May 10, 1932. F. O. L. CHORLTON ET AL 1,857,765

SAFETY DEVICE FOR SPEED GOVERNORS OF THE PICKERING OR LIKE TYPE

Filed April 9, 1931

Fig. 1.

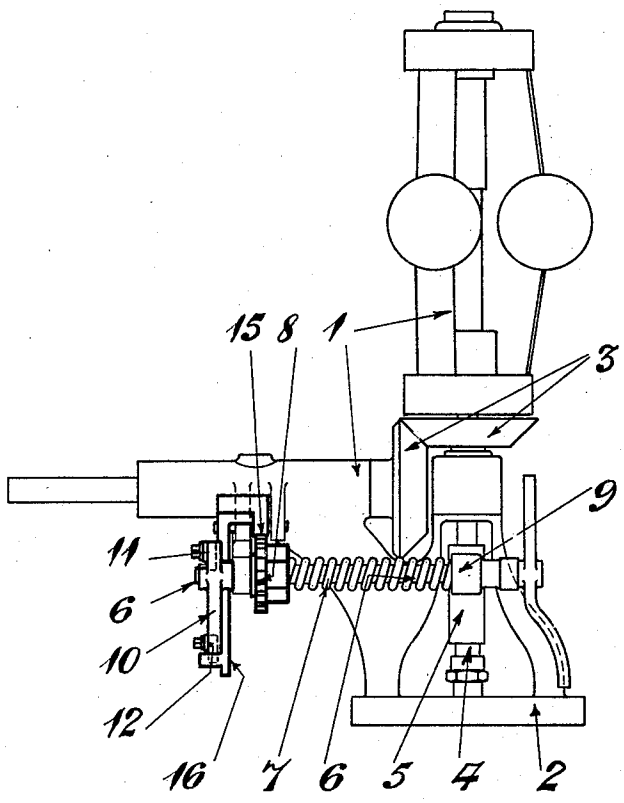


Fig. 2.

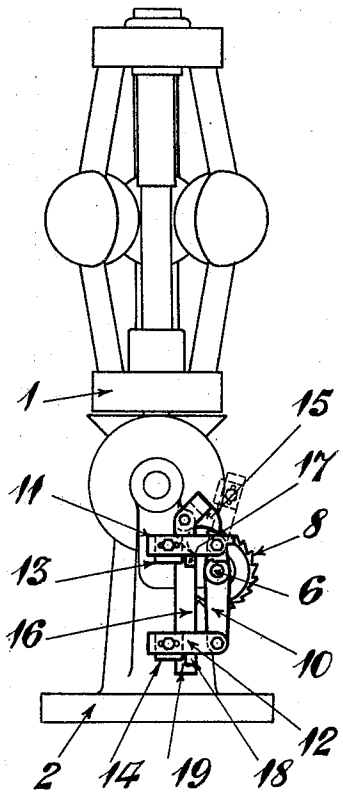
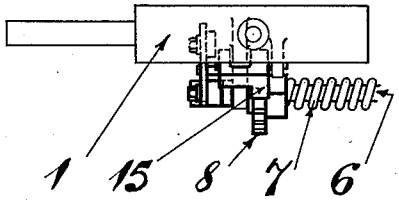


Fig. 3.



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UNITED STATES PATENT OFFICE

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SAFETY DEVICE FOR SPEED GOVERNORS OF THE PICKERING OR LIKE TYPE

Application filed April 9, 1931, Serial No. 528,852, and in Great Britain April 22, 1930.

The invention relates to speed governors of the Pickering or like type, wherein coincident with the movement of the throttle valve by the governor is brought about the rotation of a spring-restrained rod, which spring, in helical form and connected to said rod, is put into torsion by applied pressure to a pawl-actuated ratchet wheel attached to said spring, and concentrically mounted relatively to said rod.

It has been proposed to provide what is termed a trip lever for disconnecting the pawl engaging the ratchet wheel above referred to, and therefore resulting in closure of the throttle valve in the event of the breaking of the driving belt, or when over-speed occurs.

The object of our invention is to provide a safety device in connection with a trip lever arrangement but which is actuated by extreme movements of the governor itself, whereby the throttle valve is closed or capable of being closed not only when over-speed occurs as herein named, but also when under-speed is involved, such as when the governor belt slips, or gear wheels engaged also slip, or breakages occur.

That is to say, for both up-and-down movements of the governor, we are able to disengage by the movement of the governor itself at extremes of movement thereof.

According to our invention, we provide a trip lever to the rod named operating through links or connections on opposite sides of the axis of the rod concerned, and at predetermined limits of rotary movement of the latter, to disconnect a pawl normally in gear with the ratchet wheel, whereby the torsion of the spring about the rod is reduced or removed, thus allowing the throttle valve to close by its own weight. The pawl is suitably positioned or pivoted for the purpose, as well as being adapted for the present purpose.

With reference to the accompanying drawings, Fig. 1 is a side elevation, Fig. 2 a view at right angles thereto, and Fig. 3 is a plan view of a portion of said Fig. 1. 1 is the governor, with flange 2 for attachment to the throttle valve (not shown) which governor is driven as usual by bevel gearing outlined at 3. The spindle of the throttle valve is shown at 4. Said spindle is attached to a sleeve 5, but the governor spindle is loose in the same.

A revoluble rod 6 is the one adopted in the type of governor named, about which rod is a helical spring 7, attached to the rod at the right hand end in Fig. 1, and at the other end attached to the ratchet wheel 8 freely mounted about said rod 6. The torsion of the spring 7 holds the sleeve and throttle valve spindle up against the governor spindle and opening up of the governor balls presses down this spindle to shut the throttle valve against the spring.

Opposite movement of the governor allows the spring to open the valve. A lever connection at 9 between the rod 6 and the spindle 4 through the sleeve 5 enables the up-and-down movement of the latter to rotate said rod in the one direction or the other as understood, and holding of the ratchet wheel 8 in a given position puts a restraint upon the rotation referred to by resistance against torsion by the spring 7 mounted as stated.

This torsion is maintained by means of a pawl engaging said ratchet wheel, and according to ordinary practice this pawl is pinned upon a short rod to form a lever. In carrying out our invention, and according to the arrangement shown in the drawings, we provide a two-armed trip lever 10 which is attached to the rod 6 and to the upper arm of which is pivoted a link 11 and so mounted as to be capable of a lateral movement. A similar link 12 is pivoted on the lower arm of the lever 10 and is mounted as to be also capable of a lateral movement. Each of these links is formed or provided with an adjustable stop, the upper one being marked 13 and the lower one marked 14.

The pawl for engaging the ratchet wheel 8 is indicated at 15, said pawl being pivoted at a level above that of the links 11 and 12, or beyond the positions thereof. Said pawl or an extension thereof at 16 also carries stops or projections 17 and 18, the former being in the path of possible movement of stop 13, and the latter in the path of possible movement of stop 12.

A clearance indicated at 19 between the stops at each level indicated allows a certain amount of movement of the two-armed lever 10 or of the rod 6 to take place without affecting the pawl 15 according to our invention. Thus the governor operates normally between the limits determined by the clearance referred to, but when the limit of movement involved in the clearance named is exceeded contact between the stops 13 and 17 (for clockwise movement of the rod 6) or between stops 14 and 18 (for anti-clockwise movement of rod 6 aforesaid). Under one or the other of the conditions last named, further movement of the rod 6 in a rotary direction results in the pawl 15 being turned on its pivot or axis at the position shown, and so becoming disengaged from the ratchet wheel 8. The sudden release of the torsional resistance of the spring 7 as a consequence, allows the connection 5 to fall and the throttle valve to close. To prevent the pawl-disconnecting action described taking place every time the engine concerned was shut down, we may provide one of the links (here termed the low-speed link) capable of being swung out of position as shown by broken lines in Fig. 2. Before the engine is started it is swung back into normal position again. Both links are hinged on their respective pins, and rest on the stops 17 and 18. The arms of the two-armed lever are shown unequal in length in order to obtain about equal action on the pawl extension 16.

We claim:

1. A safety device for speed governors of the Pickering type, actuated by extreme movements of the governor itself, for closing the throttle valve of the engine concerned when either over-speed or under-speed is involved, comprising a trip lever with connections on opposite sides of its axis of turn, stops on said connections, a pivoted pawl provided with an extension, whereby the latter is capable of being engaged by said stops at extremes of movement of the governor itself, for closing the throttle valve of the engine, as herein set forth.

2. A safety device for speed governors of the Pickering type, actuated by extreme movements of the governor itself, for closing the throttle valve of the engine concerned when either over-speed or under-speed is involved, comprising a two-armed trip lever with connections on opposite sides of its axis of turn, stops on said connections, a pivoted pawl provided with an extension, whereby the latter is capable of being engaged by said stops, at extremes of movement of the governor itself, for closing the throttle valve of the engine, as herein set forth.

Dated this 16th day of November, 1931.

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