F. H. BALL.

Valve-Gear.

No. 161,195. Patented March 23, 1875.

Fig. 1.

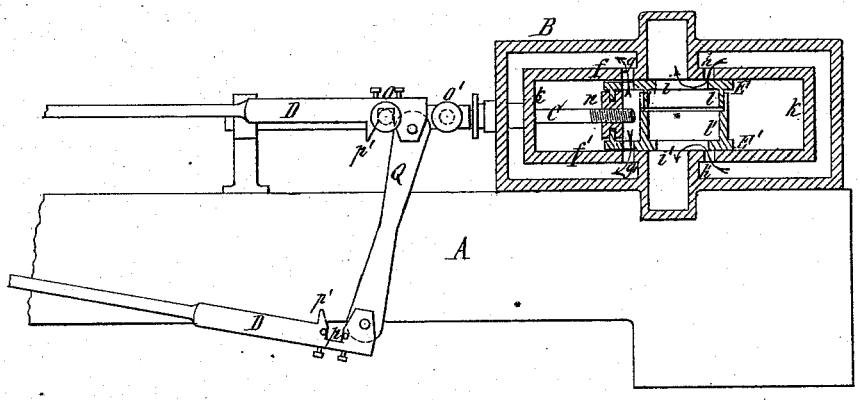


Fig. 2.

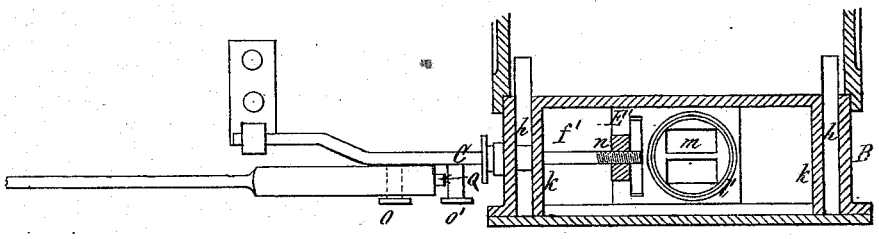


Fig. 3.

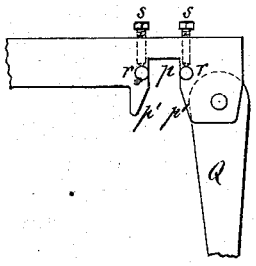
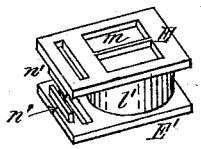


Fig. 4.



Witnesses

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J. J. Bonnes

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UNITED STATES PATENT OFFICE.

FRANK H. BALL, OF FOXBURG, PENNSYLVANIA, ASSIGNOR TO BRAINARD T. BALL, OF BUFFALO, NEW YORK.

IMPROVEMENT IN VALVE-GEARS.

Specification forming part of Letters Patent No. **161,195**, dated March 23, 1875; application filed April 24, 1874.

To all whom it may concern:

Be it known that I, FRANK H. BALL, of Foxburg, in the county of Clarion and State of Pennsylvania, have invented certain Improvements in Steam-Engines, of which the following is a specification:

My improvements relate to the construction of the valve-gear of steam-engines, as will fully appear from the following description:

In the accompanying drawing, Figure 1 is a sectional elevation through the valve-chest of a steam-engine provided with my improvements. Fig. 2 is a sectional plan view through the valve-chest. Fig. 3 is a detached view, on an enlarged scale, of the end of one of the eccentric rods. Fig. 4 is a perspective view of the steam-valve.

Like letters designate like parts in each of the figures.

A represents the bed-plate or frame of a steam-engine, and B the valve-chest, containing a valve of improved construction.

As this valve has been withdrawn from the present application, and will form the subject of a separate application, a description of the same in this specification is unnecessary.

o o' are two studs or pins, secured to the valve-rod C, or any other suitable part connecting with the valve-stem, and projecting laterally therefrom, and *p* the recess, formed in the end of each eccentric rod, for the purpose of engaging with the pin *o*, and provided with inclined guide-hooks or claws *p'*, as is usual in this class of valve-gear. The ends of the two eccentric rods D D are connected by a bar, Q, of double-wedge shape, as clearly shown in Fig. 1.

This bar is arranged between the pins *o o'*, so that in shifting the eccentric rods its rear side will operate on the stud *o* as a continuation of the front portions of the inclined guides *p'*, while its front side will engage with the pin *o'*, and aid in moving the valve-rod to the proper position for engaging with the pin *o* in the notch of the respective eccentric rod. The reduced inner portion of the bar Q allows the eccentric rods to drop a certain distance in being shifted before the bar Q engages with either of the pins *o o'*, whereby the eccentric rods acquire a certain momentum, which greatly assists in shifting the valve.

r r are bearing pins or cylinders, arranged transversely in corresponding cavities formed on each side of the recesses *p* of the eccentric rods, in such manner that the pins *r* expose a portion of their surface in each recess and receive the wear of the stud *o*. The pins *r* are held in place, as clearly shown in Fig. 3, by set-screws *s*, so that after they become worn, they can be readily turned in their seat and a new portion exposed to the action of the stud *o*, and also be readily replaced by new ones after they are entirely worn out.

What I claim as my invention is—

1. The combination, with the recessed eccentric rods D D and studs *o o'*, of the double-wedge-shaped bar Q, arranged between said studs and connecting the ends of the eccentric rods, substantially as and for the purpose hereinbefore set forth.

2. The combination, with the eccentric rods D D, provided with recesses *p*, of the bearing-pins *r* and set-screws *s*, substantially as and for the purpose hereinbefore set forth.

F. H. BALL.

Witnesses:

J. J. BONNER,

ERNST HODDICK.