

No. 758,010.

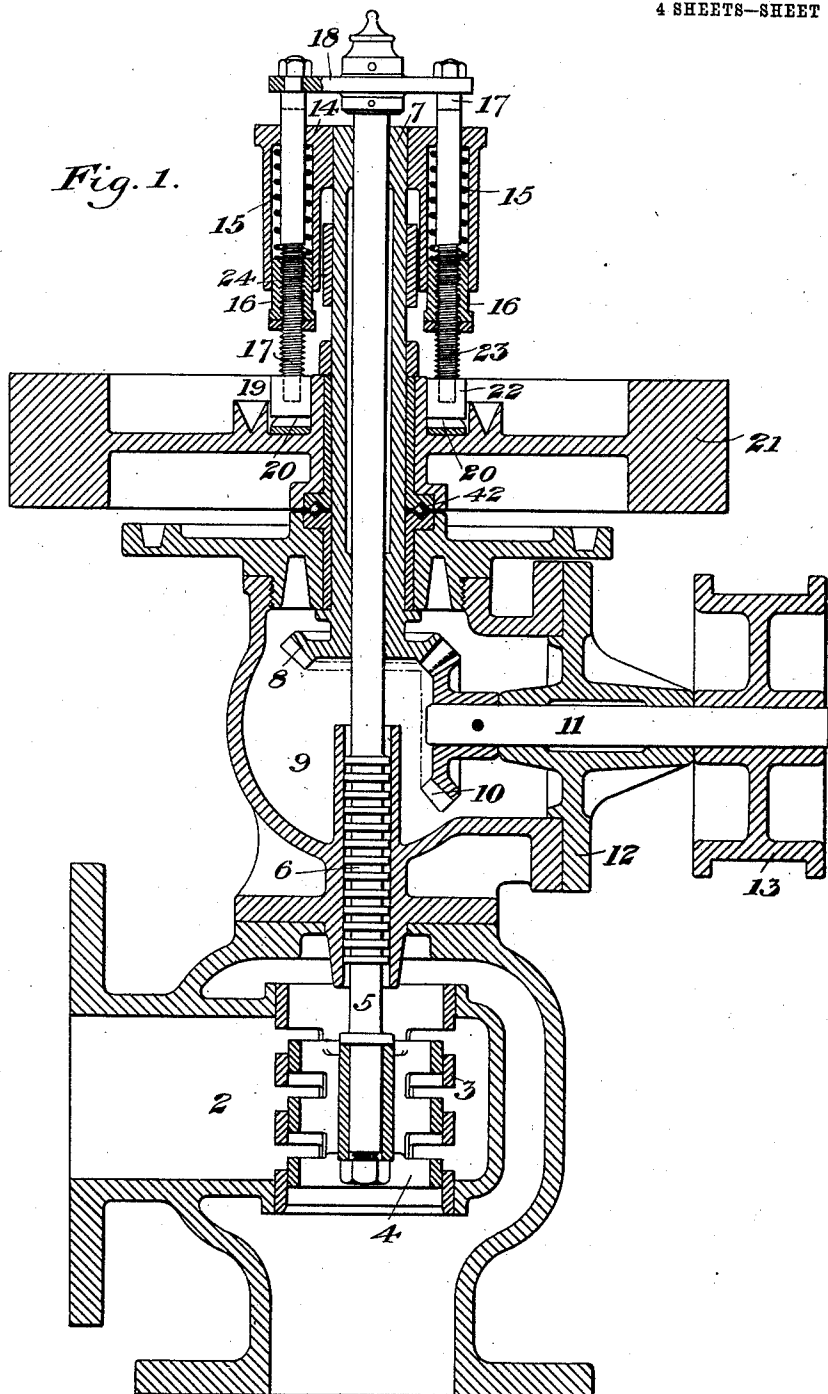
PATENTED APR. 19, 1904.

C. KUHLEWIND.
VALVE GOVERNOR FOR ENGINES.

APPLICATION FILED JULY 3, 1902.

NO MODEL.

4 SHEETS—SHEET 1.



WITNESSES

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J. M. Corwin

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4 SHEETS—SHEET 2.

Fig. 2.

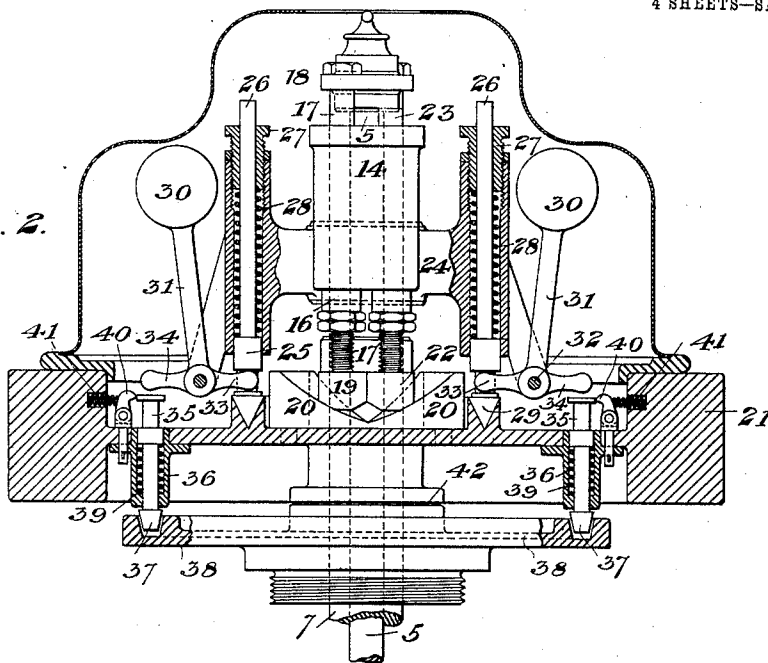
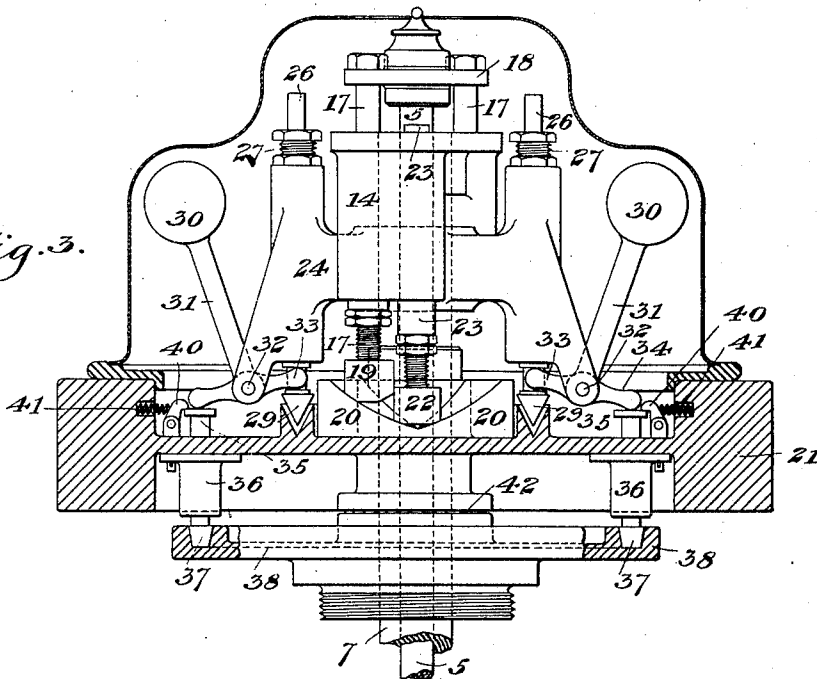


Fig. 3.



WITNESSES

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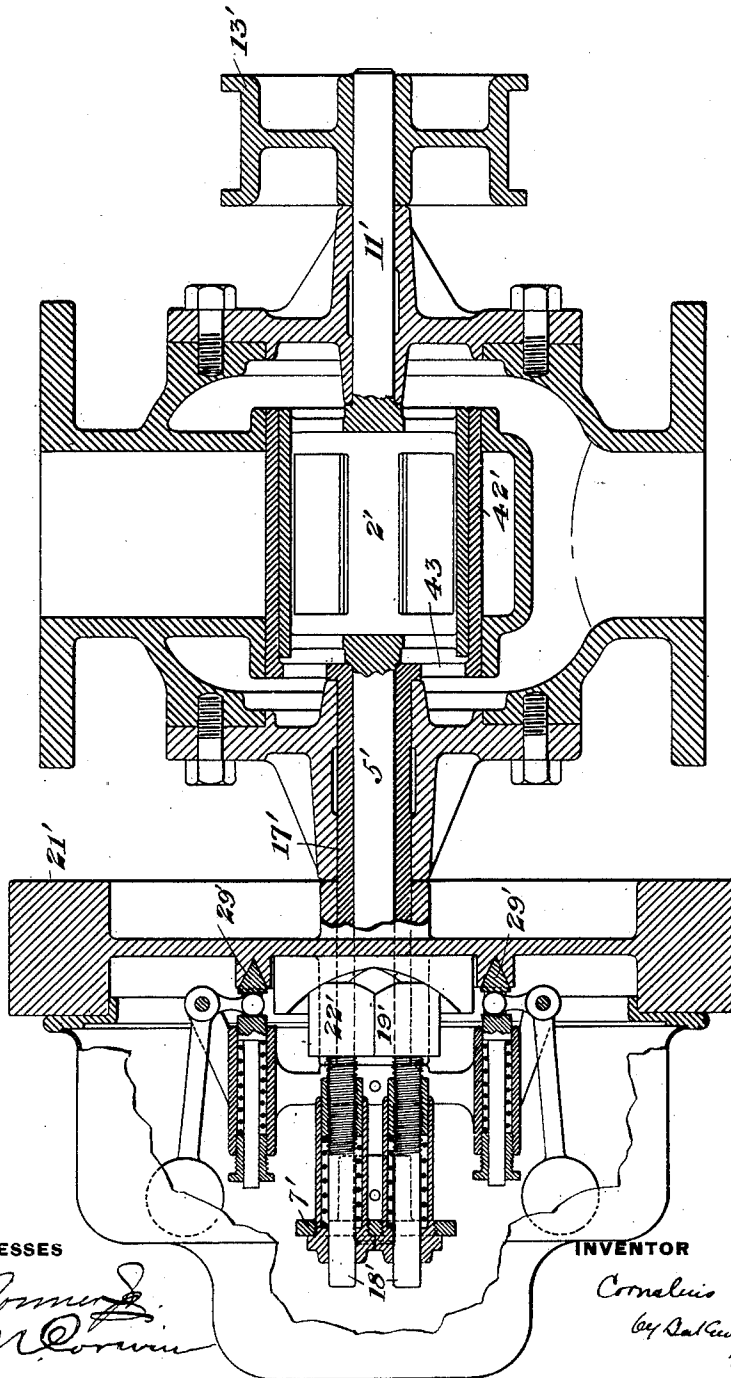
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4 SHEETS—SHEET 3.

Fig. 4.



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APPLICATION FILED JULY 3, 1902.

NO MODEL.

4 SHEETS—SHEET 4.

Fig. 8.

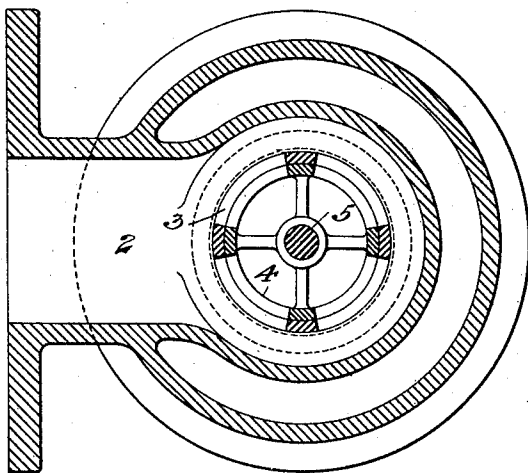


Fig. 6.

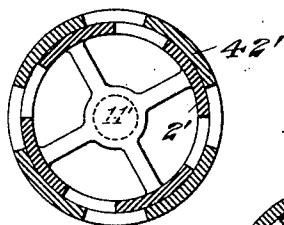


Fig. 7.

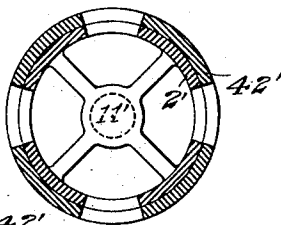


Fig. 5.

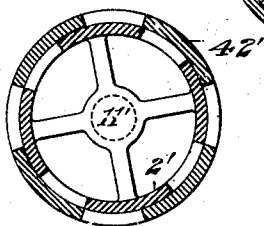
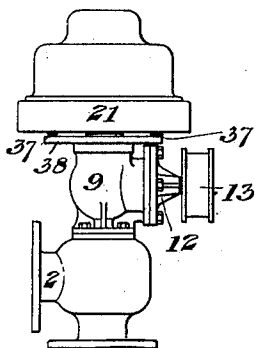


Fig. 9.



WITNESSES

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UNITED STATES PATENT OFFICE.

CORNELIUS KUHLEWIND, OF KNOXVILLE, PENNSYLVANIA, ASSIGNOR TO
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CORPORATION OF PENNSYLVANIA.

VALVE-GOVERNOR FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 758,010, dated April 19, 1904.

Application filed July 3, 1902. Serial No. 114,281. (No model.)

To all whom it may concern:

Be it known that I, CORNELIUS KUHLEWIND, of Knoxville, Allegheny county, Pennsylvania, have invented a new and useful Valve-Governor for Engines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a vertical central section showing a piston-valve provided with my improved governing device. Fig. 2 is a sectional side elevation at right angles to the section of Fig. 1, showing the parts in normal position at rest. Fig. 3 is a sectional side elevation showing the parts in position after the emergency application of the braking device. Fig. 4 is a sectional side elevation showing my invention applied to a horizontal piston-valve. Figs. 5, 6, and 7 are cross-sections of the piston-valve of Fig. 4, showing it in different positions. Fig. 8 is a horizontal cross-section of the valve of Fig. 1, and Fig. 9 is a side elevation, in reduced size, of the form of Fig. 1.

My invention relates to the governing of the fluid-admission valves of engines, such as steam or explosive engines, and is designed to provide a sensitive and quickly-acting governor which will act upon the valve to change the size of the fluid-admission ports by either throttling down or opening them, according to differences in speed.

In the drawings, referring to the form of Figs. 1, 2, 3, 8, and 9, 2 is the admission-port of an engine, having a slotted cylindrical valve-casing 3, containing a hollow piston-valve 4, with slots registering with those of the valve-casing. The stem 5 of this valve extends upwardly through the top of the valve-chamber and through a packing device 6 and thence through a tubular shaft 7. The shaft 7 is provided at its lower end with a bevel-wheel 8, located within a casing 9, also containing a bevel-wheel 10, intermeshing with wheel 8 and mounted on a shaft 11, extending through the removable side 12 of the casing and carrying at its outer end a pulley 13, which is driven from the engine-shaft.

A cross-head 14 is secured to the upper end of the tubular shaft 7 and is provided on opposite sides with pockets containing spiral springs 15, which at their lower ends bear upon sliding sleeves 16, having screw-thread connections with inner stems 17. The stems 17 project through the upper end of the cross-head and are rigidly secured to a cross-head 18, fastened to the upper end of the shaft 5. The stems are provided at their lower ends with blocks 19, having cut-away corners at their lower ends, forming wedge-faces which fit upon the oppositely-directed inclines of blocks 20, secured to a fly-wheel 21 on opposite sides of the shafts. Mating with each of the wedge-blocks 19 is a corresponding block 22, having similar wedge-faces and carried upon a stem 23, which projects upwardly through a pocket in the cross-head 14, each pocket containing a spiral spring similar to the spring 15. The upper end of the stem 23 is free from any connections. During the operation of the device the side faces of the blocks 19 and 22 contact with each other, the one rising or falling relatively to the other, depending upon the relative position of the fly-wheel and the tubular shaft. When at rest, these two blocks are in the position shown in Fig. 2, while Fig. 3 shows the extreme position when the valve is closed. Another cross-head, 24, is secured to the tubular shaft below the cross-head 14 and at right angles to it. This cross-head 24 is provided at its outer ends with vertical extensions bored out to receive the plungers 25, having stems 26, which extend upwardly through upper tubular guides 27. Spiral springs 28 surround the stems and press downwardly upon the plungers 25. The plungers 25 are provided with downwardly-extending stems having at their lower ends V-shaped clutch-blocks 29, which are arranged to fit in a V-shaped annular groove in the web of the fly-wheel. The governor-balls 30 are formed with stems 31, forming arms of three-armed levers mounted at 32. The arm 33 of each lever is forked to surround the stem between the plunger 25 and brake-block 29, while the arm 34 is arranged to act upon the upper end of the

plunger 35, carried in a bearing 36, secured to the fly-wheel and having a brake-block 37 at its lower end arranged to engage an annular groove of corresponding shape in a stationary braking-disk 38. Spiral springs 39 act upon the plungers 35 to normally press them upwardly and lift the blocks 37 out of engagement with the brake-disk. To lock the blocks in engagement with the brake-disk in case of accident and running away of the engine, I provide on the fly-wheel the pivoted latches 40, which are pressed inwardly by springs 41. In case of sudden and excessive increase of speed balls 30 will move the brake-blocks 37 downwardly far enough to allow the latches to be drawn over their upper ends by the springs. When this occurs, the wedge-blocks 19 and 22 will immediately assume the position shown in Fig. 3, thus immediately closing the valve.

The fly-wheel 21 rotates loosely about the tubular shaft 7 and is carried on ball-bearings 42, supported upon the brake-disk. The fly-wheel rotates between collars mounted on the tubular shaft and is actuated by the yielding connection, consisting of the wedge-blocks 19 and 22, which act upon the corresponding concave blocks of the fly-wheel.

In the operation of the device in starting the engine the wedge-blocks 19 and 22 will be in a position opposite to that shown in Fig. 3, in which position the valve is wide open and the V-shaped blocks 29 are in contact with their groove in the fly-wheel. As the fluid-supply at the engine is opened the engine will turn the pulleys 13, and thus rotate the fly-wheel through the cross-head 24 and V-shaped blocks 29. As the engine speeds up the balls 30 will swing outwardly under centrifugal force until they lift the block 29 out of the groove in the fly-wheel. During all variations of speed from this point until an excessive speed is reached the blocks 29 are out of contact, and the driving of the wheel and governing of the valve are performed by the wedge-blocks 19 and 22. The pressure of the springs 15 is adjusted by the nuts at the lower ends of the part 16, and the speed of the engine is thus regulated. At the normal speed the fly-wheel will rotate at the same speed as the tubular shaft 17, and consequently the blocks 19 and 22 will remain in the same relative position. When any variation of speed occurs, these wedge-blocks will immediately change their relative position and the wedge-block 19, through its connection to the shaft 5, will immediately shift the piston-valve. As above stated, in case an excessive speed is reached by accident or otherwise the balls will be thrown out into the position of Fig. 3, and thus clutch the fly-wheel to the friction-disk. This action immediately shifts the wedge-block to a position where the block 19 closes the admission-valve.

In the form of Figs. 4 to 7, inclusive, I show

the system as applied to a horizontal valve. In this form 2' is the piston-valve, with a stem 5' extending through the valve-case on one side and a stem 11' extending through the case on the opposite side and carrying a pulley 13'. In this form the tubular shaft which carries the cross-head is shown at 17', 21' being the fly-wheel loosely surrounding the tubular shaft. The governor parts are the same as those of the first form. The tubular shaft 17' is secured to an outer rotary valve or valve-casing 42' by spider-arms 43, and this valve 42' is slotted to correspond with the slots in the hollow piston-valve. The wedge-blocks in this case are carried upon stems 18', which extend loosely through the cross-head 7' upon the valve-stem, and their outer ends are free and unconnected. The V-shaped blocks 29' are also attached to plungers moving in a cross-head secured to the inner valve-stem and having the centrifugal connection, as before. In this form when the engine is in motion under any change of speed the changing position of the wedge-blocks 19' and 22' will act upon the tubular shaft, and thereby oscillate the movable casing of the valve. The casing normally rotates at the same speed as the valve, and hence this movement of the casing will shift the ports and throttle or open them.

In Fig. 5 I show the ports as closed, in Fig. 6 as partly open, and in Fig. 7 as fully open.

The advantages of my invention result from the quick and positive action of the governor which changes the fluid-supply. In actual operation the device is found to work with great accuracy and efficiency.

The governor may be attached to a cut-off by which the steam or gaseous mixture is cut off at different points in the stroke, and the invention may be varied in many other ways as to construction and arrangement without departing from my invention.

I claim—

1. An engine-governor comprising a rotary momentum-disk, a rotary element, a valve connected to one of said parts, driving connections between one of these parts and the engine, a yielding driving connection between the rotary element and the disk, another detachable driving connection between the rotary element and the disk, and automatic mechanism for severing said latter driving connection as the speed is increased; substantially as described.

2. An engine-governor comprising a rotary momentum-disk, a rotary element, one of said parts being connected to the admission-valve and one of them having driving connections with the engine, a yielding driving connection between the rotary element and the disk arranged to shift the position of the rotary element and mechanism for adjusting the pressure of the yielding connection to regulate the speed; substantially as described.

3. An engine-governor having a rotary mo-

mentum-disk, a rotary element, one of said parts being connected to the admission-valve and one having driving connections with the engine, and a cam connection between the rotary element and the momentum-disk, said cam connection having spring-pressed blocks as a part thereof; substantially as described.

4. An engine-governor having a rotary momentum-disk, a rotary element connected to the valve, driving connections between the engine and one of said parts, and a cam connection between the rotary element and the disk, said cam connection including a pair of spring-pressed coacting wedge-blocks, one of which is arranged to cause movement of the rotary element; substantially as described.

5. An engine-governor comprising a rotary momentum-disk, a rotary element arranged to drive the same, said element being connected to the valve and having driving connections

with the engine, a yielding driving connection between the element and the disk, another clutch-driving connection between the element and disk, and a centrifugal device arranged to sever the latter driving connection at a predetermined speed; substantially as described.

6. In an engine-governor, a rotary momentum-disk, a rotary element, driving connections between one of said parts and the engine, a valve connected to one of said parts, a yielding driving connection between the rotary element and the momentum-disk, and an automatic brake device for excess speed; substantially as described.

In testimony whereof I have hereunto set my hand.

CORNELIUS KUHLEWIND.

Witnesses:

GEO. B. BLEMING,
H. M. CORWIN.