J. D. HAZLET.

VALVE-GEARS FOR STEAM-ENGINES.

No. 193,606. Patented July 31, 1877.

Fig. 1.

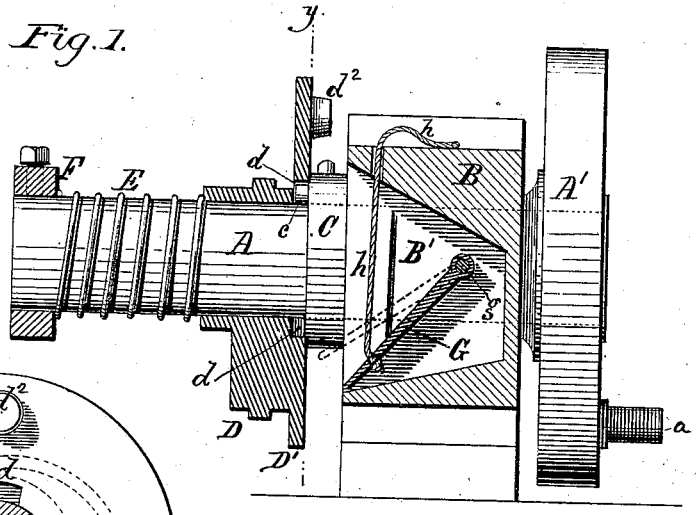
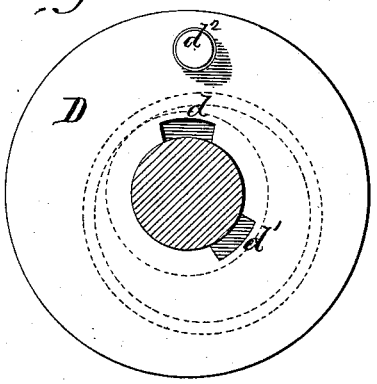


Fig. 3.



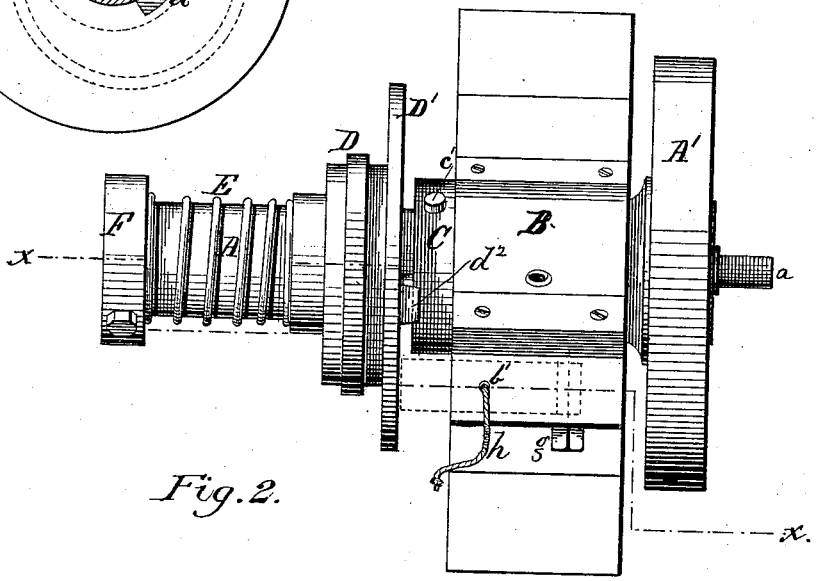


Fig. 2.

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JOHN D. HAZLET, OF MEADVILLE, PENNSYLVANIA.

IMPROVEMENT IN VALVE-GEARS FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. **193,606**, dated July 31, 1877; application filed June 21, 1877.

To all whom it may concern:

Be it known that I, JOHN D. HAZLET, of Meadville, Crawford county, State of Pennsylvania, have invented certain new and useful Improvements in Valve-Gear for Steam-Engines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 represents a vertical section through the pillow-block and eccentric of the crank-shaft, with the latter in elevation. Fig. 2 is a plan view of the same, and Fig. 3 is a face view of the clutch-disk attached to the eccentric.

Similar letters of reference, wherever used on the different figures, denote the same parts.

My invention relates to a novel means for reversing the engine, dispensing with the link-motion in ordinary use for that purpose; and consists in mounting the eccentric loosely on the crank-shaft, so as to permit it to slide longitudinally thereon, and providing it with a clutch, by means of which it can be engaged with or disconnected from the shaft, the arrangement being such that when the eccentric is disconnected, it (the eccentric) is allowed to rest while the shaft makes a half-revolution, or thereabout, and then is re-engaged with the eccentric on its opposite side in such manner as to reverse its direction of rotation, as hereinafter explained.

It further consists in the devices employed for effecting the sliding movement of the eccentric on its shaft, whereby the action of reversing the engine is rendered automatic, as hereinafter described.

In the accompanying drawings, A represents the crank-shaft; B, the pillow-block or box in which said shaft has its bearing; A′, the crank-wheel, and *a* the crank-pin, these parts, except in particulars hereinafter recited, being of any usual or preferred construction and arrangement.

Upon the shaft A, on the opposite side of the pillow-block B to crank-wheel A′, and in close proximity therewith, is a collar, C, keyed or otherwise secured to and moving with the shaft, and provided on its outer face with a pin or key, *c*, adapting it to engage with the eccentric D, as will be explained.

The eccentric D is mounted loosely on its shaft A in such manner as to adapt it to slide thereon, and has a face-plate or disk, D′, formed upon or rigidly connected with it at the side adjacent to the collar C, said face-plate being provided with two key-seats, d d^1, arranged nearly opposite to each other relative to the shaft A, as shown in Fig. 3, adapting the eccentric to be engaged with the shaft through the pin or key *c* and collar C.

The eccentric D, when not forced away from collar C, in a manner which will be explained, is held engaged therewith by a spring, E, interposed between the eccentric and a collar, F, secured to said shaft, as shown.

The pillow-block B is enlarged at one side of the shaft-bearing, and within said enlarged part is formed a socket or recess, B′, open on the side adjacent to the eccentric face-plate D′, and within said socket a dog or lever, G, is pivoted at its inner end at *g*, its opposite end projecting outward through the open end of the socket or recess toward the face-plate D′. A cord, *h*, is attached to this lever near its swinging end, said cord passing through a perforation at *b′* in the pillow-block, and thence over suitable guiding-sheaves, if desired, to any convenient point within reach of the attendant.

The face-plate D′ is provided on its face adjacent to the pillow-block, and at a point near its periphery, with a pin or spur, d^2, and the collar C has on its periphery two similar pins or spurs, for a purpose which will be explained.

Supposing the parts to be in the position shown in Fig. 1, with the shaft revolving outward, and it is desired to reverse its movement, the attendant will draw on the cord *h*, raising the lever G until its swinging end strikes and rests against the face-plate D′, when, by the rotation of the latter, the pin d^2 comes in contact with the lever and raises it into a horizontal position, in which process the lever forces the face-plate and the eccentric D outward on the shaft, overcoming the tension of the spring E. The pin or key *c* is withdrawn from its seat, say *d*, in the face-plate when the eccentric is disconnected from the shaft, which, owing to the momentum of the crank or fly-wheel, moves on, leaving the eccentric at rest, the lever being carried on up

and out of contact with the disk or face-plate D by one or other of the pins c' c' on collar C, for allowing the eccentric to be again thrown into engagement with its shaft when the opposite key-seat d' comes opposite the pin or key c. The eccentric is thus brought upon the opposite side of its shaft, and the movement or direction of rotation of the shaft will be reversed, the lever G being now held up in an elevated position out of the way of the pins d^2 and c' by the cord h, which may be secured at any convenient point for the purpose.

When it is desired to again reverse the engine the lever is released and allowed to drop against the face-plate D′, the motion of which being reversed the pin d^2 carries the lever downward, forcing the eccentric out of engagement with its shaft, as before, causing the parts to be returned to their former position, again reversing the engine and giving the crank-shaft the direction of rotation first described.

The collar C may, if desired, be dispensed with by making the face-plate or disk D′ separate from the eccentric, and feathering it upon the crank-shaft in such manner as to permit it to slide out and in thereon, while at the same time insuring its rotation with the shaft. In this arrangement the key will be applied to the shaft outside of the face-plate, and the key-seats d d^1 will be formed in the inner face of the eccentric itself, and the movement of the disk D′ outward on its shaft will move the eccentric out of engagement with the shaft, the pin d^2, by the continued rotation of the disk independently of the eccentric, serving to carry the lever by, leaving the face-plate and eccentric free to be retracted by the spring for again engaging the eccentric with its shaft, as before.

It will be seen from the foregoing description that by simply bringing the dog or lever G into position against the face-plate the operation of reversing the engine will be effected automatically, and by the rotation of the parts themselves.

The arrangement described will be found valuable and particularly adapted for use in the oil-regions, and in other localities where it is desirable to apply the power frequently at considerable distance from the engine.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The sliding eccentric D, mounted loosely on the crank-shaft and adapted to move laterally thereon, for being connected with and disconnected from said shaft, substantially as and for the purpose described.

2. The eccentric D, mounted loosely and sliding laterally on the crank-shaft, for being connected with or disconnected from said shaft, in combination with the vibrating plate or lever for throwing said eccentric out of engagement with the shaft, as described.

3. The dog or lever G, arranged within the hollow or recessed pillow-block, in combination with the sliding eccentric D, as described.

4. The lever G, for throwing the eccentric out of engagement with its shaft, in combination with the spring E, for forcing the eccentric back into engagement with said shaft, substantially as described.

5. The clutch face-plate D′, attached to the sliding eccentric, and provided with the key-seats d, d^1, in combination with the collar C on the crank-shaft, having the pin or key engaging with said face-plate, as described.

6. The face-plate D′, provided with the pin d^2, in combination with the dog or lever G, substantially as and for the purpose set forth.

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