F. W. BAINES.

DOUBLE SUCTION PUMP.

APPLICATION FILED MAR. 5, 1908.

905,046.

Patented Nov. 24, 1908.

2 SHEETS—SHEET 1.

Fig. 1.

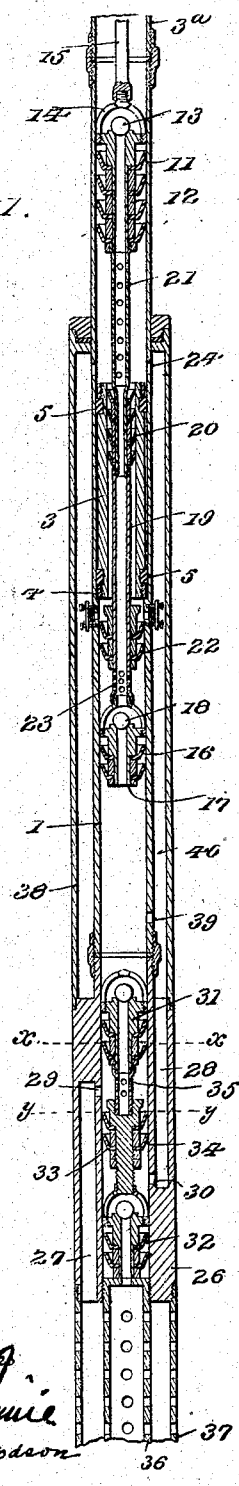


Fig. 2.

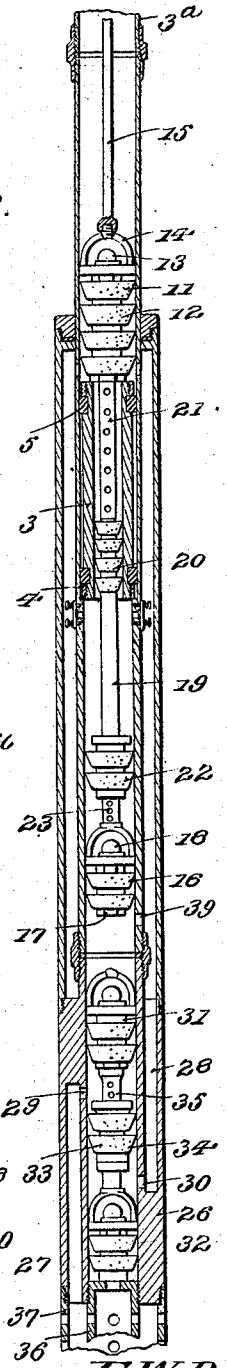


Fig. 9.

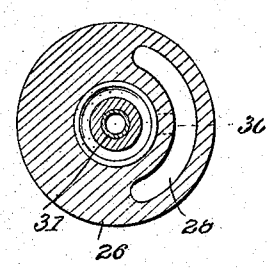
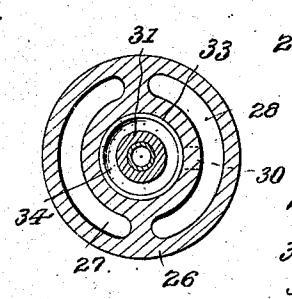


Fig. 10.



Witnesses

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905,046. Patented Nov. 24, 1908.

2 SHEETS—SHEET 2.

Fig. 3.

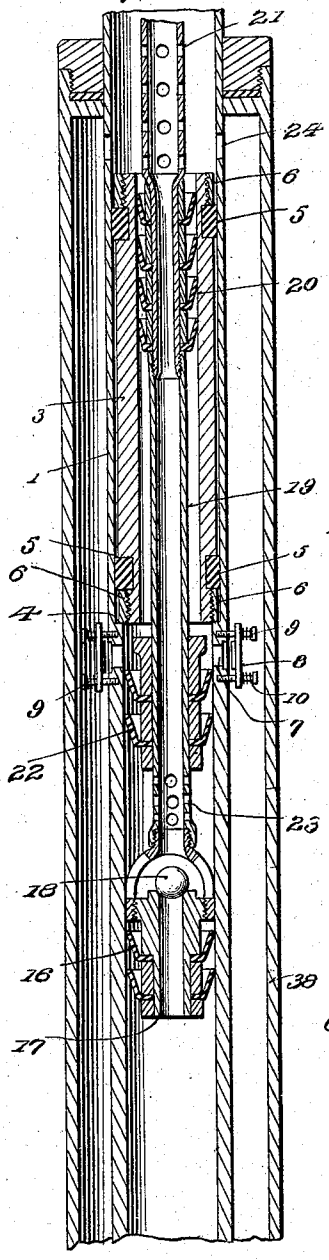


Fig. 5.

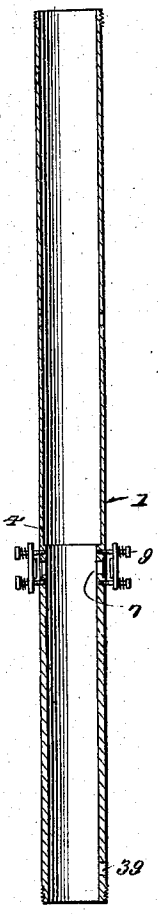


Fig. 6.

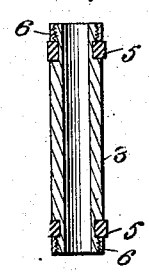


Fig. 7.

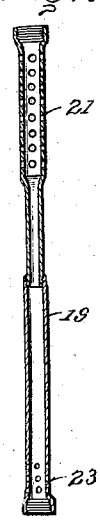


Fig. 8.

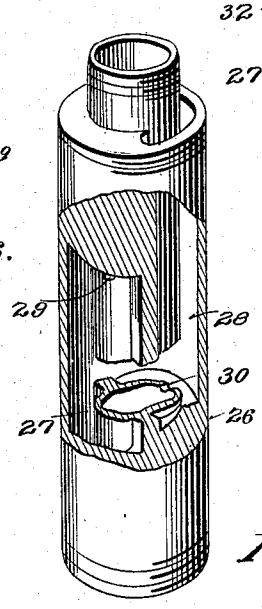
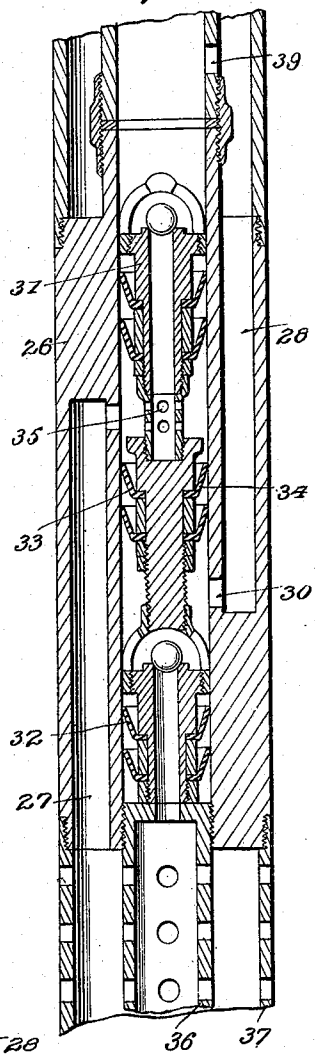


Fig. 4.



Witnesses.

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FREDERICK W. BAINES, OF MONTPELIER, INDIANA, ASSIGNOR OF ONE-FOURTH TO JOHN E. SCOTT, ONE-FOURTH TO GEORGE ELY, AND ONE-FOURTH TO DAVID E. SCOTT, OF MONTPELIER, INDIANA.

DOUBLE-SUCTION PUMP.

No. 905,046. Specification of Letters Patent. Patented Nov. 24, 1908.

Application filed March 5, 1908. Serial No. 419,344.

To all whom it may concern:

Be it known that I, FREDERICK W. BAINES, citizen of the United States, residing at Montpelier, in the county of Blackford and State of Indiana, have invented certain new and useful Improvements in Double-Suction Pumps, of which the following is a specification.

The present invention relates to lift pumps, being designed most especially for deep wells for elevating oil or water and to obtain delivery of a greater volume of liquid at each stroke of the piston than is now possible with a pump of like stroke and cross sectional area.

The invention about doubles the capacity of the pump without increasing the length of stroke or enlarging the piston, thereby enabling the pump to be readily substituted for others now in use without requiring enlargement of the pump barrel or increase in the length of stroke of the piston.

For a full understanding of the invention and the merits thereof and also to acquire a knowledge of the details of construction and the means for effecting the result, reference is to be had to the following description and accompanying drawings.

While the invention may be adapted to different forms and conditions by changes in the structure and minor details without departing from the spirit or essential features thereof, still the preferred embodiment is shown in the accompanying drawings, in which:

Figure 1 is a vertical central section of a deep well pump embodying the invention, showing the relation of the parts when the piston is elevated. Fig. 2 is a view similar to Fig. 1, showing the relation of the parts when the piston is at the limit of its down stroke. Fig. 3 is an enlarged section of the upper portion of the pump. Fig. 4 is an enlarged section of the lower portion of the pump. Fig. 5 is a vertical central section of the working barrel. Fig. 6 is a central section of the liner arranged between the piston and the working barrel. Fig. 7 is a sectional view of the piston tube. Fig. 8 is a detail perspective view of the foot section, parts being broken away. Fig. 9 is a horizontal section on the line *x*—*x* of Fig. 1, showing the parts on a larger scale. Fig. 10 is a horizontal section similar to Fig. 9 on the line *y*—*y* of Fig. 1.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The working barrel of the pump is indicated at 1 and is adapted to be connected at its lower end with the foot section 26 and at its upper end with the discharge pipe 3ª. The upper portion of the working barrel has its bore enlarged to receive a liner 3 which is supported upon the shoulder 4 formed at the lower end of the enlargement. The end portions of the liner are reduced to receive packing rings 5 which are retained in place by collars 6 threaded upon the extremities of said liner. Openings 7 are provided in the sides of the working barrel just below the liner 3 and are normally closed by means of valves 8 which are mounted upon pins 9 let into the sides of the working barrel, springs 10 serving to normally hold the valve seated and being confined between said valves and stops at the outer ends of the pins 9.

A piston is arranged to operate in the upper portion of the working barrel above the liner, and a companion piston is provided to operate in the lower portion of the working barrel below the liner. Each of the pistons is hollow and provided with an upwardly opening valve. Packing cups 11 are fitted to the body 12 of the upper piston and the valve 13 is of the ball type and is adapted to close downward upon a seat provided at the upper end of the piston body, a spider or cage 14 serving to retain the valve 13 in place and receiving the lower end of the rod 15. Packing cups 16 are fitted to the body 17 of the lower piston and a ball valve 18 closes upon a seat at the upper end of said piston body 17. A tube 19 connects the upper and lower pistons and is provided intermediate of its ends with packing cups 20 which operate in the liner 2. The upper portion of the piston tube 19 is provided with a series of perforations 21 through which the liquid passes upon the descent of the piston. Packing cups 22 are fitted to the lower portion of the piston tube a short distance above its connection with the lower piston. A series of openings 23 are formed in the lower end portion of the piston tube

19 below the packing 22 to admit of the liquid passing therethrough in the operation of the pump. Openings 24 are provided in the sides of the working barrel at a point above the liner 3.

The foot section 26 receives upper and lower stand valves and is provided in opposite sides with passages 27 and 28, said passages being separated from each other and having their inner ends overlapped and in communication with the interior or bore of said passage. The passage 27 has communication with the interior of the foot section by means of an opening 29 at its upper end. The passage 28 communicates at its lower end with the bore of the section 26 by means of an opening 30. The upper stand valve 31 is similar in construction to the lower stand valve 32, the two stand valves being connected by means of a coupling 33 upon which is fitted packing 34, the latter being arranged between the openings 29 and 30. The lower portion of the coupling 33 is closed or made solid, whereas the upper portion is provided with openings 35 to admit of the liquid passing from the upper portion of the foot section into and through the hollow piston body 31 of the upper stand valve. Strainer sections 36 and 37 are fitted to the lower end of the foot section 26.

The parts being assembled substantially as herein set forth, the operation of the pump is as follows: Upon the down stroke of the upper and lower pistons, the liquid, oil or water, confined in the pump above the stand valves, passes above said pistons into the discharge pipe 3^a. It is to be noted that a jacket 38 surrounds the working barrel and is spaced therefrom and is jointed at its upper end thereto and connected at its lower end to the foot section 26. An opening 39 is formed in a side of the working barrel near its lower end and establishes communication between the lower portion of said working barrel and the space inclosed by the jacket 38. It is assumed that the pump is prime. As the pistons descend the liquid in the lower portion of the working barrel passes through the lower piston or bucket into and through the piston tube 19, thence upward through the upper piston into the discharge pipe 3^a. The liquid in the upper portion of the working barrel above the packing 20 passes through the openings 21 into the upper portion of the piston tube, thence through the upper piston or bucket into the discharge pipe. Upon the down stroke of the pistons both stand valves close. As the pistons move upward their valves 13 and 18 become seated and the stand valves open, thereby permitting liquid to be drawn into the working barrel and the space surrounding said working barrel and inclosed by the jacket 38. The upper piston or bucket draws liquid into the space of the working barrel above the packing 20, said liquid entering the space inclosed by the lower screen 36 and passing through the lower stand valve 32 into the space below the packing 34, thence through opening 30 into passage 28 into the space 40 inclosed by the jacket 38, thence through openings 24 into the space of the working barrel above the packing 20. The lower piston or bucket draws liquid into the space formed between the screens 36 and 37, thence into passage 27, through opening 29 into the space of the foot section above the packing 34, thence through openings 35 and into and through the stand valve 31 into the space of the working barrel below the said lower piston or bucket.

From the foregoing it will be readily understood that the two pistons or buckets and the two stand valves arranged as specified, materially increase the capacity of the pump and enable a continuous discharge, the latter being about double the volume of a pump of like stroke and piston area.

Having thus described the invention, what is claimed as new is:

1. In a pump of the character specified, the combination of a foot section having a longitudinal bore and passages at the sides of the bore, the inner end portions of said passages overlapping and having communication with the bore and their outer ends opening through opposite ends of said section, stand valves arranged within the bore of the foot section and at or near the ends thereof, a packing arranged within the bore of the foot section between said stand valves and between the openings establishing communication between the aforesaid passages and bore, a working barrel having connection with the foot section, a jacket surrounding the working barrel and also having connection with the foot section, and buckets arranged to operate in said working barrel.

2. In a pump of the character specified, the combination of a foot section having a longitudinal bore and passages at the sides of the bore with their inner ends overlapped and in communication with the bore, and their outer ends extending through opposite ends of said foot section, stand valves arranged within the foot section at or near opposite ends thereof, a pipe connecting the stand and having its lower portion closed and its upper portion formed in its sides with a series of openings, packing fitted upon said pipe below the openings and arranged between the points of communication of the aforesaid passages with the bore of the foot section, a working barrel having connection with the foot section, a jacket surrounding the working barrel and also having connection with the foot section, and buckets arranged to operate in said working barrel.

3. In a pump of the character described,

the combination of a working barrel having openings in its sides near its ends and intermediate of its ends, a jacket surrounding the working barrel, a liner arranged within the working barrel between the upper and intermediate openings in the sides thereof, outwardly opening valves fitted to the outer sides of the working barrel to close the said intermediate openings, upper and lower buckets arranged to operate in the working barrel above and below the said liner, a piston tube connecting said upper and lower buckets, and a packing fitted upon the piston tube and arranged to operate within the said liner.

4. In a pump of the character described, the combination of a working barrel having openings in its sides near its ends and intermediate of its ends, a jacket surrounding the working barrel, a liner arranged within the working barrel between the upper and intermediate openings in the sides thereof, outwardly opening valves fitted to the outer sides of the working barrel to close the said intermediate openings, upper and lower buckets arranged to operate in the working barrel above and below the said liner, a piston tube connecting said upper and lower buckets and having openings in the sides of its upper portion, and a packing fitted to the piston tube below the upper portion having the openings formed therein and arranged to operate in the said liner.

5. The herein described deep well pump, comprising a foot section having a longitudinal bore and passages at the sides of the bore, the inner ends of said passages overlapping and having communication with the bore, and their outer ends extending through the extremities of the foot section, stand valves arranged within opposite end portions of the bore of said foot section, a packing located within said bore between the stand valves and the points of communication of said passages with the said bore, a working barrel having openings in its sides, a jacket surrounding the working barrel, both the working barrel and jacket having connection with said foot section, a liner located within the working barrel, upper and lower buckets arranged to operate within the working barrel, a piston tube connecting said buckets and having its upper portion perforated, and packing fitted upon the piston tube below the perforated portion thereof and arranged to operate in the said liner.

In testimony whereof I affix my signature in presence of two witnesses.

FREDERICK W. BAINES. [L. S.]

Witnesses:
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GEORGE ELY.