A. B. WOOD.

CENTRIFUGAL PUMP.

APPLICATION FILED SEPT. 10, 1915.

1,182,439. Patented May 9, 1916.

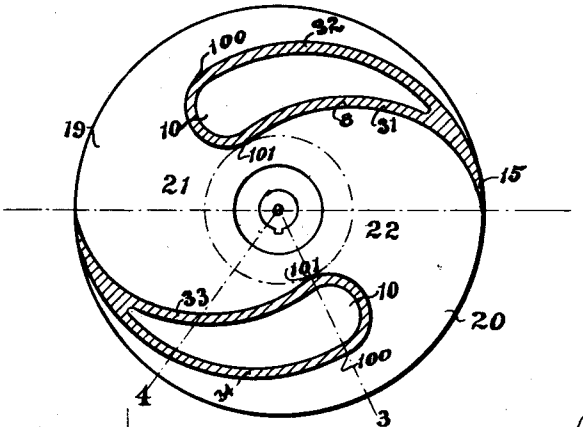

Fig 2

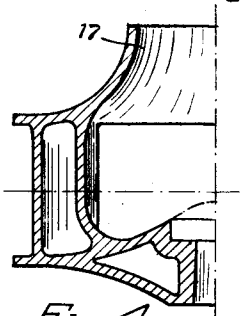

Fig 4

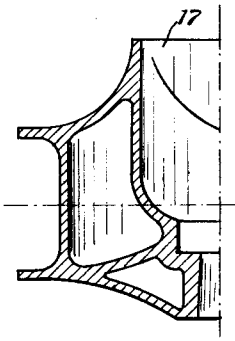

Fig 3

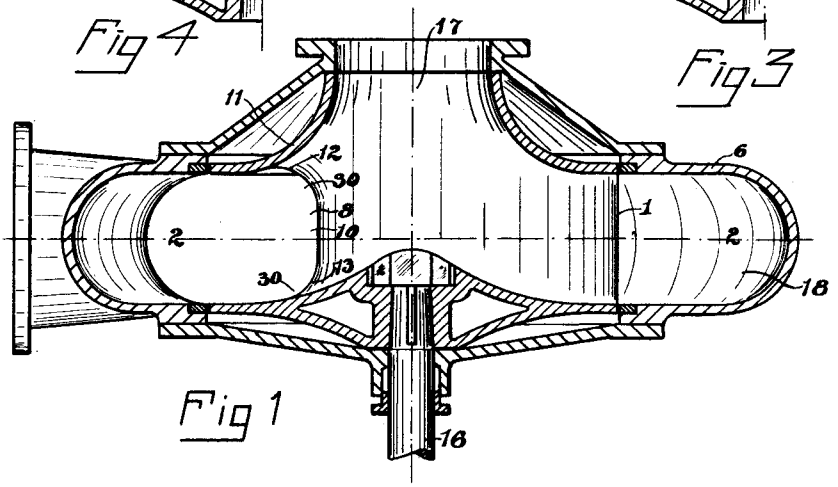

Fig 1

INVENTOR.

Albert B. Wood

BY O'Reilly

His ATTORNEYS.

UNITED STATES PATENT OFFICE.

ALBERT B. WOOD, OF NEW ORLEANS, LOUISIANA.

CENTRIFUGAL PUMP.

1,182,439. Specification of Letters Patent. Patented May 9, 1916.

Application filed September 10, 1915. Serial No. 49,847.

To all whom it may concern:

Be it known that I, ALBERT B. WOOD, a citizen of the United States, residing at New Orleans, in the parish of Orleans and State of Louisiana, have invented certain new and useful Improvements in Centrifugal Pumps; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in centrifugal pumps. Such pumps are frequently employed for pumping water containing foreign substances, such as drainage water, which frequently contains roots, grass, rags, paper and other trash of this nature, as well as blocks of wood or other solid substances of considerable volume. Such pumps may also be used for pumping dredge water, which may sometimes contain stones of considerable size. These objects frequently lodge in the pump, sometimes placing it out of service entirely, and at least greatly reducing its efficiency. Indeed, sometimes the nature of the foreign substances lodging in the pump may be such as to cause its injury or destruction.

Another object of my invention is to provide a pump of this nature which can accomplish the foregoing objects, and which is provided with vanes taking up little or none of the circumference of the impeller, thereby enabling me to discharge the water uniformly over the entire periphery of the impeller, thereby avoiding the creation of eddies in the volute and the consequent loss of efficiency.

These and other objects of my invention will probably be better understood from a description of an embodiment of the invention.

Figure 1 is a section through the impeller about which I have illustrated a volute. Fig. 2 is a section through the impeller at right angles to the section shown in Fig. 1. Figs. 3 and 4 are sections along the lines O^3, O^4 of Fig. 2.

Referring now to the embodiment illustrated in the drawing, at 6 is shown the volute or casing which surrounds the impeller 7. The impeller is provided with a plurality of vanes, shown at 8 and 9. The forward ends 10 of these vanes are rounded to eliminate all sharp points and edges upon which trash might catch. The curvature of the ends should be such as would tend to oust any such trash as rags or papers which engage the ends of the vanes. In the form shown, I have illustrated the surfaces as uniformly rounded from the foremost element to points, here shown at 100 and 101, where the vanes begin to take the curvature for the purpose of impelling the water. I have here illustrated the vanes as being provided with forward ends, semi-elliptical in cross-section, though, of course, the curvature of the surfaces may be varied without departing from the spirit of my invention. The edges 30 of the vanes are also curved, or convexly rounded where they meet the main walls 11 of the impeller, as shown at 12 and 13. This formation will prevent the lodging of trash between the vanes and the walls of the impeller. These two curvatures meeting on the corners of the fronts of the vanes will give the corners a rounded or substantially rounded curvature. While making these surfaces curved tends to prevent the accumulation of trash in the pump, such accumulation is effectively prevented by giving a convex curvature to the surfaces as they engage the water, and thereby utilizing the force of the water to remove the trash from the impeller. This will be appreciated when it is considered that were trash to strike any point of the front of the vanes or any point along the connection between the vanes and the impeller, the water rushing over such curved surface toward the rear would immediately carry such trash on through the pump.

The vanes are given a curvature suitable for the purpose of impelling the water, together with the foreign substances therein contained through the pump, and of transmitting thereto force applied to the pump, thereby increasing the velocity of the water. The vanes extend from the point 10 to the point 15 upon the circumference of the impeller, as will be seen, taking up but little surface thereon, and thereby permitting water to flow in considerable volume down both sides of the vanes, washing the trash away. A shaft 16 is provided, through which the impeller is driven by any suitable source of power, such as an engine, motor or the like. The fluid enters the impeller at 17 and is caught by the vanes, which increase its velocity and force it into the chamber 18 in the volute through the passages 19 and 20. In order to prevent any solid object

which enters the impeller at 17 lodging therein, I make the width of the passages 21 and 22 as great or greater than the width of the entrance 17, the rounded ends of the vanes striking such object and rolling it on into these passages, whence the water sweeps it into the volute and outward.

The vanes, as will be seen at 15, take up but little of the periphery of the impeller, thereby enabling the pump to discharge the water uniformly over the entire periphery of the impeller. Consequently, no eddies or shocks are caused in the volutes with consequent loss of efficiency of the pump.

I have illustrated the embodiment shown in the drawing and its details for the purpose of better explaining my invention. I do not wish to be limited to such embodiment and details, as many departures may be made therefrom without departing from the spirit of the invention.

I claim:—

1. In an impeller for centrifugal pumps, the combination of one or two impeller walls, a plurality of vanes having forward ends convexly rounded on all sides, said vanes extending curvilineally from such forward ends to the periphery of the propeller and being lessened in cross-section as they approach such periphery, where their rear ends occupy but little of the periphery, permitting a uniform or substantially uniform discharge of water from the impeller, such vanes being supported from one or both of said walls.

2. In an impeller for centrifugal pumps, the combination of vane supporting walls, a plurality of vanes having forward ends convexly rounded on all sides, the forward ends being substantially semi-elliptical on cross-sections taken parallel to the main impeller walls, the forward ends of the vanes being positioned between the center and periphery of the impeller, such vanes extending curvilineally from the forward ends in gradually decreasing cross-sectional areas to the periphery of the impeller, where the rear ends of the vanes occupy but little of the periphery of the impeller, permitting free and uniform discharge of water from the impeller.

3. In an impeller for centrifugal pumps, the combination of a pair of circular vane supporting walls substantially parallel to each other and spaced apart, one of said walls being provided with an opening through which water flows into the impeller, means for rotating said impeller connected to the other walls, a plurality of vanes connecting said walls, no part of any vane being nearer any part of any other vane than the length of the diameter of said opening, said vanes being provided with forward ends convexly rounded on all sides, said forward ends being positioned between the center and periphery of said walls and said vanes extending curvilineally from their forward ends to the periphery of the walls, where they are narrowed down to occupy but little of such periphery, permitting a uniform discharge of water from the impeller.

4. In a centrifugal pump impeller, the combination of vanes provided with forward ends which are rounded on a considerable radius and with rear ends occupying but little of the periphery of the impeller.

5. In a centrifugal pump impeller, the combination of a support, vanes on said support provided with forward ends convexly rounded on all sides and with narrow rear ends on the periphery of the impeller occupying but little of such periphery.

6. In a centrifugal pump impeller, the combination of a pair of circular vane supporting walls and a plurality of vanes supported between said walls, the forward ends of the vanes being convexly curved where they join said walls.

7. In a centrifugal pump, the combination of a pair of substantially circular vane supporting disks and a plurality of vanes between said disks, the forward ends of said vanes having a substantially semi-elliptical shaped front perpendicular to the planes of the disks and convexly rounded where the front ends of the vanes join the disks.

8. In an impeller for centrifugal pumps, the combination of a pair of substantially disk-shaped vane supporting walls, one of said walls being provided with an opening for the ingress of water, a plurality of vanes mounted between said walls providing a path through the impeller which will allow a sphere of the diameter of the inlet to pass entirely through the impeller, said vanes being large at the forward end and extending in gradually reducing cross-sectional area to the peripheries of said walls.

9. In an impeller for centrifugal pumps, the combination of a pair of substantially disk-shaped vane supporting walls, one of said walls being provided with an opening for the ingress of water, a plurality of vanes mounted between said walls, providing a path through the impeller which will allow the passage of a sphere of the diameter of said opening, said vanes being convexly rounded at the forward ends and extending to the peripheries of the disks.

In witness whereof, I have hereunto signed my name this 2nd day of September, 1915.

A. B. WOOD.