(No Model.)

J. M. ANCIRA.

CENTRIFUGAL PUMP.

No. 342,723. Patented May 25, 1886.

Fig. 1.

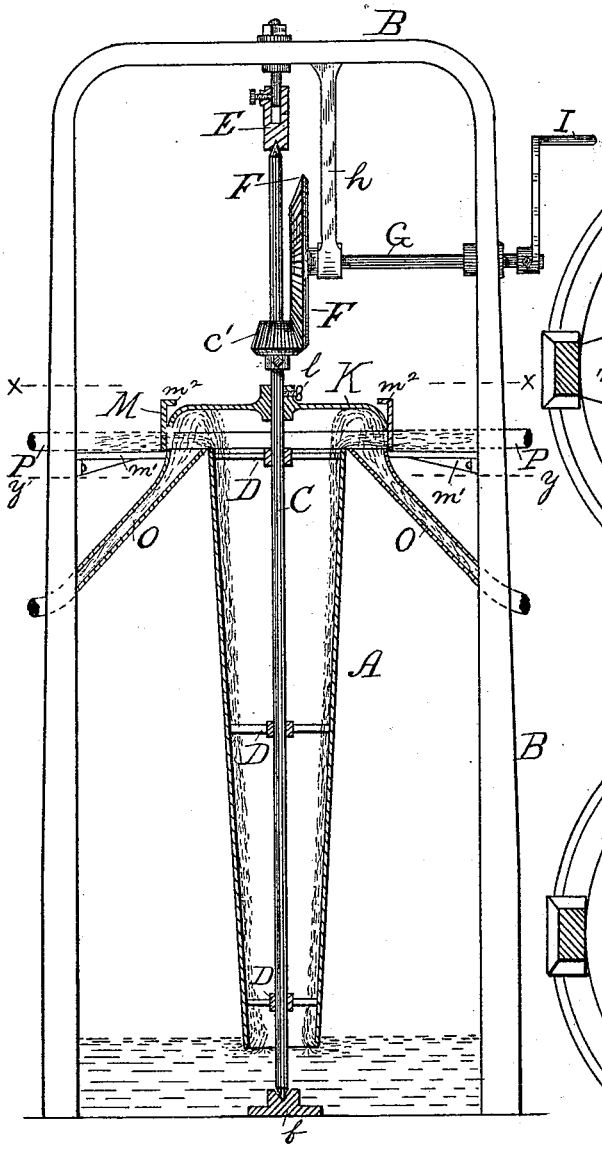


Fig. 2.

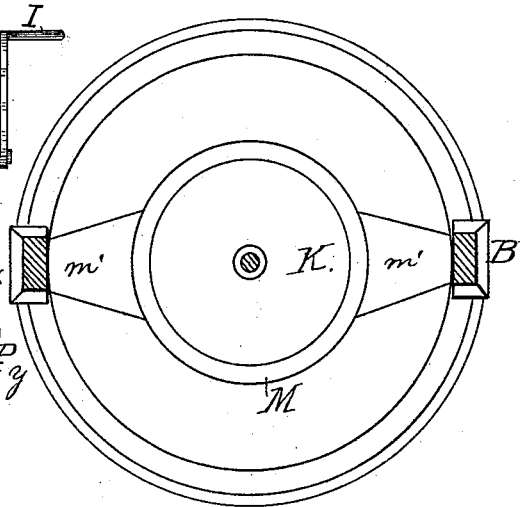
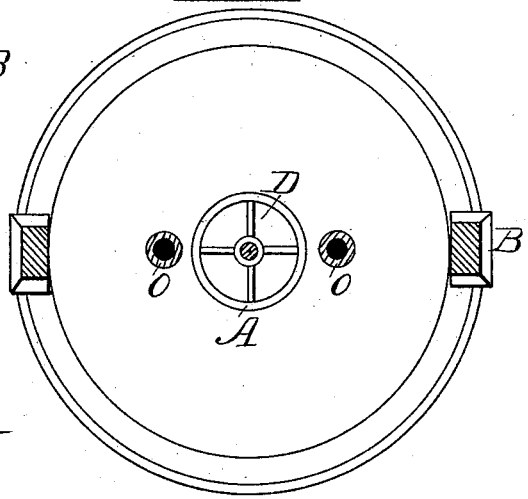


Fig. 3.



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UNITED STATES PATENT OFFICE.

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CENTRIFUGAL PUMP.

SPECIFICATION forming part of Letters Patent No. 342,723, dated May 25, 1886.

Application filed November 3, 1885. Serial No. 181,781. (No model.)

To all whom it may concern:

Be it known that I, JOSÉ MARTINEZ ANCIRA, a citizen of Mexico, residing at Monterey, Mexico, 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 centrifugal pumps; and it consists, mainly, in a rotating tube or body, the diameter of which gradually increases from the bottom to the top, in combination with a central rotating shaft carrying the tube, and without blades or flanges, whereby by the rotation of the shaft and tube alone the water or other material to be lifted and discharged is carried by centrifugal action up the diverging walls of the tube to the discharge-opening. In addition to this, it also consists of special means for deflecting, receiving, and carrying away the liquid or other material thus elevated.

My improvements are illustrated in the accompanying drawings, in which Figure 1 is a view in elevation of the apparatus, partly in section; Fig. 2, a top view on line *x x* of Fig. 1, and Fig. 3 a similar view on line *y y*.

In the drawings, A is the tube, placed within a frame-work, B, which, as shown, is nearly in the form of a reversed cone with apex removed, it being necessary to my invention that the walls of the tube should gradually diverge from the induction-point to the discharge-opening. This tube is secured to a central vertical rotating shaft, C, by the arms of spider-supports D. The shaft C at its lower end extends through the tube A, and is journaled in the block *b*. The upper end of the shaft extends above the tube, and is journaled in an adjustable and removable block, E, secured to a short rod extending down from the frame. The shaft C is rotated by means of a pinion, *c'*, fixed on the shaft above the tube and engaging with a bevel-wheel, F, mounted on shaft G, journaled in hanger *h* and frame B. The shaft C is provided with a crank, I.

K is a deflecting cap or hood fixed to and adjustable upon the rotating shaft above the tube and below the pinion *c'* by means of a set-screw, *l*. The deflector is thus made independent of the tube and adjustable on the shaft for the purpose of regulating its position in view of the different velocities of the upflowing stream. If it were a fixed cover on the tube, the liquid, when carried up with great velocity, might be thrown back upon itself sufficiently to embarrass the free working of the apparatus.

M is a receiving-trough surrounding the top of the tube and extending below and around the deflector K. It is secured to the frame-work by means of arms M', and is provided with a flange, m^2, which extends over a slight distance the edge of the deflector K.

O are pipes leading down and outwardly from the trough for conducting the discharged material away, and the trough may also be provided with horizontal pipes P for the same purpose.

To operate the apparatus, the lower ends of the tube and shaft are submerged in the water or material to be raised. Power being applied to the shaft through the crank I and gearing F and *c'*, the shaft and the tube are rotated at a suitable speed, which gives to the liquid a centrifugal action, causing it to rise quickly up the inclined walls of the tube and be discharged into the trough M. If operated with considerable velocity, the liquid will be thrown against and toward the outer part of the cap K, and then be deflected by the sloping sides of the cap into the trough and out of the pipes O. Where the velocity is less in degree, the liquid may not be thrown against the cap, but at the same time be carried with sufficient force in an outward direction over the lower outlets to discharge it horizontally out of the side pipes, P. At a still less velocity the liquid will simply flow into the trough and out of the lower pipes. It is evident, however, that one or both sets of these pipes may be dispensed with and other means of discharge employed.

The course followed by the water up the tube and out of the pipes, as thus described, is indicated in Fig. 1 of the drawings.

It has been customary to call the usual forms of pumps of the class having the shaft provided with blades or vanes "centrifugal," as if the effects produced thereby were due to centrifugal force alone, whereas such pumps

operate on the principle of the Archimedean screw, and the liquid is raised by successive lifts.

In my apparatus the liquid is raised entirely by centrifugal force, there being no blades, vanes, or flanges employed; and by my form of a conical tube the dispensing of all such lifting means is made possible by giving to the centrifugal force its natural and most efficient action.

My invention is based entirely upon the centrifugal principle, and I not only avail myself of the tendency of the material operated upon to fly off in a tangent from the axis of motion, but increase the effect of that motion by forming the walls of the tube into a proper tangential path, so that resistance is reduced to the minimum and a uniform accelerated velocity of the liquid is obtained.

The results are, as I have demonstrated practically, that my improved pump can be operated by a greatly smaller force than is necessary in so-called "centrifugal pumps" heretofore known, and that instead of being confined to low lifts and the raising of the material to moderate heights only, my apparatus can be used with ease to carry water and other liquid material to any height. In some cases, when it is desired to carry the liquid to a considerable height or to economize space, the tapering tube may be placed within or attached to the bottom of a long pipe or casing, and this without changing the nature of my invention.

The object of the flange m^2 on the trough above the deflecting-cap is to throw back any water that may escape upward around the edge of the cap.

I am aware of the cylinder pump without flanges of Christensen, as set forth in his Patent No. 288,409, and also of the conoid pump of Richardson, as set forth in his Patent No. 289,559.

Having thus described my invention, what I claim is—

A centrifugal pump comprising, in combination with a suitable frame, a rotating tube, the diameter of which gradually increases from the bottom to the top, a central rotating shaft to which said tube is secured, suitable means of rotation, the independent adjustable deflecting dome or cap, the trough at the top of the tube, surrounding said cap, and suitable discharge-pipes leading from said trough, substantially as described.

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

JOSÉ MARTINEZ ANCIRA.

Witnesses:
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