

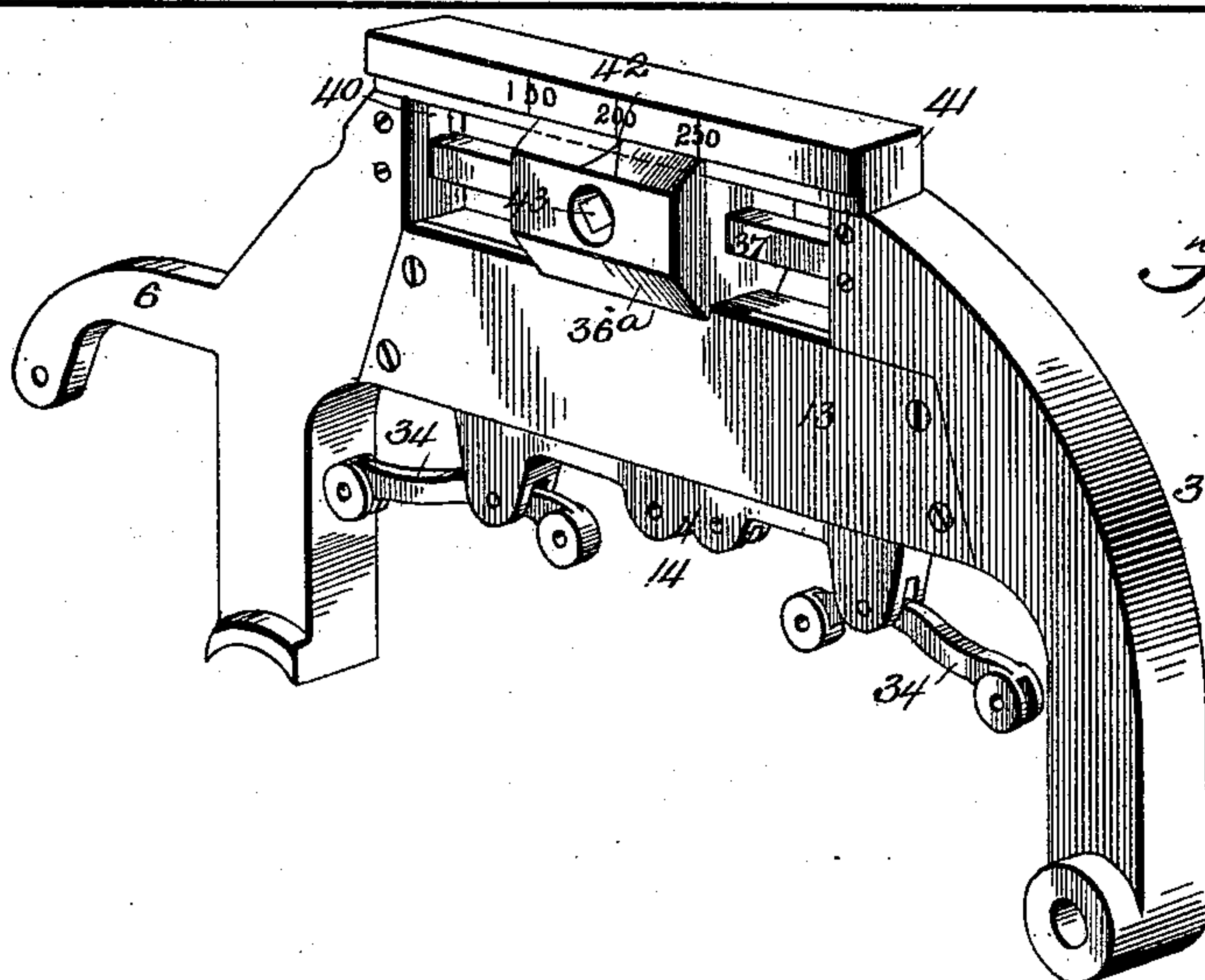
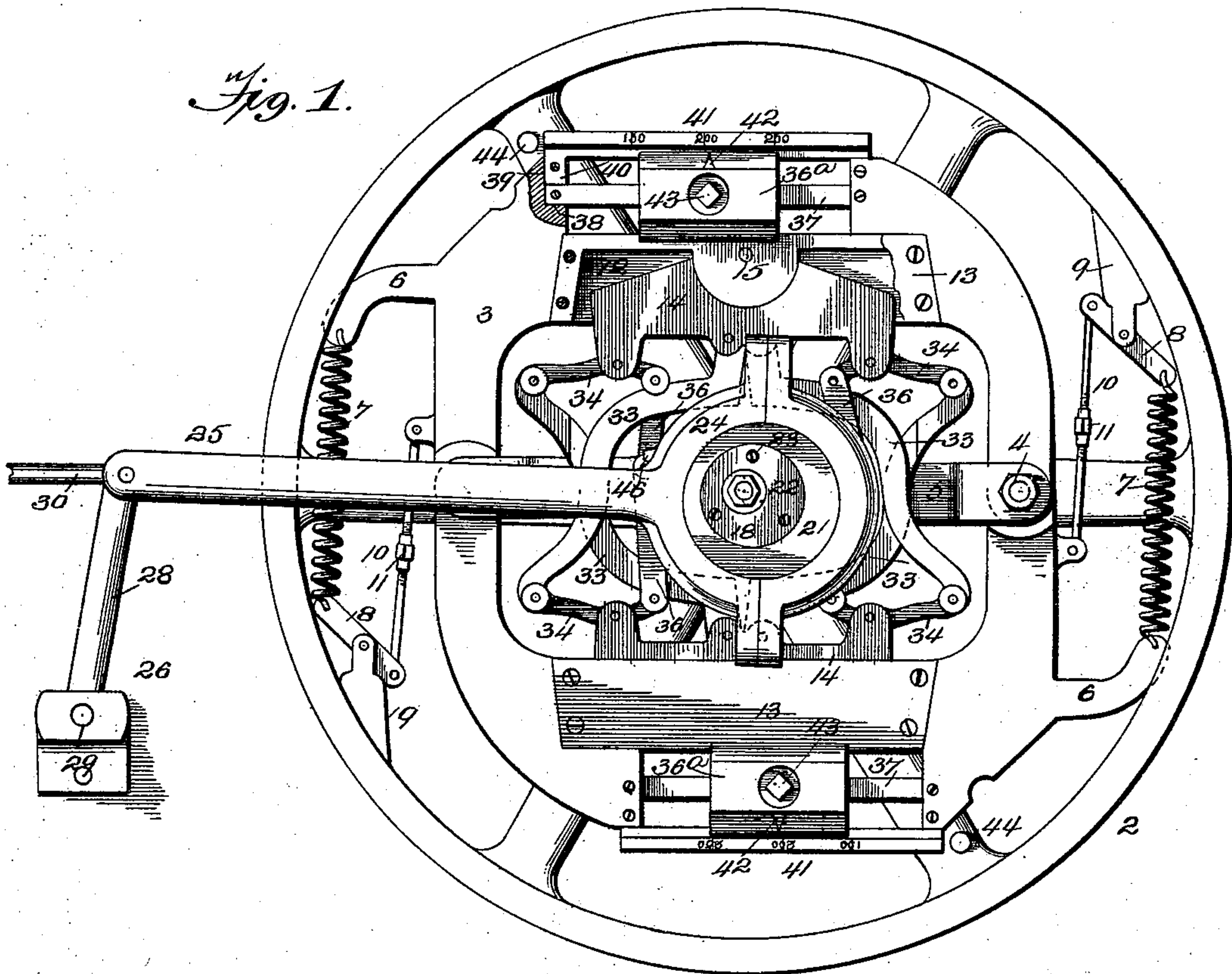
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3 Sheets—Sheet 1.

B. JOHNSON.  
GOVERNOR FOR STEAM ENGINES.

No. 532,734.

Patented Jan. 15, 1895.



*Fig. 4.*

Inventor

*Bullie Johnson*

Witnesses

*Jos. C. Stack*  
*[Signature]*

By his Attorneys,

*C. A. Snow & Co.*

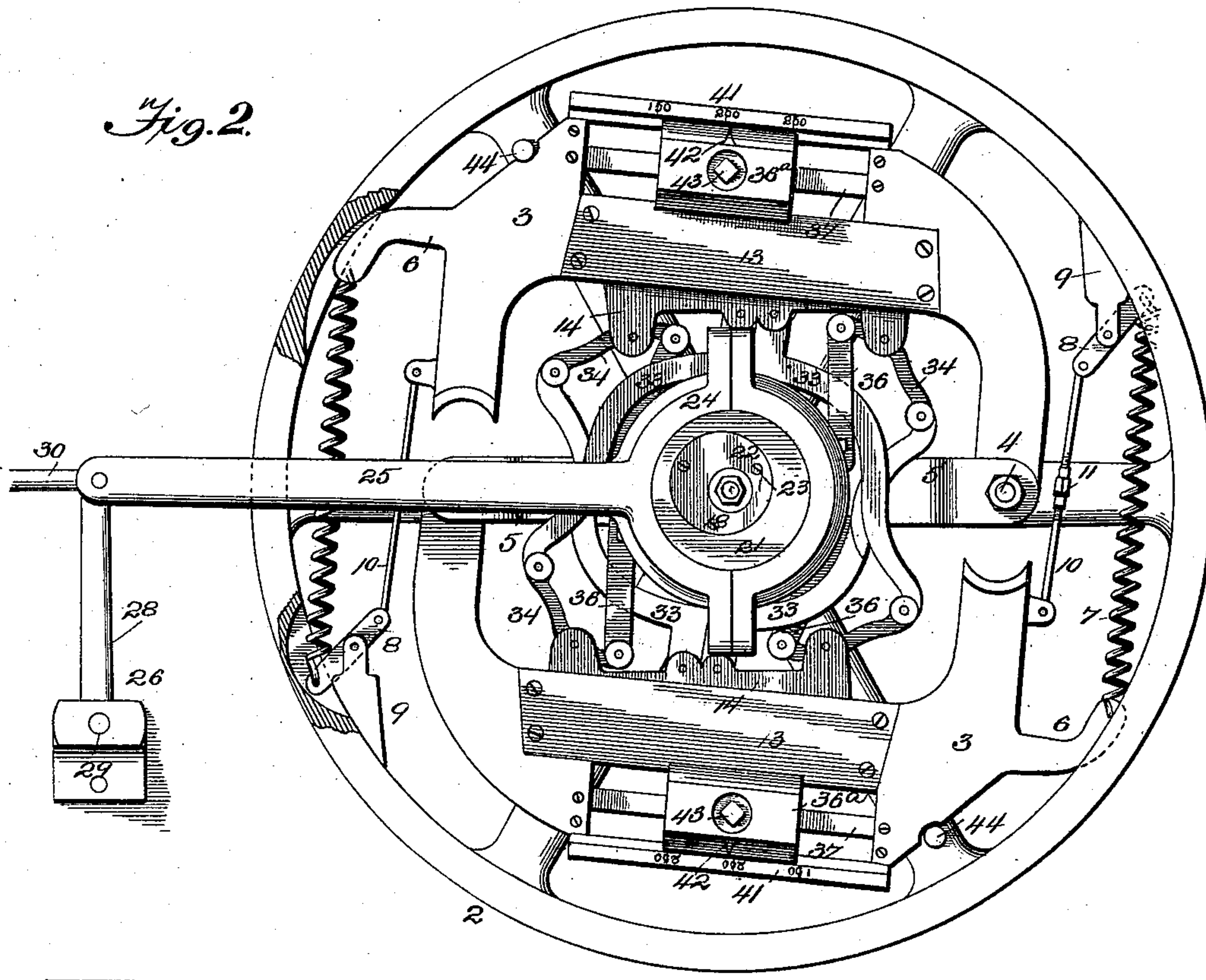
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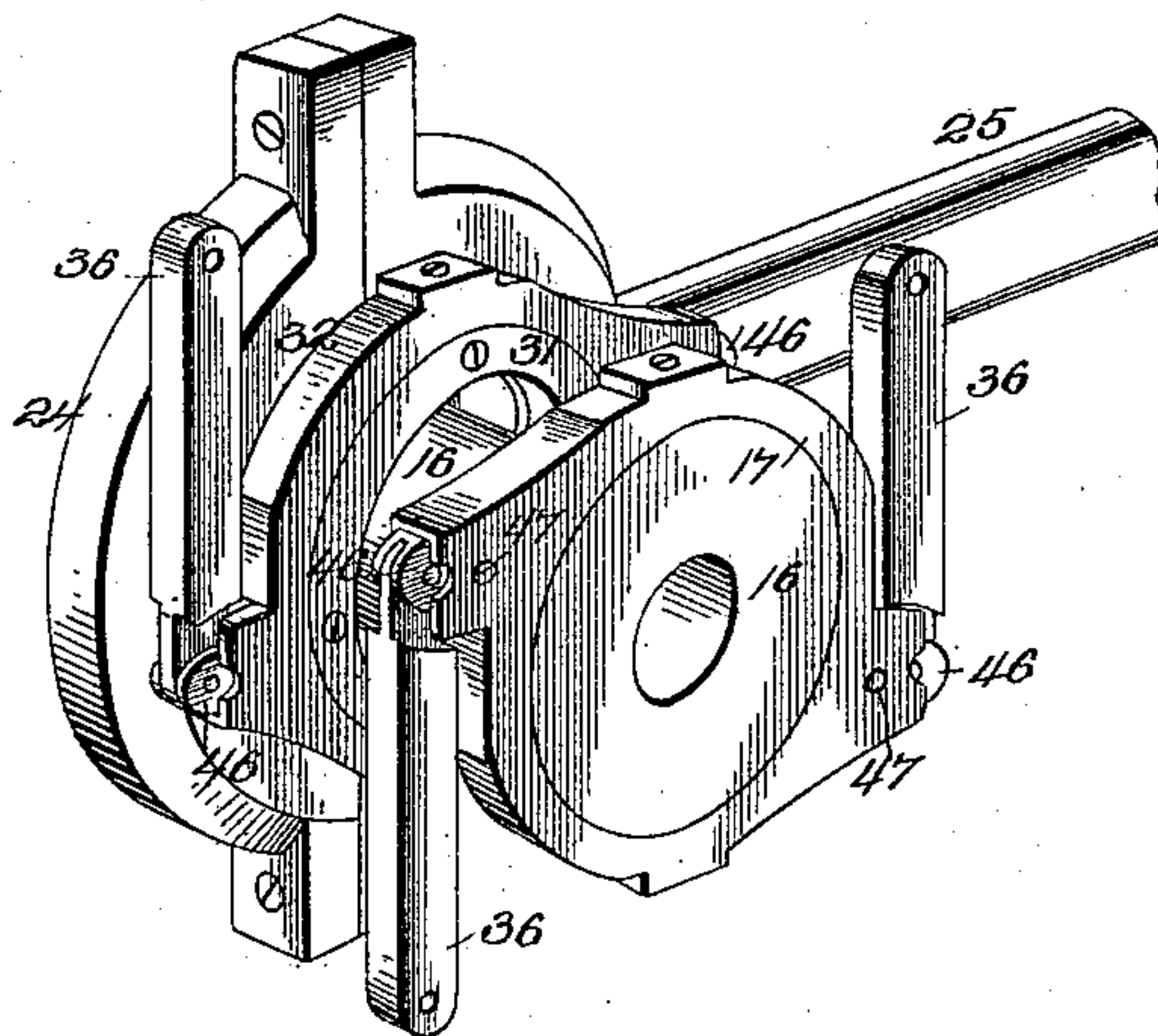
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*Fig. 6.*



Inventor

Witnesses

Jos. C. Stack.

*[Signature]*

By his Attorneys.

Billie Johnson

*Cañon & Co.*



(No Model.)

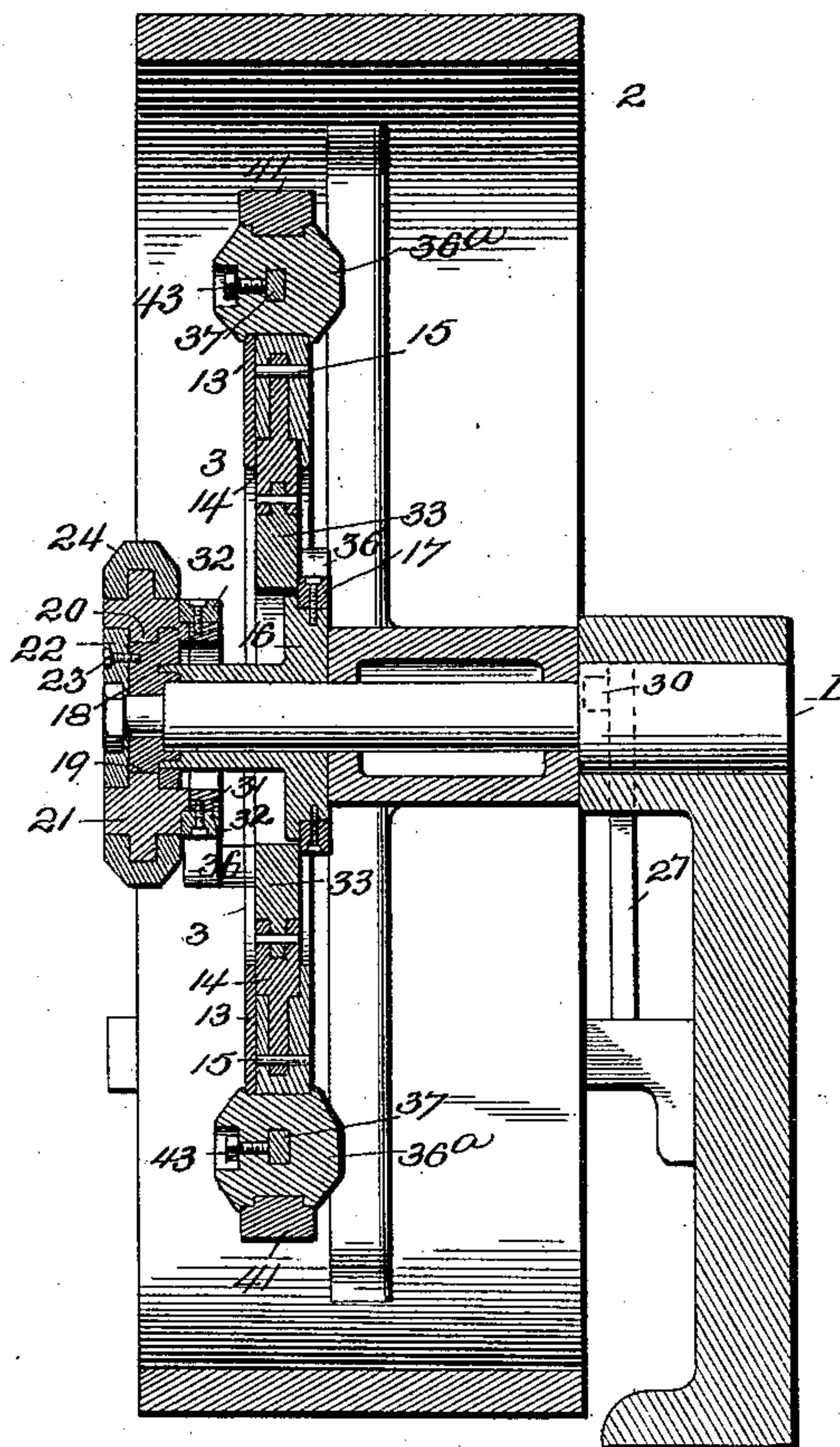
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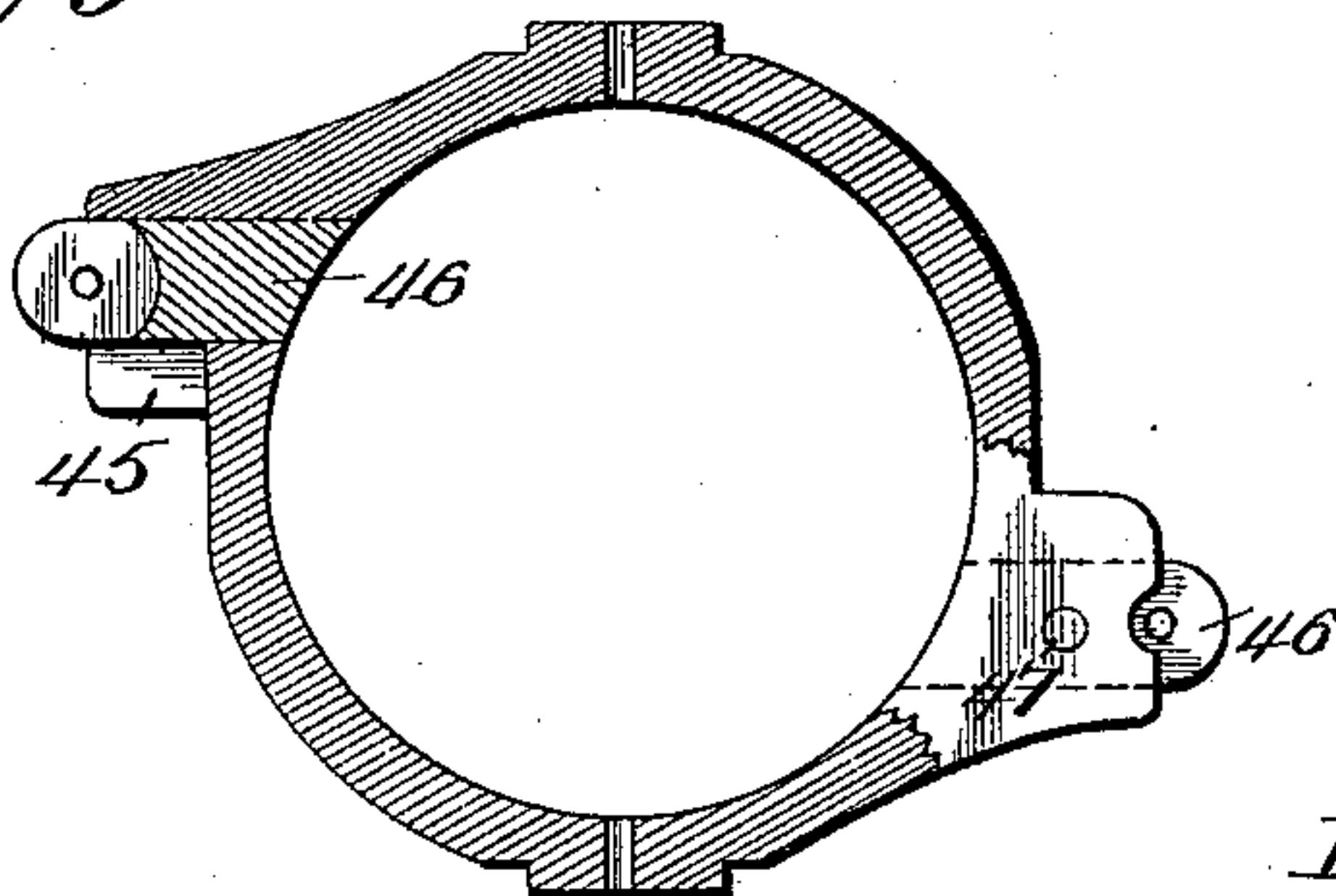
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*Fig. 3.*



*Fig. 5.*



Inventor

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Witnesses

*Jos. L. Stack.*  
*[Signature]*

By *his* Attorneys.

*C. A. Snow & Co.*



# UNITED STATES PATENT OFFICE

BILLIE JOHNSON, OF MOUNTAIN PEAK, TEXAS.

## GOVERNOR FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 532,734, dated January 15, 1895.

Application filed August 22, 1894. Serial No. 521,026. (No model.)

*To all whom it may concern:*

Be it known that I, BILLIE JOHNSON, a citizen of the United States, residing at Mountain Peak, in the county of Ellis and State of Texas, have invented a new and useful Governor for Steam-Engines, of which the following is a specification.

My invention relates to governing devices for steam and other engines, the objects in view being to provide an automatic governing device controlled by the speed, and hence, by the load of the engine, in order to maintain uniformity of movement under variations of load.

Further objects and advantages of my invention will appear hereinafter and the novel features thereof will be particularly pointed out in the claims.

In the drawings: Figure 1 is a view of the governing mechanism embodying my invention showing the parts contracted. Fig. 2 is a similar view showing the parts expanded. Fig. 3 is a vertical central section parallel with the axis of rotation of the wheel. Fig. 4 is a detail view in perspective of one of the centrifugal levers. Fig. 5 is a detail sectional view of one of the adjustable collars. Fig. 6 is a detail view in perspective of the means for communicating motion to the members of the eccentric.

Like numerals of reference indicate like parts in all the figures of the drawings.

1 designates a shaft carrying a pulley or other wheel 2 and within and carried by the wheel is a centrifugal weighted lever 3 pivoted at one end by means of a bolt 4 arranged in a bracket 5 and provided at its other or free end with an extension 6 to which is connected one end of a tension spring 7. The other end of this tension spring is connected to one arm of a rocking lever 8 fulcrumed at an intermediate point to a block 9 fixed, in the construction illustrated in the drawings, to the inner surface of the rim of the pulley or wheel. The other arm of said rocking lever is connected by means of an extensible tension regulating rod 10 to the free end of the lever 3. Said connecting rod 10 comprises independent relatively adjustable sections or members united by a right and left screw threaded sleeve or nut 11 and

it is obvious that by turning said sleeve or nut the members or sections of the connecting rod may be drawn toward or moved from each other to vary the tension of the spring 7. Fulcrumed in a cavity 12 formed in the inner side of the main or centrifugal lever 3, said cavity being covered by a removable plate 13, is a compensating block 14, the pivotal point of said block being indicated at 15.

Revolubly mounted upon the shaft, spindle, or axis of the wheel or pulley is a sleeve 16 and removably and adjustably secured to this sleeve at one end is a collar 17. Said sleeve carries the inner member or core 18 of a double eccentric, said inner member or core being provided with a peripheral groove 19 which receives a web 20 on the exterior member or ring 21 of said double eccentric, the inner member or core being provided with a removable cheek plate 22 held in place by bolts 23 to facilitate the assembling of the parts of the double eccentric. Connected to the eccentric by means of a yoke 24 of the ordinary or any preferred construction is a stem 25. This stem may be the valve stem of the engine but in the construction illustrated in the drawings, it is an intermediate part between the eccentric and a rocker 26 consisting of the parallel arms 27 and 28 connected by the shaft 29, a valve stem 30 being connected to the arm 27.

Removably and adjustably connected to a flange or extension 31 of the exterior member or ring of the double eccentric is a collar 32 which is similar in construction to the collar 17 which is attached to the sleeve 16, and therefore it will be seen that one of the collars is attached to each of the members of the double eccentric.

Pivotaly connected to the compensating block 14 at points near the center thereof are the extremities of links 33, the opposite ends of said links being connected to the outer arms of rocking levers 34. The inner arms of said levers 34 are connected by means of links 36 to the collars 17 and 32 respectively.

From the above description, it will be seen that when the rotation of the wheel or pulley is sufficiently rapid to cause an outward movement of the lever 3 due to centrifugal force the links 33 will cause a rocking move-



ment of the levers 34 and the motion of the latter communicated through the short links 35 will cause the collars 17 and 32 to turn in opposite directions thus turning the members 5 of the double eccentric respectively in opposite directions and either increasing or diminishing the eccentricity according to the relative adjustment of the members prior to such movement.

10 It will be understood that the members of the eccentric are so constructed that when the enlarged portion of one member is radially opposite the reduced portion of the other member the axis of the eccentric will be concentric with the outer periphery of the exterior member, and therefore when said members occupy these relative positions, no motion will be imparted to the connected stem or other part of the machine.

15 In the foregoing description, I have referred to a single construction involving a certain combination of elements for imparting opposite rotary movements to the members of the double eccentric, but in order to secure uniformity of movement and efficiency with a high speed of rotation of the wheel or pulley to which the mechanism is applied, I prefer to duplicate said combination of elements and arrange the same in diametrically opposite positions in the wheel or pulley. By such an arrangement I secure an equalization of strain in opposite directions upon each of the collars 17 and 32 and hence upon each of the members of the double eccentric, thus avoiding cramping or binding of the parts.

20 In addition to the above described mechanism I employ an adjustable weight attached to each of the centrifugal levers for increasing or diminishing the weight of the free end thereof and thus varying the speed at which such lever will be thrown outward by the centrifugal force caused by the rotation of the wheel or pulley. This weight 36 is fitted upon a guide 37 which is removably fitted at its extremities in sockets 38 formed at the ends of a recess 39 in the outer side of the lever. Said extremities of the guide bar 37 are held in place to the seats 38 provided therefor by means of blocks 40 carried by a scale bar 41.

25 Said scale bar is provided with graduations and the adjustable weight 36 is provided with a pointer 42 and when the weight is arranged in a given position the pointer carried thereby will indicate by reference to the graduated scale bar the number of revolutions of the wheel or pulley per minute required to turn the members of the double eccentric into such relative positions that all steam will be cut off from the cylinder of the engine.

30 The adjustable weight is secured at the desired point of the guide bar by means of a set screw 43. Suitable stop pins 44 are provided for limiting the outward movement of the free ends of the centrifugal levers.

35 In order to provide for more or less move-

ment of the exterior member or ring of the eccentric in proportion to the movement of the centrifugal levers I provide the collar 32 with recesses 45 in which are fitted studs 46 by which connection is formed between the 70 collar and the extremities of the short links 36. These studs are adjustable radially on the collar, pins 47 being provided to engage perforations in the studs to secure them at the desired adjustment, and it will be seen 75 that by arranging the studs at a greater or less extension the communication of motion to the collar from the other parts of the apparatus may be varied.

The operation of the improved governing 80 mechanism will be fully understood from the foregoing description and it will be obvious that in adapting the same to various forms and styles of engines various changes in the form, proportion and the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus described my invention, what I claim is—

90 1. The combination with a wheel or pulley of a double eccentric arranged upon the axis of the wheel or pulley, an eccentric yoke and connections, opposite centrifugal levers carried by the wheel or pulley, rocking levers 95 fulcrumed at intermediate points and carried by the centrifugal levers, connections between the inner ends of said rocking levers and the members of the double eccentric respectively, and connections between said centrifugal levers and the outer extremities of the rocking levers whereby when the centrifugal levers are operated the members of the eccentric are rotated in opposite directions, substantially as specified.

105 2. The combination with a wheel or pulley of a double eccentric arranged upon the axis of the wheel or pulley, an eccentric yoke and connections, a centrifugal lever carried by the wheel or pulley, a compensating block carried by the centrifugal lever and fulcrumed at an intermediate point thereto, and connections between said compensating block and the members of the eccentric, substantially as specified.

115 3. The combination of a wheel or pulley of a double eccentric arranged upon the axis of the wheel or pulley, an eccentric yoke and connections, oppositely disposed centrifugal levers fulcrumed at their extremities upon the 120 wheel or pulley, intermediate fulcrumed compensating blocks carried respectively by the centrifugal levers, rocking levers fulcrumed to the extremities of the compensating blocks and connected at their inner ends in pairs to 125 the members of the eccentric, and links connecting intermediate points of the compensating blocks to the outer extremities of said rocking levers, the links which are attached to the center of one compensating block being 130



connected to the extremities of the rocking levers of the other compensating block, substantially as specified.

4. The combination with a wheel or pulley of a double eccentric arranged on the axis of the wheel or pulley and having concentric sleeves or extensions, centrifugal levers carried by the wheel or pulley, intermediate rocking levers connected with the centrifugal levers, links connected to the said intermediate levers, and adjustable connections between said links and the extensions of the members of the eccentric, substantially as specified.

5. The combination with a wheel or pulley of a double eccentric arranged upon the axis thereof and provided with concentric extensions, collars adjustably secured to the said concentric extensions, centrifugal levers carried by the wheel or pulley, intermediate rocking levers operatively connected with the centrifugal levers and connections between said rocking levers and the said collars, substantially as specified.

6. The combination with a wheel or pulley, of a double eccentric arranged upon the axis thereof and having an outer member or ring and an inner member or core fitting within said outer member or ring, the inner member having a removable cheek plate to facilitate its arrangement within the outer member or ring, an eccentric yoke and connections, centrifugal levers arranged upon the wheel or pulley, and connections between said levers and the members of the eccentric, substantially as specified.

7. The combination with a wheel or pulley of a double eccentric arranged upon the axis thereof, an eccentric yoke and connections, a centrifugal lever carried by the wheel or pulley and pivoted at one end thereto, connections between the centrifugal lever and the members of the eccentric whereby the latter are turned relatively in opposite directions, and a tension regulating device comprising a contractile spring attached at one end to the free end of the centrifugal lever, a rocking lever fulcrumed at an intermediate point to a bracket fixed to the wheel or pulley and having one arm connected to said spring, and an extension rod having relatively adjustable

members and connected at its extremities respectively to the other arm of said rocking lever and to the free end of the centrifugal lever, substantially as specified.

8. The combination with a wheel or pulley of an eccentric arranged upon the axis thereof, an eccentric yoke and connections, a centrifugal lever carried by the wheel or pulley and fulcrumed at one extremity thereto, connections between said lever and the eccentric, means for normally holding the free end of the centrifugal lever from outward movement, and an adjustable weight carried by the lever, substantially as specified.

9. The combination with a wheel or pulley, of an eccentric arranged upon the axis thereof, an eccentric yoke and connections, a centrifugal lever carried by and fulcrumed at one end to the wheel or pulley, connections between said pulley and the eccentric, a yielding connection between the free end of the lever and the fixed part of the wheel or pulley, a weight mounted upon a guide carried by the centrifugal lever, means for locking said weight at the desired adjustment, and a graduated scale bar arranged contiguous to the weight, substantially as specified.

10. The combination with a wheel or pulley of an eccentric arranged upon the axis thereof, an eccentric yoke and connections, a centrifugal lever carried by and fulcrumed at one end to the wheel or pulley, connections between said centrifugal lever and the eccentric, means for normally holding the free end of the centrifugal lever from outward movement, a guide bar fitted in seats in the centrifugal lever, removable blocks for holding the extremities of said guide bar in the seats, a weight slidably mounted upon the guide bar and carrying a pointer or indicator, means for locking the weight at the desired point of the guide bar, and a graduated scale arranged parallel with the guide bar, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

BILLIE JOHNSON.

Witnesses:

S. M. MCCLANAHAN,  
L. E. ESKRIDGE.