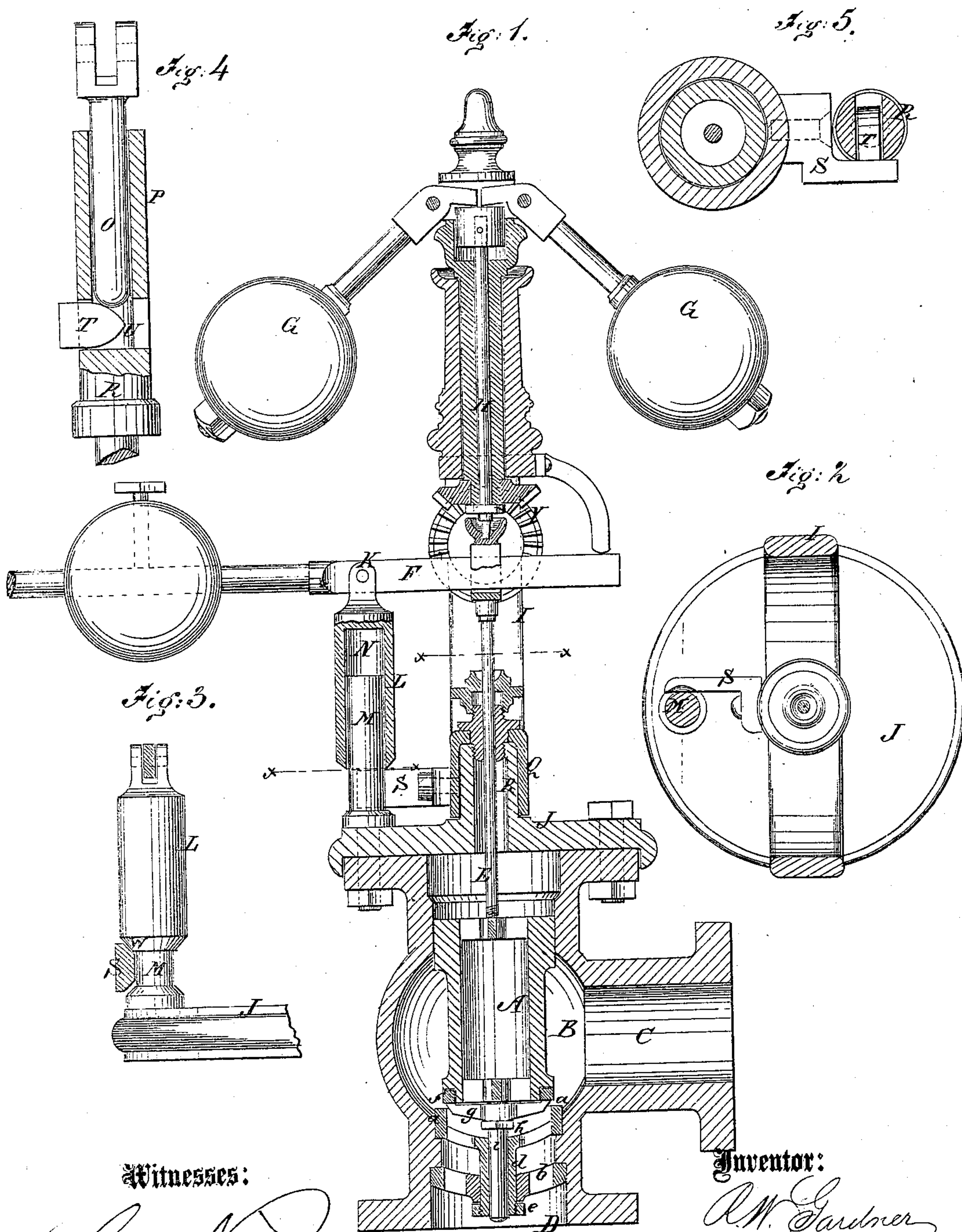


R. W. GARDNER.  
Governors.

No. 139,055.

Patented May 20, 1873.



Witnesses:

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# UNITED STATES PATENT OFFICE.

ROBERT W. GARDNER, OF QUINCY, ILLINOIS.

## IMPROVEMENT IN GOVERNORS.

Specification forming part of Letters Patent No. **139,055**, dated May 20, 1873; application filed February 1, 1873.

*To all whom it may concern:*

Be it known that I, ROBERT W. GARDNER, of Quincy, in the county of Adams and State of Illinois, have invented a new and Improved Governor, of which the following is a specification:

The first part of my invention relates to steam-governors in which the valve is opened by a weight and lever, subject to the action of the balls, and is closed by the balls; and it consists of a stop-motion by which the valve is closed down on its working seat when the governor-belt breaks, instead of closing against another seat by the falling of the balls, as in the common way, which necessitates the opening of the valve fully before closing, and a long movement, which are very objectionable—which said stop-motion comprises a fulcrum for the weighted lever, which is arranged to be let fall, and is tripped when the belt breaks and let fall so as to close the valve. The second part of my invention is applicable to different governors; and consists of a valve-seat of hardened steel or other durable metal secured in a novel manner; also a facing of the valve with the same, and a mode of applying it. The third part of the invention consists of a hollow clamping or fastening stem for securing the valve-seat, arranged to receive a guide-stem for the lower end of the valve.

Figure 1 is a sectional elevation of a governor constructed according to my improvement. Fig. 2 is a horizontal section taken on the line *xx* of Fig. 1. Fig. 3 is a detail. Fig. 4 is a sectional elevation; and Fig. 5 a horizontal section, of a modification of some of the details of the tripping mechanism.

Similar letters of reference indicate corresponding parts.

A represents the hollow balanced valve; B, the valve-chamber; C, the inlet-pipe; D, the pipe to the engine; E, the valve-rod; F, the weighted lever for opening the valve; G, the balls; and H, the rod for closing the valve; which, together with the driving-gear being arranged as heretofore described and shown in my patents of August 14, 1860, December 27, 1864, and November 21, 1865, are not now claimed; but as before used the frame I, which supports the balls and the driving-gear, was permanently attached to the

disk or plate J, which incloses the top of the valve-chest, and the lever F was pivoted to a permanent fulcrum, K. Now I make the fulcrum vertically movable, either by a tubular piece, L, fitted on a cylindrical rod, M, arranged so that the tube can fall when required to do so, and, when falling, will be regulated by an air-cushion in the chamber N, or by rod O, in a tube, P, erected on the plate J; and to hold the fulcrum up in the required working position to cause the balls to regulate the valve, I make the frame I, so that it can turn on the plate J, by a socket in the lower end Q, fitting on a stud, R, of the plate, and provide an arm, S, on the frame to hold the fulcrum of the lever up to its place, either by resting against the standard M, under the end of the tube, or by the wedge T, under the end of the rod O, in the mortise U of the tubular standard P, the arm and the wedge being constantly borne in the direction to maintain the tube or the rod in the elevated positions by the strain of the belt, for driving the governor, on the shaft of the driving-wheel V, the belt being purposely arranged to cause such strain.

In case of a vertical engine, it will, for that purpose, be arranged over suitable guide-pulleys.

The upper edge W of the arm S, and the lower end X of the tube, are beveled, and the wedge T is beveled, and the end of the rod O is tapered so that the gravity of the weighted lever will instantly cause the arm S to swing back and let the lever fall and close the valve, when the frame I is relieved of the strain of the driving-belt by its breaking or running off the pulleys. The bar S may be reversed in its application to the stand Q of the governor-frame so that the belt for working the governor may be applied from either of two opposite directions. *a* represents a hardened steel or American sterling metal valve-seat, with which I propose to bush or re-enforce the casting to resist the tendency of the steam to cut and wear the seat; and I propose to secure it in place without the use of screw-threads on it or the casting in which it fits by seating it in a rabbet in the casting, as shown in Fig. 1, and clamping it therein by the spider *b*, fitted in a reverse rabbet in the steam-



tube below, and a stem, *d*, passing down through the spider, and having a nut, *e*, screwed on the lower end. I also re-enforce the valve A with a ring-face, *f*, of hardened steel, American sterling metal, or other durable metal, and secure it by the clamp *g*, which is screwed up by the nut *h*, on the stem *i*, which I fit in the hollow stem *d* of the valve-seat *a*, to guide the lower end of the valve. This ring may be reversed after being worn out on one side and a new face presented.

By having the valve close, for stopping the engine, in this way on the same seat with which it acts to regulate the quantity of steam, I not only save the cost of the extra seat commonly used, but I avoid the opening of the valve wider before closing, and the long movement it has to make in the said common arrangement, by which the engine "races" before being stopped.

By the common arrangement, if a heavy load is thrown on with low steam, the balls may fall to the stop-plane and stop the engine when unnecessary, thus causing considerable trouble and delay, which cannot occur

when the valve is raised by a weighted lever, as in this case.

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

1. The combination, with valve-rod E, of the rotary frame I and supporting weight-lever F fulcrumed in a vertical slide supported on a tapering arm that is itself held in position by the strain of the belt, substantially as and for the purpose described.

2. The valve-seat *a* having stem *d*, and resting on rabbet of casting, combined with a spider, *b*, fitted on a reverse rabbet of said casting, and a nut, *e*, applied as and for the purpose described.

3. A face, *f*, and a guide, *i*, secured to valve A by the same clamp *g h*, as described.

4. A valve, A *f*, having guide-pin *i* combined with a valve-seat, *a*, having socket *d*, as and for the purpose set forth.

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Witnesses:

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