

No. 787,247.

PATENTED APR. 11, 1905.

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PUMP.

APPLICATION FILED MAR. 17, 1900. RENEWED OCT 10, 1904.

Fig. 1.

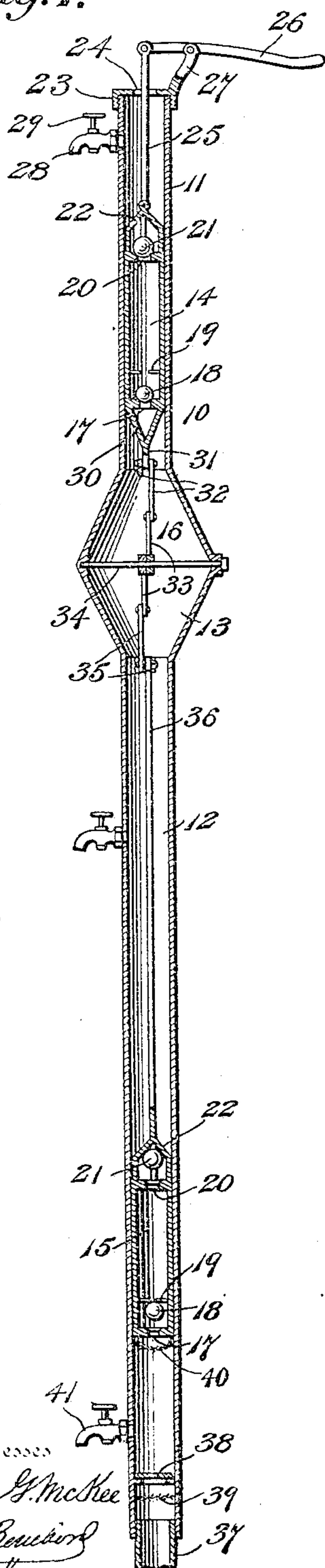


Fig. 2.

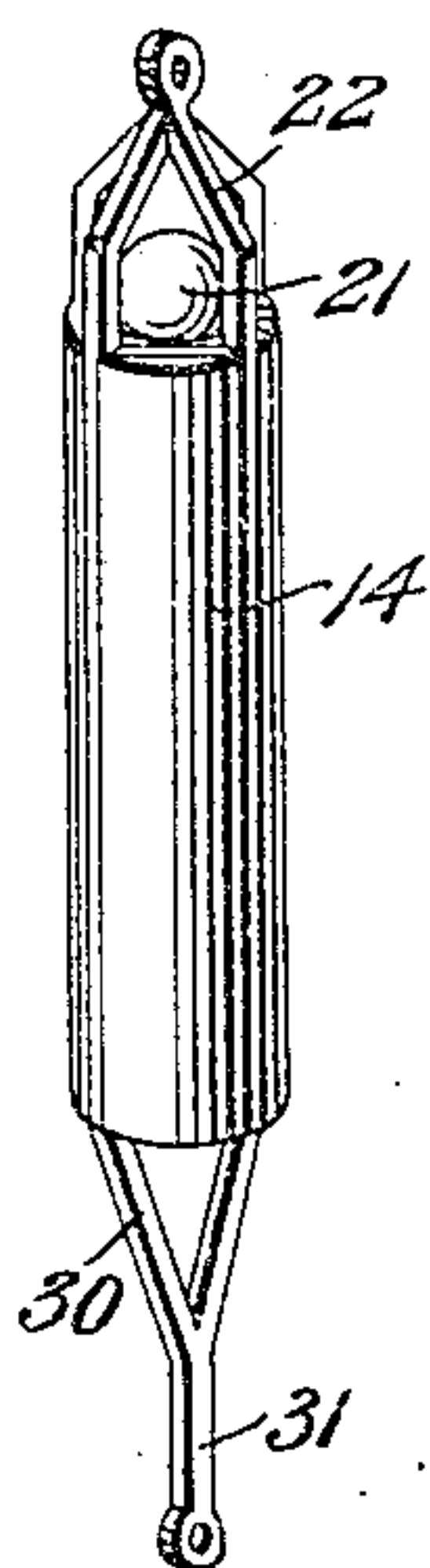


Fig. 3.

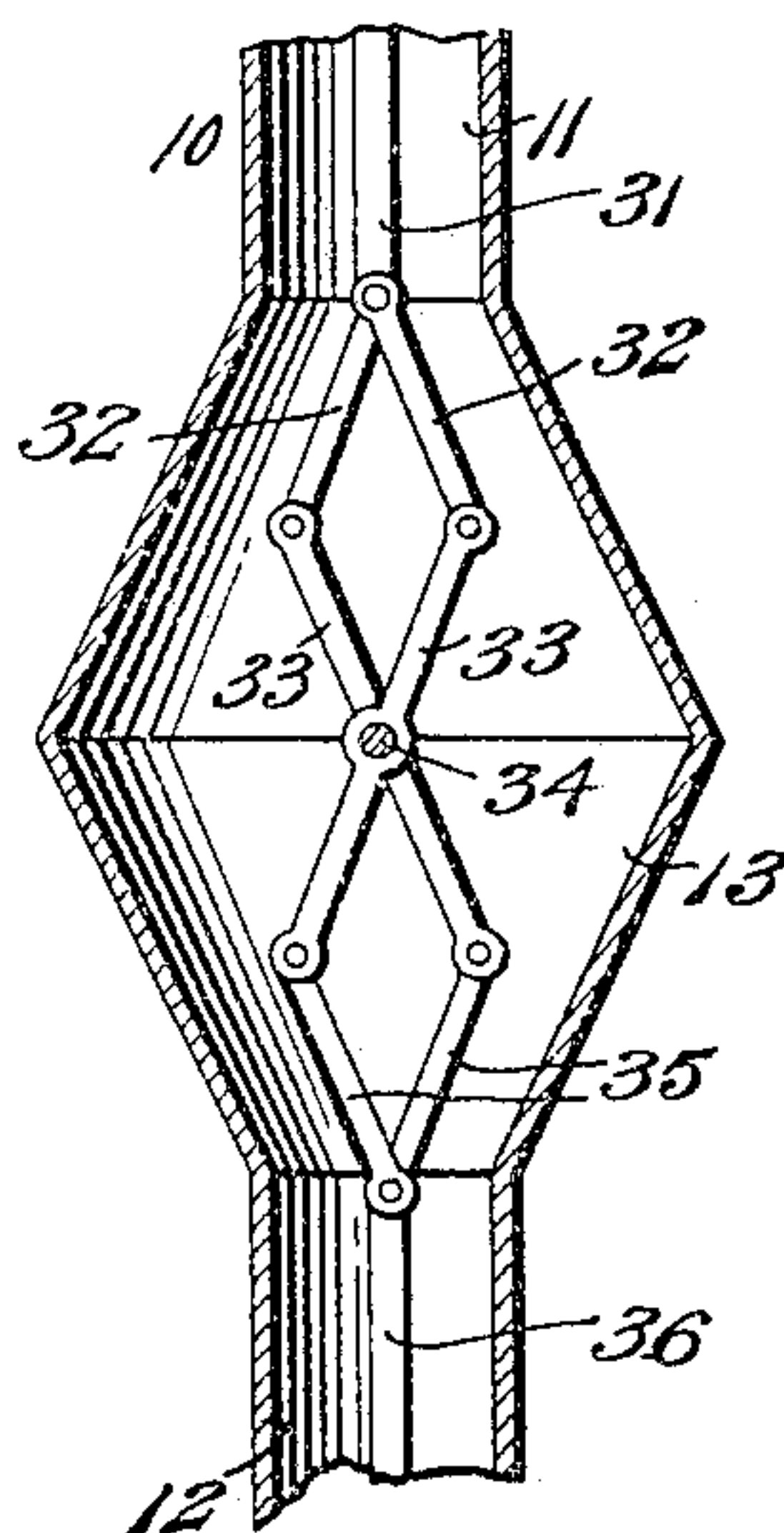
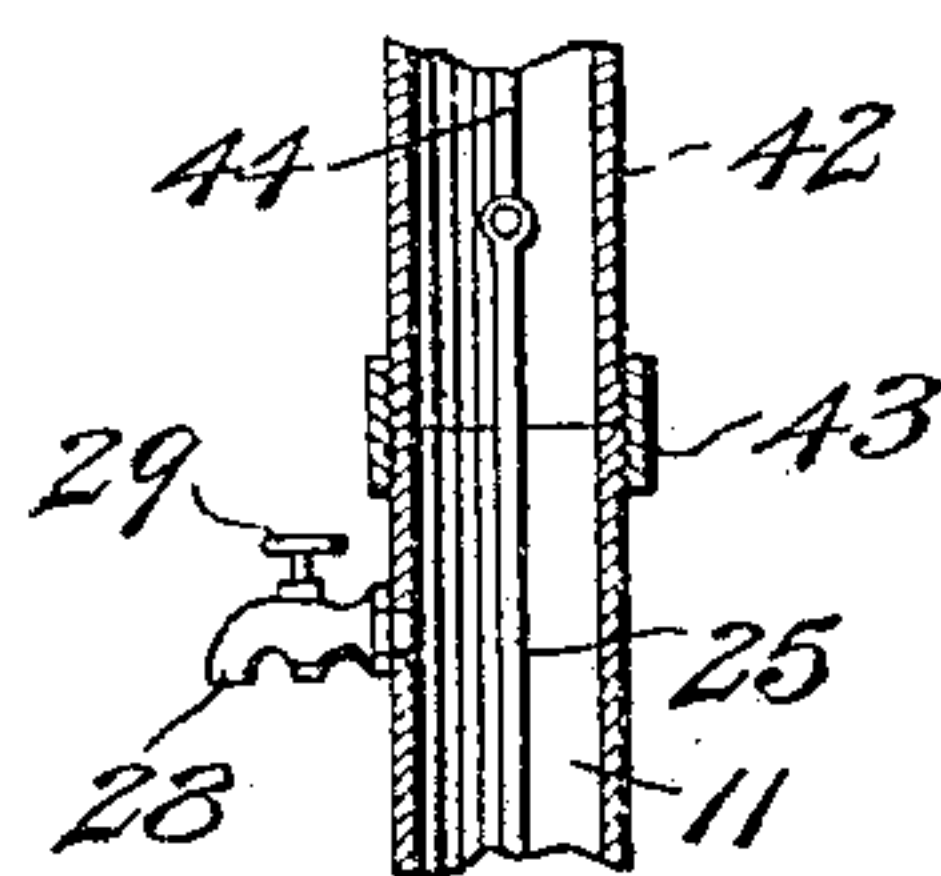


Fig. 4.



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UNITED STATES PATENT OFFICE.

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SPECIFICATION forming part of Letters Patent No. 787,247, dated April 11, 1905.

Application filed March 17, 1900. Renewed October 10, 1904. Serial No. 227,911.

To all whom it may concern:

Be it known that we, FRANK ROBERTSON WILSON and GEORGE MANSELL, citizens of the United States, residing at Llano, in the county of Llano and State of Texas, have invented a new and useful Pump, of which the following is a specification.

Our invention relates to improvements in pumps; and the object that we have in view is to provide an improved construction which operates sufficiently to quickly lift the water from a well or other source of supply to the surface of the ground, the several parts of the pump being simple in construction and readily separable for the purpose of access thereto for repairing any of the worn parts.

Further objects and advantages of the invention appear in the course of the subjoined description, and the novelty in the combination and construction of parts will be pointed out in the claim.

In the drawings, Figure 1 is a central vertical section of the improved pump embodying our invention. Fig. 2 is a perspective view of one of the tubular piston-buckets detached from the pump-casing. Fig. 3 is an enlarged sectional view through the lazy-tongs mechanism, which connects the upper piston-bucket with the lower piston-bucket for the purpose of operating one bucket by the movement of the other bucket. Fig. 4 is a view showing the cap and lever detached and the casing extended.

The same numerals of reference are used to indicate like and corresponding parts in each of the several figures of the drawings.

In carrying the invention into practice we employ a pump-casing 10, which is of peculiar construction, for the accommodation of a series of valved piston-buckets and a lazy-tongs mechanism which is arranged to operatively connect the series of piston-buckets for the purpose of positively reciprocating the lower bucket by the movement of the upper bucket. This pump-casing is provided with the tubular lengths 11 12, which are arranged in vertical alinement with each other and are connected by an intermediate expanded section 13. The tubular lengths 11 12 of the pump-casing constitute the

working barrels or cylinders of the pump; but the expanded section 13 of said casing is of double conical shape in vertical section, so as to provide a chamber the diameter of which at all points exceeds that of the tubular lengths or working barrels of the pump. It is evident that this pump-casing may be made in sections of proper shape and size and provided with means for coupling the same securely one to the other, whereby the casing may be made of any suitable length, according to the depth of a well; but, if desired, the casing may constitute a single continuous casting, as may be found most expedient by the skilled constructor.

We have shown the pump as equipped with an upper piston-bucket 14 and a lower piston-bucket 15, operatively fitted in the working barrels 11 12, respectively, and these piston-buckets are connected one with the other by means of an intermediate lazy-tongs mechanism, which is indicated in its entirety by the numeral 16 and is housed or contained within the chamber of the expanded section 13 of the pump-casing. Each piston-bucket is preferably tubular in form and of a diameter to fit snugly within its proper working barrel. At the lower end of each bucket is provided a valve-seat 17, which accommodates a check-valve 18, that is adapted to occupy the seat on the upward movement of the bucket, said check-valve being automatically unseated on the downstroke of the piston-bucket and held against undue movement with relation to the valve-seat by means of the stops 19, which project from the inside of the piston-bucket. Each bucket is, furthermore, provided at its upper end with a valve-seat 20, adapted to accommodate a check-valve 21, which is opened on the downward movement of the bucket and closes on the upward movement thereof, and the piston-bucket is, furthermore, provided at its upper end with a valve-cage 22, the same being of skeleton form and secured firmly to the bucket so as to surround the valve 21 for the purpose of limiting the movement of the latter with relation to the seat 20 and the upper end of the bucket. In the drawings we have shown the piston-buckets

as provided with check-valves, which are spherical or ball-shaped; but it is to be understood that we do not limit ourselves to this particular type of check-valves.

5 The upper end of the pump-casing is provided with a cap 23, which is screwed detachably on said casing to close the upper working barrel 11 thereof. This cap is provided with a central vertical opening 24,
10 through which passes a pitman 25, the latter being connected at its lower end pivotally to the apex of the valve-cage 22. The upper end of this pitman is pivoted to a suitable operating appliance, which is shown in the drawings in the form of a lever 26, the same being
15 fulcrumed at a point intermediate of its length to an offstanding arm or bracket 27, which is fast to the upper end of the pump-casing. Any suitable means may be substituted for
20 the lever as a means for reciprocating the connected piston-buckets of our improved pump.

The upper end of the pump-casing 10 is provided at a point below the cap 23 with
25 a discharge-spout 28, the same having a suitable cock 29 to cut off the flow of water from the pump.

One of the important features of our invention resides in the employment of the
30 lazy-tongs mechanism 16 between the series of piston-buckets which are employed for the elevation of the water. The upper piston-bucket 14 of the improved pump is provided at its lower end with a hanger 30, consisting of a pair of arms arranged in inclined
35 positions, so as to meet or join one another, and are firmly secured to the lower end of the piston-bucket 14 in a way to avoid interference to the free ingress of water through the
40 lower valve 18 to said bucket 14. A pitman 31 is attached at its upper end to the apex of this hanger, and the lower end of this pitman is connected pivotally to a pair of links 32, the latter arranged in divergent relation and having
45 their lower ends pivoted individually to the upper ends of a pair of crossing levers 33. These levers are fulcrumed at the middle thereof on a cross-bolt 34, which is supported removably in the middle portion of the ex-
50 panded section 13 of the pump-casing, and said levers are connected at their lower ends pivotally to another pair of links, 35, which converge toward their lower ends and are pivoted at a common point to an arm 36,
55 which is provided on the valve-cage 22 of the lower piston-bucket 15.

The crossed levers 33 and the two pairs of links 32 35 constitute the toggle mechanism which serves as the means for operatively
60 connecting the upper and lower piston-buckets of the pump, and this toggle mechanism is adapted to be expanded or opened on the downward movement of the upper piston-bucket 14 for the purpose of raising
65 the lower piston-bucket 15 simultaneously

with such downward movement of the upper piston-bucket, and vice versa. An upward movement of the piston-bucket 14 operates to contract or draw together the members of the toggle mechanism for the purpose
70 of positively forcing the piston-bucket 15 in a downward direction. It is therefore to be understood that the power necessary for the operation of the pump is applied to the upper piston-bucket and that the toggle mechanism transmits the motion of the upper piston-bucket to the lower piston-bucket in a
75 manner to move the latter in an opposite direction to and simultaneously with the movement of said upper piston-bucket.

The pump-casing 10 may be extended any suitable distance below the working barrel or cylinder 12, or an induction-pipe 37 may be connected with said lower working barrel,
80 said induction-pipe being immersed in the water of the well or other source of supply. A foot-valve 38 of any suitable character may be provided between the induction-pipe and the lower working barrel 12, said valve serving to sustain the weight of the column
90 of water contained within the pump, and thereby relieve the strain on the lower piston-bucket. Below the valve 38 is arranged a strainer 39, and a similar strainer 40 may be attached to the lower end of the piston-
95 bucket 15. A drain-cock 41 is attached to the lower portion of the pump-casing at a point above the foot-valve 38, said valve being operable by any suitable means for the purpose of draining water from the casing in
100 very cold weather, and thereby minimizing the liability of the pump freezing.

In operation the water is supplied to the lower working barrel by the induction-pipe, and the upward flow of the water unseats the
105 valves 18 21, so as to fill the lower piston-bucket 15. The upward movement of this piston-bucket closes the valves 18 21, so as to lift the water contained within the bucket and to force upwardly any water in the
110 pump-barrel above the valve 21. On the downstroke of the piston-bucket both of the valves are unseated, and the water is free to flow out of the bucket and into the pump-casing above the piston-bucket. The upper
115 piston-bucket has its valves arranged to operate in a like manner for the water contained in the chamber of the expanded casing-section 13 to enter the barrel and also be received in the piston-bucket 14 on the down-
120 ward movement thereof. On the upward movement of this piston-bucket 14 the water is discharged into the working barrel 11 of the casing above the piston-bucket 14, so that on the next upward stroke of this bucket
125 14 the water is ejected from the pump through the discharge-spout 28.

In Fig. 4 is shown the preferred manner of extending the pipe or casing to any desired height. The lever 26 is disengaged from the

pitman 25 and the cap 24 is unscrewed. A pipe 42 is connected to the section 11 by a suitable coupling 43, and an operating-rod 44 is connected to the end of the pitman 25. This pipe may be extended to any height desired and the cap fixed thereon. The lever 26 is then connected to the rod 44.

From the foregoing description it is apparent that the connected piston-buckets work in unison for the elevation of the water through the pump-casing, and the water lifted by the lower bucket is received into and lifted on the upstroke of the upper bucket. The expanded casing-section 13 provides for the proper movement or play of the lazy-tongs mechanism which transmits the motion from one bucket to the other. By having the fulcrum-bolt 34 supported removably within the expanded casing-section the piston-buckets and the lazy-tongs mechanism may be withdrawn endwise from the casing on the removal of the cap 23, thus permitting access to be obtained to any of the working parts of the pump for repairing and renewing the same.

Changes within the scope of the appended claim may be made in the form and proportion of some of the parts, while their essential features are retained and the spirit of the invention is embodied. Hence we do not desire to be limited to the precise form of all the parts as shown, reserving the right to vary therefrom.

Having thus described the invention, what we claim is—

A pump having in combination a straight

single casing only, comprising an upper tubular section, a lower tubular section alined longitudinally therewith, and an intermediate expanded section connecting the tubular sections, the lower section having a discharge connection with the expanded section only, and the upper section having an inlet connection with the expanded section only, a removable fulcrum-bolt piercing the sides of the expanded section at its point of greatest width, a lazy-tongs device located in the expanded section and fulcrumed upon the bolt, valved plungers working in the respective upper and lower casing-sections and connected to the respective upper and lower ends of the lazy-tongs device, a cap closing the upper end of the casing and provided with an opening in its top, an operating-lever fulcrumed upon the upper end of the casing, a rod connecting the lever with the upper plunger and working through the opening in the cap, an outlet for the casing disposed between the top thereof and the upper limit of the upper plunger, an inlet check-valve at the lower end of the casing, and a drain-valve in the casing between the lower plunger and the inlet-valve.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

FRANK ROBERTSON WILSON.
GEORGE MANSELL.

Witnesses:

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E. J. DARDEN.