(No Model.)

2 Sheets—Sheet 1.

M. R. TURNER, R. G. KIRBY & C. L. WHITE.

PUMP.

No. 582,561. Patented May 11, 1897.

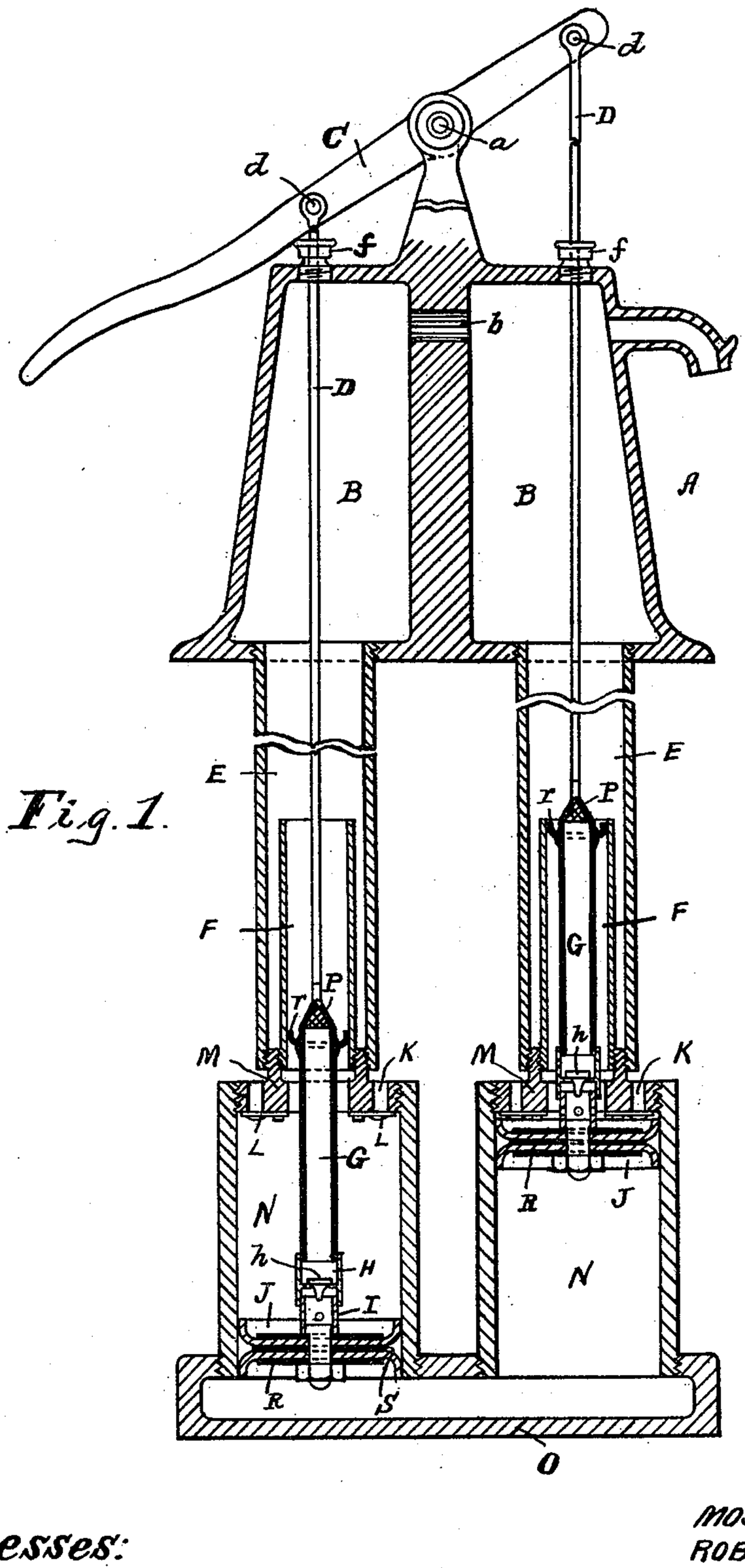

Fig. 1.

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(No Model.)

2 Sheets—Sheet 2

M. R. TURNER, R. G. KIRBY & C. L. WHITE.

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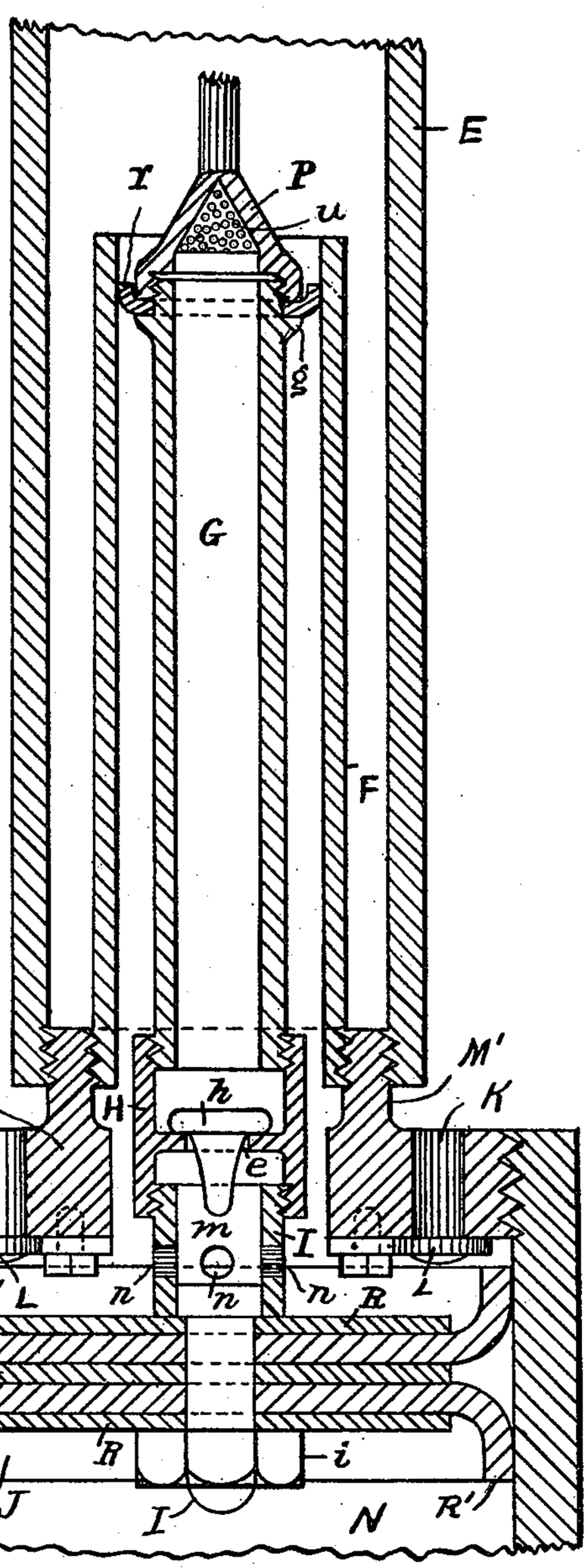

Fig. 2.

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UNITED STATES PATENT OFFICE.

MOSES R. TURNER, ROBERT G. KIRBY, AND CHARLES L. WHITE, OF GREENSBURG, INDIANA; SAID TURNER AND KIRBY ASSIGNORS TO SAID WHITE.

PUMP.

SPECIFICATION forming part of Letters Patent No. 582,561, dated May 11, 1897.

Application filed June 18, 1896. Serial No. 596,013. (No model.)

To all whom it may concern:

Be it known that we, MOSES R. TURNER, ROBERT G. KIRBY, and CHARLES L. WHITE, citizens of the United States, residing at Greensburg, in the county of Decatur and State of Indiana, have invented certain new and useful Improvements in Pumps; and we do 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

Our invention relates to that class of pumps which have for their object the elevating of water or other liquids; and it consists of a peculiar combination and arrangement of cylinders, pistons, and other devices whereby a double-acting easy-working pump is produced, as will be more fully described hereinafter.

The object of our invention is to overcome the weight of the liquid to be lifted by providing a pump in which are two columns of liquid of approximately equal weight, one constantly balancing the other, whereby the force expended in operating the pump is reduced to the minimum. The above object is attained in our invention, which is of simple design, cheaply manufactured, and is durable and economical in use.

Referring to the drawings, Figure 1 represents a central vertical sectional view of the pump, parts being broken out to shorten the illustration, the lever and connections being a side view; and Fig. 2 is a central vertical sectional view of upper part of one cylinder and connecting parts.

In the drawings, N N designate duplicate cylinders; O, a base connecting the lower end of the cylinders; M M, the upper cylinder-heads; J J, pistons; E E, discharge-pipes; A, the pump-standard, having chambers B B; C, a lever operating the pistons by means of rods D D and connecting hollow plungers G G.

F F are tubes in which the hollow plungers work.

In constructing our pump the cylinders N N are preferably made of tubing, either of brass or other metal, and have screw-threads cut on the outside of the lower ends, similar threads being cut on the inside of the upper ends to receive the heads M M, although in some cases the heads and base may be suitably attached by other means. The base O is cast and is provided with suitable threaded openings into which the cylinders are screwed, and, being hollow, provides a clear channel through it from the lower end of one cylinder to the lower end of the other.

The upper cylinder-heads M M are provided with inlet-openings K K, which are covered at the inside of the head by check-valves L L. At the outside the heads each have an annular flange M′, having screw-threads inside and outside, to which are screwed the tubes F F and discharge-pipes E E, the upper ends of the latter being screwed to the bottom of the standard A and opening into the chambers B B. The latter are connected by a channel *b*, and one or both chambers may have a suitable discharge-spout. The heads M have a circular central opening.

It will be understood that the discharge-pipes E E are composed of ordinary well-piping which is rough at the inside, and we use the tube F, which is preferably made of smooth brass, to provide a smooth and true surface for the packing *r* to work against, and these tubes are essentially a part of the cylinders, complete and ready to be attached to the ordinary discharge-pipes.

The pistons J J are composed of outside plates R R and a center plate S, between which are cup-leathers R′ R′, the leathers and plates having each a central hole through which passes the piston-rod I, having a nut *i* on the end, securing all together. The upper end of the rod I has a hollow portion *m* and is provided with outside screw-threads. The hollow portion has perforations *n* to permit liquid to enter from the outside. To the upper end of the rod I is a sleeve H, attached by means of screw-threads at the inside of the end, the upper end being likewise provided with threads to which is screwed the tube G. The sleeve has a valve-seat *e*, on top of which is a check-valve *h*.

Near the top of the tube G is a flange *g*, and

at the end of the tube are outside screw-threads over which is screwed a cap P, having at two sides a series of perforations *u*. The lower end of the cap presses against a cup-leather *r*, securing it against the flange *g*. The cap P is attached to the rod D.

At the top of the standard A the lever C is mounted and supported by a pin *a*. The rods D D are suitably connected to the lever by means of pins *d d* and pass through suitable packing-boxes *f f* and chambers B B and down through the discharge-pipes E E.

In adapting our pump for use in driven wells of small diameter the position of the cylinders with relation to each other may be suitably changed without affecting their efficiency, as one may be placed above the other close to the discharge-pipe of the other cylinder, the bottoms of the cylinders being suitably connected. It will be understood that the cylinders are to be submerged, the pipes E E and rods D D being made of suitable length to connect the upper and lower operative parts.

In practical operation one piston ascends while the other descends. The descending piston draws the liquid into the upper part of the cylinder through the inlet-openings K. The space below each piston and through the base is constantly of the same area and may contain either air or liquid. As the piston descends the weight of the column of liquid above is upon the check-valve *h* and cup-leather *r*, thus assisting the other piston to ascend by means of the connection through the base, and the lever at the top connecting the two rods D D. After the piston has reached the lower end of the cylinder and begins to ascend the valves L close, the pressure forces open the check-valve *h*, and the liquid passes upward through the openings *n*, plunger G, perforations *u*, and pipe E, discharging from the spout near top of standard. This action takes place in the other cylinder during its stroke, the two producing a continuous flow of liquid.

Having described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a pump the combination with a pair of cylinders rigidly connected at their lower ends to a suitable base having a passage or duct therethrough connecting the said lower ends, of the cylinder-heads provided with inlet-openings and check-valves seated at the inside of said head over said openings, each of said heads having a central opening and an outside annular flange provided with screw-threads inside and outside; a standard having two connected chambers and a suitable discharge-spout, the bottom of said standard being connected by discharge-pipes to the upper heads of said cylinders; a packed piston working in each of said cylinders, a tube connected to each of said upper cylinder-heads and extending upward within said discharge-pipes; a hollow piston-rod or plunger working in each of said tubes, each of said plungers being attached at its lower end to one of said pistons and having an internal check-valve near its lower end and perforations below said valve through the walls of said plunger; the cup-packing attached as shown at the upper part of said plunger thereto between the outside thereof and the inside of said tube; a perforated cap secured to the upper end of each of said plungers and each connected to a suitable rod, the upper ends of which are connected to a suitable lever supported upon said standard, substantially as and for the purposes shown and described.

2. In a pump, the combination of the cylinders, the base connecting the lower ends thereof, the heads attached to the upper ends of said cylinders, the tubes attached at the lower end thereof to said heads, the pistons working in said cylinders, the hollow rod or plunger attached to each of said pistons, said plungers having each an internal check-valve situated near the lower end thereof and perforations through the walls thereof between said valve and said piston, the perforated cap attached to the upper end of said plungers, suitable packing near said cap between said plunger and said tube, the discharge-pipes attached at their lower ends to said cylinder-heads and incasing said tubes, the standard having two connecting-chambers and connected to said discharge-pipes, and means whereby said plungers and pistons may be operated, substantially as shown and described, for the purposes set forth.

3. In a pump, the combination with a pair of cylinders and connecting-base providing a duct between the lower ends of said cylinders, of the standard A having the chambers B B and connecting-channel *b;* the head secured to the top of each of said cylinders and provided with a central opening and suitable check-valves; the pipes connecting said standard and said cylinder-heads; the smooth tube secured to each of said heads and extending upward into each of said pipes; the pistons in said cylinders; the hollow rods connecting said pistons and having the check-valve and perforations at the lower end thereof; packing between said tube and said hollow rod secured near the upper end thereof; and a pair of suitable rods connecting said hollow portions with means situated at the top of a well whereby said rods may be operated, substantially as shown and described.

4. In a pump, the combination of the cylinders; the connecting-base O; the heads M attached to the upper ends of said cylinders and each having a central opening therethrough and the inlets K and valves L, and the annular flange M′ provided with internal and external screw-threads; the tubes F connected to said internal screws; the pipes E connected to said external screw-threads; the standard connected to the upper end of said pipes; the pistons in said cylinders; the piston-rods I attached to said pistons and pro-

vided with the hollow portion *m* having the perforations *n;* the sleeves H having the check-valve *h* and attached to said hollow rod; the tube or plunger G attached to said sleeve and having at the upper end the packing *r;* the caps P secured to the upper end of said plungers; with means whereby said plungers and pistons may be operated, substantially as shown and described.

In testimony whereof we affix our signatures in presence of two witnesses.

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ROBERT G. KIRBY.
CHARLES L. WHITE.

Witnesses:
JAMES A. LUTHER,
ROBERT ST. JOHN.