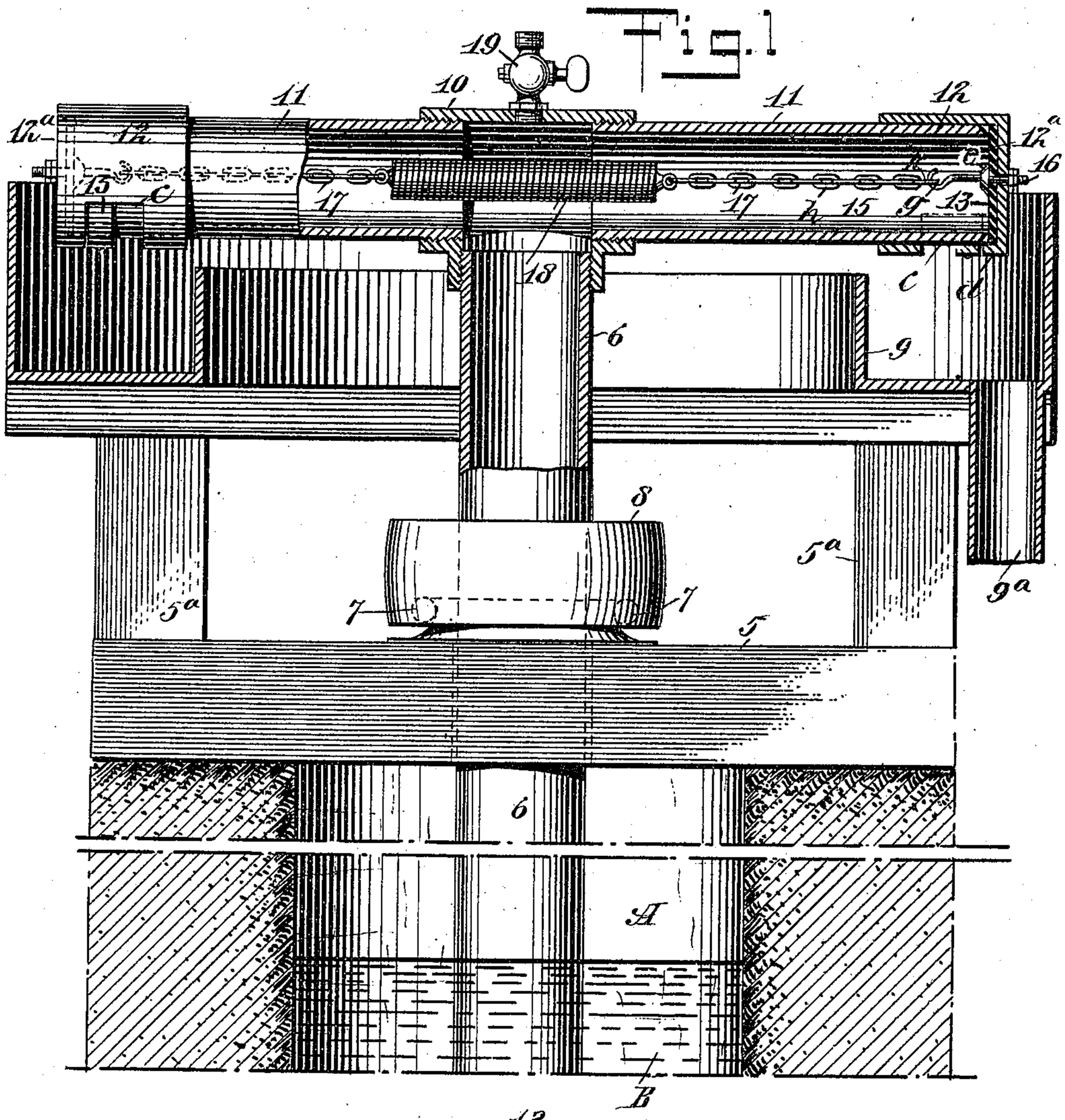
G. E. HANES & J. B. WALLER.

CENTRIFUGAL PUMP.

APPLICATION FILED JUNE 7, 1909.

975,232. **Patented Nov. 8, 1910.**

Fig. 1



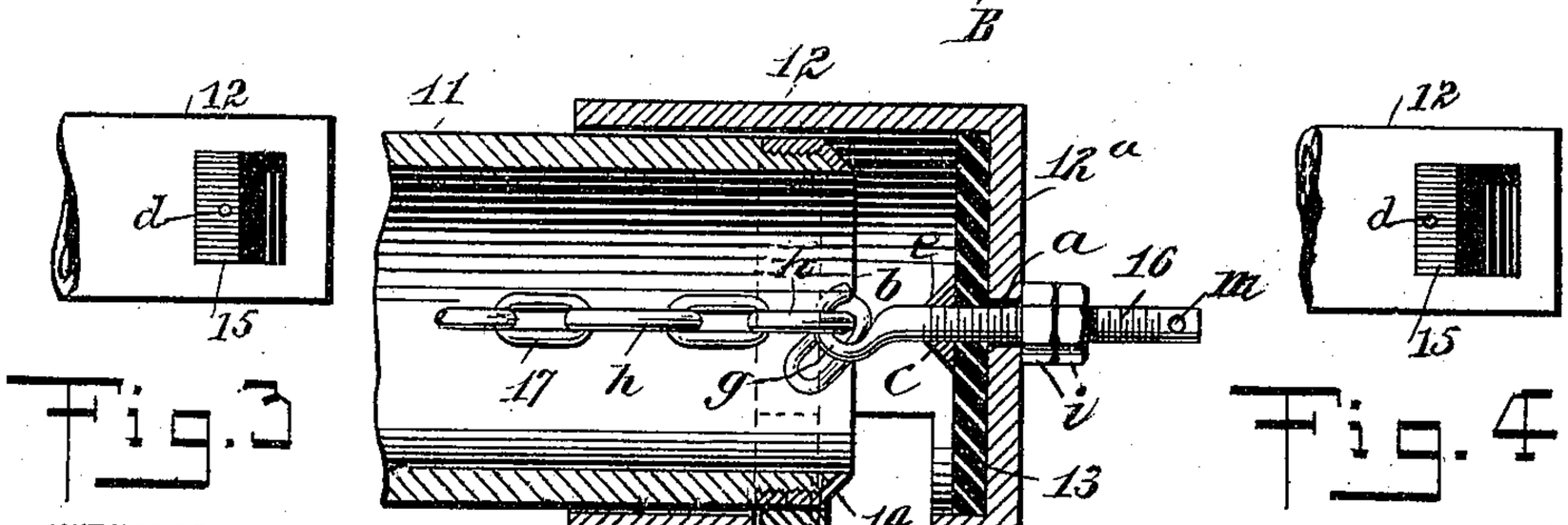


Fig. 3

Fig. 2

Fig. 4

WITNESSES

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CENTRIFUGAL PUMP.

975,232. Specification of Letters Patent. **Patented Nov. 8, 1910.**

Application filed June 7, 1909. Serial No. 500,609.

To all whom it may concern:

Be it known that we, GEORGE E. HANES and JOSEPH B. WALLER, both citizens of the United States, and residents of Kansas City, in the county of Jackson and State of Missouri, have invented a new and Improved Centrifugal Pump, of which the following is a full, clear, and exact description.

The purpose of our invention is to provide a centrifugal pump that is extremely simple, that will raise a large volume of water from a comparatively deep well without requiring a foot valve, and operate effectively with the expenditure of a minimum of power; and a further object is to provide novel means for the pump, which will enable an adjustment of parts to decrease the lifting power thereof, and a corresponding decrease of power employed in operating the same.

The invention consists in the novel construction and combination of parts, as is hereinafter described and defined in the appended claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a sectional view of the improved pump in position for service; Fig. 2 is an enlarged sectional side view of a cap-valve and adjacent parts of the pump. Fig. 3 is a reduced plan view of a cap valve and a segment block, showing one adjustment of said block; and Fig. 4 is a similar view to Fig. 3, but showing a changed position of the segment block.

In the drawings A represents a well or other water supply for the pump, and 5 a horizontal beam that affords support for the pump.

A suction pipe 6 is vertically supported in the beam 5, and extends down in the well A a suitable distance, having an open lower end that is submerged in the water B contained in the well. Preferably the suction pipe 6 is provided with a ball-bearing support 7, that is seated on the beam 5, and adapts the pipe for free rotation, a pulley 8 that is secured on the suction pipe affording means for its rotatable connection with a source of power and motion by an endless belt (not shown). Upon the beam 5 vertical posts 5^a are erected of an equal height, and on said posts an annular trough 9 is horizontally mounted, having suitable dimensions that adapt said trough for reception of water raised by the pump, a discharge pipe 9^a extending from the trough to a selected point for discharge of the water. The suction pipe 6 extends above the trough at a point central thereto, and on the upper end of said pipe a T-shaped fitting 10 is mounted, the lateral and opposite outlets thereof each receiving a branch pipe 11, said pipes having equal diameter and length. Upon the true cylindrical body of each branch pipe 11, at or near the outer end thereof, a cap-valve 12 is slidably mounted, these similar valves each consisting of a short cylindrical body, that is closed by a flat end wall 12^a.

Seated in each cap valve body 12 is a rubber joint washer 13, that is centrally perforated, and a corresponding perforation *a* is formed in the end wall 12^a whereon the joint washer is seated. Upon each branch pipe 11, at the outer end thereof, an adjustable ring 14 is screwed, as is plainly shown for one of said pipes in Fig. 2, the body of the pipe being reduced in diameter and externally threaded for the reception of the interiorly-threaded ring, and it will be noted that the exterior of the sleeve-like ring or band 14 fits slidably in the cap-valve 12. The outer end of the ring or band 14 is beveled, giving it conical shape, thus producing a sharp inner edge *b*, that may be embedded in the washer 13 if the latter is moved toward the end of the branch pipe 11. In each cap-valve 12 a lateral rectangular opening *c* is formed by the removal of a portion of the side wall thereof, these openings having sufficient area to permit the passage of water freely therethrough, that has been lifted by the pump. Upon each ring 14 a preferably rubber segment block 15 is neatly fitted and secured by a screw *d*, each segment block having such a length as will permit it to fit snugly at its ends in the opening *c*, and is of a width that will considerably reduce the area of a respective opening *c* occupied by the segment block.

As shown in Figs. 3 and 4, the screws *d*, for holding the segment blocks 15 in place, are respectively inserted through a perforation that is near one side edge of each segment block, and thence is screwed into a tapped perforation in the adjacent band or ring 14. It will be noted that if the side edge of each block 15 which is nearest to

the screw *d* is disposed near the free edge *b*, of a respective band 14, this will project the wider portion of the block away from said edge, and adapt the block 15 to restrict the outward sliding movement of the cap valve a degree equal to the difference in space between the screw *d* and the opposite side edges of the segment block, and obviously this is the case with regard to each segment block and cap valve. The restriction of travel of the cap valves by the adjustment of the segment blocks, as described, proportionally reduces the area of the discharge openings, this adjustment being represented in Figs. 2 and 3. If it is desired to increase the area of the discharge openings for the cap valves 12, the segment blocks 15 are reversed in position by turning them endwise, which will dispose the side edges of said blocks that are farthest from the holes therein which receive the screws *d*, toward and nearer to the joint washers 13, which will permit the cap valves 12 to travel farther away from the edges *b* of the rings 14, and thus proportionally increase the area of the discharge openings in the cap valves.

In the perforation *a* in each cap valve end wall 12ª and joint washer 13 the threaded body 16 of a coupling bolt is inserted outwardly therethrough, said bolts each having a coniform washer *e* thereon, that contacts with the exposed surface of a respective joint washer 13. Upon the inner end of each coupling bolt 16 a hook *g* is formed, with which the open links *h* of a chain 17 may be connected, said chains of equal length having their opposite ends respectively secured upon the ends of a strong coiled spring 18. On the outer end portion of each coupling bolt 16 two jam nuts *i* are mounted, that engage respective end walls 12ª of the cap valves 12, and when appropriate links of the chains 17 are respectively placed upon the hooks *g*, the nuts may be adjusted so as to stretch the chains and draw the cap valves 12 into air-tight contact with the ends of the rings or bands 14.

To facilitate the operation of starting the pump, a valve 19 is placed in the T-fitting 10, and affords means for connecting a portable suction pump (not shown) with the pump that is to be started. By working the priming pump, air is exhausted from the improved pump and water lifted thereinto; the suction pipe 6 and branch pipes 11 are now rapidly rotated by the application of power and rotary motion to the pulley 8, which will cause an up-flow of water from the well and a discharge of the pumped water into the trough 9, and from the trough out of the discharge pipe 9ª, it being understood that the pressure of water will force the cap valves 12 away from the ends of the branch pipes 11. If the pump is to be worked at its full capacity, the segment block 15 is removed, which will open the passage *c*, the full area thereof, the elevation and discharge of water being also controlled by the speed of rotation given to the pipe 6 and branches 11.

As before mentioned, the contraction of the spring 18 serves to draw the cap valves 12 toward and against the ends of the branch pipes 11 or rings 14 thereon, and thus seals the outlets *c*, so that when the pump is run slowly, the strength of the spring may close the valves 12 and produce a vacuum that will hold the column of water in the pipe 6 for resumption of the pumping operation, as occasion may require.

The provision of the segment blocks 15 is mainly of service to enable the economical use of the pump, when the amount of water to be pumped is less than the full capacity of the pump, as by cutting down the area of the discharge openings, the pump may be run with less speed and power than if working at full capacity.

It will be noted that each coupling bolt 16 is transversely perforated at *m*, near its outer end, this provision being made to facilitate the removal of the cap-valves 12, or either of them, if the repair and removal of the rings 14 are necessary. To this end the segment blocks 15 are detached, and a wire rod is inserted through the perforation *m* in each bolt 16; said wires are now bent to afford handles, that enable the application of draft strain upon the bolts and attached cap valves, that may thus be removed from the branch pipes 11 against stress of the spring 18. If preferred, the bolts 16 may be slackened sufficiently to permit the removal of the ends of the chains 17 from the hooks *g*, whereupon the cap valves will be released and they may be drawn off of the branch pipes.

Having thus described our invention, we claim as new and desire to secure by Letters Patent:

1. A centrifugal pump, embodying a vertical and rotatably-supported suction pipe having its lower end submerged in a water supply, two oppositely-extended branch pipes on the upper end of the suction pipe, a cap-valve slidably mounted on the outer end of each branch pipe, said similar cap-valves each having a lateral opening therein, a spring, flexible connections between the ends of the spring and the cap-valves, and means for rotating the suction pipe and branch pipes.

2. A centrifugal pump, embodying a vertically and rotatably-supported suction pipe, open at the lower end, the lower end being immersed in a water-supply, two oppositely-disposed branch pipes on the upper end of the suction pipe, a slidable cap-valve mounted on the outer end of each branch pipe, said cap valves each having a joint washer there-

in and also a lateral discharge opening, adjusting screw-bolts passing through the washer and the end wall of each cap-valve and having hooked ends, a coiled spring, and a flexible connection between the respective ends of said spring and the hooked ends of the adjusting bolts.

3. A centrifugal pump, comprising a suction pipe having at its upper end oppositely extending lateral branch pipes, a valve slidably mounted for movement toward and from the end of each of the branch pipes, for closing the same, a spring intermediate the valve, a flexible connection between each valve and the adjacent end of the spring, and means for rotating the suction pipe and the branch pipes.

4. A centrifugal pump, comprising a suction pipe, oppositely arranged lateral branch pipes at one end of the suction pipe, a cap valve slidable on the end of each of said branch pipes for closing the same and having a lateral opening, a yielding connection between the cap valves for normally retaining them closed, and means for varying the extent of the opening.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

GEORGE E. HANES.
JOSEPH B. WALLER.

Witnesses:
JESSIE PAYNE,
FREDERICK GRIFFITH.