

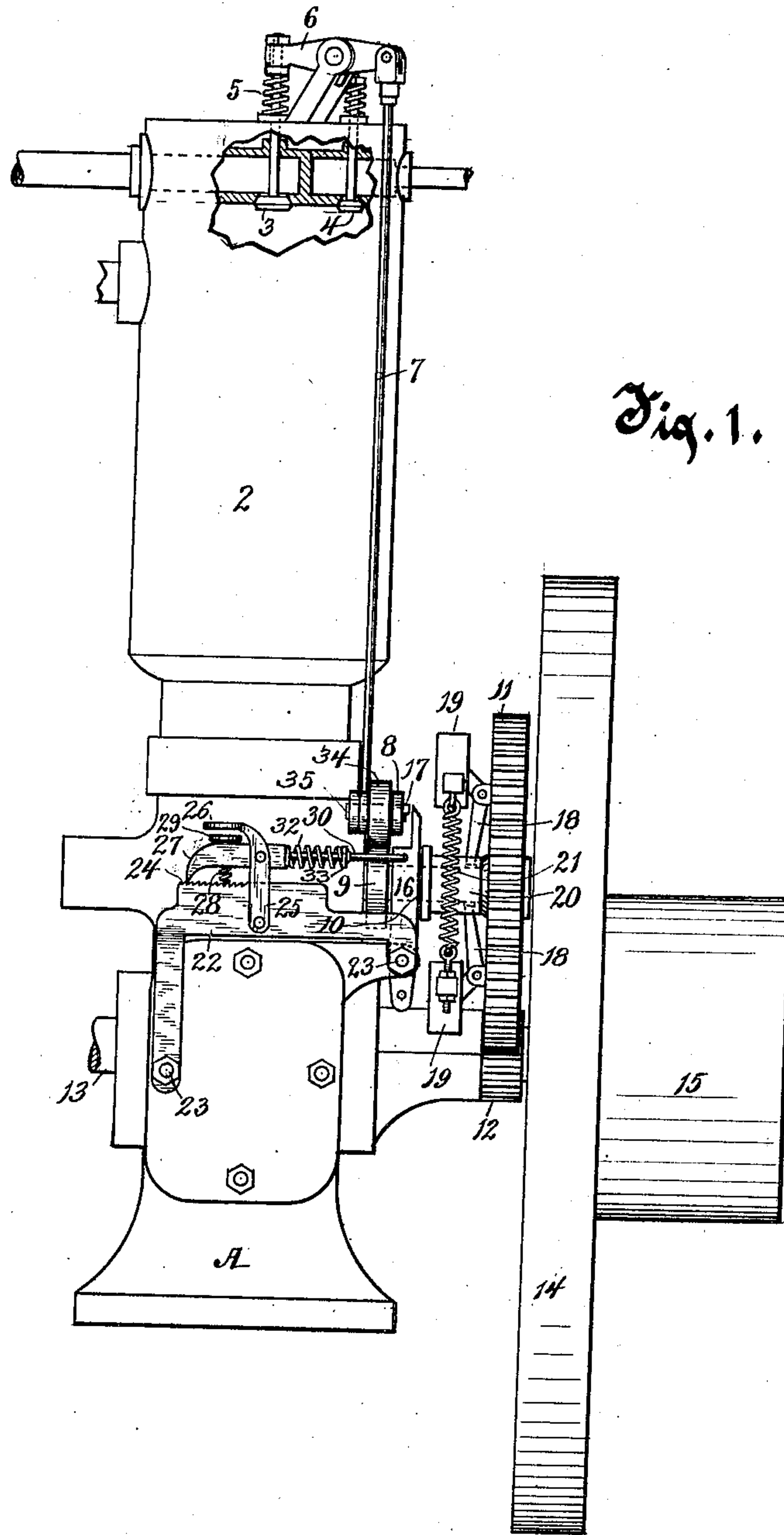
No. 844,359.

PATENTED FEB. 19, 1907.

T. HOLLNAGEL.
SPEED REGULATOR FOR GAS ENGINES.

APPLICATION FILED NOV. 27, 1905.

2 SHEETS—SHEET 1.



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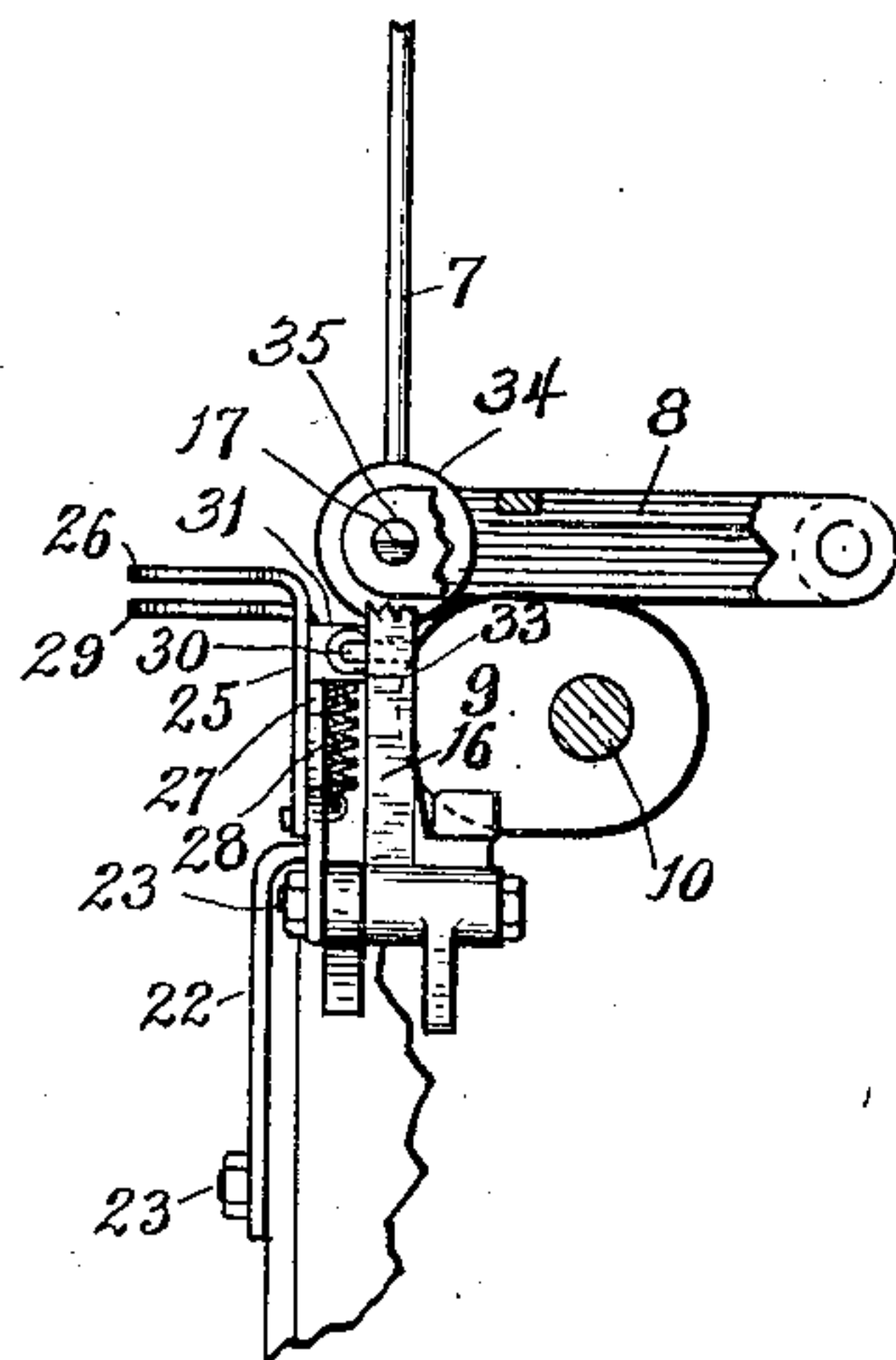


Fig. 2.

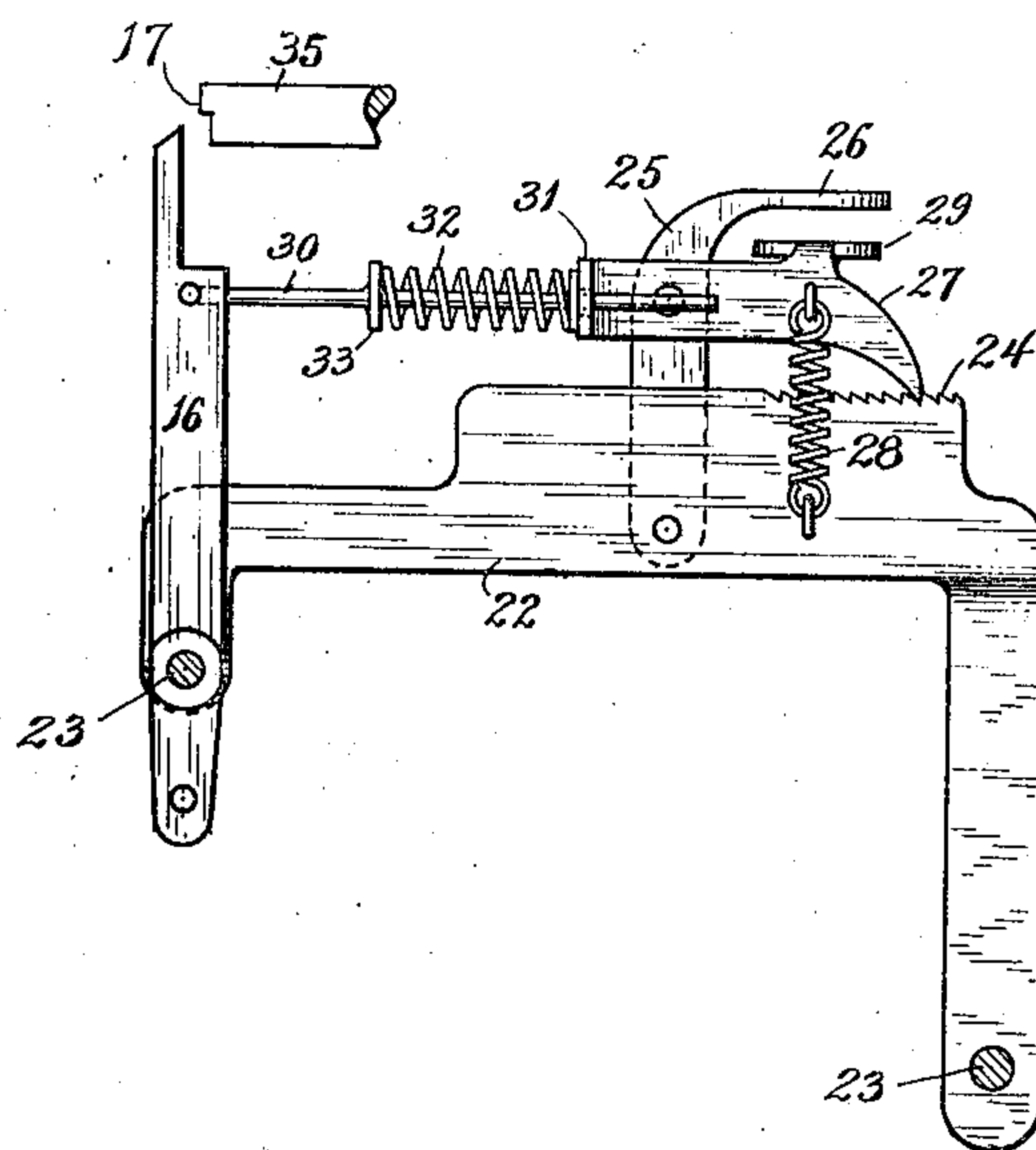


Fig. 3.

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UNITED STATES PATENT OFFICE.

THEODORE HOLLNAGEL, OF THIENSVILLE, WISCONSIN.

SPEED-REGULATOR FOR GAS-ENGINES.

No. 844,359.

Specification of Letters Patent.

Patented Feb. 19, 1907.

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To all whom it may concern:

Be it known that I, THEODORE HOLLNAGEL, residing in Thiensville, in the county of Ozaukee and State of Wisconsin, have invented new and useful Improvements in Speed-Regulators for Gas-Engines, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

In gas-engines it is common to provide a revolving governor and means therewith for regulating the speed of the engine by devices adapted under excessive speed of the engine to hold open the exhaust-valve of the explosion-cylinder for an unusual time, and thereby to prevent the drawing in to the cylinder or charging it with gas during such unusual time, and thus by the failure to supply the cylinder with the explosive agent to allow or cause it to slow down or reduce the speed of the engine. Within certain limits these devices act automatically; but if it is desired that the engine shall run at a greater speed than it is running at the regulating devices must be readjusted therefor. To do this, the engine, having only such regulating devices as are generally in use, must be stopped, and the devices may then be adjusted, usually by setting up the nuts on bolts that control the tension of some parts of the speed-regulator, usually the bolts that anchor the springs that yieldingly control the lever-actuating movements of centrifugally-actuated weights.

My invention relates to an improved device of a kind by which the adjustment of the regulating devices can be accomplished readily and quickly while the engine is running, thereby obviating the necessity for stopping the engine and taking time to make the adjustment of parts by hand.

My improved device may be employed with various forms of gas-engines; but as I have had occasion to apply it to upright engines I have chosen to illustrate and describe its use in connection with an upright engine, though not intending thereby to limit its use to engines of this form.

The invention consists of the device, its parts and combinations, as herein described and claimed, or the equivalents thereof.

In the drawings, Figure 1 is an elevation of an upright gas-engine with my improved device therewith, parts of the engine being broken away to exhibit interior construction. Fig. 2 is a detail of my improved device and

of immediately-related parts of devices commonly used on such engines for controlling the exhaust-valve, and Fig. 3 is a side view of my improved device.

That the application and operation of my improved device may be clearly understood it will be necessary briefly to describe the features and operation of a gas-engine as heretofore in use to which my improvement may be readily and successfully applied.

In the drawings, A is the pedestal, and 2 is the upright cylinder, of a gas-engine. 3 is the exhaust-valve arranged to close the exhaust-duct leading from the cylinder, and 4 is the spring-held check-valve for the gas-supply duct leading into the cylinder. The exhaust-valve 3 is closed yieldingly by the spring 5, coiled about its stem and lifting thereon. The stem of the valve is connected to the medially-pivoted lever 6, the other arm of which lever is connected by a rod 7 to the free end of a pivoted and swinging arm 8. This arm 8 is adapted to be lifted intermittently against the action of the spring 5 by a cam 9, engaging loose wheel 34 on pin 35 in furcate arm 8 and fixed on a shaft 10, on which shaft there is a toothed wheel 11, that meshes with a pinion 12 on the shaft 13, on which shaft also there is a fly-wheel 14 and a pulley 15.

It will be understood that the mechanism thus far described is adapted when the engine is in operation to open and close the exhaust-valve 3 regularly intermittently. As the engine is liable to acquire too great a speed when left without any control, there has been provided a means for catching the arm 8 at the upper limit of its travel and holding it there, thus holding the valve 3 open during one or more revolutions of the cam 9, thus preventing the drawing of the explosive agent into the cylinder, and thereby delaying the succeeding explosion. Such means has been made to and may properly consist of a tiltable arm 16, pivoted on the pedestal or some stationary part of the engine and adapted to be swung under a catch 17 on the arm 8 when at its limit of upward travel to thereby hold the exhaust-valve 3 open for a brief unusual period, as hereinbefore described. The catch 17 may conveniently be formed in or consist of the end of the pin 35, projecting from the arm 8. This tilting arm 16 is held normally yieldingly out of contact with and out of the path of the catch 17 by a suitable spring, (not shown in the

drawings;) but for the purpose of automatically putting this tilting arm into the path of the catch 17 there are mounted eccentrically on the wheel 11 a plurality of pivoted lever-arms 18, the outer ends of which arms are provided with weights 19 and the inner ends of which arms enter sockets therefor in a sleeve 20, splined and movable endwise on the shaft 10. The weights 19 are connected to each other yieldingly by springs 21, the action of these springs being to hold the weights yieldingly toward the axis of the shaft 10 and also to hold the sleeve 20 yieldingly toward the wheel 11. The arrangement of parts is such that when the sleeve 20 is moved in the other direction—that is, away from the wheel 11—by the centrifugal action of the weights 19 the inner end of the sleeve will contact with the tilting arm 16 and against the action of its holding-spring will push it into the path of the catch 17, where it will remain until the lessening of the centrifugal action on the weights shall permit their coming toward the center under the action of the spring 21, and thereby withdrawing the sleeve 20, permitting the arm 16 to be tilted by its spring out of the path of the catch 17. By this means the so-called "hit-and-miss" movement or governor action may be controlled.

While the mechanism heretofore described is adapted to control the speed of the engine within the limits for which the devices are adjusted to operate, it is often desirable to readjust this regulating device or governor, so as to permit the engine to run at a higher rate of speed, within which such higher rate of speed the thus-described governor will control its movements; but heretofore to thus adjust these regulating devices or the governor it has been necessary to stop the engine to do the work of readjusting the device.

My improved device is adapted to accomplish the readjustment of the regulating device readily and quickly and without stopping the engine.

My improved device as applied to the engine illustrated consists of means adapted to hold the tilting arm 16 out of the path of the catch 17 against a stronger or much stronger action of the centrifugal weights 19, thus preventing the holding open of the exhaust-valve 3 and continuing the supply of explosive agent to the cylinder while the engine is running at such a high rate of speed as otherwise would not be permitted by the governor.

My improved device, attachable to the engine and connected to the tilting arm 16 for the purpose stated, consists of an auxiliary frame 22 of suitable form and size to be fixed on the pedestal or engine, conveniently by bolts 23, which frame includes an elongated edge provided with serrations or teeth 24.

A standard 25 is pivoted to the frame 22 and at its free end is advisably provided with a thumb-piece 26. A dog 27 is pivoted on the standard 25 adjacent to the toothed edge of the frame 24, which dog is provided with a pointed extremity or tooth adapted to engage the teeth 24. A spring 28, attached to the dog and to the frame, is adapted to hold the dog yieldingly in engagement with the teeth. The dog is provided with a finger-piece 29, complementary to the thumb-piece 26. A rod 30, pivoted at its outer end in the tilting arm 16, passes movably through a flange 31, formed on the inner end of the dog 27. An expansion-spring 32, coiled about the rod 30 and bearing at its inner end against a collar 33 on the rod 30 and at its outer end against the flange 31 or end of the dog 27, is adapted to push the arm 16 yieldingly away from the dog or hold it yieldingly up to its work.

It should be understood that this device is so adjusted that when the dog 27 takes into the outer tooth of the teeth or rack 24 it permits of the normal operation of the engine-governor, and it will be seen that then by setting up the dog on the toothed rack 24 the lever-arm 16 will be pushed away from the path of the catch 17 on the arm 8 with greater force and to a greater extent than when the dog was not so set up, the result of which is that the engine must acquire greater speed under such adjustment before the exhaust-valve 3 will be held open by the tilting arm 16, thus establishing a readjustment of the governor, adapting it to permit of a higher rate of speed of the engine, all of which is accomplished readily and quickly and without any occasion for stopping the engine therefor.

What I claim as my invention is—

1. In combination with a hit-and-miss mechanism on a gas-engine, a governor-adjusting device, consisting of a non-movable rack, a tiltable standard, a dog mounted and movable on the standard, means holding the dog to releasable engagement with the rack, a rod mounted movably endwise in the dog and adapted to be connected to the hit-and-miss mechanism, and a spring adapted to extend the rod in a direction away from the dog.

2. An adjusting device for a governor of a gas-engine, comprising a non-movable rack, a thereto-pivoted standard, a dog pivoted on the standard and adapted to engage the rack, a rod mounted and extensible on the dog, and a spring adapted to extend the rod on the dog.

3. A device for adjusting the hit-and-miss movement of a governor on a gas-engine, comprising a stationary rack, a dog mounted and movable endwise on and along the rack and adapted to engage the rack, a rod mounted and extensible on the dog, and a spring

adapted to resist the retreat of the rod on the dog.

4. An adjusting device for the governor of a gas-engine, consisting of a stationary rack; 5 a standard pivoted on the rack and provided with a thumb-piece, a dog pivoted on the standard and having a tooth adapted to engage the rack and a finger-piece complementary to the thumb-piece on the standard, a 10 spring holding the dog yieldingly in engage-

ment with the rack, a rod slidable endwise in the dog and adapted to be attached to the governor mechanism, and a spring adapted to hold the rod yieldingly up to its work.

In testimony whereof I affix my signature 15 in presence of two witnesses.

THEODORE HOLLNAGEL.

Witnesses:

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