

No. 651,953.

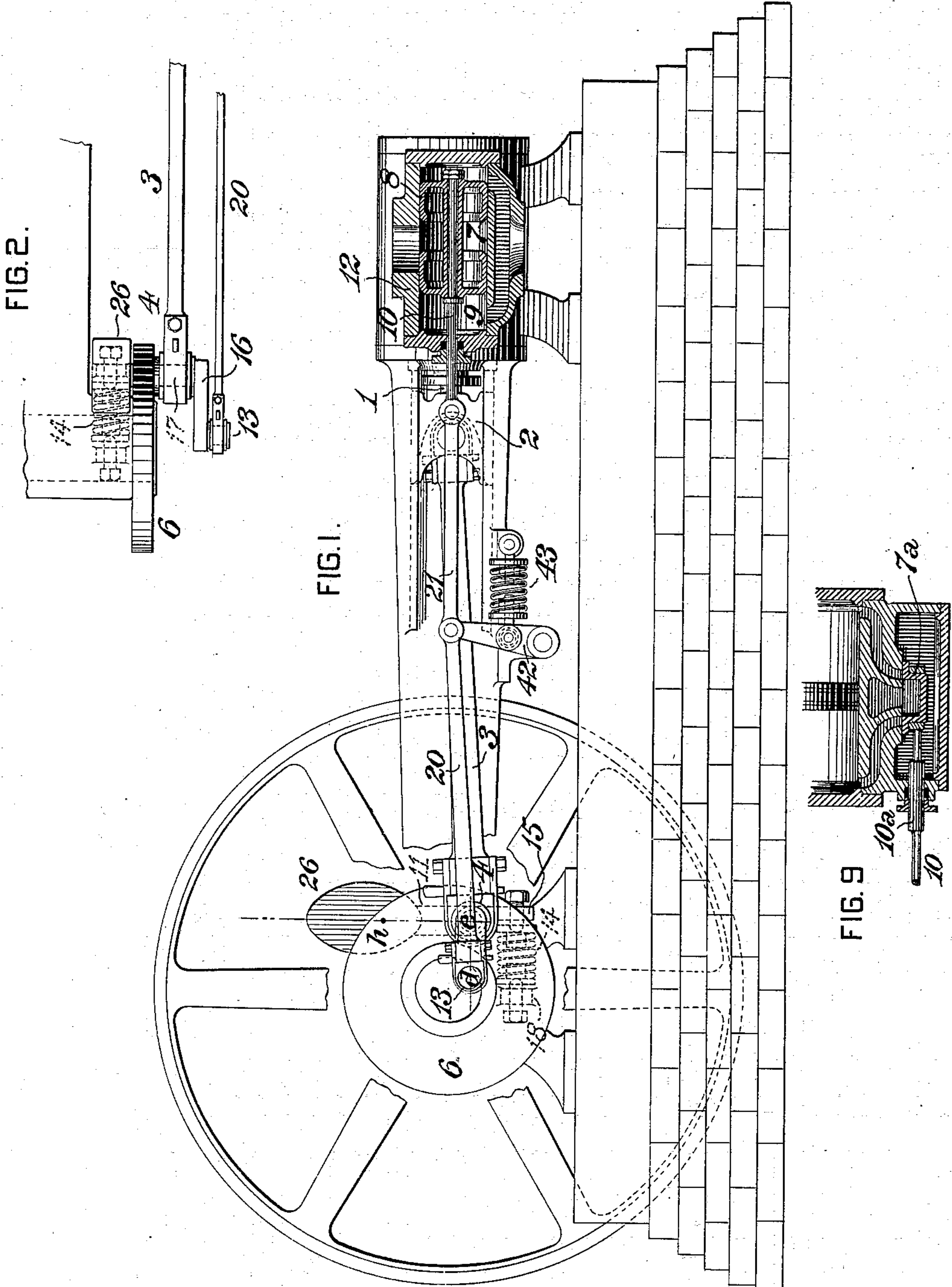
Patented June 19, 1900.

F. M. RITES.
GOVERNOR FOR FLUID PRESSURE ENGINES.

(Application filed May 16, 1896.)

(No Model.)

2 Sheets—Sheet 1.



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2 Sheets—Sheet 2.

FIG. 3.

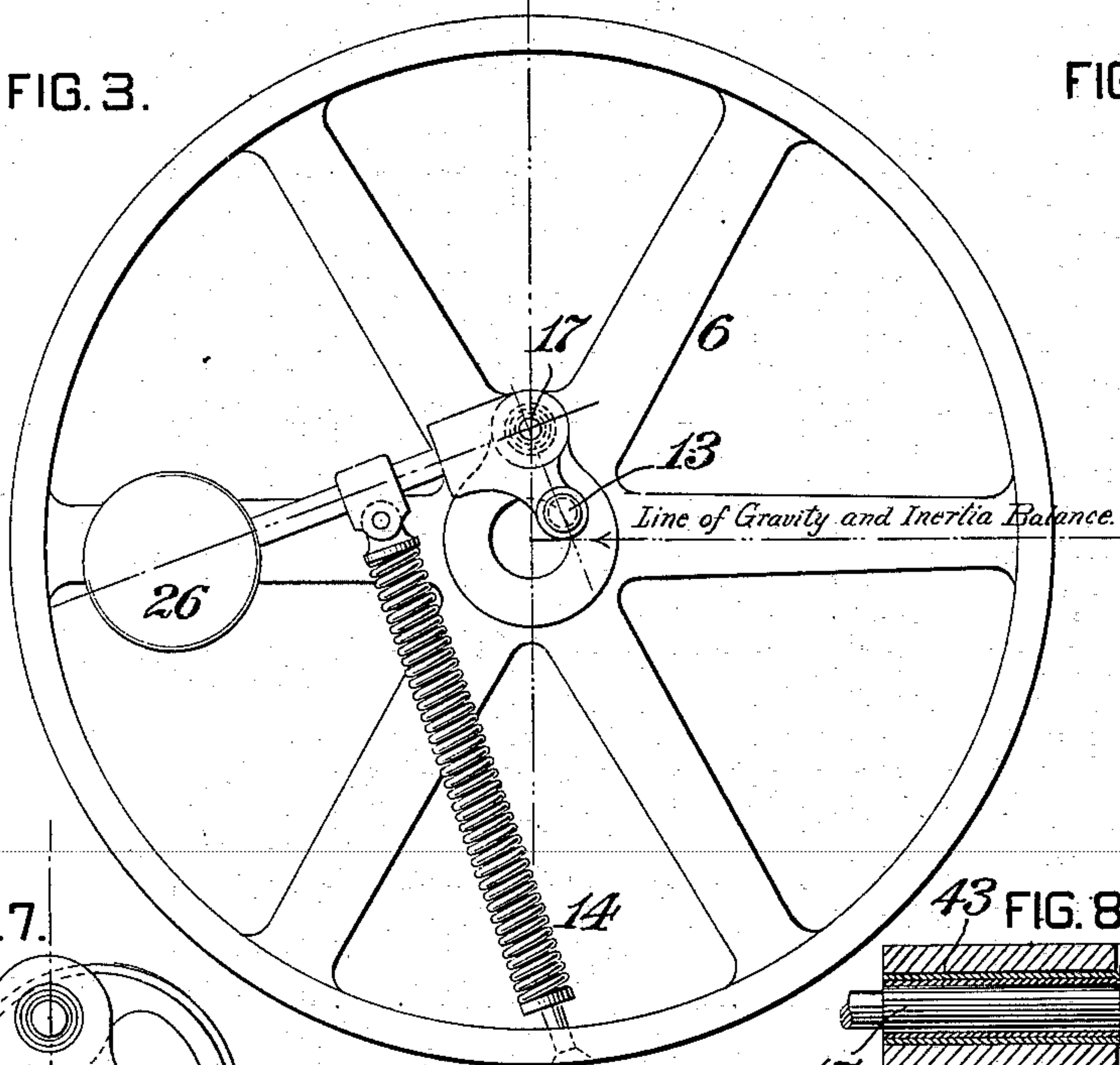


FIG. 4.

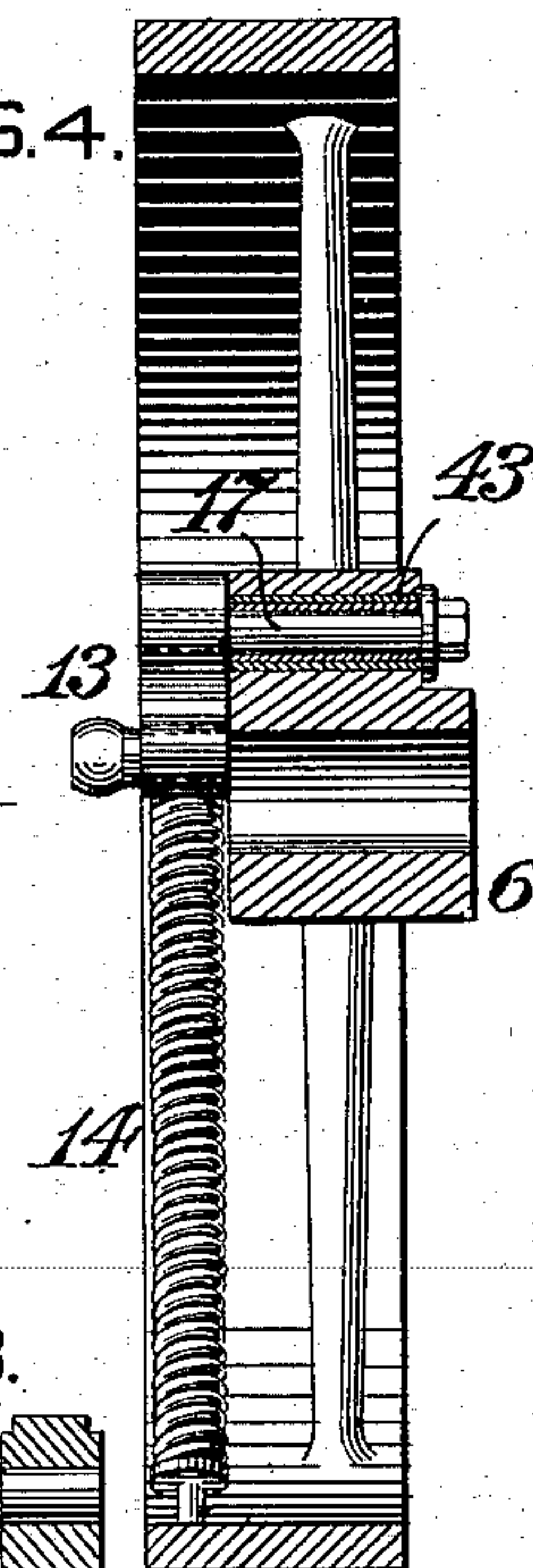


FIG. 7.

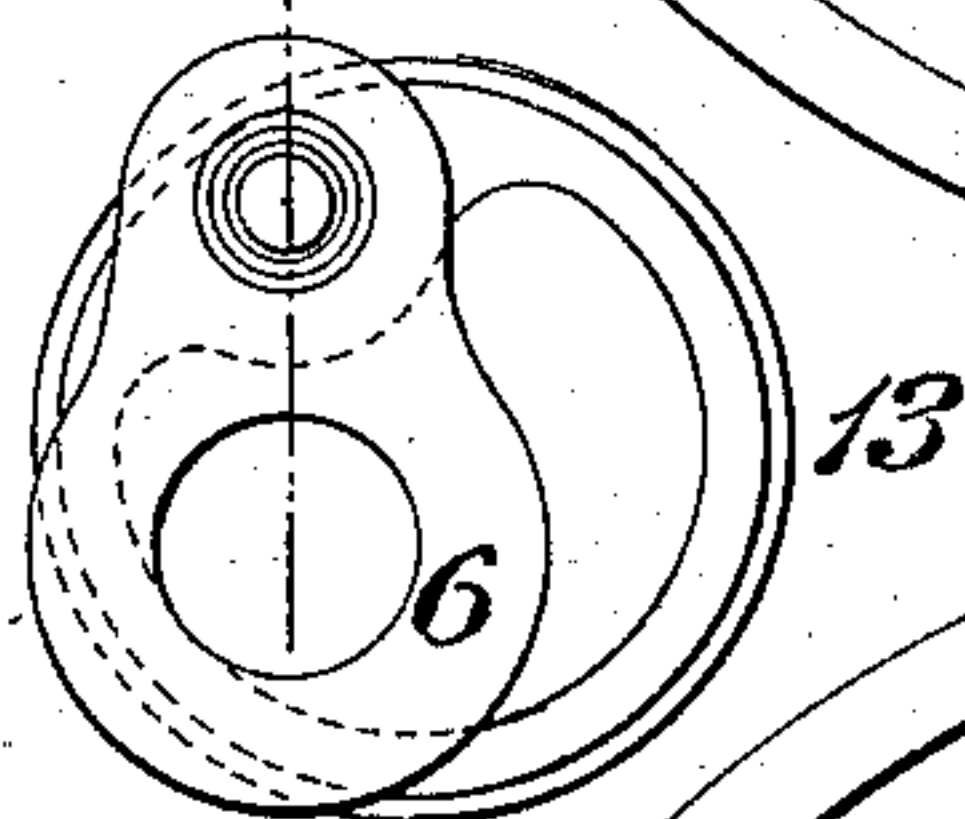


FIG. 8.

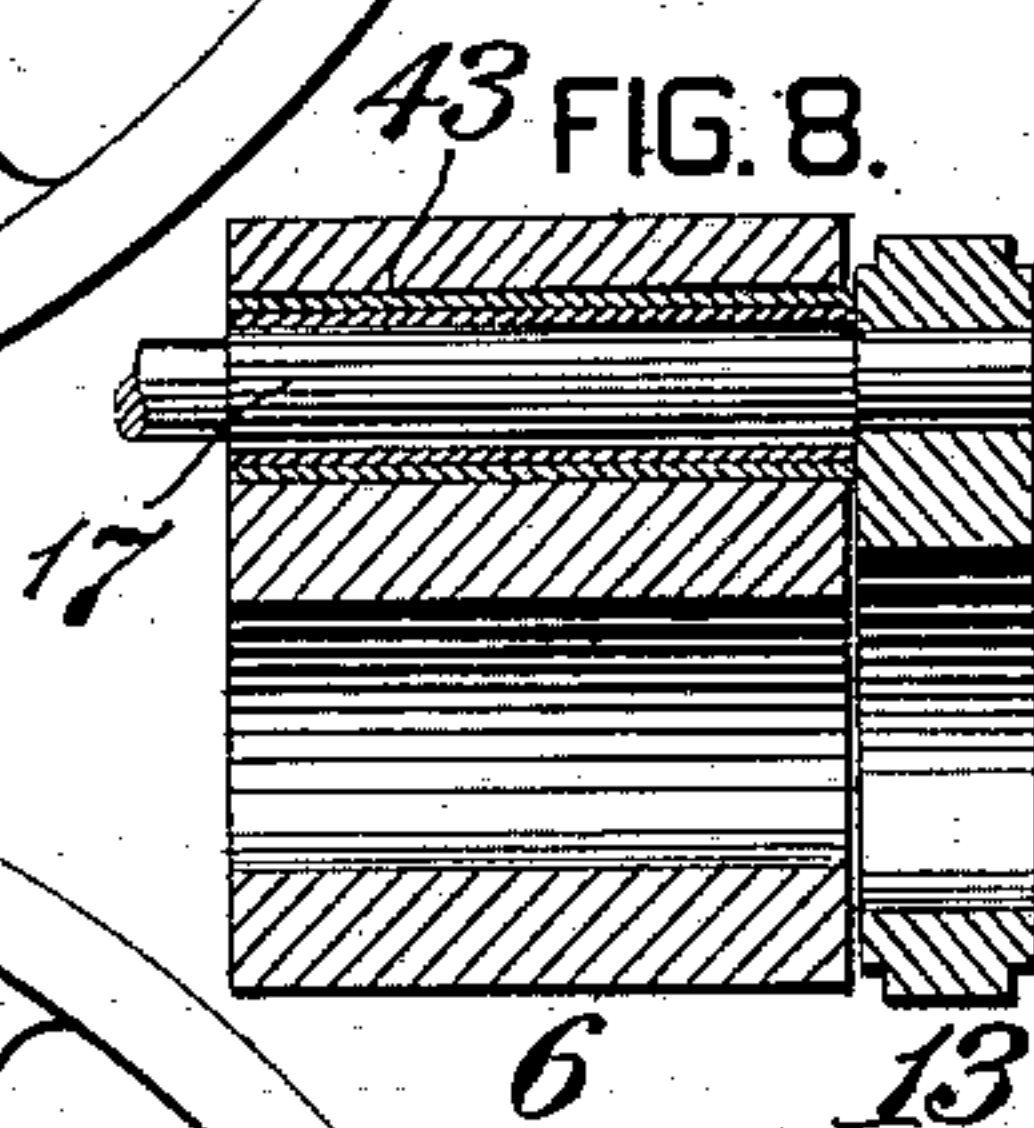


FIG. 5.

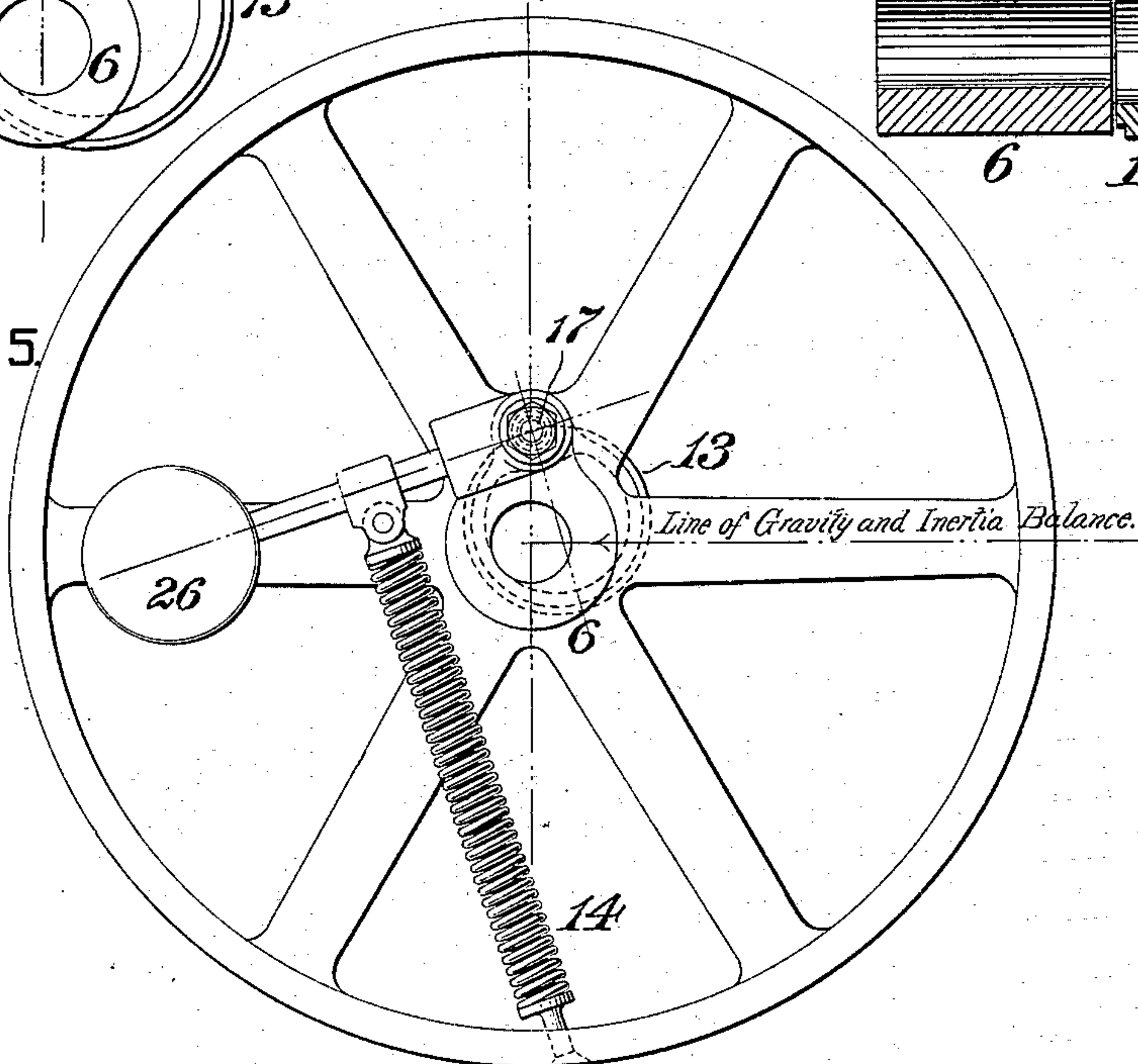
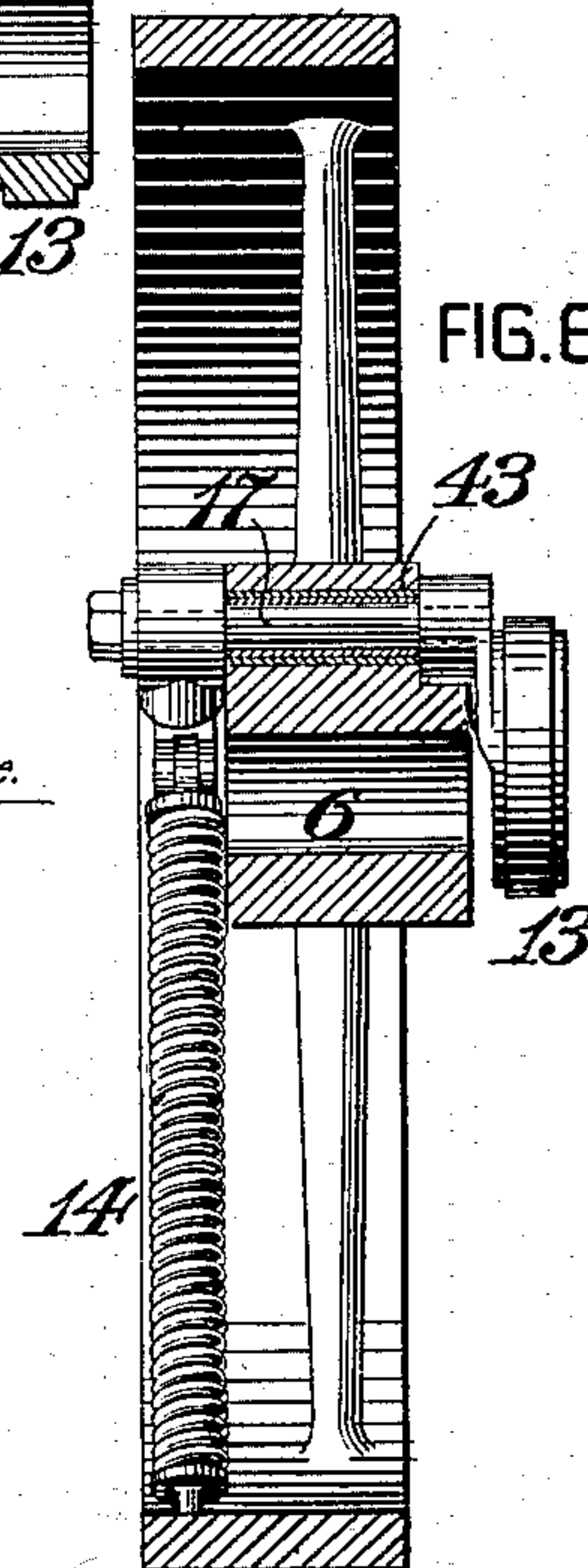


FIG. 6.



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UNITED STATES PATENT OFFICE.

FRANCIS M. RITES, OF ITHACA, NEW YORK.

GOVERNOR FOR FLUID-PRESSURE ENGINES.

SPECIFICATION forming part of Letters Patent No. 651,953, dated June 19, 1900.

Application filed May 16, 1896. Serial No. 591,810. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS M. RITES, a citizen of the United States, residing at Ithaca, in the county of Tompkins and State of New York, have invented or discovered a certain new and useful Improvement in Governors for Fluid-Pressure Engines, of which improvement the following is a specification.

My invention relates to improvements in governors for fluid-pressure engines; and it consists in the novel construction of the weight structure and the arrangement of the parts thereof with respect to each other and to the revoluble fly-wheel or carrier; in the provision of a single device, in a horizontal engine containing my improved governor, for balancing both the inertia of the reciprocating parts of the valve-gear and the unbalanced gravity of the weight structure of the governor, and in the novel combination, construction, and arrangement of the parts of the governor.

The objects of my invention are to improve and simplify governors of fluid-pressure engines, to give them maximum strength and minimum tendency to race, and to make the effect of the resistance of the fly-wheel on the weight structure uniform in all positions of the eccentric. These objects are attained in the governor herein described, and illustrated in the drawings which accompany and form a part of this specification, in which the same reference-numerals indicate the same or corresponding parts, and in which—

Figure 1 is a side view, partly in elevation and partly in section, through the steam-chest of a steam-engine provided with my improved governor. Fig. 2 is a detail plan view of the portion of the engine containing the governor. Fig. 3 is a side view, and Fig. 4 a transverse section, of a form of governor differing slightly in details of construction from that shown in Fig. 1. Fig. 5 is a side view, and Fig. 6 a transverse section, of another form of governor differing slightly in details of construction from those shown in Figs. 1 and 3. Fig. 7 is an end view, and Fig. 8 a transverse section, of the hub of the fly-wheel or carrier of the governor, showing the bearing of the pivot-pin; and Fig. 9 is a section through the valve-

chest of an engine having an unbalanced distribution-valve.

In the drawings, 1 designates the piston-rod of a horizontal engine; 2, its cross-head; 3, its connecting-rod; 4, its crank-pin; 6, the crank-disk, carrying said pin; 7, the steam-valve, composed of two pistons 8 and 9, mounted upon a valve-stem 10, and 12 the steam-chest.

13 designates an eccentric which in the governor shown in Figs. 1, 2, 3, and 4 is a pin carried by the weight structure of the governor, as hereinafter described.

20 is an eccentric-rod extending from the eccentric 13 to a rocker-arm 42, supported by the engine-frame, and 21 is a link connecting said rocker-arm with the valve-stem 10.

43 is a combined tension and compression spring one end of which is secured to the rocker-arm 42 and the other end to the frame of the engine. This spring, as hereinafter explained, serves both to balance the unbalanced gravity of the weight structure and to counteract the effect of inertia of the reciprocating parts of the valve-gear.

The governor consists of a combined centrifugal and inertia weight 26, mounted upon and preferably formed rigidly with an arm 11, secured to a pivot-pin 17, which in the form of governor shown in Figs. 1 and 2 has its bearing in the crank-pin 4 of the engine, while in the governor shown in Figs. 3 to 6, inclusive, this pin has its bearing in the fly-wheel or carrier itself. The eccentric-pin in the form of governor shown in Figs. 1 and 2 is upon an arm 16, secured to the other end of this pivot-pin 17. In the form of governor shown in Fig. 3 the pivot-pin is carried by an extension of the arm which carries the weight structure, while in the form of governor shown in Figs. 5 and 6 the eccentric-disk there shown is secured to the end of the pin 17 opposite to that to which the arm carrying the governor-weight is secured. The governor-weight, with the arm carrying the same, the eccentric and the arm carrying the same, and the pivot-pin constitute one rigidly-connected weight structure.

In all of the governors shown in the drawings the radius of the center of gravity of the weight structure drawn from the pivotal

point of the weight structure is substantially at right angles to the radius of the eccentric. This permits the use of the same spring 43 for balancing both the inertia of the reciprocating parts of the valve-gear and the unbalanced gravity of the weight structure when the governor is employed in horizontal engines. The use of the spring 43 for balancing the inertia of the reciprocating parts of the valve-gear is described and claimed in Letters Patent No. 342,307, granted to me on May 18, 1886; but because of the acute angle formed by the radius of the center of gravity of the weight structure with the radius of the eccentric in the governors illustrated in said patent it was necessary to provide other means than the spring shown in Fig. 5 of that patent and corresponding to spring 43 of the drawings which accompany this specification to balance the unbalanced gravity of the weight structure; but when the radii of the center of gravity and of the eccentric are substantially at right angles the moment of the spring 43 about the pivot increases and decreases in accordance with but in opposition to the increase and decrease of the gravity moment of the weight structure about its pivot. Thus when the fly-wheel is in the position shown in Fig. 1, the center of gravity of the weight structure being directly over the pivot, the gravity moment of the weight structure is zero, and the moment of the spring 43 is also practically zero, since the pressure of the spring 43 is transmitted to the eccentric practically in line with the pivot; but when the fly-wheel has rotated through ninety degrees, so that the gravity moment of the weight structure about its pivot is maximum, the moment of the spring is also substantially maximum.

Instead of employing the spring 43 to balance the unbalanced gravity of the weight structure the pressure of steam on the valve-stem may be employed for that purpose when the distribution-valve of the engine is unbalanced. For this purpose the valve-stem may be enlarged to form a piston 10^a, as shown in Fig. 9. This feature, however, I do not claim as of the present invention, since it is described in my Patent No. 342,307, above men-

tioned. Its incorporation into the governor herein described, however, does not involve any departure from the present invention.

In order to decrease friction of the pivot-pin in its bearings and to avoid cutting of the journal or bearing, one or more bushings 44, movable one within the other within the bearing and on the bearing-pin, may be employed, as shown in Figs. 4, 6, and 8.

Having thus completely described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In an engine, the combination, with a horizontally-moving valve-gear, and a revoluble fly-wheel or carrier, of a centrifugal weight and an eccentric, rigidly connected and movably mounted on the carrier, and a combined tension and compression spring, acting on said eccentric and weight in line with the line of valve travel and balancing both the inertia of the reciprocating parts of the valve-gear and the unbalanced gravity of said eccentric and weight.

2. In an engine, the combination, with a horizontally-moving valve-gear, and a revoluble fly-wheel or carrier, of a centrifugal weight and an eccentric rigidly connected and pivotally mounted on the carrier, the radii of the center of gravity of the weight structure and of the eccentric being substantially at right angles, and a combined tension and compression spring, acting on said eccentric and weight in line with the line of valve travel and balancing both the inertia of the reciprocating parts of the valve-gear and the unbalanced gravity of said eccentric and weight.

3. In a governor, the combination, with a revoluble fly-wheel or carrier, of a weight structure, the parts of which are rigidly connected, and which consists of a pivot-pin journaled in the carrier, a centrifugal weight mounted upon one end of the pivot-pin, and an eccentric mounted upon the opposite end of the pivot-pin.

In testimony whereof I have hereunto set my hand.

FRANCIS M. RITES.

Witnesses:

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S. E. BANKS.