

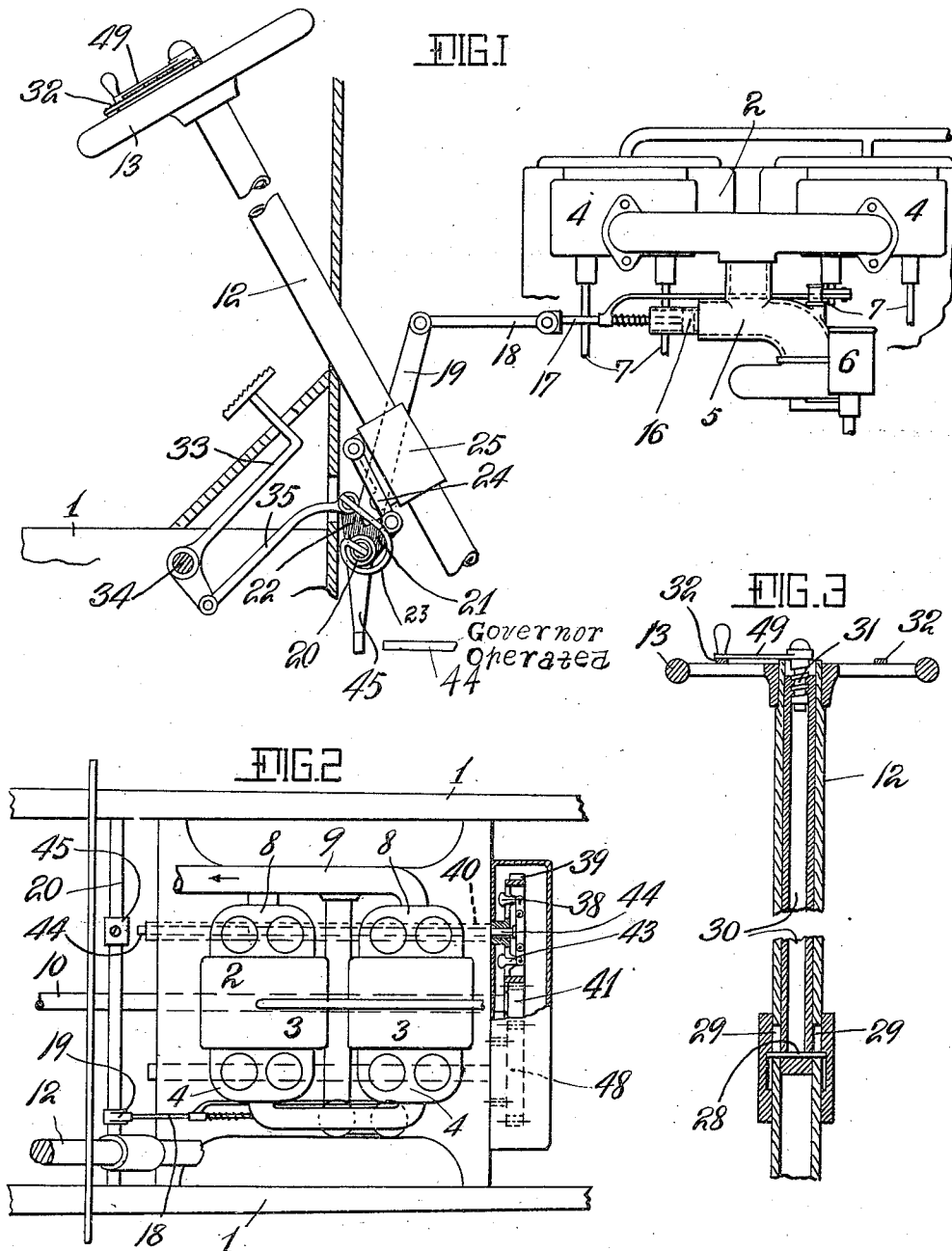
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CONTROLLING MECHANISM FOR ENGINES.

APPLICATION FILED DEC. 10, 1906. RENEWED APR. 15, 1908.

903,133.

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Witnesses
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UNITED STATES PATENT OFFICE.

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CONTROLLING MECHANISM FOR ENGINES.

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To all whom it may concern:

Be it known that I, GIOVANNI ENRICO, a subject of the King of Italy, residing at Turin, Italy, in the Province of Piedmont, Italy, have invented certain new and useful Improvements in Controlling Mechanism for Internal-Combustion Engines, of which the following is a full, clear, and exact specification.

This invention relates to controlling mechanism for internal combustion engines, and has especial reference to the provision of controlling mechanism which will prevent the driver from regulating the engine in such manner as to exceed a predetermined speed. In engines of this type, operating under conditions, varying both as to load and speed, a speed governor acting upon the engine throttle or the spark timing devices is commonly employed to prevent excessive speeds, and other connections, controlled directly by the driver are also provided, so that he can vary the speed at will. As commonly arranged, the connections have been such as to permit the driver to practically nullify the control exercised by the governor, and to attain excessive speeds, with the consequent result of overheating and damaging the engine, and unnecessarily wasting the fuel.

This invention has for its object to provide mechanism such that the driver will be prevented from increasing the speed above the limit determined by the governor, no matter how he may manipulate the manual speed controlling devices.

As exemplified herein, the invention is applied to the throttle of an internal combustion engine, but the same principle of operation may be used to control the speed in other ways, as will be hereinafter pointed out.

The invention also has for its object to simplify and improve the mechanism, and arrangements of parts, as will be more fully pointed out in connection with the accompanying drawings, wherein

Figure 1 is an elevation of parts of a motor vehicle embodying the invention; Fig. 2 is a plan view, and Fig. 3 an end view.

1, 1, represents the frame of a vehicle on which the engine 2 is mounted. The latter comprises a plurality of cylinders 3, having inlet chambers 4, supplied from a pipe 5, carbureter 6, inlet valve stems 7, exhaust chambers 8, exhaust pipe 9, main shaft 10, all of well known construction. 12 is the steering

post, having hand wheel 13, and connected through suitable connections, to the steering wheels, not shown. Located in pipe 5 is throttle valve 16, which is operated manually to control the engine speed by varying the quantity of mixture supplied to the engine. The valve 16 is on a stem 17, which is connected by a link 18 with a lever 19, carried by a rock-shaft 20. 21, 22, are the arms of a bell crank lever loosely mounted on shaft 20, but connected therewith by a spiral spring 23, fixed at one end to the shaft, and at the other end to one arm of the lever, as 22. Any movement of the lever, will therefore, through spring 23, rock the shaft and move the throttle valve. The arm 21 is connected by link 24 with a sleeve 25 carried on the steering post 12, and free to move longitudinally thereon, but held against rotation. 28 is a pin projecting through slots 29 in post 12 and engaging an internal groove in sleeve 12, and pin 28 is carried by a reciprocating rod 30 within tube 12. The rod 30 is reciprocated by means of a worm 31, which is turned by a crank 49, having bearings in the steering post 12, and capable of being set in any position, by a rack 32. Furthermore it is sometimes desirable to open the throttle quickly to secure temporarily increased power, so that a foot lever 33, pivoted at 34, and connected by a link 35 to arm 22 is provided, for opening the throttle independently of crank 49 and without disturbing its adjustment.

With the arrangements thus far described including of course the usual spark regulating devices, the speed can be varied within wide limits, and frequently the parts are so set by an ignorant or careless driver that the engine becomes overheated and damaged. To prevent this, a speed governor is provided, which acts to prevent further increase of speed, as to close the throttle, when a predetermined speed is reached or to retard the spark, or both, as is well understood, but with the arrangements heretofore suggested, it has been possible for the driver to nullify the control exercised by the governor and open the throttle in opposition thereto. 38 represents a centrifugal governor carried within a gear 39, mounted on a shaft 40 and driven by a gear 41 on main shaft 10. The governor comprises pivoted weighted bell-crank levers 43 controlled by springs and connected with a reciprocating rod 44, 110

which actuates the throttle to partially close it if set manually for an excessive speed, through a lever 45 carried by the shaft 20 and adjustable thereon whenever the speed increases beyond the desired amount.

The operation of the parts may be explained as follows: When the engine is at rest, the rod 44 is at its extreme right, of movement, and the driver can open the throttle as wide as he desires by turning lever 49, or by depressing lever 33, which tend to coil up spring 23 and throw the throttle to the left to open position, at the same time throwing lever 45 towards the end of rod 44. As the engine acquires speed, the rod 44 is moved to the left by the governor and after striking lever 45, automatically closes the throttle at the same time coiling up spring 23 without moving sleeve 25 or foot lever 33. If either or both of these latter parts are in such position that the throttle is opened, the rod 44 turns shaft 20 through lever 45 sooner than it would if the throttle were already partially closed by the driver. If now the driver attempts to open the throttle with the rod 44 in such position as to partially close it, the only effect is to wind up the spring 23, the throttle itself being unaffected. Should the speed suddenly drop, causing the rod 44 to be withdrawn, the tension of the spring would immediately act to open the throttle, tending to restore the speed and then the governor would again close the throttle and wind up the spring. It will be understood that in practice, the governor will be set for the desired speed, which determines the corresponding position of rod 44, and the driver can operate the throttle as he desires as long as lever 45 does not strike rod 44, but as soon as these parts contact any further manipulation of the manual throttle connections merely winds up spring 23.

48 is a governor similar to governor 38, and may be connected to the commutator or spark timing devices to vary the timing of the spark as the speed varies.

By interposing a movable abutment, varying in position according to the speed, in combination with a flexible actuating connection, the invention can be applied to various other controlling mechanisms than that herein described, without departing from the scope thereof, and the invention is not to be restricted to the precise construction herein described.

Having thus described my invention, I declare that what I claim as new and desire to secure by Letters Patent, is,—

1. The combination with a rotating shaft and manual means including a resilient connection for controlling the speed thereof, of means coöperating with said resilient con-

nection for rendering said manual means ineffective to increase the speed above a predetermined limit, substantially as described.

2. The combination with a rotating shaft and manual means including a resilient connection for controlling the speed thereof, of a movable abutment adapted to be opposed to said resilient connection when a predetermined speed is reached to thereby render further operation of said manual controlling devices ineffective for increasing the speed, substantially as described.

3. The combination with a rotating shaft and manual means including a resilient connection for controlling the speed thereof, of a movable abutment adapted to be opposed to said resilient connection when a predetermined speed is reached to thereby render further operation of said manual controlling devices ineffective for increasing the speed, but not preventing operation of the manual controlling devices to decrease the speed, substantially as described.

4. The combination with a rotating shaft and manual means for controlling the speed thereof including an actuating shaft and yielding connections, of centrifugally controlled means for limiting the movement of said actuating shaft when a predetermined speed is reached, substantially as described.

5. The combination with an engine and throttle actuating connections, of a centrifugal governor operated by the engine shaft and connected to prevent further opening of the throttle when a predetermined speed is reached, substantially as described.

6. The combination with an engine, and throttle actuating connections including a torsion member, of a centrifugal governor operated by the engine shaft and acting to positively limit actuation of the throttle in one direction when a predetermined speed is reached, substantially as described.

7. The combination with an engine, and throttle actuating connections including a torsion member connected to an actuating shaft, of a centrifugal governor operated by the engine shaft and acting to positively limit the movement of said actuating shaft in one direction when a predetermined speed is reached, substantially as described.

8. The combination with an engine, of manual controlling connections including a yielding member normally permitting direct speed control of the engine, and centrifugally controlled means whereby, at a predetermined speed, said yielding member prevents manual actuation of said controlling devices to secure increased speed, substantially as described.

9. The combination with an explosion engine having a throttle, and hand actuating connections therefor including a spring, of a

governor, and a rod actuated thereby to form a stop and prevent further opening of the throttle when a predetermined speed is reached, substantially as described.

10. The combination with an explosion engine having a throttle, of throttle actuating connections including a spring, and a centrifugally controlled abutment for preventing opening of the throttle through the spring when a predetermined speed is reached, substantially as described.

11. The combination of an engine controlling device, an actuating shaft, a torsion spring connected at one end with said shaft, and manual actuating connections connected with the other end of the spring, substantially as described.

12. The combination with a rotatable steering post, of a reciprocating sleeve thereon, connections for operating the sleeve, a lever connected with the sleeve in all positions, and engine controlling means connected by an interposed torsion spring with said lever, substantially as described.

13. The combination with an engine and speed regulating means therefor, and a steering mechanism, of a worm mounted thereon, a rod adapted to be reciprocated by said worm, a sleeve mounted on said steering mechanism and connected with said rod, a rock shaft for actuating the engine controlling mechanism, a lever mounted on said shaft and connected with said sleeve at all positions, and a spring connecting said lever with said shaft, substantially as described.

14. The combination with an engine, a regulator, and an emergency speed accelerating device, of a yielding connection between said device and the regulator, and means whereby said connection yields to prevent increase of speed beyond a predetermined limit, when said limit is reached, substantially as described.

15. The combination with an engine, and a governor adapted to determine the speed thereof, of a speed regulating device actuated by said governor, manual means for controlling said regulator up to said determined speed, means for setting said manual means in a determined position, and means whereby said manual means is prevented from increasing the speed beyond that determined by the governor and in case of a drop in speed below the maximum automatically actuates the speed regulator to increase the speed, substantially as described.

16. The combination with an engine, and a governor adapted to determine the speed thereof, of a speed regulating device controlled by said governor, manual means for controlling said regulator up to said determined speed, a movable abutment varying in position according to the speed of the gov-

ernor, and means whereby said abutment prevents actuation of said regulator in one direction by the manual controlling means while the governor is moving at the determined speed, substantially as described.

17. The combination with an engine and a manual speed regulator, of a governor driven by the engine and operating means preventing actuation of said manual regulator in one direction when the governor has attained a predetermined speed, substantially as described.

18. The combination with an engine and a manual speed regulator, of a governor driven by the engine and acting on said manual regulator only when a determined speed is reached to prevent further operation thereof such as tends to increase the speed above the determined speed, substantially as described.

19. The combination with an engine having a governor, of a movable stop operated by said governor, manual means for regulating said engine, and means whereby said stop at a predetermined position prevents further actuation of said regulator in one direction, substantially as described.

20. The combination with an engine having a governor, of a movable stop operated thereby, manual means for regulating said engine including a flexible connection, means whereby said stop at a predetermined position prevents further actuation of said regulator in one direction, and means whereby further actuation of said manual means is stored up in said flexible connection and becomes effective upon a movement of said stop responsive to a variation in the engine speed, substantially as described.

21. The combination with an engine and a manual regulator therefor, of a movable stop varying in position according to the engine speed, and means whereby at a determined speed said stop renders said manual means inoperative in one direction until a variation in speed occurs, substantially as described.

22. The combination with a rock shaft having connection with an engine regulator, of a movable device adapted to limit the movement of said shaft, and means for manually actuating said shaft in one direction at all times and in the other direction only when such movement is not limited by said movable device, substantially as described.

23. The combination with an engine, of controlling means, manual actuating connections, and a governor independent of said controlling means but adapted, at a determined limit, to prevent further movement of said controlling means in one direction without preventing actuation of said connections, substantially as described.

24. The combination with an engine, of controlling means, manual means for actuat-

ing said means to regulate the engine, and means whereby, at a determined limit, actuation of said connections is rendered ineffective to move said controlling means in one direction, substantially as described.

25. The combination with a speed controlling device, of separate manual devices for actuating said controlling device, and actuating connections comprising a torsion spring between said manual devices and said controlling device, substantially as described.

26. The combination with a speed control-

ling device, of separate manual devices for actuating said controlling device, an oscillatory part to which both of said devices are connected, and spring actuating connections between said oscillatory part and said controlling device, substantially as described.

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

GIOVANNI ENRICO.

Witnesses:

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JOSEPH FORNAS.