C. W. Isbell,

Rotary Steam Engine.

No. 46,800. Patented Mar. 14, 1865.

Fig. 3.

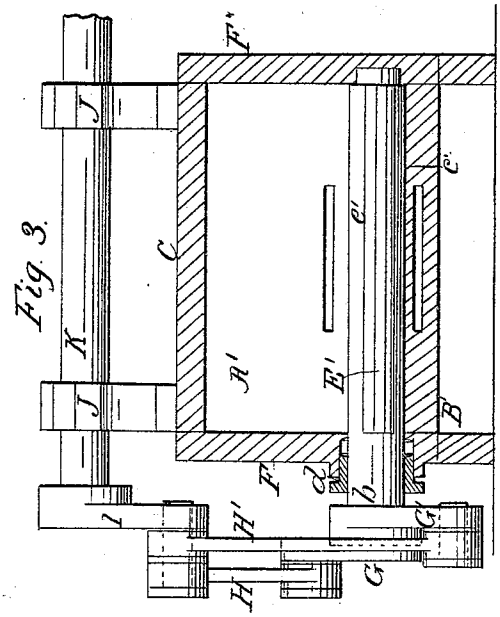


Fig. 1

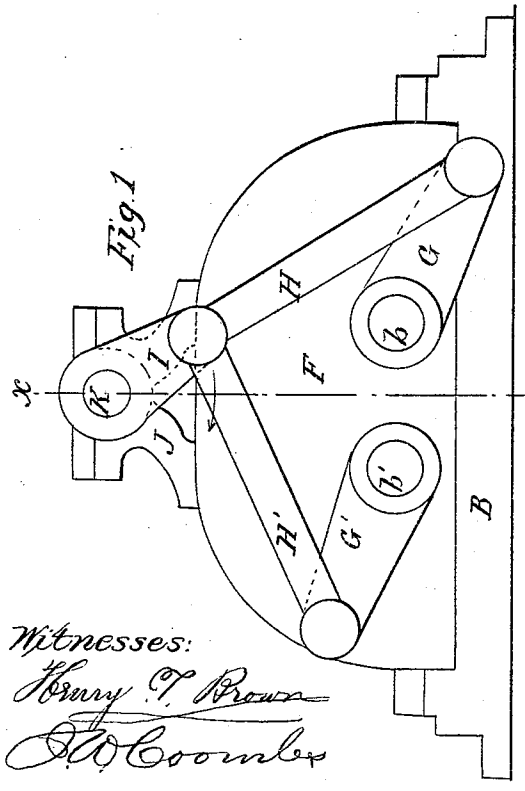
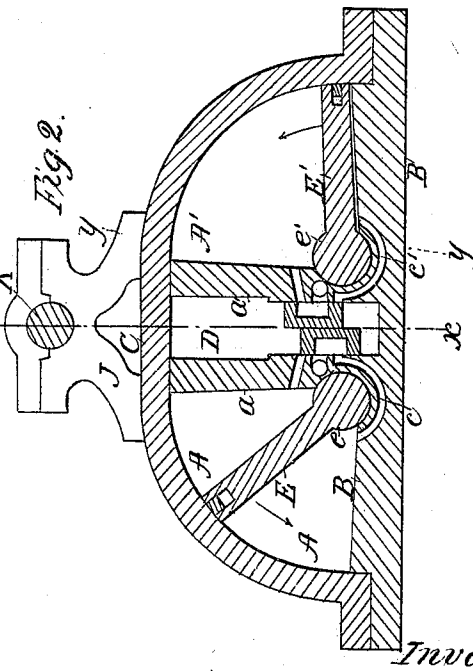


Fig. 2.



Witnesses:
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AM. PHOTO-LITHO. CO. N.Y. (OSBORNE'S PROCESS.)

UNITED STATES PATENT OFFICE.

CHARLES W. ISBELL, OF NEW YORK, N. Y.

IMPROVEMENT IN STEAM-ENGINES.

Specification forming part of Letters Patent No. **46,800**, dated March 14, 1865.

To all whom it may concern:

Be it known that I, CHAS. W. ISBELL, of No. 358 Ninth avenue, in the city, county, and State of New York, have invented a new and useful Improvement in Steam and other Engines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to what have been termed "vibrating-piston engines," in which radial pistons vibrate within sector-shaped cylinders, such engines being used as motors, with steam or other fluid at a suitable pressure as the motive agent or as pumps.

In consists in a novel arrangement of two such cylinders with an interposed induction-chamber common to both, and a connection of their two pistons with one crank, whereby I obtain a very simple double engine.

Figure 1 in the drawings is a side view of the engine. Fig. 2 is a vertical section of the same parallel with Fig. 1. Fig. 3 is a vertical section of the same at right angles to Fig. 1 and 2 in the plane indicated by the line *y y* in Fig. 1.

Similar letters of reference indicate corresponding parts in the several figures.

A A′ are the two cylinders, of quadrant shape, arranged side by side on the same bed-plate, B, and in corresponding positions on opposite sides of a central plane perpendicular to the said bed-plate, such plane being indicated by a red line, *x x*, in Figs. 1 and 2. These cylinders might each be cast separately and bolted to the bed-plate, but are represented as having all but their movable heads F F* of two castings, one of which is the bed-plate B and the other an arch-formed casting, C, common to both cylinders, the partitions *a a′*, which separate the two cylinders, and form between them the induction-chamber D, common to both, being cast with the bed-plate. Each of the two heads F F* may be common to both cylinders, or separate heads may be provided for each.

E E′ are the vibrating pistons, one in each cylinder and radial thereto, each having its axis of vibration concentric with the arc-formed side of its respective cylinder, and the two axes being parallel with each other and only so far apart as is rendered necessary by the partitions *a a* of the cylinders and the interposed induction-chamber. These pistons may have their edges fitted with any suitable packing. Their hubs *e e′*, which are concentric with their respective axis of vibration, are fitted into suitable concave bearings, *c c′*, formed at the junction of the partitions *a a′* with the bed-plate, and in which they are kept tight by the pressure of the steam or other fluid in their respective cylinder on whichever side of the piston the pressure operates, so that the steam or other fluid cannot pass around the hub from one side of the piston to the other. At the corresponding ends of the two pistons journals *b b′*, concentric with their axes of vibration, pass through stuffing-boxes *d* in one of the cylinder-heads, and are furnished with arms G G′, which are connected, by rods H H′, with one common crank, I, on the main shaft K of the engine, which is arranged with its axis in the central plane *x* before mentioned, and supported in plumber-blocks J J on the top of the cylinders.

The arms G G′ are so arranged relatively to their respective piston, and the rods H H′ of such length, that when either piston is at the middle of its stroke the other is at one end of its stroke.

The induction and eduction of the steam or other fluid to and from the cylinders may be effected by any suitable system of valves, ports, and passages. In Fig. 2 there are represented for this purpose two slide-valves, one for each cylinder, arranged in the interposed induction-chamber D, and operating in combination with a system of ports and passages, substantially like what are commonly used in slide-valve engines to effect the induction and eduction to and from each cylinder on each side of its piston alternately, and make the pistons double-acting.

When the engine is used as a motor, the vibrating movement of the piston, produced by the induction and eduction of the steam or other fluid used as the motive agent to and from the cylinders on opposite sides of the pistons alternately, produces a rotary motion of the crank and main shaft. When used as a pump, rotary motion given to the main shaft causes the crank to produce a vibrating movement of the pistons, and thereby causes the

induction and eduction of the water or other fluid to the cylinders on opposite sides of the pistons alternately.

The engine may be inverted from the position represented to bring the main shaft below instead of above the cylinder, or may be arranged in any other position.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The two sector-shaped cylinders A A′, arranged side by side in corresponding positions on opposite sides of a central plane, in which is arranged the axis of a crank-shaft common to both, and with their vibrating pistons connected with a common crank on the said shaft, substantially as herein specified.

2. In combination with the within-described arrangement of two sector-shaped cylinders, vibrating pistons, and crank-shaft, the interposed induction-chamber, common to both cylinders, substantially as herein described.

CHARLES W. ISBELL.

Witnesses:
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