

C. J. PILLIOD.  
AUTOMATIC GOVERNOR AND REVERSING GEAR.  
APPLICATION FILED MAY 2, 1910.

982,988.

Patented Jan. 31, 1911.

3 SHEETS—SHEET 1.

Fig. 3.

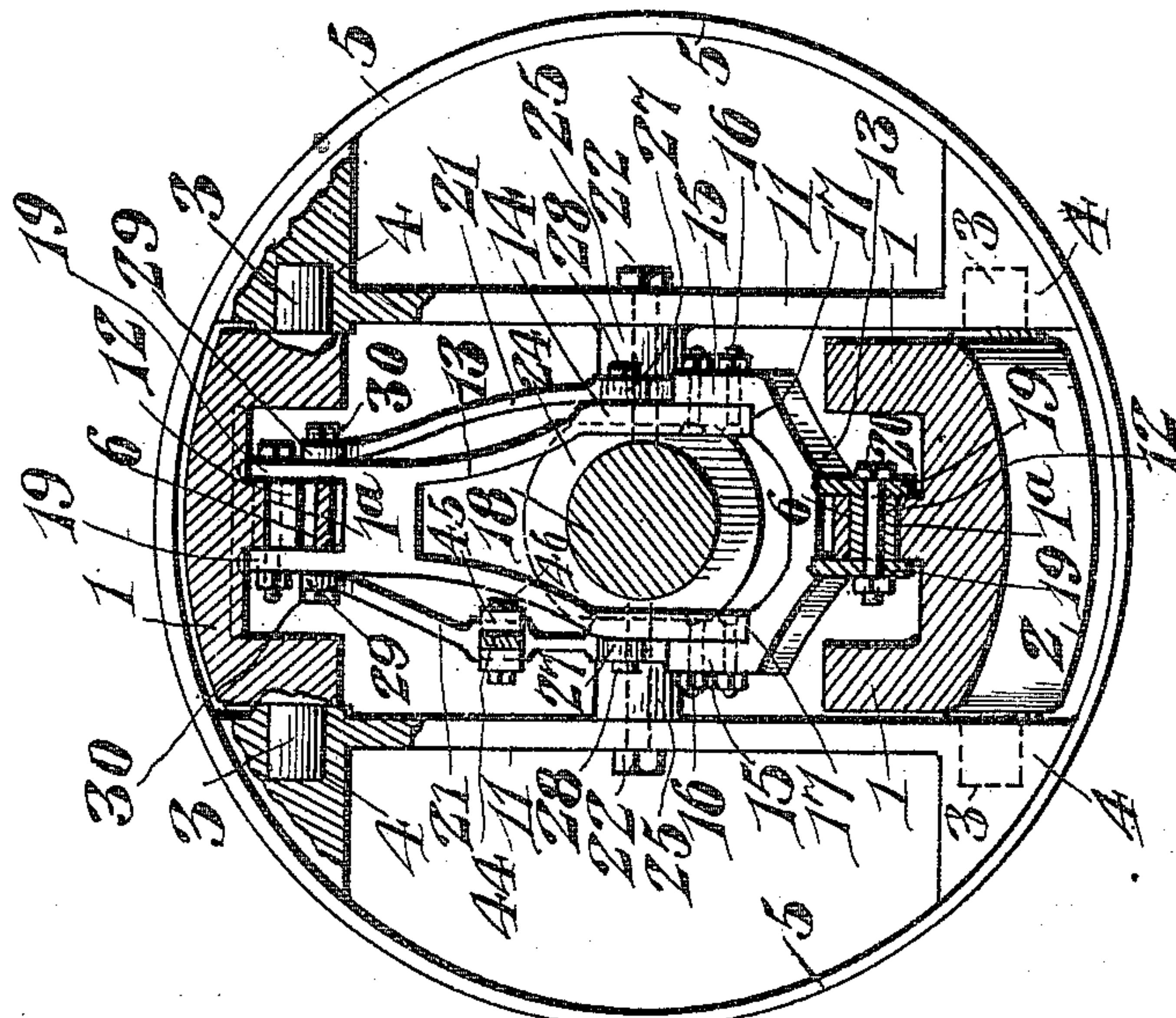
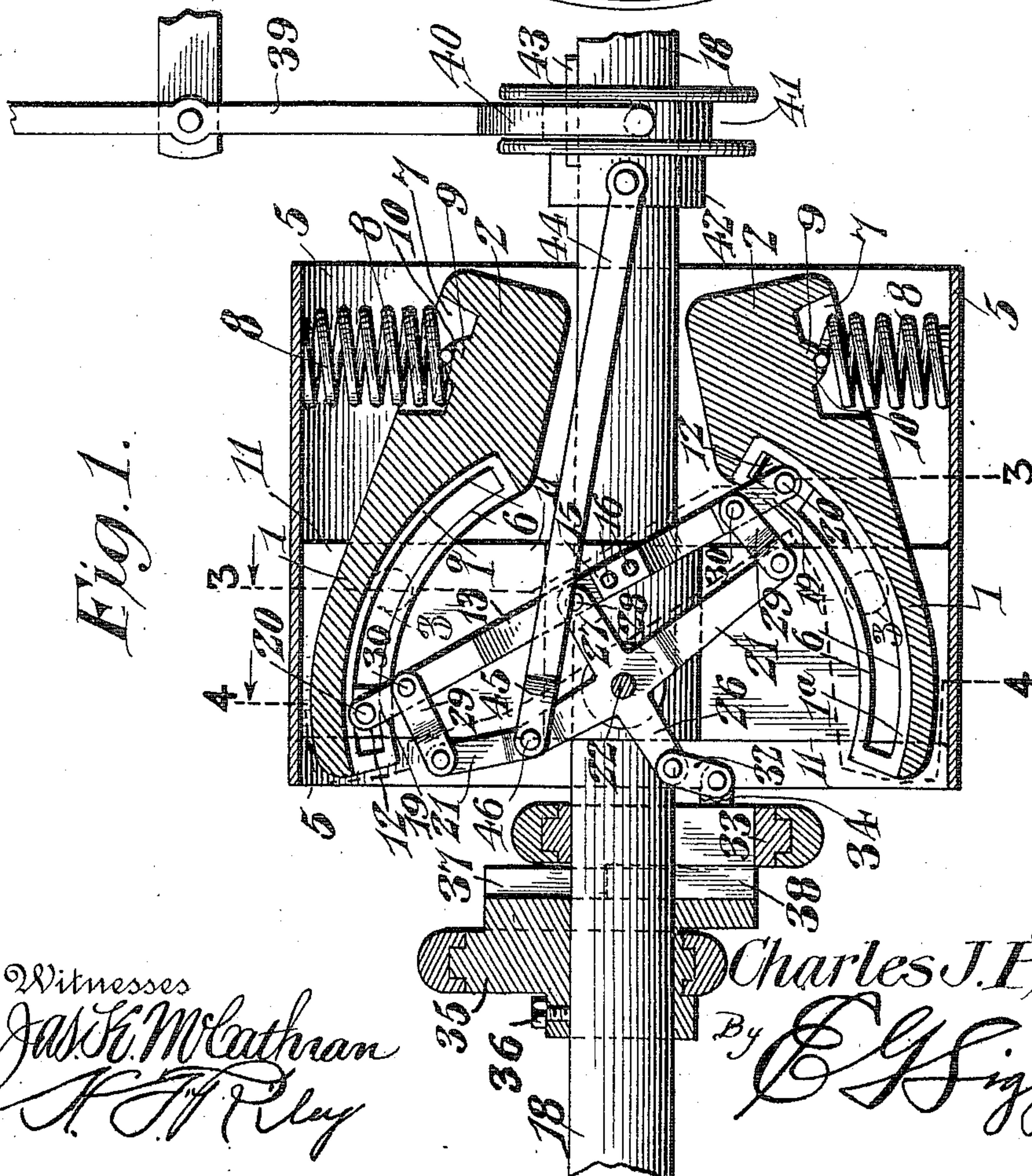


Fig. 1.



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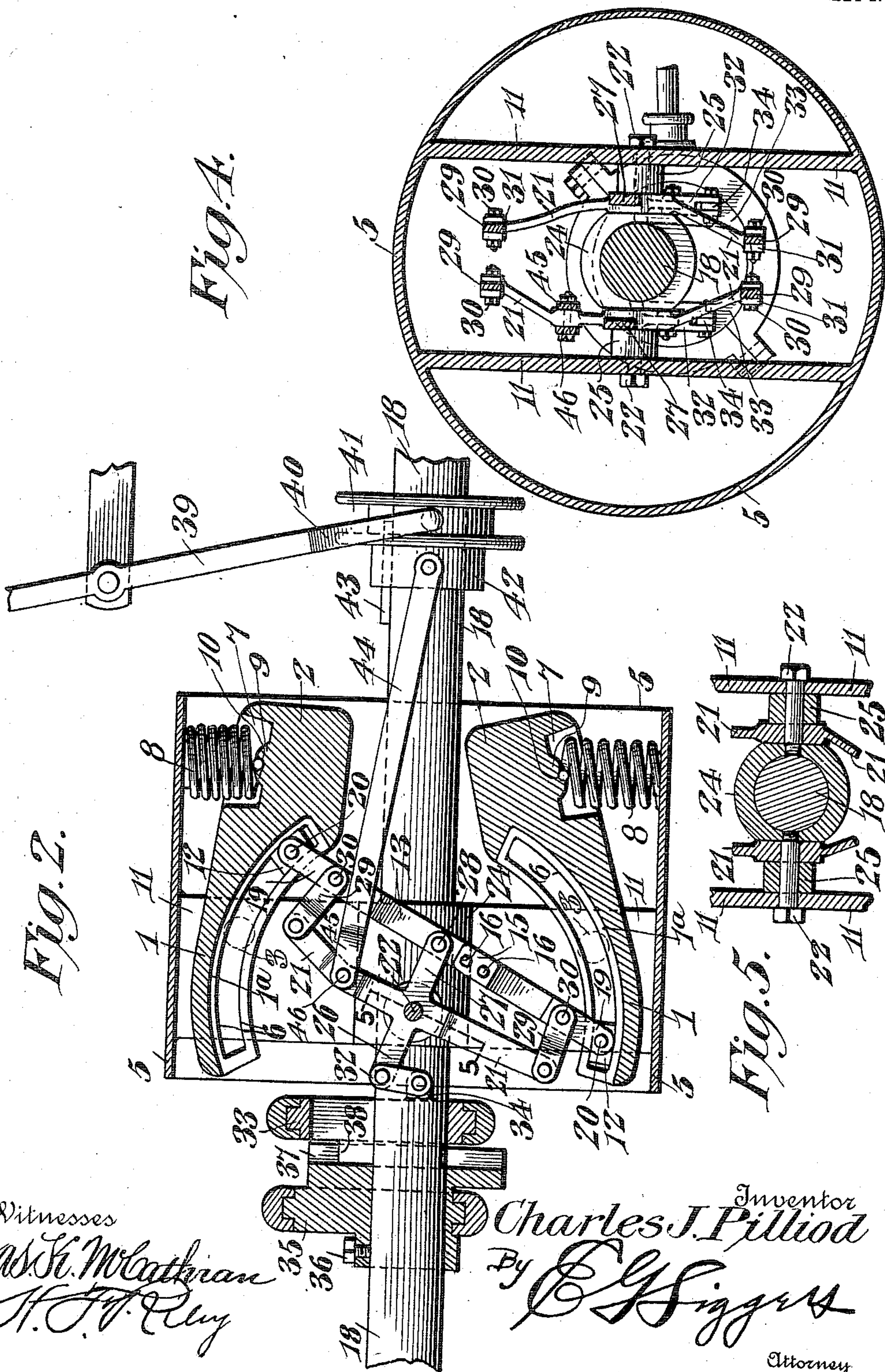


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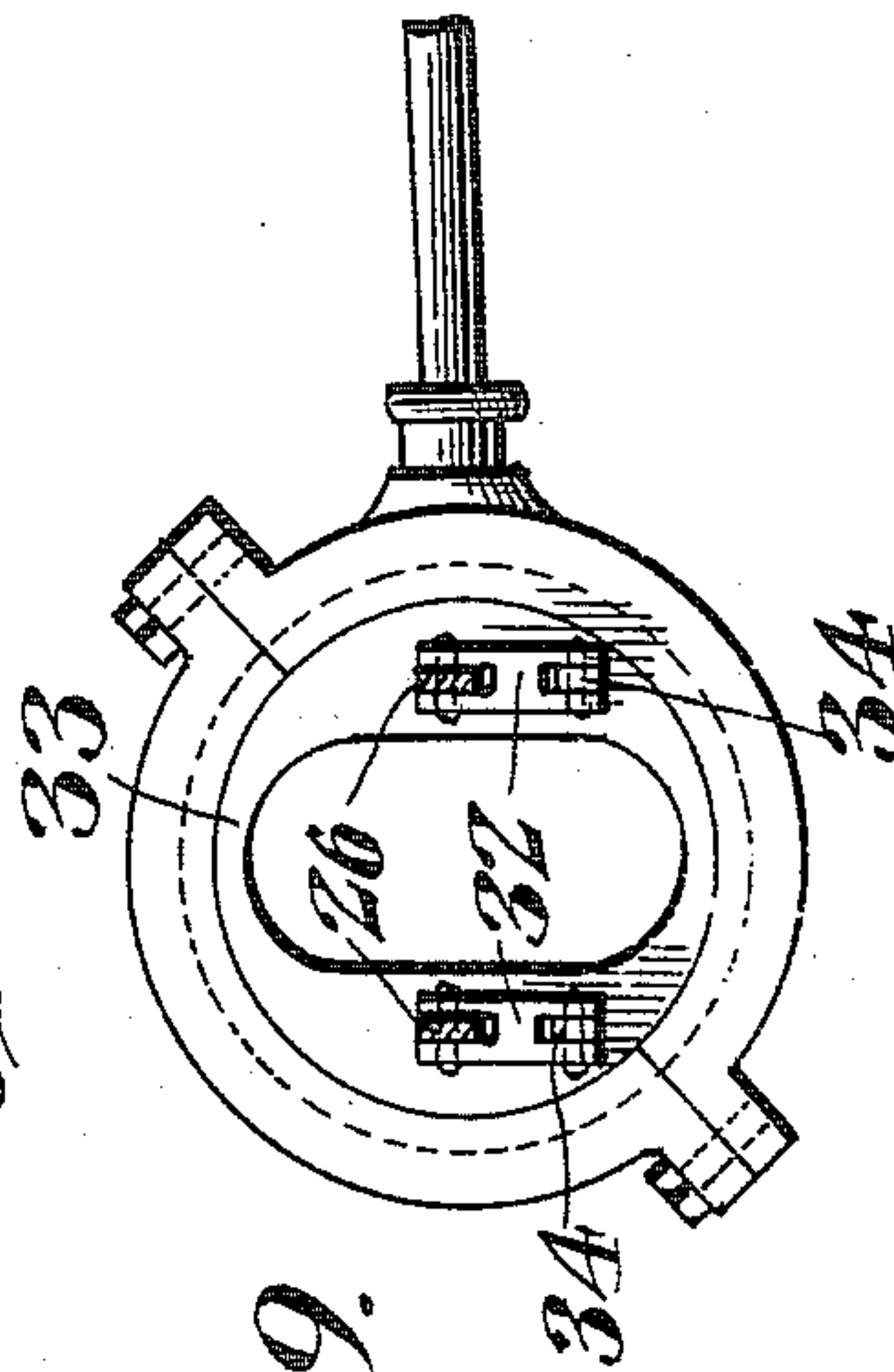
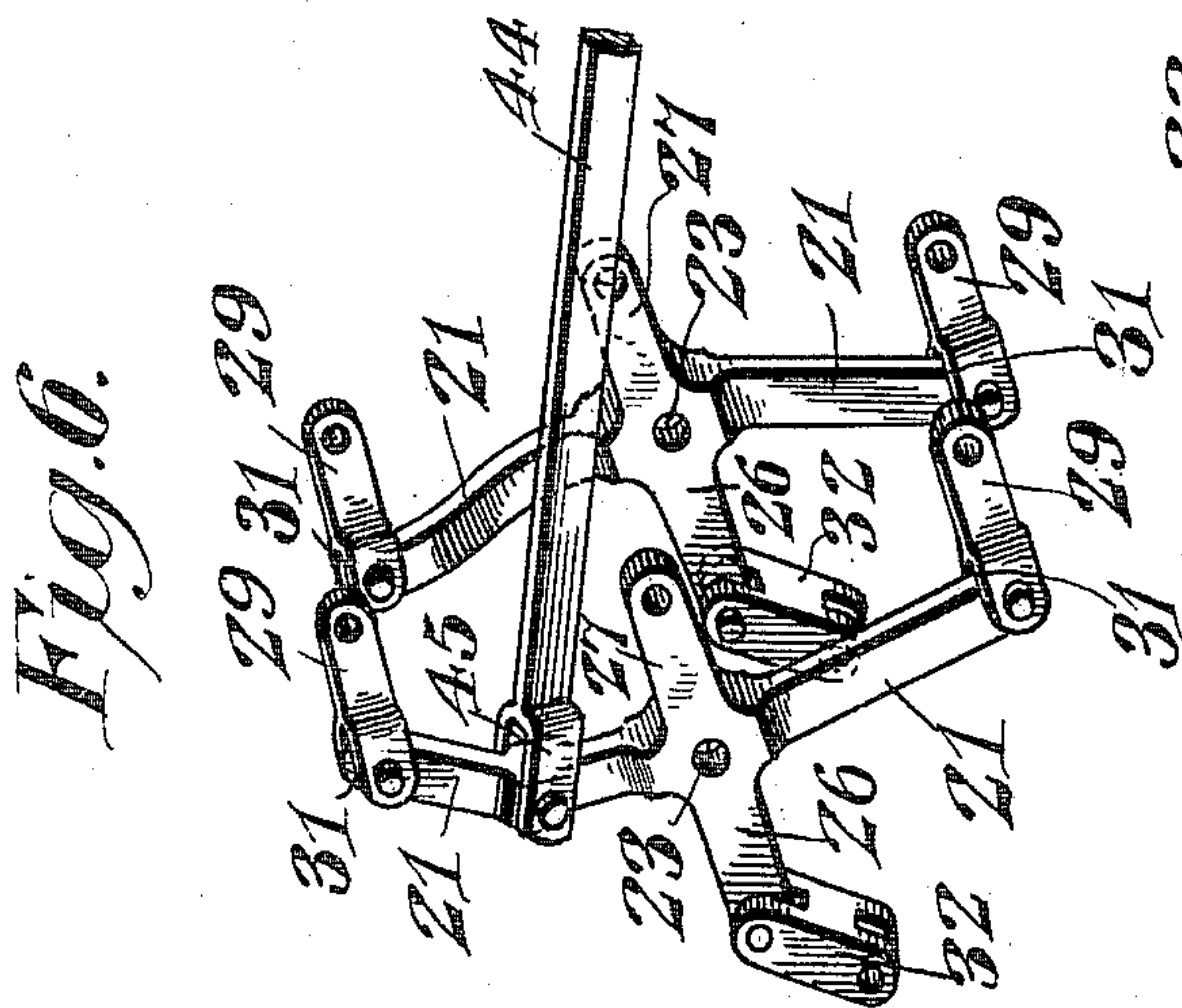
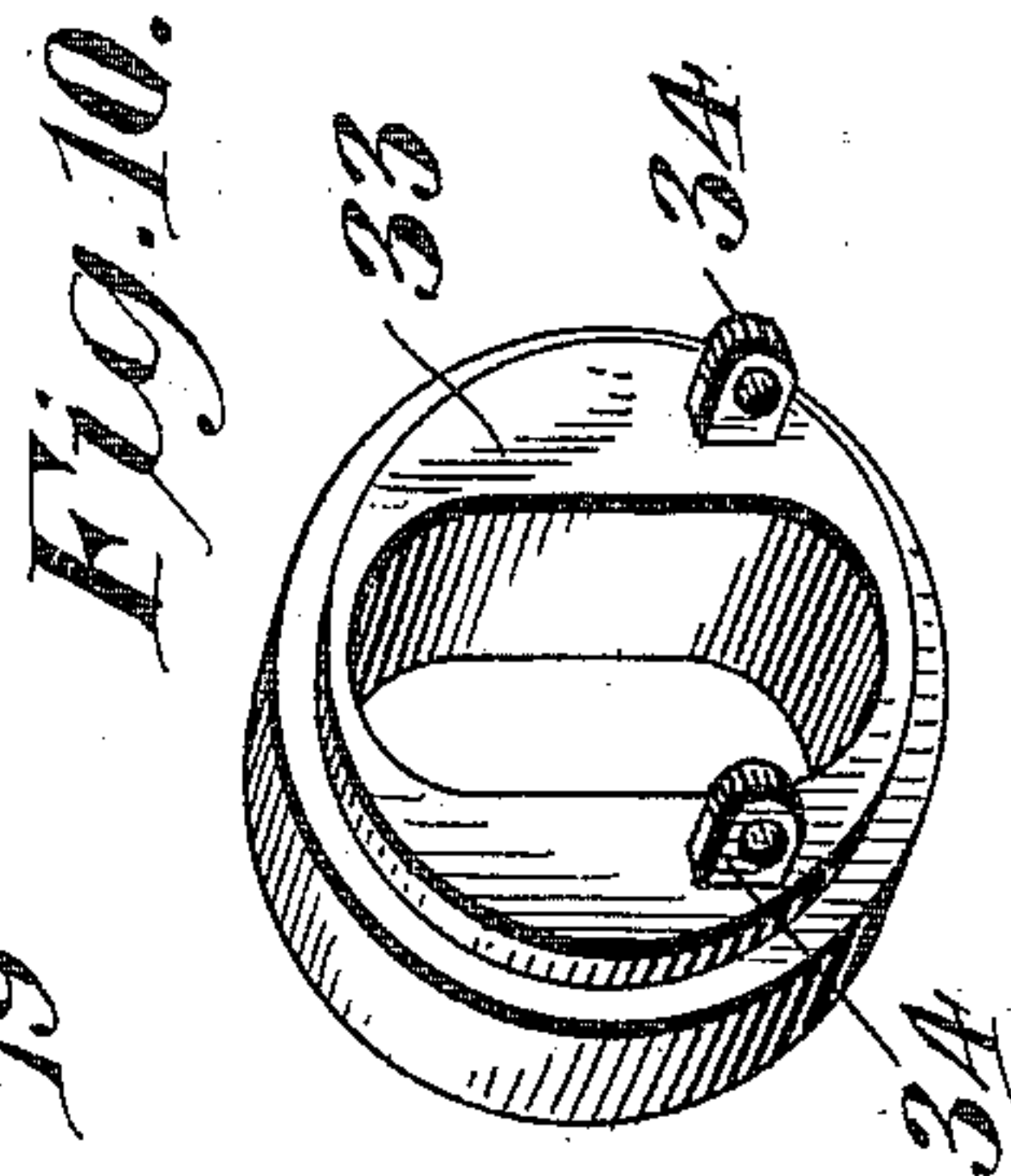
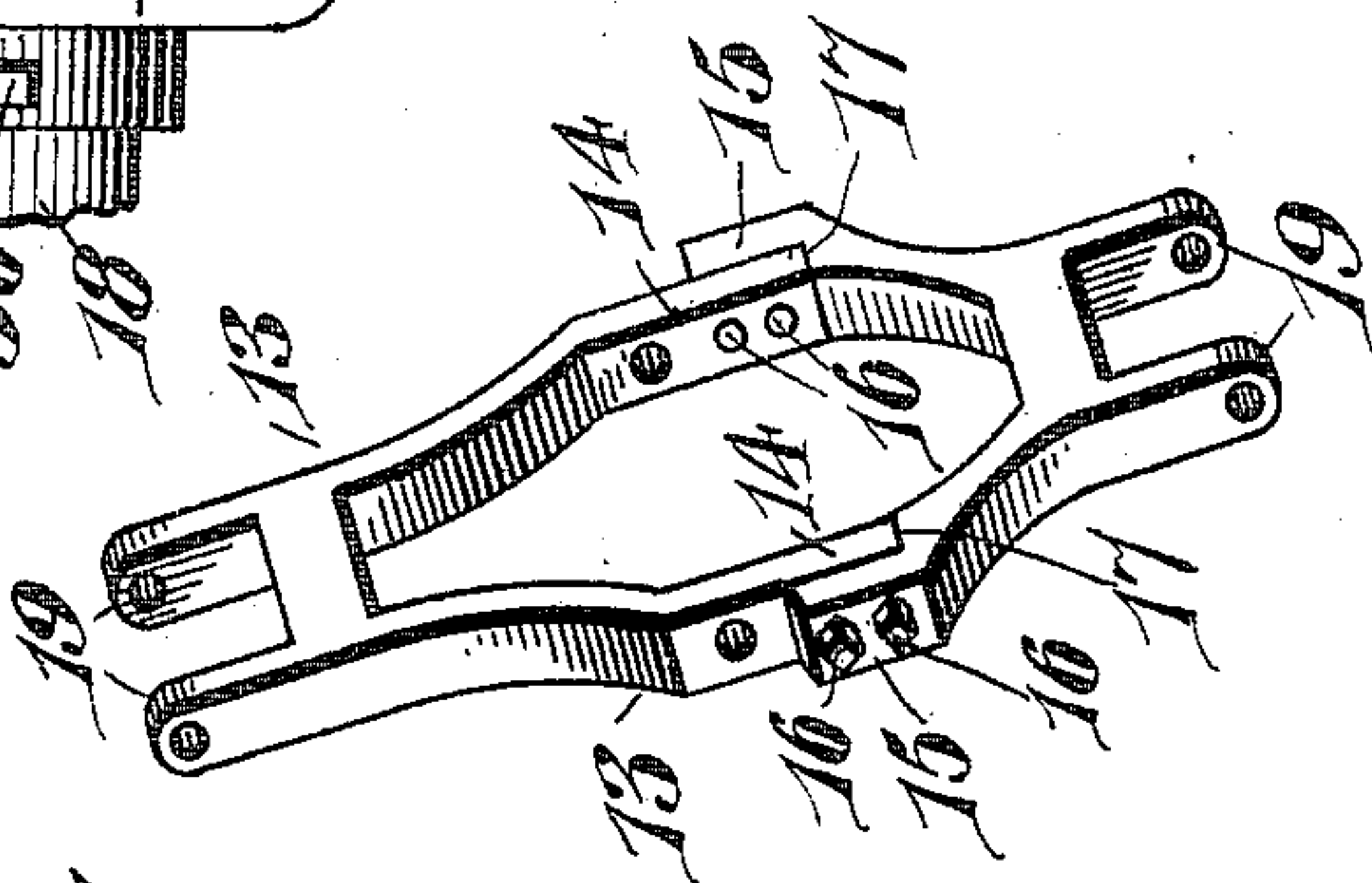
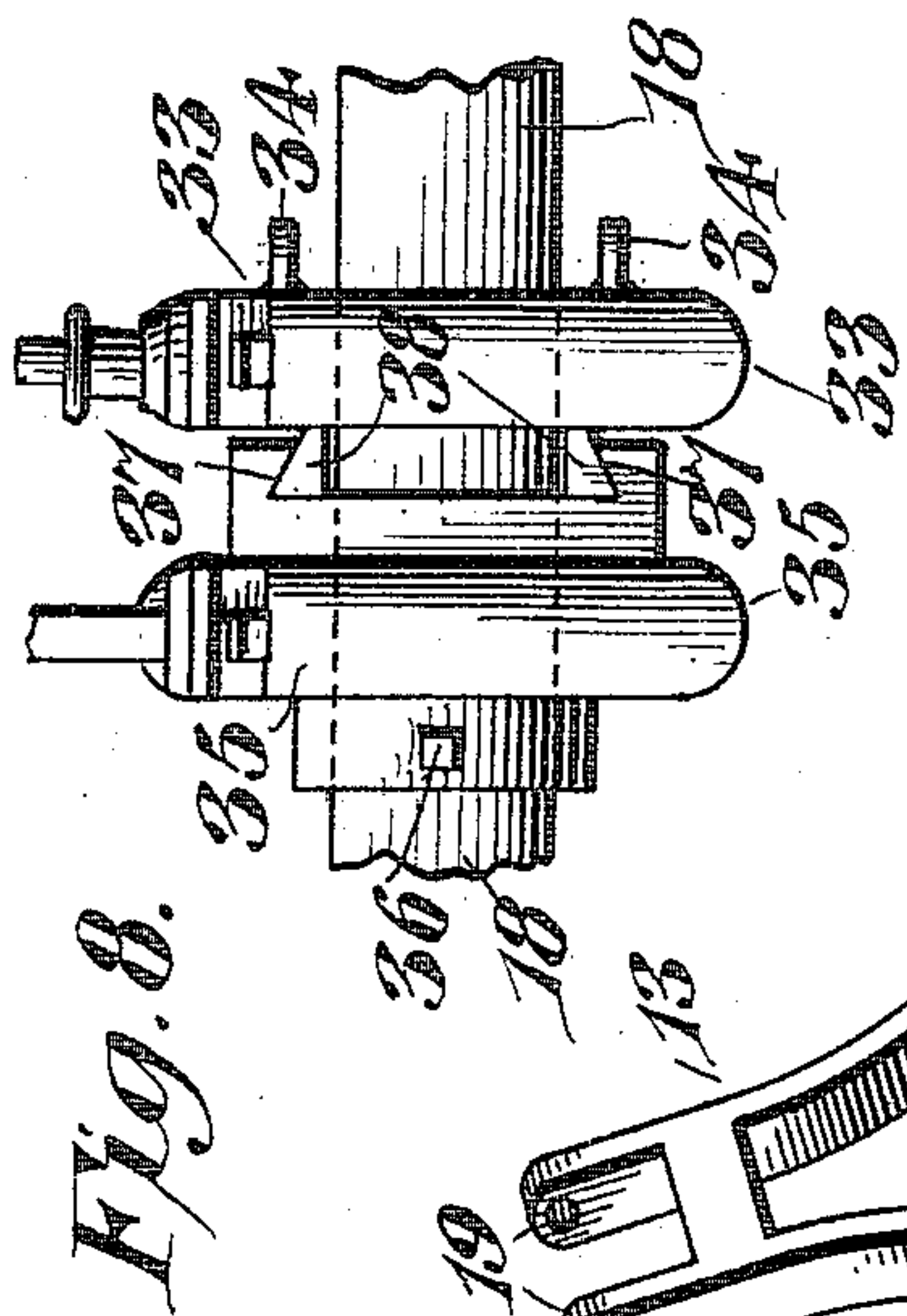


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3 SHEETS—SHEET 3.



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# UNITED STATES PATENT OFFICE.

CHARLES J. PILLIOD, OF TOLEDO, OHIO.

AUTOMATIC GOVERNOR AND REVERSING-GEAR.

982,988.

Specification of Letters Patent.

Patented Jan. 31, 1911.

Application filed May 2, 1910. Serial No. 558,821.

*To all whom it may concern:*

Be it known that I, CHARLES J. PILLIOD, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented a new and useful Automatic Governor and Reversing-Gear, of which the following is a specification.

The invention relates to an automatic governor and reversing gear for engines.

The object of the present invention is to provide a simple and efficient combined automatic governor and reversing gear, automatically operated by variations in speed due to changes in the load or in the pressure of the steam, or other motive fluid, and adapted to secure uniform speed of an engine, and capable also of being manually operated to reverse the engine.

With these and other objects in view, the invention consists in the construction and novel combination of parts hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claims hereto appended.

In the drawings:—Figure 1 is a longitudinal sectional view of a combined automatic governor and reversing gear, constructed in accordance with this invention. Fig. 2 is a similar view, the parts being in the opposite position from that shown in Fig. 1 for reversing an engine. Fig. 3 is a transverse sectional view on the line 3—3 of Fig. 1. Fig. 4 is a similar view on the line 4—4 of Fig. 1. Fig. 5 is a detail sectional view on the line 5—5 of Fig. 2. Fig. 6 is a detail perspective view of the lever. Fig. 7 is a similar view of the reversing yoke or bar. Fig. 8 is a plan view of the fixed and slidable eccentrics. Figs. 9 and 10 are detail views of the slidable eccentric.

Like numerals of reference designate corresponding parts in all the figures of the drawings.

The specification is a disclosure of one form of the invention, while the claims define the actual scope of the invention.

In the embodiment of the invention illustrated in the accompanying drawings, the combined automatic governor and reversing gear comprises in its construction a pair of opposite centrifugally operable weighted guiding members 1, constructed of suitable metal and tapered from one end to a point near the opposite end and having weighted end portions 2. The weights or weighted

guiding members are provided at a point intermediate of their ends with laterally extending pivots 3, journaled in suitable bearings 4 of a rotary casing 5. The pivots or journals 3 are located at points intermediate of the ends of the tapered portions of the weights, which are provided in the inner faces of the tapered portions with longitudinal recesses 1<sup>a</sup>, and are equipped at the recesses with longitudinal guides 6 having curved slots or guideways and located midway between the side walls of the recesses 1<sup>a</sup>. The inner faces of the tapered portions are curved to conform to the curvature of the guides 6, and are arranged in the same plane as the outer side face of the guide. The guide may consist of a separate piece applied to the centrifugally operable member or formed integral with the same. The enlarged portions 2 of the weights or members 1 are provided in their outer side edges with recesses 7, receiving coiled springs 8, interposed between the enlarged portions 2 and the circular casing, as clearly shown in Figs. 1 and 2 of the drawings. The outer ends of the coiled springs 8 may be secured to the circular casing by any suitable means, and the enlarged ends 2 of the centrifugally operable members are preferably provided in the recesses 7 with protuberances 9, having grooves 10 receiving the inner ends of the coiled springs 8 and forming seats for the same. The bearings 4 are arranged in pairs at opposite portions of the rotary casing, and they may consist of the enlargement of the parallel plates 11, mounted within the circular casing and forming opposite supports.

The curved guides or ways 6 receive slidable blocks 12, to which is pivoted a reversing bar or yoke 13, preferably composed of two approximately U-shaped members, rigidly connected at their adjacent ends 14 and 15 by bolts 16, or other suitable fastening devices. The ends 15 are provided at their inner faces with recesses 17, receiving the ends 14 and forming shoulders against which the said ends 14 abut. The reversing bar or yoke, which is adapted to straddle the shaft 18, is provided at its ends with spaced projecting portions or arms 19, which are connected with the blocks 12 by suitable pivots 20. The reversing bar connects the opposite weights and extends from the outer end of one of the slots or guideways to the



inner end of the other, one end of the reversing bar being located at one side of the pivots of one of the weights, and its other end being located at the opposite side of the pivots of the other weight. The reversing bar is of a length equal to the distance between the pivots of the two members, so that it can be passed beyond the same in either direction in the manual operation of the device. The blocks are slidable along the curved guideways and are automatically actuated in such movements to vary the cut-off of an engine, and are manually operable to shift them from one side of the pivots to the other for reversing the engine, as hereinafter more fully explained.

The reversing bar or yoke is carried by a pivoted lever composed of two sides or members 21, located at opposite sides of the shaft 18 and mounted on opposite centrally arranged pivots 22, consisting of screws extending through central bearing openings 23 of the sides or members of the lever and piercing the supports 11 of the rotary casing and having inner threaded portions, which engage threaded openings of a sleeve 24 that is mounted on the shaft 18. Spacing sleeves 25 are interposed between the supports 22 and the outer faces of the sides or members 21 of the lever. The sides or members of the lever are provided at their centers with opposite projecting arms 26 and 27; the arms 27 are connected at their outer ends with the sides of the reversing bar or yoke by suitable fastening devices 28, and the outer ends of the sides or members 21 of the lever are connected by short links 29 with the outer portions of the reversing bar or yoke by suitable fastening devices 30. The links 29 have forked or bifurcated ends 31, which embrace the ends of the sides or members 21 of the lever. The other arms 26 of the sides or members of the lever 21 are connected by short links 32 with a sliding eccentric 33, provided with spaced ears 34 for the attachment of the links 32, which are bifurcated at each end to receive the arms 26 of the lever and the ears 34 of the sliding eccentric.

The combined automatic governor and reversing gear is designed principally for use in connection with the valve gear shown and described in a companion application, executed of even date herewith.

The fixed eccentric 35, which is secured by a set screw 36, or other suitable means to the shaft 18, is provided at one side with a dove-tailed groove or guideway 37, and the sliding eccentric 33 is provided with dove-tailed portions 38, located at opposite sides of the shaft and arranged in the groove or guideway 37 and constituting a slide. The eccentric 33 is slidable across the shaft, being shiftable or adjustable from the extreme points of the limit of its movement to a central position to vary the cut-off and to

stop the engine, and it is movable directly across the shaft for reversing the engine, as explained in the aforesaid application.

The centrifugal action of the weights or weighted members automatically shift the sliding eccentric to secure uniform speed under varying conditions of the load and steam pressure, and the lever is shifted to move the blocks from one side of the pivots 3 to the other for reversing the engine by means of an operating lever 39, having a forked portion 40 engaging a groove 41 of a collar 42. The collar 42 is slidably interlocked with the shaft 18 by means of a key 43, and it is connected by a rod 44 with the other sides or members of the lever at a point between the pivot and one end thereof. The rod 44 is forked or bifurcated at 45 to straddle the side or member of the lever to which it is connected by a suitable pivot 46. The swinging of the lever moves across the shaft the arm 27 and the link 32, which constitute means for connecting the combined automatic governor and reversing gear with the valve gear. The coiled springs will not permit the sliding blocks to move in the guideways across the pivots in an automatic action of the device, and they move the weights inwardly as soon as the speed decreases sufficiently to reduce the centrifugal force to a point below the power of the springs.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. An automatic governor and reversing gear including a pivoted centrifugally operable member, a lever having means for connecting it with a valve gear, and means for connecting the lever with the centrifugally operable member, said means being shiftable to opposite sides of the pivoted member for reversing an engine.

2. An automatic governor and reversing gear including a pivoted centrifugally operable member, a lever having means for connecting it with a valve gear, means for connecting the lever with the centrifugally operable member, and manually operable mechanism for shifting the lever to opposite sides of the pivot of the said member for reversing an engine.

3. An automatic governor and reversing gear including opposite centrifugally operable pivotally mounted members, springs for moving the members inwardly, a lever connected with and actuated by the members for operating a valve gear to vary the cut-off, and manual mechanism for shifting the lever to opposite sides of the pivotal points of the said members for reversing an engine.

4. An automatic governor and reversing gear including a centrifugally operable member having a guideway and provided with a pivot located intermediate of the ends



of the guideway, a lever having means for connecting it with a valve gear, and means slidable in the guideway and connected with the lever, whereby the centrifugally operable member is adapted to automatically actuate the lever for varying the cut-off, and manually operable means for moving the slidable means from one side of the pivot to the other for reversing an engine.

5. An automatic governor and reversing gear including a centrifugally operable member having a guideway and provided with a pivot located at a point intermediate of the ends of the guideway, a block slidable in the guideway, a lever connected with the block and automatically actuated by the said member for varying the cut-off of an engine, and manually operable means for moving the block from one side of the pivot to the other for reversing the engine.

6. An automatic governor and reversing gear including a centrifugally operable member having a curved slot or guideway and pivoted centrally of the same, a spring for urging the centrifugally operable member inwardly, a lever having means for connecting it with a valve gear, means slidable in the slot or guideway and connected with the lever, whereby the latter is automatically actuated by the centrifugally operable member to vary the cut-off, and operating mechanism for shifting the slidable means from one side of the pivot to the other for reversing an engine.

7. An automatic governor and reversing gear including a pivotally mounted centrifugally operable member enlarged at one end and provided with a tapered portion having a guideway, the enlarged end of the said member being provided at the outer side with a recess and having a seat therein, a coiled spring arranged on the seat and adapted to urge the said member inwardly, a lever having means for connecting it with a valve gear, and means slidable along the guideway for connecting the lever with the centrifugally operable member.

8. An automatic governor and reversing gear including opposite centrifugally operable members having curved guideways and pivoted centrally thereof, a reversing bar connecting the said members and having means slidable in the said guideways, a pivotally mounted lever connected with the said reversing bar and actuated by the said members for varying the cut-off of an engine, and operating mechanism for shifting the reversing bar for reversing an engine.

9. An automatic governor and reversing gear including opposite centrifugally operable members weighted at one end and provided with curved guideways and pivoted centrally thereof, springs for urging the said members inwardly, a reversing bar connect-

ing the said members and having means slidable in the said guideways, a lever connected with the reversing bar and actuated by the same, and actuating mechanism for shifting the reversing bar from one side of the pivot to the other for reversing an engine.

10. An automatic governor and reversing gear including opposite centrifugally operable members provided with guideways and pivoted centrally thereof, a reversing bar connecting the said members and extending from one end of one guideway to the opposite end of the other guideway and having means slidable in the said guideways, said reversing bar being shiftable along the guideways to the opposite ends thereof for reversing an engine, and a lever actuated by the reversing bar and having means for connecting it with a valve gear for varying the cut-off.

11. An automatic governor and reversing gear including opposite centrifugally operable members having curved guideways and pivoted centrally thereof, a yoke-shaped reversing bar having terminal portions located at the sides of the said guideways, blocks slidable in the guideways and pivotally connected with the terminals of the reversing bar, a lever connected with and actuated by the reversing bar and having means for connecting it with a valve gear, and manually operable means for shifting the reversing bar.

12. An automatic governor and reversing gear including a centrifugally operable member provided with a recess and having a curved guide seated in the recess and provided with a curved slot or guideway, said member being pivoted centrally of the slot or guideway, a reversing lever having means slidable in the guideway, and a lever actuated by the reversing bar and having means for connecting it with a valve gear.

13. An automatic governor and reversing gear including pivotally mounted centrifugally operable members, a reversing bar consisting of a yoke slidably connected with the said members, a lever composed of two pivotally mounted sides connected with the reversing bar, and means for connecting the sides of the lever with a valve gear.

14. An automatic governor and reversing gear including opposite centrifugally operable members, a reversing bar slidably connected with the said members, a pivotally mounted lever composed of two sides connected with the reversing bar and having projecting arms extending from the lever at the pivotal point thereof, and means for connecting the said arms with the valve gear.

15. An automatic governor and reversing gear including opposite pivotally mounted centrifugally operable members, a reversing



bar slidably connected with the said members, a pivotally mounted lever composed of two sides and having projecting arms connected with the reversing bar, links also  
5 connecting the sides of the lever with the reversing bar, and means for connecting the lever with a valve gear.

16. In a governor and reversing gear, the combination with a shaft, and an eccentric  
10 slidable across the same, of opposite pivotally mounted centrifugally operable members, a lever composed of two pivotally mounted sides having arms, means for slidably connecting the lever with the said mem-  
15 bers, and links connecting the arms of the lever with the slidable eccentric.

17. In an automatic governor and reversing gear, the combination with a shaft, and an eccentric slidable across the shaft, of op-  
20 posite pivotally mounted centrifugally operable members, a pivotally mounted lever, means for connecting the lever with the slidable eccentric, and a reversing bar carried by the lever and slidably connected  
25 with the said members.

18. In an automatic governor and reversing gear, the combination with a shaft, and an eccentric slidable across the same, of op-  
30 posite pivotally mounted centrifugally operable members, a yoke-shaped reversing bar slidably connected with the members, a pivotally mounted lever composed of two sides connected with the reversing bar, and means for connecting the lever with the  
35 eccentric.

19. In an automatic governor and reversing gear, the combination with a shaft, and an eccentric slidable across the same, of op-  
40 posite pivotally mounted centrifugally operable members, a yoke-shaped reversing bar slidably connected with the members, a pivotally mounted lever composed of two sides connected with the reversing bar, a pivotally mounted lever composed of two  
45 sides having oppositely disposed arms, one of the arms of each side being connected with the reversing bar, means for connecting the other arm of each side of the lever with the sliding eccentric, and links connecting  
50 the sides of the lever with the reversing bar.

20. An automatic governor and reversing gear including a rotary casing provided with spaced supports extending across the casing and having opposite bearings arranged in  
55 pairs, centrifugally operable members having journals arranged in the said bearings, a reversing bar slidably connected with the said

members, and a lever connected with and actuated by the reversing bar and having pivots mounted on the said supports. 60

21. An automatic governor and reversing gear including a rotary casing having spaced supports, a sleeve located between the sup-  
ports and adapted to be mounted on the shaft, pivots piercing the supports and con- 65 nected with the sleeve, centrifugally operable members pivotally mounted within the casing, a lever mounted on the said pivots, and means for slidably connecting the lever with the centrifugally operable members. 70

22. In an automatic governor and reversing gear, the combination with a shaft, of an eccentric slidable across the same, a ro-  
tary casing, opposite pivotally mounted cen- 75 trifugally operable members carried by the casing, a centrally pivoted member having an arm located at the pivotal point and arranged to swing across the shaft and connected with the slidable eccentric, and means for slidably connecting the lever with the 80 centrifugally operable members.

23. An automatic governor and reversing gear including opposite pivotally mounted centrifugally operable members, a reversing  
yoke composed of two approximately U- 85 shaped sections rigidly connected at their adjacent terminals, one of the sections having abutting portions fitted against the other section, means for slidably connecting the reversing yoke with the said members, and a 90 pivotally mounted lever actuated by the yoke and having means for connecting it with a valve gear.

24. An automatic governor and reversing gear including opposite centrifugally oper- 95 able members provided with curved guides, a reversing yoke composed of two U-shaped sections secured together at their inner ends and provided at their outer ends with pro-  
jecting terminal portions arranged in pairs 100 and straddling the said guides, blocks slidable in the guides and pivotally connected to the projecting terminals of the reversing yoke, and a pivotally mounted lever actu-  
ated by the yoke and having means for con- 105 necting it with a valve gear.

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

CHARLES J. PILLIOD.

Witnesses:

JAMES JNO. HAND,  
CHARLES J. PILLIOD, Jr.