

Jan. 23, 1923.

C. C. HINKLEY,
GOVERNOR.
FILED SEPT. 27, 1919.

1,442,885

3 SHEETS-SHEET 1

Fig. 1.

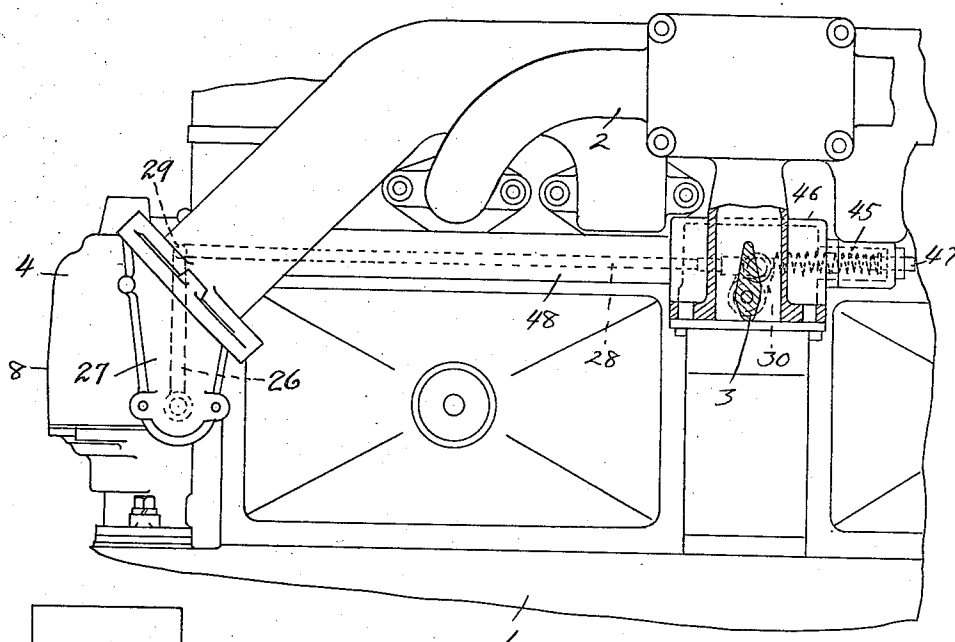
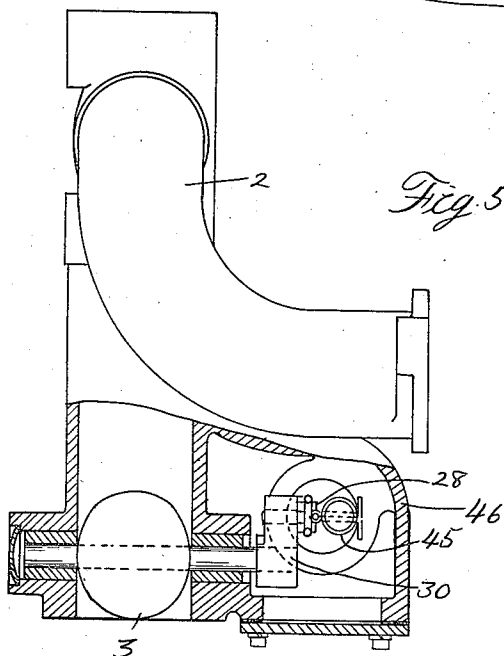


Fig. 5.



Inventor
Carl C. Hinkley

By *Whittemore, Hubert & Whittemore*

Attorneys

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3 SHEETS-SHEET 2

Fig. 2.

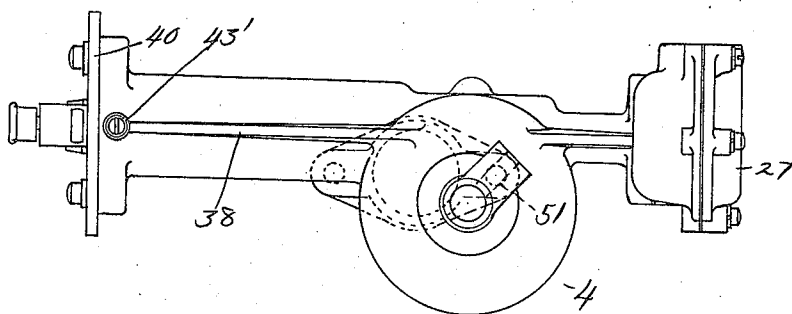
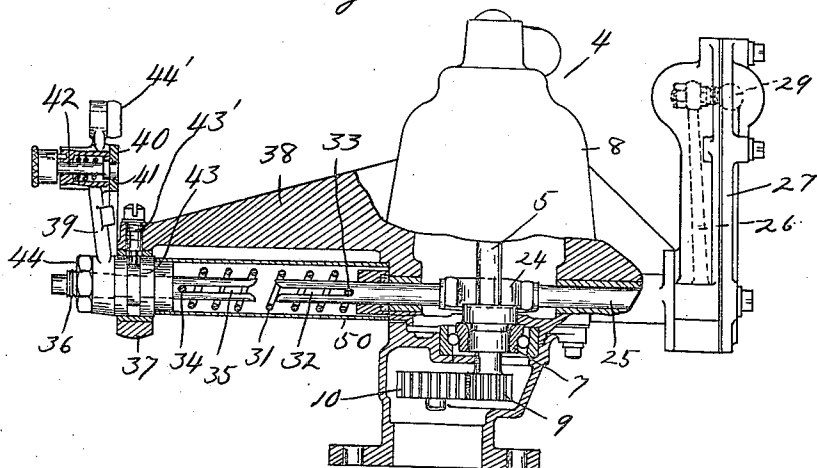


Fig. 3.



Inventor
Carl C. Hinkley

By *Whittemore* *Attorney*

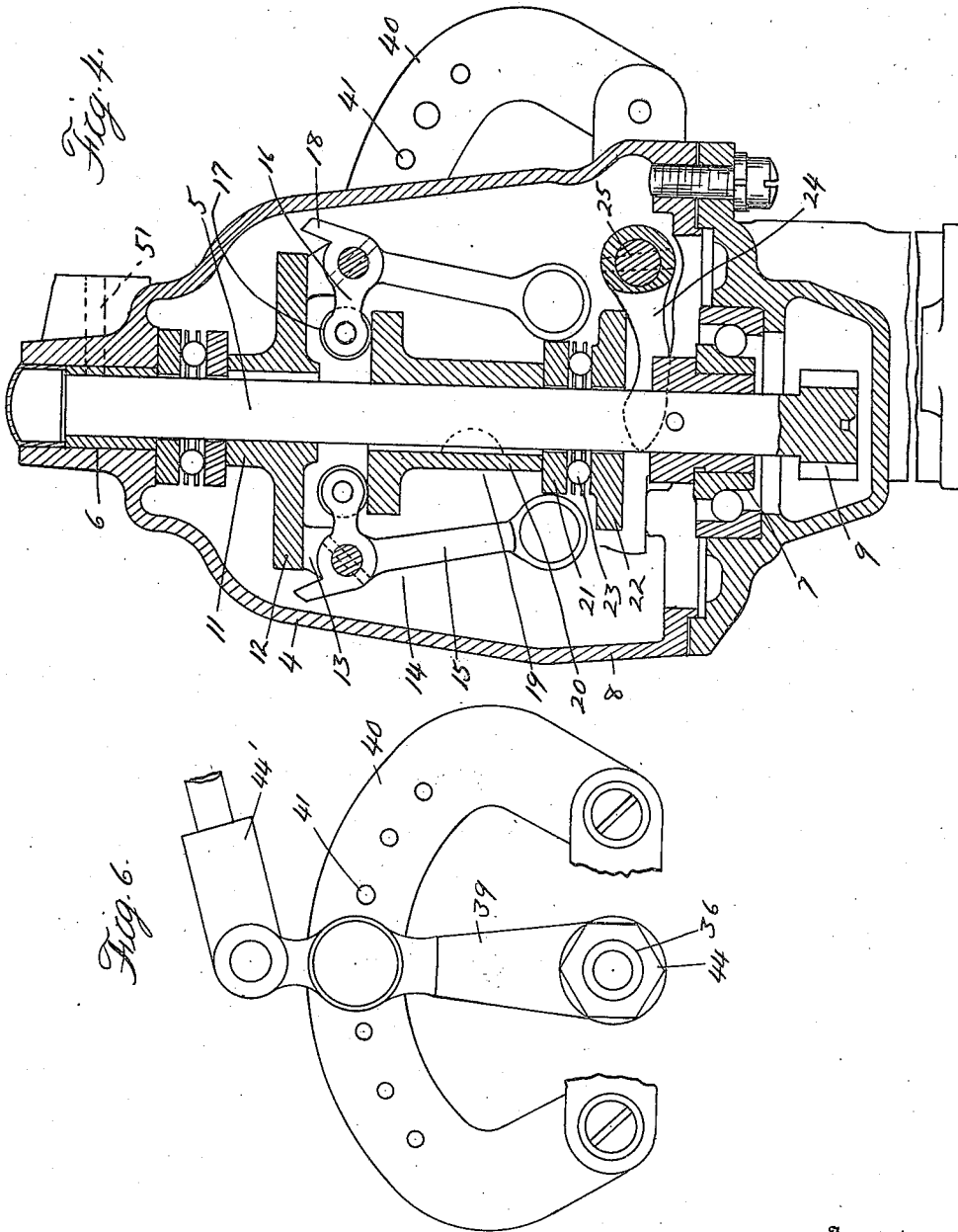
Attorney

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C. C. HINKLEY.
GOVERNOR.
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3 SHEETS-SHEET 3



Inventor
Carl C. Hinkley

By *Whitmore Hubert Whitmore*

Attorney

Patented Jan. 23, 1923.

1,442,885

UNITED STATES PATENT OFFICE.

CARL C. HINKLEY, OF DETROIT, MICHIGAN.

GOVERNOR.

Application filed September 27, 1919. Serial No. 326,951.

To all whom it may concern:

Be it known that I, CARL C. HINKLEY, a citizen of the United States of America, residing at Detroit, in the county of Wayne, and State of Michigan, have invented certain new and useful Improvements in Governors, of which the following is a specification, reference being had therein to the accompanying drawings:

10 The invention relates to governors and particularly to governor mechanism designed for use in internal combustion engines. In governors heretofore constructed the throttle valves have been actuated at only
15 approximately a predetermined engine speed. That is if the governor is set to actuate the throttle valve at 1200 revolutions per minute of the engine, it has been found that the throttle valve does not necessarily begin to
20 close at this speed but is liable to begin to close at 1100 or 1300 revolutions per minute. With my construction this objectionable feature is overcome and the throttle valve begins to close at the predetermined speed
25 of engine. Another object is to provide a construction in which a torsion spring provides the yieldable resistance to the outward or lateral movement of the weight members in the governor proper. A further object
30 is the provision of means for varying the resistance to movement of the throttle valve. A still further object is the provision of a compact construction in which the parts are inclosed so that they are protected both from
35 the weather and from being tampered with. Other objects of the invention reside in the novel arrangements and combinations of parts as more fully hereinafter set forth.

In the drawings:

40 Figure 1 is a side elevation partly in section of a portion of an engine with the governor mechanism embodying my invention attached;

45 Figure 2 is a top plan view of the governor mechanism;

Figure 3 is a side elevation partly in section thereof;

Figure 4 is a central section thereof;

50 Figure 5 is a section through the throttle valve end of the governor mechanism at right angles to the section shown in Figure 1.

55 Figure 6 is an elevation of a portion of the device for varying the tension of the torsion spring.

1 is the engine provided with the intake

manifold 2, in the leg of which is located the throttle valve 3. 4 is the governor mechanism driven from the engine and controlling the movement of the throttle valve 3 depending upon the speed at which the engine is running.

The governor proper is preferably located at the rear of the engine and driven from a shaft having a high rate of rotation. In
65 detail, 5 is a vertical shaft mounted at its upper and lower ends in the bearings 6 and 7 respectively, which are in turn mounted in the casing 8. 9 are gear teeth upon the lower end of the shaft 5 and meshing with
70 the teeth of the gear 10 which is driven preferably from the cam shaft of the engine (not shown). 11 is a hub member fixedly secured to the shaft 5 and having the flange 12, which latter is provided with depending lugs
75 13 upon which are pivotally mounted the bell crank weight members 14. These bell crank weight members have the depending weight arms 15 and the inwardly extending
80 arms 16 which are preferably provided with rollers 17 at their inner ends. Upon rotation of the shaft 5 the bell crank weight arms 14 will also be rotated, thereby tending to throw laterally outward the weight arms
85 15 which will move the inwardly extending arms 16 downwardly. Movement in this direction is limited by means of the lugs 18 upon the bell crank weight arms which will engage the periphery of the flange 12.
90 19 is a thrust member sleeved upon the shaft 5, and as shown this thrust member comprises the sleeve 20 keyed to the shaft and having its upper end in engagement with the rollers 17. 21 and 22 are plates between
95 which are located the balls 23. The upper plate 21 engages the lower end of the sleeve 20 while the lower surface of the lower plate 22 is adapted to rest upon the yoke 24 which has its furcations embracing the shaft 5.

25 is a shaft extending transversely of the
100 engine 1 at its rear and rotatably mounted in the casing 8. Non-rotatably secured to one end of this shaft is the vertically extending rock arm 26 enclosed within the casing 27 at the side of the casing 8. This rock
105 arm 26 is connected to the rod 28 by a ball and socket joint 29. The rod 28 extends longitudinally at the sides of the engine and is connected at its rear end to the crank arm 30, which is non-rotatably secured to the
110 throttle valve 3. The middle of the shaft 25 has non-rotatably mounted thereon the

yoke 24, while the opposite end of the shaft 25 is engaged by the torsion spring 31 which yieldably resists rotation of the shaft. In detail, this opposite end of the shaft 25 is provided with the longitudinally extending central slot 32 in which the inner end 33 of the torsion spring 31 engages. The opposite end 34 of the torsion spring 31 engages in a corresponding slot 35 in the threaded member 36 extending through the depending flange 37 upon the arm 38 of the casing 8. The coils of the torsion spring surround the adjacent ends of the shaft 25 and threaded member 36.

For the purpose of varying the tension of the torsion spring 31 the rock arm 39 is provided engaging the threaded member 36. 40 is a quadrant secured to the arm 38 and having the series of apertures 41 concentric with the axis of the threaded member 36 and opposite the rock arm 39. The rock arm 39 is provided with a suitable spring-pressed plunger 42, which is adapted to engage in the apertures 41 to lock the rock arm 39 in adjusted position. 43 is a collar having an annular groove in its outer face engaged by the screw 43' for retaining the collar in the outer end of the arm 38. The threaded member 36 threadedly engages the collar 43 and the rock arm 39, the latter being locked in position upon the threaded member by the lock nut 44. By rocking the arm 39 the threaded member 36 will be correspondingly rocked thereby increasing or decreasing the tension of the spring 31 by respectively coiling or uncoiling the same.

The plunger 42 may be held from engagement in the apertures 41 of the quadrant 40, and a suitable connection 44' may be provided pivotally secured to the end of the rock arm 39 extending above the quadrant 40 for rocking the rock arm. This connection may be extended to a place to be conveniently operated by the driver of the vehicle, such as the dash.

For the purpose of securing a uniform time of operation of the throttle valve depending upon the engine speed and the predetermined adjustment of the governor the coil tension spring 45 is provided within the casing 46 at the side of the leg of the intake manifold 2. The inner end of this tension spring is secured to the crank 30, while the outer end is secured to the stem 47 extending through the end of the casing 46 and suitably secured thereto. The throttle valve actuates this auxiliary spring which yieldably resists movement of the throttle valve, the operation being such that the throttle valve will close constantly at the predetermined rate of engine speed and will not vary as in governor constructions heretofore manufactured. In fact, it has been found that with the present construction if this second or auxiliary spring is omitted the throttle valve

will begin to close at different speeds of rotation of the engine instead of beginning to close constantly at a predetermined speed of the engine.

For the purpose of preventing tampering of the governor mechanism the tube 48 is provided at the side of the engine and extending between the casing 27 and the leg of the intake manifold 2, this tube enclosing the rod 28. The tube 50 is also provided enclosing the torsion spring 31. Thus with this construction, after the springs have been adjusted to secure an actuation of the throttle valve at a predetermined rate of engine speed the adjustment means may be suitably locked or sealed and it will be impossible to tamper with the governor mechanism to vary the time of actuation of the throttle valve.

The governor proper is lubricated by means of lubricant forced through the aperture 51 in the bearing 6. This lubricant descends upon the shaft 5 and is thrown laterally out by centrifugal force and thoroughly lubricates all the parts within the casing 8. The lubricant then passes through the ball bearing 7 at the lower end of the shaft 5 and lubricates the gears 9 and 10 moving back to the crank case of the engine.

What I claim as my invention is:

1. In a governor for an internal combustion engine, the combination with a housing, of a positively driven shaft within said housing, weight members within said housing rotated by said shaft, a throttle valve, a shaft connected to said throttle valve, a yoke upon said shaft and within said housing, means between said yoke and weight members for rocking the former upon lateral movement of the latter, a torsion spring yieldably resisting rocking of said yoke, and a tension spring connected to said throttle valve for resisting actuation thereof.

2. In a governor for an internal combustion engine, the combination with a positively driven shaft, of weight members rotated by said shaft, a throttle valve, a shaft connected to said throttle valve, a yoke upon said shaft, means between said yoke and weight members for rocking said shaft upon lateral movement of said weight members, and an adjustable torsion spring yieldably resisting rocking of said shaft.

3. In a governor for an internal combustion engine, the combination with a vertical positively driven shaft, of bell crank weighted members rotatably connected to said shaft, a throttle valve, a rotatable shaft connected to said throttle valve, a yoke non-rotatably secured to said shaft and embracing said first-mentioned shaft, a thrust member sleeved upon said first-mentioned shaft and engaging said yoke, said thrust member being actuated by said bell crank weight members when the weighted arms of the lat-

ter move outwardly, and adjustable means for varying the resistance to rotation of said second-mentioned shaft.

4. In a governor, the combination with a
5 revoluble member, of a member actuated by
said revoluble member, a torsion coil spring
for resisting actuation of said second men-
tioned member, and means for controlling
10 the time of operation of said second men-
tioned member dependent upon the speed of
rotation of said revoluble member.

5. In a governor, the combination with a
revolving weight, of a member actuated
thereby, yieldable means for variably resist-
15 ing actuation of said member, means for ad-
justing said yieldable means, and an aux-
iliary yieldable means operated by said mem-
ber and resisting actuation of said member.

6. In a governor, the combination with a
20 housing having a laterally extending arm,
of a driven shaft journaled in said housing,
weight members upon said shaft and ro-
tated thereby, a rock shaft journaled in said
housing and extending transversely of said
25 driven shaft, means for rocking said rock
shaft from said weight members, a rotatably
adjustable member in substantial alignment
with said rock shaft and mounted in said
laterally extending arm, a coil spring hav-
30 ing its opposite ends secured to said rock
shaft and rotatably adjustable member, and
means for inclosing said coil spring.

7. In a governor for an internal combus-
tion engine, the combination with a housing
35 having a lateral arm, of a driven shaft jour-
naled in said housing, weight members upon

said shaft and rotated thereby, a throttle
valve, a rock shaft journaled in said housing
and extending transversely of said driven
shaft, means for rocking said rock shaft 40
from said weight members, connections be-
tween said rock shaft and throttle valve for
actuating the latter from the former, means
for inclosing said connections, a rotatably
adjustable member mounted in said lateral 45
arm in substantial alignment with said rock
shaft, a coil spring having its opposite ends
connected to said rock shaft and said rota-
tably adjustable member, and means for in-
closing said coil spring. 50

8. In a governor, the combination with a
revolving weight, of a member actuated by
said weight, a rock shaft, means for rocking
said shaft upon movement of said weight, a
spring connected to said rock shaft for yield- 55
ably resisting actuation of said member, and
a rotatably adjustable member in substantial
alignment with said rock shaft and con-
nected to said spring.

9. In a governor for an internal combus- 60
tion engine, the combination with a revol-
ving weight, of a throttle valve actuated by
the movement of said weight, a torsion
spring for resisting actuation of said throt-
tle valve, a movable member connected to 65
said spring, a quadrant, a rock arm con-
nected to said movable member, and spring
pressed means carried by said arm adapted
to engage said quadrant to vary the tension
of said spring. 70

In testimony whereof I affix my signature.
CARL C. HINKLEY.