

No. 754,469.

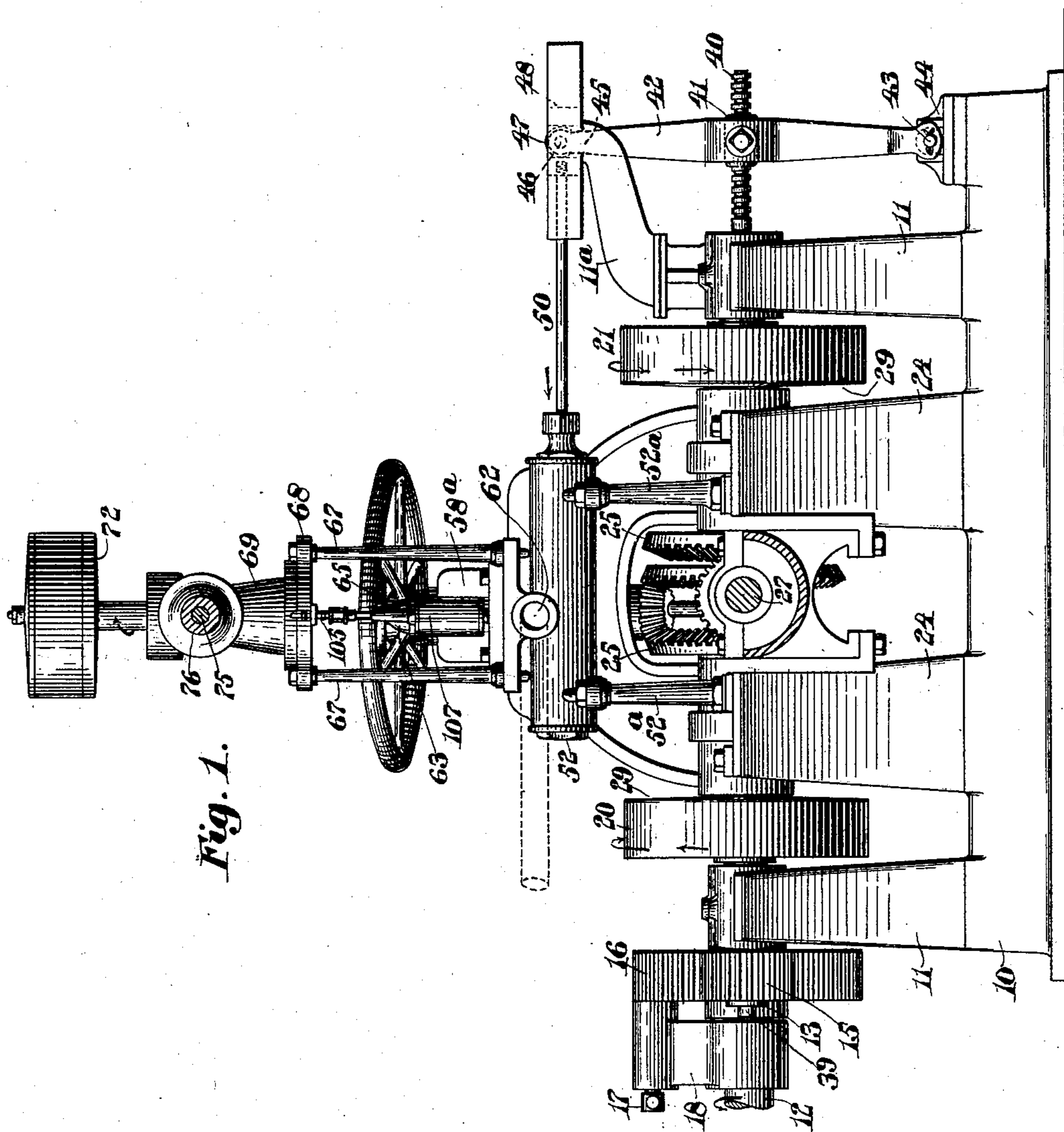
PATENTED MAR. 15, 1904.

N. LOMBARD.
GOVERNOR.

APPLICATION FILED JULY 11, 1903.

NO MODEL.

7 SHEETS—SHEET 1.



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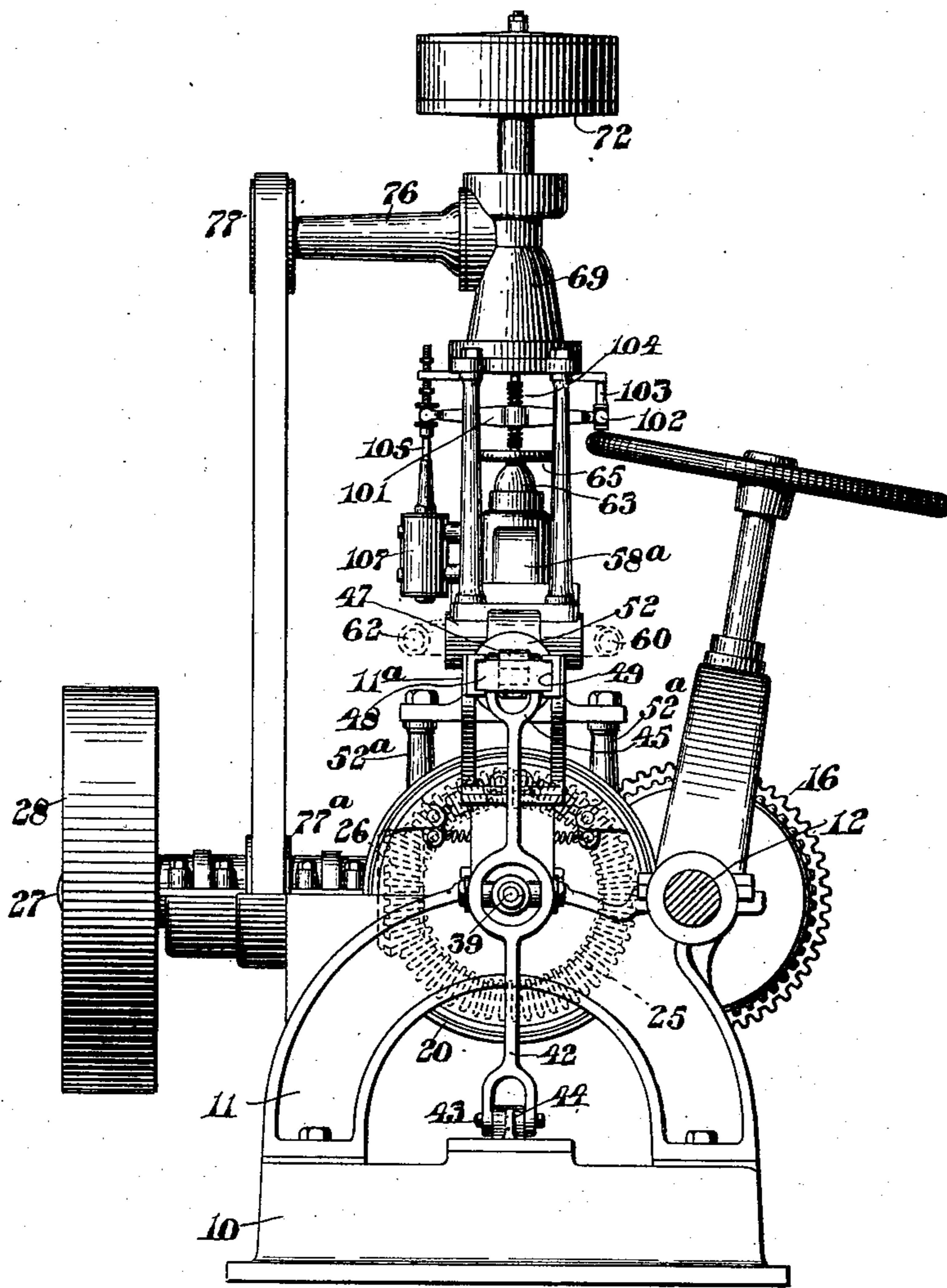
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7 SHEETS—SHEET 2.

Fig. 2.



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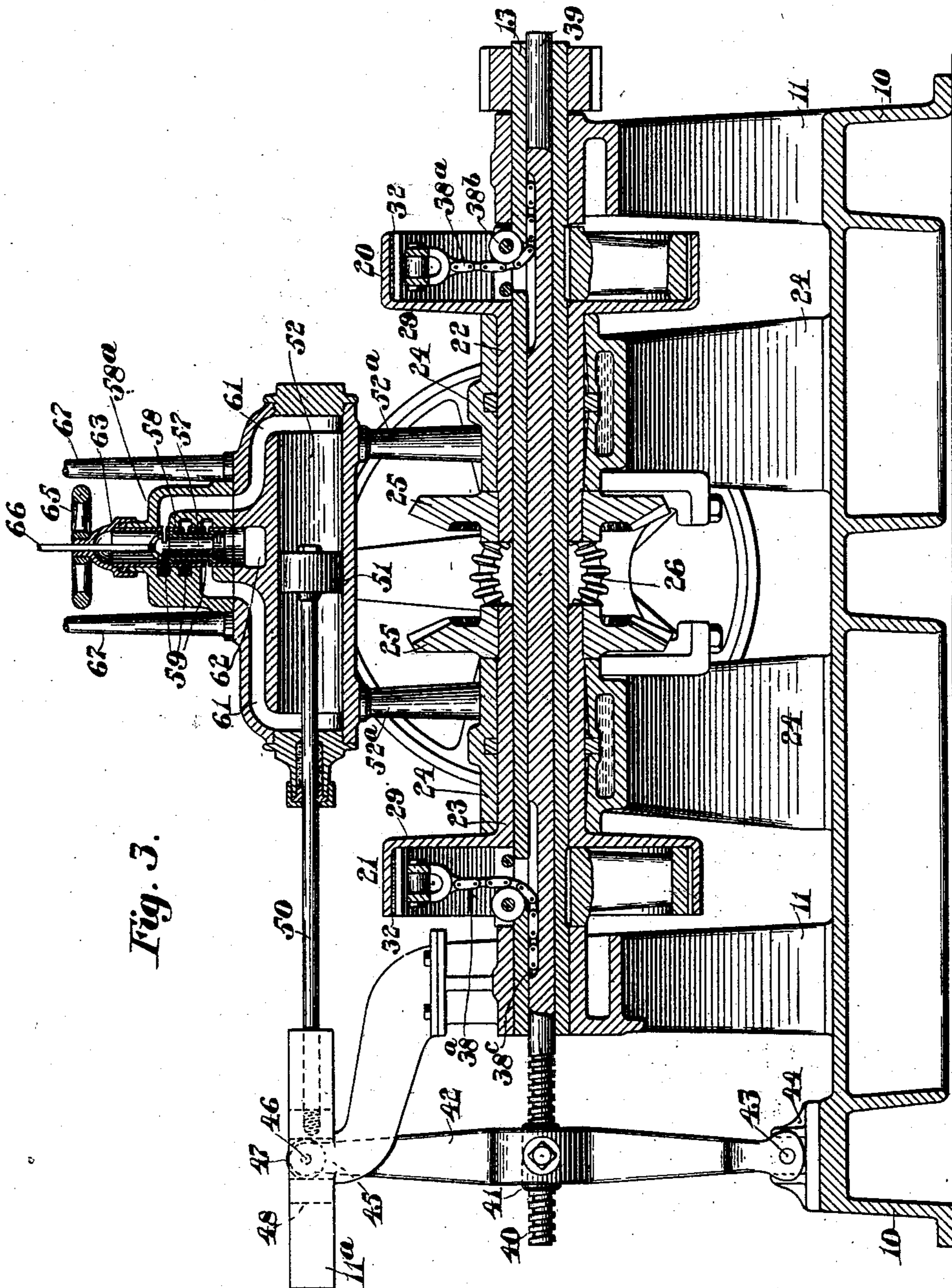
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7 SHEETS—SHEET 3.



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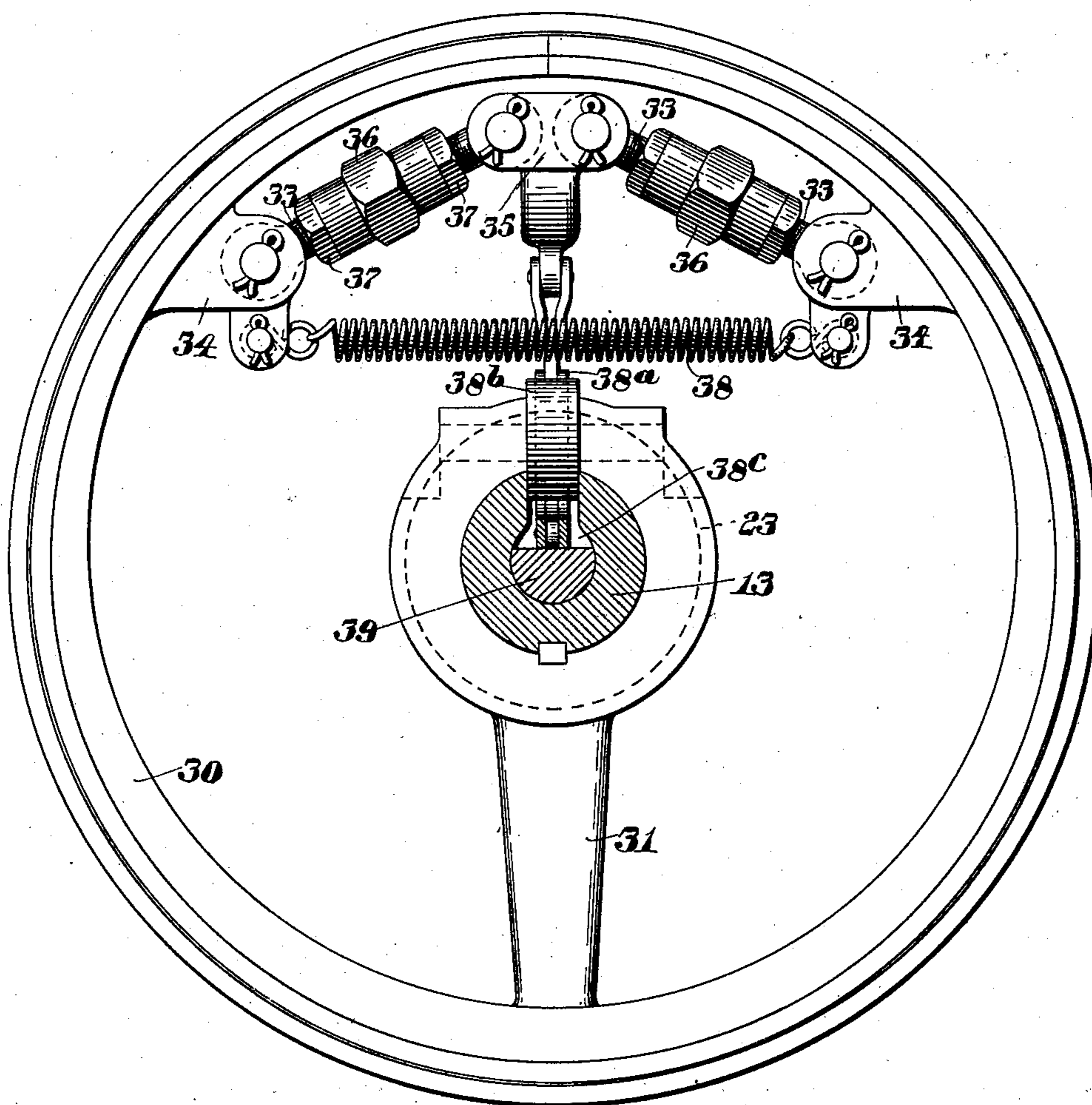
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7 SHEETS—SHEET 4.

Fig. 4.



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PATENTED MAR. 15, 1904.

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APPLICATION FILED JULY 11, 1903.

NO MODEL.

7 SHEETS—SHEET 5.

Fig. 5.

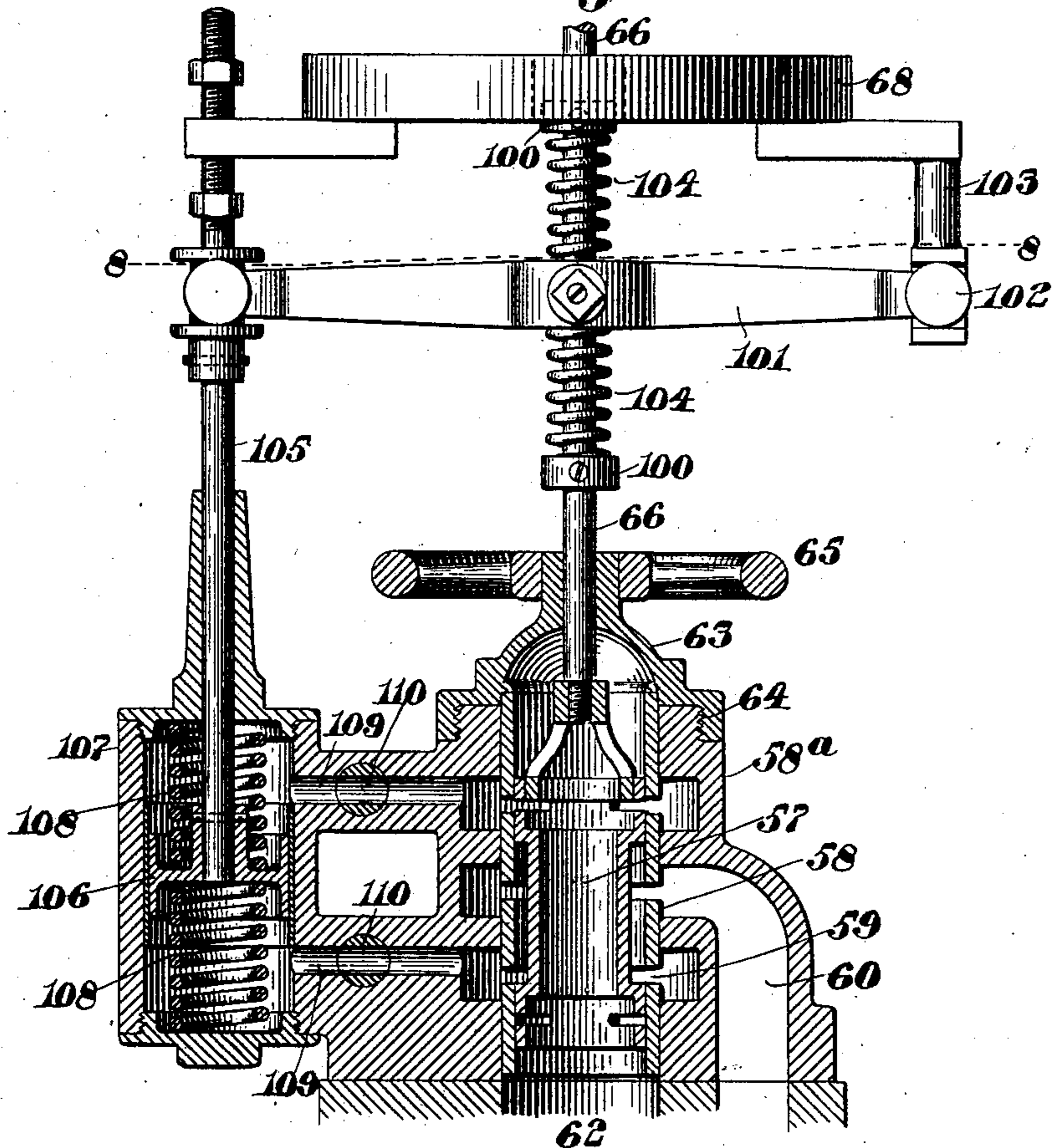


Fig. 8.

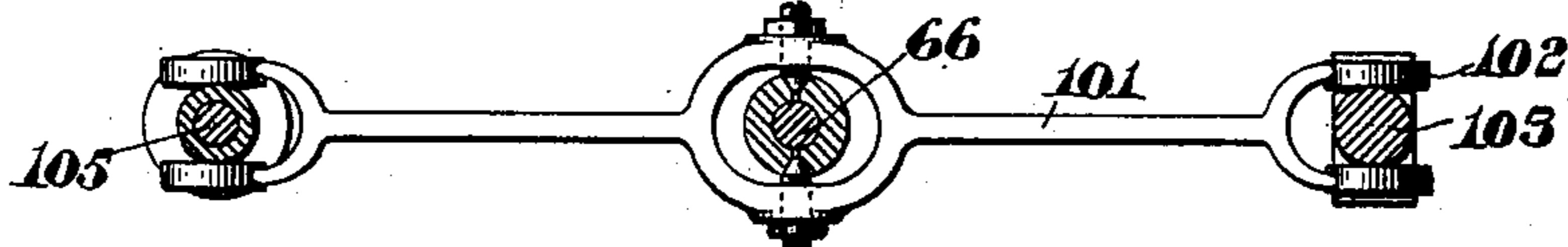
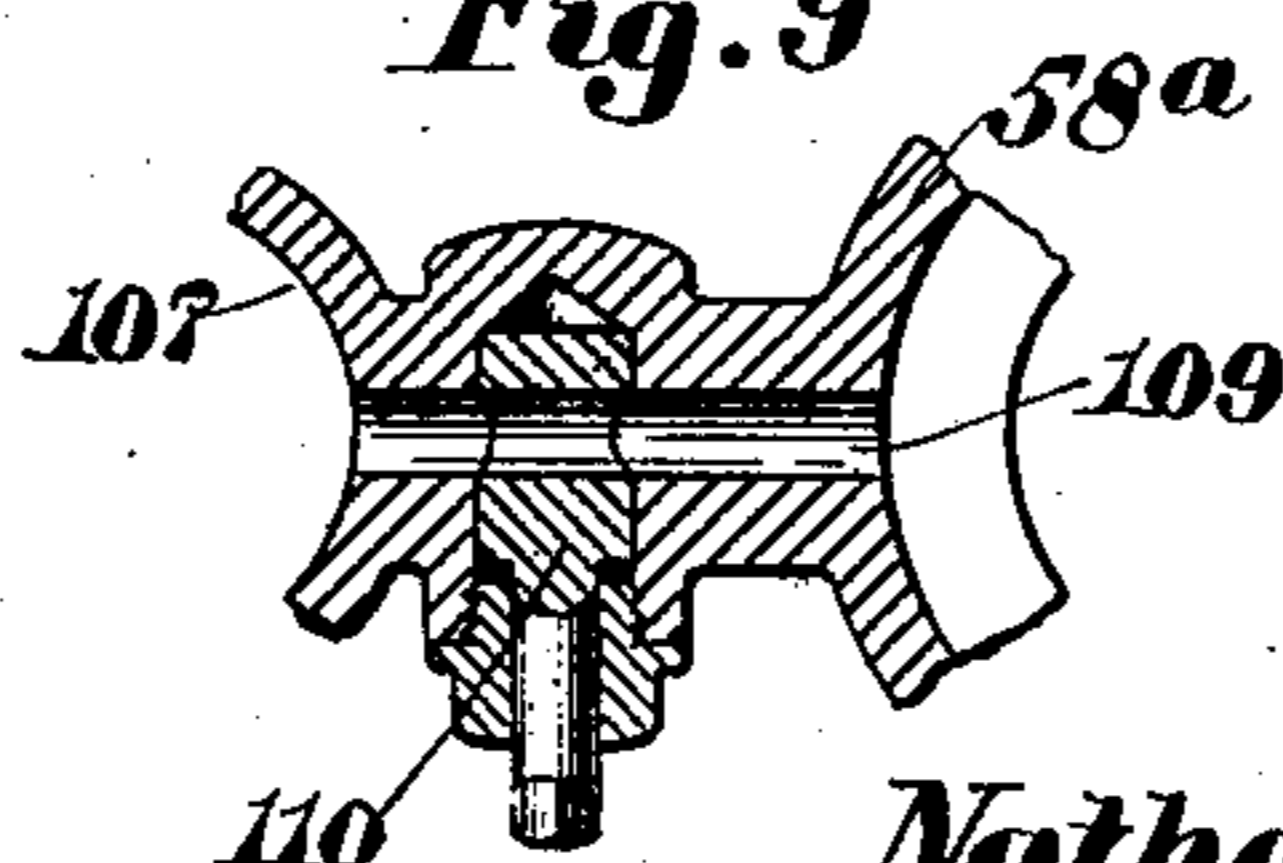


Fig. 9.



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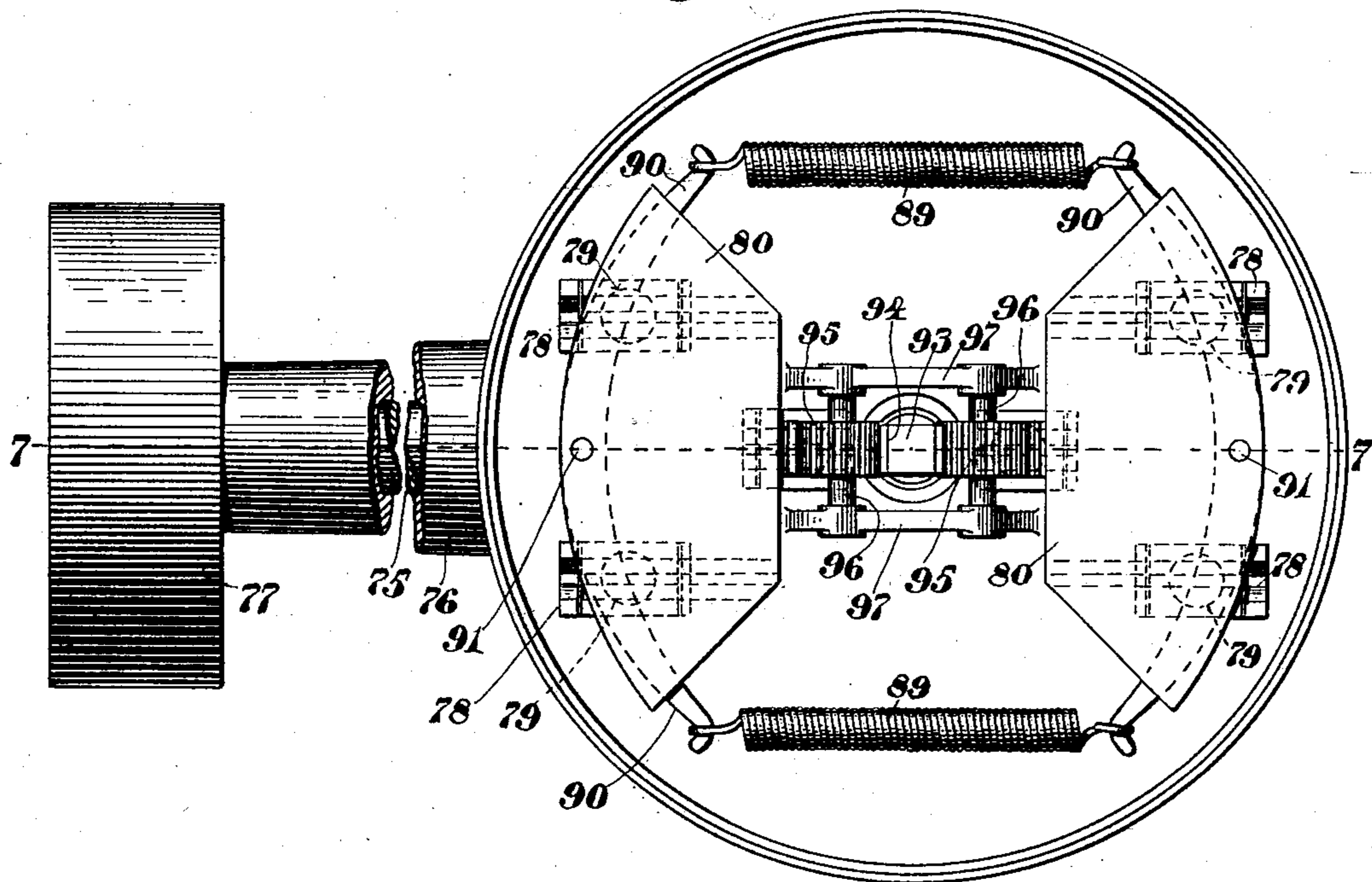
N. LOMBARD.
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APPLICATION FILED JULY 11, 1903.

NO MODEL.

7 SHEETS—SHEET 6.

Fig. 6.



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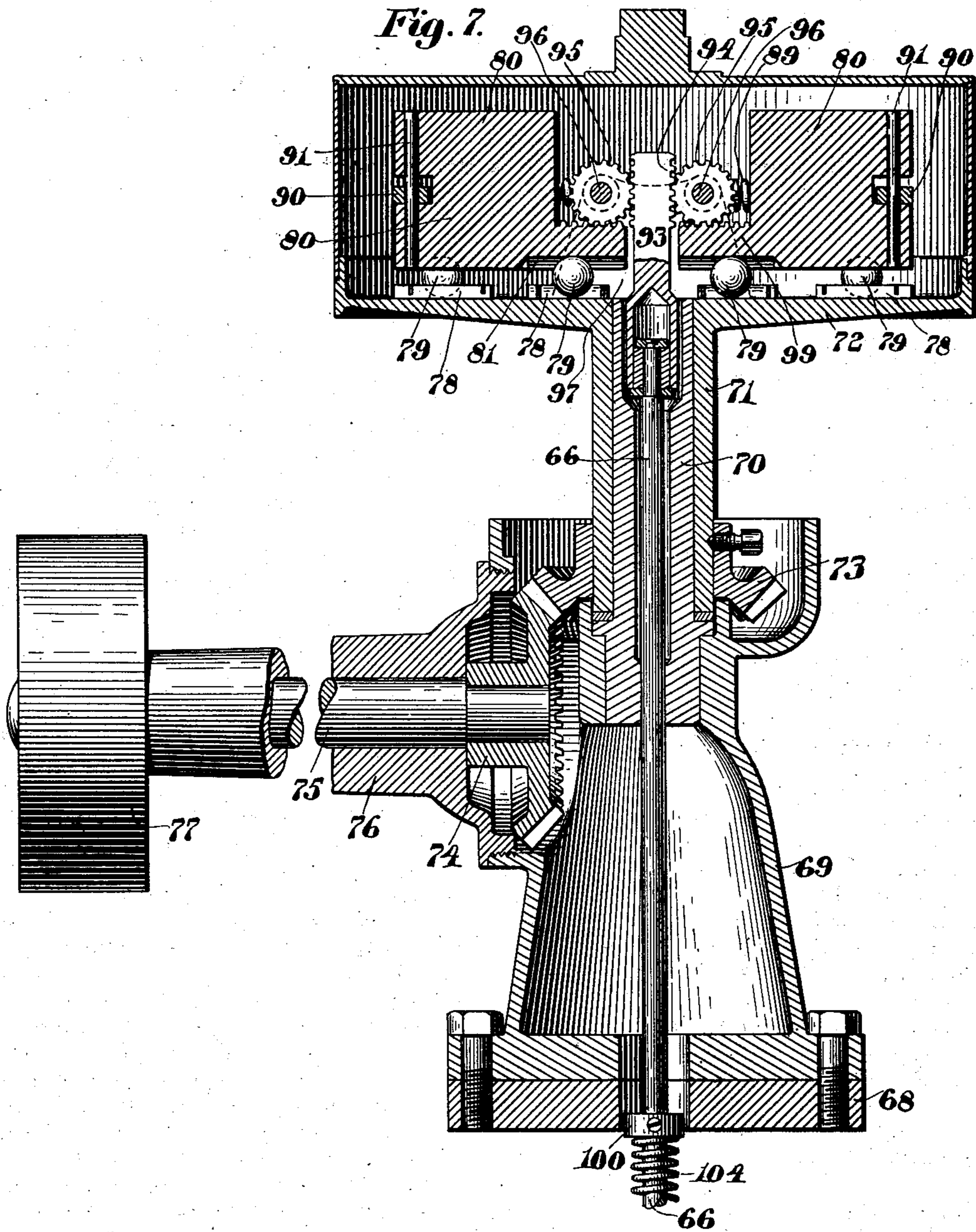
PATENTED MAR. 15, 1904.

N. LOMBARD.
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APPLICATION FILED JULY 11, 1903.

NO MODEL.

7 SHEETS—SHEET 7.



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UNITED STATES PATENT OFFICE.

NATHANIEL LOMBARD, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO
THE N. LOMBARD IMPROVED GOVERNOR COMPANY, OF WATERVILLE,
MAINE, A CORPORATION OF MAINE.

GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 754,469, dated March 15, 1904.

Application filed July 11, 1903. Serial No. 165,088. (No model.)

To all whom it may concern:

Be it known that I, NATHANIEL LOMBARD, a citizen of the United States of America, and a resident of Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Governors, of which the following is a specification.

My invention relates to mechanism for controlling the speed of various motors, and more particularly to such governors which serve to apply power from an auxiliary source to effect the movements of the valve, gate, or other regulating device.

The invention consists in the novel features and combinations hereinafter described and claimed.

Of the drawings, Figure 1 represents a rear elevation of a governor embodying this invention with a portion of the driving mechanism removed. Fig. 2 represents an end elevation of the same. Fig. 3 represents a central vertical longitudinal section. Fig. 4 represents an enlarged detail and side elevation of one of the clutches. Fig. 5 represents a section of the valve-operating mechanism. Fig. 6 represents a plan of the centrifugal mechanism. Fig. 7 represents a section of the same on line 7 7 on Fig. 6. Fig. 8 represents a plan of the valve-stem-operating lever. Fig. 9 represents a sectional plan of the cock controlling the admission of fluid to the secondary power-cylinder.

Similar characters designate like parts throughout the several figures of the drawings.

The numeral 10 designates a suitable base-plate on which is journaled in standards 11 a shaft 12 for connection with the gate or regulating device for controlling the speed of a motor—as, for example, a turbine-wheel—which shaft may be appropriately termed a “motor-controlling” shaft. In the standards 11 may be also journaled a preferably hollow actuating-shaft 13 for the motor-controlling shaft, they being conveniently connected by spur-gears 15 16, the latter preferably releasably fixed to the shaft 12 by some such

connector as a pin-clutch 17, carried by an arm 18, fast upon the shaft and engaging an opening in the gear. The actuating-shaft has fast upon it the inner members of clutches or connectors 20 21, the outer members of which are fixed to or formed integrally with driving-shafts 22 23, respectively, which are here shown as hollow, surrounding the actuating-shaft and journaled in the standards 24, supported upon the base-plate between the standards 11. The driving-shafts may be conveniently rotated in opposite directions by bevel-gears 25, meshing with a bevel-gear 26, fixed to a shaft 27, conveniently journaled in one of the standards and rotated at the desired speed from any suitable source of power through a pulley 28.

The outer member of each clutch may consist of a flanged disk 29, while the inner co-acting member is preferably formed as a divided ring 30, carried by an arm 31, having its hub keyed to the actuating-shaft. A leather facing 32 is shown as secured to the outer surface of the ring 30. This ring is expanded to frictionally coact with the outer member by a toggle-lever having the arms 33 33 pivoted to lugs 34, projecting from the opposite sides of the ring, and to an intermediate block 35. The arms may be made adjustable in length by including a right and left hand coupling 36, into which they are threaded, check-nuts 37 at each end serving to maintain the adjustment. If desired, a spring 38 may be provided extending between the sections of the ring to hold it normally out of contact with the outer member.

To each block 35 is connected a chain or flexible member 38^a, conveniently passing over a guide-roll 38^b, turning on a pin fixed to the actuating-shaft, and into a recess 38^c in an operating rod or member 39 for the clutches located within the actuating-shaft, these chains extending from the clutches in opposite directions.

One end of the operating-rod is provided with a threaded end 40, screwed into a block 41, swiveled in a lever 42, pivoted at 43 to a bearing 44, secured to the base-plate 10. The

upper end of the lever 42 is forked, as at 45, and is provided with a pin 46, upon which is mounted in said forked end a truck or roller 47, which coacts with a block 48, mounted in
5 guideways 49 in an extension or bracket 11^a, secured to one of the standards 11.

With the block 48 is connected a rod 50 of a piston 51, operating in a power-cylinder 52, shown as supported by posts or uprights 52^a
10 from the standards 24. To either end of this cylinder hydraulic or other pressure may be admitted, the admission of power to the cylinder being controlled by a valve, preferably comprising a hollow body 57, reciprocating
15 within a casing 58, supported in a chest 58^a, both body and casing having a series of openings 59, suitably arranged to admit the fluid-pressure supplied through a passage 60 in the chest to either one of the two passages 61 61
20 at either end of the cylinder and at the same time permit exhaust from the opposite end through a passage 62. To enable the valve to be adjusted, its casing may be closed at the top by a cap or dome 63, threaded upon the
25 chest at 64.

A hand-wheel 65, secured to the cap, allows the casing to be readily turned, and thus raise and lower the openings and change their relations to those of the inner body.

30 To the valve-body is affixed a rod 66, extending up through the cap and connected with centrifugal governing mechanism, to be now described.

From convenient points, as from the top of
35 the cylinder, arise posts or uprights 67, carrying a suitable platform 68, upon which is supported a standard 69, having projecting upwardly therefrom a hollow hub 70. Upon the hub 70 is mounted a sleeve or hollow shaft
40 71, here shown as integral with a disk or platform 72, serving as a support for governor-weights, to be hereinafter described. The sleeve may have upon it a bevel-gear 73, meshing with a bevel-gear 74 upon a shaft 75. This
45 shaft is journaled in a bearing 76 in the standard 69 and continuously rotated at the desired speed through a pulley 77; conveniently belted to a pulley 77^a on the shaft 27.

The platform 72 is provided with ways 78,
50 in which are mounted the balls 79, on which are mounted the weights 80, provided in their bottom surfaces with ways 81, coacting with the balls 79, to permit said weights to have a radial movement toward and from the valve-stem 66.
55

To oppose centrifugal force and hold the weights at the limit of inward movement when the primary support is stationary, springs 89 are provided, here shown as two in number,
60 of spiral form, and extending between the weights on each side.

To compensate for differences in tension and permit the weights to run smoothly without cramping or throwing uneven pressure upon
65 the balls, these springs are connected to the

opposite ends of yokes 90, pivoted at 91 upon each weight.

The valve-rod 66 extends through the hollow hub 70 and has swiveled to its upper end a controlling member 93, provided with rack-teeth 94, said teeth engaging with pinions 95
70 on the shafts 96, mounted in suitable bearings 97. The pinions 95 also mesh with racks 99, secured to the weights 80, and thereby change the radial movement of said weights into a re-
75 ciprocatory movement of said valve-rod 66.

It is obvious that with this construction any radial movement of the weights 79 will cause a longitudinal movement of the valve-stem 66 and the valve on the lower end thereof. Upon
80 the valve-stem 66, within the standard 69, are secured collars 100 on either side of a lever 101, pivoted at 102 to a standard 103 and provided with an opening through which the valve-stem 66 passes. Between said lever 101
85 and each of said collars 100 is interposed a spiral spring 104, encircling said valve-stem 66. To the free end of said lever 101 is mounted a piston-rod 105, to the opposite end of which is secured a piston 106 in a vertical cyl-
90 nder 107, inclosed at either end.

Between the piston 106 and each end of the cylinder 107 is a spring 108, tending to center said piston. Either end of said cylinder 107
95 is connected by a passage 109, each of which connects with a passage 61, by which a fluid is admitted to the cylinder 52 to operate the piston 51 of the power-cylinder. In each pas-
100 sage 109 is a valve 110, adapted to be adjusted in such a manner that when fluid is admitted to the cylinder 52 to move the piston 51 a given distance in its cylinder a proportionate amount of fluid will be admitted to the cyl-
105 nder 107 to move the piston 106 a proportionate distance in its cylinder. It is obvious, therefore, that any movement of the piston 51 moves proportionately the lever 101 to raise or lower the valve 59.

The operation of my improved governor is as follows: With the parts in the relation here
110 illustrated the power is applied to the pulley 28 to drive the centrifugal mechanism at such a rate that normally for the desired speed of rotation of the motor the weights are substan-
115 tially at the center of their range of movement, and the lever 101 and pistons 51 and 106 will be at the center of their movements. This condition continues until there is a change in the speed of the motor—as, for example, an increase. This results in the support 72
120 rotating more rapidly, causing the weights to move outwardly under the increased centrifugal force generated and their racks, moving the pinions 95 to lower the valve-stem 66 and the valve 57, admitting pressure to the right-
125 hand end of the cylinder 52. This movement of the valve 57 will cause fluid to pass into the cylinder 107 beneath the piston 106 and raise the lever 101, thereby causing said valve 57 to be raised to stop further admis-
130

sion of fluid to the cylinders 52 and 107 and to cause the weights 100 to resume their normal positions. The travel of the piston 51 moves the block 48 and the coacting end of the lever 42 to the left or inwardly about its lower end as a fulcrum. This movement of the lever carries the operating-rod 39 to the left, sets the clutch 20, and compels the actuating-shaft to rotate the driving-shafts 22 right-handedly, turning the shaft 12 in such a direction as to close the gate—if, for example, a hydraulic system is being governed. If the weights acted alone upon the controlling mechanism, they would tend to cause too great a movement or to overcorrect. To obviate this difficulty and check the piston, the springs 104 are provided, which will act upon the valve-stem to cause the valve to be restored to its initial position at which the pressure is shut off both ends of the cylinder. To counteract the effect of the power-cylinder upon the clutch to permit the return of the valve to its normal position and a consequent checking of the piston to stop the movement of the gate, the relative positions of the lever 42 and the operating-rod 39 are automatically changed in the following manner: As soon as the actuating-shaft begins its rotation through the connection made by the clutch 20 it also rotates the operating-rod 39. This causes the threaded end of said rod to move in the lever to the right, and this being in the opposite direction to the travel of the block 48 tends to release the clutch. As long as the piston continues its movement the rate of travel of the upper end of the lever will offset that caused by the operation of the rod 39 in the block 41 and the clutch will remain in engagement; but as soon as the piston is checked by the return of the valve to its normal position this outward movement of the rod disengages the clutch and the movement of the gate at once ceases until the valve again acts.

As the above operation will restore the motor system to its normal speed, the weights will return to the position they occupied before the change occurred, and unless their effect upon the valve-rod is neutralized they would be liable to move it in the opposite direction and destroy the balance of the forces just attained. This is prevented, however, by the operation of the piston 106 upon the lever 101, which prevents the weights from moving to any great extent out of their normal positions, and when the weights do depart from the normal against the tension of the centering-springs they will immediately become again centered through the agency of these springs as soon as the abnormal force has been removed.

Having thus described my invention, I claim—

1. In a governor, the combination with a hollow actuating-shaft, of means for rotating the actuating-shaft in opposite directions, con-

nectors between the rotating means and actuating-shaft located in part within said actuating-shaft, a rod slidable within said actuating-shaft, a pivoted lever connected intermediate its ends to said rod, and power mechanism acting upon the outer end of said lever.

2. In a governor, the combination with a hollow actuating-shaft, of means for rotating the actuating-shaft in opposite directions, connectors between the rotating means and actuating-shaft located in part within said actuating-shaft, a rod movable within said actuating-shaft, a pivoted lever connected intermediate its ends to said rod, power mechanism acting upon the outer end of said lever, and means for controlling the application of power.

3. In a governor, the combination with a motor-controlling shaft, of a hollow actuating-shaft therefor, means for rotating the actuating-shaft in opposite directions, connectors between the rotating means and actuating-shaft located in part within said actuating-shaft, a pivoted lever connected intermediate its ends to said rod, and power mechanism acting upon the outer end of said lever.

4. In a governor, the combination with a hollow actuating-shaft, of means for rotating the actuating-shaft in opposite directions, connectors between the rotating means and actuating-shaft located in part within said actuating-shaft, a rod slidable within said actuating-shaft, a pivoted lever connected intermediate its ends to said rod, a power-cylinder acting upon the outer end of said lever, and a valve for controlling the admission of pressure to the cylinder.

5. In a governor, the combination with a motor-controlling shaft, of a hollow actuating-shaft therefor, two oppositely-rotating driving-shafts, pairs of coacting clutch members carried by the actuating-shaft and driving-shafts, an operating member for the clutches movable within the actuating-shaft, a pivoted lever connected intermediate its ends with said operating member, and a power-cylinder acting upon said lever.

6. In a governor, the combination with a motor-controlling shaft, of a hollow actuating-shaft therefor, two oppositely-rotating driving-shafts, pairs of coacting clutch members carried by the actuating-shaft and driving-shafts, an operating member for the clutches movable within the actuating-shaft, a pivoted lever connected intermediate its ends with said operating member, a power-cylinder acting upon said lever, and a valve controlling the admission of pressure to the cylinder.

7. In a governor, the combination with a hollow actuating-shaft, of two oppositely-rotating driving-shafts, pairs of coacting clutch members carried by the actuating-shaft and driving-shafts, a rod movable within the actuating-shaft, flexible members connecting the rod and one of each pair of clutch members, a pivoted lever connected intermediate

its ends with said rods, and a power-cylinder acting upon said lever.

8. In a governor, the combination with a motor-controlling shaft, of a hollow actuating-shaft therefor, two oppositely-rotating driving-shafts, pairs of coacting clutch members carried by the actuating-shaft and driving-shafts, a rod provided with a recess movable within the actuating-shaft, chains secured within the recess and to one of each pair of clutch members, a pivoted lever connected intermediate its ends with said rod, and a power-cylinder acting upon said lever.

9. In a governor, the combination with a hollow actuating-shaft, of two oppositely-rotating driving-shafts, clutches connecting the driving-shafts and actuating-shaft, a lever connected with the clutches at a point intermediate its ends, power mechanism acting upon one end of the lever, and mechanism connected with the actuating-shaft for changing the position of said lever.

10. In a governor, the combination with an actuating-shaft, of two oppositely-rotating driving-shafts, clutches connecting the driving-shafts and actuating-shaft, a lever connected with the clutches at a point intermediate its ends, power mechanism acting upon one end of the lever, and mechanism connected with the actuating-shaft for automatically changing the relative positions of said lever and said connecting mechanism to disengage the clutches.

11. In a governor, the combination with an actuating-shaft, of two oppositely-rotating driving-shafts, clutches connecting the driving-shafts and actuating-shaft, a pivoted lever, a power-cylinder for operating the free end of said lever, a threaded bearing swiveled to said lever intermediate its ends, a threaded rod coacting with said bearing and operated by said actuating-shaft to change the relative positions of said lever and rod.

12. In a governor, the combination with an actuating-shaft, of two oppositely-rotating driving-shafts, clutches connecting the driving-shafts and actuating-shaft, a pivoted lever, a swiveled block mounted on said lever intermediate its ends, a rod connected with the clutches and threaded into said swiveled block, and power mechanism acting upon the outer end of the lever.

13. In a governor, the combination with an actuating-shaft, of two oppositely-rotating driving-shafts, clutches connecting the driving-shafts and actuating-shaft, a pivoted lever connected with the clutches at a point intermediate its ends, and power mechanism acting upon one end of the lever.

14. In a governor, the combination with an actuating-shaft, of two oppositely-rotating driving-shafts, clutches connected with the driving-shafts and actuating-shaft, a pivoted lever, a connector connecting the clutches with said lever at a point intermediate its ends,

power mechanism acting upon one end of the lever to effect the engagement of the clutches, and mechanism interposed between said clutch-connector and said lever for automatically effecting the disengagement of the clutches.

15. In a governor, the combination with an actuating-shaft, of two oppositely-rotating driving-shafts, clutches connecting the driving-shafts and actuating-shaft, a pivoted lever, a connector connecting the clutches with said lever at a point intermediate its ends, a power-cylinder acting upon one end of the lever to effect the engagement of the clutches, and mechanism interposed between said actuating-shaft and said lever for automatically effecting the disengagement of the clutches.

16. In a governor, the combination with a hollow actuating-shaft, of two oppositely-rotating driving-shafts surrounding the actuating-shaft, an outer clutch member fast upon each driving-shaft, coacting inner clutch members fast upon the actuating-shaft, a rod within the actuating-shaft connected with the inner clutch members, a pivoted lever connected with the rod, and means for applying power to the movable end of said lever.

17. In a governor, the combination with a hollow actuating-shaft, of two oppositely-rotating driving-shafts surrounding the actuating-shaft, an outer clutch member fast upon each driving-shaft, coacting inner clutch members fast upon the actuating-shaft, a rod within the actuating-shaft, chains connecting the rod and inner clutch members, a pivoted lever, a threaded block swiveled in said lever, a threaded end to said rod coacting with said swiveled block, and means for applying power to the lever.

18. In a governor, the combination with a hollow actuating-shaft, of two oppositely-rotating driving-shafts surrounding the actuating-shaft, an outer clutch member fast upon each driving-shaft, coacting inner clutch members fast upon the actuating-shaft, a rod within the actuating-shaft connected with the inner clutch members, a pivoted lever provided with a swiveled block intermediate its ends, a threaded bearing in said block, a threaded end to said rod coacting with said bearing, and means for applying power to the outer end of said lever.

19. In a governor, the combination with an actuating-shaft, of two oppositely-rotating driving-shafts, clutches connecting the driving-shafts and actuating-shaft, a lever, a swiveled block mounted on said lever, a rod connected with the clutches and threaded into said swiveled block, and power mechanism acting upon one end of the lever.

20. In a governor, the combination with an actuating-shaft, of two oppositely-rotating driving-shafts, clutches connecting the driving-shafts and actuating-shaft, a pivoted lever, a threaded connector interposed between said

lever and said clutches, and power mechanism acting upon one end of the lever.

21. In a governor, the combination with an actuating-shaft, of two oppositely-rotating driving-shafts, clutches connected with the driving-shafts and actuating-shaft, a pivoted lever connected with the clutches at a point intermediate its ends, power mechanism acting upon one end of the lever to effect the engagement of the clutches, and mechanism interposed between said clutches and said lever for automatically effecting the disengagement of the clutches.

22. In a governor, the combination with an actuating-shaft, of two oppositely-rotating driving-shafts, clutches connecting the driving-shafts and actuating-shaft, a pivoted lever connected with the clutches at a point intermediate its ends, power mechanism acting upon one end of the lever to effect the engagement of the clutches, and mechanism interposed between said actuating-shaft and said lever for automatically effecting the disengagement of the clutches.

23. In a governor, the combination with a hollow actuating-shaft, of two oppositely-rotating driving-shafts surrounding the actuating-shaft, an outer clutch member fast upon each driving-shaft, coacting inner clutch members fast upon the actuating-shaft, a rod within the actuating-shaft connected with the inner clutch members, a pivoted lever or connector between said lever and rod, and means for applying power to the movable end of said lever.

24. In a governor, the combination with a hollow actuating-shaft, of two oppositely-rotating driving-shafts surrounding the actuating-shaft, an outer clutch member fast upon each driving-shaft, coacting inner clutch members fast upon the actuating-shaft, a rod within the actuating-shaft, chains connecting the rod and inner clutch members, a pivoted lever, a threaded block swiveled in said lever, a threaded end to said rod coacting with said swiveled block, a slide coacting with the outer end of said lever, and means for applying power to said slide.

25. In a governor, the combination with a hollow actuating-shaft, of two oppositely-rotating driving-shafts surrounding the actuating-shaft, an outer clutch member fast upon each driving-shaft, coacting inner clutch members fast upon the actuating-shaft, a rod within the actuating-shaft connected with the inner clutch members, a pivoted lever provided with a swiveled threaded bearing intermediate its ends, a threaded end to said rod coacting with said bearing, and means for applying power to the outer end of said lever.

26. In a governor, the combination with an actuating-shaft, of means for rotating the actuating-shaft in opposite directions, connectors between the rotating means and actuating-shaft, power mechanism acting upon the connectors, means for controlling the application

of power, a centrifugal weight rotatable from the motor, a rack mounted upon the weight, a rack upon the controlling means, and a pinion-connector meshing with said racks.

27. In a governor, the combination with an actuating-shaft, of means for rotating the actuating-shaft in opposite directions, connectors between the rotating means and actuating-shaft, power mechanism acting upon the connectors, a valve for controlling the application of power, a centrifugal weight rotatable from the motor, a rack mounted upon the weight, a rack upon the controlling means, a pinion-connector meshing with said racks, and means for counteracting the effect of the centrifugal mechanism upon the valve.

28. In a governor, the combination with an actuating-shaft, of means for rotating the actuating-shaft in opposite directions, connectors between the rotating means and actuating-shaft, power mechanism acting upon the connectors, a valve for controlling the application of power, a centrifugal weight rotatable from the motor, a rack mounted upon the weight, a rack secured to said valve, and a pinion-connector meshing with said racks.

29. In a governor, the combination with an actuating-shaft, of means for rotating the actuating-shaft in opposite directions, connectors between the rotating means and actuating-shaft, power mechanism acting upon the connectors, a valve for controlling the application of power, a centrifugal weight rotatable from the motor, a rack mounted upon the weight, a valve-stem, a rack swiveled to said stem, and a pinion-connector meshing with said racks.

30. In a governor, the combination with an actuating-shaft, of means for rotating the actuating-shaft in opposite directions, connectors between the rotating means and actuating-shaft, power mechanism acting upon the connectors, a valve for controlling the application of power, a centrifugal weight rotatable from the motor, a connector between said valve and said weight and reciprocated by the movement of the latter, and means for causing said controlling means to resume its normal position.

31. In a governor, the combination with an actuating-shaft, of means for rotating the actuating-shaft in opposite directions, connectors between the rotating means and actuating-shaft, power mechanism acting upon the connectors, a valve for controlling the application of power, a centrifugal weight rotatable from the motor, means for changing the radial movement of said weight to a reciprocatory movement of said valve, and power mechanism operated by said valve for counteracting the effect of the centrifugal mechanism upon the valve.

32. In a governor, the combination with an actuating-shaft, of means for rotating the actuating-shaft in opposite directions, connectors

tors between the rotating means and actuating-shaft, power mechanism acting upon the connectors, a valve for controlling the application of power, a centrifugal weight rotatable from the motor, means for changing the radial movement of said weight to a reciprocatory movement of said valve, a lever operating with said valve, and a power-cylinder to operate said lever.

33. In a governor, the combination with an actuating-shaft, of means for rotating the actuating-shaft in opposite directions, connectors between the rotating means and actuating-shaft, power mechanism acting upon the connectors, a valve for controlling the application of power, a centrifugal weight rotatable from the motor, means for changing the radial movement of said weight to a reciprocatory movement of said valve, a lever operating with said valve, springs on either side of said lever to center the same, and a power-cylinder to operate said lever.

34. In a governor, the combination with an actuating-shaft, of means for rotating the actuating-shaft in opposite directions, connectors between the rotating means and actuating-shaft, power mechanism acting upon the connectors, a valve for controlling the application of power, a centrifugal weight rotatable from the motor, means for changing the radial movement of said weight to a reciprocatory movement of said valve, a lever operating with said valve, a power-cylinder to operate said lever, and inlet and exhaust passages communicating with said cylinder and controlled by said valve.

35. In a governor, the combination with an actuating-shaft, of means for rotating the actuating-shaft in opposite directions, connectors between the rotating means and actuating-shaft, power mechanism acting upon the connectors, a valve for controlling the application of power, a centrifugal weight rotatable from the motor, means for changing the radial movement of said weight to a reciprocatory movement of said valve, a lever operating with said valve, a power-cylinder to operate said lever, inlet and exhaust passages communicating with said cylinder and controlled by said valve, and valves in said passages to regulate the flow of fluid therein.

36. In a governor, the combination with an actuating-shaft, of means for rotating the actuating-shaft in opposite directions, connectors between the rotating means and actuating-shaft, power mechanism acting upon the connectors, a valve for controlling the application of power, a centrifugal weight rotatable from the motor, a connector between said valve and said weight and reciprocated by the movement of the latter, a lever operating with said valve, a piston therein connected with said lever, inlet and exhaust passages communicating with said cylinder and controlled by said valve, and valves in said passages to regulate the flow of fluid therein.

Signed by me at Boston, Massachusetts, this 6th day of July, 1903.

NATHANIEL LOMBARD.

Witnesses:

WALTER E. LOMBARD,

NATHAN C. LOMBARD, 2d.