(No Model.) 2 Sheets—Sheet 1.

G. H. CAUGHREAN.

PUMP.

No. 385,842. Patented July 10, 1888.

Fig. 1.

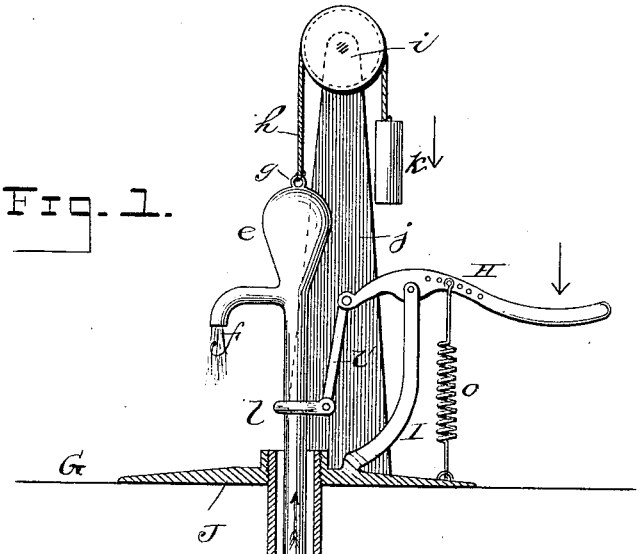
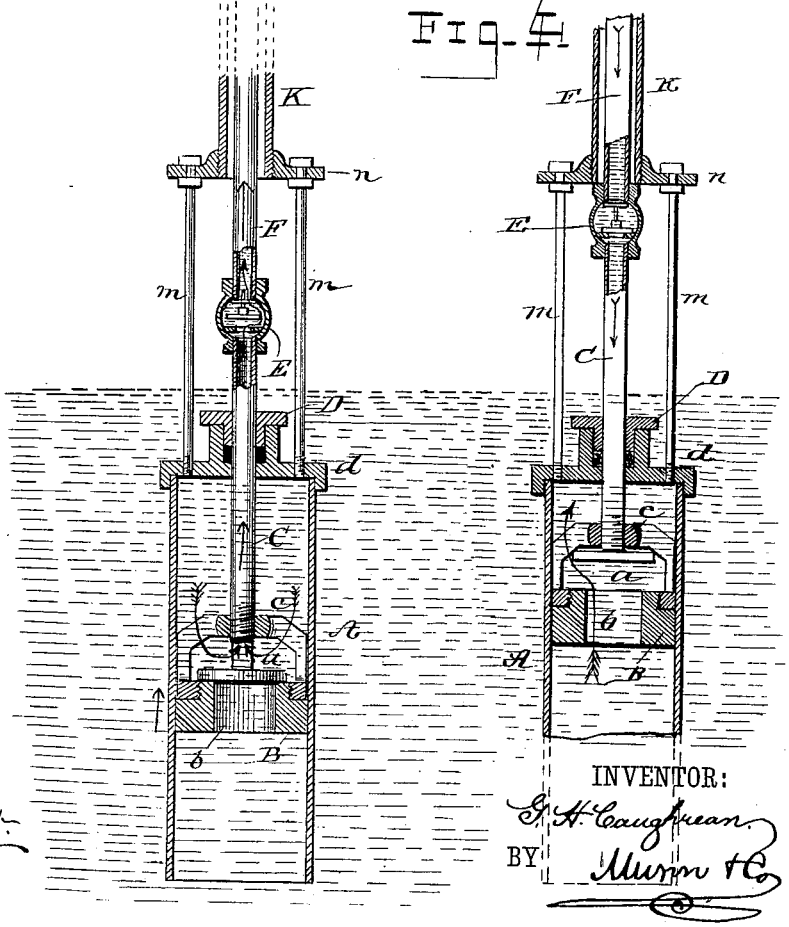


Fig. 4.



WITNESSES:

O. D. Mott.

C. Sedgwick.

INVENTOR:

G. H. Caughrean.

BY Munn & Co.

ATTORNEYS.

N. PETERS, Photo-Lithographer, Washington, D. C.

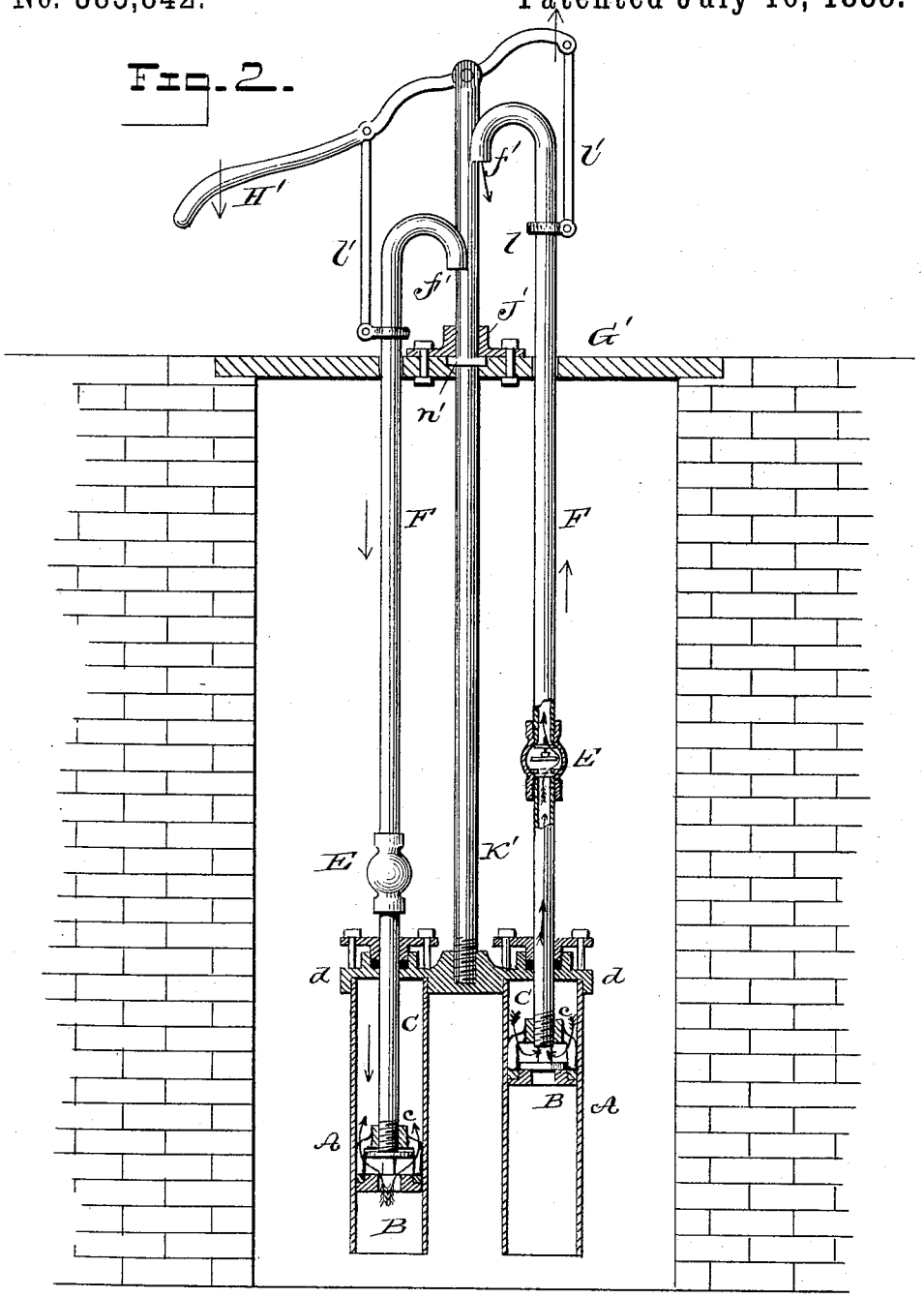
(No Model.) 2 Sheets—Sheet 2.

G. H. CAUGHREAN.

PUMP.

No. 385,842. Patented July 10, 1888.

Fig. 2.

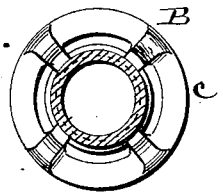


WITNESSES:

D. D. Mott.

C. Sedgwick.

Fig. 3.



INVENTOR:

G. H. Caughrean.

BY Munn & Co

ATTORNEYS.

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

GEORGE H. CAUGHREAN, OF NEVADA, MISSOURI, ASSIGNOR TO HIMSELF AND WILLIAM H. ROBINSON, OF SAME PLACE.

PUMP.

SPECIFICATION forming part of Letters Patent No. 385,842, dated July 10, 1888.

Application filed February 28, 1888. Serial No. 265,610. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. CAUGHREAN, of Nevada, in the county of Vernon and State of Missouri, have invented a new and Improved Pump, of which the following is a specification, reference being had to the annexed drawings, forming a part thereof, in which—

Figure 1 is a side elevation, partly in section, of a single-acting pump constructed according to my improvement. Fig. 2 is a side elevation, partly in section, of a double-acting pump. Fig. 3 is a horizontal section of the pump-plunger; and Fig. 4 is a vertical section of a portion of the single-acting pump, illustrating the position of the valves when the piston and riser are descending.

Similar letters of reference indicate corresponding parts in all the views.

The object of my invention is to provide a pump especially designed for deep wells, but adapted to any kind of pumping.

My improved pump belongs to the general class known as "submerged," and in that particular or sub-class in which a weight or equivalent is applied to the pump-lever to counterbalance the hollow piston-rod and the column of water contained therein. I have adapted a novel construction and combination of parts, whereby a new and important advantage is attained.

The pump-barrel A is entirely open at the bottom instead of being provided with a foot-valve, like some other pumps of this general class. The piston B is provided with the suction-valve *a*, adapted to close the central opening, *b*, of the piston. The piston *b* is provided with a spider, *c*, in which is inserted a pipe, C, which extends through a stuffing-box, D, in the pump-head *d*. To the pipe C is attached a vertical check-valve, E, in which is inserted the riser F, which extends upward above the well-covering G, and is provided with an air-chamber, *e*, and discharge-spout *f*. Upon the top of the air-chamber *e* is formed an eye, *g*, for receiving a cord, *h*, which extends over a sheave, *i*, journaled in posts *j*. To the extremity of the rod *h* is attached a weight, *k*, which counterbalances the riser F and the parts connected therewith; also, the water contained by the riser.

To the riser F, above the well-covering, is attached a collar, *l*, which is connected by a link, *l'*, with the pump-handle H, the said pump-handle being fulcrumed in the standard I, secured to the pump-base J. In the top of the cylinder A are inserted rods *m*, which are connected with a flange, *n*, in which is inserted a pipe, K, also screwed into the base J. The pipe K incloses the riser F and supports the pump-barrel A.

In lieu of employing the counterbalance-weight *k*, I may use a spring, *o*, which is pivotally connected with the handle H, and attached by its lower end to the pump-base J.

In Fig. 2 I have shown two pumps of substantially the same construction as that already described, and so far as the parts are alike they will be described by the same letters of reference. The heads *d* of the two pump-cylinders are formed in a single casting, into which, between the pump-cylinders A, is screwed a rod, K', which extends to the well-covering G, and is provided with a collar, *n'*, resting in a cavity in the well-covering, and secured in place by the flanged collar J'. In the upper end of the rod K', which extends above the well-covering, is pivoted a pump-handle, H', which is connected on opposite sides of its pivot with the risers F by means of the collars *l*, embracing the risers, and the links *l'*, connecting the collars with the handle H'. In the present case the upper ends of the risers are curved over toward each other, forming discharge-spouts *f'*, which are both capable of discharging into the same vessel.

The operation of my improved pump, as shown in Figs. 1 and 2, is as follows: The barrel A being immersed in the water, the handle H is raised, thereby forcing down the riser F, carrying down the piston B, thus causing the valve *a* to open, as shown in Fig. 2, and allowing the water to flow into the space in the barrel above the said piston. Upon reversing the movement of the handle the piston B is raised, (see Fig. 1,) and the water in the closed space between the piston and head *d* of the barrel or cylinder is forced to enter the pipe C, flow past the check-valve E, up through the riser F, and out at the spout *f*. The check-valve E retains the water forced into the riser, and when the piston B is again pushed down a new supply of water is taken in the cylinder A above the

piston B in the manner before described, and upon again raising the piston by means of the handle H the water is again forced up the riser, and after the riser is filled by continued pumping the water is discharged through the spout *f*. When the riser is full, the riser, with its contents, will be approximately counterbalanced by the weight *k* or the spring *o*, so that the only power required to raise the water will be that expended in overcoming the friction of the parts of the pump and the water, and the hydraulic pressure of the latter, (which necessarily varies with the depth from which it is raised.) In this respect my pump has an important advantage over those in which the barrel or cylinder is not entirely open at the bottom but provided with a foot-valve, since the latter supports nearly the whole weight of the column of water in the hollow piston-rod when the piston is descending, so that the weight is not counterbalanced, and the operator must therefore apply a force adequate to lift it in order to carry the piston down. In my pump the counter-balance is effective during the descent as well as the ascent of the piston, which is rendered practicable by the absence of a foot-valve and leaving the barrel open.

In the pump shown in Fig. 2 the weight *k* or spring *o* is replaced by an additional riser. In this case the risers both have the same weight, and, as they both contain the same amount of water, they will exactly counterbalance each other, so that a continuous flow of water is maintained by the expenditure of only enough power to overcome friction and the hydraulic pressure.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

In a submerged pump, the combination of the following elements: the barrel A, having its bottom open, as shown, in contradistinction to pump-barrels which are provided with a foot-valve, the piston B, having the valve *a*, and constructed with open spaces above said valve, which permit water to pass into the space between the piston and head of the cylinder, the hollow piston-rod C and riser F, the check-valve E, arranged in the latter, and a counterbalance connected with said riser, as shown and described.

GEO. H. CAUGHREAN.

Witnesses:
C. HURD,
W. T. LOW.