

P Bennet

Centrifugal Pump

N^o 7883.

Patented Jan. 7, 1851.

Fig. 1.

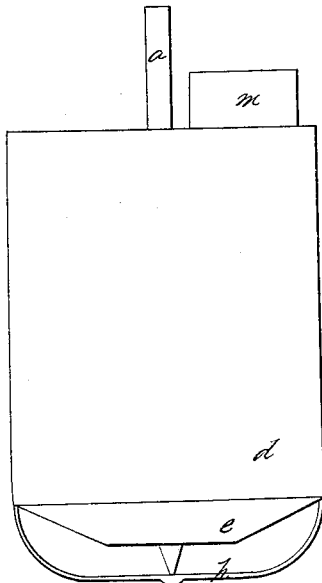


Fig. 2.

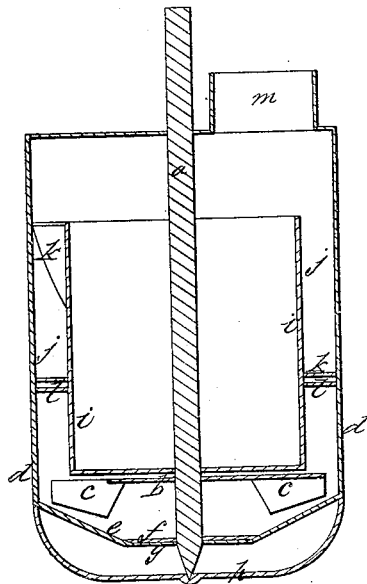


Fig. 3.

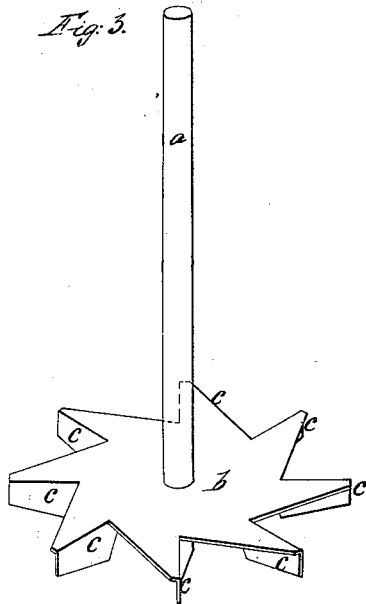
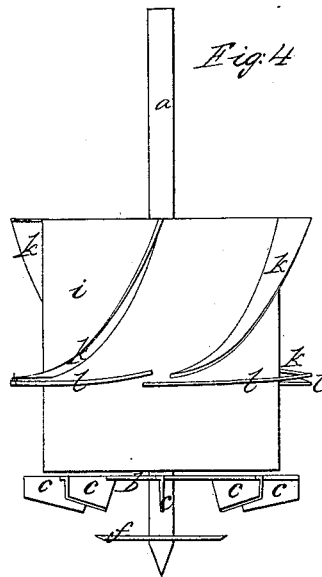


Fig. 4.



UNITED STATES PATENT OFFICE.

PHINEAS BENNET, OF NEW YORK, N. Y.

ROTARY PUMP.

Specification of Letters Patent No. 7,883, dated January 7, 1851.

To all whom it may concern:

Be it known that I, PHINEAS BENNET, of the city, county, and State of New York, have invented a certain new and useful improvement in rotary pumps for raising water, particularly applicable to the purpose of pumping out wrecked or stranded vessels, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is an elevation of my improved pump, Fig. 2 a vertical section, Fig. 3 a separate perspective view of the rotating part of the said pump, and Fig. 4, an elevation of the whole with the outer shell or casing removed to represent the internal arrangement.

The same letters indicate like parts in all the figures.

In my improved pump the water is acted upon by a rotating wheel composed of vanes or fans on a disk attached to the lower end of a vertical shaft. The water enters the casing at or near the center of said wheel and is forced outward by centrifugal force, and thence rises in an annular space between the outer casing and an inner concentric cylinder; the said annular space being provided with curves or spiral partitions to form water ways through which the water shall pass upward but with a whirling motion due to the motion of the wheel and the form of the annular space. In the annular space below the lower edge of the spiral partitions, and above the rotating wheel there are placed a series of spring or hinged valves which are opened by the force of the current of water, and which will therefore be opened to an extent due to the force with which the water is acted upon by the wheel.

The nature of my invention consists in combining with the rotating fan or paddle wheel the annular space provided with curved water ways which answer the purpose of guides for the upward flow of the water. And the nature of my invention also consists in combining with the rotating wheel or fans or paddle and the curved water ways, and interposed between them, spring or hinged valves which are opened by the current of water and in proportion to the force thereof, the object of which combination is to have the apertures through which the water passes self adapting that no more water shall pass up than is due to

the force applied and the height of the column to be raised, whereby I am enabled with a given power to apply my improved pump to the raising of water to various heights.

In the accompanying drawings *a* represents a vertical shaft to be driven in any desired manner and by any appropriate first mover. Near the lower end this shaft carries a disk *b*, the lower face of which is provided with radial or nearly radial fans or paddles *c* which should be in length about one quarter the diameter of the wheel thus composed. The periphery of the disk should be cut out as shown in the drawings, or the paddles made to extend beyond the periphery of the disk to allow of the free upward passage of the water. This wheel is placed within a cylindrical casing *d* whose length will depend on the maximum height to which the water is to be raised, the bottom *e* of the casing being dished or funnel shaped and provided with a lifting disk valve *f* to govern the induction aperture *g* in the center of the said bottom through which the water enters the casing by the centrifugal action of the paddles. The lower end of the shaft runs on a step in a cross bar *h*, below the bottom, and the upper end runs in an appropriate box at the top, or may be otherwise properly sustained. Within the casing there is another cylinder *i* concentric therewith which extends from the upper face of the disk wheel to within a short distance of the top, and the annular space *j*, between the two is provided with four or more partitions *k*, which at their lower ends are nearly horizontal and gradually curve upward to constitute four or more water ways leading up to the space in the casing above the inner concentric cylinder.

Just below the lower edge of the partition *k* and a short distance above the disk wheel are arranged four or more valves *l*, dividing the circle into four equal parts, the opening end of one being made to lap over and close onto the fixed end of the next, and so on throughout the series. These valves are made of thin spring metal, or they may be made of some rigid material and hinged at their rear end. When opened they form a continuation of the partitions *k*.

The casing should be provided with a discharge aperture *m* or apertures at the top or side to suit convenience, to which, if de-

sired, a discharge hose may be attached for guiding the discharged water to any place desired.

The lower end of the casing may be immersed in the water to be raised or made to communicate therewith by an induction pipe or hose attached to the lower aperture of the casing. When the apparatus is put in connection with the water to be raised and the disk wheel set in motion, the centrifugal action of the paddles on the disk wheel will exhaust that part of the casing below the disk which will cause the water to be forced in by atmospheric pressure or by the weight of the column of water if the casing be immersed in the water to the requisite depth. The rotary motion of the wheel will cause the paddles to act on the water and by centrifugal force to carry it toward the periphery of the casing and thence to rise with a whirling motion in the annular space between the outer casing and the inner cylinder; and as it rises the force of the current acting against the valves will force them open to an extent due to the force with which the water is impelled upward. The valves being thus opened the water will pass out through the apertures and rise in the water spaces above the valves, and as these spaces become filled the columns of water therein will rest on the upper surface of the valves and balancing in part the upward force of the water below, will cause the valves partly to close until the size of the apertures will be exactly proportioned to the force applied to the water and the height of the column of water above the valves.

If the column of water to be raised with a given amount of power be high, the apertures thus formed will be small, and as the column is reduced in height the apertures will enlarge and increase the bulk of water raised, and hence I call these self adapting valves specially useful when the pump is applied to pump out vessels, in which the height of column to be raised is constantly varying, as in pumping out wrecked or stranded vessels. But they are also useful

in all other situations, as they adapt themselves precisely to the force applied and the height of the column to be raised. In addition to all these they have another and important object to effect, and that is to prevent the reaction of the water on the paddles, for it will be evident on reflection that if the apertures through which the water passes to the water ways be greater than the capacity of the columns of water forced upward an eddy will be formed in each water-way which reacting on the paddles will produce a resistance to the motion of the wheel, by reason of which the force applied will be expended simply in producing these eddies.

I have found in practice that the use of the curved partitions constituting the water ways are very beneficial in preventing the wasteful expenditure of power in centrifugal pumps.

The number of water ways and valves can be increased and diminished at pleasure, although I have found in practice that four is a good number, and I have also found in practice that it is better that the number of valves should correspond with the number of water ways.

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

1. The arrangement of the curved water ways in the annular space above the fan or paddle when substantially as described, in combination with the rotating fan or paddle wheel, substantially as described and for the purpose specified.

2. And I also claim the self adapting valves substantially as described and governing the apertures leading to the annular space above in combination with the rotating fan or paddle wheels, and the curved waterways, substantially in the manner and for the purpose specified.

PHINEAS BENNET.

Witnesses:

JAMES SHIELDS,
C. WM. BROWNE.