No. 778,590. PATENTED DEC. 27, 1904.

C. LAGER.

CENTRIFUGAL DREDGING PUMP.

APPLICATION FILED AUG. 22, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

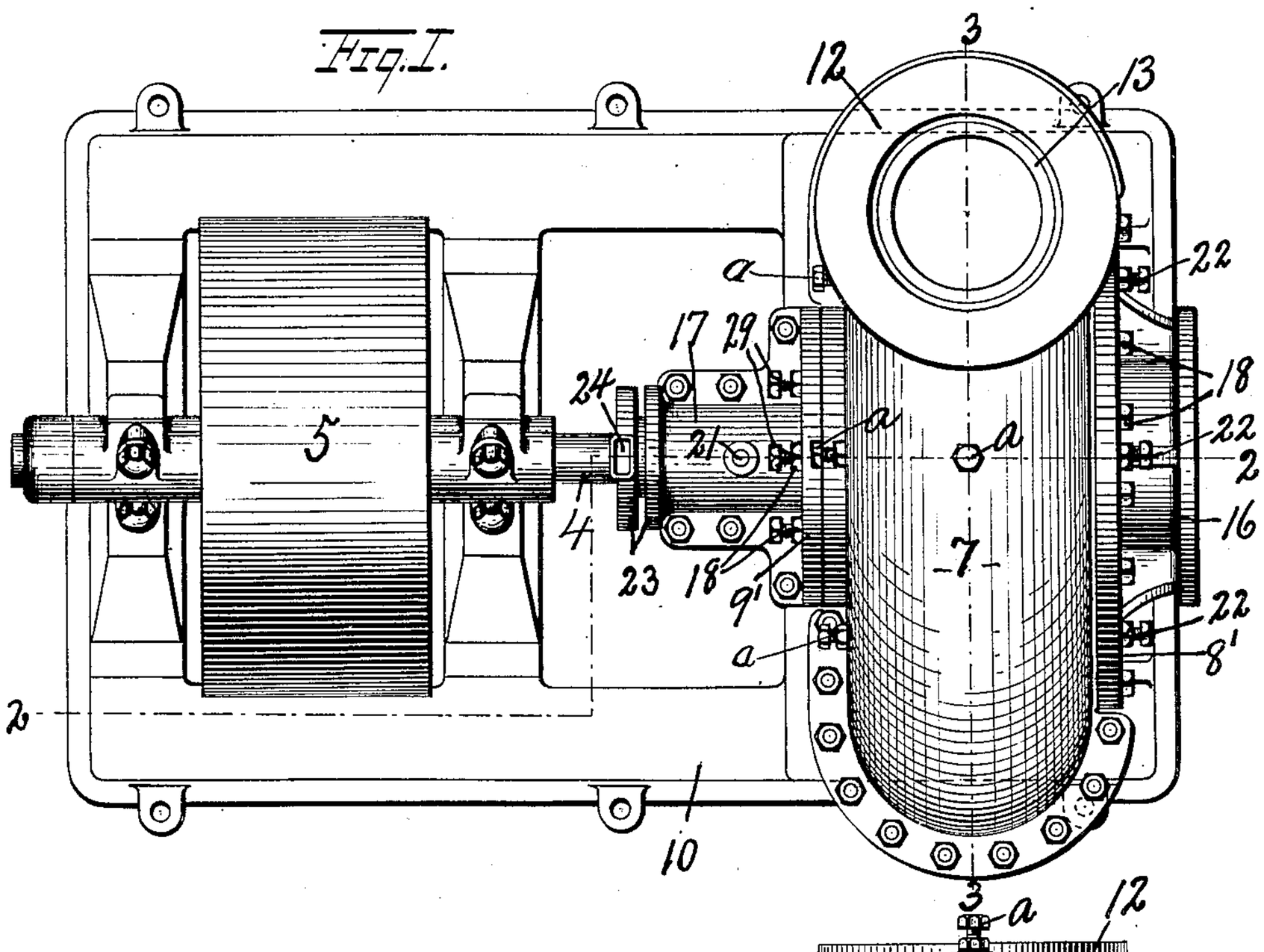
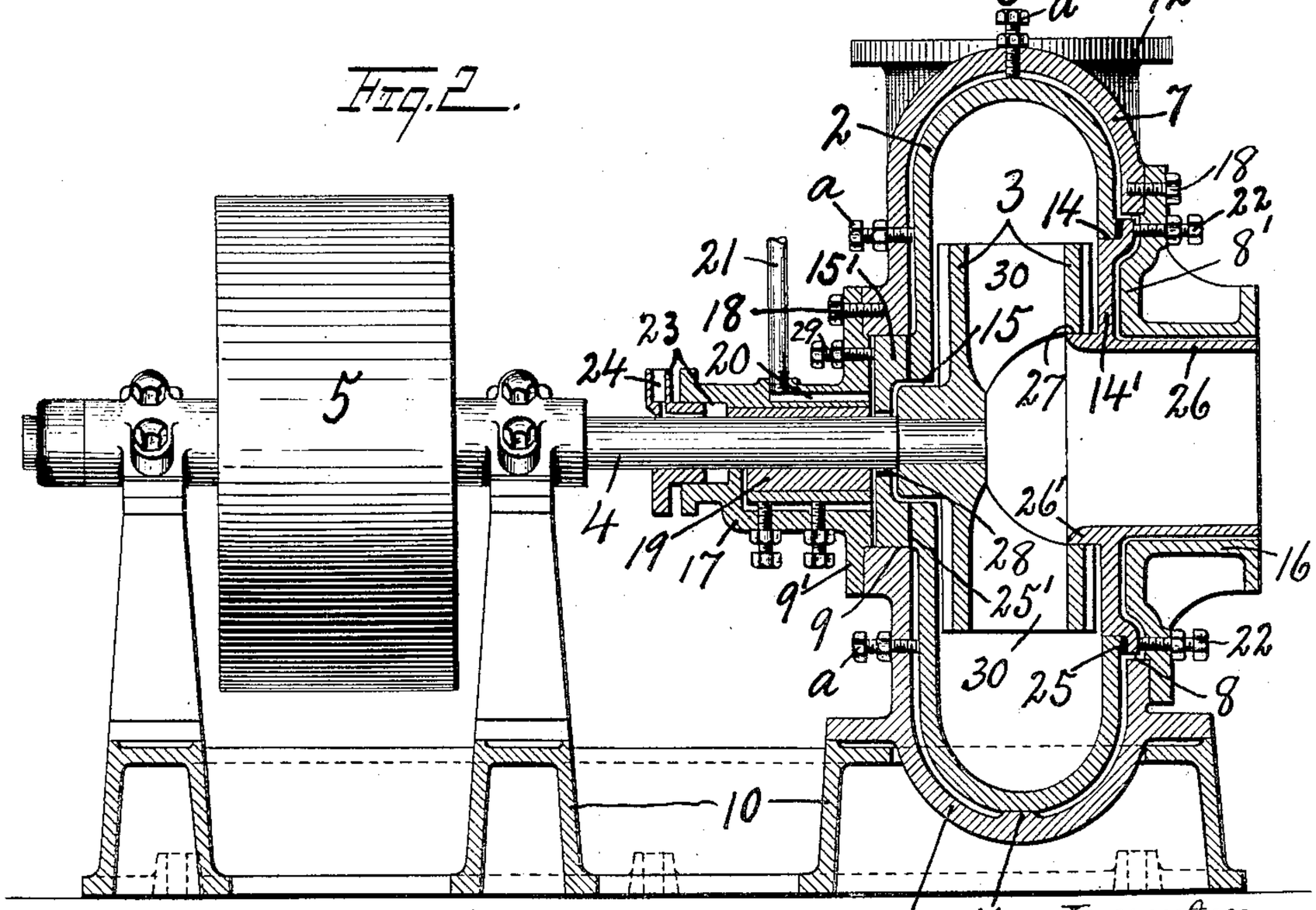


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

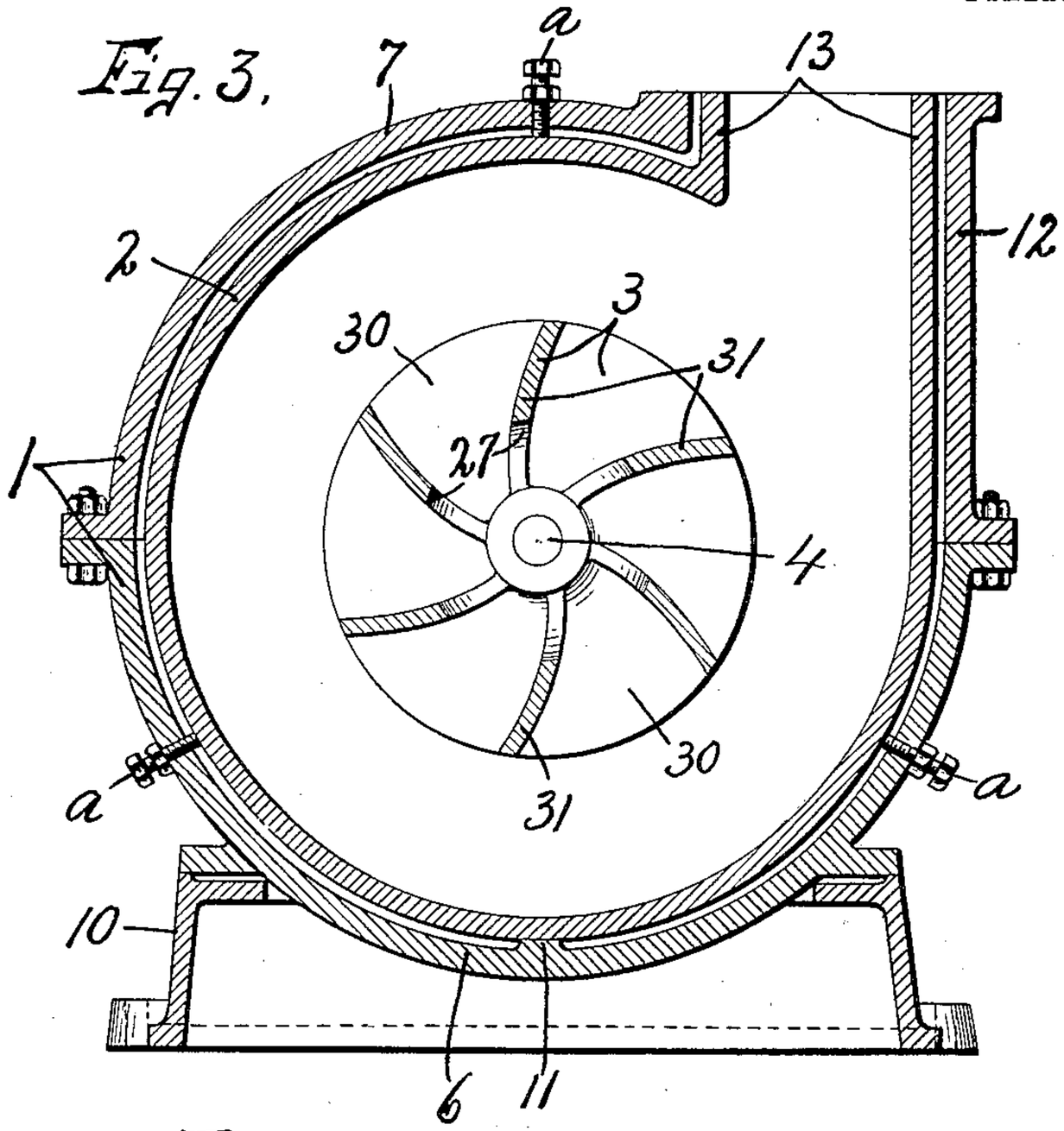
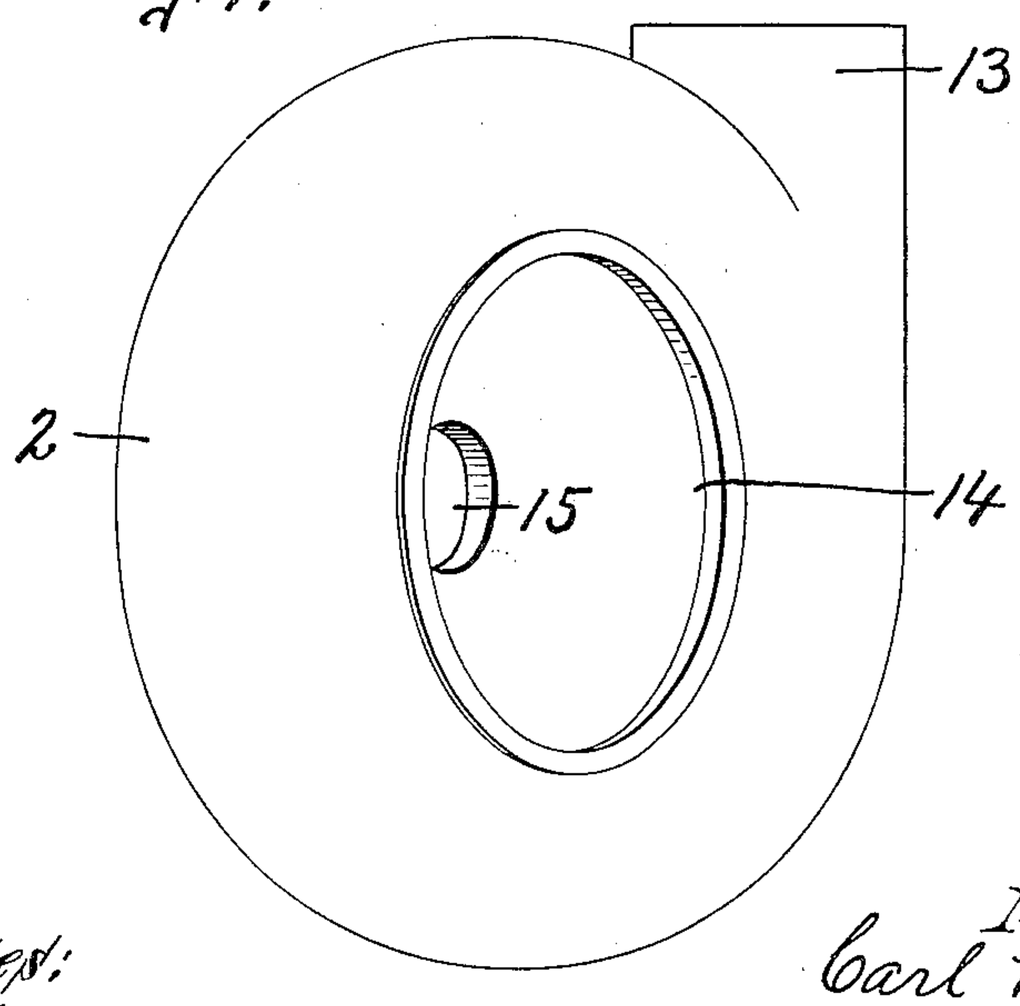


Fig. 4.



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No. 778,590. Patented December 27, 1904.

UNITED STATES PATENT OFFICE.

CARL LAGER, OF BALDWINSVILLE, NEW YORK.

CENTRIFUGAL DREDGING-PUMP.

SPECIFICATION forming part of Letters Patent No. 778,590, dated December 27, 1904.

Application filed August 22, 1904. Serial No. 221,751.

To all whom it may concern:

Be it known that I, CARL LAGER, of Baldwinsville, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Centrifugal Dredging-Pumps, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to improvements in centrifugal dredging-pumps for pumping water containing sand, gravel, and other solid abrasive material, which soon cuts and wears the parts of the pump 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, therefore, of my present invention is to provide the outer pump with removable inner linings of suitable material and to secure this lining in such manner as to prevent the entrance of sand or other solid material into the space between the lining and outer shell and at the same time to enable the lining to be easily and quickly inserted and renewed when necessary.

Another object is to provide means whereby the lining may be properly adjusted or lined up after the parts of the pump have been assembled without necessitating the removal of any such parts.

A further object is to prevent the entrance of sand or other abrasive material into the bearing of the runner-shaft by introducing a jet or stream of pure water into a suitable waterway around the bearing and through an adjustable and removable disk between the bearing and runner, which waterway communicates with the interior of the lining into which the sand-laden water around the bearing is washed or forced, thus preventing the accumulation of sand or other foreign matter in the runner-shaft bearing.

Other objects and uses will appear in the following description.

In the drawings, Figure 1 is a top plan of a centrifugal dredging-pump embodying the various features of my invention. Figs. 2 and 3 are sectional views taken, respectively, on lines 2 2 and 3 3, Fig. 1. Fig. 4 is a perspective view of the detached inner shell or lining.

This pump comprises, essentially, an outer shell 1, an inner shell or lining 2, a pumping-runner 3, and means, as a driving-shaft 4 and pulley 5, for rotating the pumping-runner.

The shell 1 is preferably made of cast-iron and is divided horizontally through its axis to form lower and upper half-sections 6 and 7, each of which is cast separately, with a central semicircular cut-out in each end for forming central circular openings 8 and 9 in the ends of the completed shell, which openings are closed by disks or caps 8′ and 9′. The lower section 6 is mounted in an upright position upon a supporting-base 10, with its open side uppermost to receive and inclose the lower half of the lining 2, while its bottom is formed with an inwardly-projecting rib or boss 11 to support and center the lining in the outer shell during the operation of assembling the parts of the pump. The upper shell-section 7 is formed at one side with an integral discharge-nozzle 12 and has its lower open side secured to the top face of the section 6 to cap over and inclose the upper half of the lining 2.

The inner shell or lining 2 is made in a single casting of steel or other suitable material, with a tangential discharge-nozzle 13 and central end openings 14 and 15, which are alined axially with the openings 8 and 9 in the outer shell and are closed by suitable disks or caps 14′ and 15′ of steel or other suitable material. This lining 2 is similar in form, but is somewhat smaller in its outer dimensions than the interior of the outer shell to permit it to be easily inserted into or removed from the outer shell and adjusted or "lined up" after the parts of the pump are assembled without removing any of such parts. This adjustment or "lining up" is effected by means of adjusting-screws *a*, which are adjustable in threaded apertures arranged at suitable intervals in the sides and periphery of the outer shell-sections 6 and 7, so that the inner ends of the adjusting-screws will engage the adjacent sides

and periphery of the lining to effect a vertical and lateral adjustment of said lining, and thus avoid any friction with the pumping-runner.

The openings 8 and 14 in the inlet ends, respectively, of the outer and inner shells are sufficiently large to permit the pumping-runner to be easily inserted or removed therethrough; but the opening 8 is of greater diameter than the opening 14 in the lining 2, so that a portion of the lining around the opening 14 is exposed in the opening 8 when the disk 8′ is removed. These disks 8′ and 9′ are made of steel, cast-iron, or other suitable material and are formed, respectively, with central tubular hubs 16 and 17 and are secured to the adjacent ends of the outer shell by screws or bolts 18, thereby additionally securing the half-sections 6 and 7 of the outer shell together and forming a strong compact case with a tubular hub at each end. The tubular hub of the disk 8′ is adapted for connection to a suitable suction-pipe (not shown) and is therefore of greater diameter than the hub 17 of the disk 9′. This tubular hub of the disk 9′ receives and supports a suitable bearing 19 for the shaft 4, and in order to prevent the entrance of sand or other abrasive to this bearing the hub 17 is formed with a water-passage 20, having one end communicating with the interior of the runner-chamber in the lining 2 and its other end connected to a pipe 21, through which pure water is introduced under pressure to wash any foreign matter from the bearing 19 into the runner-chamber. The outer end of this tubular hub 17 is closed by a stuffing-box 23, having its follower provided with an oil-inlet 24, which leads directly to the shaft-opening in the bearing 19.

The disk 14′ is fitted in the opening 14 between the disk 8′ and adjacent face of the runner and has a marginal flange which is impinged between the disk 8′ and adjacent face of the lining 2 by means of set-screws 22, which are passed through threaded apertures in the disk 8′, a suitable packing 25 being interposed between the marginal flange of the disk 14′ and adjacent face of the lining 2 to make a practically tight joint and prevent any leakage from the runner-chamber to the space between the lining and outer shell. This disk 14′ is also formed with a tubular hub 26, which projects into the hub of the disk 8′, and has an inwardly-projecting annular flange 26′ extending into the inlet-opening 27 in the adjacent end face of the runner 3 and forming a running fit with the walls of said inlet-opening 27.

The tubular hub 26 forms the suction-pipe through which the sand-laden water is drawn by the runner and extends entirely through and protects the pipe 16 of the disk 14′ against undue abrasion and wear by the inflowing sand and gravel and, together with the remaining part of the disk, constitutes practically a part of the runner-lining 2.

The disk 15′ is also formed of steel or equivalent material and is snugly fitted in the opening 9 around the shaft 3 and between the disk 9′ and adjacent end face of the lining 2 and has a central shaft-opening 28 of greater diameter than the shaft, so as to form a washout-passage which connects the clean-water passage 20 with the interior of the lining 2.

A suitable packing 25′ is interposed between the contiguous faces of the disk 15′ and lining 2, and the disk 15′ is forced endwise against the packing by set-screws 29, which are passed through threaded apertures in the disk 9′ to make a practically tight joint between the disk 15′ and lining 2.

The runner 3 is provided with branch openings 30, leading from the inlet 27 through the periphery of the runner and separated by vanes or partitions 31, while the water, sand, and gravel is expelled through the discharge-nozzle of the pump case and lining.

When it becomes necessary to remove the lining 2, the upper shell-section 7 and end disks 8′ and 14′ are removed after first removing their fastening-bolts, whereupon the runner 3 is withdrawn endwise through the opening 14 in the inlet end of the lining, which lining is then lifted out of the lower shell 6. A new lining is then inserted and the parts reassembled in the reverse order from that described for removing the old lining. The pumping-runner may be removed through the openings 8 and 14 by simply removing the disks 8′ and 14′.

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

1. In a centrifugal dredging-pump, an outer shell composed of sections and an inner lining smaller in its outer dimensions than the interior of the shell and having a limited adjustment in the shell, and means to effect such adjustment from the exterior of the shell.

2. In a centrifugal dredging-pump, a sectional shell and a one-piece lining smaller in its outer dimensions than the interior of the shell and having a limited vertical and lateral adjustment in said shell, and means to effect such adjustment and secure the lining to the shell.

3. In a centrifugal dredging-pump, an outer shell and an inner lining having an opening in each end, in combination with caps or disks joined to the open ends of the lining with interposed packings to form water-tight joints, and means to hold the disks or caps in place.

4. In a centrifugal dredging-pump, an outer shell and an inner lining therefor, in combination with a disk between one end of the shell and adjacent end of the lining, adjusting-screws, in the shell for clamping the disk

against the lining, and a packing in the joint between the disk and lining, said disk having a tubular hub forming the suction-inlet for the pump.

5. In a centrifugal dredging-pump, an outer shell composed of sections and a one-piece lining therefor, in combination with adjusting-screws in the outer shell for engaging and adjusting the lining radially, and additional screws in the outer shell for engaging and adjusting the lining axially.

6. In a centrifugal dredging-pump, the combination with an outer shell composed of sections and an inner shell smaller in its outer dimensions than the interior of the outer shell to leave space for "lining up" the inner shell, and adjusting-screws in the outer shell for adjusting or lining up the inner shell.

7. In a centrifugal dredging-pump the combination with a shell, a pump-runner and its driving-shaft, of a bearing for the shaft, a disk between the bearing and runner and having a central opening receiving the shaft, and a conduit communicating with the interior of the shell to prevent the entrance of sand or other foreign matter into the bearing.

8. In a centrifugal dredging-pump the combination with a shell having a suction-inlet in one end and a bearing at its opposite end, a shaft journaled in said bearing, a pump-runner secured to the shaft and revolving within the shell, a disk secured to the shell between the runner and bearing and having a central opening receiving the shaft, and means for discharging clean water through said central opening and into the interior of the shell.

9. In a centrifugal dredging-pump, an outer shell and an inner lining therefor, in combination with disks between the ends of the shell and adjacent ends of the lining, packings between the disks and lining, and means for clamping the disks and packing to the lining.

10. In a centrifugal dredging-pump, a sectional outer shell and an inner one-piece lining having a limited vertical and lateral adjustment in the shell, and means operable from the exterior of the shell to effect such adjustment.

11. In a centrifugal dredging-pump, an outer shell and an inner lining therefor, both parts having a central opening in each end, a separate disk or cap for each of said openings, the disks for the openings in the lining having a water-tight connection with said lining, and adjusting-screws holding the lining-disks in operative connection with the lining.

12. In a centrifugal dredging-pump, a shell divided horizontally through its axis to form lower and upper sections, a tubular hub secured to each end of the shell, a one-piece lining in the shell, adjusting-screws in the ends and sides of the shell to engage and adjust the lining, a suction-nozzle in one of the hubs and having a water-tight connection with the lining, a runner-shaft journaled within the other hub, a runner in the lining and secured to the shaft, and a clean-water-supply pipe discharging in said other hub and communicating with the interior of the lining.

13. In a centrifugal dredging-pump, a pumping-runner and its driving-shaft, in combination with a hub having a bearing at one end of the runner and provided with a lengthwise water-passage, a shell and a lining therefor inclosing the runner, and a disk having water-tight connection with the lining and provided with a water-passage connecting the former passage with the interior of the lining.

14. In a centrifugal dredging-pump, an outer shell and an inner one-piece lining therefor, in combination with a pumping-runner in the lining having an inlet in one end, and having a water-tight connection with the lining and provided with a suction-inlet and a flange fitting in the inlet of the runner.

15. In a centrifugal dredging-pump the combination with an outer shell having an opening in one end and a shaft-bearing in its opposite end, a cap for said opening secured to the shell and provided with a central tubular hub, a lining in the shell having central openings in its opposite ends, a shaft journaled in said bearing and projecting through the opening in the adjacent end of the lining, a second disk or cap in the opposite end of the lining and secured to said lining, said disk or cap having a tubular hub projecting into the hub of the former disk or cap and also formed with an inwardly-projecting annular flange, and a pump-runner secured to the shaft and having a portion thereof surrounding the annular flange.

In witness whereof I have hereunto set my hand this 12th day of August, 1904.

CARL LAGER.

Witnesses:
R. C. SCOTT,
L. L. HOFMANN.