W. D. Andrews,

Centrifugal Pump,

No. 4,418. Patented Mar. 14, 1846.

Fig. 3.

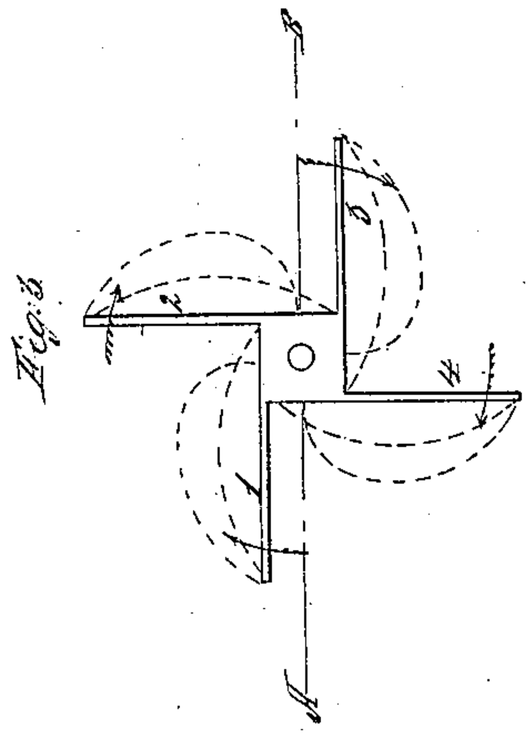


Fig. 6.

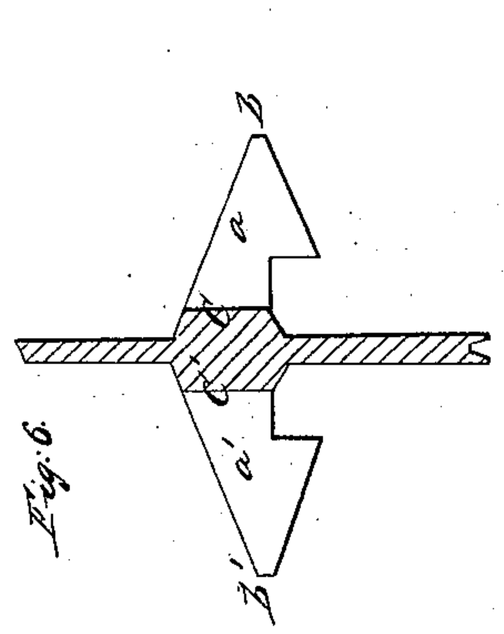


Fig. 2.

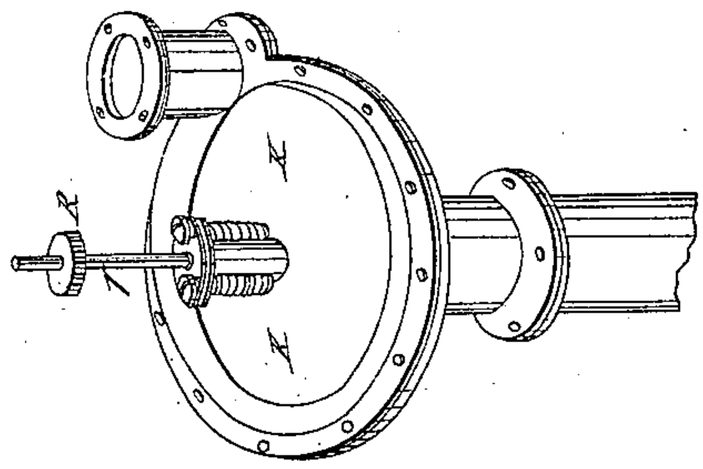


Fig. 5.

Fig. 7.

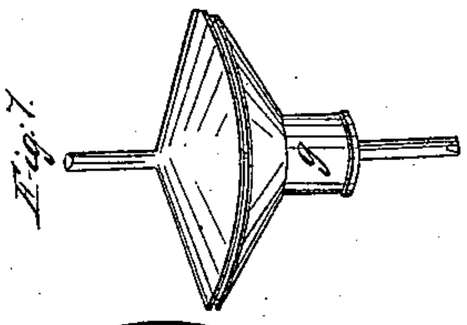


Fig. 4.

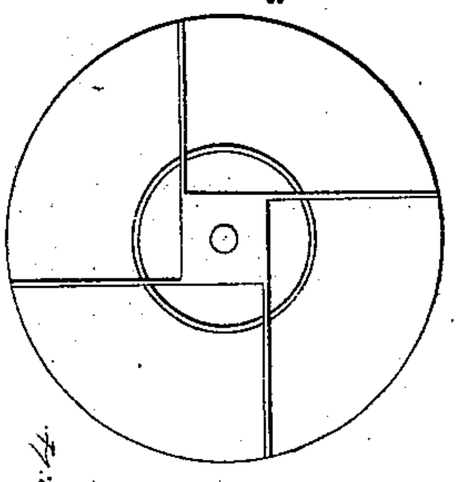
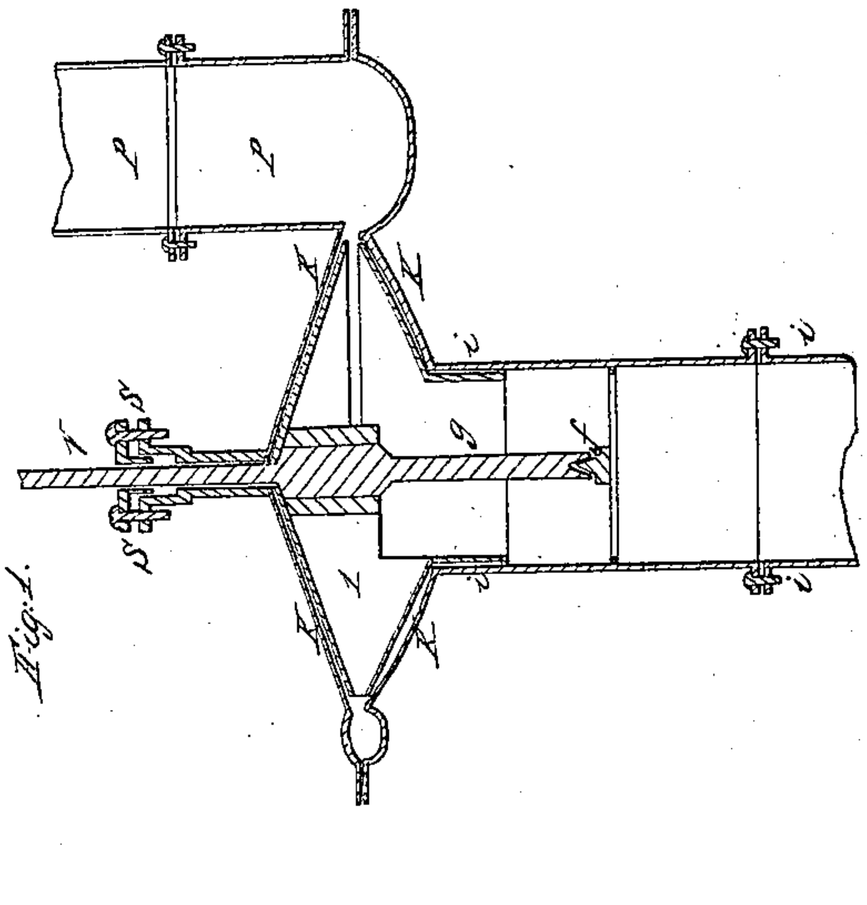


Fig. 1.



UNITED STATES PATENT OFFICE.

WM. D. ANDREUS, OF NEW YORK, N. Y.

CENTRIFUGAL PUMP.

Specification of Letters Patent No. 4,418, dated March 14, 1846.

To all whom it may concern:

Be it known that I, WILLIAM D. ANDREUS, of New York, N. Y., have invented an Improved Centrifugal Pump, and that the following is a full and exact description of the same, reference being had to the annexed drawings, which make a part of this specification.

My improvements are the results of experience in discharging water from wrecked vessels in which sand, gravel, and other matters mingle with the fluid pumped up. For this purpose I have found the centrifugal pump as modified by me more efficient throwing up more water and sand, less liable to derangement and consuming less power in friction than cylindrical and piston pumps. But I do not intend to confine it to this or any particular application. It is well known that revolving parts of centrifugal pumps are sometimes tubes, and sometimes vanes or arms working within a fixed case with which the suction and forcing pipes communicate. In my pump I use vanes and I inclose them within and connect them to an additional case which revolves with them within the exterior or stationary case.

The accompanying drawings exhibit the various parts essential to explain my improvements.

Figure 3 is a plan of the vanes or arms four in number, marked, 1, 2, 3, 4 at right angles to each other not radiating from the center, but proceeding from the corners of a square enlargement of the axis or shaft as represented. Sometimes I have the vanes as shown by the dotted lines but generally I make them straight. The arrows show the direction in which they turn when at work.

Fig. 6 is a view of the shaft and of two of the vanes a', a, secured to it. They are of a tapered form increasing in depth as they approach the shaft. Their lower edges extend below the square enlargement of the latter and each has a portion removed with the view of enlarging the passage way of the water rising out of the suction pipe into the compartments formed by the vanes. The case inclosing these vanes consists of two hollow cones whose bases approach but do not touch each other, being kept at a distance apart equal to the depth of the small ends of the vanes marked b', b, Fig. 6. The depth of the vanes at b', b, and consequently of the space left between the peripheries of their conical covers through which the water is thrown out by centrifugal force is to be proportioned to their depth at c', c, where they unite with the shaft, that when the pump is at work there may be a sufficient volume of water within the revolving case to keep the circular space for its exit fully supplied and by keeping a greater body of water revolving, increase the centrifugal force, enabling me to raise water to a greater height with a given number of revolutions, thereby saving loss of power from friction.

Fig. 7 is a view on a reduced scale of the revolving case inclosing the vanes. The lower end of the shaft is hollowed and supported upon a pointed pivot fixed on a cross bar within the suction pipe, and shown at f, Figs. 1 and 5. Fig. 4 is a plan of the lower half of the revolving case, showing the square enlargement of the shaft and the interior of the short pipe g, in Fig. 7. The shaft, vanes, conical covers or case and the short pipe g, as shown at Fig. 7 are permanently connected and may be cast in one piece. The upper and under edges of the vanes being made air tight to the case; there is no opening in the upper cover and none in the lower one except where the pipe g, communicates with it. The portions removed from the vanes as shown at Fig. 6 do not extend beyond the bore of the pipe g, Fig. 7.

Fig. 1 is a section of the exterior case marked K, K, K, K, with its discharging pipe P, P, and suction pipe l, l, l, l. It is similarly formed as the inner one and of such dimensions as just to allow the latter to turn within it without touching.

S, S, is a stuffing box through which the upper part of the shaft V, is passed and within which it turns while the lower end is supported on the pivot at f. The same figure represents a section of the revolving case through the dotted line A, B, Fig. 3, and consequently exhibits only the vane marked 1, in the last named figure. The short cylindrical pipe g, turns readily in the suction pipe l, l, l, l, but a slight fillet or ring is cast on the end at g, and made to work air tight or nearly so against the

interior of *l*, *l*, *l*, *l*, thereby preventing a loss of power by the return of water between the two cases. By this arrangement the rubbing surfaces of the pump are confined to this joint and the stuffing box and pivot on which the shaft turns. The water as thrown from the periphery of the inner case is received into a spiral channel formed in the outer one. This channel is enlarged as it approaches the discharging orifice as at Fig. 5 which represents a plan of the lower half of the case K, K, K, K, and by keeping the fluid moving with the same velocity in all its parts prevents loss of power by friction. When the pump is required to elevate water above itself the pipe P, P, is to be connected to the discharging orifice to conduct the water to the place of delivery.

Fig. 2, is a perspective view of the pump showing the upper half of the exterior case connected by a flange and bolts to the lower half. The requisite velocity is communicated to the revolving case by means of a pinion secured in the shaft as at R.

What I claim as my invention and desire to secure by Letters Patent is—

The combination of the following parts as applicable to the raising of water and other fluids either alone or with an admixture of sand, gravel, or other substances: 1st, the vanes either straight and placed at right angles to each other, not radiating but proceeding from the corners of an enlargement, increasing in depth as they approach the shaft or curved, proceeding from the center and increasing in depth as they approach the shaft; 2d, the hollow cones inclosing the vanes and revolving with them; 3d, the joint formed by the fillet attached to the short pipe connected with the lower half of the revolving case, working within the stationary pipe attached to the outer case; 4th, the spiral passage of discharge constantly enlarging toward its exit.

WILLIAM D. ANDREUS.

Witnesses:
HENRY J. HALL,
WM. J. HALL.