No. 844,129. PATENTED FEB. 12, 1907.

A. HILL & S. PURCELL.

GOVERNOR.

APPLICATION FILED MAR. 8, 1906.

Fig. 1.

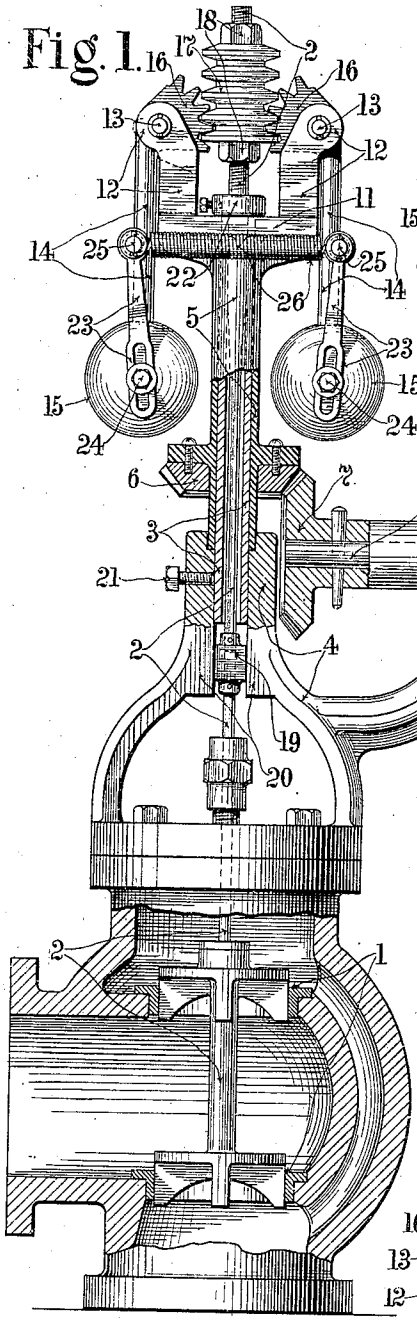


Fig. 3.

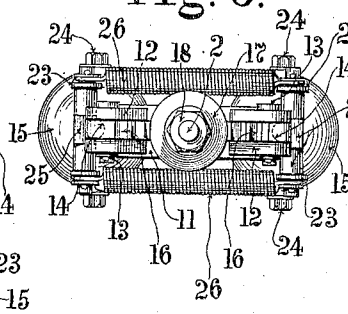


Fig. 2.

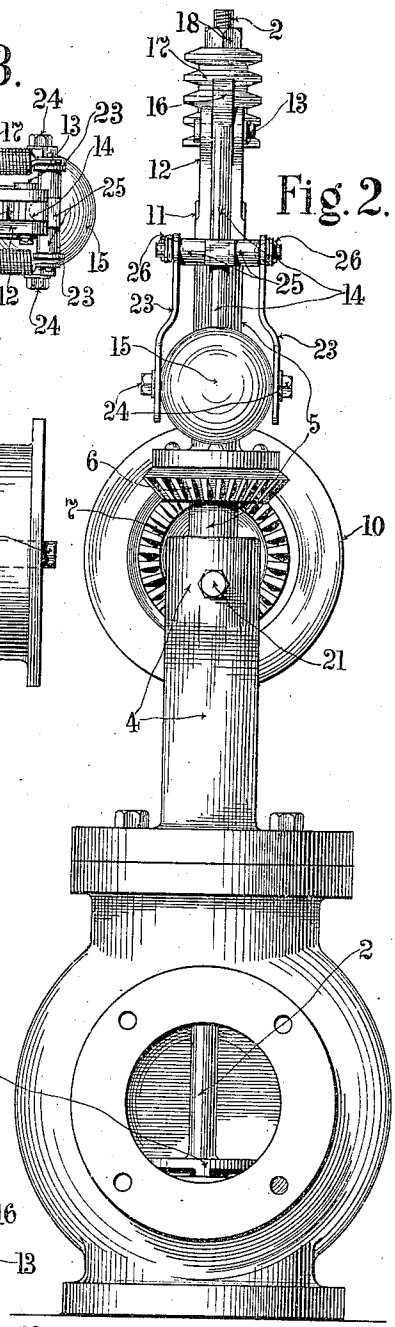
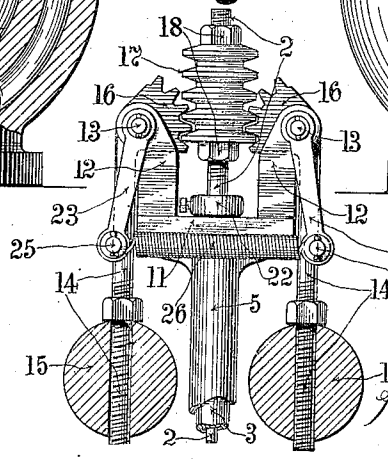


Fig. 4.



Witnesses

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GOVERNOR.

No. 844,129. Specification of Letters Patent. Patented Feb. 12, 1907.

Application filed March 8, 1906. Serial No. 304,835.

To all whom it may concern:

Be it known that we, ARTHUR HILL and SAMUEL PURCELL, subjects of the King of Great Britain, residing at Pontefract, in the county of York, England, have invented certain new and useful Improvements in Governors for Steam-Engines, of which the following is a specification.

This invention relates to centrifugal governors of the type wherein a pair of swinging balls is employed for operating the throttle-valve of a steam-engine in order to regulate the admission of steam to the engine according to the rate of motion; and our object is to construct or arrange a governor of this type whereby uniform velocity may be maintained, said governor being particularly applicable for use in connection with engines driving coal-cutting machines and other appliances where the load is variable.

According to this invention the upper end of the valve-rod of the throttle-valve is provided with a fluted or toothed barrel, while the upper part of the rotating sleeve of the governor is formed with a cross-head carrying an upstanding bracket at each side of the valve-rod, and to each of these brackets is pivoted a pending arm provided with a ball at its lower end, while the upper ends of the said arms beyond their pivots are each formed with a toothed segment, which segments engage with the toothed barrel carried on the upper end of the valve-rod. The segments are situated at opposite sides of the barrel, with their teeth engaging the teeth of the barrel, and on the governor-sleeve being rotated the pivoted ball-arms are caused to swing outward, so that on any acceleration of speed above a given rate the segments by reason of their engagement with the toothed barrel cause the latter to be lowered, and with it the valve-rod, so as to diminish the area of the steam-passage, while in the case of flagging in the speed of the engine the pivoted ball-arms come nearer the axis of rotation and cause the segments, by reason of their engagement with the barrel, to raise the latter, and with it the valve accordingly. The ball-arms are elastically connected together by spiral springs, one at each side of the governor-sleeve, whereby the extent of movement outward of the ball-arms is limited to the extent of the said springs, which act directly with the load, while the springs are adjustably mounted, so that their distance to and away from the pivots or axes of the ball-arms may be adjusted at will in order to regulate the speed of the engine as desired.

In order that our invention may be clearly understood, we will proceed to describe the same with reference to the accompanying drawings, wherein—

Figures 1, 2, and 3 are, respectively, a side elevation, partly in section, an end elevation, and a plan, of a governor constructed in accordance with our invention. Fig. 4 is a detached view of a portion of the same governor, showing a slightly-modified construction.

In the drawings, and with particular reference to Figs. 1, 2, and 3, 1 is a balanced throttle-valve of ordinary construction, having its valve-rod 2 extending vertically upward within a tubular guide 3, carried within a bracket 4, mounted on the top of the throttle-valve casing, while outside the said guide 3 is mounted a sleeve 5, provided with a bevel-wheel 6, gearing with another bevel-wheel 7, carried on a horizontal shaft 8, supported by a bracket 9 from the bracket 4, said shaft 8 being provided with a pulley 10, which is driven by a belt from the engine, whereby the said sleeve 5 is rotated. The top of the sleeve 5 is formed with a cross-head 11, provided with an upstanding bracket 12 at each side of the valve-rod 2, and to each of these brackets 12, on a stud 13, is pivoted a pending arm 14, provided with a ball 15 at its lower end, while the upper ends of the said arms 14 beyond their pivots 13 are each formed with a toothed segment 16, which segments 16 engage with a fluted or toothed barrel 17, mounted on the upper end of the valve-rod 2. The segments 16 are situated at opposite sides of the barrel 17 with their teeth engaging the teeth of the said barrel 17, and on the sleeve 5 being rotated the ball-arms 14 swing outward on the pivots 13, so that on any acceleration of speed above a given rate the segments 16, by reason of their engagement with the toothed barrel 17, cause the latter to be lowered, and with it the valve-rod 2, so as to diminish the area of the steam-passage, while in the case of flagging in the speed of the engine the pivoted ball-arms 14 come nearer the axis of rotation and cause the segments 16, by reason of their engagement with the barrel 17, to raise the latter, and with it the valve 1 accordingly.

The upper end of the valve-rod 2, carrying the toothed barrel 17, is screw-threaded, and

fixing-nuts 18 are provided on the rod 2, one at each end of the said barrel 17, so that by adjusting the said fixing-nuts 18 the position of the valve-rod 2 can be adjusted vertically in order to obtain a fine adjustment of the valve 1, while on the lower part of the valve-rod 2 is provided a guide-block 19, working in guides 20, formed in the carrying-bracket 4, so as to prevent the valve-rod 2 turning round and to insure the true vertical working of the said rod. The tubular guide 3 is securely held in position within the bracket 4 by means of a set-screw 21, while a fixed collar 22, provided on the upper end of the said guide 4, effectually retains the governor-sleeve 5 in the down position with its bevel-wheel 6 in engagement with the bevel-wheel 7.

On each of the ball-arms 14, carried on slotted side links 23, adjustably fixed to the balls 15 by fixing-nuts 24, is a cross-rail 25, which cross-rails 25 are elastically connected together by spiral springs 26, one at each side of the governor-sleeve 5, so as to limit the extent of movement outward of the ball-arms 14 to the extent of the springs 26, which act directly with the load, while by making the side links 23, which carry the spring-connected rails 25, adjustable by means of the fixing-nuts 24 on the balls 15 the distance of the springs 26 to and away from the pivots 13 of the ball-arms 14 can be adjusted at will in order to regulate the speed of the engine as desired. Instead of mounting the links 23 on the balls 15 we may mount the said links 22 directly onto the studs 13 of the ball-arms 14, in which case the balls 15 themselves are made adjustable on their carrying arms 14, as shown at Fig. 4.

What we claim as our invention, and desire to secure by Letters Patent, is—

In a centrifugal governor for steam-engines, the combination with the bracket 4 and its tubular guide 3, of a valve-rod 2 passing upward within the said guide 3 and carrying at its upper end a fluted or toothed barrel 17, an external sleeve 5 on the guide 3 adapted to be rotated by gear-wheels driven from the engine, a cross-head 11 on the sleeve 5 having upstanding brackets 12 carrying studs 13, pending arms 14 pivoted on the studs 13 carrying balls 15 at their lower ends and being provided at their upper ends with toothed segments 16 gearing with the toothed barrel 17 on the valve-rod 2, together with springs 26 carried on cross-rails 25 supported at the back of the pending arms 14 by links 23, substantially as described.

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