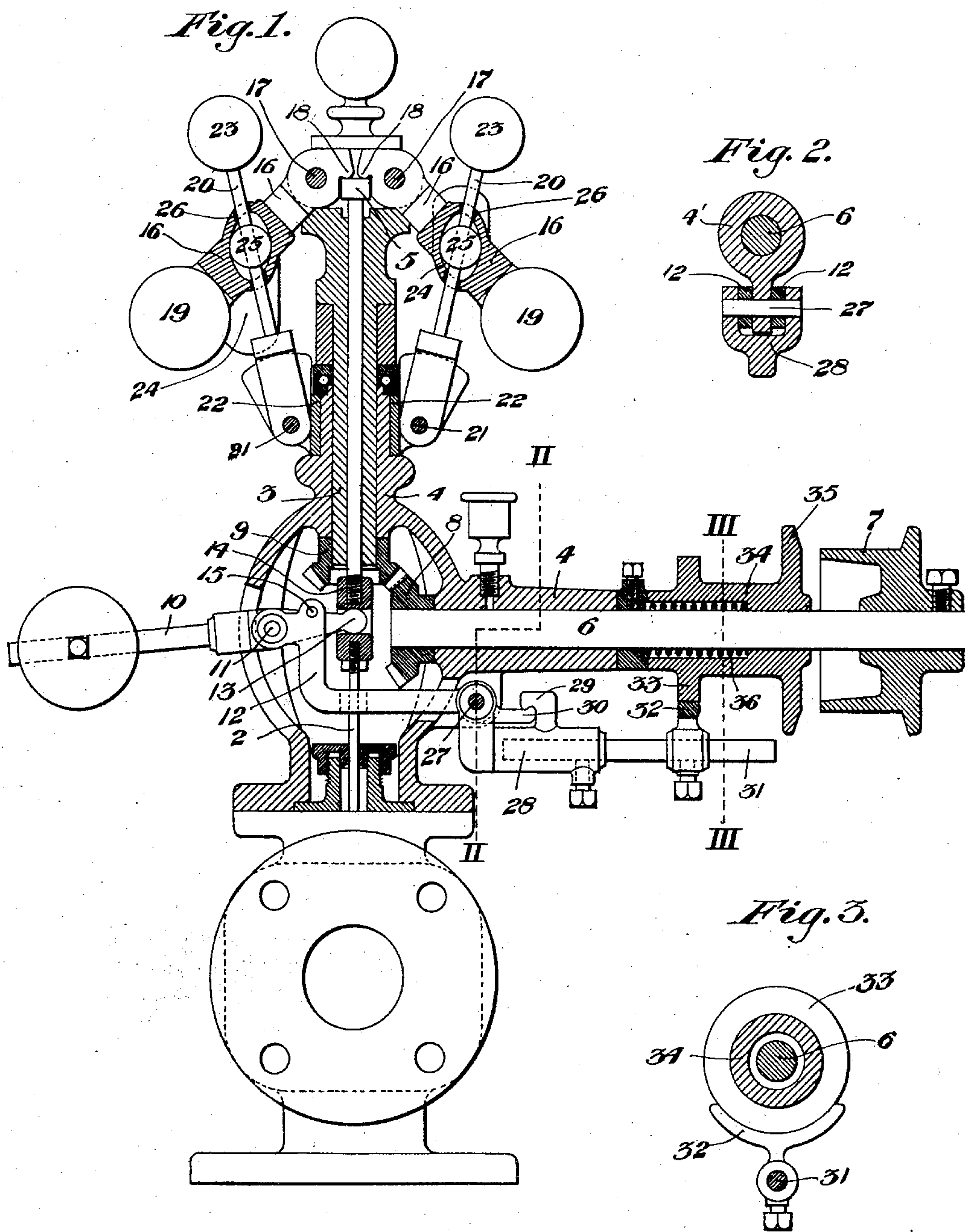


W. GLASER.
ENGINE GOVERNOR.
APPLICATION FILED JULY 16, 1904.

2 SHEETS—SHEET 1.



Witnesses:

Geo. W. MacKenzie Jr.
Chas. S. Lively

Inventor:

William Glaser
by C. M. Clarke
his attorney

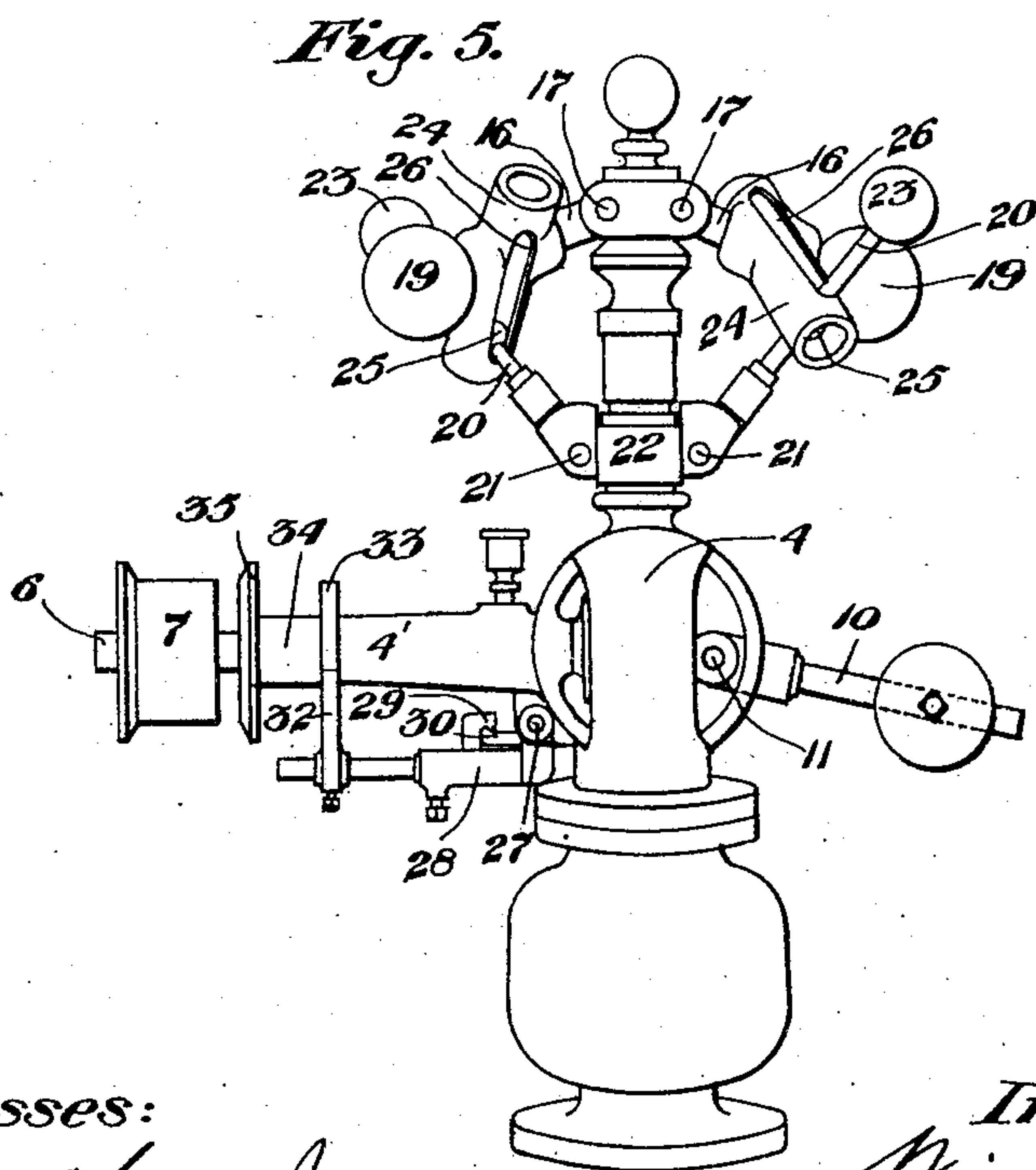
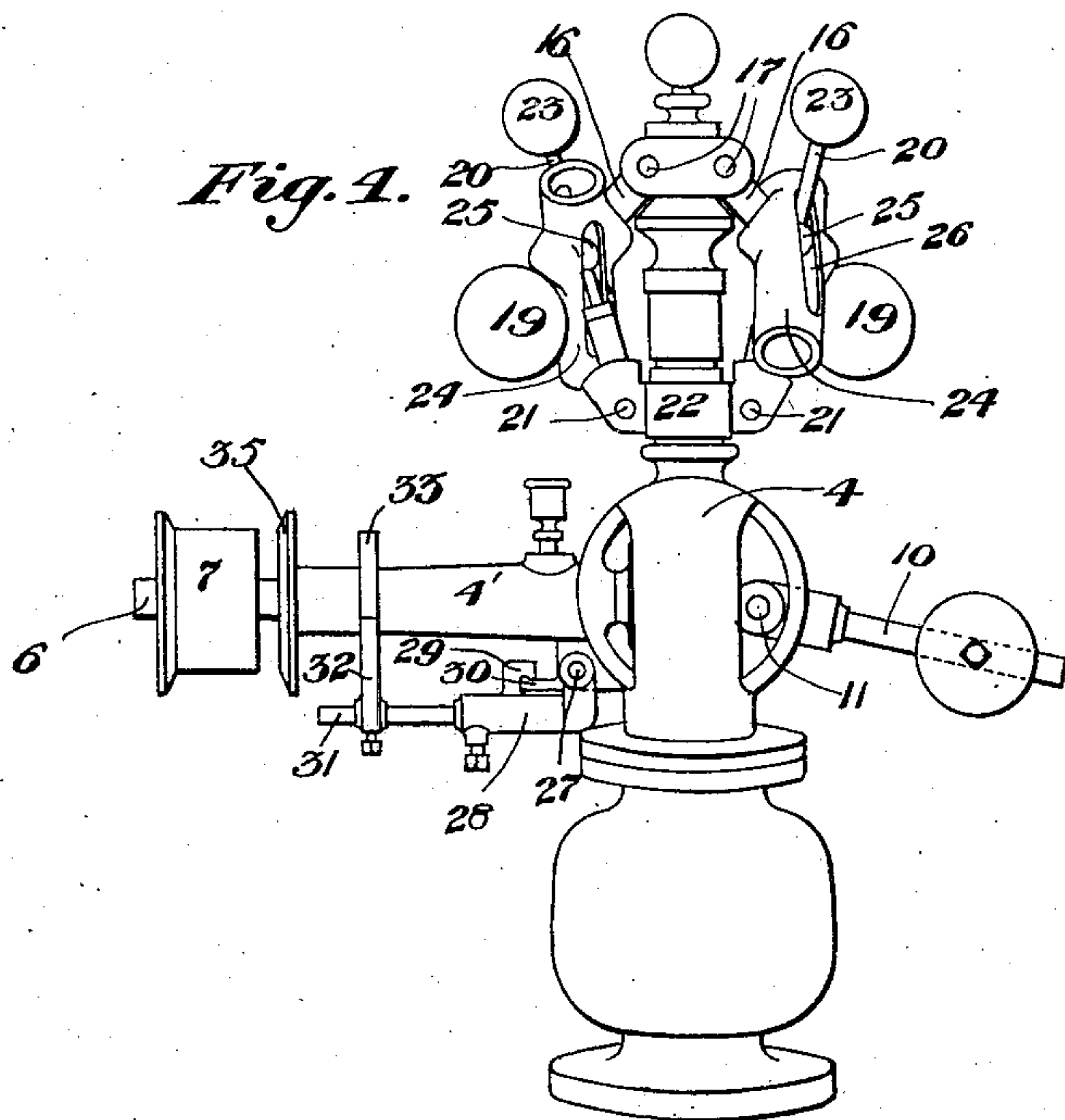
No. 786,435.

PATENTED APR. 4, 1905.

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2 SHEETS--SHEET 2.



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UNITED STATES PATENT OFFICE.

WILLIAM GLASER, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF SEVEN-EIGHTHS TO PAUL WUESTHOFF, OF PITTSBURG, PENNSYLVANIA.

ENGINE-GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 786,435, dated April 4, 1905.

Application filed July 16, 1904. Serial No. 216,819.

To all whom it may concern:

Be it known that I, WILLIAM GLASER, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Engine-Governors, of which the following is a specification, reference being had therein to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a central vertical sectional view of my improved engine-governor. Fig. 2 is a cross-section on the line II II of Fig. 1. Fig. 3 is a similar view on the line III III of Fig. 1. Fig. 4 is a view in side elevation of the device, showing the weights closed in. Fig. 5 is a similar view showing the weights extended.

My invention refers to the class of valve-governors for steam or other fluid-supplied engines of the type wherein centrifugal weighted arms control the flow through the valve in conformity with the speed and load of the engine. In governors of this class it is desirable to restrain or control the action of the weighted arms in both directions, so as to prevent too sudden or violent action at any time and also to maintain the effect of the braking apparatus employed, so that the arms can never outrun or get away from the influence of such controlling means, or vice versa.

My invention is designed to provide means whereby a uniform braking contact will be applied to the arms at all times; and it consists of counter-arms provided with inertia-weights similar to the valve-actuating governor-arms, similarly under the effect of centrifugal force, and so combined with the governor-arms that they will be in the operative engagement which I have just described at all times and at whatever angle the governor-arms may assume.

Referring now to the drawings, 2 is the stem of a throttle-valve of any construction adapted to gradually vary or entirely close the fluid-supply to the engine. This stem is suitably provided with packing devices, as indicated, and extends upwardly through a

hollow spindle 3, rotatably mounted in a supporting-frame 4, the stem being provided with a terminal 5, extending into range of the depressing devices of the centrifugal governor-arms. The frame 4 is provided with a lateral bearing 4', carrying the shaft 6, to which at the outer end is secured the belt-pulley 7 and at the inner end a bevel-wheel 8, meshing into the bevel-wheel 9, secured to the lower end of spindle 3. By this means the spindle 3 is rotated at a speed varying with the speed of the engine in the manner usual with this class of devices, it being understood that the pulley 7 is geared by a belt with the main shaft or other equivalent element of the engine, as will be readily understood.

Ordinarily valve-stem 2 is normally held raised and the valve maintained open by a counterweighted lever 10, pivoted at 11 in a frame 12 and provided with a lifting or depressing terminal 13, engaging a slotted yoke 14, connected with and forming a portion of valve-stem 2. Frame 2 is provided with a limiting-abutment 15, adapted to arrest upward movement of inner end of lever 10 and its terminal, so as to normally elevate the valve-stem to its upward limit.

16 16 are the primary centrifugal governor-arms, pivoted at 17 in suitable bearings mounted upon or forming portions of the rotating spindle 3 at its upper end and so arranged that the arms may freely move in or out on their bearings 17 while being rotated by the spindle. These arms are provided with inner terminals 18, which bear downwardly upon the stem-terminal 5 and depress it and the valve in proportion to the centrifugal travel of the arms 16. These arms are provided with weights 19 at their outer ends in the usual manner and operate under centrifugal force to vary the movement of the valve in the usual manner of valves of this class.

For the purpose of providing the constant braking means referred to I have provided secondary arms 20, pivoted at 21 to bearings formed in each side of a collar 22, rotatably mounted around the upper portion of frame

4 and provided with terminal weights 23, preferably of less avoirdupois than weights 19, the arms extending upwardly in a direction across the path of primary arms 16, as shown.

Between arms 16 and arms 20 I have provided a universal sliding-joint connection adapted to maintain the same bearing contact at whatever angle the arms may assume with relation to the other parts of the apparatus and to each other. These means consist of tubes 24, incorporated with arms 16 between their pivotal bearings and weighted extremities, with which they are rigidly connected, so as to form integral portions thereof, and spherical balls 25, slidably mounted within the tubes, through which balls pass the secondary arms 20, clearance-slots 26 being provided through opposite sides of the tubes lengthwise for said arms. It will be observed that the tubes are located laterally across the axial line of both arms 16 and 20 and slantingly disposed, so as to provide for free movement of both of the interfitting elements, while the bearing of the tubes against the balls 25, and vice versa, is always in a direction opposing the line of centrifugal energy.

As the speed of the engine increases primary arms 16 fly out, as in Fig. 1, as do secondary arms 20, the balls 25 sliding toward the lower end of the tubes and the relative position of rotating collar 22 and its bearings changing to correspond. The slots 26 are not exactly in alinement with the axial center of the tube, but are deflected, as shown, to correspond to the varying relative positions of stems 20, while the balls find a bearing within the tubes at whatever position they may assume, sufficient clearance being provided to insure free movement.

For the purpose of immediately shutting off the supply of fluid either by hand or automatically, as in case of breakage of the belt, I have provided means for quickly dropping the frame 12 and counterweighted arm 10 together, as I shall now describe.

The frame is pivoted at 27, as is also a separate trigger-arm 28, provided with a trigger 29, engaging a projecting terminal 30 of frame 12 beyond its bearing 27. Arm 28 is provided with an extension 31, carrying a bearing 32, which bears upwardly against a peripheral extension 33 of a belt-guard 34 on shaft 6. This belt-guard constitutes a longitudinally-movable bearing for the belt, against which at one side it bears by a disk 35, pressure toward the belt being exerted by a spring 36. When the counteracting bearing of the belt is eliminated, as by breakage, the guard 34 moves toward the pulley sufficiently far to disengage the disk 33 from bearing 32, which then flies up, allowing trigger 29 and terminal 30 while still connected to also rise, whereby the entire outer portion

of frame 12, with its weighted lever 10, will fall a corresponding distance. This movement will be transmitted bodily to the valve-stem and is sufficient to shut off the supply. Ordinarily the same result may be secured by depressing the arm 31 by hand, releasing terminal 30 from the trigger, and dropping frame 12 and its parts, as just described.

The operation of the device will be readily understood from the foregoing description. Upon a change of speed of the engine, either faster or slower, the governor-arms will extend or retract, the balls 25 pressing against the interior of tubes 24, the inertia of which is thus utilized to check or control too sudden movement of the arms 16. It will be observed also that centrifugal action of weights 23 will cooperate with weights 19, and each will tend to control or regulate the other. Upon slowing of the engine the tendency of the weights 19 to close in suddenly is opposed by the outwardly-pressing action of tubes 24, due to gravity in addition to their inertia.

The advantages of my invention will be readily appreciated by all those familiar with this class of devices. It is very simple and durable in construction, responds immediately to variations in speed due to changes in the load, overcomes racing or other irregularities in running of the engine, and is durable and not liable to get out of order. The same construction may be applied to engines of various types, and the device may be changed or varied by the skilled mechanic to suit varying requirements of use within the scope of the following claims.

What I claim is—

1. An engine-governor provided with centrifugal arms having slotted tubular bearings, and secondary arms extending through said bearings and provided with bearing-balls, substantially as set forth.

2. An engine-governor provided with valve-stem-actuating arms and slantingly-disposed slotted tubular bearings and terminal weights, with secondary weighted arms extending through the slots of said bearings and provided with bearing-balls mounted within the bearings, substantially as set forth.

3. In a governor, the combination of primary and secondary centrifugal arms having coincident axial centers, and in sliding bearing engagement with each other, substantially as set forth.

4. In a governor, the combination with a depressible valve-stem, of primary and secondary centrifugal arms having coincident axial centers, with means for maintaining the arms in such relation at all positions, substantially as set forth.

5. In a governor, the combination with a depressible valve-stem, of primary and secondary centrifugal arms having coincident axial centers, with means for maintaining

the arms in such relation at all positions and for providing sliding resistance, substantially as set forth.

5 6. In a governor, the combination with a depressible valve-stem, of primary pivoted arms in engagement with the stem having tubular bearings and terminal weights, and secondary arms pivoted to rotatable bearings and having bearing devices in sliding
10 engagement with said tubular bearings, and terminal weights, substantially as set forth.

15 7. In a governor, the combination with a depressible valve-stem, of primary pivoted arms in engagement with the stem having tubular slanting bearings arranged across the axial center of the arms, and terminal weights; and secondary arms pivoted to rotatable bearings and having bearing devices in sliding engagement with said tubular bearings,
20 and terminal weights, substantially as set forth.

8. A governor comprising a rotatable spindle geared with the engine, a depressible valve-stem mounted therein, primary arms
25 pivoted adjacent to and in engagement with said valve-stem, slotted tubular bearings and

terminal weights forming integral portions of said arms, a rotatably-mounted bearing-ring, secondary arms pivoted therein and extending through the slotted tubular bearings and
30 provided with balls in internal sliding engagement therewith, with terminal weights for said secondary arms, substantially as set forth.

9. In a governor, the combination with a
35 valve-actuating element, of a centrifugal arm in operative engagement with said element, and a secondary centrifugal arm in axial coincidence with said arm, substantially as set forth.
40

10. In a governor, the combination with a valve-actuating element, of a centrifugal arm in operative engagement with said element, and a secondary arm in sliding engagement with said arm, substantially as set
45 forth.

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

WILLIAM GLASER.

Witnesses:

JAS. J. McAFEE,
C. M. CLARKE.