

July 2, 1940.

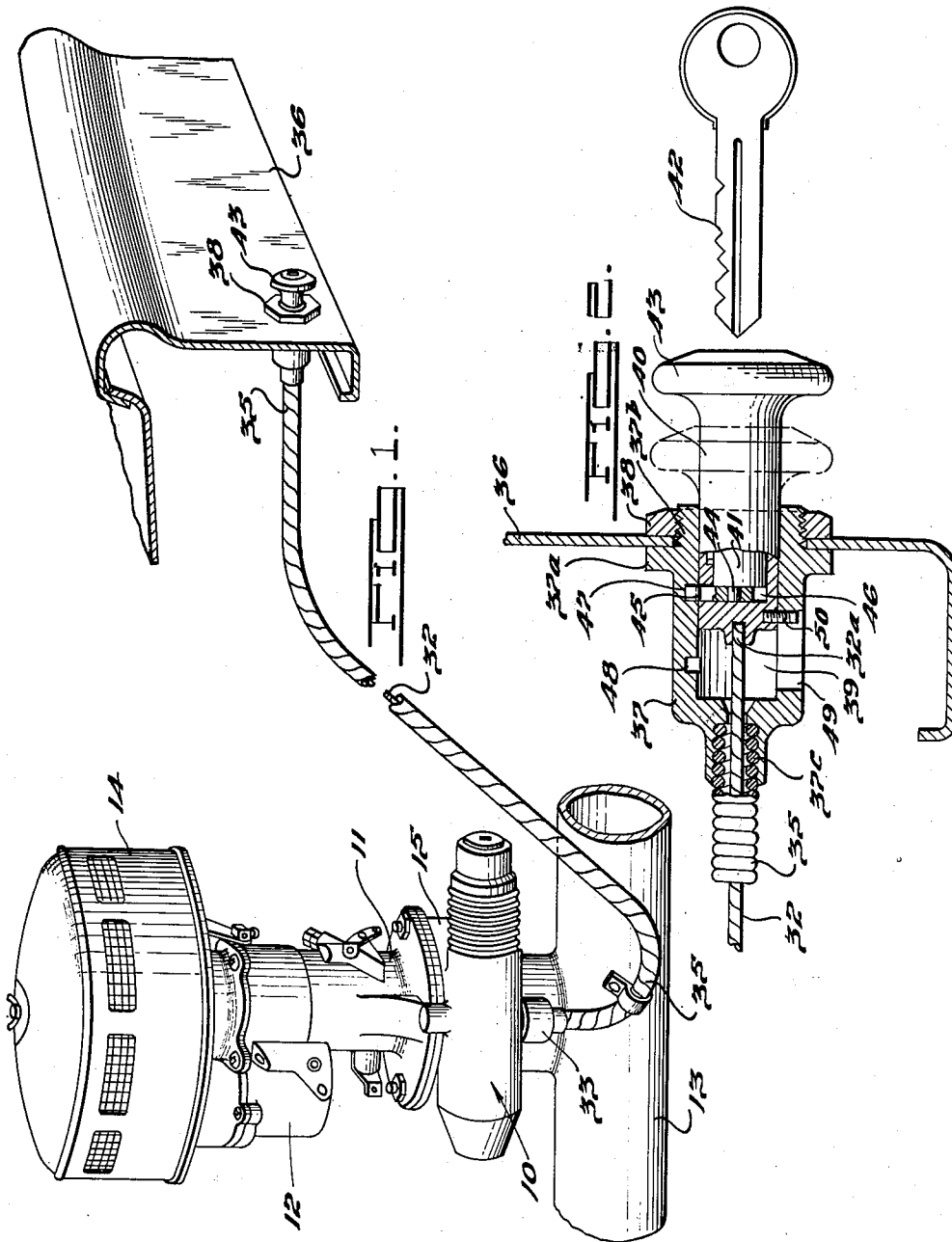
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2,206,503

CONTROL MECHANISM FOR GOVERNORS

Filed May 28, 1936

3 Sheets-Sheet 1



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CONTROL MECHANISM FOR GOVERNORS

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3 Sheets-Sheet 2

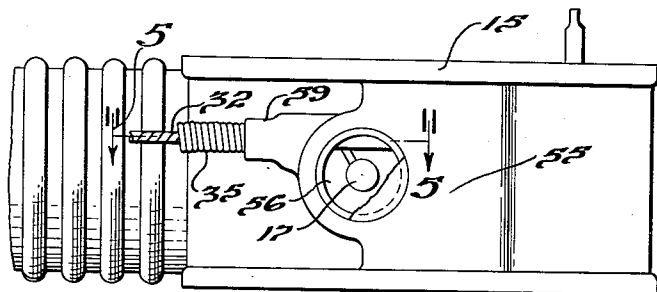
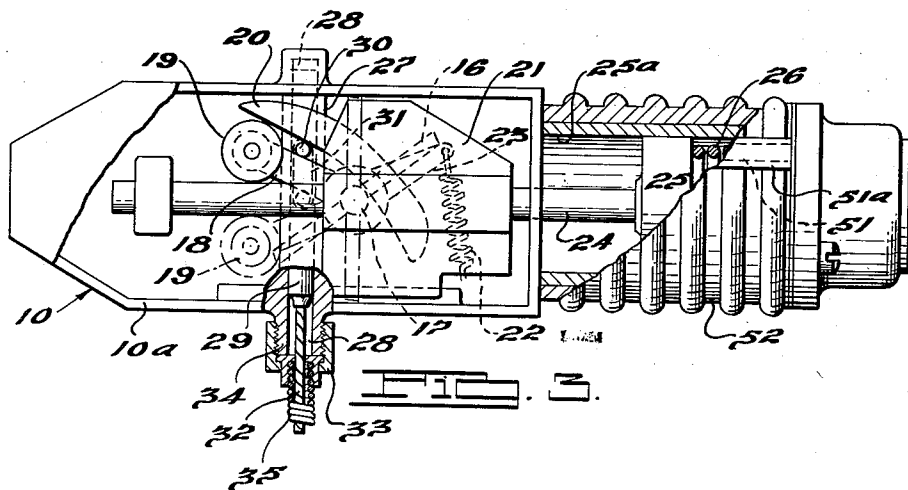


FIG. 4.

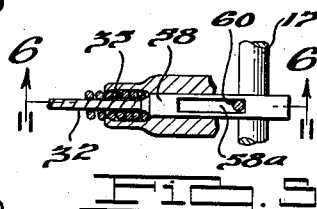


FIG. 5.

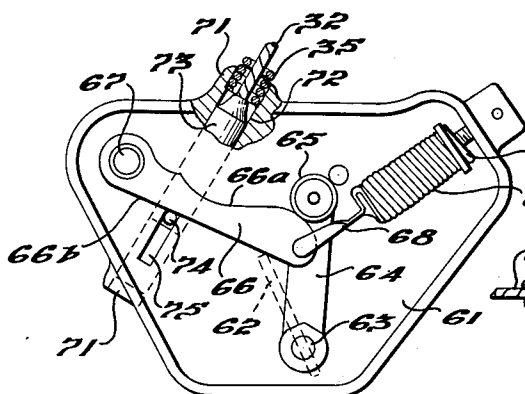


FIG. 6.

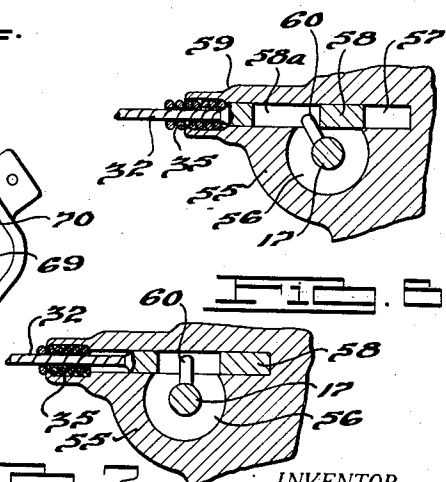


FIG. 7.

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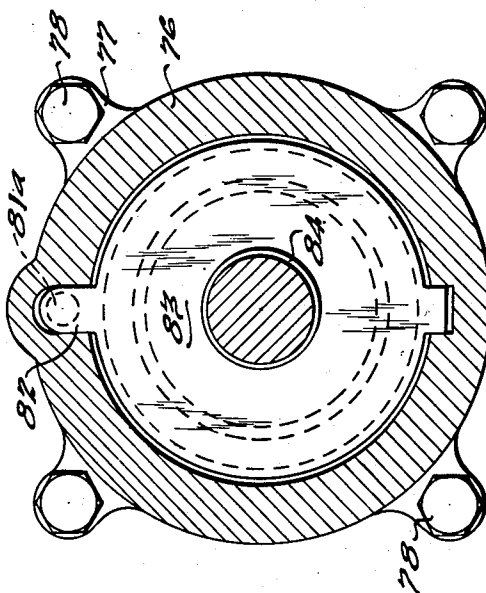
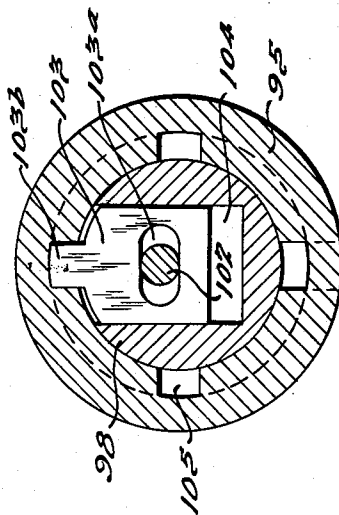
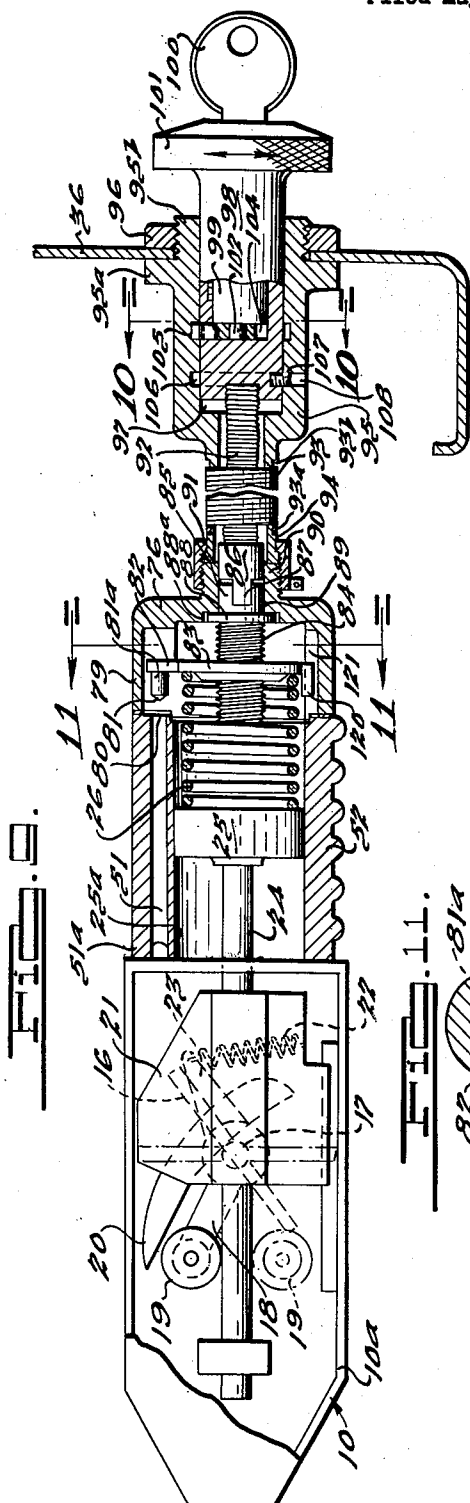
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CONTROL MECHANISM FOR GOVERNORS

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,206,503

CONTROL MECHANISM FOR GOVERNORS

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Application May 28, 1936, Serial No. 82,278

2 Claims. (Cl. 137—153)

This invention relates to governor mechanism for internal combustion engines and particularly, although not exclusively, to governor mechanism of the automatic vacuum operated type adapted to be mounted in an automotive vehicle and having improved means whereby the governor may be adjusted or rendered partially or wholly inoperative at predetermined times.

An object of the invention is to provide a governor, especially of the vacuum operated type, having a governing valve, such as a balanced or unbalanced butterfly valve, responsive to the engine suction or vacuum, and wherein remote control mechanism is provided for rendering the governor or governing valve operative or inoperative at any predetermined time.

A further object of the invention is to provide a governor, especially of the vacuum operated type, having a governing valve responsive to engine suction, such valve being either of the so-called flow actuated type, such as an unbalanced butterfly valve, or the type, such as a balanced butterfly valve, controlled by a vacuum actuated piston or diaphragm, and wherein means is provided for locking the governing valve shaft in any predetermined angular position thereby rendering the governor ineffective to govern the engine at the set speed.

A further object of the invention is to provide a vacuum operated governor having means, such as a key operated remote control mechanism, for rendering the suction or vacuum actuated means of the governor, which may be the piston or the unbalanced portion of the governing valve, inoperative or partially so whereby the main counteracting spring of the governor will function to hold the governing valve in predetermined open position with the governor ineffective to govern the engine at the normal set speed.

A further object of the invention is to provide a vacuum operated governor having mechanism, such as a crank arm or cam lever, for turning the governing valve shaft, and wherein remote control mechanism, adapted to be mounted, for example, on the dash or instrument panel of the vehicle, is provided for locking said mechanism in any predetermined position whereby the governing valve will be rendered ineffective to govern the engine at the normal set speed.

A further object of the invention is to provide a remote control mechanism, preferably a mechanism which is key operated, which is adjustable to lock the governing valve shaft in a position to maintain the governing valve open during operation of the engine, and which is also ad-

justable to release the valve shaft and permit the governor to govern the engine at the set speed.

A further object is to provide a relatively simple governor control means characterized by the provision of mechanism remotely controlled for adjusting the governor through adjustment of the main spring thereof and also, preferably, for shutting off or disconnecting the governor as desired, and adapted to be locked, as by a key operated mechanism, in "off" and "on" positions of the governor or in various positions of adjustment of the spring.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

Fig. 1 is a perspective view, partly in section, illustrating the assembly of the governor and control mechanism in connection with a down draft carburetor.

Fig. 2 is a side elevation, partly in section, illustrating the control mechanism adapted to be mounted on the instrument panel of the vehicle.

Fig. 3 is in part a longitudinal sectional elevation of a governor adapted to be controlled in accordance with the present invention.

Fig. 4 is a fragmentary side elevation of the governor shown in Fig. 3, illustrating a modified form of control mechanism.

Fig. 5 is a section through lines 5—5 of Fig. 4 in the direction of the arrows.

Fig. 6 is a section through lines 6—6 of Fig. 5 in the direction of the arrows.

Fig. 7 is a view similar to Fig. 6 illustrating the valve shaft in unlocked position.

Fig. 8 is a plan view of a modified type of governor illustrating another form of control mechanism.

Fig. 9 is a longitudinal sectional view of a governor and control mechanism therefor embodying the present invention.

Fig. 10 is a section taken through lines 10—10 of Fig. 9 in the direction of the arrows.

Fig. 11 is an enlarged fragmentary sectional view taken substantially on the line 11—11 of Fig. 9, looking in the direction of the arrows.

Before explaining in detail the present invention it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways.

Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation, and it is not intended to limit the invention claimed herein beyond the requirements of the prior art.

In the drawings there are illustrated, by way of example, suitable governors of the vacuum operated type adapted to be controlled in accordance with the present invention. A typical installation of a governor in connection with the carburetor and intake manifold with key-operated remote control mechanism for rendering the governor operative or inoperative is illustrated in Fig. 1. As shown in said figure, the governor 10, which is of the vacuum-operated type, is interposed in the intake passage or conduit 11 from the down-draft carburetor 12 to the intake manifold 13. As shown in this view, the air cleaner, illustrated at 14, is connected to the upper end of the intake pipe 11. In this instance the governor 10 is provided at one side thereof with a valve body 15 which is bolted in place in the intake pipe.

Referring to Fig. 3, wherein the governor 10 is illustrated as a suitable device for the incorporation of the present invention, it will be seen that the butterfly valve 16, which is located in the intake passage within the valve body 15 of the governor, is attached to a transverse valve shaft 17. It will be understood that the governing butterfly valve 16 lies within the main intake passage 11, a portion of which is formed within the valve body 15 of the governor. The rock shaft 17 is journaled in suitable bearings in the body 15 and in the governor casing 10a at one side of the intake passage. Secured to the shaft 17 within the casing 10a is a crank arm 18 carrying a cam roller 19 cooperable with the inclined face of a suitable cam 20 carried by a sliding cam carrier 21. A light spring 22 is connected at one end to the casing and at the opposite end to an arm 23 projecting from the rock shaft 17 in a direction opposite to the crank arm 18. The cam carrier 21 is attached to a sliding piston rod 24 secured to a piston 25 within a cylinder 25a formed in one end of the casing. Movement of the piston inwardly or to the left in Fig. 3 is effected by means of a main spring 26, and movement of the piston in the opposite direction against the action of the spring is caused by differential pressures acting on opposite ends of the piston, the piston being subject at its inner end to the atmospheric pressure within the casing and at its opposite end to the partial vacuum within the intake passage 11 by means of a conduit 51 extending through the embossed or rib portion 51a in the casing wall 52. The governor, shown in this embodiment of the invention, is constructed and is adapted to operate substantially in accordance with my copending application Serial No. 520,060.

Formed within the valve casing 10a at one side of the crank arm 18 is a boss 27 bored to provide a cylindrical passage 28. Within this passage is located a sliding plunger 29. The plunger is provided with a laterally projecting pin 30 engaging the upper edge of the crank arm 18. The pin projects through a guide slot 31 for engagement with the crank arm and the length of the slot is such as to provide limits for the sliding movement of the plunger 29. Secured to the lower end of the plunger 29 is a Bowden wire 32 which projects through a screw cap 33 secured to the extension 34 of the boss 27. The casing 35 of the Bowden wire or cable is fastened by

means of a plug to the cap 33 as shown. The cable or wire leads from the governor to a suitable remote point, such as the instrument panel 36 of an automotive vehicle, within the convenient reach of the operator of the vehicle.

The control mechanism for the governor is mounted within a housing or body 37 having a flanged end 37a abutting against the rear face of the instrument panel 36, see Fig. 2, the body 37 having a threaded extension 37b extending through an aperture in the panel. The body is clamped onto the panel by means of a nut 38. The body or housing 37 is provided with a cylindrical bore 39 within which is slidably mounted a cylindrical plunger 40. The rear end of the wire or cable 32 is fastened at 32a to the forward end of the plunger 40, and the casing 35 is fastened at 37c to a boss projecting rearwardly from the body 37. The plunger 40 is provided with a central bore to receive a suitable lock mechanism having, for example, a conventional lock cylinder 41, this mechanism being controlled by means of a key 42 insertable through a key hole in the forward end of a terminal knob 43 on the plunger 40. By turning the key 42 and the lock cylinder 41, an eccentric pin 44 projecting therefrom is oscillated to actuate a latch 45. The eccentric pin extends into an elongated transverse slot in the latch 45, the latter being slidable in a vertical slot 46 in the plunger 40 and having a latch projection movable either into the notch 47 or the notch 48 formed within the barrel 37. Movement or oscillation of the eccentric pin 44 in one direction will retract the latch 45, and movement in the opposite direction will extend the latch into either one of the notches according to the position of the plunger 40. At the bottom of the barrel 37 there is provided a guide slot 49 within which slides a pin 50 attached to the plunger 40. The pin 50 cooperates in the slot to prevent rotative movement of the plunger 40. The construction of the remote control mechanism, illustrated in Fig. 2, is substantially the same as that shown and described in my copending application Serial No. 63,162.

From the foregoing it will be seen that upon retracting the plunger 40 to the position illustrated in Fig. 2, the Bowden wire 32 will be pulled rearwardly thereby drawing down the plunger 29 in the cylindrical hole 28. By this operation the pin 30 will pull down the crank arm 18 to the dotted line position shown in Fig. 3, thus rotating the governing valve shaft 17 so as to turn the valve 16 into its wide open position. At such time the governor will be inoperative to govern the engine, and the plunger 40 may be locked in such position by means of the key 42. By unlocking the plunger and pushing it forwardly to the dotted line position of Fig. 2 and locking the same in such position through cooperation of the latch 45 in the notch 48, the plunger 29 and its control pin 30 will be moved to the opposite end of the slot 31 thereby releasing the crank arm 18 and permitting the governor to function.

Referring to the embodiment illustrated in Figs. 4 to 7 inclusive, it will be seen in this instance that the valve body 15 of the governor 10 is provided at one side thereof with an enlarged portion or boss 55 within which the rock shaft 17 for the governing valve is journaled. An annular recess 56 is provided around the shaft 17, this recess being intersected by an elongated drilled hole or slot 57 within which is

mounted a sliding plunger 58. This plunger has an elongated slot 58a and into this slot projects a crank pin 60 secured to the governing valve shaft 17. The Bowden wire 32 of the cable 35 is fastened to one end of the plunger 58 whereby upon shifting the control knob 43 inwardly or outwardly the plunger 58 will be correspondingly shifted within the slot or hole 57.

From the foregoing it will be readily seen that upon pulling the control knob 43 outwardly to its full line position shown in Fig. 2, thereby exerting a pull on the wire 32, the inner end of the slot 58a in the plunger 58 will engage the pin 60 and force it into the position shown in Fig. 6. This action will result in rocking the shaft 17 and rotating the governing valve 16 into its wide open position. Thus, with the parts adjusted, as illustrated in Fig. 6, the governing valve may be held and locked in its wide open position, thereby rendering the governor inoperative to govern the engine. The governor may be placed in operative condition by unlocking the control plunger 40 by means of the key 42, sliding the control knob 43 inwardly to the dotted line position of Fig. 2, thereby moving the plunger 58 to the position illustrated in Fig. 7. At this time the governing valve shaft 17 will be free to turn since the pin 60 will be free to move laterally within the slot 58a. Since, therefore, the shaft 17 at this time is unlocked and unrestrained, the governing valve and associated governor mechanism will be free to operate for the purpose of governing the engine.

Referring to the embodiment illustrated in Fig. 8, in this instance a somewhat different type of governor is illustrated. This governor, as is known in the art, includes a valve body, somewhat analogous to the valve body 15, which includes a portion of the intake passage, and within this passage is located an unbalanced or offset butterfly valve 62. The valve 62 is of the flow actuated or velocity type, being movable toward closed position within the intake passage by reason of the velocity of the gaseous mixture passing therethrough and also by reason of differences in pressures at opposite sides of the valve. The governing valve 62 is fixed to a cross-shaft 63 journaled in the valve body and also in the valve casing 61 offset at one side thereof as illustrated in full lines in Fig. 8. Within this casing is located a crank arm 64 fastened to the extension of the valve shaft 63. This arm carries a cam roller 65 cooperable with the cam face 66a of a cam lever 66, the latter being pivoted at 67 to the casing for swinging movement therein. The outer free end of the cam lever 66 is connected at 68 to the end of a tension spring 69 which is fastened at 70 to the casing. It will be understood that closing movement of the governing valve 62 is resisted by the counteracting spring 69, the cam mechanism providing a differential means interposed between the spring and valve. The foregoing construction is part of the prior art, and therefore, a further detailed description of the governor is not deemed necessary herein.

The governor casing 61 is provided at one side thereof with a boss 71 which is drilled longitudinally to provide a hole or slot 72 within which is slidably mounted a plunger 73. Secured to one end of this plunger is a control pin 74 which projects through a slot 75 in the boss 71 and wall of the casing 61. The pin 74 projects into the casing in position to engage one edge 66b of the cam lever 66. The outer end of the plunger 73

is fastened to the Bowden wire 32 of the cable 35.

From the foregoing it will be readily seen that retraction of the control knob 43 to the full line position of Fig. 2, thereby exerting a pull on the wire 32, will move the plunger 73 into the position illustrated in Fig. 8, thereby causing the pin 74 to swing the cam lever 66. Through engagement of the cam face 66a with the roller 65, this movement of the cam lever will be transmitted to the arm 64. The force exerted by the plunger 73 on the cam lever 66 in conjunction with the pull of the spring 69 will thus rotate the valve shaft 63 and swing the governing valve 62 into its wide open position and hold it in this position during engine operation. By locking the plunger 40 with the key 42 the valve 62 will be locked in wide open position, thus rendering the governor inoperative to govern the engine. By unlocking the plunger 40 and shifting the same forwardly to the dotted line position, the control pin 74 will be shifted to the end of the slot 75, thereby permitting free movement of the cam lever 66 and full governing operation.

Referring to the embodiment illustrated in Figs. 9 to 11 inclusive, in this instance the remote control mechanism is also applied to the governor 15, but in lieu of the push-and-pull mechanism the control knob and its plunger are adapted to be rotated into various positions to adjust the tension of the main spring 26. Moreover, rotative adjustment of the control knob is also effective to render the governor inoperative when desired.

In Fig. 9 it will be noted that the vacuum take-off from the intake passage communicates through the conduit or passage 51 in the boss 51a with the back-side of the piston 25 leading into the space occupied by the main spring 26. The end of the casing portion 52 is closed by means of a specially formed cap or closure member 76 having lugs 77 by means of which it is bolted at 78 to the end of the casing 52, the joint between the parts being sealed to provide a gas-tight joint. The end of the vacuum passage 51 communicates through a port 80 with a slot or passage 79 in the wall of the cap 76. Within this passage is located a conical valve 81 adapted to cooperate with the annular edge of the port 80 to close off the vacuum passage 51. The valve 81 is carried by a body 81a secured to an ear 82 slidable within the slot or passage 79. The ear 82 projects from the peripheral edge of a disk or collar 83 centrally bored and tapped to cooperate with the threaded shank 84 of a rotatable coupling member 85. The cylindrical member 85 is coupled by means of a tongue and slot connection 87 with a cylindrical member 86, both members being rotatable within the cylindrical bore 89 of a neck portion 90 projecting from the cap 76. The member 85 is held in position by means of an annular flange 88 thereon confined and rotatable within a circular recess 88a, the flange being maintained within the recess by the expansion pressure of spring 26 against the collar 83. Fastened to the outer end of the coupling member 86 is a flexible cable 92 housed within an exterior flexible armour or casing 93 secured at 93a to a coupling 94, the latter being clamped to the part 90 by a nut 91 threaded onto the end of the latter.

From the foregoing it will be seen that, upon rotation of the coupling member 85 and the threaded portion 84, the collar 83, which is held against rotation by means of guide portion 120 thereof slidable within a guide slot 121, will be

moved longitudinally toward and from the casing 52. In this manner the spring 26 may be adjusted to have different degrees of compression, and by adjusting the collar 83 the maximum distance the valve 81 will close off the port 80, thereby rendering the governor inoperative. This action at the same time will increase the effort of the spring 26 to such an extent that it will hold the governing valve 16 in wide open position.

In the present instance, as illustrated in Figs. 9 and 10, the control mechanism for the governor is mounted within a housing or body 95 having a flanged end 95a abutting against the rear face of the instrument panel 36, the body 95 having a threaded extension 95b extending through an aperture in the panel. The body is clamped onto the panel by means of a nut 96. The body or housing 95 is provided with a cylindrical bore 97 within which is rotatably mounted a cylindrical plunger 98. The rear end of the flexible cable 92 is fastened to the forward end of the plunger 98 and the rear end of the casing 93 for the cable is fastened at 93b to the body 95. The plunger 98 is provided with a central bore to receive a suitable lock mechanism having, for example, a conventional lock cylinder 99, this mechanism being controlled by means of a key 100 insertable through a key hole in the outer end of the control knob 101 of the plunger. Projecting forwardly from the end of the cylinder 99 is an eccentric pin 102 projecting into an elongated slot 103a in a latch piece 103 movable vertically within a slot 104 in the plunger 98. The body 95 is provided with a suitable number of notches or recesses 105, all located in a common transverse plane, four being illustrated by way of example in Fig. 10. The latch body 103 has a latch projection 103b adapted to extend into any one of the notches 105. The plunger 98 is held against longitudinal sliding movement within the recess 97 by means of a set screw 107 slidable circumferentially within an annular groove 106 in the body 95, the set screw being inserted in place through a hole 108.

From the foregoing it will be seen that upon turning the key 100 to unlock the plunger the eccentric pin 102 will retract the latch 103. The plunger 98 may then be rotated and may be locked after every quarter turn by turning the key 100 and forcing the latch projection 103b into one of the notches 105. Upon turning the

control knob 101 the cable 92 will be rotated thereby rotating the coupling members 85, 86 and the threaded portion 84 and causing the adjustable collar 83 to travel longitudinally within the closure member 76 of the governor.

I claim:

1. In a governor for an internal combustion engine having an intake passage, a governor having a valve interposed in the intake passage, a cylinder, connecting means between the cylinder and intake passage, a piston slidably mounted in the cylinder and responsive on opposite sides to atmospheric and intake passage pressures controlling the governor valve, resilient means engaging the piston and urging the valve toward open position, longitudinally movable means in the cylinder to vary the force of the resilient means, valve means carried by the longitudinally movable means to interrupt the connecting means between the cylinder and intake passage when the longitudinally movable means approaches one extreme position, and guide means between the movable means and cylinder to prevent the longitudinally movable means from rotating in the cylinder.

2. In a governor for a motor vehicle having an instrument panel, a governor for an internal combustion engine having an intake passage, a valve interposed in the intake passage, a cylinder, connecting means between the cylinder and the intake passage, a piston slidably mounted in the cylinder and responsive on opposite sides to atmospheric and intake passage pressures controlling the governor valve, resilient means engaging the piston and urging the valve towards open position, longitudinally movable means in the cylinder to vary the force of the resilient means, valve means carried by the longitudinally movable means to interrupt the connecting means between the cylinder and intake passage when the longitudinally movable means approaches one extreme position, guide means between the longitudinally movable means and cylinder to prevent the longitudinally movable means from rotating in the cylinder, a threaded member in the cylinder cooperating with the longitudinally movable means to move it longitudinally in the cylinder, manually operable rotatable means mounted at a remote point and motion transmitting means between the manual means and the threaded member.

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