

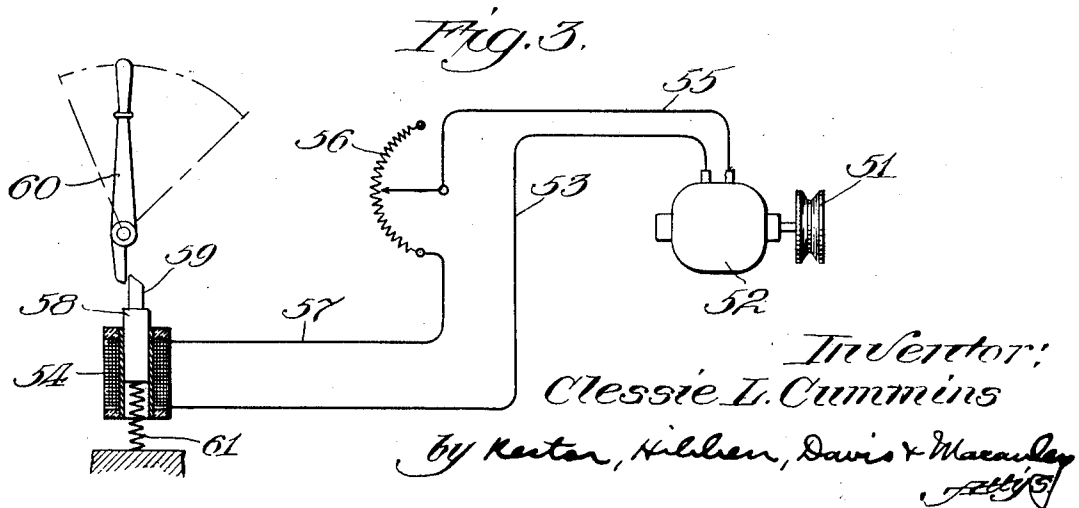
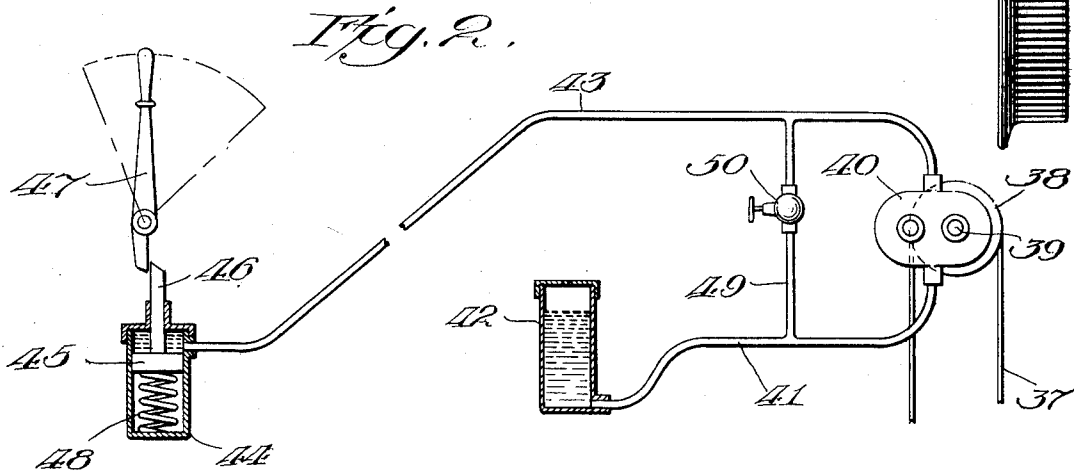
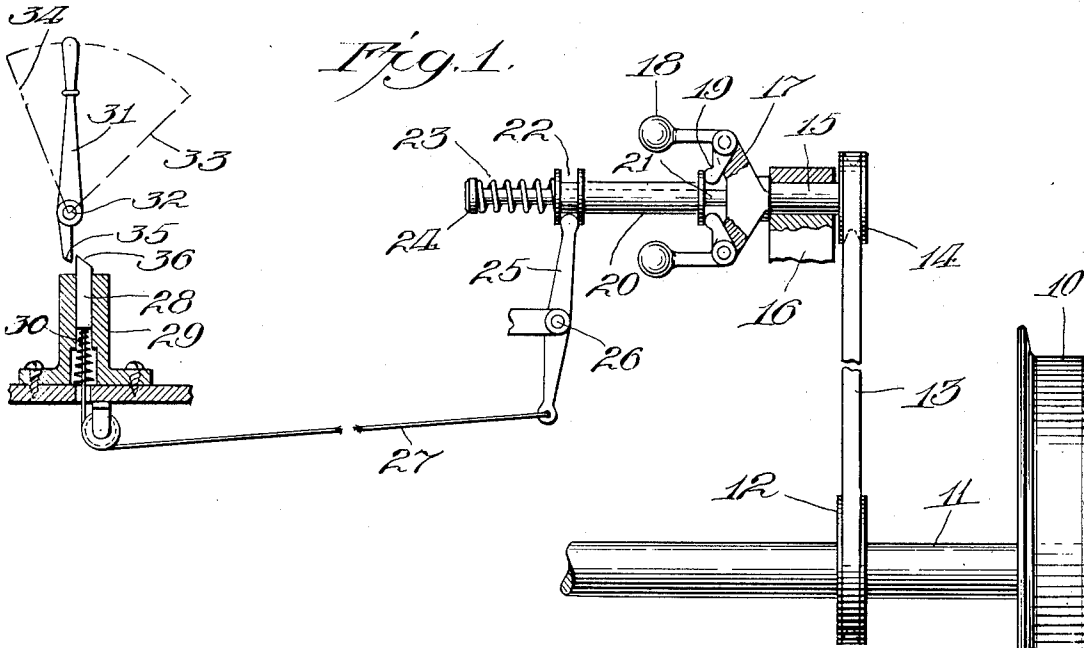
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THROTTLE CONTROL MECHANISM

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THROTTLE CONTROL MECHANISM

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10 Claims. (Cl. 105—48)

My invention relates to a throttle control mechanism for internal combustion engines, particularly oil engines, and is concerned primarily with a mechanism for preventing the movement of the throttle to full open position until the vehicle propelled thereby has attained a predetermined speed.

It is characteristic of oil engines that practically their full power is available when starting under load. This condition is advantageous where the principal operative requirement is rapid acceleration, but is a positive detriment unless properly controlled where, for example, the engine furnishes the motive power for a shifting locomotive in a railroad yard. Because of the high starting torque of the engine, the tendency of the shifting crew is to couple as many cars as the locomotive is capable of moving, with the result that the train cannot be accelerated and therefore is moved at a slower rate of speed than is demanded by efficient shifting service.

It is therefore the principal object of my invention to devise a mechanism which prevents the utilization of the full power of the engine when starting under load by interposing a stop in the path of movement of the throttle lever short of the latter's full load position, and which is automatically shifted to a clear position when the vehicle attains a predetermined speed.

A further object is to devise a mechanism of the character indicated in which the position of the stop is dependent upon, and automatically controlled by, the speed of the vehicle, and in which the relation between the stop and throttle lever is such that the latter may be moved from full-load to no-load position, notwithstanding that the stop may then be occupying an interrupting position due to a decrease in the vehicle speed.

A further object is to provide a speed governed, throttle control mechanism which may be conveniently connected to an axle of the locomotive, for example, and in which the specific mechanism may take the form of mechanical, fluid or electrically operable devices.

These and further objects of my invention will be set forth in the following specification, reference being had to the accompanying drawing, and the novel means by which said objects are effectuated will be definitely pointed out in the claims.

In the drawing:

Figure 1 is a diagrammatic view, partly in section, showing a mechanically controlled mechanism

for limiting the movement of the throttle lever toward full-load position, the lever being shown in the maximum position which it may assume until the locomotive attains a predetermined speed.

Figs. 2 and 3 are diagrammatic views similar to Fig. 1, showing, respectively, hydraulic and electrical devices for controlling the throttle lever.

Referring to Fig. 1, the numeral 10 designates a wheel of a locomotive, for example, which is mounted on the usual axle 11 that may have affixed thereto a pulley 12. A belt 13 operates over the pulley 12 and also over a second pulley 14 secured to a shaft 15 which is journaled in a suitable bearing 16. The shaft 15 extends to the left of the bearing and has affixed thereto a pair of arms 17 upon which are pivotally mounted a pair of fly-ball levers 18, the inner arms 19 of which are in constant bearing engagement with one end of a sleeve 20 that is journaled upon an extension 21 of the shaft 15. The left end of the sleeve is formed with an annular channel 22 and a coil spring 23, which encircles the left extremity of the extension 21, bears against the left end of the sleeve 20 and also against a head 24 provided on the extension 21. The tendency of the spring 23 to extend in length causes the sleeve 20 to bear constantly against the lever arms 19.

A lever 25 is pivoted at 26 upon a convenient supporting structure and the upper end of the lever is formed as a nose for constant retention in the annular channel 22. The lower end of this lever is connected to one end of a cable 27 whose opposite end is fastened to a stop 28 that is slidably mounted in a casing 29. A coil spring 30 encircles the cable 27 within the casing and tends to normally project the stop 28 without the casing for engagement with the lower end of a throttle lever 31 that is pivoted at 32. The no-load position of the throttle lever is indicated by the dotted line 33 and the full-load position thereof by the dotted line 34, the lever being shown in the maximum position to which it can be moved owing to its engagement with the stop 28. Preferably, the lower end of the lever 31 and the upper end of the stop 28 are provided with inclined cam surfaces 35 and 36, respectively, so that the throttle lever can be returned to the no-load position from any position between the intermediate position, as shown, and the full-load position, notwithstanding that the stop 28 may be occupying the position shown in Fig. 1. During this return movement, it will be ob-

vious that the cam surfaces will cause the stop 28 to be moved downwardly in the casing 29 until the lever 31 has cleared the upper end of the stop.

5 In the relation of the parts as shown, the interrupting position of the stop 28 is indicated as permitting a movement of the throttle lever through approximately two-thirds of its range from no-load position, although this relation 10 may be varied as desired. In the operation of this mechanism, the fly-balls 18 will be adjusted so that, at some predetermined speed of the locomotive, they will move outwardly sufficient to cause a sliding of the sleeve 20 toward 15 the left and consequently a retraction of the stop 28 within the casing. This releasing movement of the fly-balls may be set for as low as a speed of five miles per hour, or at any speed which the operating requirements demand. When the 20 speed of the locomotive falls below the indicated critical speed, the stop will be returned to interrupting position.

In the hydraulic arrangement shown in Fig. 2, the numeral 37 designates a belt which operates 25 over a pulley 38, corresponding to the belt 13 and pulley 14, respectively, in Fig. 1, it being assumed that the belt 37 is driven from the locomotive axle as above described.

The pulley 38 is drivably connected to a shaft 39 of a hydraulic pump 40 which may be of the gear type, and this pump is connected by a fluid 30 line 41 to a source of liquid 42. The delivery side of the pump is connected by a line 43 to a cylinder 44 within which is reciprocally mounted a piston 45 having a piston rod 46 which pro- 35 jects without the casing and operates as a stop for the throttle lever 47. A coil spring 48 is disposed in the casing 44 below the piston 45 and normally tends to maintain the stop 46 in the throttle lever interrupting position shown in 40 Fig. 2. A by-pass line 49 connects the lines 41 and 43 around the pump 40 and in this line is located a valve 50 which may be adjusted to provide for any suitable relieving flow such that, 45 when the locomotive attains a predetermined speed, as before described, sufficient pressure will be created above the piston 45 to effect a withdrawal of the stop 46. When the speed of the locomotive falls below this predetermined 50 speed, the spring 48 again returns the stop 46 to interrupting position and, as in the case of the mechanism shown in Fig. 1, the adjacent ends of the lever and stop may have cooperating cam surfaces in order to permit a 55 return of the lever to no-load position in the event that the stop 46 has in the meantime been returned to interrupting position.

In the electrical arrangement shown in Fig. 3, the numeral 51 designates a pulley which may 60 be appropriately driven from the axle of the locomotive and which is fixed upon the rotor of a generator 52. A wire 53 connects the generator with a solenoid coil 54 and a second wire 55 65 connects the generator with an adjustable resistance 56 which is in turn connected by a wire 57 with the solenoid. A magnetic core 58 is slidably mounted within the solenoid and is provided with a stop 59 for engagement with the lower 70 end of a throttle lever 60. The stop is normally actuated outwardly to the interrupting position shown by a coil spring 61.

In the operation of this electrical arrangement, the resistance 56 will be so adjusted that, for any 75 predetermined speed of the locomotive, the current output of the generator 52 will be sufficient

to cause the coil 54 to withdraw the stop 59 from interrupting position and upon a drop in the speed of the locomotive below this predetermined speed, the spring 61 will return the stop 5 to the position shown. As in the two modifications discussed above, the adjacent ends of the lever and stop are provided with cam surfaces for the purpose already stated.

Whichever of the modifications is employed, 10 it is apparent that the shifting crew is positively prevented from coupling more cars to the locomotive than the latter can initially move for the throttle opening indicated. Therefore, there is 15 always provided a sufficient reserve of power to insure a desirable acceleration of the coupled train and it is contemplated that, after the mechanism is once adjusted, it will be incapable of unauthorized change by the train crew.

I claim:

1. A throttle control mechanism for an engine 20 driven vehicle comprising in combination, a throttle lever operable between no-load and full-load positions, means for limiting the movement of the lever to a predetermined intermediate position when moved toward full-load position be- 25 low a predetermined speed of the vehicle, and means for releasing the lever for continued movement toward full-load position when the vehicle exceeds this speed.

2. A throttle control mechanism for an engine 30 driven vehicle comprising in combination, a throttle lever operable between no-load and full-load positions, a stop for limiting the movement of the lever to a predetermined intermediate position when moved toward full-load position, and 35 means for withdrawing the stop to permit further movement of the lever when the vehicle attains a predetermined speed.

3. A throttle control mechanism for an engine 40 driven vehicle comprising in combination, a throttle lever operable between no-load and full-load positions, a stop, and means for automatically positioning the stop to limit the movement of the lever to a predetermined intermediate 45 position when moved toward full-load position below a predetermined vehicle speed, and for automatically withdrawing the stop to permit further movement of the lever above said speed.

4. A throttle control mechanism for an engine 50 driven vehicle comprising in combination, a throttle lever operable between no-load and full-load positions, a stop for limiting movement of the lever to a predetermined intermediate position when moved toward full-load position, and 55 means connected to and controlled by the speed of the vehicle axle for withdrawing the stop to permit further movement of the lever when the vehicle attains a predetermined speed.

5. A throttle control mechanism for an engine 60 driven vehicle comprising in combination, a throttle lever operable between no-load and full-load positions, a stop for limiting movement of the lever to a predetermined intermediate position when moved toward full-load position, 65 means for maintaining the stop in lever-holding position below a predetermined vehicle speed, and means for withdrawing the stop to permit further movement of the lever when the vehicle exceeds said speed.

6. A throttle control mechanism for an engine 70 driven vehicle comprising in combination, a throttle lever operable between no-load and full-load positions, a stop for limiting movement of the lever to a predetermined intermediate position when moved toward full-load position, a 75

spring actuating the stop to lever-interrupting position, and means for withdrawing the stop to permit further movement of the lever when the vehicle attains a predetermined speed.

5 7. A throttle control mechanism for an engine driven vehicle comprising in combination, a throttle lever operable between no-load and full-load positions, a yieldable stop for limiting movement of the lever to a predetermined position
10 when moved toward full-load position, and means for withdrawing the stop to permit further movement of the lever when the vehicle attains a predetermined speed, the lever and stop having cam portions adapted for engagement whereby
15 the stop, if occupying an interrupting position, is depressed when the lever is moved from a position beyond its intermediate position toward no-load position.

20 8. A throttle control mechanism for an engine driven vehicle comprising in combination, a throttle lever operable between no-load and full-load positions, a stop, a spring tending to hold the stop in a position to limit the movement of the lever to a predetermined intermediate position
25 when moved toward full-load position, a mechanical governor device driven by the vehicle axle, and a connection between the stop and device whereby the stop is shifted from lever-interrupting position when the vehicle attains a predetermined speed.

30 9. A throttle control mechanism for an engine driven vehicle comprising in combination, a throttle lever operable between no-load and full-

load positions, a cylinder, a piston operable in the cylinder and having a stop projecting externally thereof, a spring in the cylinder tending to hold the stop in a position to limit the movement of the lever to a predetermined intermediate
5 position when moved toward full-load position, a hydraulic pump driven by the vehicle axle, a liquid source, feed lines connecting the source to the pump and cylinder, respectively, a by-pass line
10 connecting the feed lines around the pump, and a valve in the by-pass line adjustable to establish in conjunction with the pump a pressure in the cylinder sufficient to shift the stop from lever-interrupting position when the vehicle attains a
15 predetermined speed.

10. A throttle control mechanism for an engine driven vehicle comprising in combination, a throttle lever operable between no-load and full-load positions, a solenoid, a magnetic core operable in the solenoid and having a stop projecting
20 externally thereof, a spring tending to hold the stop in a position to limit the movement of the lever to a predetermined intermediate position when moved toward full-load position, a generator driven by the vehicle axle, and electrical connections between the solenoid and generator including a resistance adjustable to cause a retraction of the magnetic core sufficient to free the
25 throttle lever for continued movement toward full-load position when the generator attains a predetermined speed.

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