2 Sheets--Sheet 1.

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Governor for Steam-Engines.

No. 163,662. Patented May 25, 1875.

Fig. 1.

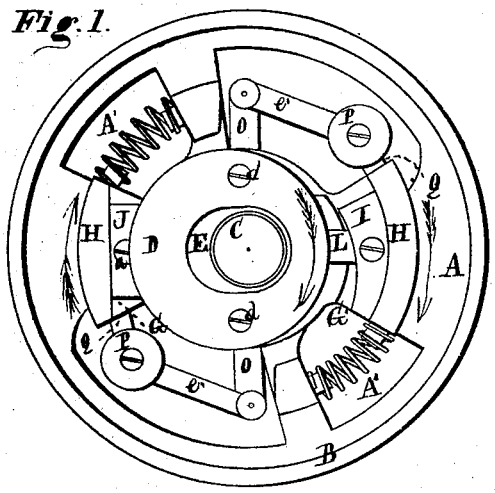


Fig. 2.

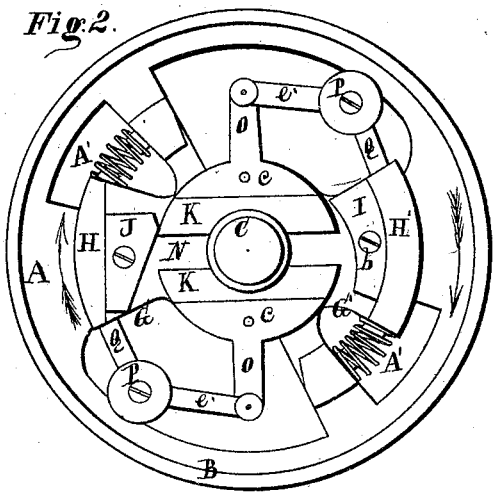


Fig. 3.

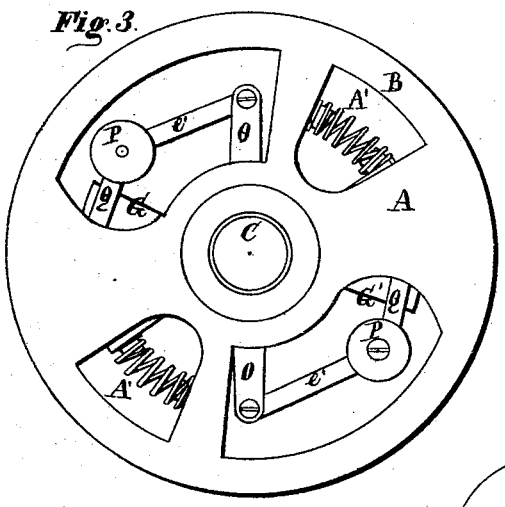


Fig. 4.

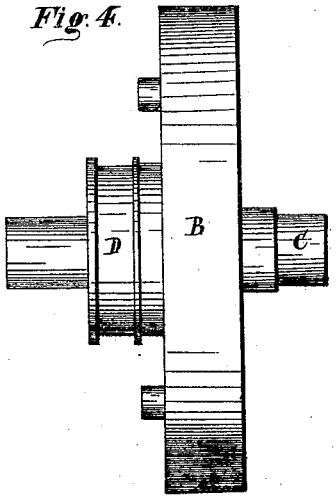
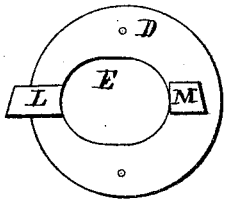


Fig. 5.



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2 Sheets--Sheet 2.

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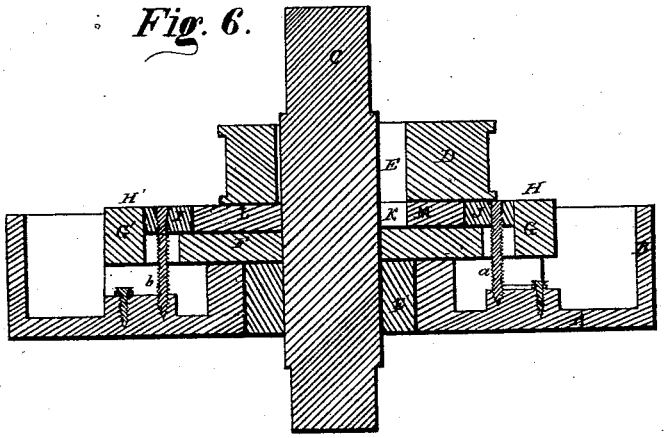
Fig. 6.



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UNITED STATES PATENT OFFICE.

ADONIRAM KENDALL, OF CLEVELAND, OHIO.

IMPROVEMENT IN GOVERNORS FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. **163,662**, dated May 25, 1875; application filed November 28, 1874.

To all whom it may concern:

Be it known that I, ADONIRAM KENDALL, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented new and useful Improvements in Governors for Steam-Engines of which the following is a description, reference being had to the accompanying drawings making a part of this specification, in which—

Figure 1 is a side view of the governor. Fig. 2 is a side view, having a section thereof detached. Fig. 3 is a view of the opposite side of Fig. 1. Fig. 4 is an edge view. Fig. 5 is a detached section. Fig. 6 is transverse section.

Like letters of reference refer to like parts in the several views.

The nature of this invention relates to a governor for steam-engines; and the object of the same is to control the throw of the eccentric by a governing device attached to the eccentric itself, whereby the throw of the same is made more or less, thereby governing the movement of the valve for cutting off steam, regulating by this means the speed of the engine.

Of the aforesaid invention the following is a more full and complete description.

In the drawing, A represents a wheel having a wide peripheral band or flange, B, within which is arranged the following devices: C is a shaft passing through the eccentric D and wheel. Said shaft is fitted loosely in the wheel, and also in the eccentric. In the latter is an elongated hole, as will be seen at E, Fig. 1, to allow of a transverse movement of the eccentric on the shaft. To the shaft is secured a disk, F, having a pair of radial wings, G G′, Fig. 2. On the outer end of each wing is formed a shoulder, H H′. The inner side of shoulder H′ is curved, to which is fitted a cam, I, secured to the wheel A by a screw, *b*. Said screw passes through the wing G′ in an elongated hole to admit of a rotary movement of the wing. Against the shoulder H is fitted an inclined plane, J, which is also secured to the wheel by a screw, *a*, passing through the wing in a slot, to allow to it a rotary movement. It will be obvious that in thus fastening the cam I and the inclined plane J to the wheel they will remain stationary while the wings are permitted to move. To the disk F is fitted the eccentric referred to, by being dovetailed thereto (to admit of its sliding transversely) as follows: The outer edges of the guides K, Fig. 2, are cut from the upper edge down in under, to which are fitted blocks or fillets *c c*, having their inner edges cut at an angle to correspond with the inclined edges of the guides. To said fillets the eccentric is secured by screws *d*, Fig. 1, thereby holding the fillet close against the sides of the guides, and which, by their dovetailed relation to said guides, prevents the eccentric from moving back or away from the disk, but which, however, does not prevent the eccentric from sliding transversely in the guides. It will be seen in Fig. 5 that to the under side of the eccentric is attached two keys, L M. Said keys are of a size to fit closely, but loosely, in the space N, Fig. 2, between the guides K. The disk F is connected to the wheel A, as follows: To the arms *o o* projecting from the disk are pivoted links *e e′*. The opposite ends of the links are pivoted to the balls P. One end of each of the links Q Q is also pivoted to the balls, whereas the opposite end is pivoted to the wheel. This free pivotal connection of the disk to the wheel admits of a centripetal and centrifugal movement of the balls for operating the wings G, and, in connection therewith, the eccentric, substantially in the manner as follows: The eccentric is attached to the valve of the engine by a rod in the usual way. Now, as the shaft C is made to revolve with the eccentric in the position as shown in Fig. 1, the throw of the valve will be of a certain length, and that proper for the ordinary run of the engine. In the event of an accelerated movement of the engine in consequence of an excess of steam, the balls P will be thrown outward, more or less, from the position shown in Fig. 1 to that shown in Fig. 2. This centrifugal movement of the balls will draw upon the arms *o o*, thereby turning the disk and wings in direction of the arrows. As the wings move around the inclined plane presses upon the end of the key M, and forces it, together with the eccentric, toward the shaft, thereby shortening up the throw of the eccentric, and consequently the throw of the valve, which will cut off more or less steam, as the action of the balls may act-

uate the wings and the eccentric attached thereto. As the speed of the engine may decrease the balls fall in toward the center, thereby extending the stroke of the eccentric by its being pushed back toward its position shown in Fig. 1, by the cam H acting upon the end of the key L.

It will be obvious that by this device the stroke of the valve is readily and measurably regulated by the speed of the engine imparted to the wheel A, which, by its velocity, actuates the eccentric by shortening or extending its stroke, thereby governing the amount of steam admitted into the cylinder, and consequently controlling the movement of the engine. The springs A′ are to keep the balls from moving too freely, and before the proper time, while the wheel A serves as a counter-balance or check against any sudden or violent motion that may chance to happen.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The eccentric D, having an elongated hole, E, therein, wings G G′, inclined plane J, cam I, and shaft C, in the manner substantially as described, and for the purpose set forth.

2. The inclined plane J, and cam I, as arranged to operate in combination with the eccentric D, in the manner as and for the purpose set forth.

3. The combination of the eccentric D, keys L M, wings G G′, inclined plane J, cam I, shaft C, links e' e', balls P P, links Q Q, springs A′, and wheel A, all arranged and combined to operate in the manner as set forth, and for the purpose specified.

ADONIRAM KENDALL.

Witnesses:
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