

No. 675,581.

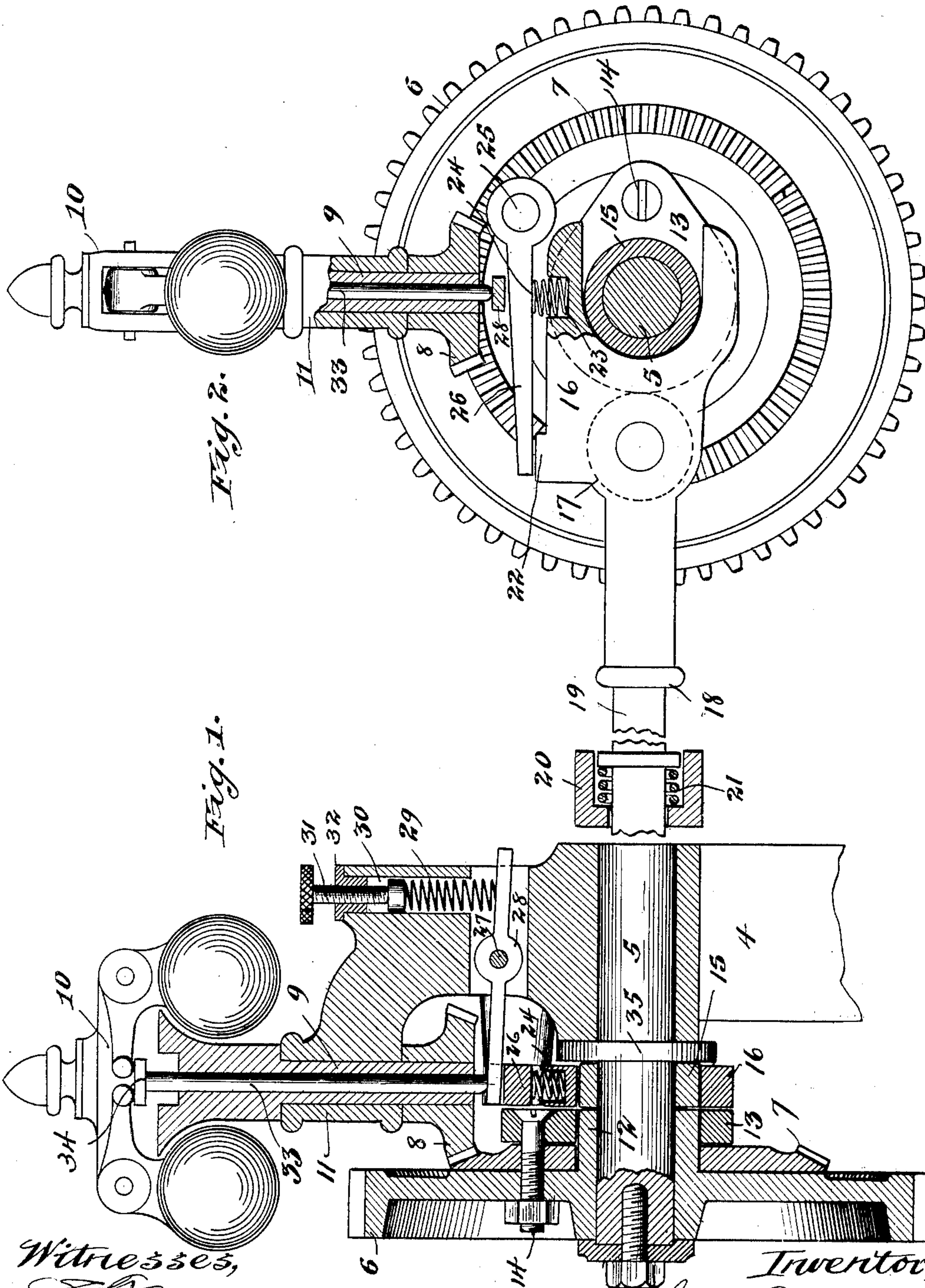
Patented June 4, 1901.

G. ALDERSON.
VALVE GEAR FOR GAS ENGINES.

(Application filed Jan. 25, 1901.)

(No Model.)

2 Sheets—Sheet 1.



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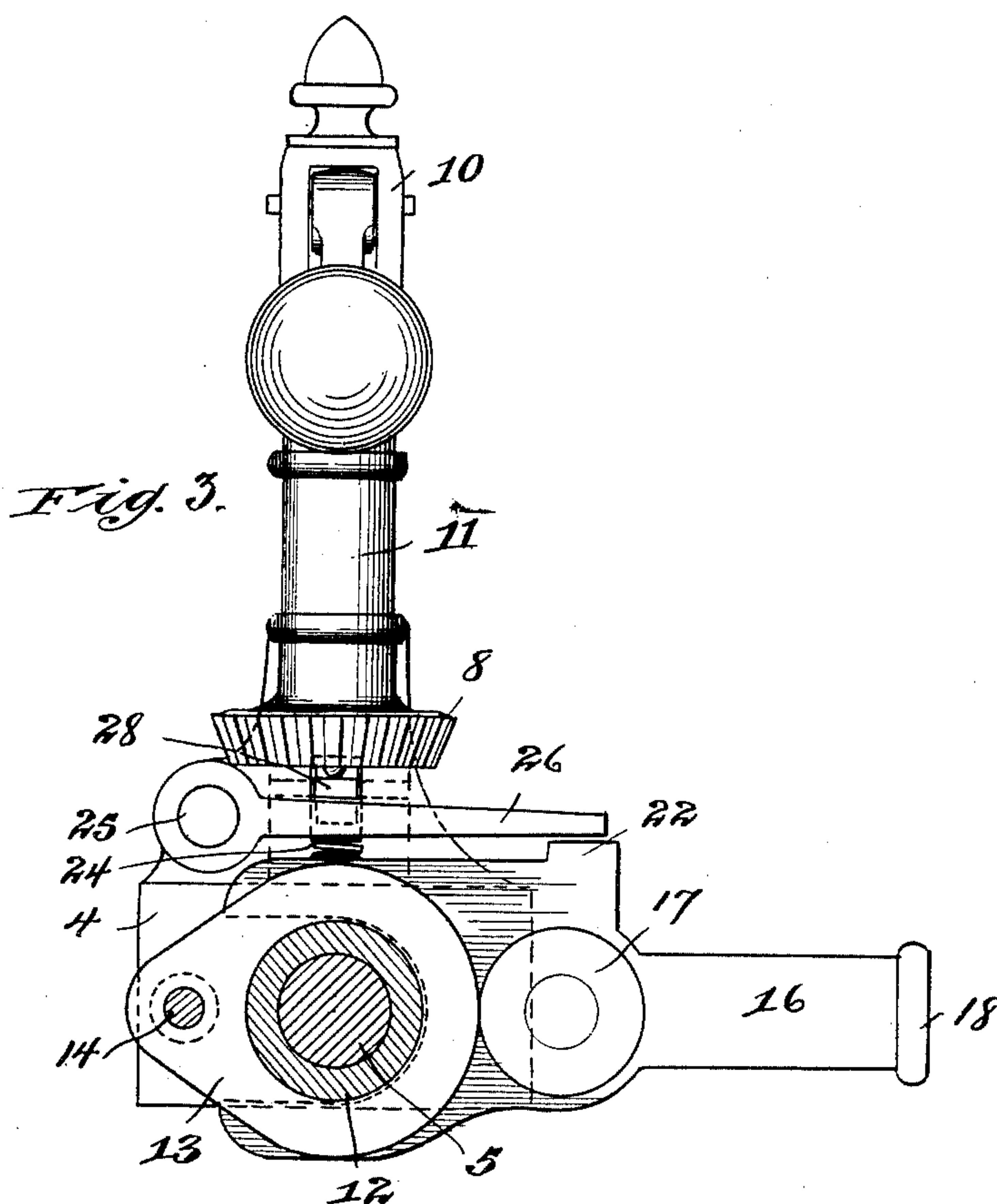
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UNITED STATES PATENT OFFICE.

GEORGE ALDERSON, OF LASALLE, ILLINOIS, ASSIGNOR TO CHARLES
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VALVE-GEAR FOR GAS-ENGINES.

SPECIFICATION forming part of Letters Patent No. 675,581, dated June 4, 1901.

Application filed January 25, 1901. Serial No. 44,748. (No model.)

To all whom it may concern:

Be it known that I, GEORGE ALDERSON, of Lasalle, Illinois, have invented certain new and useful Improvements in Valve-Gear for Gas-Engines, of which the following is a specification.

My invention relates to improvements in valve-gear for gas-engines of a type well adapted for controlling the exhaust-valve of a gas or vapor engine in properly-timed relation to the other operating parts, although not confined to this particular application.

More specifically, my invention relates to a valve-gear of the "hit-and-miss" type which controls the valve to interrupt the recharging of the engine while the latter is running at an abnormal speed; and the invention also contemplates a fine regulation and control of the speed of an explosive or internal-combustion engine through a delicately-adjustable spring-controlled mechanism which determines the exact centrifugal effect of the governor-balls at which the valve mechanism will operate to hold open the exhaust-valve of the engine, thus causing the omission of a power-stroke and the consequent slowing down of the engine.

To these ends my invention consists in the matters hereinafter set forth, and more particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a central vertical section through the device embodying my invention. Fig. 2 is a side elevation, partly in central vertical section, of the device as viewed from the right in Fig. 1, the cam being shown in another position; and Fig. 3 is a similar view as viewed from the left of Fig. 1.

In the drawings, 4 designates a block removably fastened to the side of the pillow-block of the engine above the driving-shaft in the latter. Fixed horizontally in said block 4 is a stub-shaft 5, which carries loose on its outer end the larger member 6 of the usual two-to-one gear commonly employed to actuate the exhaust-valve of four-cycle engines, said gear meshing with a smaller gear (not shown) fast on the driving-shaft. On the inner face of gear 6 is formed or secured a bevel-gear 7, which meshes with a smaller

bevel-gear 8, fast on the lower end of the stem 9 of a centrifugal ball-governor 10, which stem 9 is vertically journaled in an overhanging bracket 11, formed integral with or secured on the block 4.

On an inwardly-extending hub 12 of the gear 6 is mounted a cam 13, which cam may be secured in fixed relation to the gear 6, so as to rotate therewith on the shaft 5, by means of a threaded bolt 14, passing through said cam and the bevel-gear 7 and the web of the gear 6 and securing said parts rigidly together, as plainly shown in Fig. 1.

Straddling a loose collar 15 on the shaft 5 is the inner forked end of a tappet 16, on the inner face of which is mounted a roller or other antifriction projection 17. The outer end of the tappet is socketed, as at 18, to receive the inner end or shank of a valve-actuating rod 19, the latter being supported intermediate its length by a bracket 20 and being provided with a spring 21 for normally keeping the roller 17 on the tappet pressed into engagement with the cam 13. The tappet 16 is provided on its upper edge with a latch-engaging member in the form of a projection 22, and in the upper fork of the same is formed a socket 23, in which is seated a spring 24. At a convenient point on the block 4 is pivoted, as at 25, a latch 26, which latter is arranged to lie parallel with and directly over the upper edge of the tappet 16 and is normally pressed upward by the engagement of the spring 24 with its lower side, as shown in Fig. 2. In the block 4 is also pivoted, at 27, a lever 28, the said lever being desirably disposed transversely to the latch 26 and having one arm thereof extending across and just above said latch, as clearly shown in Figs. 1 and 2. The opposite arm of said lever 28 is adapted to receive a finely-regulable downward pressure by means of a spring 29, housed in a vertical recess 30, formed through the upper part of the block 4, the upper end of said spring contacting the lower headed end of a thumb-screw 31, screwing vertically through a cap 32, which closes the upper end of recess 30. The inwardly-extending arm of lever 28 abuts the lower end of a vertical rod 33, which latter is mounted in and coaxially with the stem 9 of the governor 10, so as

to be capable of an endwise-sliding movement therein. The upper end of rod 33 has a head 34, adapted to be engaged by the inner ends of the ball-levers of the governor, as plainly shown in Fig. 1.

35 represents a washer fixed on the shaft 5, interposed between the collar 15 and the end of the shaft-bearing.

The operation of the device is as follows:

In the normal operation of the engine the tappet 16 and its connected valve-actuating rod 19 are reciprocated by the cam 13 and the spring 21 at the proper time and during the proper interval to force and hold open the exhaust-valve of the engine. During such operation the point of latch 26 is held up and out of engagement with the projection 22 on the tappet by the engagement of the spring 24 with the under face of said latch. When-
ever, however, the speed of the engine exceeds the normal, the spreading of the governor-balls through the rod 33 and the lever 28 depresses the latch 26 against the action of spring 24, its point dropping into engagement with the projection 22, whereby the reciprocating tappet 16 is held locked in its outermost position against the thrust of the returning spring 21, and the exhaust-valve of the engine is thereby maintained open. This interrupts the drawing in of the explosive charge and causes the engine to run by its own momentum, during which period it pumps air idly back and forth through the open exhaust-valve, whereby the speed is checked and decreased until the falling of the governor-balls again permits the latch 26 to be raised out of engagement with the projection 22, whereupon the valve-actuating rod 19 is again reciprocated regularly and the engine resumes its normal operation. By the provision of the spring-tensioned lever 28 interposed between the governor-controlled rod 33 and the latch 26 a finely-adjustable resistance is interposed to the positive action of the governor, which has to be overcome by the governor before the latter becomes effective to depress the latch 26. The degree of this resistance is determined by the compression to which spring 29 is subjected by the thumb-screw 31 in an obvious manner. By this means the exact maximum speed at which the engine will be permitted to run at any given operation or under any given load or under any given fuel conditions may be accurately regulated and determined by the simple operation of turning a thumb-screw.

My invention is not limited to the precise details of construction and arrangement hereinabove described, and shown in the drawings.

For instance, it is plain that other and mechanically-equivalent means for securing the cooperative action between the latch and the tappet might be employed. Other and mechanically-equivalent means for applying the finely-tensioned resistance to the positive action of the governor would also suggest themselves to one skilled in this art in the light of

what I have herein shown and described. I wish it to be understood that such modifications and equivalents would be fully within the spirit and intended scope of my invention.

I claim as my invention—

1. In a valve-gear for gas-engines, the combination with the exhaust-valve and a valve-actuating rod of a tappet in which the shank of said rod is held, a cam for imparting an outward movement to said tappet and rod to open the exhaust-valve at properly-timed intervals, a spring for imparting the return movement to said tappet and rod, a latch pivoted adjacent said tappet, a latch-engaging member on said tappet, a spring on said tappet normally holding said latch out of engagement with said latch-engaging member, and a governor operating to force said latch into locking engagement with said latch-engaging member, and thereby hold open the exhaust-valve when the speed of the engine becomes excessive, substantially as described.

2. In a valve-gear for gas-engines, the combination with the exhaust-valve and mechanism for opening the same at the proper intervals and a governor, of a locking device adapted to be forced by the governor into locking relation to said exhaust-valve mechanism so as to hold said valve open when the speed becomes excessive, a lever having one arm interposed between said governor and said locking device, a spring acting on the other arm of said lever in a direction to oppose the centrifugal effect of the governor, and means for regulating the tension of said spring, substantially as described.

3. In a valve-gear for gas-engines, the combination with the engine-frame and the exhaust-valve, of a stub-shaft fixed therein, a forked tappet, the inner forked end of which straddles said stub-shaft and the outer end of which is adapted to receive a valve-actuating rod, said tappet being further provided with a projection on its upper edge, a cam on said stub-shaft for actuating the tappet, means for actuating said cam from the driving-shaft of the engine, a latch pivoted to the engine-frame, the free end of which is adapted to engage said projection, a spring seated in a recess in the upper edge of the tappet and normally tending to press said latch out of engagement with said projection, and a centrifugal governor journaled in the engine-frame, the endwise-movable rod of which operates to force said latch into locking engagement with said projection when the speed becomes excessive, substantially as described.

4. In a valve-gear for gas-engines, the combination with the engine-frame and the exhaust-valve, of a stub-shaft fixed therein, a forked tappet, the inner forked end of which straddles said stub-shaft and the outer end of which is adapted to receive a valve-actuating rod, said tappet being further provided with a projection on its upper edge, a cam on said stub-shaft for actuating the tappet, means

for actuating said cam from the driving-shaft
of the engine, a latch pivoted to the engine-
frame, the free end of which is adapted to en-
gage said projection, a spring seated in a re-
cess in the upper edge of the tappet and nor-
mally tending to press said latch out of en-
gagement with said projection, a centrifugal
governor journaled in the engine-frame, the
endwise-movable rod of which operates to
force said latch into locking engagement with
said projection when the speed becomes ex-

cessive, a lever pivoted in the frame and hav-
ing one arm interposed between the governor-
stem and the latch, a spring acting on the
other arm of said lever in a direction to op-
pose the centrifugal effect of the governor and
means for regulating the tension of said
spring, substantially as described. 15

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