

F. H. JACKSON.

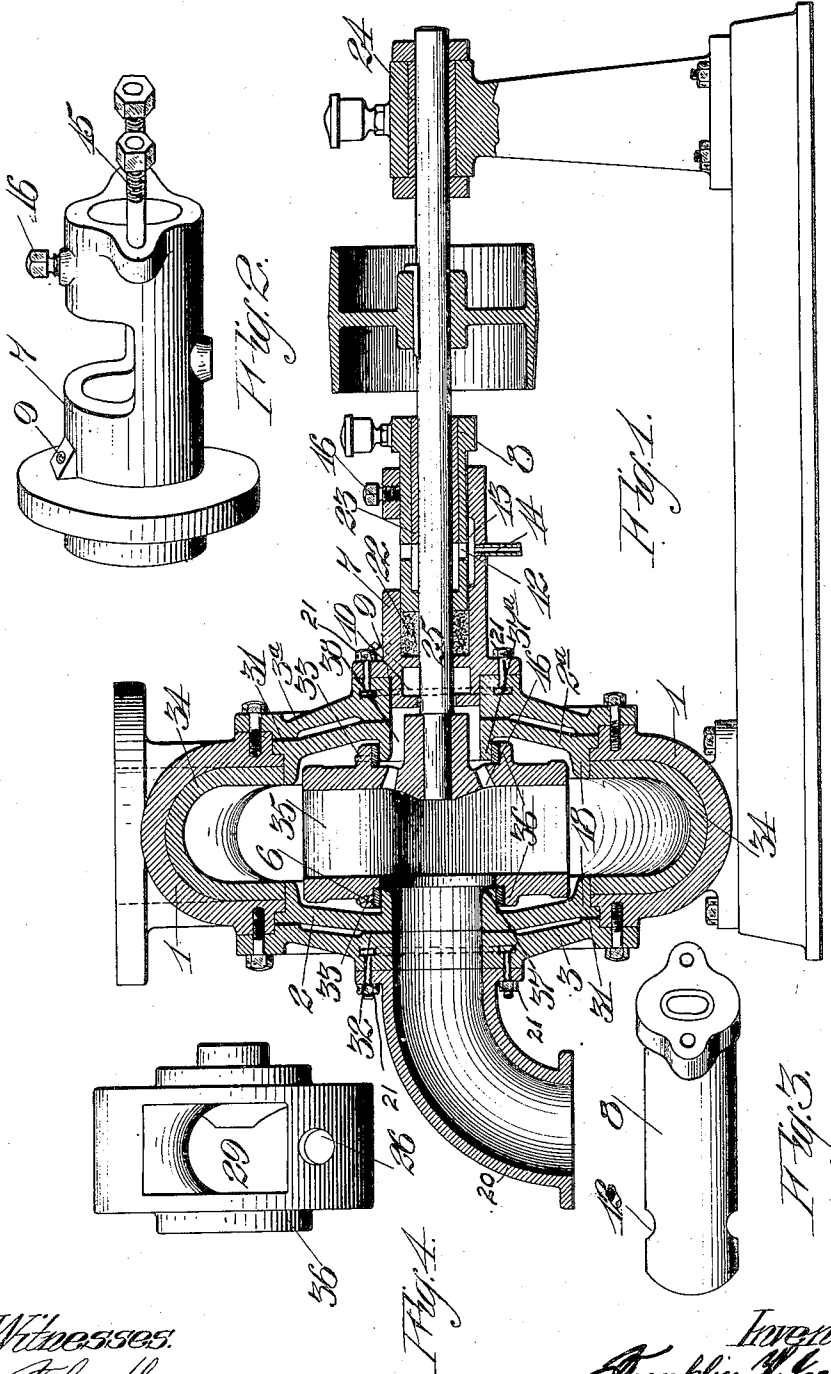
DREDGER PUMP.

APPLICATION FILED MAR. 30, 1908.

Patented Mar. 2, 1909.

2 SHEETS—SHEET 1.

914,283.



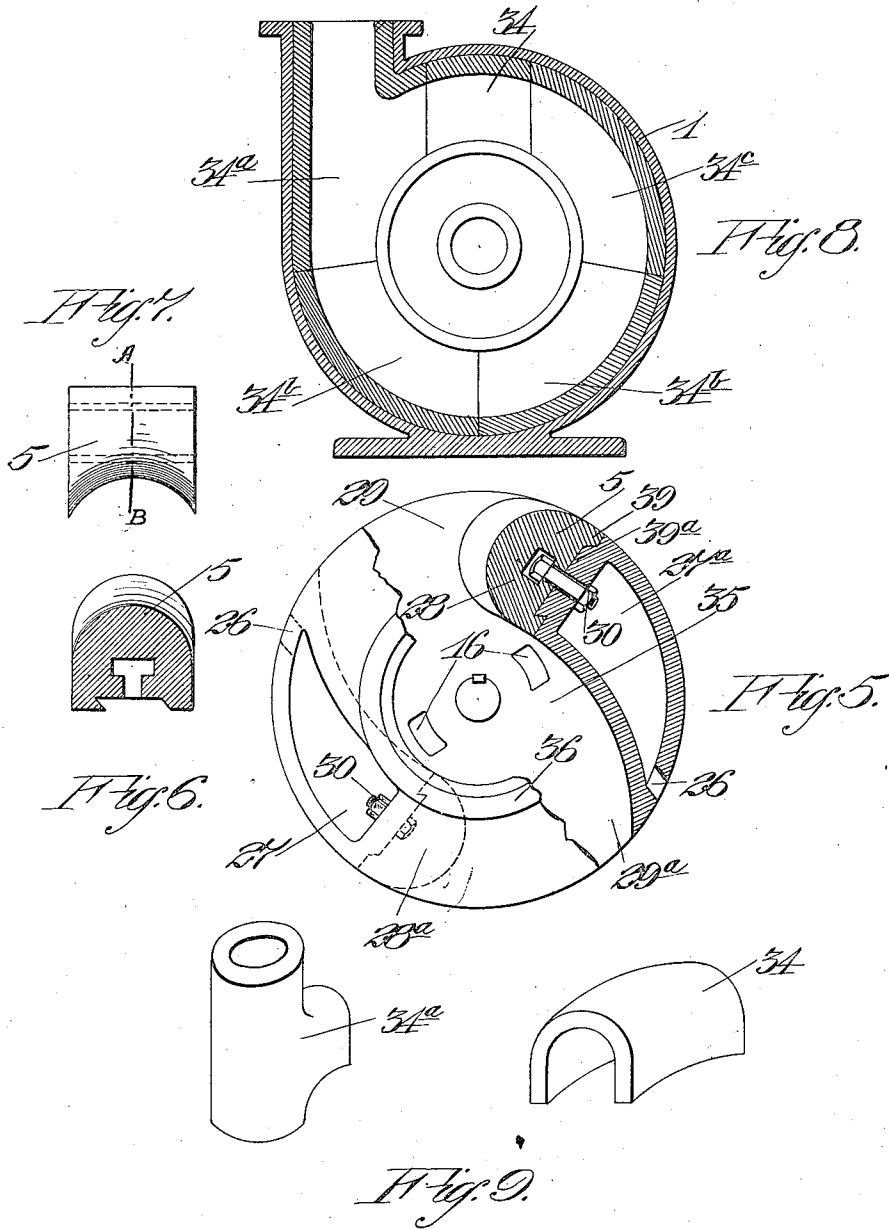
Witnesses:
J. H. Ashberg
Charles A. R. Field

Inventor:
Franklin H. Jackson
by Geo. H. Strong
Att'y.

F. H. JACKSON.
DREDGER PUMP.
APPLICATION FILED MAR. 30, 1908.

Patented Mar. 2, 1909.
2 SHEETS—SHEET 2.

914,283.



Witnesses:
J. H. H. H.
Charles A. H. H.

Inventor:
Franklin H. Jackson
by Geo. H. H. H.
Att'y.

UNITED STATES PATENT OFFICE.

FRANKLIN H. JACKSON, OF WEST BERKELEY, CALIFORNIA, ASSIGNOR TO BYRON JACKSON
IRON WORKS, OF WEST BERKELEY, CALIFORNIA, A CORPORATION OF CALIFORNIA.

DREDGER-PUMP.

No. 914,283.

Specification of Letters Patent.

Patented March 2, 1909.

Application filed March 30, 1908. Serial No. 424,237.

To all whom it may concern:

Be it known that I, FRANKLIN H. JACKSON, a citizen of the United States, residing at West Berkeley, in the county of Alameda and State of California, have invented new and useful Improvements in Dredger-Pumps, of which the following is a specification.

My invention relates to improvements in centrifugal dredging pumps for pumping water containing sand, gravel or other abrasive material, which soon cuts and wears impellers or runners on sides, wearing rings, and shell, to such an extent as to render it unfit for further use, unless some means is provided to protect it against such abrasion and wear.

The object of my present invention is to provide a means whereby the arms of the impeller are so formed that solid bodies will not impinge or strike projecting points of arms, but roll radially or outwardly through ports of impeller when same is in motion.

Another object is to so construct impeller lining blocks that they may be firmly secured without exposed bolt heads, and also held against centrifugal force exerted when pump is in operation.

A further object is to provide side liners which may be of any hard material suitable to resist abrasion, and which may be easily and cheaply renewed. And a further object being to form a boltless lining for pump shells, which may be made of suitable non-abrasive material that can be made in sections and placed in shell and firmly secured without bolts, screws, or wedges.

A further object is to construct an impeller having but two arms or ports so formed that they will not clog with roots, grass or the like; and another object, to so construct a combined water seal packing-box relief chamber and relief ports, bearing and gland, that the same may be firmly secured to the pump side.

Other objects will appear in the following description.

In the drawings—Figure 1 is a transverse longitudinal section of pump embodying my present improvements, the plane of the section corresponding with the axis of the pump suction. Fig. 2 is a perspective view of combined water seal packing box and bearing holder, showing gland studs and opening for packing. Fig. 3 is a perspective view of combined bearing and gland showing

relief ports and stud holes. Fig. 4 is a face view of impeller, showing wearing-blocks 5 in place, and relief ports in rim of impeller. Fig. 5 is a side view of impeller partly in section, showing method of securing wearing-blocks in impeller side openings through which bolts for said lining blocks are secured, relief hole in rim of impeller and balancing ports near hub of impeller to relieve pressure in back balancing chamber. Fig. 6 is a view of a section of lining block at a line drawn through Fig. 7 at A—B. Fig. 7 is a top view of said liner block. Fig. 8 is a side view of shell partly in section, showing shell liners in place. Fig. 9 is a perspective view of shell liners.

The pump comprises essentially a shell 1, preferably made of cast iron, an inner lining 34, made of hard cast iron or steel in sections so that same may be inserted from inside center opening of shell, and held in place by inwardly projecting annular flange 18 cast integral, with hard iron or steel side liners 2 and 2^a; said side liner having inwardly projecting annular flange 37 forming balance ring and guide to runner, and having shaft and suction opening in center. Side liners 2 and 2^a having outwardly projecting flanges at rims which set in counterbores on either side of cast iron shell 1, and are held firmly in place by outside cover plates 3 and 3^a. A rubber or other packing ring, is placed at points 31 and 32, which prevents leakage or circulation between liners 2 and 2^a, and side plates 3 and 3^a.

An impeller 35 mounted on a shaft 25 revoluble in bearings 23 and 24, such impeller having two hollow arms so recessed as to receive wearing blocks 5 in working side of said ports or arms, and thus forming two hollow arms in the form of the letter S, and having outwardly projecting annular flanges 36 on either side, lined on the inside with renewable steel wearing rings 6 secured to said flange with rivets 33, said wearing rings forming a running joint with inner annular projecting flanges 37 and 37^a, cast integral with and part of side liner 2 and 2^a, said impeller having circular opening on one side and outwardly projecting hub on opposite side to receive shaft 25, side wall in back of hub side of impeller continuing to shaft 25; said wall having two ports 16 connecting chamber 38 with ports 29^a and 29 near center of runner, thus relieving said chamber

38 of any pressure that might cause the impeller to have end thrust toward the suction side of pump. Impeller 35 has two openings 27 and 27^a extending entirely through impeller, parallel with axis of same, and forming means of reaching bolts 30, which secure the inner blocks 5 in place; also forming a pumping arm so that any material which may by any means get into said openings 27 and 27^a may be pumped or thrown out through port 26 in rim of impeller when same is in motion. The arms of the impeller are recessed to receive wearing blocks 5, having projecting lugs 39 on the side towards center of impeller, being so formed as to form a lock joint so that when the pump is in operation centrifugal force will tend to hold wearing blocks in place. The runner wearing blocks (Figs. 6 and 7) are so formed that the backs 39 interlock on the lugs 39^a and also contains T slot to receive head of holding bolts. The working face is convex to a line drawn radially from center of runner to circumference of same. The center of the radii are at a point midway between the outer diameter of suction ring and the periphery of said runner or impeller. The working face is also concave to a line at right angles to a line drawn parallel with the shaft 25, so that the working face is similar to a half sheave cut at a line parallel with the shaft or axis of same.

The shell 1, shown partly in section in Fig. 8, has circular openings on each side, and is counterbored to receive said liners 2 and 2^a. The shell liners, which are hard iron or steel, are made in section, as shown in Fig. 9, in which 34^a is the discharge liner, having a portion of the circular liner cast integral with same, one end being cut at an angle to receive key section 34 of liner. 34^b and 34^c are similar; 34^c being so formed that one end matches end of 34^b, and the other end matches key section 34. All of said liners are held in working position by the projecting annular flange 18, which is part of side liner 2 and 2^a.

Bolted to the shaft side of the pump is a combined bearing support 7 consisting of an enlarged annular water-seal chamber 10 with the supply port 9, and packing-box 22, and enlarged annular relief chamber 13 into which is tapped drain pipe 14. Also the combined bearing gland 8, lined part of its length with bearing metal, and in the end of which, nearest the pump, is an annular space larger than the shaft, with end nearest packing chamber contracted nearly to shaft with relief holes 12 opening into annular space 13. Thus, after packing is tightened by means of the studs 15, (shown in perspective Fig. 2) the bearing is held rigidly by the set screw 16, and should any water or gritty material escape from the water seal chamber 10 through the packing 22, either while the

pump is standing or running, instead of going into bearing 23 and washing out the lubricant the water or grit will escape into the annular space, thence through the relief holes 12, space 13 and pipe 14.

The outside cover plates 3 and 3^a have annular slots or channels of dovetail form, made around that portion against which the flanges of the suction pipe 20 and the bearing support 7 abut, and these flanges are secured to those of the cover plates by bolts 21, the heads of which are adjustably held in the annular slots. This allows the connected parts to be turned and adjusted with relation to each other as may be required. Nuts upon the outer ends of the bolts secure the parts together.

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

1. In a centrifugal pump, an outer shell, a sectional lining fitting therein, and removable side liners having annular flanges by which the lining is held in place.

2. In a centrifugal dredging pump, a shell having a counterbored wall, side liners having outwardly projecting flanges at the rim, fitting the counterbored wall of the shell, said liners converging outwardly toward the center, and having inwardly projecting annular flanges contiguous to the center, forming balancing ring and guide tubes for the impeller, and side disks or covers exterior to said liners and bearing thereagainst.

3. In a centrifugal dredging pump, an outer shell, a sectional shell liner, side liners having projecting annular flanges whereby the shell liner is held in place, said liners having outwardly projecting radial flanges fitting in counterbores of the pump shell.

4. In an apparatus of the character described, an outer shell having circular openings on either side counterbored to form inwardly projecting flanges, side liners having outwardly projecting radial flanges fitting the recesses of the shell, and less in thickness than the depth of said recesses, disks or covers fitting over the liners and projecting into the recesses, and packing-rings intervening between the liners and the covers, and means for securing the covers to the side liners.

5. In an apparatus of the character described, a shell having a boltless sectional lining, retaining side liners, means forming a suction inlet at one end of the shell, a bearing at the opposite portion of the shell, a shaft journaled in said bearings, and a second bearing exterior thereto, means for revolving the shaft, an impeller secured to the shaft within the pump shell, an external sleeve fixed upon the shell having an annular chamber larger than the shaft at the end nearest the impeller, with an inlet opening in one side, a packing-box and a wall intervening

between said chamber and said box, said sleeve having an opening on one side for the introduction of packing, a semi-circular space made larger than the stuffing-box, an outlet from said space, the outer end of said sleeve forming a continuous ring to receive and support the sleeve bearing, and means for securing said ring.

6. In a centrifugal pump of the character described, an impeller having hollow arms, wearing blocks fitted thereto, hooked lugs projecting from a line drawn radially from the center of the impeller, said lugs having bolt-holes, and wearing block bolts fitting therein.

7. In a pumping apparatus of the character described an impeller having hollow arms

and projecting lugs, wearing blocks fitted to the impeller having working faces concaved to a line drawn parallel with the axis of the pump, and convex with relation to a line radial thereto, said blocks having recesses or grooves adapted to form a lock-joint with the projecting lugs and hollow arms of the impeller, and holding bolts, said blocks having a T slot in the recess to receive the head of the holding bolts.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FRANKLIN H. JACKSON.

Witnesses:

GEO. H. STRONG,
CHARLES EDELMAN.