

No. 748,520.

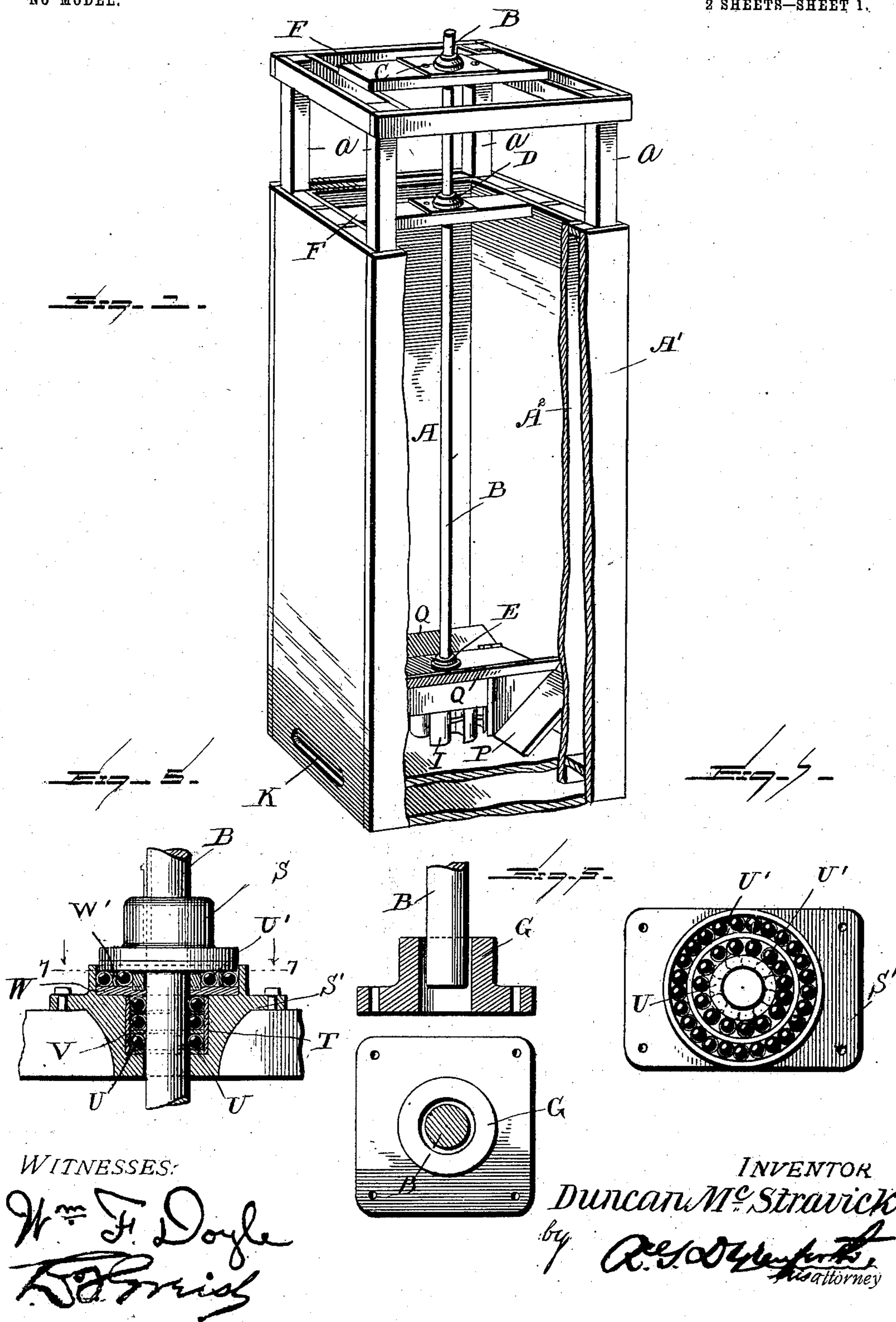
PATENTED DEC. 29, 1903.

D. McSTRAVICK.  
PUMP.

APPLICATION FILED DEC. 16, 1901.

NO MODEL.

2 SHEETS—SHEET 1.



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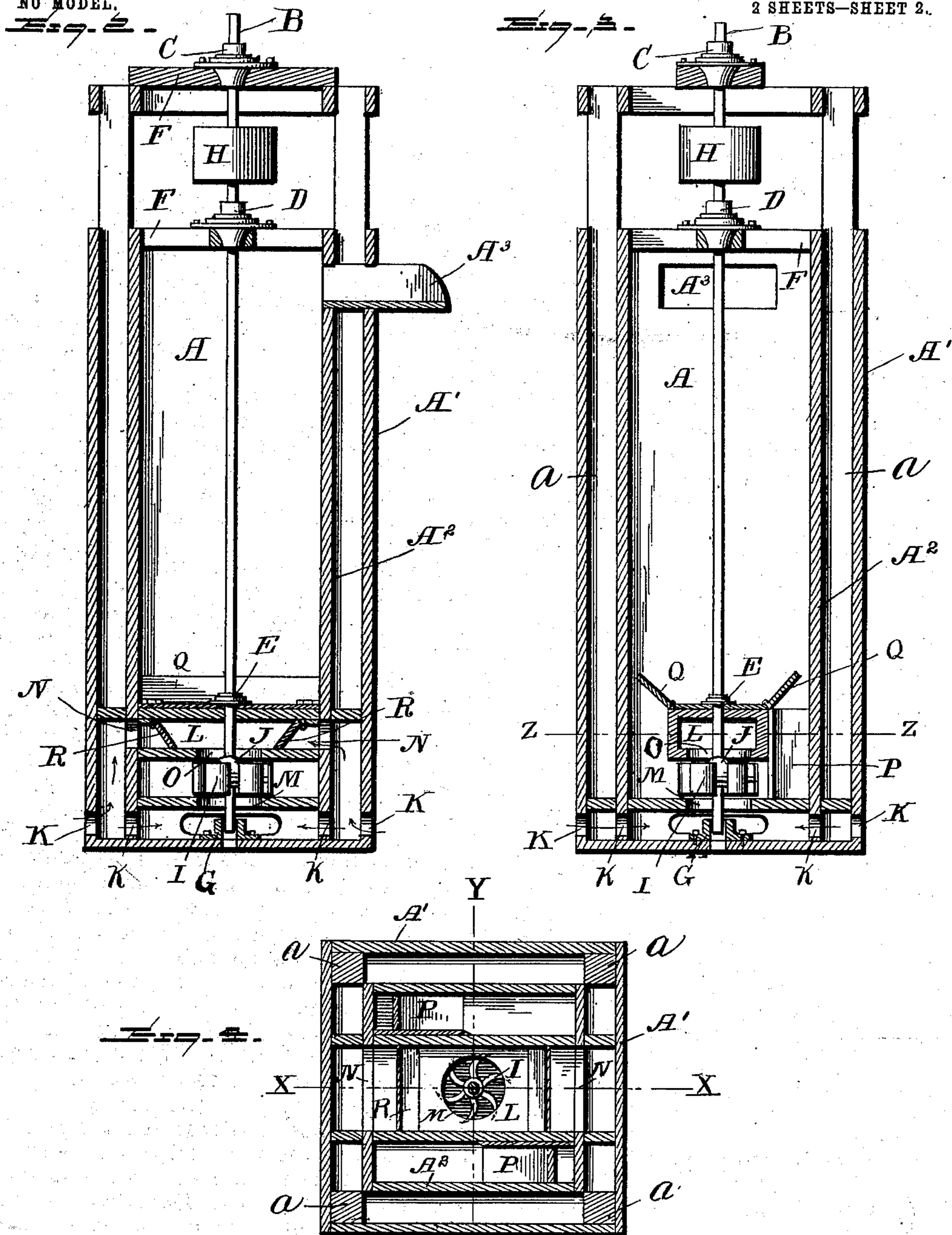
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2 SHEETS—SHEET 2.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

DUNCAN MCSTRAVICK, OF NEW ORLEANS, LOUISIANA.

## PUMP.

SPECIFICATION forming part of Letters Patent No. 748,520, dated December 29, 1903.

Application filed December 16, 1901. Serial No. 86,182. (No model.)

*To all whom it may concern:*

Be it known that I, DUNCAN MCSTRAVICK, a citizen of the United States, residing at New Orleans, in the parish of Orleans and State of Louisiana, have invented certain new and useful Improvements in Pumps; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to that class of rotary pumps in which a wheel of the centrifugal type is mounted upon a vertical spindle or shaft, the same being inclosed in a suitable box having apertures near or at its bottom for the entrance of water and the upper end of said box being open for the discharge of water. In pumps of this general type a great objection has been found to exist in the tendency upon the stoppage of the machinery of the water immediately and with great force to rush out of the casing at the apertures where it entered, often breaking or displacing the interior mechanism of the pump, and also making it necessary first to pump the box full of water before the discharge flow from the top of the pump-box will begin, thus causing a waste of time, power, and damage to the machinery. It is also an objection common to many of this type of pump that they will only operate successfully when the water-supply is of sufficient depth to allow the pump-box to be submerged for a considerable portion of its height.

The object of my invention is not only to produce a pump operating with less friction in the shaft-bearings, to reduce the resistance encountered by the water in its passage upward through the pump-box, but also to provide means whereby the pump will continue to operate and lift water until the source of supply is practically entirely exhausted and a means whereby the water once brought into the pump-box will be prevented from falling backward out of the same upon the stoppage of the pump machinery and whereby the pump will be always ready for operation upon the application of motive power and without the usual preliminary "priming." I accomplish these objects by the construction illustrated in the accompanying

drawings, in which similar letters refer to similar parts throughout, and in which—

Figure 1 is a view in perspective of a pump embodying my invention. Fig. 2 is a view in vertical section on the line X X of Fig. 4. Fig. 3 is a similar view on the line Y Y of Fig. 4. Fig. 4 is a view in horizontal section on the line Z Z of Fig. 3. Fig. 5 is a detail sectional view of the bottom step. Fig. 6 is a detail view of the ball-bearings. Fig. 7 is a plan view of the ball-bearings.

Referring more specifically to the drawings, A is the pump-box, containing the vertical shaft B, journaled in bearings C, D, and E, supported in position upon the cross-beams F and operating at its lower end in the step G. The shaft carries near its upper end the power-pulley H and near its lower end the centrifugal wheel I, held in position by the usual collar J. The pump-box A may be built round, rectangular, or octagonal and of wood, iron, or other suitable material. In my preferred construction it is made square and formed of four corner-posts *a*, and, if desired, of intermediate posts for greater strength, with planking on the outside of the same, forming the outer casing A'. In order to secure a smooth interior surface, I prefer to construct the same with a layer of planking A<sup>2</sup> on the inside of the posts *a* and may break the corners by placing therein lengths of quarter-round. At the upper end of the pump-box I provide the trough A<sup>3</sup> or any other suitable means to carry off the water. The ports K admit water from the exterior and transmit the same through the ports *k* and M to the lower side of the wheel I. The suction-box L, arranged transversely of the box above the water-wheel, receives water from the exterior by means of the ports K and N and transmits it to the upper side of the water-wheel through the opening O. Within the pump-box and approximately on a level with the water-wheel are inclined guides P, arranged concentrically of the pump-wheel and adapted to give an upward direction to the water thrown out by the centrifugal action of the wheel I. Above the inclined guides P are drop-valves Q, which permit the upward passage of the water, but close against a downward flow. Arranged within the suction-box

L are drop-valves R, which permit an inward flow of water from the ports K and N, but prevent an outward flow of the same.

The shaft B may, if desired, be journaled in a bearing-box, or to reduce the friction I have designed and applied special ball-bearings intended to carry the principal part of the combined weight of the shaft and wheel and to lessen the lateral friction incident to the operation of the pump. My preferred form of ball-bearing consists of the upper flanged collar S and the base S', provided with a flange for properly securing the same in position and having a stepped recess for the reception of the balls. The lower portion of the recess contains a bearing adapted to lessen lateral friction which consists of the cylindrical casing T, fitted to the inner wall of the recess and serving as a seat for the balls U, which are arranged in vertical layers and guided by flat rings V around the shaft B. The upper portion of the recess contains a bearing adapted to receive the vertical weight of the shaft and pump-wheel and consists of the flat ring W, resting upon the bottom of the recess and serving as a seat for the balls U', which travel in concentric grooves formed between separate concentric rings W' and upon which balls rests the upper flanged collar S. If desired, it is obvious that the lateral or the vertical portion of the two-part bearing may be omitted without departing from the spirit of my invention; but greater efficiency is attained by their conjoint use.

In pumps of this character considerable trouble ensues by reason of the rapid wear of the lower bearing. I therefore provide a step G, consisting of a flanged hub, with its bore of slightly larger diameter than the shaft B and opening downward, thereby allowing of the ready and rapid discharge of sand or such other gritty substances as usually accumulate at that point.

The operation of my pump is as follows: The water being admitted through the ports M to the lower side of the wheel I and through the ports K and N and by means of the channel formed by the inner and outer casings of the pump-box and past the valves R in the suction-box L and thence through the port O to the upper side of the wheel I is drawn in by the wheel from above and below and thrown by its centrifugal action into the pump-box. There by means of the inclined guides P it is directed upward through the openings controlled by the valves Q to the upper portion of the pump-box, where it is drawn off by the trough A<sup>3</sup> or other suitable discharge.

By my improved construction the pump will continue to lift water until the level of the water-supply has fallen to the level of the ports K and N, whereas in other pumps of this general type the pump becomes inoperative as soon as the water reaches the level

of the suction-box L. In case of the stoppage of the pump through design or by accident the valves Q and R automatically close and prevent the water from flowing backward out of the pump-box, thus constituting a water-tight box which holds the water until it is desired again to start the pump. Thus I not only obviate the danger of displacement and breaking of the apparatus by reason of the rush of water downward out of the pump in case of stoppage, but also the strain upon the pump mechanism in starting the same with the pump-box empty.

Wherefore having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a pump of the character described, the combination, with the pump-box, a centrifugal water-wheel located therein, and a suction-box having ports on the sides and top communicating with the pump-box, of valves Q and R arranged to open upward and located, respectively, in water outlet and inlet passages, as and for the purpose specified.

2. In a pump of the character described, a pump-box having an inner and outer casing, a water-wheel near the bottom of the inner casing, ports communicating with the exterior and admitting water to the lower portion of the wheel and also, by means of a passage between the inner and outer casing, to the upper side of the wheel, substantially as described.

3. In a centrifugal pump, a pump-box having an inner and outer casing, a shaft journaled within the inner casing and carrying a centrifugal water-wheel near its lower end, a suction-box above said wheel, ports in the lower end of the pump-box below the level of the wheel admitting water to the lower side of the wheel and also, by means of the passage between the inner and outer casing, to said suction-box, substantially as described.

4. In a centrifugal pump, a pump-box having an inner and an outer casing, a centrifugal wheel therein, common ports in said outer casing arranged to admit water to both the top and bottom of said wheel, and valves positioned above said wheel in said inner casing and arranged to prevent the backward flow of water, substantially as described.

5. In a rotary pump, the combination of a pump-box, a shaft mounted therein, a water-wheel carried by the shaft, and a journal-box of larger diameter than said shaft positioned to support the lower end of said shaft and opening downward, thereby permitting the escape of gritty substances through said journal, substantially as described.

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

DUNCAN McSTRAVICK.

Witnesses:

FRED. ZENZEL,

JOHN FETTEBEL.