J. S. Barden,

Steam Cut-Off.

No. 50,413. Patented Oct. 10, 1865.

Witnesses

Frederick Eaton

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UNITED STATES PATENT OFFICE.

JOHN S. BARDEN, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO NEW ENGLAND BUTT COMPANY, OF SAME PLACE.

IMPROVEMENT IN VALVE-GEAR FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. **50,413,** dated October 10, 1865.

To all whom it may concern:

Be it known that I, JOHN S. BARDEN, of the city and county of Providence, and State of Rhode Island, have invented a new and useful Improvement in Steam-Engines, or in their slide-valves and the mechanism for operating the same; and I do hereby declare the said invention to be fully described in the following specification and represented in the accompanying drawings, of which—

Figure 1 is a front elevation of it, with parts of the valve-chest and steamways of the cylinder uncovered so as to more clearly exhibit them. Figs. 2 and 3 are vertical sections of the slider, the cylinder thereof, the governor, and the rocker-lever, to be hereinafter described. Fig. 4 is a longitudinal section, and Fig. 5 a transverse section, of the slide-valve.

In the said drawings, A denotes a slide-valve arranged within the steam-chest B of an engine-cylinder, such chest being provided with steam ports or passages *a a*, leading into opposite parts of the cylinder. The said valve is composed of two square rectangular perforated plates, *b b'*, an elastic square or rectangular perforated plate of vulcanized india-rubber, *c*, and a circumscribing frame or case, *d*, from one end of which the valve-stem *e* is projected, the whole being arranged as shown in the drawings. While the perforated plate *b'* is borne against the upper side of the valve-chest chamber the lower plate, *b*, will be pressed against the valve-seat or lower side of the said chamber, the spring *c*, by its expansive power, serving to force the two plates *b b'* in direction away from one another and against the opposite sides of the valve-chest. By having both plates and the spring perforated, as shown at *f f* and *g*, the valve becomes what is termed a "balanced valve."

The valve-stem *e*, at its rear end, is jointed to a rocker-lever, *h*, which passes through a cylinder, *i*, that is fitted to slide freely on the lever. This cylinder is for the lever an adjustable fulcrum, it being inserted within and applied to a corresponding cylindrical bearing or hole, *k*, made in a slider or block, *l*, which is arranged between two parallel guides, *m m*. The said slider should be so formed as not only to allow of the necessary vibratory motions of the rocker-lever, but enable the block to be elevated far enough to bring into coincidence the axis of the cylinder *i* and that of the joint-pin of the valve-stem.

An ordinary ball-governor, P, of a steam-engine is to be so applied to the slider *t* as to actuate or raise and depress it while the engine or its slide-valve is in operation. The lower end of the rocker-lever is jointed to the strap-rod *n* of an eccentric, *l'*, and when the eccentric is revolved a reciprocating vibratory motion will be imparted to the rocker-lever, whereby the valve will be moved on its seat. The extent of movement of the valve will depend on the position of the slider *l*, for when the slider is elevated high enough to bring the axis of the cylinder *i* into coincidence with that of the joint-pin *o* of the valve-stem the vibratory movements of the rocker-lever will cause it to produce no motion of the valve. The farther the slide may descend from such a position the greater will be the amount of motion imparted to the valve. Thus by means of the slider, its cylinder, and guides, applied together and to the rocker-lever of the valve, we are enabled to regulate the movement of the slide-valve by the action of a ball-governor applied directly to the slider.

Thus it will be seen that, instead of applying the governor to a throttle-valve placed in the induction-pipe which leads the steam from the boiler to the valve-chest, I apply the governor to work the slide-valve, and thus I am enabled to dispense with the throttle-valve and to regulate the flowage of steam from the valve-chest into the piston-cylinder, instead of regulating the flowage of steam into the valve-chest.

With my invention I can obtain a more sensitive and a much better regulation of the engine by the ball-governor with much economy of steam in comparison to what results when the governor is applied to work a throttle-valve placed in the induction-pipe of the valve-chest.

Therefore what I claim as my invention is as follows—that is to say:

1. The combination and arrangement of the

cylinder *i*, the slider *l*, and the guides *m m* with a slide-valve, A, and rocker-lever *h*, the whole being substantially as and to operate as hereinbefore explained.

2. The combination of the ball-governor with the slide-valve of a steam-engine cylinder by means as described, or the equivalent thereof, whereby such slide-valve shall be controlled in its movements by the ball-governor in manner as specified.

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Witnesses:
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