(No Model.)

J. S. BARDEN.

VIBRATING CYLINDER ENGINE.

No. 348,097. Patented Aug. 24, 1886.

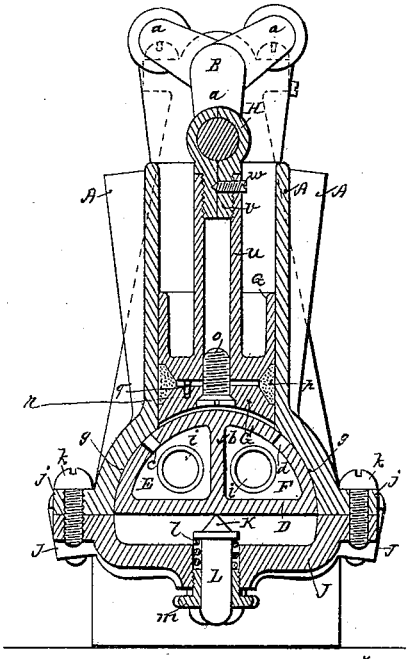

Fig. 1.

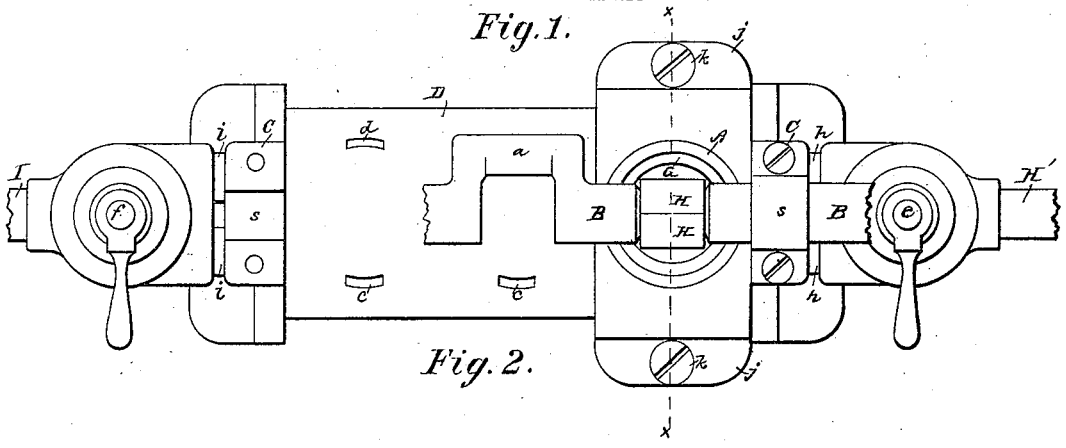

Fig. 2.

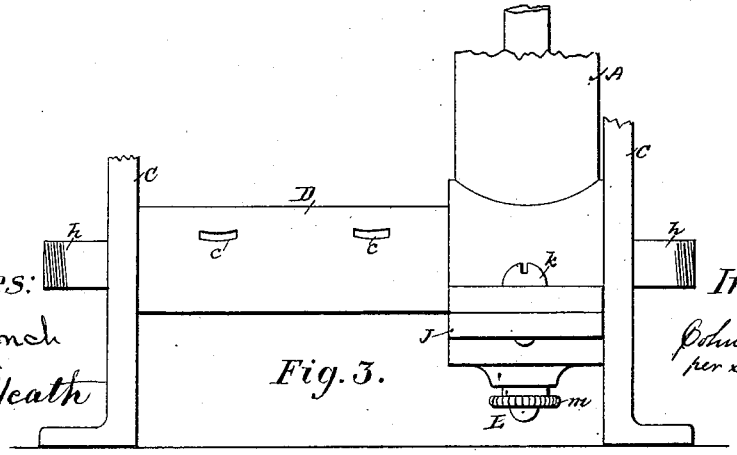

Fig. 3.

Witnesses:
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UNITED STATES PATENT OFFICE.

JOHN S. BARDEN, OF WARREN, ASSIGNOR TO JAMES O. DRAPER, OF PAWTUCKET, RHODE ISLAND.

VIBRATING-CYLINDER ENGINE.

SPECIFICATION forming part of Letters Patent No. 348,097, dated August 24, 1886.

Application filed May 22, 1886. Serial No. 203,045. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. BARDEN, of Warren, in the county of Bristol and State of Rhode Island, have invented a new and useful Improvement in Vibrating-Cylinder Engines, of which the following is a specification.

My invention relates to that class of engines in which the cylinder is pivoted at one end upon a stationary valve, so as to vibrate with the movement of the crank; and it consists in the improved means for holding the vibrating cylinder against the curved surface of the stationary valve, as hereinafter fully set forth.

Figure 1 is a vertical section taken in the line *x x* of Fig. 2, showing a vertical section of one of the cylinders of a three-cylinder engine, and the relative position of the other two cylinders in elevation. Fig. 2 is a partial top view showing one of the cylinders in position, the other two cylinders being removed from the stationary valve. Fig. 3 is a partial side elevation of Fig. 2.

In the accompanying drawings, A A A are the cylinders of a three-cylinder engine, by means of which a continuous rotary movement is produced.

The shaft B is provided with the cranks *a a a*, and is held in the boxes *s* of the bearing-standards C C.

The stationary valve D, made in segment form, is provided with a central partition, *b*, which divides the interior of the valve into two parallel chambers, E and F, one of which may be used for the inlet of steam or other fluid and the other for the exhaust of the same. The valve-ports *c* and *d*, which are to be either inlet or exhaust ports, as the case may be, serve to admit steam or other fluid to the cylinders A and to exhaust the same therefrom upon the proper vibration of the cylinder A over the curved surface of the valve by means of the crank *a* of the shaft B.

The piston G is provided with a face-plate, G′, which is secured to the piston by means of the screw *o*, and between the face-plate G′ and the piston G is placed the annular packing-ring *p*. The face-plate G is hollowed on its face to fit the periphery of the stationary valve D, and is prevented from rotation with respect to the piston G and the valve D by means of the pin *q*, which is fixed in the face of the piston G and loosely enters the hole *r* in the back side of the face-plate G′.

The piston G is secured to the crank *a* by means of the split box H, the split shank *v* of which is screwed into a threaded perforation at the outer end of the hollow piston-rod *u*, and the split box H is prevented from turning with respect to the position of the piston G and its hollowed face-plate G′ by means of the penetrating set-screw *w*.

The inlet-pipe H′ connects by a two-way cock, *e*, with the pipes *h h*, leading to the chambers E and F, respectively, and the exhaust-pipe I is connected by a two-way cock, *f*, with the pipes *i i*, leading from the chambers E and F, and by means of the two-way cocks *e* and *f* the steam or other operating fluid may be directed into either of the chambers of the valve, as desired, so that a reverse movement can be thereby imparted to the shaft B.

The stationary valve D is made in semicircular or segmental form, to fit the circular seat *g* at the lower end of the cylinder A, and to the ears *j j* at the lower end of the cylinder is secured the yoke-piece J by means of the screws *k k*, and at the center of the yoke-piece J is placed the bearing-head K, which may be either fixedly attached to the yoke J or form a part thereof; or the bearing-head K may form the head of a cylindrical bolt, L, which is held against the center point of the semicircular valve D by means of the spiral spring *l* and hollow screw *m*. The cylinder A will thus be held to its seat upon the stationary valve D by the adjustable spring-pressure of the head K against the center line of the outer side of the semicircular valve D.

The bearing-head may be made in conical pointed form or in the form of a knife-edge, or it may be rounded, as preferred.

I claim as my invention—

1. The combination of the segmental stationary valve, the vibrating cylinder, the rigid yoke secured to the vibrating cylinder,

the centrally-located bearing-head adjustably held in the yoke, the spring, and the adjusting-screw for the bearing-head, substantially as and for the purpose specified.

2. The combination of the segmental stationary valve, the vibrating cylinder, the adjustable central bearing-head operating against the back of the valve, and the reciprocating piston hollowed on its face in conformity to the curvature of the face of the stationary valve, substantially as described.

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