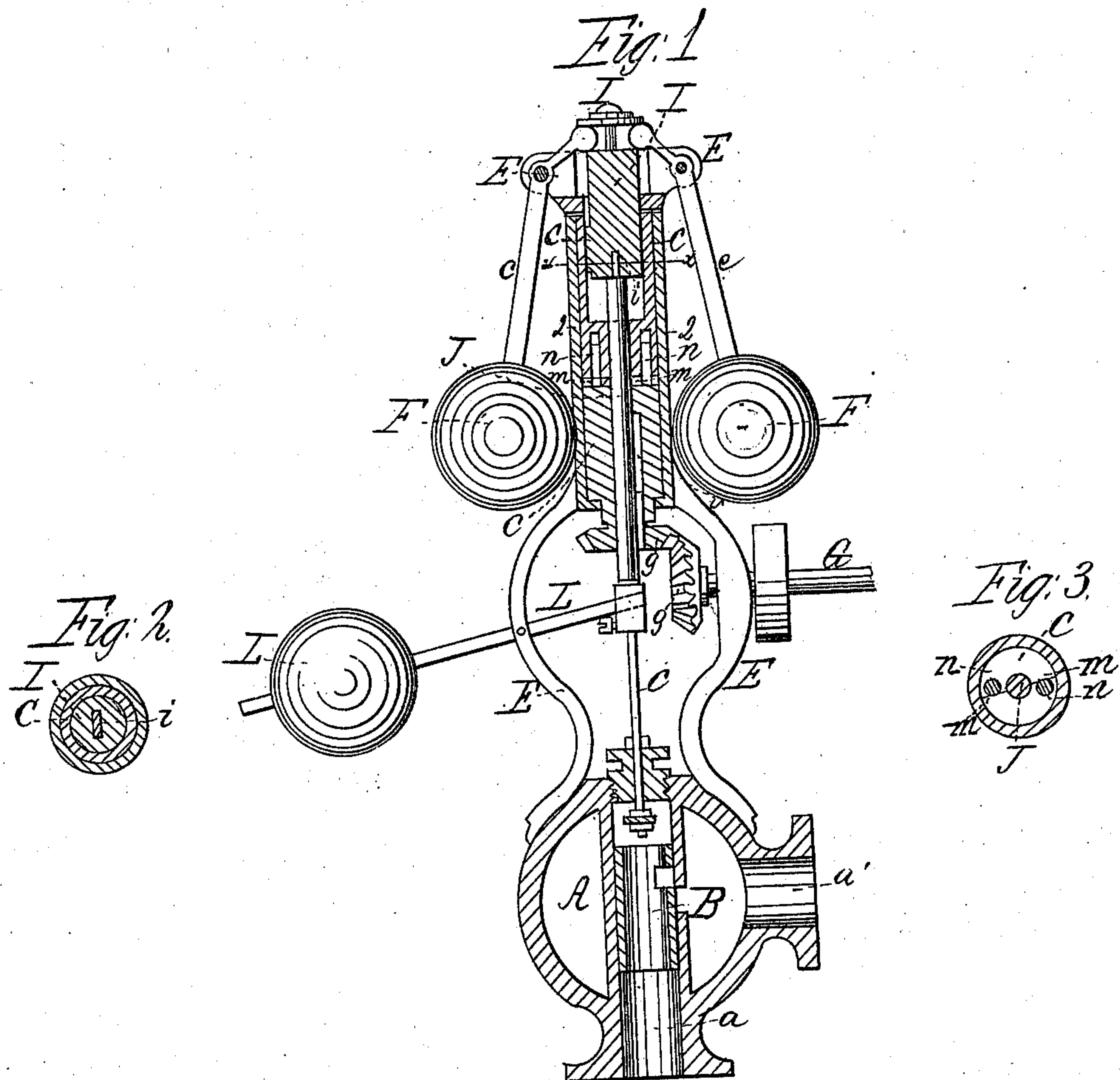


*T. Alson,  
Governor.*

*N<sup>o</sup> 81,455.*

*Patented Aug. 25, 1868.*



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# United States Patent Office.

THOMAS ALSOP, OF ELKHART, ILLINOIS.

Letters Patent No. 81,455, dated August 25, 1868.

## IMPROVEMENT IN GOVERNORS FOR STEAM-ENGINES.

The Schedule referred to in these Letters Patent and making part of the same.

### TO ALL WHOM IT MAY CONCERN:

Be it known that I, THOMAS ALSOP, of Elkhart, in the county of Logan, and State of Illinois, have invented a new and improved Steam-Governor; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a vertical axial section.

Figure 2 is a cross-section through the line  $x x$  of fig. 1.

Figure 3 is a similar section through the line  $y y$  of fig. 1.

The object of this invention is to construct a steam-governor, with its parts so arranged and operating that if the belt slips, or an accident happens to the machinery, the governor will cut off the steam and stop the engine, in addition to properly performing its functions as a steam-regulator at other times.

To this end the valve-stem is not connected permanently with or made a part of the vertical-revolving shaft or rod which rotates the governor-arms and balls, but the connection between the two vertical rods or stems is made by an independent rod between them, which engages with the upper rod by a clutch. When the belt-shaft is properly receiving its motion from the engine, and applying it to the governor, the clutch remains engaged, and the apparatus regulates the supply of the steam to the engine, but when from any cause, as the slipping of the belt, or otherwise, the motion of the belt-shaft falls behind that acquired by the governor-balls and their stem, the clutch becomes disengaged, and drops a weight, which closes the steam-valve, cuts off the feed, and stops the engine at once.

In the drawings, A indicates a hollow globe, of brass or other suitable material, in which the valve that cuts off or regulates the flow of steam from the boiler to the engine is denoted by the letter B,  $a$  being the pipe which connects the globe to the boiler, and  $a'$  that which passes from it to the cylinder. E E are arms which support the cylinder D, in which the revolving, sliding, vertical rod C, that actuates the arms  $e e$ , and balls, F F, slides up and down. The arms are pivoted to lugs  $e e$  attached to the top of the sliding rod C, and their inner ends are attached to or connected with the upper end of another vertical rod, I, which slides up and down through the centre of the revolving rod C, being raised as the governor-balls drop, and depressed as they rise. The inner rod, I, does not rotate independently of its enclosing-rod C, the two being connected together by a spline and key, which allow independent vertical but not independent rotary motion.

The outer rod, C, is put in motion by the belt-shaft G through gear  $g g'$ , and raises or depresses the governor-balls in proportion to its velocity of revolution. It follows, therefore, that the inner rod I will be depressed just in proportion to the velocity of revolution of the outer rod C, or in proportion to the speed of the engine. As it is depressed, it thrusts down the valve B by means of a connecting-rod, J, the upper end of which is pressed against by the lower end of rod I, its lower end pressing against the upper end of the valve-stem  $b$ . As the steam fails, and the balls drop and raise the rod I, the rod J and valve-stem  $b$  follow it, through the operation of a weighted lever, L, which presses them upward when not counteracted by the high speed of the balls.

The rod, C, is made in two parts, C and C'. The upper end of the lower part C' is provided with clutch-shoulders  $m m$ , vertical on one side and inclined on the other. The lower end of the upper part C is provided with two clutch-pins  $n n$ , which engage with the shoulders  $m m$  when the part C' tends to move faster than the part C, or when the power is applied from C' to C, causing the two parts, C and C', to revolve together. But when, from any cause whatever, the motion of the lower part, C', is retarded, so that the upper part, from its momentum, gains upon it, the clutch does not operate, but the upper part moves on independently of the lower part.

In order to make the parts run smoothly, without jar or friction as far as possible, I set the pins  $n n$  loosely in sockets, which permit them to rise out of the way when the part C is running faster than the part C'. To effect this, it is only necessary to bevel the lower end of the pins in the proper manner, to cause them



to rise easily over the inclines in the end of part C', and to arrange them in vertical holes in the lower end of part C, so that they will rise when passing up the said inclines, and drop when free again. If, then, the part C run faster than the part C', the pins will rise out of the way, but if the part C' run faster than the part C, the pins will drop and engage with the shoulders *m m*, and the whole rod C C' will revolve together.

Fig. 3 shows the pins *n n* thus engaged with the shoulders *m m*.

The upper end, *r*, of the intermediate rod J, is made rectangular, or with rectangular cross-section. Many other forms would answer as well, perhaps, as may be seen from the description of its function, as hereinafter set forth, but I prefer the rectangular form, as being the simpler. This end rests against the lower end of rod I, supporting the latter, and affording the means for the latter to move the valve-stem, as above explained. There is, however, an axial opening or hole, *s*, in the lower end of part I, extending upward a considerable distance, and of the form of the upper end of rod J, so that, when brought directly over the rod J in the same position, the upper end, *r*, of rod J will fit into the opening, and, by the force of the weighted lever L, the rod J will suddenly rise, lifting the valve B, so as entirely to cut off the steam.

The opening, *s*, in the rod I is so arranged, in connection with the clutch *m m*, *n n* in rod C C', that, when the clutch is engaged, the opening stands directly across the end, *r*, so that the part I holds the rod J down, keeping the valve B open. When the part C gains on the part C', however, the opening gradually turns round until it corresponds in position to the end, *r*, when the rod J rises at once and cuts off the steam.

The rod, J, is prevented from rotating independently of the part C' by a spline, *v*, just as the rod I is incapable of rotating independently of the upper part C, so that the gaining of the part C over the part C' is always necessary to enable the lever L to drop and raise the rod J. As long as the clutches are engaged, and the part C does not gain upon the part C', the rods remain connected, and the valve is simply regulated by the governor-balls, but the moment the belt slips, or any other accident happens to the machinery, that delays or retards the motion of the belt-shaft, and thereby of the part C', the momentum of the balls carries the part C ahead until the end, *r*, drops into the opening *s*, when the steam is shut off by the action of lever L, and the engine automatically stops.

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

1. The arrangement of the independent rod J, resting upon the rod or stem *b*, and having its upper end held against the rod I by means of a lever, L, or its equivalent, whereby the ingress of steam is controlled or arrested, substantially as herein set forth.

2. The combination of the parts C C', clutch *m n*, and rods I and J, substantially as described.

3. The weighted lever L, or its equivalent, in combination with the valve-stem *b* and steam-governor apparatus, in such a way that, when the motion of the belt-shaft is retarded, as compared with that of the governor-balls, the weight will be dropped, and the cut-off valve thereby closed, substantially as described.

To the above specification of my invention I have signed my hand, this 25th day of June, 1868.

THOS. ALSOP.

Witnesses:

CHAS. A. PETTIT,  
 SOLON C. KEMON.