(No Model.)

W. H. BAILEY & G. LINDEMANN.

PUMP AND PUMPING ENGINE.

No. 457,022. Patented Aug. 4, 1891.

FIG. 1.

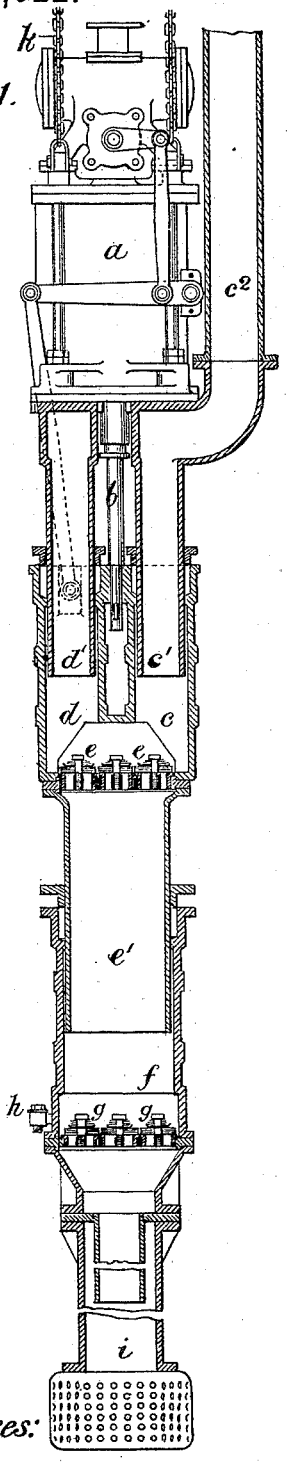
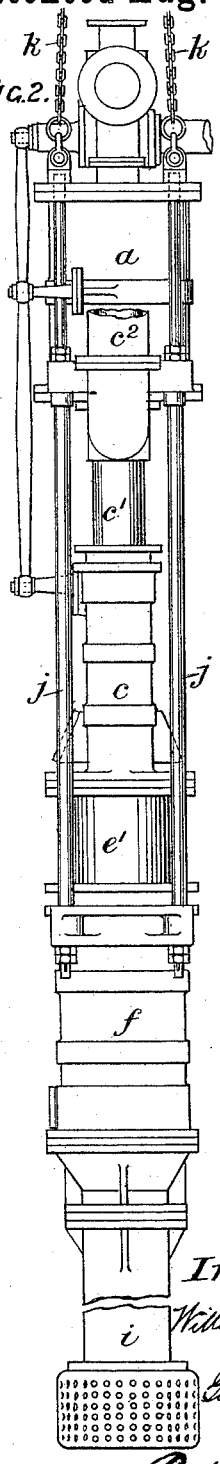


FIG. 2.



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UNITED STATES PATENT OFFICE.

WILLIAM H. BAILEY AND GUSTAVE LINDEMANN, OF SALFORD, ENGLAND.

PUMP AND PUMPING-ENGINE.

SPECIFICATION forming part of Letters Patent No. 457,022, dated August 4, 1891.

Application filed December 6, 1890. Serial No. 373,800. (No model.) Patented in England January 23, 1890, No. 1,192.

To all whom it may concern:

Be it known that we, WILLIAM HENRY BAILEY and GUSTAVE LINDEMANN, both subjects of the Queen of Great Britain, and residents of Salford, in the county of Lancaster, England, have invented certain new and useful Improvements in Pumps and Pumping-Engines, (for which we have obtained Letters Patent in Great Britain, No. 1,192, bearing date January 23, 1890,) of which the following is a specification.

Our invention relates particularly to improvements in those pumping-engines—such as sinking-pumps—in which a ram or rams, in combination with a steam-cylinder, is employed; but our improvements can be applied to pumps actuated by a separate motor.

In applying our improvements to a pump for well-sinking we employ a suitable steam-cylinder, the piston-rod of which passes through the bottom of the cylinder and is connected to a pair of cylinders or pump-barrels, in each of which is fitted a hollow piston or guide, the first hollow piston forming part of the discharge-pipe for the water. The second hollow piston is in connection with or forms an air-vessel. To the pair of cylinders or pump-barrels is connected the hollow ram of the pump-cylinder, which latter is fitted with a suitable number of lifting-valves near the bottom, the other lifting-valves being fitted at the base of the two cylinders near the top of the hollow ram. A snifting valve or valves is placed above or below the valves at the bottom of the pump-cylinder, and in order to connect the different parts of the pump together suitable tie-rods are secured between the steam-cylinder and pump-cylinder, the whole machine being suspended by chains when employed in sinking wells. The above-mentioned air-vessel obtains a supply of air from the snifting valve or valves and serves to prevent shocks when the pump-valves operate.

In our improved pump the steam-cylinder, the hollow pistons, and the main pump-barrel remain stationary, the two cylinders or pump-barrels with the main ram being moved by the piston-rod of the steam-cylinder, the moving parts being guided by the two stationary hollow pistons.

In order that our invention may be fully understood and readily carried into effect, we will describe the accompanying sheet of drawings, reference being had to the letters marked thereon.

Figure 1 represents a sectional elevation, and Fig. 2 an elevation, of a pump for well-sinking to which our invention is applied.

a is the steam-cylinder, in which works the piston-rod *b*, to which are secured the pump-barrels or cylinders *c* and *d*, to which are fixed the hollow ram *e'*.

e e are the lifting-valves.

c' and *d'* are hollow pistons or guides secured to or near to the bottom of the cylinder *a*. The piston *c'* forms parts of or is connected to the discharge-pipe c^2, and the piston *d'* forms an air-vessel. The pump-barrels *c* and *d* slide on the pistons or guides *c'* and *d'*, which together constitute well-balanced guides and enable the pump to work smoothly and without side strain.

f is the pump-cylinder, in which the ram *e'* slides.

h is the snifting-valve, and *g g* are the lifting-valves at the bottom of the cylinder *f*.

i is the inlet-pipe.

j j are tie-rods, which connect the pump-cylinder *f* to the steam-cylinder *a*, and *k k* are chains by which the pump is suspended.

The mode of operation is as follows: When steam is admitted to the cylinder *a*, the piston *b* moves downward and carries with it the pump-barrels *c* and *d* and the hollow ram *e'*, the valves *e e* lifting. When the piston *b*, barrels *c* and *d*, and ram *e'* rise, the valves *e e* are closed and some of the water above the valves *e e* is discharged through the pipe c^2. The snifting-valve *h* admits air into the pump-barrel *f*, as usual, and a portion of the said air finds its way to the air-chamber in the hollow piston *d'*. In case of a separate motor being employed to operate the pump, it would be necessary to apply the power to move the two pump-barrels and the main ram.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim, and desire to secure by Letters Patent of the United States, is—

In a lift-pump, the combination, with the discharge-pipe c^2, on which the pump-barrel slides, and the hollow piston or guide c', forming part of said discharge-pipe, of the hollow piston or guide d', forming an air-vessel and on which also the pump-barrel slides, piston b, pump-barrel c and d, and ram e', all carried by said piston b, and valves e e, substantially as and for the purpose set forth.

In witness whereof we have hereunto set our hands in presence of two witnesses.

W. H. BAILEY.
GUSTAVE LINDEMANN.

Witnesses:
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