

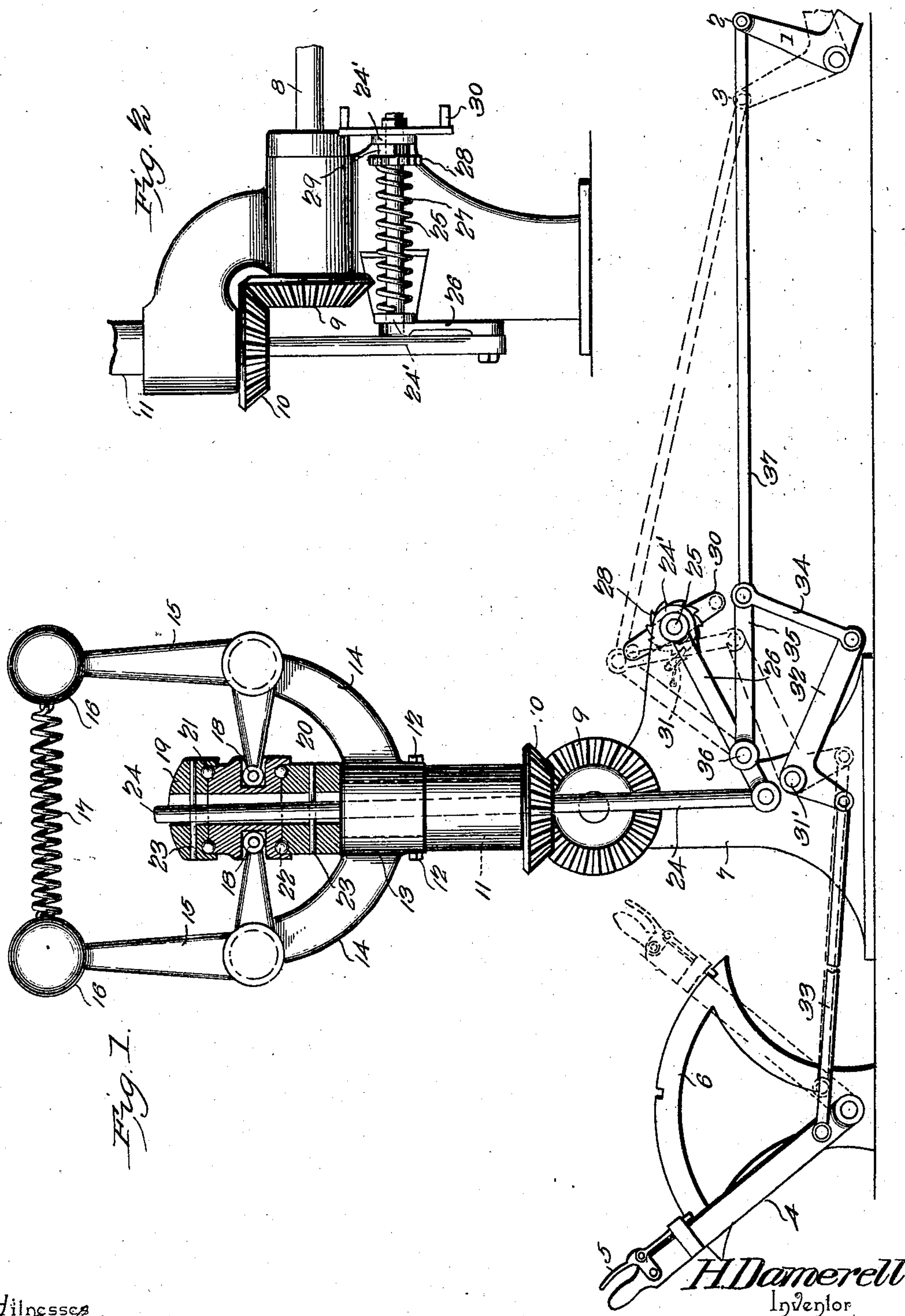
No. 695,445.

Patented Mar. 18, 1902.

H. DAMERELL.
VALVE GEAR.

(Application filed Aug. 27, 1901.)

(No Model.)



UNITED STATES PATENT OFFICE.

HENRY DAMERELL, OF RACINE, WISCONSIN, ASSIGNOR OF ONE-HALF TO
FRANK WAY, OF CHILLICOTHE, MISSOURI.

VALVE-GEAR.

SPECIFICATION forming part of Letters Patent No. 695,445, dated March 18, 1902.

Application filed August 27, 1901. Serial No. 73,455. (No model.)

To all whom it may concern:

Be it known that I, HENRY DAMERELL, a citizen of the United States, residing at Racine, in the county of Racine and State of Wisconsin, have invented a new and useful Improvement in Valve-Gear, of which the following is a specification.

My invention relates to certain improvements in valve-gear for steam-engines, and has for its object to effectively regulate a supply of steam to a reversible engine by varying the point of cut off, the governor being so arranged and connected to the valve-operating mechanism as to tend to move such mechanism from either extreme of position to a central position.

A further object of the invention is to effect the governing of the engine without reducing the volume or pressure of steam in the steam-chest and without wire-drawing, the throttle being at all times wide open.

A still further object of my invention is to regulate the sensitiveness of the governor, so as to prevent hunting.

With these and other objects in view the invention consists in the improved governing device, hereinafter more fully described, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation, partly in section, of a governor constructed and arranged in accordance with my invention; and Fig. 2 is an end elevation of a portion of the same.

In the drawings similar numerals of reference indicate corresponding parts in both of the figures.

1 designates a bell-crank lever connected to any suitable form of reversing mechanism—such, for instance, as the ordinary and well-known link, the movement of which will effect a reversal of the steam-valve. The upper end of this lever has two extremes of movement, as indicated in full lines at 2 and by dotted lines at 3, and the movement from either position toward a central or mid position causing an earlier cut off of the steam and reducing the quantity of steam supplied to the cylinder. The position 2 indicates the full-open position with the engine

running forward and the block at one end or corner of the link; and the dotted-line position 3 represents the opposite extreme of movement with the engine reversed or running backward. To operate this reversing mechanism, I employ the usual reversing-lever 4, having a latch 5, which may be locked in any one of three positions on the usual notched bar, the lever being connected by a series of suitable intervening rods to the bell-crank lever 1.

7 indicates a suitable frame, in which is journaled a horizontal shaft 8, driven by any suitable intervening mechanism, usually a belt and pulley-wheels, from the main shaft of the engine. On this shaft 8 is secured a beveled gear 9, the teeth of which intermesh with the similar teeth of a beveled gear 10, secured to the lower end of a sleeve 11, journaled in the frame and connected by bolts or set-screws 12 to a revoluble frame 13, having radially-projected arms 14. In the upper and outer ends of the arms 14 are pivoted bell-crank levers 15, the vertical arms of which are provided with the usual weights 16, the latter being connected to each other by a controlling device in the form of a helically-coiled tension-spring 17, which normally holds the arms together, but yields and allows them to separate under the influence of centrifugal force when the engine is running at a high speed.

The shorter arms of the governor are provided with antifriction-rollers 18, adapted to suitable recesses in a mortised collar 19, which revolves with the arm, said collar being held and guided by upper and lower collars 19 and 20 and suitable ball-bearings 21 22 being placed between the three collars to reduce the friction to a minimum.

The upper and lower collars 19 and 20 are keyed or secured by suitable pins 23 to a vertical rod 24, the movements of which are transmitted to the bell-crank lever 1 and effect the movement of the latter in a direction tending toward the mid-position from either extreme of movement.

Journaled in suitable bearings 24' in the frame 7 is a horizontal shaft 25, secured at

one end to an arm 26, the outer or lower end of which is pivotally connected to the lower end of the vertical rod 24. Coiled around the shaft is a torsion-spring 27, one end of which
 5 is secured to the shaft and the opposite end to a ratchet-wheel 28, journaled loosely on the shaft and adapted to be operated by a wrench which may be placed on an angular extension 29 of the ratchet, any backward
 10 movement of the ratchet-wheel being prevented by a locking-pawl 31, pivoted to the frame and engaging with the teeth of the ratchet-wheel, as shown by dotted lines in Fig. 1. The turning of the ratchet-wheel
 15 will cause a winding up or tightening of the spring, increasing its torsional strain and tending to depress the arm 26 and the vertical rod 24 and to some extent resist the operation of the governor. This adjustment is
 20 delicate, but is effective in preventing hunting and will enable the governor to more readily reestablish its equilibrium after any sudden movement of the valve.

Pivoted to the frame of the machine on a
 25 stud 31' is a bell-crank lever 32, the shorter arm of which is connected by a link 33 of any suitable length to the reversing-lever 4 and the longer arm of the lever being connected by a link 34 to a second link 35, the opposite
 30 end of which is pivoted on a stud 36, near the juncture of the arm 26 and the vertical rod 24. From the pivot-point of the links 34 and 35 there extends a rod 37, connected to the upper end of the bell-crank lever 1.

35 The operation of the device is as follows: Assuming the parts to be in the position illustrated in full lines in the drawings, any upward movement of the vertical rod 24 under the influence of the governor will cause a corresponding upward movement of the arm 26
 40 and link 35, the latter being drawn slightly in the direction of the vertical rod 24 and tending to move the bell-crank lever 1, through the rod 37, in the direction indicated by the
 45 arrow—that is to say, from the full-open position 2 to the central or closed position at a point midway between the two limits of movement. This movement will be transmitted to the link and through the latter to the valve,
 50 causing the valve to cut off at an earlier point in the stroke, reducing the volume of steam supplied to the cylinder and in a measure reducing the speed of the engine. When the lever 4 is moved to the dotted-line position,
 55 it will effect a corresponding movement of all the various parts, including the bell-crank lever 1, to the position shown by dotted lines, the link being then in the opposite position, the valve full open, and the engine reversed or running backward. Any upward
 60 movement of the vertical rod 24 under the influence of the governor will then tend to raise arm 26 and, through the link 35, force the rod 37 away from the vertical rod and
 65 cause the bell-crank lever 1 to travel from the

position 3 toward the position 2, the effect on the link and valve being the same, but in the reverse direction, as previously described.

On the shaft 25 is secured a lever 30, which may be used as a hand-lever to operate the
 70 governor in adjusting or to be tied down to prevent the action of the governor when high speed is desired.

The device may be modified in a variety of ways as may be necessary in adapting it for
 75 use in connection with any suitable reversing-gears, and it will be understood that I do not wish to limit myself to the application of the device to the link reversing-gear or to any other particular type, the arrangement being
 80 adapted for use in connection with any reversing-gear having two full-open positions.

Having thus described my invention, what I claim is—

1. In a device of the class specified, a gov-
 85 ernor, a longitudinally-movable rod operatively connected thereto, an arm pivotally connected at one end to the rod and at the opposite end to a fixed fulcrum, a reversing
 90 mechanism, a rod and link pivoted together and connected respectively to the reversing mechanism and the said pivoted arm, a re-
 95 versing-lever, and mechanism operatively connecting the same to the rod and link to effect the movement of their pivotal connec-
 tions to points on one or other side of the fixed fulcrum of said pivoted arm.

2. The combination with a reversing-gear of an operating-lever, the governing device
 100 having as one of its elements a movable rod 24, a pivoted arm 26 connected to said rod, and a series of jointed levers connected to the reversing-lever, the reversing mechanism, and the arm 26, substantially as specified.

3. The combination with a reversing mech-
 105 anism, of a governor, a fulcrumed arm adapted to be operated by said governor, connections between said arm and said reversing mechanism and means for adjusting said con-
 110 nections to opposite sides of the fulcrum of said arm, whereby the movement in one direction of said arm may be transmitted in the reverse direction to said reversing mechanism, substantially as specified.

4. The combination with a reversing mech-
 115 anism, of an operating-lever, a governor, a fulcrumed arm 26 operatively connected to said governor, a bell-crank lever 32 fulcrumed to a fixed point and having one of its arms
 120 connected to the operating-lever, and a series of links connecting the opposite end of said bell-crank lever to the arm 26 and to the reversing mechanism, substantially as specified.

5. The combination with a reversing mech-
 125 anism, of a reversing-lever, a governing device, a vertically-operated rod 24 connected to the governor, a lever 26 fulcrumed to a fixed point and connected at one end to the
 130 rod 24, a bell-crank lever 32, a link 33 con-

necting one arm to the bell-crank lever to the
reversing-lever, links 34 and 35 connecting
the opposite end of the bell-crank lever to the
arm 26, and a rod 37 extending from the junc-
5 ture of the links 34 and 35 to the reversing
mechanism, substantially as specified.

In testimony that I claim the foregoing as

my own I have hereto affixed my signature in
the presence of two witnesses.

HENRY DAMERELL.

Witnesses:

MARTIN J. HENDERSON,

JAMES GRAHAM KIDDLE, Jr.