

H. A. BENSON & W. AVERY.

Improvement in Direct-Acting Steam-Engines.

No. 127,451.

Patented June 4, 1872.

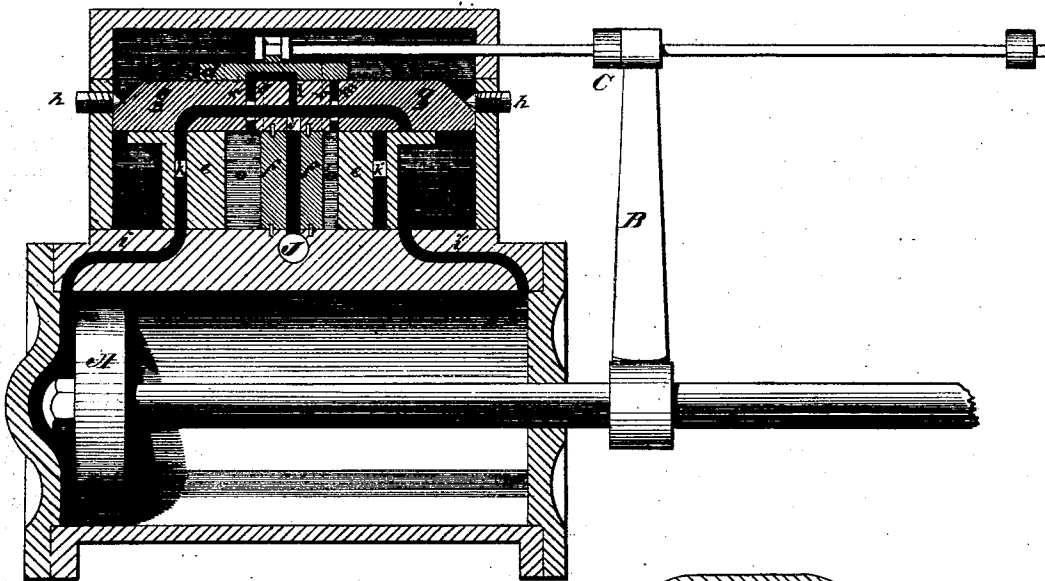


Fig. I

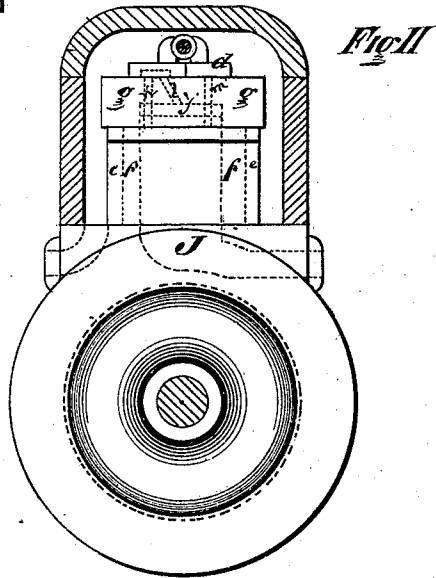


Fig. II

Fig. III



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HEZEKIAH A. BENSON AND WILLIAM AVERY, OF WARREN, MASS.

IMPROVEMENT IN DIRECT-ACTING STEAM-ENGINES.

Specification forming part of Letters Patent No. 127,451, dated June 4, 1872.

To all whom it may concern:

Be it known that we, HEZEKIAH A. BENSON and WILLIAM AVERY, both of Warren, Worcester county, State of Massachusetts, have jointly invented an Improvement in that class of Steam-Engines called "Direct Acting," of which the following is a specification:

The improvements sought and obtained in our invention are, first, a steam-valve and piston sufficiently packed by steam pressure to prevent leakage, yet sufficiently relieved from the pressure incident to ordinary slide-valves to insure ease in running and certainty in action; second, the so constructing this steam-valve that it may be simple, readily accessible, easily repaired, and accurately adjusted.

Figure I is a central longitudinal section. Fig. II is an end view, with the end of valve-chest removed. Fig. III is a top view of chambered valve with exhaust-port.

Reference being had to the drawing, *e e* represent this steam-valve in Figs. I, II, and III. Its bottom sides operate the ports *i i'*, connecting each, alternately, with the steam in the chest and the exhaust-passage *j'*, by means of passages *k* and *k'*, thus producing a reciprocating motion to the main piston. In the chamber *o o'* we place the exhaust-port *f f*, the passage in the center of which forms a communication between *j* and *j'*. This exhaust-port fits the sides of the chamber *o o'* steam-tight, and is of the same height as the thickness of the valve *e e*, so that the plate *g g* being in place the two parts of the chamber *o o'* may be alternately filled by and exhausted of steam by means of the supplemental valve *d*. The valve *e e* and exhaust-port *f f* may be together ground first to the top of the cylinder, then to the plate *g g*, all of which parts, by means of the screws *h h*, constructed as shown in Fig. I, may then be accurately adjusted. The plate *g g* has its upper ends beveled, and the screws *h h*, having their bearing in the center of these bevels, allow sufficient freedom of motion in the plate to make this adjustment, notwithstanding any ordinary imperfections in the construction of the parts *e e*, *f f*, and *o*. The plate *g g* carries on its upper side the sup-

plemental valve *d*, the ports of which pass through it. One or both sides of the exhaust-port *f f* may be packed to the side of the chamber *o o'* by means of movable pieces held out by springs, or otherwise, if desired.

In Fig. I the piston *A* is supposed to have finished its stroke to the left and carried, by means of *B C*, the valve *d* to the position shown, thus admitting steam through port *m'* into side *o'* of chamber *o o'*, at the same time permitting steam from the side *o* of same chamber to escape by means of passage *n* and cavity in valve *d* and passage *l* to the main exhaust-port *J*, thus forcing the chambered valve *e e* to right and connecting port *i'*, through *k'* and *j'*, with *J*, at the same time opening the port *i* to the steam-chest, thus compelling reversal of the engine.

We do not confine ourselves to any particular form of supplemental valve or cushion to prevent *e e* from striking *f f*.

Now, having described our invention, what we claim is—

1. The valve *e e* and detachable exhaust-port *f f*, so that they may both easily and practically make steam-joints with plate *g g* and top of cylinder, constructed substantially as shown and described.

2. In combination with exhaust-port *f f* and plate *g g*, the valve *e e*, so arranged as to work with sufficient steam-pressure to insure tight joints, yet relieved of the excessive pressure incident to ordinary slide-valves.

3. In combination with passages *j* in plate *g g* and the passage through port *f f*, and in combination with ports *i i'*, the valve *e e* having passages *k k'*, operating substantially as described.

4. The combination of beveled-edged plate *g g* and screws *h h*, allowing plate *g g* to be readily adjusted to any imperfection in construction of parts *e e*, or *f f*, or *g g*, and arranged substantially as shown and described.

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