

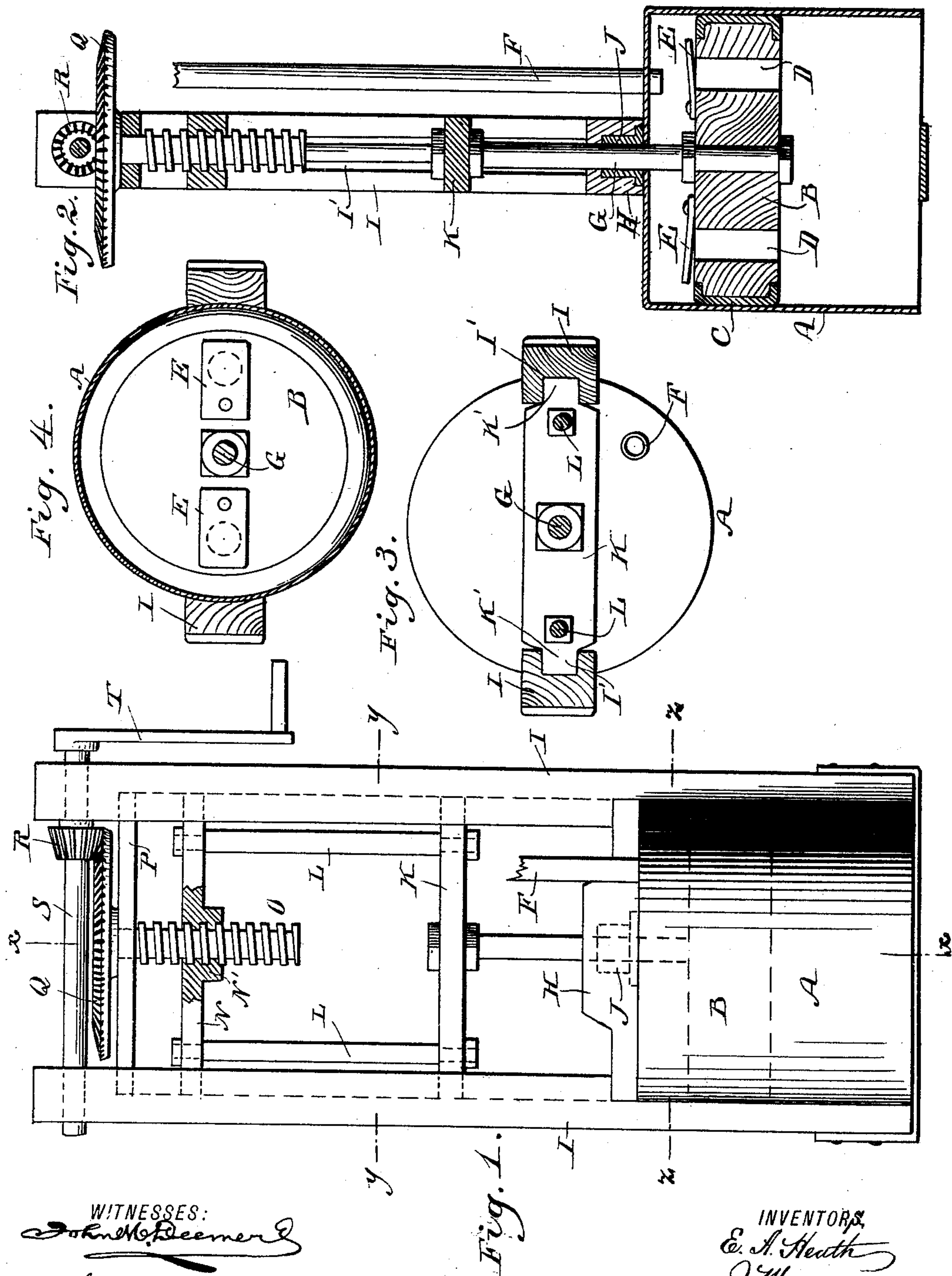
(No Model.)

E. A. HEATH & J. MAY.

FORCE PUMP.

No. 414,044.

Patented Oct. 29, 1889.



WITNESSES:
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Fig. 1.

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FORCE-PUMP.

SPECIFICATION forming part of Letters Patent No. 414,044, dated October 29, 1889.

Application filed March 20, 1889. Serial No. 303,963. (No model.)

To all whom it may concern:

Be it known that we, EUGENE A. HEATH and JAMES MAY, both of Nonpareil, in the county of Box Butte and State of Nebraska, have invented a new and Improved Force-Pump, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved force-pump which is simple and durable in construction and very effective in operation.

The invention consists of certain parts and details and combinations of the same, as will be fully described hereinafter, and then pointed out in the claim.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a front elevation of the improvement with parts broken out. Fig. 2 is a transverse section of the same on the line xx of Fig. 1. Fig. 3 is a sectional plan view of the improvement on the line yy of Fig. 1, and Fig. 4 is a similar view of the same on the line zz of Fig. 1.

The improved force-pump is provided with a barrel A, open at the bottom and closed at the top, and adapted to fill out the lower end of the well. In the barrel A is held to slide vertically the plunger B, provided with a suitable packing C, and also having vertical valve-openings D, on the upper ends of which operate the valves E, opening upward. From the closed top of the barrel A extends upward the outlet-pipe F, reaching to a convenient height and bent in the usual manner at the upper end. On the plunger B is secured the upwardly-extending plunger-rod G, passing through a transverse beam H, held on the top of the barrel A and secured to the posts I, fastened to the sides of the said barrel. In the transverse beam H is held a suitable packing J to prevent any leakage from the barrel A. The upper end of the plunger-rod G is rigidly connected with a cross-piece K, mounted to slide vertically in suitable bearings I', formed in the posts I, before mentioned. The cross-piece K is connected by rods L with a second cross-piece N, held above the cross-piece K, and also mounted to slide vertically in the guideways I'. In the middle of the

cross-piece N is formed or secured a nut N', in which screws the screw-rod O, mounted to turn near its upper end in a transverse beam P, secured to the posts I. On the upper end of the screw-rod O is fastened the bevel gear-wheel Q, meshing into a pinion R, fastened on the shaft S, extending transversely and mounted to turn in suitable bearings held in the upper ends of the posts I. On one end of the shaft S is secured a crank-arm T, for conveniently turning the said shaft in order to impart a rotary motion to the screw-rod O.

The operation is as follows: The water in the well passes into the lower open end of the barrel A, and when the operator turns the crank-arm T in one direction a rotary motion is imparted to the screw-rod O, which moves the cross-piece N downward, so that the second cross-piece K, on account of being rigidly connected with the cross-piece N, is also moved downward, thereby imparting a downward sliding motion to the plunger-rod G, so that the plunger B moves against the water in the lower end of the barrel A. The water is thus forced through the valve-openings D past the valves E, and into the upper end of the barrel A on top of the plunger B. The operator then reverses the motion of the crank-arm T, so that the plunger B slides upward, the valves E are caused to close, and the water in the top of the barrel A is forced upward and out through the outlet-pipe F. Thus it will be seen that a very simple and convenient device is produced for forcing water from the barrel upward to any desired height.

From the description and the construction illustrated it will be apparent that the pump embodying our improvements is capable of a prolonged and steady discharge of water, inasmuch as a given number of revolutions of the crank-shaft in one direction charges the space above the piston, and a like number of revolutions of said shaft in a reverse direction results in a steady and prolonged discharge from the pipe F. The employment of the intermediate guide-frame, composed of the bars and rods K, L, and N, is attended with many advantages. In the first place, it secures, as is obvious, a proper guide for the piston and screw-shaft during the reciprocations of the former and enables a positive movement of

the same. Furthermore, in addition to its functions as a guide, it presents the intermediate connecting means between the piston-stem proper and the screw-shaft O, thus allowing a very short section of screw-shaft to be employed and avoiding the binding tendency and frictional resistance that an extended shaft always incurs. In addition, the upper cross-bar of the guide serves as the nut-bearing in which the screw-shaft rotates. The cross-beam H serves to brace the head of the barrel, and at the same time affords a means for the location of the packed bearing through which the piston-spindle plays. Said beam, in connection with upper fixed beam P, furnishes stops to limit the travel of the movable guide-frame in either direction, and thus regulate and control the amount of water to be introduced above the piston and be discharged therefrom, and thereby avoid the strain on the parts that might be experienced in a pump of this class wherein a volume of water is first forced above the piston and thereafter expelled therefrom through the discharge.

We are aware of the expired patent of Mills, No. 36,665, October 14, 1862, and of the expired patent of Fitzpatrick, June 2, 1863, and we do not wish to be understood as claiming, broadly, any feature disclosed in either of said patents. Our invention will be readily distinguished from either of said patented constructions in many particulars, prominent among which the following differences may be noted: The patent of Mills is for a double-cylinder pump wherein the actuating means is a double-crank shaft, the cranks of which are connected by pitmen to the spindles of two pistons acting alternately on each side of a central discharge-chamber. This construction primarily is not adapted to have the operating-shaft rotate a number of times for a definite period to form a maximum volume of water above the piston, and then by a corresponding reverse rotation expel said

volume through the discharge. No intermediate movable frame is shown for positively guiding the parts, decreasing the length of connecting-shaft, and serving as bearings for the shaft-sections. The said Fitzpatrick construction discloses a pump wherein the two vertical rods of the piston are connected together at their top to form a screw-bearing for a vertical screw-shaft, rotated by miter-gearing and a continuously-rotating hand-shaft, the reversal of the revolution of the screw-shaft being automatically effected by clutches and a rod shifted by the travel of the beam connecting the piston-rods. In this construction there is no intermediate movable frame connecting the piston-rod and screw-shaft and serving to positively guide the parts. Specifically, the Fitzpatrick arrangement is a different and more expensive machine, and it was to supersede such forms that our improvements were devised.

Having thus fully described our invention, we claim as new and desire to secure by Letters Patent—

The combination, in a force-pump, of a barrel closed at its top, vertical guide-posts I, horizontal hand-operated shaft bearing therein, a fixed horizontal beam P below said shaft, and having a short depending screw-shaft bearing therein and geared to the said horizontal shaft, horizontal cross-bars having their ends engaging said posts and connected together to form a movable frame, the upper bar having a threaded opening for the engagement of the depending screw-shaft, together with valved piston in barrel, fixed beam J, and piston-rod playing through beam J and connected to lower bar of movable frame, substantially as set forth.

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Witnesses:

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