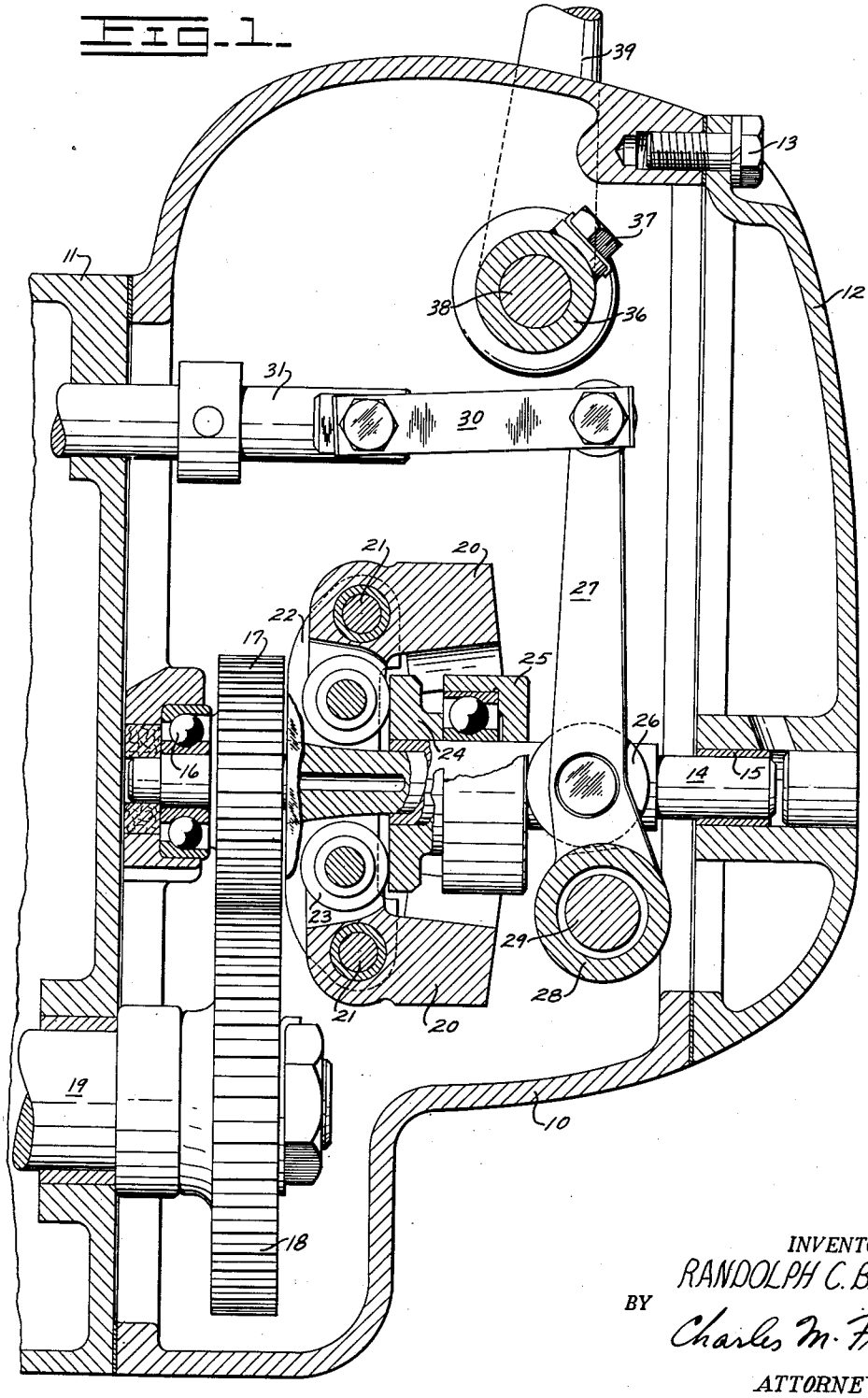
June 13, 1950 R. C. BARNES 2,511,095

ENGINE GOVERNOR

Filed Feb. 1, 1947 3 Sheets-Sheet 1

Fig. 1.



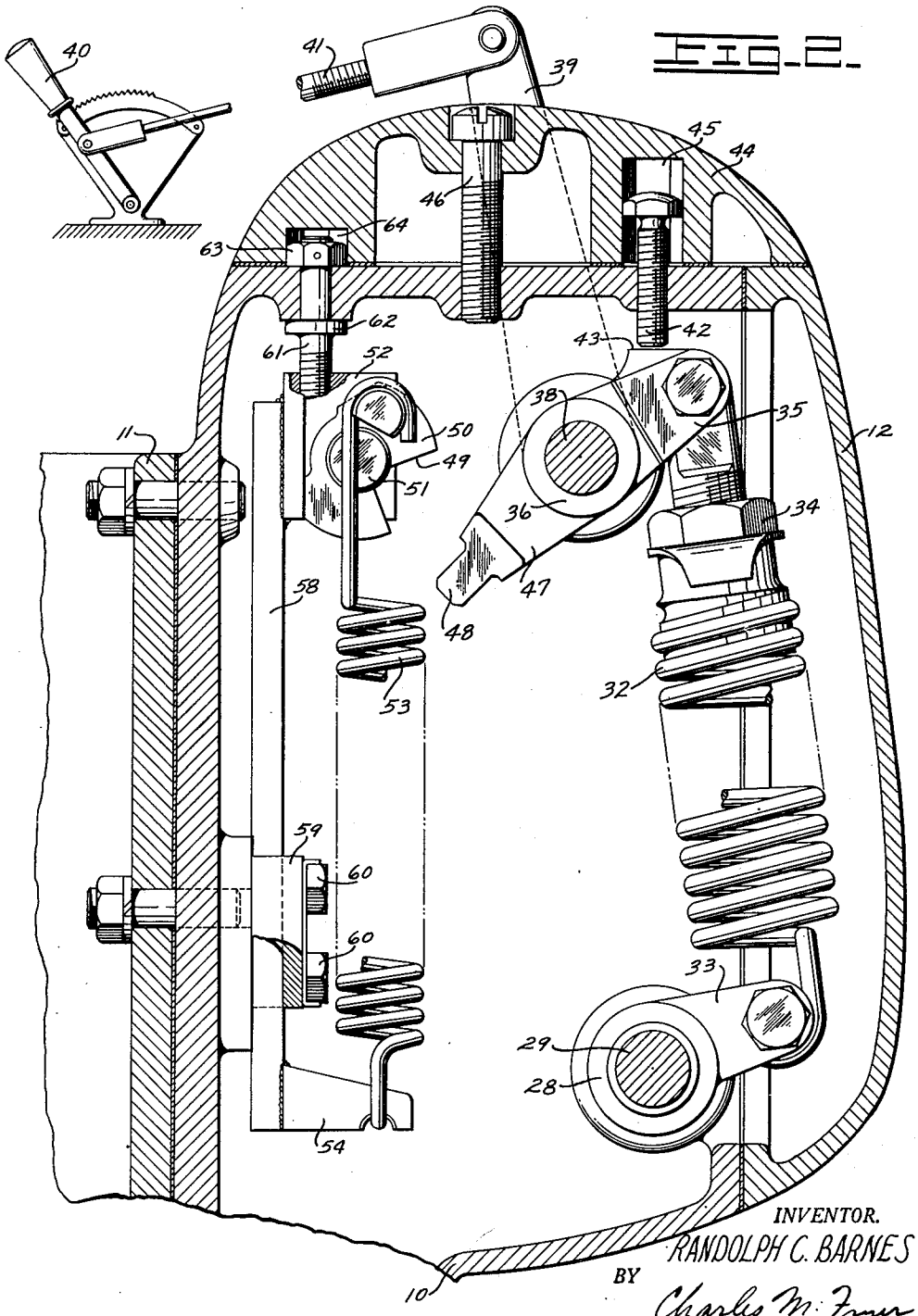
INVENTOR.
RANDOLPH C. BARNES
BY Charles M. Fryer
ATTORNEY.

June 13, 1950 R. C. BARNES 2,511,095

ENGINE GOVERNOR

Filed Feb. 1, 1947 3 Sheets-Sheet 2

Fig. 2.



INVENTOR.
RANDOLPH C. BARNES
BY
Charles M. Fryer
ATTORNEY.

June 13, 1950 R. C. BARNES 2,511,095

ENGINE GOVERNOR

Filed Feb. 1, 1947 3 Sheets-Sheet 3

Fig. 3.

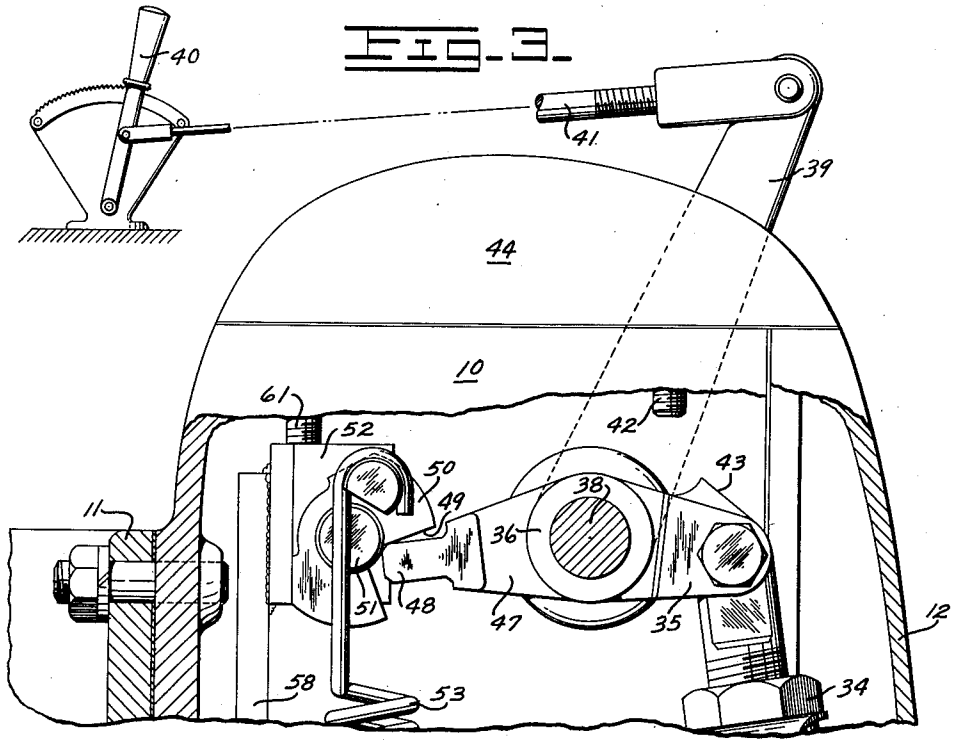
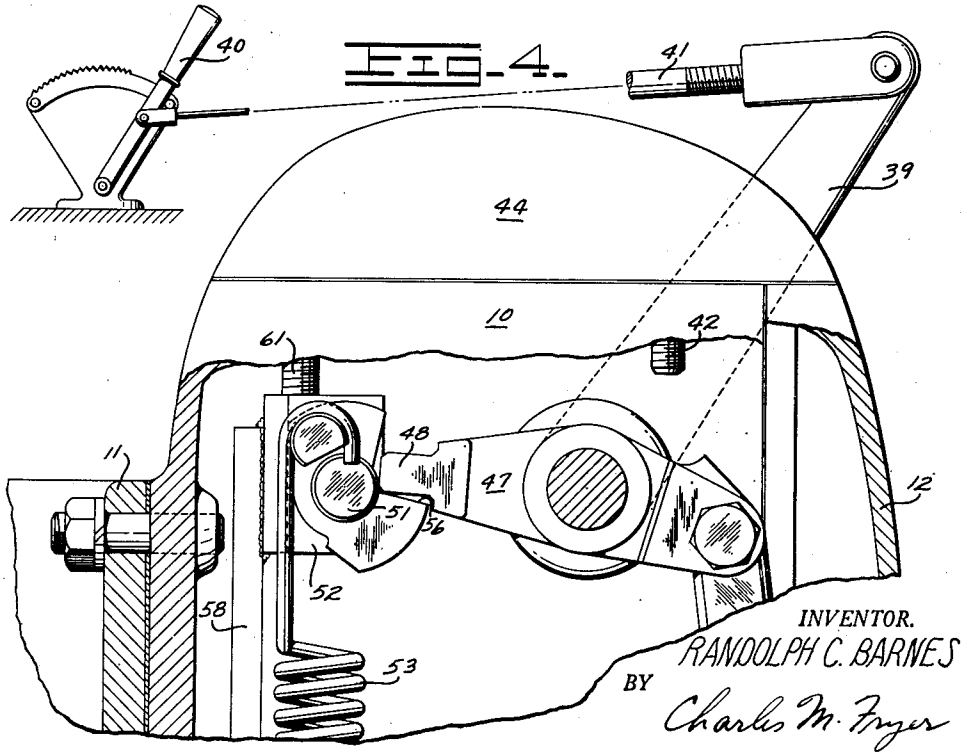


Fig. 4.



INVENTOR.
RANDOLPH C. BARNES
BY
Charles M. Fryer
ATTORNEY.

Patented June 13, 1950 2,511,095

UNITED STATES PATENT OFFICE

2,511,095

ENGINE GOVERNOR

Randolph C. Barnes, Peoria, Ill., assignor to Caterpillar Tractor Co., San Leandro, Calif., a corporation of California

Application February 1, 1947, Serial No. 725,799

5 Claims. (Cl. 264—3)

1

This invention relates to engine governors and particularly to improvements in governor controls to enable a simplified setting of a governor either at its position of low engine speed or at its position for engine shut-down.

In an internal combustion engine, particularly of the compression ignition type, a spring-balanced governor is usually employed for controlling the quantity of fuel directed to the combustion chambers of the engine. A hand throttle or other form of control lever is connected with the governor spring in a manner to vary its tension and thus to establish the speed at which the engine operates. The lowest governor setting for engine operation, generally referred to as "low idle position," effects fuel feed just sufficient to sustain operation of the engine under no-load conditions, and it is desirable that the governor control lever be stopped at this position in order to avoid accidental stalling of the engine through careless adjusting of the governor. The low idle stop for the governor control is often a resilient stop to permit the control to be moved still lower for shutting off all of the fuel when it is desired to shut down the engine. The resilient stop tends to return the control to its low idle position. It is sometimes desirable, as in starting an engine, to turn it over several times without feeding fuel to its cylinders for the purpose of raising its temperature preparatory to starting. There are various ways of raising the engine temperatures such as directing exhaust gases from a starting engine through its intake manifold, or circulating the cooling water between the starting engine and the main engine. To prevent the main engine from consuming fuel during the initial operation of the starting engine or during the warming up period, the governor control lever must be held in its shut-down position. It is therefore customary where a resilient stop is employed at low idle position to employ some latching means to hold the control lever in shut-down position against the pressure of the resilient stop tending to return it to its low idle position. In order to hold the control lever in shut-down position, the operator of conventional engines has to manipulate the lever against the action of the resilient low idle stop and then, while still holding the lever, he has to actuate the latch mechanism to prevent its return.

It is an object of the present invention, therefore, to provide an engine governor with control means operable by a single lever, or the like, for readily positioning and maintaining it at a setting either of low idle or shut-down. A further object of the invention is to provide an engine governor with a setting control means associated with the governor rather than with the control lever, so that the setting control will operate with various types of control levers. Another object

2

of the invention is to provide a governor with means for latching it in a shut-down position automatically when it is moved to such position. Still further and more specific objects and advantages of the invention are made apparent in the following specifications wherein reference is made to the accompanying drawings for a detailed description thereof.

In the drawings:

Fig. 1 is a vertical, sectional view through a governor housing disclosing parts of a governor embodying the present invention;

Fig. 2 is a similar section on a plane parallel but spaced from the plane upon which Fig. 1 is taken;

Fig. 3 is a similar fragmentary section illustrating a different position of the parts illustrated in Fig. 2; and

Fig. 4 is a view like Fig. 3 illustrating a third position of the same parts.

Referring first to Fig. 1 of the drawings, a governor housing 10 is shown as supported against a convenient part 11 of an internal combustion engine which, in this case, is one wall of a conventional fuel pump housing. A removable cover 12 is provided for the governor housing and may be secured thereon as by cap screws, one of which is illustrated at 13. A spindle shaft 14 is mounted for rotation in a bearing 15, carried by the cover 12, and a bearing 16 carried by the housing. The spindle shaft 14 is rotated in accordance with engine speed by means of gears 17 and 18 connecting it in this case with a fuel pump cam shaft 19. A pair of governor fly weights 20 are pivotally connected as by pins 21 with a governor fitting 22 carried on and rotatable with the spindle shaft 14. Upon rotation of the shaft the fly weights 20 tend to swing outwardly about their pivots 21 so that rollers 23 carried by them bear against a flange 24 mounted for sliding movement longitudinally of the spindle shaft. The flange 24 moves to the right as viewed in Fig. 1 upon spreading of the governor fly weights and, through a thrust bearing 25, exerts pressure against rollers 26 carried by a lever 27. The lever 27 has a hub portion 28 rotatably supported on a shaft 29 and as this lever is urged to swing rightwardly its upper end, connected by a link 30 with a fuel pump slide bar 31, effects reduction in the quantity of fuel delivered to the engine by its fuel pumps through conventional mechanism such, for example, as metering type pumps adjusted by rotation of their plungers, as is well understood in the art.

This rightward swinging movement of the lever 27 is resisted by a governor spring illustrated at 32 in Fig. 2. The lower end of this spring is anchored to a lever 33 fixed to the same hub 28 as the lever 27 and its upper end is anchored through an adjustable connection 34 to

an arm 35 of a lever 36. The lever 36 as shown in Fig. 1 is secured as by a set screw 37 to a shaft 38 which shaft also carries and is rotatable by a lever 39. Lever 39 may be operated by a remotely positioned control lever 40 with which it is connected as, for example, by a connecting rod illustrated at 41. Thus the control lever 40 may be employed for rotating the shaft 38 to vary the tension on the governor spring 32. In the position illustrated in Fig. 2, the setting of the governor spring is for high speed or high idle, and a high idle stop is provided by a screw 42 threaded through the upper portion of the housing 10 and engageable against a pad 43 on the lever 35 to prevent further movement of the governor spring in this direction. The stop screw 42 has a hexagonal head and may be locked in its adjusted position by a cap 44 fitting on the governor housing and provided with a hexagonal recess 45 to receive and prevent rotation of the head of the screw 42. Cap 44 may be retained in place by one or more cap screws as shown at 46.

In order to provide a low idle stop for the governor spring adjustment, the lever 36 is provided with a second arm 47 with a squared end 48 engageable in the low idle position of the governor control with a face 49 on a pivoted stop dog 50. A pivot pin 51 supports this stop dog relative to a block 52. A spring 53 is anchored at one end of the stop dog 50 in an off-center position and is anchored at its opposite end to a spring anchor 54.

In operation when the control lever 40 is swung from its high idle position, shown in Fig. 2, to its low idle position illustrated in Fig. 3, the end 48 of the lever arm 47 engages the stop as shown in Fig. 3, and a definite stop position is established. However, by exerting somewhat greater pressure on the control lever 40, its movement in the same direction may be continued until the shut-down position illustrated in Fig. 4 is reached. During this movement the lever arm 47 bears against the face 49 of the pivoted stop dog with sufficient force to overcome the tension of the spring 53 and to swing the dog about its pivot and move the upper end of spring 53 past the center of the pin 51 so that the stop dog is swung to and resiliently retained in the position illustrated in Fig. 4 with the lever end 48 on the lever arm 47 bearing in the opposite direction or downwardly against a shoulder 56 on the stop dog. In this position the tension of the spring 53 retains the governor in its shut-down position, though upon application of sufficient force to the control lever 40 in the opposite direction the normal operating position of the governor may be reestablished.

As it is desirable that the low idle governor position be an adjustable one, the position of the stop dog 50 may be varied without varying tension on the spring 53 and without otherwise interfering with its automatic function. This is accomplished by supporting both the block 52 carrying the stop dog, and the spring anchor 54 on a single plate 58. As shown in Fig. 2, this plate 58 is slidably supported in a bracket 59 secured to the interior of the housing 10 as by cap screws 60. To vary the effective position of the low idle stop face 49, a screw 61 is threaded into the block 52. A shoulder 62 on this screw abuts the inside of the housing 10 and a hexagon nut 63 is threaded on the screw to abut the outside of the housing and is then pinned to the screw against relative rotation thereon. Thus,

by rotation of the nut 63 the entire screw is rotated and through its threaded connection with the block 52, the stop dog and its associated mechanism is raised and lowered in order to adjust the low idle setting of the governor. The housing cap 44 includes a hexagonal recess 64 which embraces and prevents accidental rotation of the nut 63.

I claim:

1. In an engine governor, a stop member, a part engageable with the stop member at low idle governor position, means supporting the stop member for movement by said part upon adjustment of the governor to shut down position, and means on the stop member engageable with said part for preventing return thereof toward low idle position, and an off-center spring resisting movement of the stop member in either direction.

2. In a spring balanced engine governor, means including a moveable part for setting the tension of the governor spring, a pivoted stop member engageable by said part when the spring is set for low idle operation, an off-center spring connected with said stop member for resisting its pivotal movement, and means whereby upon setting of the governor spring to shut down position said part will pivot the stop and the off-center spring will hold the stop in a position preventing return of said part toward low idle position.

3. In combination with an engine governor having a part moveable upon changing the governor setting from low idle to shut down, a pivoted stop member with opposed stop faces engageable by said part in one position as a low idle stop and in the opposite position as a shut down stop, and an off-center spring associated with the stop member to resist its movement from one position to the other.

4. In combination with an engine governor having a part moveable upon changing the governor setting from low idle to shut down, a pivoted stop member with opposed stop faces engageable by said part in one position as a low idle stop and in the opposite position as a shut down stop, and an off-center spring associated with the stop member to resist its movement from one position to the other, and means supporting the pivoted stop for adjustment to vary its effective low idle stop position.

5. In combination with an engine governor having a part moveable upon changing the governor setting from low idle to shut down, a pivoted stop member with opposed stop faces engageable by said part in one position as a low idle stop and in the opposite position as a shut down stop, and an off-center spring associated with the stop member to resist its movement from one position to the other, and means mounting the pivotal stop and its off-center spring for adjustment as a unit to vary its effective low idle stop position.

RANDOLPH C. BARNES.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,337,865	Wells	Apr. 20, 1920
2,009,995	Engel	Aug. 6, 1935
2,047,577	Crafts	July 14, 1936
2,231,059	Douglass	Feb. 11, 1941
2,270,100	Adler	Jan. 13, 1942
2,307,974	Turner	Jan. 12, 1943