(No Model.)

A. A. DELPEYROU & L. J. ROUSSELIN.

PUMP.

No. 562,285. Patented June 16, 1896.

Fig. 2.

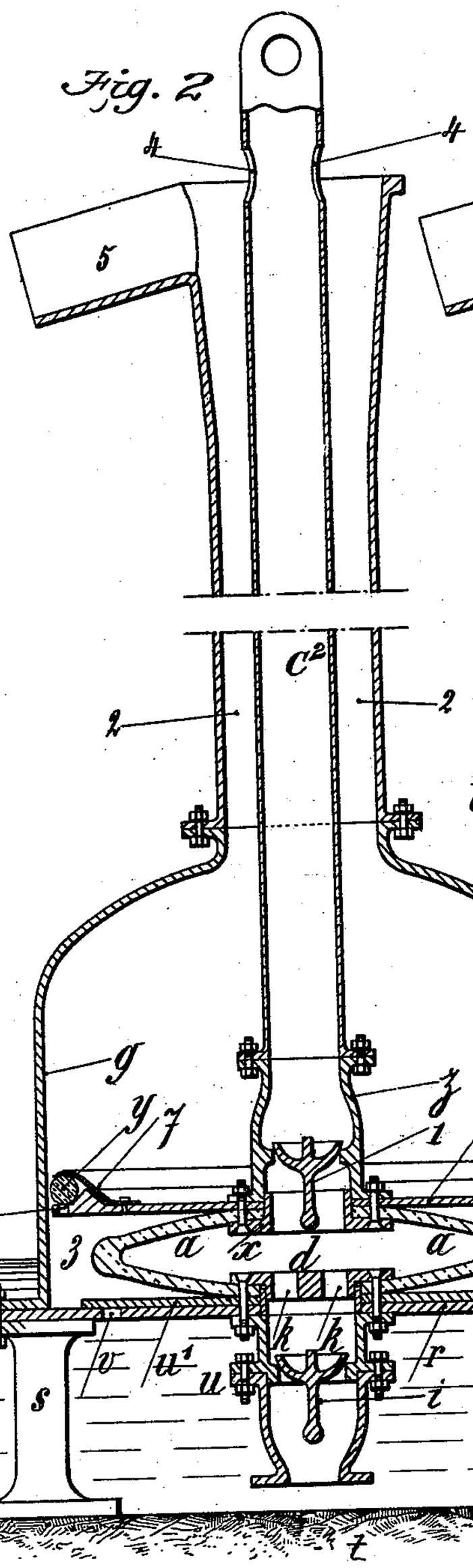


Fig. 3.

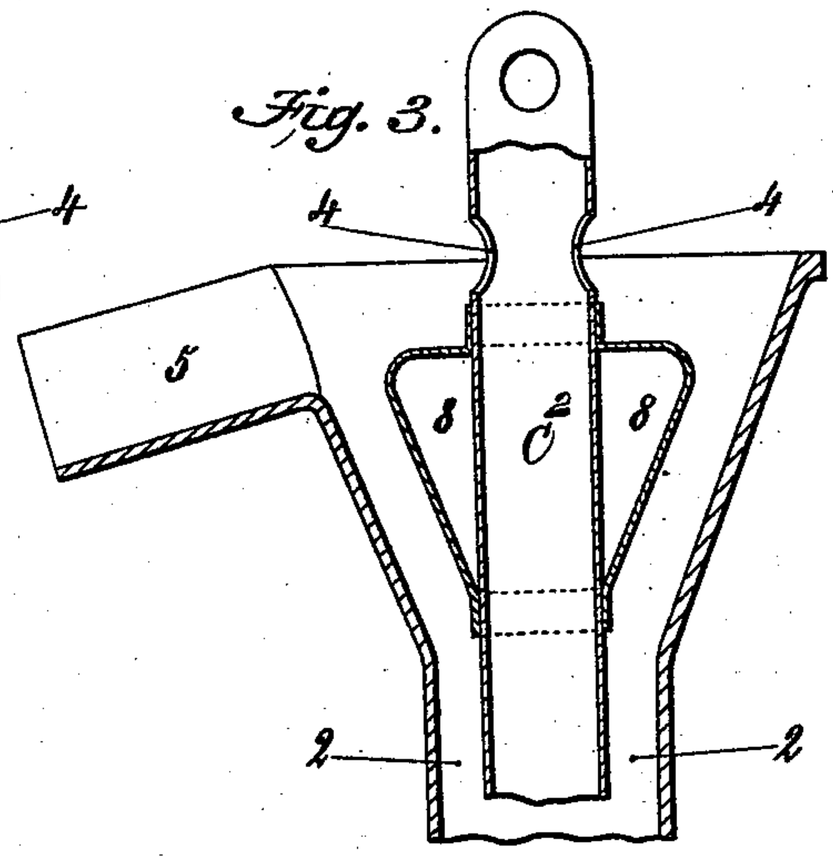
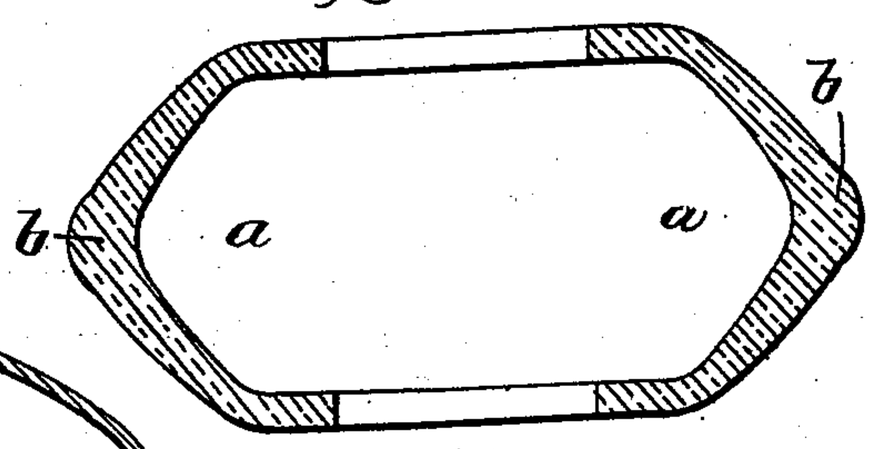


Fig. 1.



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PUMP.

SPECIFICATION forming part of Letters Patent No. 562,285, dated June 16, 1896.

Application filed June 22, 1894. Serial No. 515,382. (No model.)

To all whom it may concern:

Be it known that we, ANTOINE ARISTIDE DELPEYROU and LÉON JOSEPH ROUSSELIN, of Paris, France, have invented Improvements in Pumps, of which the following is a full, clear, and exact description.

This invention relates to a suction and force pump for raising liquids or semiliquids.

The invention consists in certain features of improvement hereinafter described and claimed, relating to that class of pumps in which in lieu of a piston or plunger a bellows-like compressible chamber made of india-rubber is employed by the forcible expansion and compression of which the liquid is alternately sucked into the pump and forced to the required height, this bellows-like suction and compression chamber being so arranged that it is not liable to become worn or damaged in use.

Reference is to be had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a central vertical section of the india-rubber suction and compression chamber detached. Fig. 2 is a vertical section of a pump for raising liquids from great depths. Fig. 3 shows a modification of the tubular rod of the pump shown in Fig. 2.

The flexible suction and compression chamber a, which constitutes the characteristic feature of the pump, is made of molded india-rubber and of lenticular form in cross-section, as shown, and is thickened at the perimeter b, so as to prevent collapse and avoid liability of being cut. It is centrally apertured to connect with the pump-rod c and is secured at the bottom to a flanged ring d, Fig. 2, by which the bottom side of the chamber a is clamped to the bottom r of the pump-barrel g. The ring d is provided with water-inlets k, to which leads the tail-pipe or suction-pipe h, connected to a valve-casing u to be described presently.

The pump-chamber g is immersed in the water to be raised, the bottom plate r of the chamber being supported upon feet s, resting on the bottom t of the sump. To the under side of the plate r is bolted the chamber u of the check-valve i and upon the plate r is applied an india-rubber disk valve u', which covers orifices v in the bottom plate r and lifts, on the suction taking place, to admit the water around the bellows a and closes when the compression takes place. The upper side of the chamber a is bolted, by means of a ring x, to a compressing-plate f and to the lower end of a tubular pump-rod c^2. The edge of the disk f is grooved to receive a rubber packing-ring y, by which a water-tight joint is formed between the disk and the sides of the pump-chamber g during the ascent only of the disk f. A valve-chamber z, containing a check-valve 1, is interposed between the disk f and the tubular pump-rod c^2, to which alternate movement is imparted by means of a crank or other suitable means.

The operation is as follows: By the ascent of the tubular pump-rod c^2 the chamber a is expanded and draws in water through the chamber u, valve i, and orifices k, the disk f at same time acting as a piston by which water is also drawn into the chamber 3 through the orifices v and beneath the disk valve u'. The chamber a is thus both filled with and surrounded by water, so that it will be in equilibrium in the liquid. On the descent of the pump-rod c^2 the disk f compresses the chamber a, and the water expelled therefrom rises through the valve 1 and rod c^2 and overflows into the surrounding casing 2 through the orifices 4 4, and when the casing is full the water overflows at the spout 5. While the water is being forced up the rod c^2, the water which surrounds the chamber a is forced by the piston f to pass between its packing and the sides of the pump-chamber g. For this purpose the disk f has orifices 6, which are covered by the packing y. The packing is pressed upon the orifices by springs 7, which yield to allow the ring y to be raised by the water passing through the orifices 6, this water passing into the pump-chamber g, where it is added to the water overflowing from the tubular pump-rod. When the disk f again rises, the packing y resumes its former position and makes a tight joint with the wall of the pump-chamber, this shifting of the packing-ring being permitted by the inclination of the groove, which has a constant tendency to force the packing against the side of the pump-chamber, and by the action of

the spring 7 bearing on the packing-ring. The tubular pump-rod c^2, as well as the outer casing 2, would be formed in lengths connected by flanges and bolts.

Fig. 3 shows a float 8 placed at the upper end of the pump-rod, which, by immersion in the water in the casing 2, relieves the tubular rod of a portion of its weight. For great depths several floats may be employed.

The above-described pump is particularly adapted for lifting water from great depths, as, for example, from the bottom of a mine.

We claim—

1. In a bellows-pump, the combination with the bellows-chamber and its pressure-disk acting as a piston to pump water up through the casing containing the bellows, of a tubular pump-rod in connection with the bellows-chamber and acting as a delivery-pipe and of an upward extension of the pump-casing through which the water is pumped up by the piston and into which the delivery-pipe overflows, as specified.

2. In a bellows-pump, the combination with the expansible and compressible chamber connected with the pump-rod and also connected with the suction-pipe, and the pump-casing containing said chamber and having valve-covered openings in its bottom through which the water is admitted to the casing, of a pressure-disk connected to the pump-rod and adapted to compress the said bellows-chamber, the said pressure-disk also acting as a piston to draw water into the casing surrounding the bellows-chamber, substantially as specified.

3. In a bellows-pump, the combination with the bellows-chamber and the casing containing the same and communicating with the water supply, of the pump-rod connected to said bellows-chamber, the pressure-disk provided with openings for the passage of water and having an inclined groove in its edge, a spring-pressed packing-ring held in said groove and adapted to cover the openings in the pressure-disk and to form a water-tight joint between the disk and the sides of the pump-chamber when the pump-rod is raised whereby the said pressure-disk acts as a piston to draw the water into the casing, the said packing-ring being adapted to move from the openings in the disk and permit the water to pass above the disk when the pump-rod is moved downward, substantially as specified.

4. In a bellows-pump, the combination with the casing having openings in its bottom and a disk valve adapted to cover said openings, of the bellows-chamber contained within said casing and connected with the suction-pipe, the tubular pump-rod connected with the bellows-chamber and surrounded by an upward extension of the casing, a pressure-disk connected with the bellows-chamber to compress the same and also acting as a piston to draw water into and through said casing, and one or more floats applied to the pump-rod, as and for the purpose specified.

The foregoing specification of our improvements in pumps signed by us this 24th day of May, 1894.

ANTOINE ARISTIDE DELPEYROU.
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Witnesses:
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