

No. 773,898.

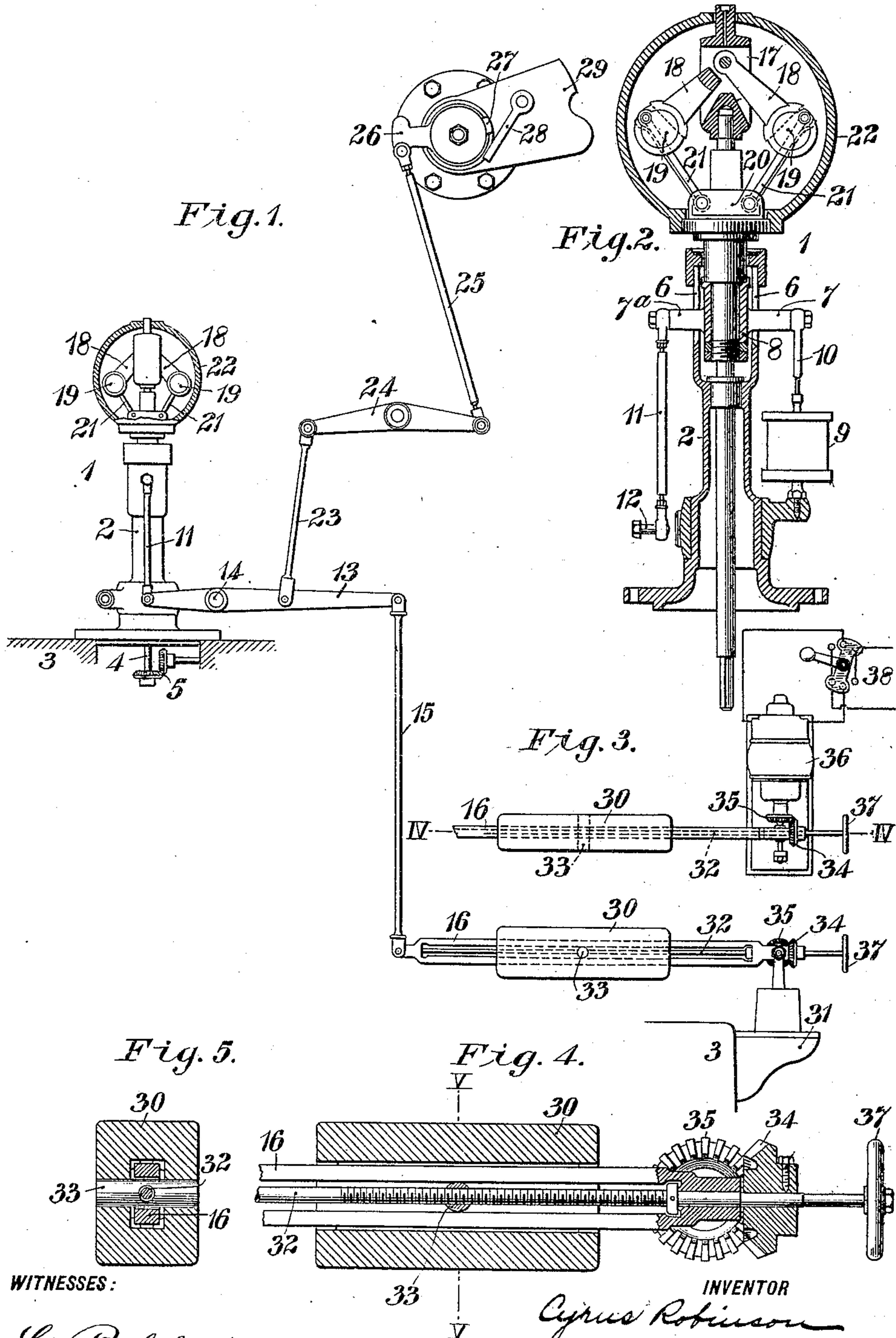
PATENTED NOV. 1, 1904.

C. ROBINSON.

SPEED ADJUSTING DEVICE FOR FLUID PRESSURE ENGINES.

APPLICATION FILED JAN. 18, 1901.

NO MODEL.



WITNESSES:

C. L. Belcher
Birney Hines

INVENTOR

Cyrus Robinson

BY

Volney E. Carr
ATTORNEY.

UNITED STATES PATENT OFFICE.

CYRUS ROBINSON, OF EDGEWOOD PARK, PENNSYLVANIA, ASSIGNOR TO
THE WESTINGHOUSE MACHINE COMPANY, A CORPORATION OF PENN-
SYLVANIA.

SPEED-ADJUSTING DEVICE FOR FLUID-PRESSURE ENGINES.

SPECIFICATION forming part of Letters Patent No. 773,898, dated November 1, 1904.

Application filed January 18, 1901. Serial No. 43,717. (No model.)

To all whom it may concern:

Be it known that I, CYRUS ROBINSON, a sub-
ject of the Queen of Great Britain, residing at
Edgewood Park, in the county of Allegheny
and State of Pennsylvania, have invented a new
and useful Improvement in Speed-Adjusting
Devices for Fluid-Pressure Engines, of which
the following is a specification.

My invention relates to fluid-pressure en-
gines, and particularly to the governing ap-
paratus therefor; and it has for its object to
provide a simple and efficient means whereby
the speed of the engine may be varied or ad-
justed from time to time by the engineer in
charge either directly by hand manipulation
of an adjusting device or from a more or less
distant point by transmitted power.

The means that I have devised for practic-
ing my invention is illustrated in the accom-
panying drawings, in which—

Figure 1 is a view, mainly in side elevation,
but partially in section, of my governing and
adjusting mechanism. Fig. 2 is a vertical sec-
tional view, on an enlarged scale, of the gov-
ernor. Fig. 3 is a plan view of a portion of
the mechanism shown in Fig. 1. Fig. 4 is a
longitudinal sectional view on line IV IV of
Fig. 3, on an enlarged scale; and Fig. 5 is a
transverse sectional view taken on line V V
of Fig. 4.

As shown, the invention is designed for use
in connection with a steam-engine, and for
convenience it will be so described. I desire
it to be understood, however, that it is not
necessarily limited to engines operated by
steam, since it may be designed for and used
in connection with engines operated by any
other fluid under pressure.

I have shown my invention as adapted for use
in connection with engines of the well-known
Corliss type, in which knock-off levers and
cams are employed for controlling the inlet-
valves, the positions of the knock-off cams be-
ing adjusted for the purpose of varying the cut-
off, and thus adjusting the speed of the engine.
It will be understood, however, that this is
merely illustrative and that the invention may

be adapted to steam-engines of other types, if
desired.

The governor 1 is shown as of the well-
known ball or pendulum type, the moving
parts of which are mounted in and upon a tu-
bular frame or casing 2, which is in turn sup-
ported upon and rigidly attached to a suitable
part 3 of the engine-frame. The governor-
shaft 4 is connected to the main shaft (not
shown) of the engine by any suitable gearing,
beveled gear-wheels 5 being indicated in Fig.
1 as a portion of such gearing. The casing 2
is provided with suitable bearings for the shaft
4 and is also provided near its upper end with
vertical slots 6, through which project hori-
zontal arms 7 and 7^a. The inner ends of these
arms are rigidly connected to a sleeve 8,
through which the shaft 4 extends and in which
it rotates. Arm 7 is connected to the piston
of a suitable dash-pot 9 by means of a rod 10,
and mounted upon the outer end of the arm
7^a is one end of a link 11, the other end of this
link being provided with a pin 12, on which
is mounted one end of a rocker-arm 13, which
is in turn pivoted at a point 14 to any suitable
stationary support. The outer end of the arm
13 is connected, by means of a link 15, to one
end of a longitudinally-slotted bar 16, the
construction and operation of which in con-
nection with the parts directly connected to
and coöperating therewith will be hereinafter
more fully described.

The governor-shaft 4 is provided at its up-
per end with a head 17, to which are pivoted
the inner ends of the governor-arms 18, hav-
ing at their outer ends balls 19, which are
connected to a rotative and vertically-movable
block 20 by means of links 21. The governor-
weight 22 is in the form of a hollow sphere, that
surrounds the parts 17, 18, 19, 20, and 21 and
is supported upon the block 20.

The rocker-arm 13 is connected at a suit-
able point between its pivotal support 14 and
its outer end by means of a link 23 to one end
of a rocker-arm 24, the other end of said
rocker-arm being connected by a rod or link
25 to an arm 26, projecting from the part

carrying the knock-off cam 27. The knock-off lever 28, with which the cam 27 coöperates, and the arm 29, on which the knock-off lever 28 is mounted, are the only parts of the valve mechanism shown, since valve-gearing of this general character is well known in the art. It will be understood from the foregoing description, in connection with the illustration, that as the speed of the engine increases it will increase the speed of rotation of the governor-shaft 4, and the centrifugal force will cause the governor-balls to move outward and through the connected parts will raise the governor-weight 22 and the parts connected thereto, and thus act through the link 11, arm 13, link 23, rocker-arm 24, link 25, and arm 26 to adjust the cam 27, so as to vary the cut-off, and thus decrease the speed of the engine. Conversely, if the engine speed decreases, so that the governor-balls move inward, the parts operate in the opposite direction to that just described, and thus effect a variation in the cut-off which will increase the speed of the engine, the operation being such as to automatically keep the engine speed approximately constant. If it be desired, however, to increase or decrease the speed of the engine at will without material variation of the regulation curve, the additional means to be now described may be employed.

The slotted lever 16, to which reference has already been made and the inner end of which is connected to the outer end of the arm 13 by means of a link 15, is provided with a weight 30 and is pivotally mounted at the end opposite that connected to the link 15 in the cone-bearings carried by a suitable base or bracket 31, which is mounted upon a suitable part of the frame 3 of the engine. A rod 32 extends longitudinally through the slot in the bar 16 and is journaled in suitable bearings in the ends of said bar. Between its bearings the rod is screw-threaded and extends through a nut 33, that externally has the form of a pin which projects laterally through the slot of the bar 16 and is supported at its ends in the weight 30. The rod 32 is provided outside the bearings for the bar 16 with a beveled gear-wheel 34, which may be fastened to the rod by means of a set-screw or in any other convenient manner. This beveled gear-wheel 34 meshes with another beveled gear-wheel 35, which is mounted upon the shaft of the armature of an electric motor 36, so that as the armature of the motor is rotated in the one direction or the other it will effect a corresponding rotation of the rod 32. The rod projects beyond the gear-wheel 34 and is provided with a hand-wheel 37 in order that it may be rotated by hand instead of by the electric motor, if desired. The motor may be supplied with electrical energy from any suitable source and may be operated either forward or backward and stopped by means of a suitable switch 38, which may be located

on the switchboard or at any other suitable point that may be found convenient for controlling the engine.

It will be understood from the foregoing description that if it is desired to decrease the speed of the engine the rod 32 may be rotated either by the hand-wheel 37 or by the motor 36, (the switch 38 being manipulated in the proper direction in case the motor is employed for actuating the rod,) so as to move the weight 30 outward from the pivoted end of the bar 16, and thus through the connected links and levers raise the governor-weight and shorten the cut-off. If, on the other hand, it is desired to increase the speed of the engine, the rod will be rotated either by hand or by means of the electric motor, so as to move the weight 30 inward toward the motor, and thus, through the connected mechanism, lower the governor and lengthen the cut-off.

It will be observed that any desired variation of the speed of the engine within considerable limits may be effected by means of either the hand or the power mechanism without disconnecting the other.

The details of the mechanism employed in practicing my invention may obviously be varied from what is shown within comparatively wide limits without materially affecting the mode of operation or the results attained, and I therefore desire it to be understood that such details are merely illustrative of satisfactory mechanism and not restrictive. I desire it to be also understood that the operating and controlling means for the speed-varying devices may involve the use of a force other than electricity, if found feasible and desirable.

I claim as my invention—

1. The combination with an engine-governor and a valve-gear connected thereto, of a weight supported partially by the connections between the valve-gear and the governor and partially by an immovable base and means supported independently of the valve-gear and governor connections for adjusting said weight toward or away from said base at will to vary its pressure upon said connections and thereby vary the engine speed.

2. The combination with an engine-governor, a valve-gear and link-and-lever connections between said governor and said gear, of a weighted bar pivotally supported at one end upon an immovable base and connected to said link-and-lever mechanism at its other end and means supported upon said immovable base for adjusting the weight longitudinally on said bar.

3. The combination with an engine-governor, a valve-gear and mechanism intermediate said parts, of a weighted bar supported at one end by said mechanism and at its other end by an immovable base, and means supported upon said immovable base for adjusting the weight along the bar to effect varia-

tions in its pull upon said mechanism and consequent variations in the speed of the engine.

4. The combination with an engine-governor and a valve-gear, of means for connecting the governor to the valve-gear, a flexible connection between a stationary part and said connecting means, a weight supported partially by said flexible connection and partially by an immovable base and means supported upon said immovable base for moving the weight on its support to vary its pull upon the connecting means and thereby secure different engine speeds.

5. The combination with an engine-governor and a valve-gear, of motion-transmitting mechanism between said parts, a flexible but inelastic connection between said mechanism and a stationary part and a weight on said flexible connection and means supported upon an immovable base for adjusting said weight along its support to secure changes in engine speed.

6. The combination with an engine-governor and a valve-gear, of motion-transmitting

means between said parts, link-and-lever mechanism connecting said motion-transmitting means with a stationary part, a weight supported by said mechanism and means supported upon an immovable base for moving said weight along its support in accordance with the engine speed desired.

7. The combination with an engine-governor and a valve-gear, of motion-transmitting mechanism between said parts, link-and-lever mechanism between the governor and a stationary part, a weight supported by said link-and-lever mechanism, a screw rod or shaft for moving said weight on its support, means supported upon an immovable base and controllable from a distance and a local, hand-operated means for rotating said screw shaft or rod.

In testimony whereof I have hereunto subscribed my name this 15th day of January, 1901.

CYRUS ROBINSON.

Witnesses:

GEO. V. MILLIGAN,

T. L. BROWN.