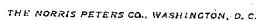


983,159.

2 SHEETS--SHEET 1.



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ENGINE GOVERNOR.
APPLICATION FILED FEB. 26, 1910.

Patented Jan. 31, 1911.
2 SHEETS—SHEET 2.

983,159.

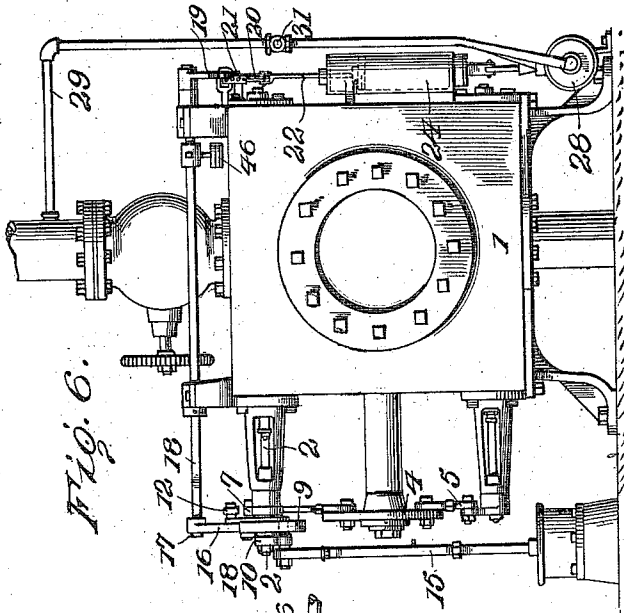


Fig. 6.

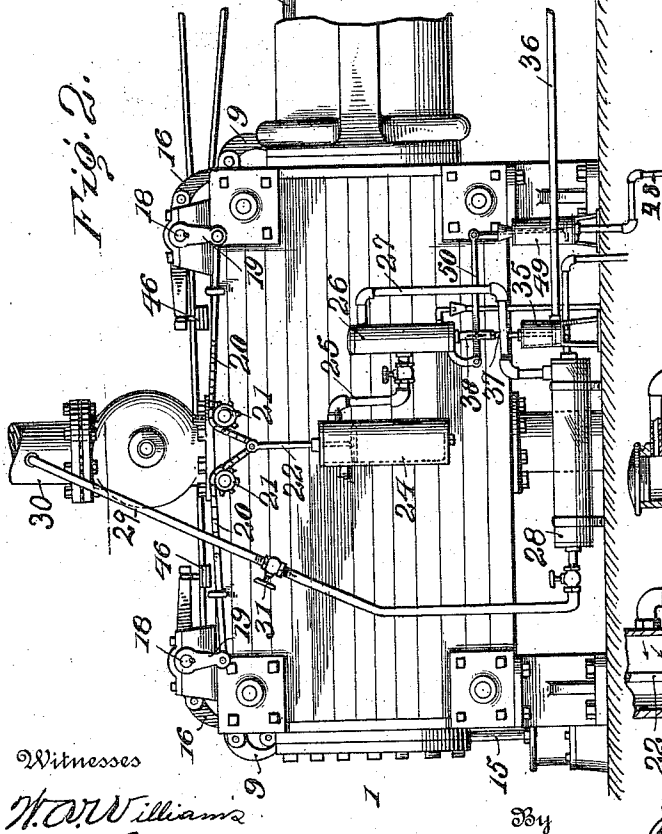


Fig. 2.

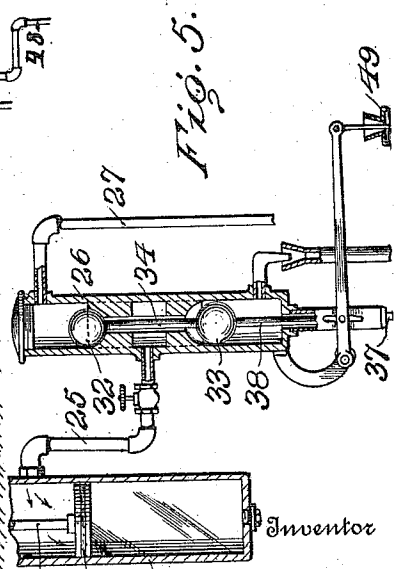


Fig. 5.

Witnesses

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JAMES MCGOWAN, OF ST. LOUIS, MISSOURI.

ENGINE-GOVERNOR.

983,159.

Specification of Letters Patent.

Patented Jan. 31, 1911.

Application filed February 26, 1910. Serial No. 546,234.

To all whom it may concern:

Be it known that I, JAMES MCGOWAN, a citizen of the United States, residing at St. Louis, State of Missouri, have invented certain new and useful Improvements in Engine-Governors, of which the following is a specification.

This invention relates to governor attachments for steam engines of that class, the valves of which are individually operated, generally called Corliss engines.

Heretofore it has been common to so arrange the valve connections that the governor action would gradually increase the admission of steam or gradually diminish it, but in a large establishment, where the power consumed varies through a great range, such gradual action of the governor is too slow to meet some emergencies, and the engine, if suddenly relieved of a great load, starts to running away, as it is termed, and the engineer has to shut off steam, to the great inconvenience and sometimes danger of other operations dependent on the same engine.

The objects of this invention are twofold; first, to provide means which will automatically prevent the valves from admitting steam into the steam chest the instant a given speed limit is reached, even though the throttle valve is wide open; second, to enable the same device to be operated by persons on different floors or in distant locations of the establishment to check or to stop the engine in case of accident or for any desired purpose.

To this end my invention consists in an engine governor, hereinafter more fully described and particularly stated in the claim, reference being had to the accompanying drawings, in which:

Figure 1 represents the front side of a portion of an engine showing my invention. Fig. 2 represents the rear side of the same. Fig. 3 shows a common style of engine regulator and portions of my invention connected therewith. Fig. 4 represents, somewhat diagrammatically, a piping system for an establishment according to my invention. Fig. 5 shows, in vertical section, a switch valve and accessories. Fig. 6 is a rear end view of the engine cylinder and attachments.

Numerals 1 represents the engine cylinder provided with the usual steam or inlet valves 2; exhaust valves 3; wrist plate 4, rods 5 connecting the wrist plate with the valves

2 and 3; the rod 6 connecting plate 4 with the eccentric on the engine crank shaft (not shown). The connection of rods 5 with the inlet valves 2 is by means of an elbow lever 7, 8, which is journaled concentric to oscillate freely with the valve and carries upon its arm 8 a hook 9, which engages the arm 10 of the valve for a long or short time; that is, during such a portion of the length of piston stroke as may be determined by the governor 11 acting through rod 12 and cams 13 upon the cam end 14 of hooks 9. At every stroke of the engine piston one of the rods 5 operates an arm 7 and with it arm 8, and its hook 9 engaging arm 10 opens a steam port. As arm 8 rises it brings cam 14 in contact with cam 13 and disengages the hook 9 from arm 10, and the valve 2 is set free to be closed by the weight of dash-pot rod 15, which is hung upon the valve arm 10. If the speed of the engine falls below the standard the falling of the governor balls, operating through the rod 12, moves cam 13 to permit a little longer action of hook 9, thus admitting more steam, and vice versa. By this common arrangement a very even rate of speed may be maintained against the average variations of power consumed, but if somewhere in the establishment a very powerful machine were suddenly stopped, this slowly creeping action of the cam 13 would not stop the inlet of steam rapidly enough to prevent the engine from racing and running away, as it is termed. All that has been thus far described is common. To obviate the danger and inconvenience described, when the engine reaches the speed limit my invention interposes a sentinel 16 between the cams 13 and 14 that instantly prevents the hook 9 from engaging the valve arm 10, so that no more steam can be admitted until the governor returns to its normal speed, even though the hook continues in motion. This sentinel 16 is hung upon a crank 17 fixed on a shaft 18 that has at its other end an arm 19 connected by a chain 20 passing over guide pulleys 21, with a piston rod 22.

The piston 23 is fitted to reciprocate in a cylinder 24 that is supplied with steam or water under pressure through a pipe 25 from a valve switch 26 which is connected by a pipe 27 with a reservoir 28. A pipe 29, communicating with the main steam pipe 30, may supply this reservoir with steam, a pressure of 40 pounds being sufficient for

service. A stop-cock 31 may be used to admit steam to the reservoir or to shut it off. The switch 26 comprises two ball valves 32 and 33. The inlet valve 32 has a downward seat and the discharge valve 33 an upward seat. A pin 34 forms communication between the valves so that when valve 33 closes it raises valve 32 from its seat and opens it. The two valves, 32 33, are free from the push pins 34 38, so that they can return to their seats any side up, as ball valves, and the operating pins are located below the valves in order that the valve 32 may gravitate to its seat and be free to be closed by the force of pressure from pipe 27 the instant positive pressure is withdrawn from valve 33. A cylinder 35 connected with a line of piping 36 acts with its piston rod 37 against a pin 38 to raise the valve 33 whenever pressure is admitted into pipe 36 by another valve switch 39. This switch is constructed like switch 26 with two valves, an inlet pipe 40, the outlet pipe 36, and a pin 41, which operates like pin 38. It closes the outlet valve whose discharge is at 42, and it opens the inlet from pipe 40. A lever 45 communicates between the pin 41 and the traveler spindle 43 of the regulator. Centrifugal force acting on the balls 11 moves the traveler spindle 43 up and down in proportion to the speed of the engine. A lug 44 is fixed upon the traveler to raise the lever 45 when the engine reaches its speed limit. This raises pin 41 and admits pressure into pipe 36; that raises valve stem 37 and the connections, opening valve 32, and admitting steam pressure through pipes 27 and 25 to the cylinder 24, actuating its piston 23 to draw down on chain 20. By means of arm 19, shaft 18 and arm 17 this drives sentinel 16 down between the cams 13 and 14 and instantly prevents further action of the lifting hook 9 from communicating its motion to the arm 10 of the steam valve 2. The steam being thus cut off, the racing of the engine will quickly slacken and when it drops back to its normal speed the regulator spindle will descend, permitting lever 45 and pin 41 to drop, opening the outlet 42 and closing the inlet 40. This relieves the pipe 36 of pressure, permitting pins 37 and 38 to drop, and closing valve 32, and opening valve 33, thereby relieving pressure from piston 23 and permitting the sentinel 16 to be withdrawn by a weighted arm 46. Then the original regulator action will proceed to operate as usual.

To adapt this device for quickly stopping the engine by a person at any one of a num-

ber of prearranged points in the establishment in case of accident, or for any adequate reason, I provide another system of pipes comprising the line 47 which is connected with the pressure system 40; an intermediate line 48 connected with a cylinder 49 which operates through its piston rod and the lever 50 on the pin 38 in the same manner as the cylinder 35 operates by its piston rod 37 on the same pin 38. The rod 37 and the lever 50 have each its own bearing on the pin 38, so that either system, that of pipe 36 or of pipe 48, may operate the stopping mechanism entirely independent of the other. The various cross pipes 51 are designed to represent connections between the pipes 47 and 48 on the different floors of a building, so that by turning a cock 52 on any floor the power will be turned onto cylinder 49 to shut off steam from the valves 2 of the engine as described in relation to cylinder 35. The result will be the same, whether the reservoir 28 and the supply pipes 40 be filled with steam or with water or with the two combined, under adequate pressure.

This application of an independent force, outside of the power of the engine, to shut off steam from the latter when it reaches a speed limit is thought to be new. It not only renders aid to assist the engine to govern itself, but it adapts means to be located in different parts of an establishment in which various machines are run by one engine, whereby the engine may be stopped at will in any emergency.

Having thus fully described my invention, I claim.

In an engine governor, an engine cylinder and independent valves for it; hooks for operating the valves and each hook having a cam-shaped portion; cams connected with the engine regulator and engaging the cam portions of the said hooks to limit their time of engagement with the valves; a curved, wedge-shaped sentinel hung to swing in the plane of movement of the said cams and to interpose between them; an engine regulator having a lug fixed on it as a speed limit for its motion, and means for communicating between this lug and the said sentinel whereby a force independent of the engine is applied to operate the sentinel.

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

JAMES MCGOWAN.

Witnesses:

WM. H. MCCORMICK,
JAS. B. REMINGTON.