

J. W. MATHIESON.
DIRECT-ACTING ENGINE.

No. 171,679.

Patented Jan. 4, 1876.

Fig. 1.

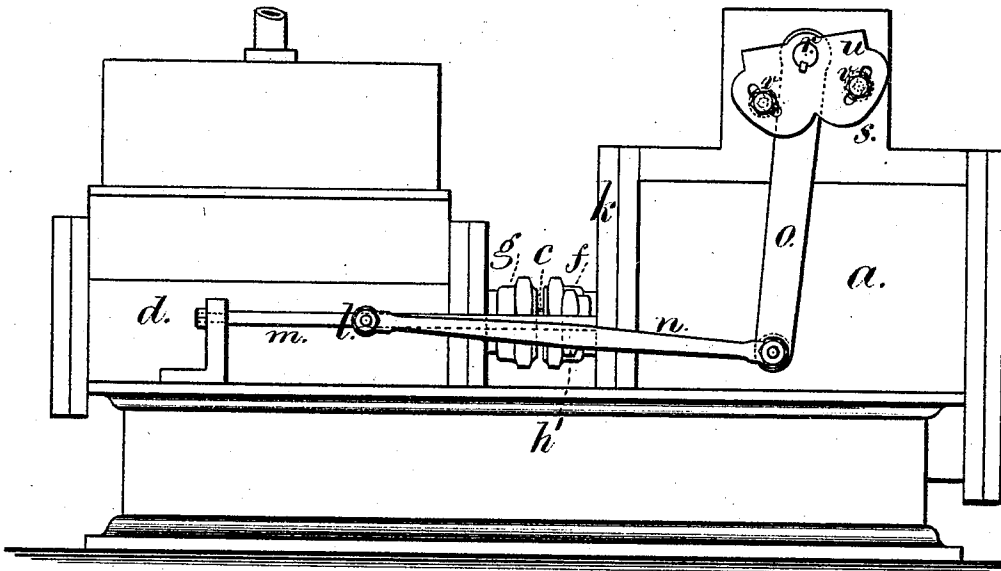
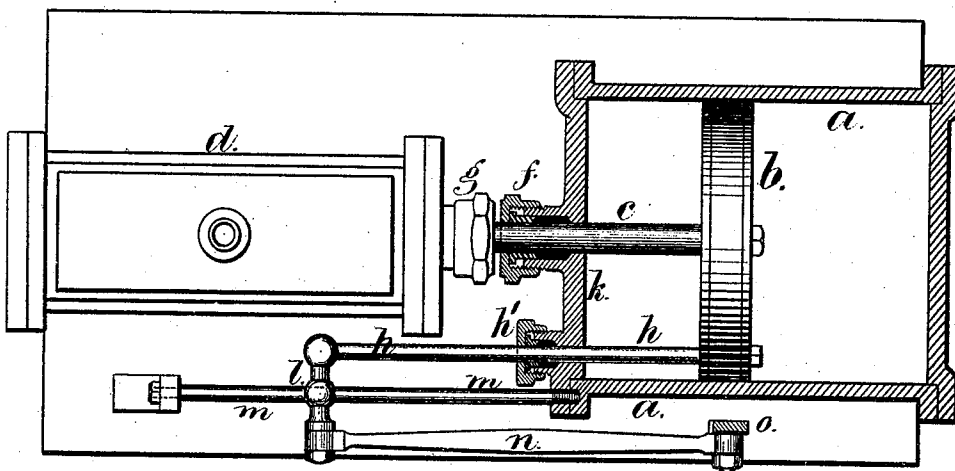


Fig. 2.



Witnesses

Chas. N. Smith
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Inventor

James W. Mathieson
for Lemuel W. Linnell
att'y.

UNITED STATES PATENT OFFICE.

JAMES W. MATHIESON, OF BROOKLYN, NEW YORK, ASSIGNOR TO SARAH HARDICK, EXECUTRIX, AND JOHN RYER AND ABRAHAM H. VAN HOESEN, EXECUTORS, OF THE ESTATE OF CHARLES B. HARDICK, DECEASED.

IMPROVEMENT IN DIRECT-ACTING ENGINES.

Specification forming part of Letters Patent No. **171,679**, dated January 4, 1876; application filed December 3, 1875.

To all whom it may concern:

Be it known that I, JAMES W. MATHIESON, of Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Direct-Acting Engines, of which the following is a specification:

Direct-acting engines and pumps are usually at a sufficient distance apart to allow of the movement of an arm with and upon the piston-rod, between the heads of the respective steam and water cylinders, to operate the steam-valve; but this renders it necessary to employ a bed-plate that is sufficiently long to support said cylinders, and a proportionately long piston-rod. Efforts have been made to place the cylinder of the pump close to the cylinder of the engine, and to move the steam-valve by the use of slide-rods passing into the steam-cylinder from each end, and against which the piston strikes in completing the stroke. These are noisy, and do not remain in good working condition.

The nature of my said invention consists in the combination, with a direct-acting pumping-engine, of a rod attached near one edge of the piston, passing out through the cylinder-head, and sliding at the side of the water-cylinder, and connected by a link to the lever that gives motion to the steam-valve. By this construction the valve movement is regular and reliable, and the engine and pump are rendered very compact.

In the drawing, Figure 1 is an elevation of the pumping-engine; and Fig. 2 is a plan view, with the steam-cylinder partially in section.

The steam-cylinder *a*, piston *b*, rod *c*, and pump-cylinder *d* are of usual construction, except that the cylinders *a* and *d* are placed as closely together as convenient for adjusting the glands or stuffing-boxes *f* and *g*. Attached to the piston *b*, near one edge, is the rod *h*, and passing through the stuffing-box *h'* upon the cylinder-head *k*, the said rod *h* being parallel with the piston-rod *c*, and connected at its outer end to a cross-head, *l*, upon a slide-rod or ways, *m*, that serve to

guide the outer end of this rod *h*, and also for connecting the link *n* to the lever *o*, that serves to give motion to the rock-shaft *r* of the valve-chest *s*. Upon said rock-shaft *r* are the plate *u* and adjustable tappets *v*, that serve to determine the extent of the valve-motion, as in Letters Patent No. 1,334, granted in Great Britain April 23, 1868, to C. B. and J. Hardick.

It will now be apparent that the movement given by the rod *h* to the valve-lever is as uniform and regular as it would be if the water and steam cylinders were sufficiently distant to allow for a valve-moving arm upon the piston-rod; and in my pump the parts are very compact and reliable, and the size, weight, and cost of the bed and other parts are lessened.

I am aware that the piston-rod of an engine has been tubular, and that a rod has passed from the same through the back head of the cylinder, to actuate the valve. In this case the valve-actuating rod is moved by the sudden blow and concussion of the piston-rod when near the end of the stroke, and it is often inconvenient to provide the required space at the back end of the cylinder-head for this valve-actuating rod. My improvement prevents the concussion, and allows for the connection being at the front end of the cylinder.

I claim as my invention—

The combination, with the direct-acting pumping-engine, of a rod attached at one end to the steam-piston, passing out through the cylinder-head, and sliding at the side of the water-cylinder, and a connecting-link, *n*, to the lever of the rock-shaft or valve-actuating mechanism, substantially as set forth.

Signed by me this 30th day of November, A. D. 1875.

JAMES W. MATHIESON.

Witnesses:

GEO. T. PINCKNEY,
CHAS. H. SMITH.