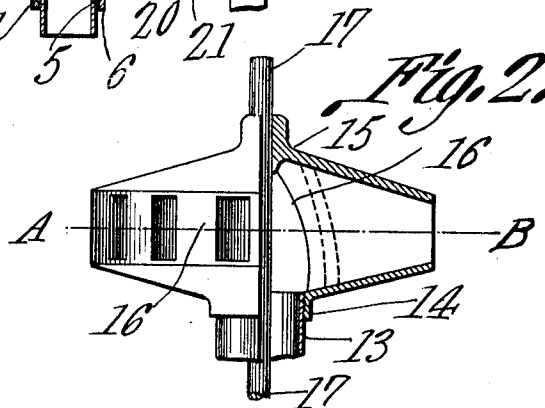
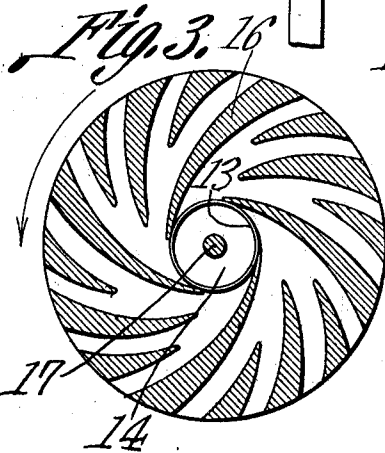
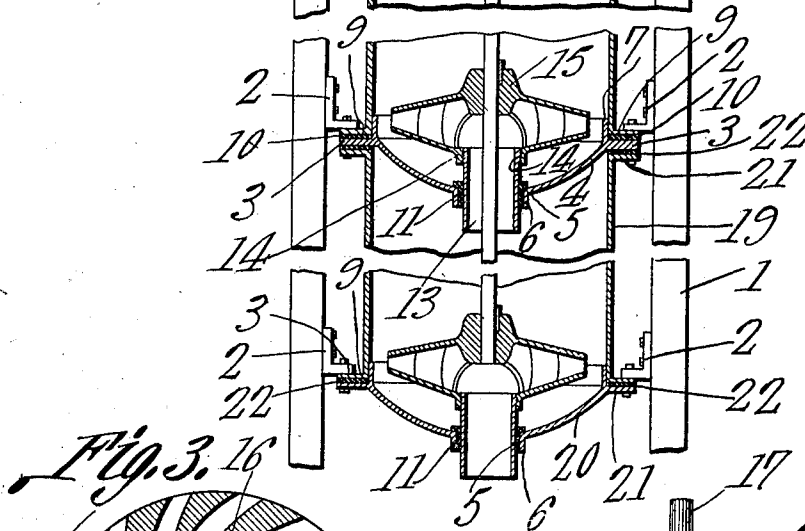
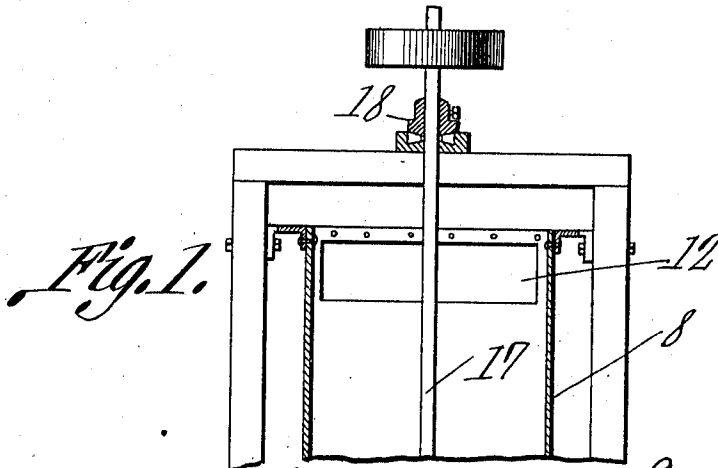


1,004,015.

Patented Sept. 26, 1911.

2 SHEETS-SHEET 1.



Witnesses

J. P. Tomlin
Robert S. Lawson

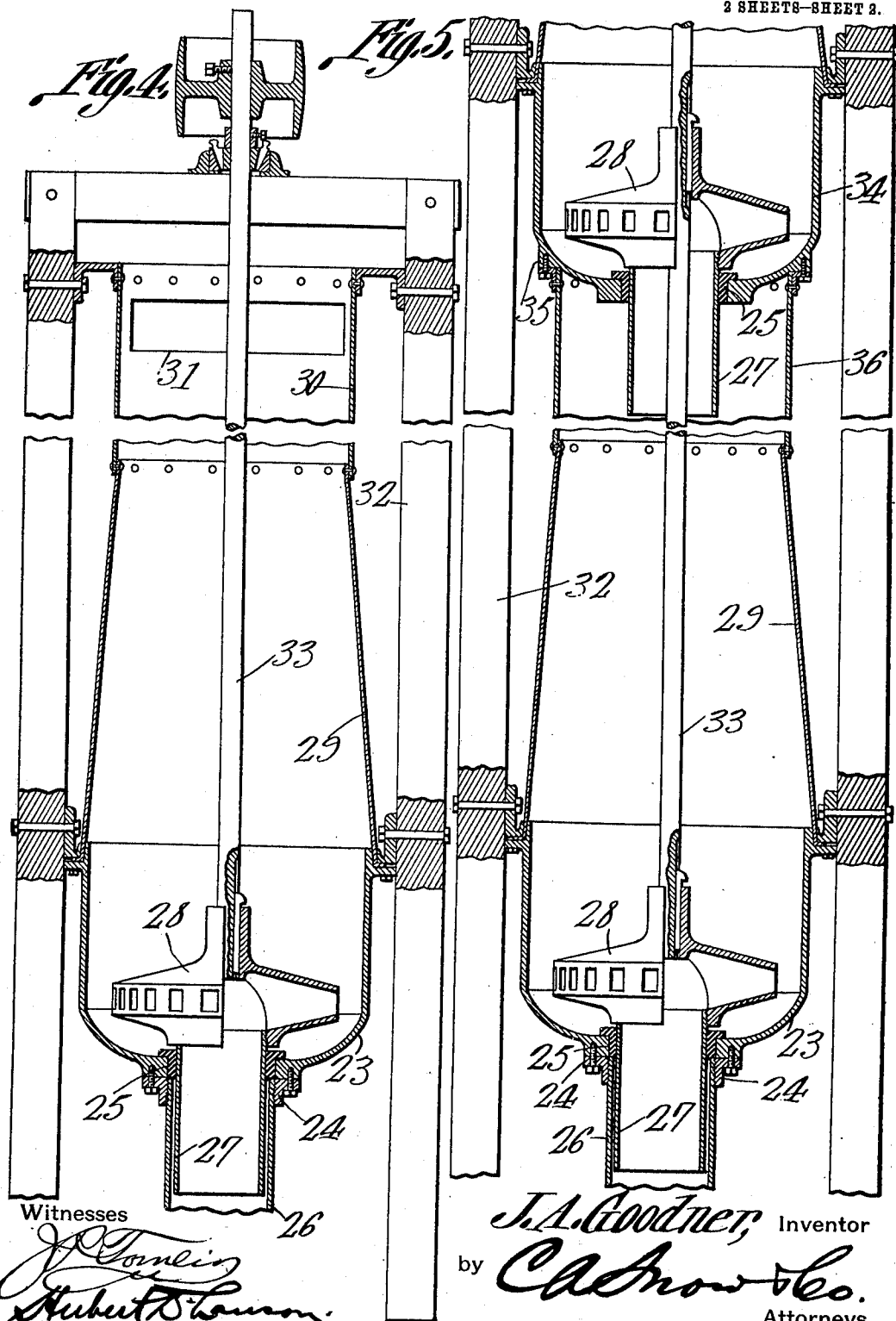
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1,004,015.

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CENTRIFUGAL PUMP.
APPLICATION FILED DEC. 16, 1910.

Patented Sept. 26, 1911.

2 SHEETS—SHEET 2.



Witnesses

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UNITED STATES PATENT OFFICE.

JAMES A. GOODNER, OF ROCKY FORD, COLORADO.

CENTRIFUGAL PUMP.

1,004,015.

Specification of Letters Patent.

Patented Sept. 26, 1911.

Application filed December 16, 1910. Serial No. 597,594.

To all whom it may concern:

Be it known that I, JAMES A. GOODNER, a citizen of the United States, residing at Rocky Ford, in the county of Otero and State of Colorado, have invented a new and useful Centrifugal Pump, of which the following is a specification.

This invention relates to centrifugal pumps of that type wherein a pump head or "runner" is mounted for rotation within a casing and operates to establish and maintain a suction to the center of the head from which point the water is discharged centrifugally into the casing.

One of the objects of the present invention is to so construct the head or "runner" that the water inlet opening thereinto is of greater area than the combined areas of the outlets, thus insuring a constant pressure of water while in the head.

A further object is to provide a head having a revoluble suction pipe depending therefrom and which is adjustably mounted within its bearing, said adjustment being effected by raising or lowering the head relative to the casing.

A further object is to provide a casing of improved form and novel means for connecting the parts of the casing.

With these and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and pointed out in the claims, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed, without departing from the spirit of the invention.

In the accompanying drawings the preferred form of the invention has been shown.

In said drawings:—Figure 1 is a central vertical section through a two stage pump embodying the present improvements, portions of the casing and shaft being removed. Fig. 2 is a view partly in elevation and partly in vertical section through one of the pump heads. Fig. 3 is a section on line A—B Fig. 2. Fig. 4 is a vertical section through a portion of a modified form of pump casing, the pump head being shown partly in section and partly in elevation.

Fig. 5 is a view similar to Fig. 4 but showing a modified form of two stage pump.

Referring to the figures by characters of reference 1 designates a supporting frame having brackets 2 secured thereto. These brackets are bolted or otherwise fastened to an annular flange 3 formed at the periphery of a bowl like receiver 4 in which is formed a central opening 5 surrounded by a flange 6 depending from the receiver. Another annular flange 7 extends upwardly from the margin of the receiver 4 and is surrounded by the lower end of a cylindrical casing 8, said lower end having an annular flange 9 located between the flange 3 and the brackets 2. A gasket 10 may be interposed between the two flanges 3 and 9 so that when said flanges are bolted together and to the brackets a water-tight joint is formed between them. A bushing 11 is fitted within the opening 5 and is surrounded by the flange 6. An outlet opening 12 is formed in the casing close to the top thereof. A suction pipe 13 is mounted for rotation within the bushing 11 and is screwed or otherwise secured in an opening 14 formed in the center of the bottom of the pump head 15. This head is preferably cast in a single piece and includes upper and lower oppositely disposed portions which are substantially conical and which are connected by integral webs 16 curved from the inlet opening 14 to the periphery of the head to form relatively narrow passages diminishing in height from the center to the periphery of the head. The inner portions of these webs are tangentially disposed relative to the opening 14 so that, when the head rotates in the direction indicated by the arrow in Fig. 3, water will be permitted to flow freely from the opening 14 to the passages between the webs. It will be noted, moreover, that the combined areas of the outlet openings formed at the periphery of the head are considerably less than equal to the combined areas of the inlets of the passages between the webs 16. As a result, when the head is rotated at a high speed and water discharged therefrom at the periphery thereof, a pressure of water within the head is constantly maintained, because of the fact that the water cannot leave the head as rapidly as it is supplied thereto. The head is secured to a shaft 17 extending longitudinally

through the casing 8 and provided with a suitable bearing 18 above the frame 1, any suitable means, not shown, being utilized for driving the shaft.

5 As shown in Fig. 1 more than one pump head may be utilized, in which event a casing 19, similar to casing 8, is arranged below the receiver 4 and carries a receiver 20. The head located within this lower casing is similar to the upper head, and both are attached to the same shaft. Casing 19 is preferably formed with an annular flange 21 at its upper end which is bolted to the lower face of flange 3, a gasket 22 being interposed between the flanges 21 and 3 if preferred.

In using the pump, the lower suction pipe 13 is partly submerged and the shaft 17 is rapidly rotated. The water contained within the heads will be thrown outwardly from the passages therein and into the respective casings 19 and 8, thus setting up a suction. The discharged water will fill the lower casing 18 and be drawn therefrom by the upper pump head into the upper casing 8 from which it will overflow through the discharge opening 12. Should the suction tubes 13 become worn, the shaft 17 can be elevated so as to bring unworn portions of the tubes into the bushings 11, after which the pump can be operated as before.

In Fig. 4 an ordinary lift pump has been shown, the receiver 23 being of greater depth than the one shown in Fig. 1 and having an interiorly screw threaded ring 24 fastened to the bottom thereof and around the central opening 25. This ring receives and engages the threaded end of a suction pipe 26 which may be extended downwardly into a bored hole. The short suction pipe 27, which is similar to the pipe 13 hereinbefore described, extends into the pipe 26 and from the pump head 28. The form of casing used in connection with this modified structure is somewhat different from that disclosed in Fig. 1 and consists of a frusto-conical portion 29 extending around and secured to the upper portion of the receiver 23 and attached, at its upper end, to a cylindrical portion 30 having an elongated discharge opening adjacent the top thereof, as shown at 31. This casing is secured within a frame 32 in any preferred manner and the shaft 33 extending from the pump head projects upwardly above the casing and may be driven in any manner described.

In Fig. 5 the features disclosed in Fig. 4 have been shown embodied in a two stage pump. In this structure the receiver 34 of the upper portion of the pump has an annular enlargement 35 to which is bolted or otherwise secured the upper portion 36 of the casing of the lower pump.

As has heretofore been stated, by deepening the receiver as shown in Figs. 4 and 5,

a considerable adjustment of the suction pipe 27 can be effected without removing the pump head from the receiver and causing the water to discharge directly against the casing. The operation of the pump shown in Figs. 4 and 5 is similar to that hereinbefore described in connection with the structure shown in Fig. 1. It has been found, however, that when the lower portion of the casing is made frusto-conical, as shown in Figs. 4 and 5, the water is packed to a greater extent within the casing and the continuous discharge of water, with considerable force, is secured.

What is claimed is:—

1. In a centrifugal pump, the combination with a bowl like receiver having a central inlet opening, and a casing upstanding from the receiver and having an outlet, of a head mounted for rotation above the inlet and consisting of spaced oppositely disposed conical portions and integral curved webs between said portions, the lower one of said portions having an inlet opening from which the webs extend tangentially, and a suction pipe extending from the inlet opening in the head and extending through and revoluble and slidable within the opening within the receiver.

2. A centrifugal pump including a bowl like receiver having a central inlet, a casing upstanding from the receiver and having an outlet, a head mounted for rotation above the inlet and including oppositely disposed conical portions and curved webs interposed between and integral with said portions and forming passages gradually diminishing in transverse area from the center to the periphery of the head, there being an inlet opening at the center of said head and from which the passages extend, and a suction pipe extending from said inlet opening and mounted for rotation within the inlet in the receiver, said pipe being shiftable longitudinally within said receiver inlet.

3. A centrifugal pump including a receiver having a central inlet opening and an annular flange, a casing bearing upon said flange, a supporting structure, means for securing the flanges to said structure, a shaft concentric with the inlet opening, and extending longitudinally within the casing, a pump head revoluble with the shaft and having a central inlet and peripheral outlets, there being curved passages between the inlet and the outlets, said passages diminishing in transverse area toward the outlets, and a suction tube extending from the inlet of the head and extending through the inlet opening in the receiver, said tube being revoluble with the head and shiftable longitudinally within the opening in the receiver.

4. In a centrifugal pump, a receiver, a casing upstanding therefrom and having a peripheral discharge opening adjacent the

upper end thereof, a pump head mounted for rotation within the casing, and a suction pipe detachably connected to and extending from the head and slidably and revolubly
5 mounted within the receiver.

5. In a centrifugal pump, a receiver, a supply pipe secured to and opening into the receiver, a casing upstanding from the receiver and having an outlet opening, a pump
10 head mounted for rotation within the receiver, and a suction pipe detachably con-

nected to and revoluble with said head and mounted to slide and to rotate within the supply pipe.

In testimony that I claim the foregoing 15 as my own, I have hereto affixed my signature in the presence of two witnesses.

JAMES A. GOODNER.

Witnesses:

G. M. HARPER,
C. S. SHARP.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."