(No Model.)

A. ROLLASON.

SPEED GOVERNING APPARATUS.

No. 394,300. Patented Dec. 11, 1888.

Fig. 1.

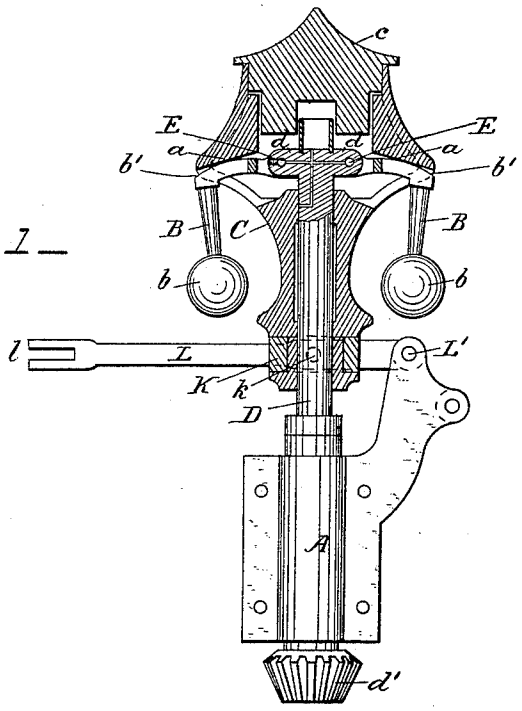


Fig. 2.

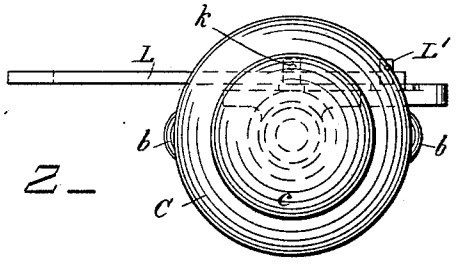
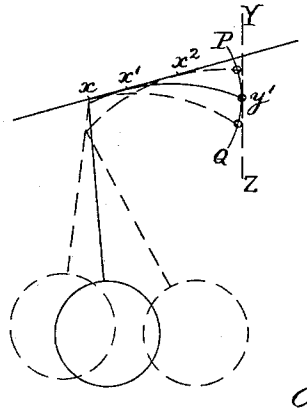


Fig. 3.



Witnesses,

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UNITED STATES PATENT OFFICE.

ARTHUR ROLLASON, OF NEWCASTLE-ON-TYNE, COUNTY OF NORTHUMBERLAND, ENGLAND.

SPEED-GOVERNING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 394,300, dated December 11, 1888.

Application filed July 24, 1888. Serial No. 280,911. (No model.) Patented in England March 7, 1888, No. 3,546.

To all whom it may concern:

Be it known that I, ARTHUR ROLLASON, a subject of the Queen of Great Britain and Ireland, residing at Newcastle-on-Tyne, in the county of Northumberland, England, have invented certain new and useful Improvements in Speed-Governing Apparatus for Gas and Caloric Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to speed-governors for gas-engines; and it consists in the novel construction and combination of the parts hereinafter fully described and claimed.

Letters Patent for this invention have been issued in England, No. 3,546, dated March 7, 1888.

In the drawings, Figure 1 is a side view of the governor, partly in section. Fig. 2 is a plan view of the governor. Fig. 3 is a diagram showing the action of the governor-balls.

A is the stationary governor-bracket, and D is the governor-spindle, journaled in the said bracket and provided with the bevel-pinion d' or other device whereby rotary motion may be imparted to the spindle from the engine. Lugs d are provided at the upper end of the spindle D; and B are the arms of the governor, provided with balls b and pivoted upon the pins E, which pass through the said lugs d. The pins E pass through the ends of the horizontal portions of the arms B, and the balls are at the other ends of the vertical portions, the knees or bends of the bell-cranks being intermediate between the said pins and balls.

C is a weight sliding on the governor-spindle, and provided with a loose cap, c, of suitable weight. The weight C revolves with the arms, and is provided with flat inclined surfaces a for the arms B to work against. The arms B are made in the form of bell-crank levers, and each has its upper surface, b', curved, preferably being a portion of a circle the continuation of which would pass through the pivot-pin E. As the arm turns on the said pivot-pin, the point of contact of its curved surface with the flat inclined surface a moves either toward or away from the governor-spindle. By properly adjusting the angle of the flat surface the arm can be made to roll upon it without any appreciable slip. The diagram in Fig. 3 shows one arm in its middle position, its end positions being indicated by dotted lines. If the arm were to roll upon the flat surface without being connected to the lug on the spindle, the center of the pivot-pin would trace out a portion of a cycloid, P Q. The vertical line Y Z is a tangent to this cycloid at the point y'. The points of contact of the arms in the three positions are $x\,x'\,x^2$, and the moments of the weight of the body of the governor which tend to turn the arm about the center of the pivot-pin are proportional to the distances between the points $x\,x'\,x^2$ and the line Y Z. These distances may be made approximately proportional to the moments of the centrifugal force of the ball and arm about the same points, in which case the governor will be nearly isochronous, and may be made as sensitive as convenient by varying the curve on the arm, the inclination of the flat surface, and the distance of the pivot-pin from the center line of the spindle.

L is a lever pivoted to the bracket A by the pin L′, and l is a fork on the end of the lever, by which it is connected with the engine valve-gear, as fully described in my application, Serial No. 275,875, filed June 2, 1888. The lever L is connected to the weight C by means of the pin k and collar K, or in any other convenient manner.

When the speed of the engine increases, the balls fly out and raise the weight and the forked lever, thereby reducing the supply of gas. When the speed of the engine decreases, the reverse occurs. The loose cap c allows the working parts of the governor to be oiled, and its removal permits the engine to be run at a very low speed.

What I claim is—

1. In a speed-governor, the combination, with a revoluble spindle, of levers pivoted to the said spindle and provided with balls, and a revoluble weight sliding on the spindle and provided with inclined surfaces for the said levers to bear against, the inclination of each surface on the weight and the curve on the lever bearing against the said surface being such that the moments of the weight tending to depress the balls and

the respective moments of the centrifugal force of the balls tending to raise the weight are approximately proportional to each other and also to the respective distances between the points of contact of the levers with said inclined surfaces and a line drawn from the center point of the pivot at a tangent to the cycloid which the said point would trace if the arm were rolled upon the surface on the weight without being pivoted to the spindle, substantially as described, and shown in the diagram, and for the purpose set forth.

2. In a speed-governor, the combination, with a revoluble spindle, of a revoluble weight sliding on said spindle and provided with flat inclined surfaces, and bell-crank levers pivoted at one end to the said spindle and provided with balls at the other end, and with curved surfaces upon the horizontal portion of said levers, said surfaces being formed of parts of circles the continuation of which would pass through the centers of the lever-pivots, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ARTHUR ROLLASON.

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