(No Model.)

D. L. KELLY.

ROTARY PUMP.

No. 314,851. Patented Mar. 31, 1885.

Fig. 1.

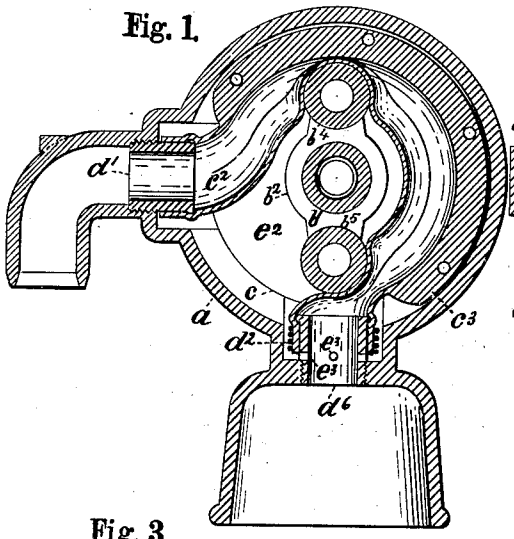


Fig. 2.

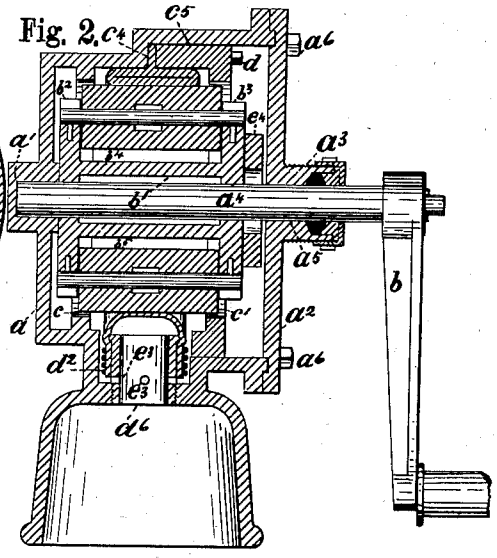


Fig. 3.

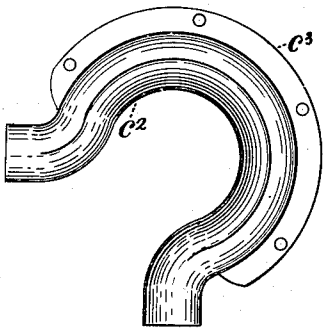


Fig. 4.

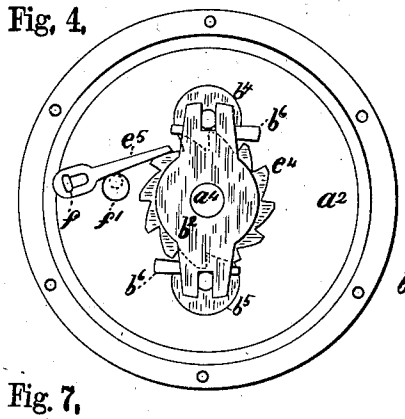


Fig. 5.

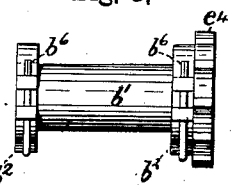


Fig. 6.

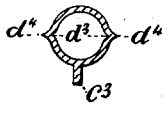


Fig. 7.

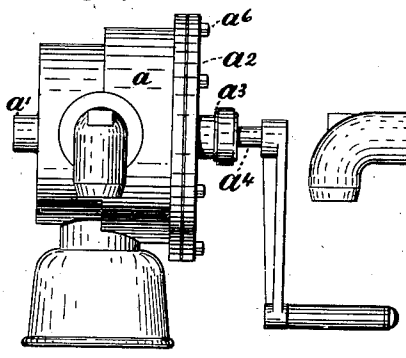


Fig. 8.

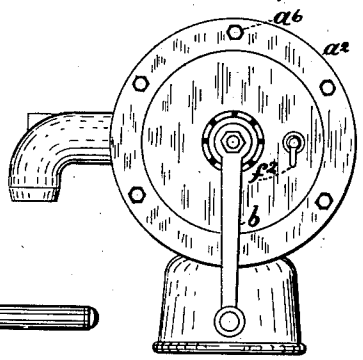
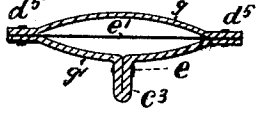


Fig. 9.



Witnesses.

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ROTARY PUMP.

SPECIFICATION forming part of Letters Patent No. 314,851, dated March 31, 1885.

Application filed January 5, 1885. (No model.)

To all whom it may concern:

Be it known that I, DAVID L. KELLY, a subject of the Queen of Great Britain, residing in Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Rotary Pumps, of which the following is a specification.

My invention relates to that class of pumps where a flexible tube is used for drawing and forcing the water or other fluid, and to certain details of construction, all of which will be fully and clearly hereinafter shown and described by reference to the accompanying drawings, in which—

Figure 1 is a vertical central cross-section. Fig. 2 is a vertical longitudinal section through the pump, cutting through all except the main shaft and handle and the roller-shafts. Fig. 3 is a detached side elevation of the flexible tube. Fig. 4 is an inside face view of the head of the pump next to the handle, showing also an end view of the main shaft, the frame-work for supporting the rollers, and a pawl-and-ratchet movement for allowing the water in the pump to go back when required. Fig. 5 is a top view of the frame-work for supporting the rollers, the barrel upon which the frame-work is mounted, and a face view of the ratchet-wheel. Fig. 6 is a cross-section through the flexible tube. Fig. 7 is a longitudinal elevation. Fig. 8 represents a transverse elevation of the pump complete; and Fig. 9 is a cross-section through a flexible tube, showing a modified construction of the same.

The body *a* of the pump is usually made of cast-iron; but it may be made of any suitable material adapted to the purpose. It is provided with a bearing or box, a', and with a cover, a^2, having an ordinary stuffing-box, a^3, through which the driving-shaft a^4 passes, and is mounted in the bearings a' a^5. It is secured in place by ordinary bolts, a^6, and is provided with a crank, *b*, for operating it.

To the shaft a^4 is rigidly secured by a key or other well-known means the barrel or drum b', having the frame-pieces b^2 b^3, upon which are mounted the rollers b^4 b^5. These rollers are kept up to their place by means of the split wedges or keys b^6, and are prevented from dropping out the other way by the circular flanges or rings *c* c'.

c^2 represents the flexible tube. It is provided with a peripheral flange, c^3, by which it is secured to the interior of the pump between the shoulders c^4 and the removable flange or ring c^5. It is secured in place by means of bolts *d*, which are drawn up tightly, so as to firmly clasp the flange c^3, and thereby hold the tube rigidly in place. It is also further secured by means of the short tubes d' d^6, which screw into the body of the pump, so as to hold it securely in place, as shown, (see Figs. 1 and 2,) the flexible tube being firmly secured to the tubes d' or d^6 by means of a wire or cord, d^7. I employ rubber as being a suitable material for the tubes c^2, and their form in cross-section is similar to that shown in Fig. 6. The interior grooves, d^3, and outwardly-projecting ridge d^4 prevent the breaking or splitting of the rubber by the continued flattening and springing out of the tube as the rollers pass over it while operating the pump.

In Fig. 9 I have shown a modified construction of the flexible tube, consisting of strips of leather either sewed or riveted together by rivets d^5. The flange c^3 is produced by folding one side, as shown, and riveting or sewing it together at or about the point *e*.

To insure the springing out of the sides of the tube after the rollers have passed over it, I employ a diaphragm of rubber or other equivalent elastic material, e', which, by its elastic force, causes the sides of the tube to spring out, as shown.

In order to use a light flexible tube and insure it springing out with sufficient force, I produce a vacuum within the body or space e^3 by means of the openings e^3, which communicate with the inlet-tube, as shown, and also with the space e^2. As a result of this construction, the moment the pump is put in operation a vacuum is produced in both the tube leading to the water or fluid to be drawn and in the space or chamber e^2, thereby taking the atmospheric pressure off from the outside of the flexible tube as well as from the inside. By this means the tube, even if very light, will be allowed to spring out without

obstruction as the rollers (which compress it) pass over it. Were it not for this construction a vacuum produced on the inside of the tube only would tend to collapse it and hold it together as long as a vacuum was maintained. The ratchet-wheel e^4 (see Figs. 4 and 5) and pivoted pawl e^5, which is pivoted by a pin, f, prevent the pump from being turned backward; but in cold weather, when there is danger of freezing, the pawl may be lifted up away from the ratchet by means of the eccentric f', which is connected by a pin passing through the head of the pump to the outside, where a handle or crank, f^2, is rigidly secured to it, so that the eccentric may be turned so as to either engage the end of the pawl with the ratchet or disengage it for the purpose above mentioned.

The operation of the pump is as follows: By turning the crank the rollers will pass over and compress the flexible tube, thereby forcing the air out from the discharge-pipe, the pressure meanwhile equalizing itself in the suction end of the tube and in the chamber e^2 inside of the casing or pump, followed by a corresponding rise of the fluid in the suction-pipe. The operation proceeds until the fluid rises into the flexible tube. The pump is now in full action on the fluid. If any air should leak into the casing or chamber e^2 through the stuffing-box, or otherwise, there will be a rise of pressure in the chamber and a corresponding fall in the suction-pipe of the fluid. During the passage of the rollers onto the suction end of the flexible tube there will be a stoppage of flow momentarily of the fluid, in which case the casing will act as an air-vessel, which subdues the shocks and equalizes the flow in the suction-pipe. In some cases the flange e^3 or its equivalent may be dispensed with and the tube secured only at the ends; but it would not answer the purpose quite so well.

I claim as my invention—

A pump having the flexible tube secured within the casing, rollers and shaft for operating it, substantially as specified, and an air-space within the pump outside of the flexible tube, in combination with one or more perforations leading from the suction-tube to the air-chamber, whereby an equal vacuum is formed and maintained in the air-chamber and inlet and flexible tube while the pump is in operation.

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