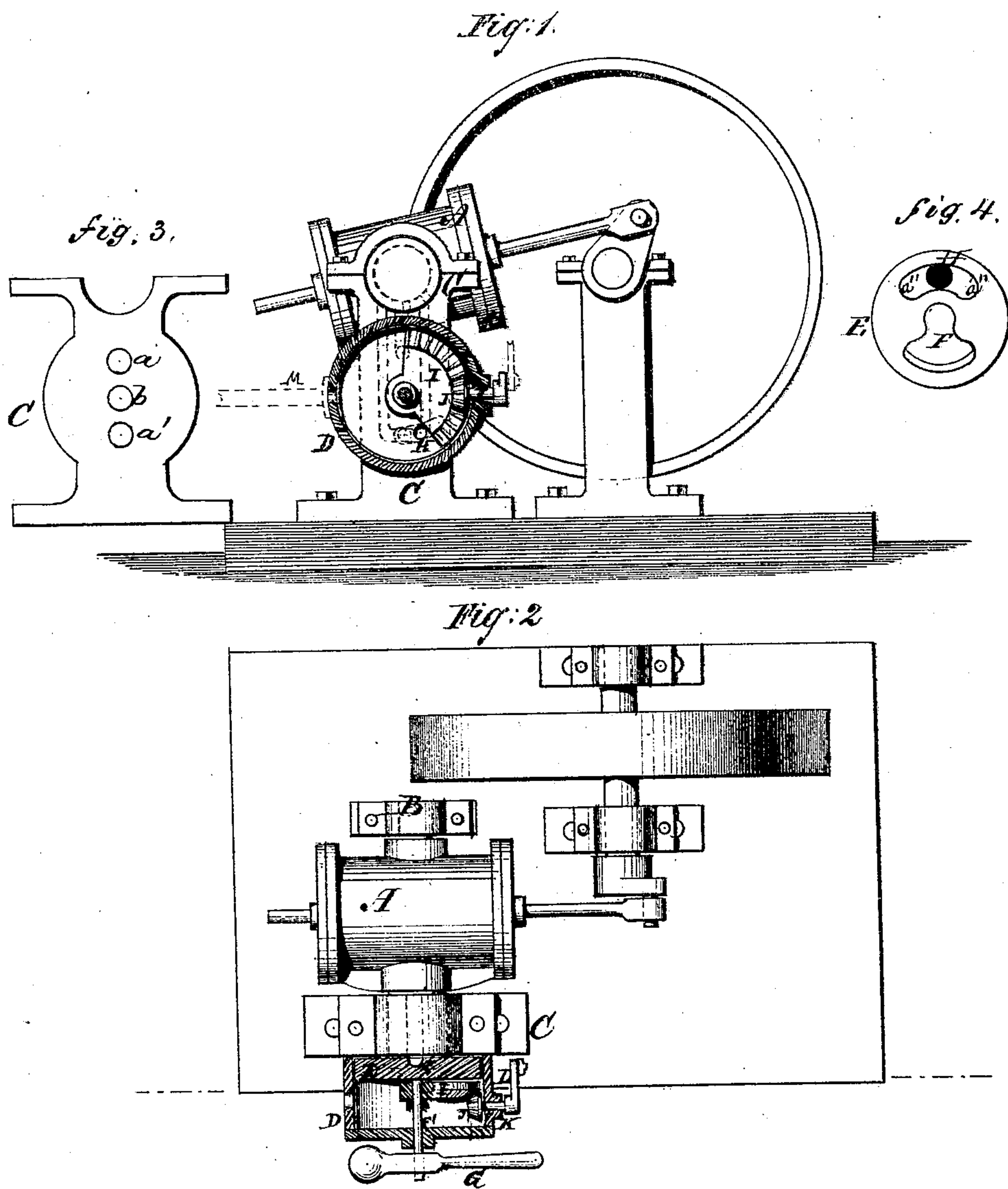


H. Broomell,

Oscillating Engine.

No. 103840.

Patented June 7. 1870.



Witnesses:

C. Raettig
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United States Patent Office.

HENRY BROOMELL, OF CHRISTIANA, PENNSYLVANIA.

Letters Patent No. 103,840, dated June 7, 1870.

VALVE MECHANISM FOR OSCILLATING 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 I, HENRY BROOMELL, of Christiana, in the county of Lancaster and State of Pennsylvania, have invented a new and useful Improvement in Oscillating Engines; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification.

This invention relates to a new and useful improvement in the class of steam engines known as "oscillating engines;" and consists in the combination of a hand-valve of peculiar construction with the engine, as will be hereinafter more fully described.

In the accompanying drawing—

Figure 1 represents a sectional side elevation of the engine;

Figure 2 is a sectional top or plan view;

Figure 3 is a side elevation of the hollow stand; and

Figure 4 is an inner face view of the valve.

Similar letters of reference indicate corresponding parts.

A is the oscillating cylinder, which is supported on trunnions on the stands B C.

The trunnion on the stand C is hollow, and conveys steam to the ends of the cylinder, through two ports in its under side, as shown in dotted lines in fig. 1.

The stand C is also hollow, with three ports through the bearing or box of the trunnion, the two outside ports being induction-ports, and the middle one an exhaust-port when the engine is running in one direction, and the middle port an induction-port, and the outside ones exhaust-ports when the motion is reversed.

The ports in the trunnion are so formed or arranged that, as the cylinder oscillates, they are caused to communicate with the center exhaust-port and with one of side ports, alternately, in the stand C.

D is the steam-chest, which is placed on the side of the stand C, to which it is fastened.

Communicating with the steam-chest and with the three ports in the bearing, referred to above, are two openings *a a'* in the side of the stand. The upper one, *a*, opens into the middle port, and the lower one into the outside or induction-ports.

Between these openings in the stand is a third opening, *b*, which passes directly through the stand. This latter opening is central with the steam-chest, from whence the steam is discharged.

Within the steam-chest is a rotating hand-valve, E. F' is the rod, and

G is the lever, by which this valve is operated. This valve serves two purposes; that of starting the engine and stopping it, and also for reversing the motion of the engine. By turning this valve so that the lever stands horizontally to the right, the aper-

ture H in the valve registers with the lower aperture *a'* in the stand, thus admitting steam to the cylinder through one of the induction-ports.

F is a cavity in the same side or face of the valve E, which allows the exhaust steam to pass from the aperture *a* to *b*, and thus escape on the opposite side of the stand C.

This cavity F will always cover the aperture *a* and *b* of the stand when the aperture H in the valve registers with the lowest aperture *a'*.

When the lever is turned to the left the aperture H registers with the upper aperture *a*, the cavity F will then cover *a'* and *b*, and the engine will be reversed.

By turning the valve so that the lever stands in an upright position, these communications are cut off and the engine is stopped.

By moving this valve, by means of the lever, the engine is started to run in either direction, or brought to a state of rest, at the will of the attendant.

Upon the back of the valve E, and playing loosely on the valve-rod F', is a quadrant-shaped governor or cut-off valve, I, with cogs on its outer side or back, which works over the orifice H in the valve E, to cut off or let on the steam according to the speed of the engine.

This governor-valve is operated by means of the pinion J, on the spindle or shaft K.

On the outer end of the shaft K is an arm, L, which is connected by a rod with the governor.

When the engine is not in motion the opening H is under the governor-valve.

In starting the engine, the valve E is turned to the right or left, so as to cause the aperture H to register with the apertures *a* or *a'* of the stand, and thus start the engine forward or reversely, while the operation of the governor-valve regulates the motion at any speed.

On the face of the valve E the opening H is enlarged, or a cavity is formed around it, extending in each direction, as at *a''*, so as to communicate with the induction-ports of the cylinder, whether the valve be turned a greater or lesser distance from under the governor-valve.

M is the pipe which connects the steam-chest with the boiler.

By this arrangement, it will be seen that the engine is under perfect control at all times.

Having thus described my invention,

I claim as new and desire to secure by Letters Patent—

In combination with an oscillating steam-engine, the hand-valve E, by means of which the engine is started and stopped, and its motion reversed, substantially as described.

HENRY BROOMELL.

Witnesses:

JOHN F. LEECH,

BRINTON WALTER.