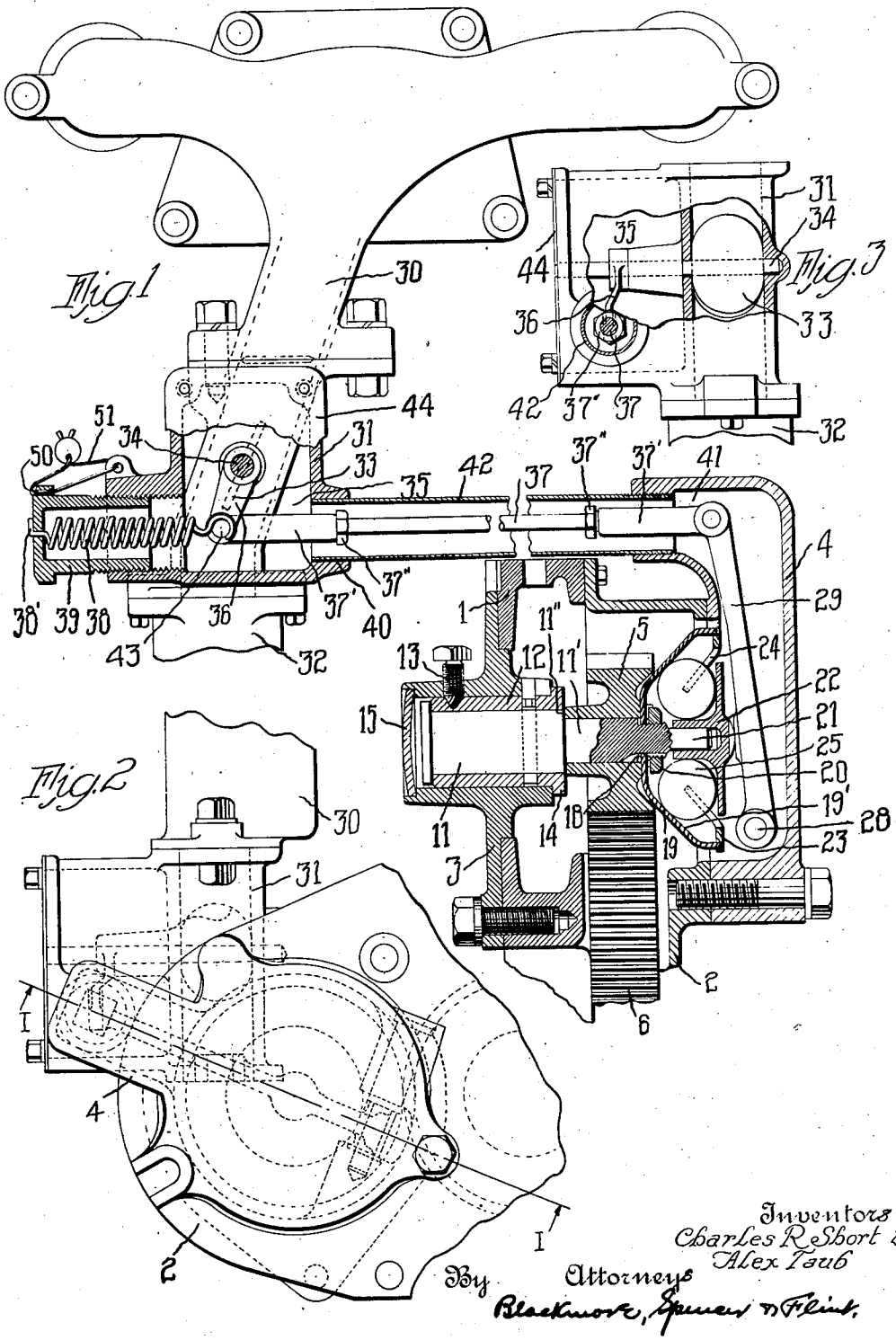
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C. R. SHORT ET AL

GOVERNOR FOR INTERNAL COMBUSTION ENGINES

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Inventors
Charles R. Short &
Alex Taub

By Attorneys
Blackmore, Spencer & Flint.

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CHARLES R. SHORT AND ALEX TAUB, OF DETROIT, MICHIGAN, ASSIGNORS TO GENERAL MOTORS CORPORATION, OF DETROIT, MICHIGAN, A CORPORATION OF DELAWARE.

GOVERNOR FOR INTERNAL-COMBUSTION ENGINES.

Application filed October 25, 1919. Serial No. 333,290.

To all whom it may concern:

Be it known that we, CHARLES R. SHORT and ALEX TAUB, both citizens of the United States, and residents of Detroit, county of Wayne, and State of Michigan, have invented certain new and useful Improvements in Governors for Internal-Combustion Engines, of which the following is a full, clear, concise, and exact description, such as will enable others skilled in the art to which the invention relates to make and use the same, reference being made therein to the accompanying drawings, which form a part of this specification.

The present invention relates to governors for internal combustion engines, being intended primarily for heavy duty service such as in connection with tractors.

A leading object is to provide a construction wherein the throttle valve is returned promptly toward open position upon increase of engine load. This is accomplished by so arranging the governor spring that it operates substantially directly on the throttle valve; added advantages resulting therefrom are that the operation is rendered independent of slight wear in the connections between the speed responsive device and the throttle, and that the size of the spring may be reduced.

The invention, in its preferred embodiment, also provides a fitting interposed between the intake manifold and the carburetor, wherein are housed the throttle valve above referred to together with the spring and associated elements, so that those parts which go to make up the governor apparatus may be readily removed or applied as a unit in the manner of an accessory.

Another object is to provide means for conveniently adjusting the tension of the spring to thereby establish the resistance to which the speed responsive device is opposed, and for sealing the spring in adjusted relation.

Again, the invention provides for readily disassociating the levers and connecting linkage from the speed responsive device, this being effected mainly by mounting the lever, upon which the speed responsive device directly acts, in a detachable cover for said device.

A further object is to provide a housing for the linkage so arranged as to be assembled and disassembled in the act of securing the cover plate for the speed responsive device in place.

In the drawings, Fig. 1 is a part side view, part section showing a preferred embodiment of the invention, those elements which appear in section at the left side of the figure being in vertical section, and those at the right corresponding to an inclined plane indicated by the line 1—1 of Fig. 2. Figure 2 is a fractional end view corresponding thereto. Figure 3 is a view of the throttle valve housing, looking from the right in Figure 1.

1 and 2 indicate, respectively, lobe-like elements offset laterally from the front end portion of the crank casing proper and from the front cover plate, these elements, together with the corresponding detachable end cover plates 3 and 4, forming a barrel-like chamber wherein is positioned a driving gear 5 for the speed responsive device, this gear in turn being driven by a timing gear 6 or other constantly driven gear of the engine. In the present case the governor shaft 11, upon the reduced portion 11′ of which the gear 5 is mounted, is itself rotatable in a detachable bushing 12 that is held in place in the cover plate by the set screws 13; and a collar 14 serves to hold the shaft from endwise movement. While the end of the bushing and shaft 11 are covered and sealed by a cap 15 in the construction shown, it is evident that the shaft might be extended and connected to drive some other element such as a magneto.

Adjacent the portion 11′, the shaft 11 is further reduced and preferably slotted at 18 to receive a stamped ball carrier 19 which is retained thereon by the nut 20 that also serves to clamp the gear against the shoulder 11″ on the shaft, it being observed that the particular ball carrier shown has tongues projecting into the slots 18 to more positively transmit torque. The extreme outer end of the shaft 11 is again reduced to form a stem or guide 21 rotatable in a pressure plate or disc 22 that is also capable of movement along said stem toward and from the ball carrier. The latter, in the construction shown, is shaped to form an inclined surface 19′ and includes a spacer plate 23 slotted at 24 to loosely embrace corresponding balls 25 which are adapted to be thrown

outwardly between said surface 19′ and the disc 22 to thereby wedge the disc outwardly on the spindle 21 in accordance with the speed of the engine. Other functionally equivalent devices might of course be used. Mounted interiorly of the cover 4, as by means of the pivot 28, is a lever 29 arranged to be swung clockwise, Fig. 1, by the pressure plate upon increase of the engine speed.

In Fig. 1, 30 indicates the usual intake passage for the engine, said passage being ordinarily disposed about mid-way in the length thereof and in this instance including a portion formed in a fitting 31 that is detachably connected to the remainder of the manifold structure and provided with a throttle valve 33. The usual carburetor the upper part of which is shown at 32 (including a manually operated throttle valve, not shown) is attached to the lower flange of the fitting as will be obvious. It will be observed that the throttle shaft 34 projects into a housing chamber 35 formed on the side of the fitting and carries an operating arm or lever 36, and that the latter is joined to the lever 29 through the medium of a link 37 which is adjustable as to length as by means of the threaded connections 37′ and lock nuts 37″. A tension spring 38 connected to the link and arm construction 36—37 in any suitable manner and anchored in a threaded adjusting cap 39 by passing its end 38′ through an opening in the cap and bending it over as indicated in Figure 1, affords means tending to open the throttle and return the balls 25 to the bottom of the conical surface; by virtue of its position in respect to the throttle valve, this spring acts more promptly to return the latter toward open position as the speed falls than would be the case were it positioned adjacent the speed responsive devices, the result being that the engine picks up more quickly to meet additional load.

In order to more fully protect the several parts and to prevent too ready access thereto, which might result in tampering with or upsetting the relative adjustment of the speed responsive devices in respect to the throttle valve, it is preferred to provide the fitting 31 with an opening 40 and to offset the cover 4 to form a chamber 41 for the end portion of the lever 29, said chamber having a threaded opening facing towards the opening 40 so that when a pipe 42 is screwed therein it may then be entered into the opening 40 by the act of assembling the cover on the element 2. Conversely, to obtain access to the removable pin 43 whereby the link or rod 37 is joined to the arm 36, it is only necessary to remove the cover 44 of the fitting 31. Upon removal of the pin 43 thus freeing the link 37 from the arm 36, the cover carrying the lever 29 and the pipe 42 may be removed, together with the link 37, without disturbing the remaining parts. By perforating the nut or cap 39 at one or more points 50, and by providing a wire 51 whose end may be soldered or otherwise sealed at the factory, the tendency of inexperienced operators to tamper with the adjustment of the parts is discouraged.

It will be understood that the details of construction may be varied considerably without departing from the spirit and scope of the invention and therefore it is not desired that the invention should be limited to the specific structure herein described except as required by the language of the appended claims.

We claim:

1. In an internal combustion engine, a crank casing having a chamber, a speed responsive device in said chamber, an end cover plate for said chamber, a lever pivoted at one end to said plate and arranged to be engaged by said device at an intermediate point, a throttle valve, a link one end of which is connected with said valve and the other end of which is connected with the free end of said lever, a chamber within which the connection between the free end of said link and said throttle valve is located, a removable cover closing an opening through which access may be had to said last-named chamber, and a tubular member enclosing said link, said link, lever, and member being removable as a unit with said cover plate.

2. In an internal combustion engine, an intake passage, a throttle valve for controlling the flow therethrough, an operating arm for said valve, a casing within which said arm is located and which casing is provided with an opening leading thereinto, a screw cap in threaded engagement with the wall of said casing, a spring connected at one end to said arm and the other end of which is connected with said screw cap, a removable cover for closing the opening aforesaid, a ball governor actuated by the engine, a lever actuated by said governor, a link intermediate the free end of said lever and the free end of the operating arm for said valve, a tubular member surrounding said link, a hollow cover plate within which said link is housed and which cover plate provides a pivotal support for one end thereof and which casing fits over the governor aforesaid to thereby enclose the same.

In testimony whereof, we have signed our names to this specification this 21st day of October, 1919.

CHARLES R. SHORT.
ALEX TAUB.