

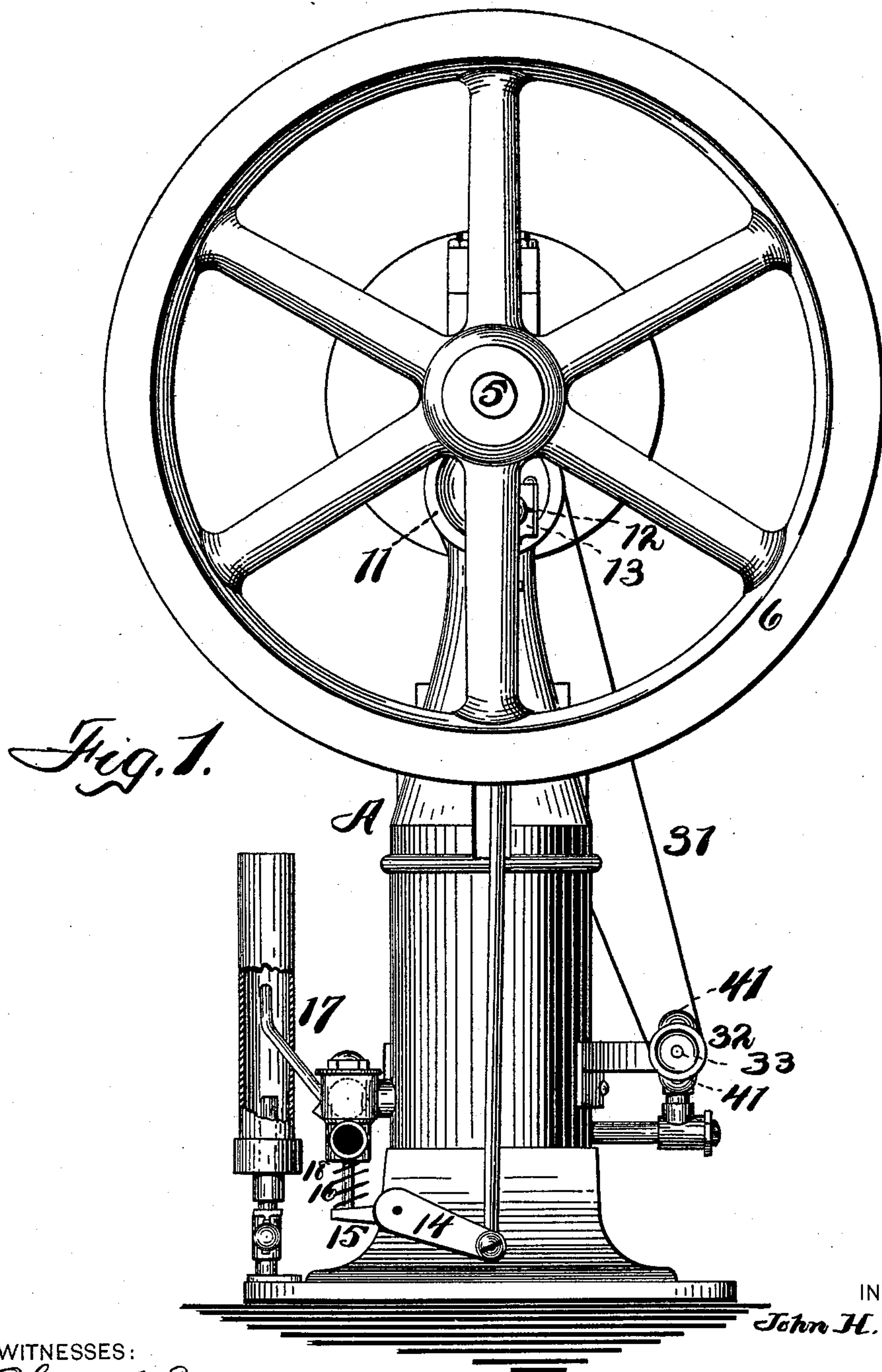
(No Model.)

5 Sheets—Sheet 1.

J. H. TUFFS.  
GAS ENGINE.

No. 583,872.

Patented June 1, 1897.



WITNESSES:

*Charles A. Morvin.*  
*J. C. Murray.*

INVENTOR

*John H. Tuffs.*

BY

*Smith & Driscoll*

ATTORNEYS.

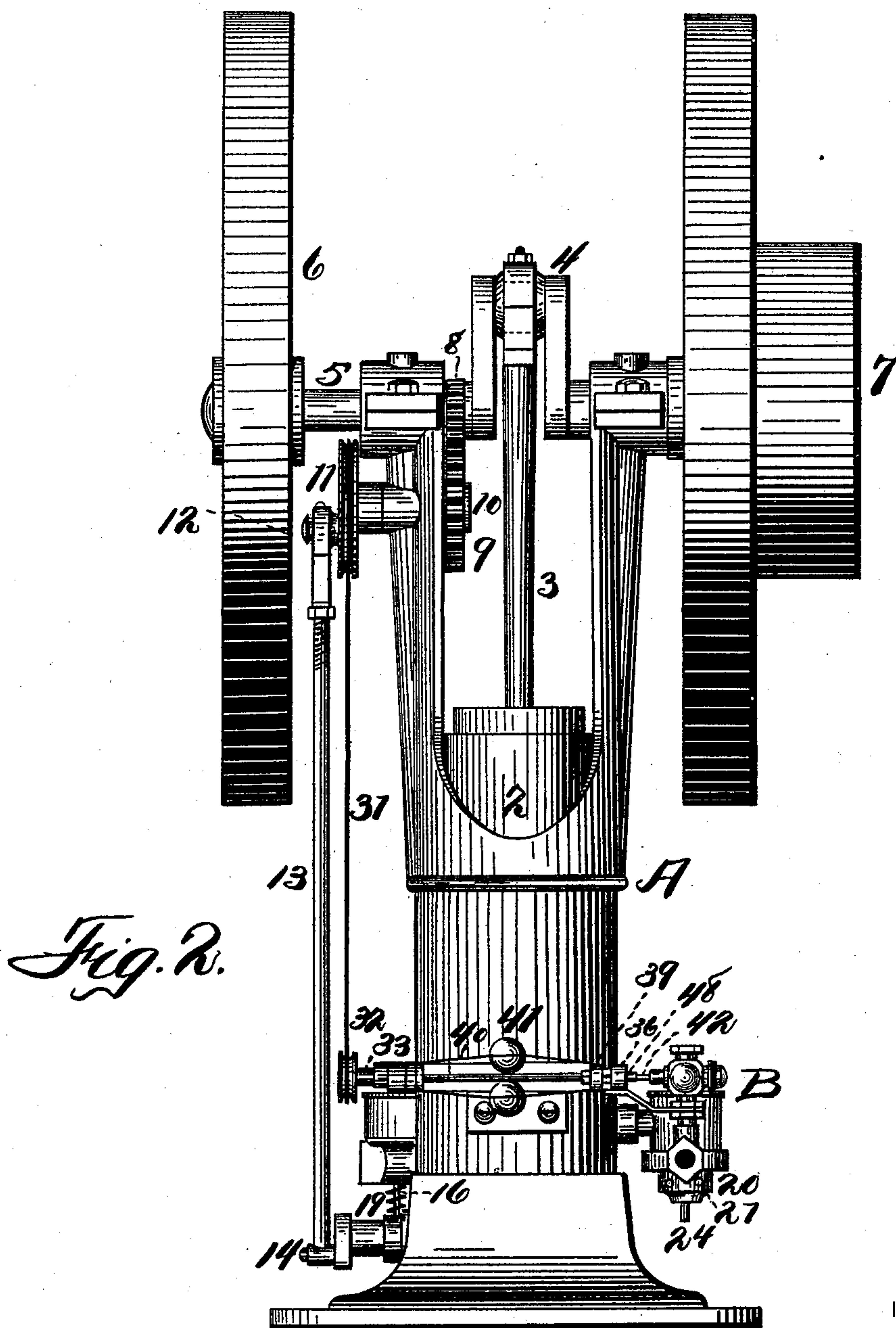
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*Fig. 2.*

WITNESSES:

*Charles M. Marvin.*  
*J. E. Murray*

INVENTOR.

*John H. Tuffs.*

BY

*Smith & Brinson*

ATTORNEYS.

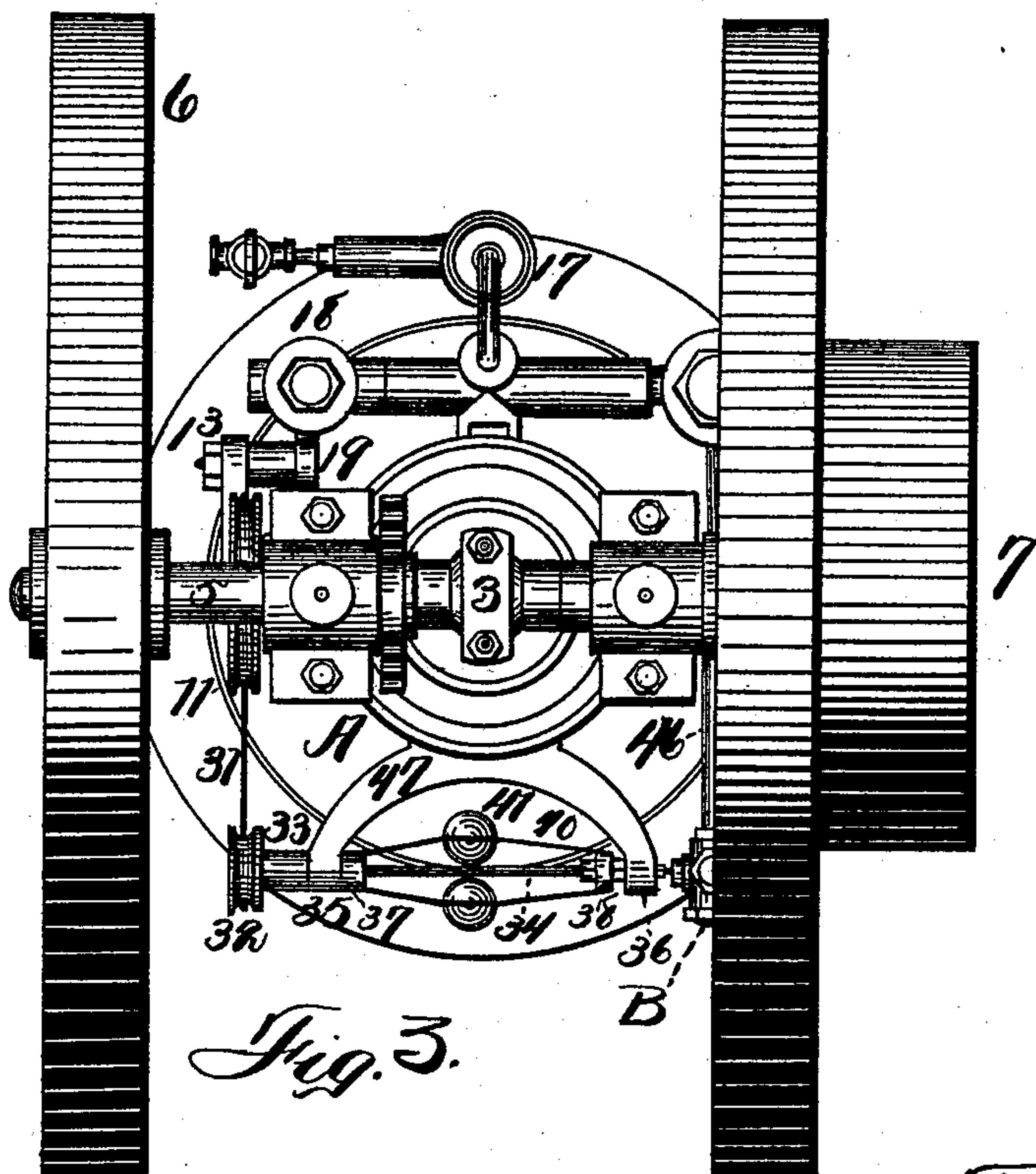
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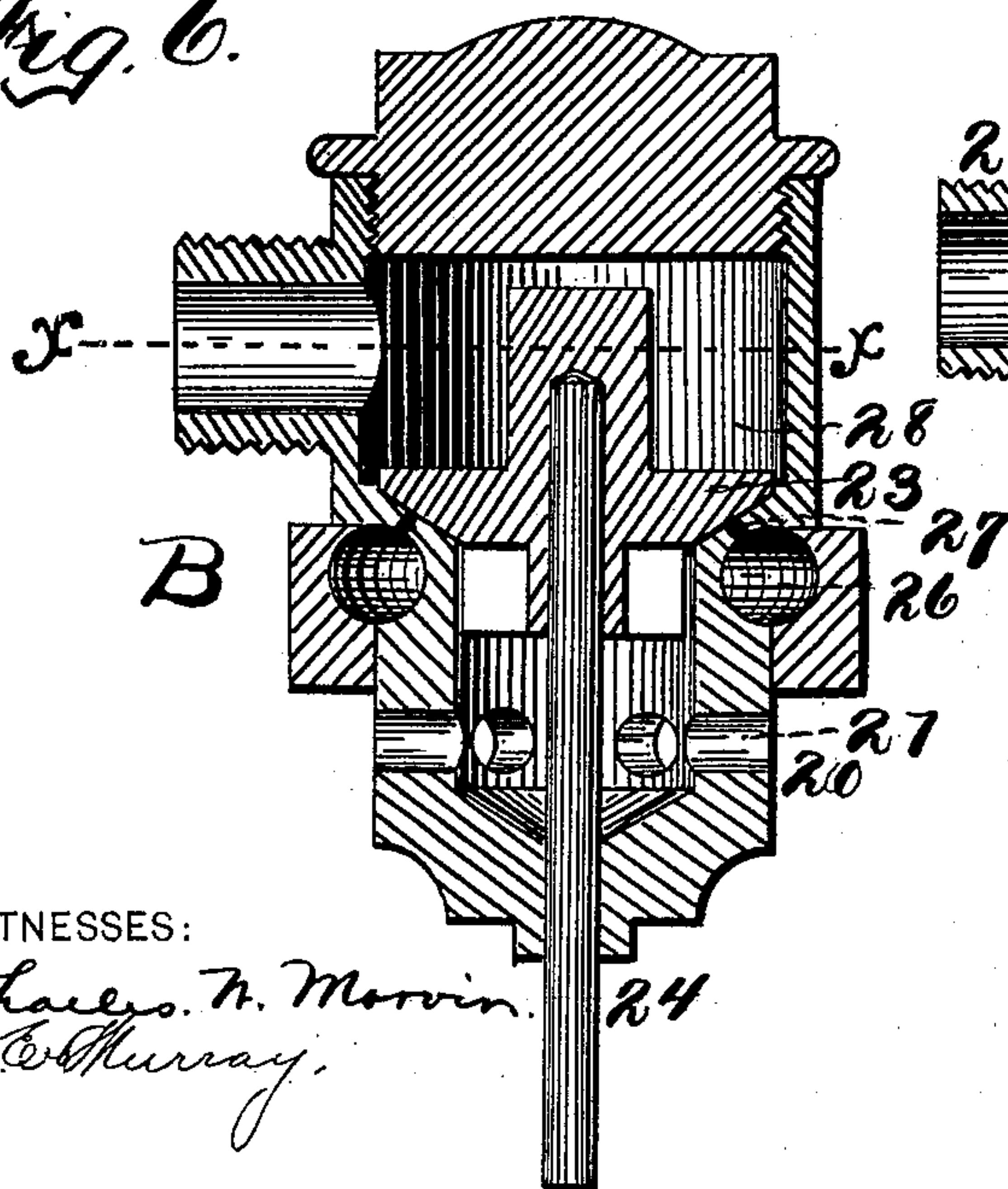
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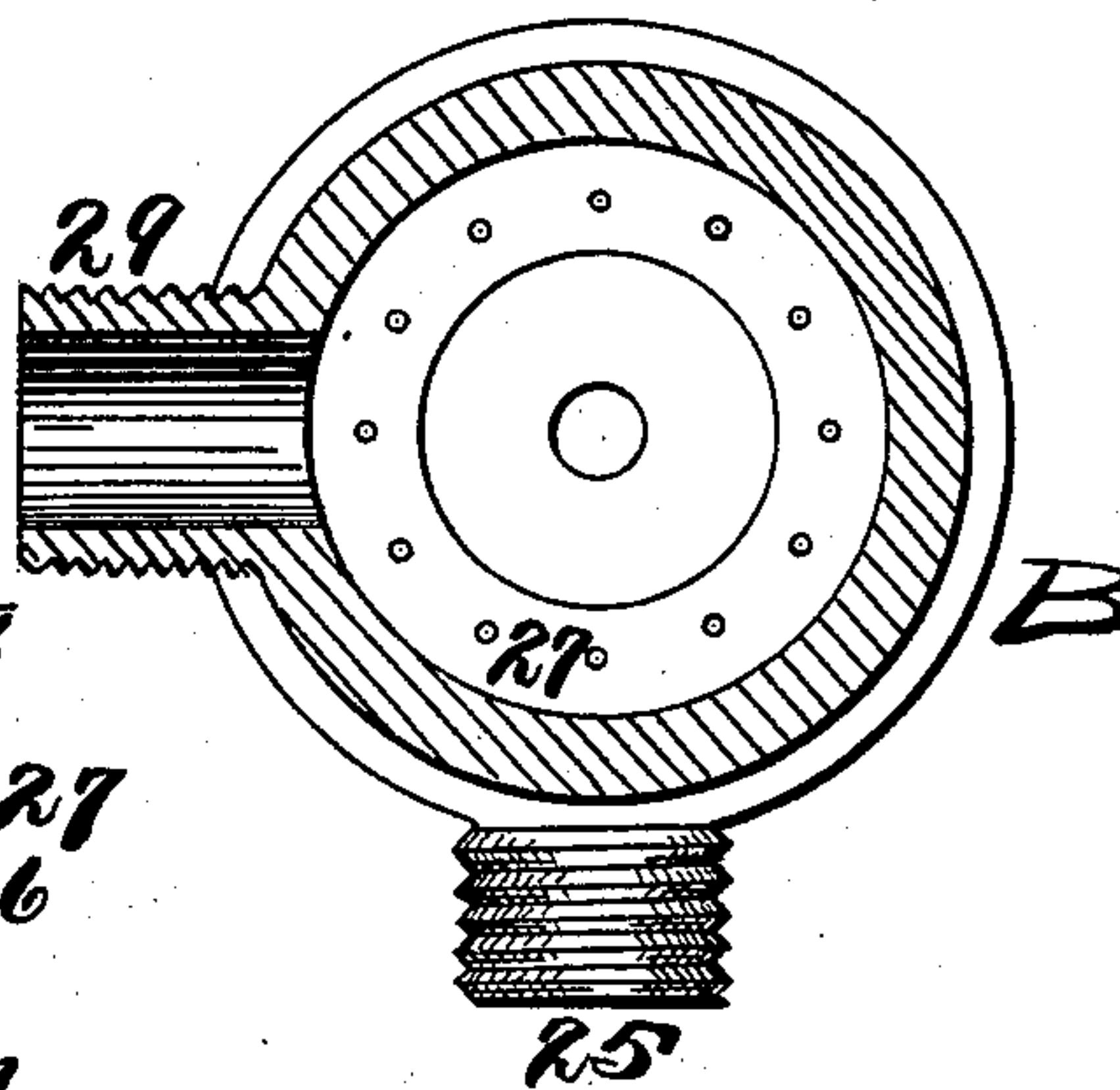
*Fig. 6.*



WITNESSES:

*Charles H. Morrin.*  
*J. W. Murray.*

*Fig. 7.*



INVENTOR

*John H. Tuffs.*

BY

*Smith & Wenslow*

ATTORNEYS.



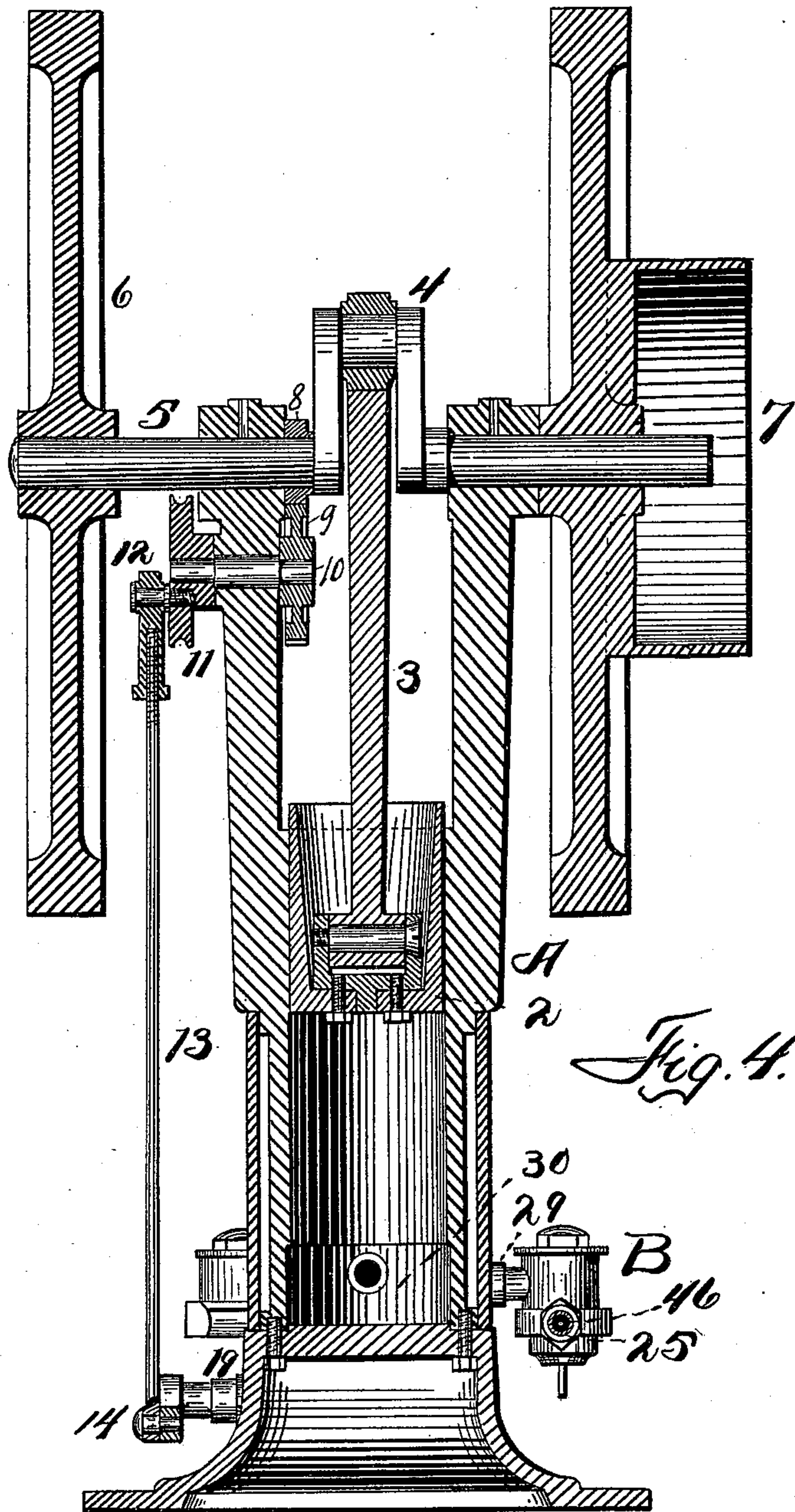
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J. H. TUFFS.  
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Patented June 1, 1897.



WITNESSES:

*Charles N. Moroin.*  
*J. E. Murray.*

INVENTOR

*John H. Tuffs.*

BY

*Smith & Rislow*  
ATTORNEYS.

(No Model.)

5 Sheets—Sheet 5.

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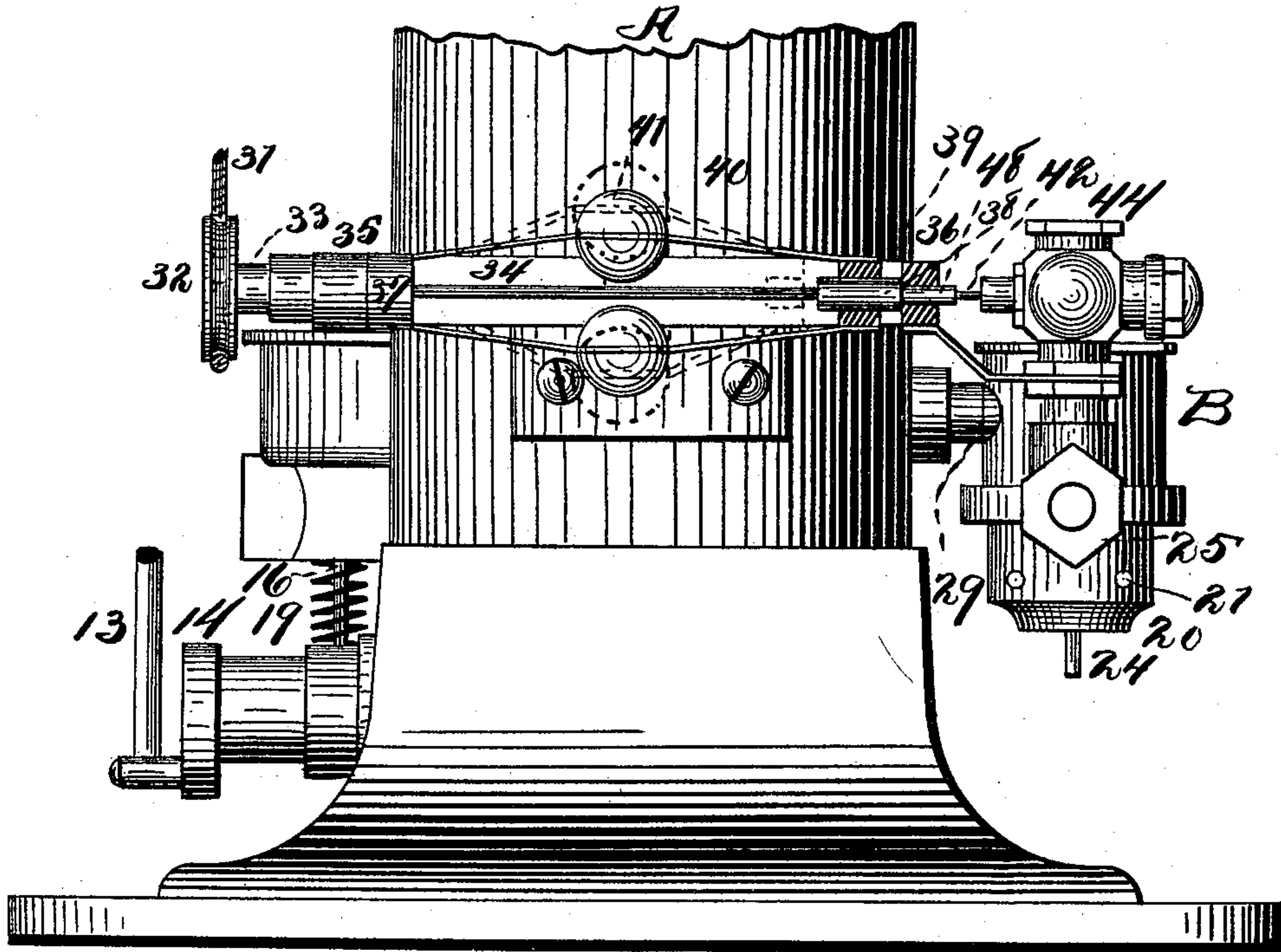


Fig. 5

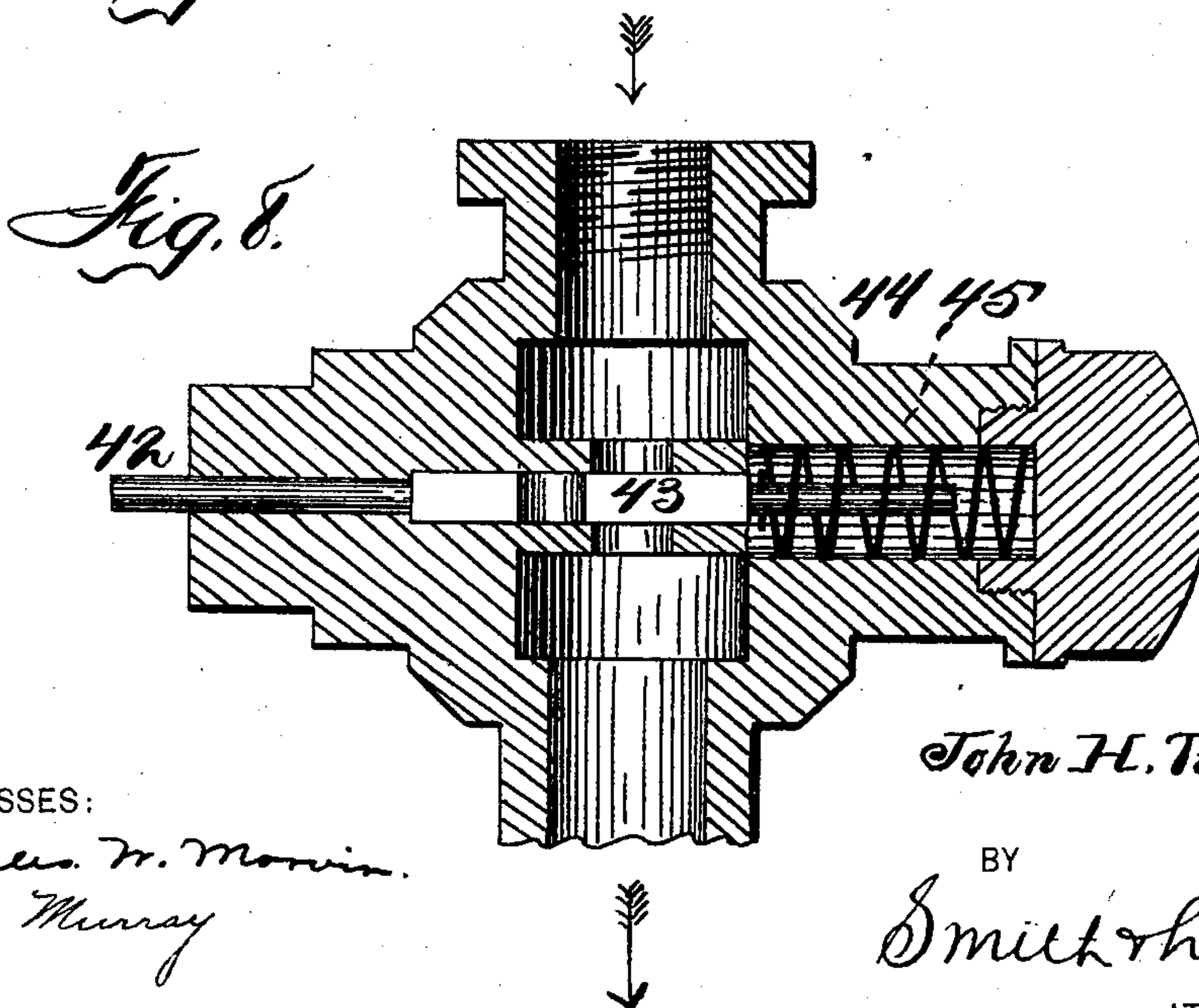


Fig. 6

WITNESSES:  
Charles W. Morrin.  
J. E. Murray

INVENTOR  
John H. Tuffs.

BY  
Smith & Wesson  
ATTORNEYS.



# UNITED STATES PATENT OFFICE.

JOHN H. TUFFS, OF SYRACUSE, NEW YORK.

## GAS-ENGINE.

SPECIFICATION forming part of Letters Patent No. 583,872, dated June 1, 1897.

Application filed September 9, 1895. Serial No. 561,893. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN H. TUFFS, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful  
5 Improvements in Gas-Engines, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to gas-engines in  
10 which a mixture of air and gas is exploded to produce a propelling force or power which is exerted upon a piston-head in a suitable cylinder.

Great difficulty has heretofore been had in  
15 regulating the supply or feed of gas and governing the speed of the engine and also in feeding the air and gas into the mixing-chamber.

The object of this invention is to provide  
20 an automatic mechanism by which the governor regulates the feed of gas, decreasing the supply as the speed increases and shutting it off entirely when a predetermined speed is reached, whereby when starting up  
25 the valve is normally wide open and is held in that position by a spring-governor, and as the speed increases the outward throw of the governor-balls releases said valve to be actuated by a spring behind it, to first partially  
30 close said valve and somewhat reduce the feed of gas, and as the speed increases to shut it off more and more until at a predetermined speed the gas is shut off entirely and remains so until the reduction of the speed elongates  
35 the governor and forces said valve open a distance proportional to the rate of such decrease of speed; and to that end this invention consists in the foregoing and other novel features of construction and operation which  
40 are hereinafter described, and which are specifically set forth in the claim hereunto annexed. It is constructed as follows, reference being had to the accompanying drawings, in which—

45 Figure 1 is a side elevation. Fig. 2 is a front elevation. Fig. 3 is a top plan. Fig. 4 is a vertical sectional elevation. Fig. 5 is an enlarged front elevation of part of the body and showing the mixing-chamber and gov-  
50 ernor and its operation to regulate the gas-inlet-valve mechanism. Fig. 6 is a vertical

section of the gas and air mixing chamber.

Fig. 7 is a transverse section thereof on line *x x*, omitting the valve. Fig. 8 is a sectional elevation of the gas-inlet-valve mechanism. 55

A is a suitable body or cylinder in which a suitable piston 2 is mounted, being carried by a suitable piston-rod 3, which is suitably connected to the crank 4 of the driving-shaft 5, upon which a balance-wheel 6 and a belt-  
60 pulley 7 are mounted. A gear 8, secured upon the drive-shaft, drives a gear 9 upon a shaft 10 and a pulley 11 upon said shaft and through a crank-pin 12, crank-rod 13, and crank 14 rocks or oscillates an arm 15, which  
65 engages with the valve-stem 16 of the exhaust-valve which governs the port 18. The lighting apparatus 17 is of well-known and ordinary construction, whereby the gas is exploded and the gases of combustion actuate  
70 the piston as usual, and when the piston reverses the cylinder exhausts in the ordinary manner through an exhaust-port 18, the spring 19 upon the valve-stem having operated to open the exhaust-valve. 75

B is the mixing-chamber, having a tubular body 20, provided with air-holes 21, opening into the air-chamber within it, and having a valve-seat upon its upper end for the valve 23, which is vertically guided by the stem 24. 80  
The gas-inlet pipe 25 opens into a circular gas-chamber 26 in said body, and the perforations 27 open therefrom into the valve-seat and are closed when the valve is seated thereon, and whenever it is opened the gas and air  
85 flow together into the mixing-chamber 28, are thoroughly mixed and commingled therein, and are thence conducted through the pipe 29 into the explosion-chamber 30 and are exploded therein. 90

A belt 31 is driven by the pulley 11 and drives a pulley 32 and the shaft 33, which drives the rod 34, journaled in bearings 35 36, passing loosely through a collar 37 and being connected by an ordinary spline or feather with  
95 the sleeve 38 in the collar 39, said collar being the ends of the governor which are connected by the spring-bars 40, upon which the balls 41 are secured. The end of said governor-shaft is suitably connected to a non-re-  
100 volving valve-stem 42 or abuts against it, which stem is connected to a valve 43, suit-



ably seated in a valve-body 44, and 45 is a spring which bears against the valve to close it. In Fig. 8 the arrows indicate the course of the flow of the gas. A suitable pipe 46, Fig. 5 3, connects this valve to the gas-inlet 25 of the mixing-chamber. When the governor is at rest, this valve is wide open, and then as the speed of rotation increases and the balls are thrown out centrifugally the spring 45 10 slides said valve according to such speed and thus regulates and controls the quantity of gas passing into the mixing-chamber, and when the speed reaches a fixed rate the balls are thrown out far enough to permit said 15 spring to entirely close said valve and shut off the flow of gas entirely until the speed is reduced, so that the balls will close and the governor-bars will force the valve open.

The bearings 35 and 36 are carried by a yoke 20 47, Fig. 3. The collar 37 bears against the bearing 35, while the sleeve 38 traverses the shaft 34. This shaft extends only a short distance into the sleeve, which permits of this traversing of the sleeve and collar 39, and

as the bar 48 is secured to the sleeve so this 25 bar is moved toward or from the valve-stem.

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

In a gas-engine, the crank-shaft, the piston, 30 the working chamber, the gear 8 on the crank-shaft, and the shaft 10 provided with a gear at one end and a wheel 11, carrying a wrist-pin, at the other, combined with a belt extending from the wheel 11, a revolving gov- 35 ernor operated by the belt, a valve operated by the governor for controlling the flow of gas; the crank-rod 13, also operated by the wheel 11, crank 14, arm 15, lighting apparatus, exhaust-port 18, and spring-actuated 40 valve controlling it, substantially as set forth.

In witness whereof I have hereunto set my hand on this 19th day of August, 1895.

JOHN H. TUFFS.

In presence of—

JESSIE E. MURRAY,  
HOWARD P. DENISON.