Sharp & Thompson,

Reciprocating Engine.

No. 111,982. Patented Feb. 21. 1871.

Fig. 1.

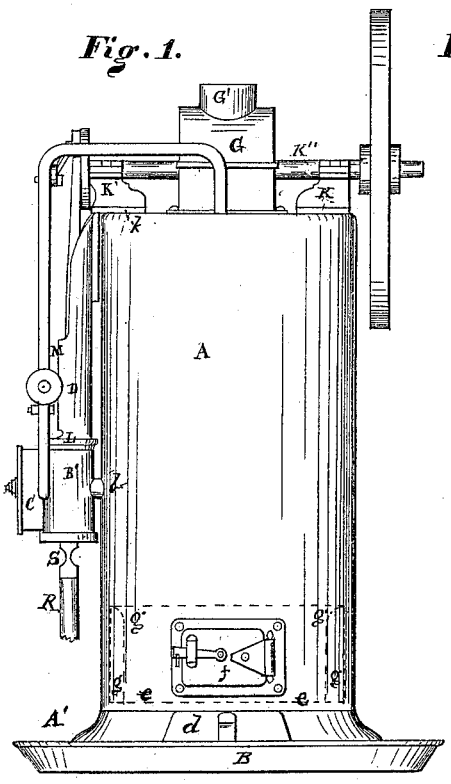


Fig. 2.

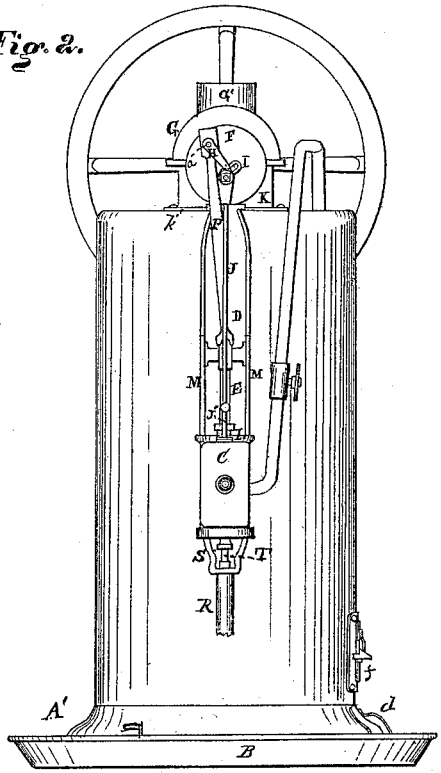
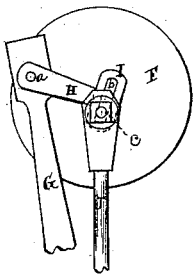


Fig. 3.



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JOEL SHARP AND JOSEPH W. THOMPSON, OF SALEM, OHIO.

Letters Patent No. 111,982, dated February 21, 1871.

IMPROVEMENT IN STEAM-ENGINES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that we, JOEL SHARP and JOSEPH W. THOMPSON, of Salem, county of Columbiana and State of Ohio, have invented certain new and useful Improvements in Steam-Engines, of which the following is a description, reference being had to the accompanying drawing making part of this specification.

Specification.

Figure 1 is a side view of the engine.

Figure 2 is a front view.

Figure 3 is a detached section.

Like letters of reference refer to like parts in the different views.

The nature of our improvement in steam-engines, and the object thereof, is to operate and regulate the stroke and cut-off of the slide-valve, whereby the throw of the valve may be increased or lessened, and the engine reversed, as may be required.

This improvement also relates to the construction and arrangement of the bed-plate, pillow-block, slides, steam-chest, and cylinder; also, to the base or floor for the engine, and the arrangement of the force-pump.

The boiler A, figs. 1 and 2, is upright, and, excepting its base, may be of the usual construction.

The bell-shaped or flaring base A′ is cast-iron, and answers the triple purpose of base or foundation for the machine, ash-box, and ring or division, to separate the fire-box from the outside shell of the boiler.

This base forms the floor-pan B, which is water-tight; it serves as the bottom of the ash-box, of which *d* is the door, and a receptacle for all the drippings from the engine, and dispenses with the necessity of a layer of brick, &c., on the floor or under the engine, and if water is placed in the floor-pan or basin B, the fire will be completely surrounded with water in this circular basin, thus giving security against the danger of fire from the fire-box, of which *f* is the door.

The ring or division indicated by the dotted lines *g*, fig. 1, forms the upper part of the base A′, and is cast all in one piece; within this ring is the fire-box chamber.

The grate-bars are indicated by the dotted line *e*. Below the grate is the ash-box, which is a close, tight chamber, the walls of which are formed by the base A′, the opening into the ash-box being through the door *d*.

In figs. 1 and 2, G represents the smoke-chamber, which is in communication with the boiler-flues and chimney G′, attached to said chamber and through which chamber is an opening to receive the engine-shaft. This shaft extends across the top of the boiler through said opening. To prevent smoke, &c., from escaping into the said opening it is closed to the smoke-chamber with a casing of iron, to prevent the escape of smoke, &c.

The pillow-blocks K K′, for the driving-shaft, are placed on the top of the boiler to admit of said shaft being hung transversely across the top of the boiler, as seen in fig. 1, which admits of the engine being attached to the side of the boiler, as seen in figs. 1 and 2, and thereby in connection with said shaft on which is placed the fly-wheel and driving-pulley on the opposite side from the engine.

The cylinder B′, steam-chest C, slides M, section D, (answering to the bed-plate,) pillow-block K′, lug *b*, and flange K, are all cast in one piece; the lug K making the main attachment and support of the engine to the boiler, which attachment or lug is below or under the pillow-block K′, and is at right angles to the line of the engine. This lug is bolted firmly to the boiler, and the lug *b*, attached to the cylinder, is secured to the side of the boiler by any suitable means.

Said engine consists, in part, of the cylinder B′, steam-chest C, bed-plate D, piston E, which is connected to the crank by the pitman P, from the wrist-pin *a*.

From crank F projects an arm, H, fig. 3, having a cross-piece, I, in which is a slot, *b*. To said arm, by means of the slot, is attached the valve-rod J.

It will be observed that the length of the arm is such as to extend inwardly beyond the axis of the crank F, on the shaft K″; hence, as the crank revolves, the cross-piece I will revolve around the center of the crank, and the two extreme ends of the slot most distant from the axis will describe the largest circle, and will, therefore, operate the rod J, and to a greater extent when attached to either of the two ends of the slot than when connected at or near the middle thereof.

From this it will be obvious that the throw of the valve will be in proportion to the distance that the connection of the rod with cross-piece I is from the middle of the slot *b* therein. Hence, the throw of the valve can be easily adjusted by loosening the nut *c* of the wrist, whereby the valve-rod is attached to the arm, and moving it in either direction toward or from the middle of the slot. By this arrangement the valve motion and cut-off is produced.

The valve, as stated, is operated by the return arm or crank H, connected with the valve-rod J, and directly to the valve-stem J′.

The arm H reaches back to or a little beyond the center of motion when it is slotted to receive the wrist-pin *a*. This slot is at right angles with the line of the crank, so that when the wrist is in the center of the slot, the top and throw of the valve are equal,

and no steam is admitted to the cylinder. Now, by shifting the said wrist from its central position, steam will be admitted, and the direction in which the wrist is moved in the slot and the distance, will determine the amount of cut-off, and also the direction which the engine is to run. The engine is in this way reversible, and the cut-off to the fullest extent adjustable without deranging the time of induction or exhaust.

This is particularly important and valuable in engines of this class for the purposes designed.

The force-pump R is provided with the usual appendages and devices for receiving water and discharging it into the boiler. This pump is attached to the lower end of the cylinder by a bail or bracket, S.

The extension T, fig. 2, of the piston-rod passes through a stuffing-box in the lower head of the cylinder, and extends into the pump forming the pump-plunger.

The said pump is worked by the action of the extension end of the piston-rod.

Engines of this construction may be horizontal as well as vertical, and the several parts of the engine thus constructed and arranged form a unity, and have the advantage of always being in line one with the other after the engine is completed.

Claims.

What we claim as our improvement, and desire to secure by Letters Patent, is—

1. The cylinder B, steam-chest C, slides M, bed-plate D, pillow-block K′, lugs *k b*, as arranged and cast in one piece, and the pump R, in combination with the boiler, substantially as and for the purpose set forth.

2. The arrangement of the driving-shaft transversely across the top of the boiler in pillow-blocks K K′, and at right angles to the line of the engine, arranged in relation to the smoke-chamber G, substantially as and for the purpose set forth.

3. The base A′, with the circular basin B, as arranged, in combination with the boiler A, for the purposes and in the manner substantially as set forth.

4. The arrangement of the arm H with the piece I, having a slot at right angles to said arm, in combination with the crank-pin *a*, wrist and link J, operating conjointly, as and for the purpose substantially set forth.

JOEL SHARP.

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