive effect upon the edges of the casing.

To shield the casing from wear in the manner stated is one purpose of my present invention, and this I accomplish by forming the

inlet side of the casing with an extension L, adapting its outer end for the reception of a suction-pipe, (not shown.) In the inner end of this extension I form an annular recess *r*, of a depth suitable for the reception of the lining hereinafter mentioned, and of a length sufficient to carry the lining outward beyond the point at which the whirling action of the fluid is set up. The lining-plate G I now form with a tubular extension T, preferably integral with the plate, adapted to fit neatly and flush in the recess in extension L, the inner end of this tubular portion entering the piston. Thus it will be seen that all wear at the inner end of the inlet will fall on the lining-plate, and this plate, when worn beyond the point of usefulness, can be replaced by a new one at a nominal cost.

By the construction shown in my previous patent above referred to, the journal-bearing, which was tubular in form, could be removed only by first removing the piston from the casing. Furthermore, in that construction the water for washing and lubricating the bearing was admitted directly into a longitudinal channel, flowing thence inwardly until it reached an annular recess near the inner end of the bearing, whence it was forced out onto the piston.

I now construct the bearing in sections, preferably halves, reducing the diameter of the inner end, so as to leave a shoulder S, adapted to bear on the outer side of the casing and thus prevent inward movement of the bearing, this reduced portion extending through the casing and through the side-lining plate, as shown. To prevent outward movement of the same, I form a shoulder *h* in the journal, against which the outer end of the bearing abuts. Outward beyond this shoulder *h* the diameter of the bore of the journal is reduced to that of the bore of the bearing; and in this reduced bore of the journal I form an annular groove 1, with which the water-supply pipe K is connected. Inward from this groove there is a longitudinal channel 2, which opens into an annular groove 3 in the outer end of the bearing, this latter groove being connected by a longitudinal channel 4 with a similar annular groove 5 in the bearing, near its inner end. By means of these series of grooves and channels I ob-

tain better lubricating and cleansing effects from the water than heretofore, owing to the increased water-surface presented to the shaft.

It will be observed on reference to the drawings that the bore of the bearing inward from groove 5 is somewhat enlarged, in order to permit the water used in lubrication to pass inward to the face of the piston, this construction being similar to that described in my former patent above alluded to, it being apparent that the packing P, held in place around the shaft by the gland J, will prevent the water from passing outward.

With the bearing constructed as above described, all that is necessary to do in order to remove it from or place it in the pump is to unbolt the journal, slide it outward on the shaft, and lift out or put in the bearing by sections.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a centrifugal pump having a hollow piston, the combination, with a casing having a removable cap-plate and a recessed inlet-extension, of an annular lining surrounding the periphery of the piston, and two lining-plates, one on each side of the annular lining, one of said plates having an integral tubular extension, said tubular extension projecting from each side of the plate, its inner end reaching within the piston and its outer end adapted to fit within the recess in the inlet-extension, the several parts of the lining being held rigidly in place by the cap-plate.

2. In a centrifugal pump, the combination, with the casing provided with a removable lining, and a journal removably secured to the casing and having an interior shoulder, of a sectional bearing having an exterior shoulder adapted to bear on the outer side of the casing, the inner end of said bearing passing through the casing and through the side-lining plate, while the outer end abuts against the shoulder in the journal.

3. In a centrifugal pump, the combination, with the casing provided with a removable lining, a journal removably secured to the casing and having an interior shoulder, an interior annular groove, and a longitudinal channel connecting with said groove and extending to the shoulder, and a water-supply pipe tapped into the journal to connect with the groove therein, of a sectional bearing having an exterior shoulder adapted to bear on the outer side of the casing, an interior annular groove in its outer end, a similar annular groove near its inner end, and a longitudinal channel connecting said grooves, the inner end of said bearing passing through the casing and through the side-lining plate, while the outer end abuts against the shoulder in the journal.

In testimony whereof I affix my signature in presence of two witnesses.

ELI J. HAWLEY.

Witnesses:

THOMAS MOLLOY,  
W. H. ROBERTS.