

(No Model.)

3 Sheets—Sheet 1.

J. L. MORRIS.
ADJUSTABLE SPEED BICYCLE.

No. 504,168.

Patented Aug. 29, 1893.

Fig: 1.

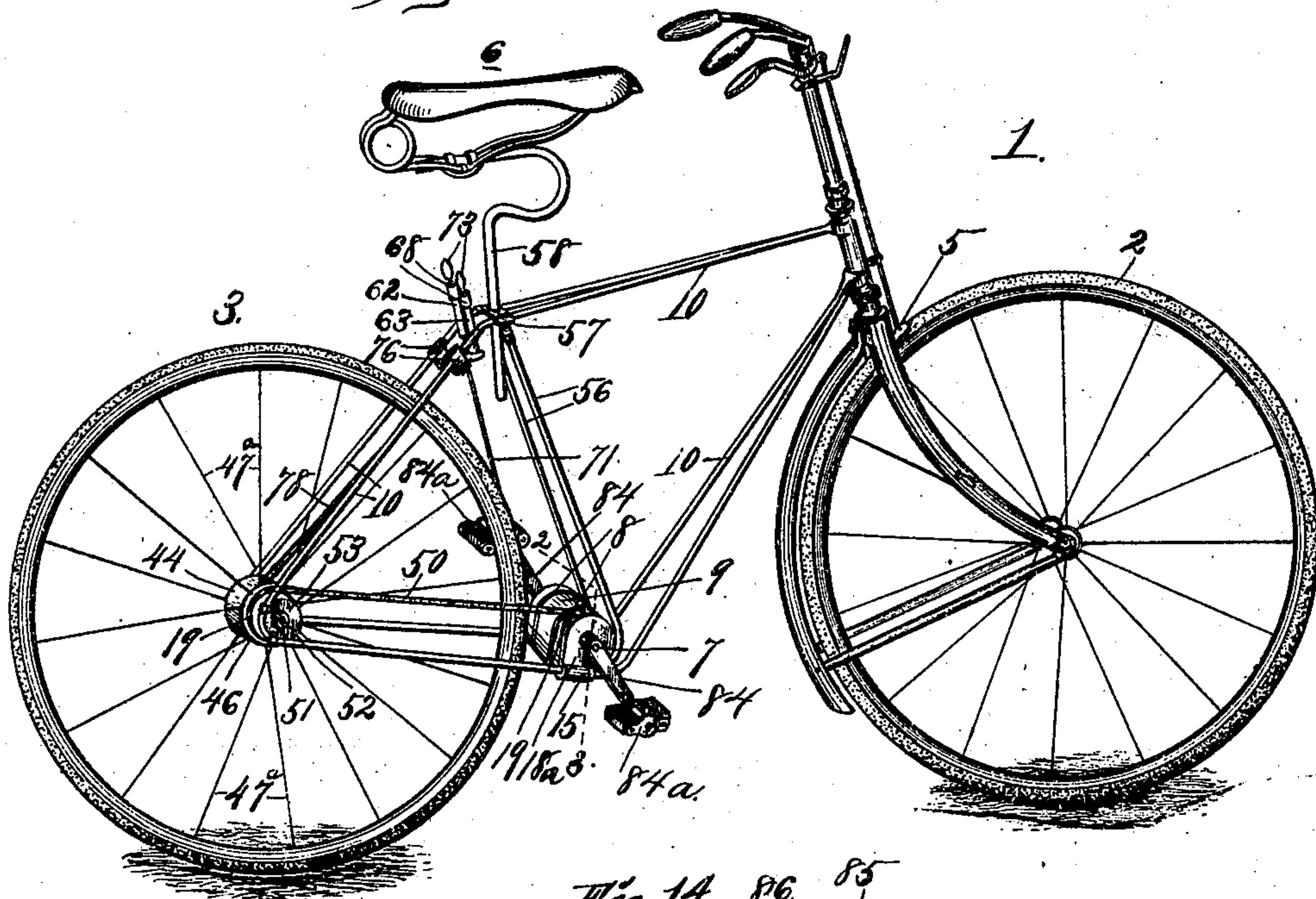


Fig. 13.

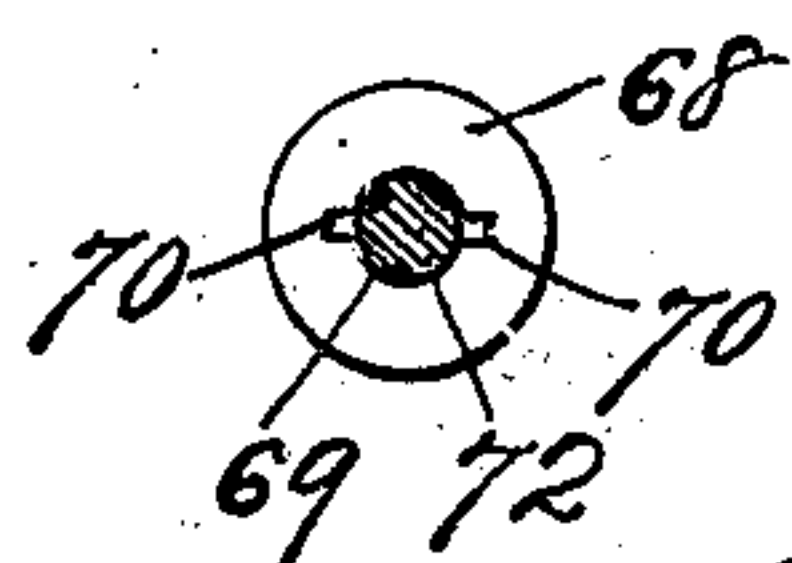


Fig. 4.

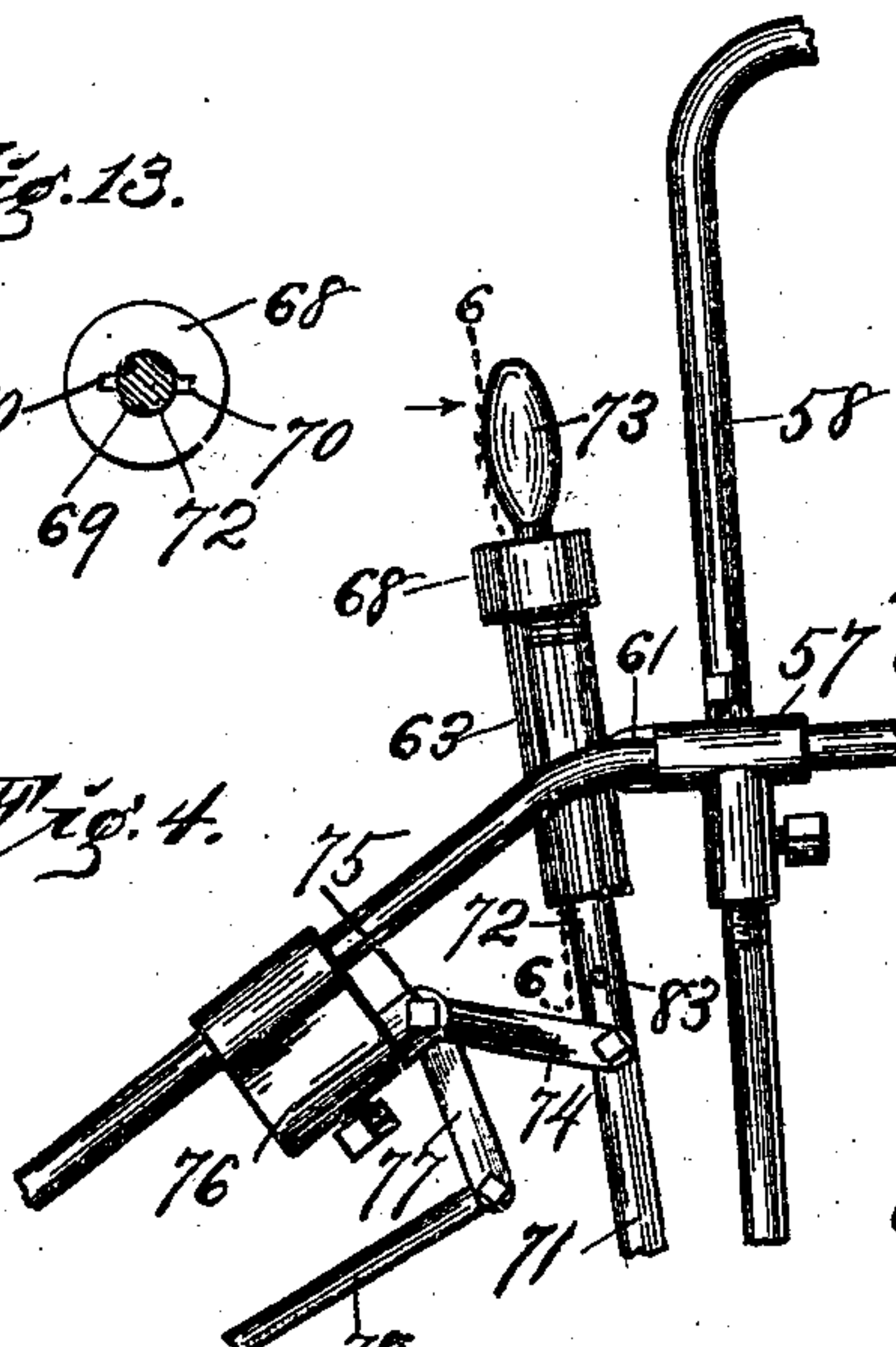
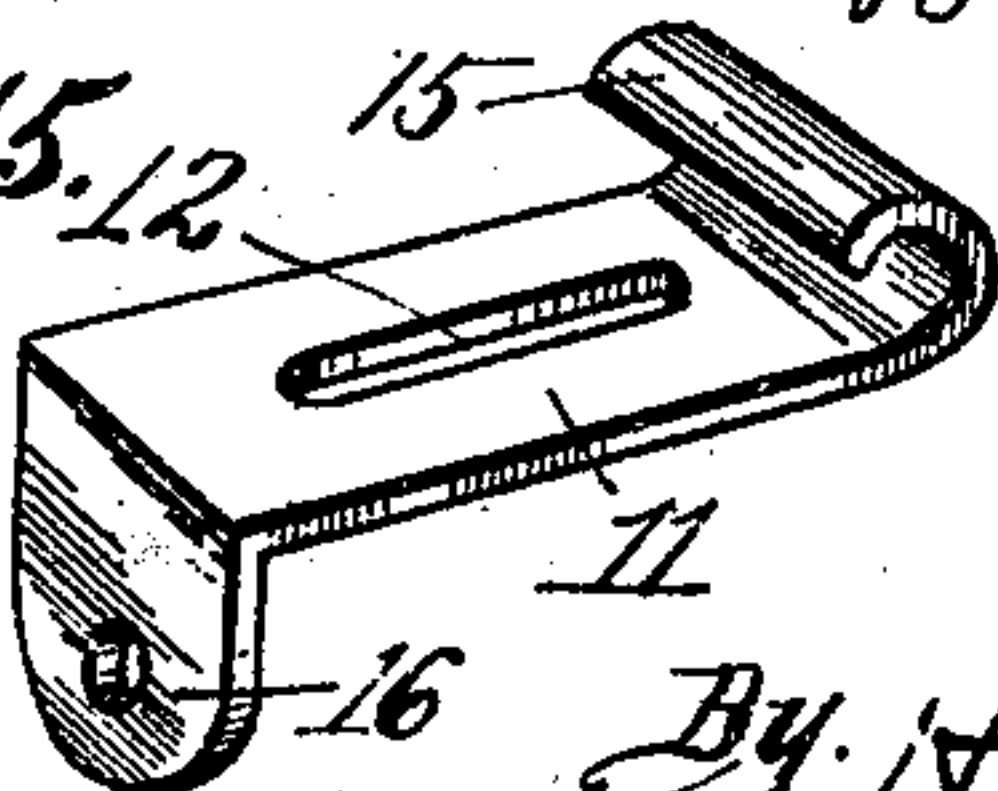


Fig. 6.



Witnesses:-

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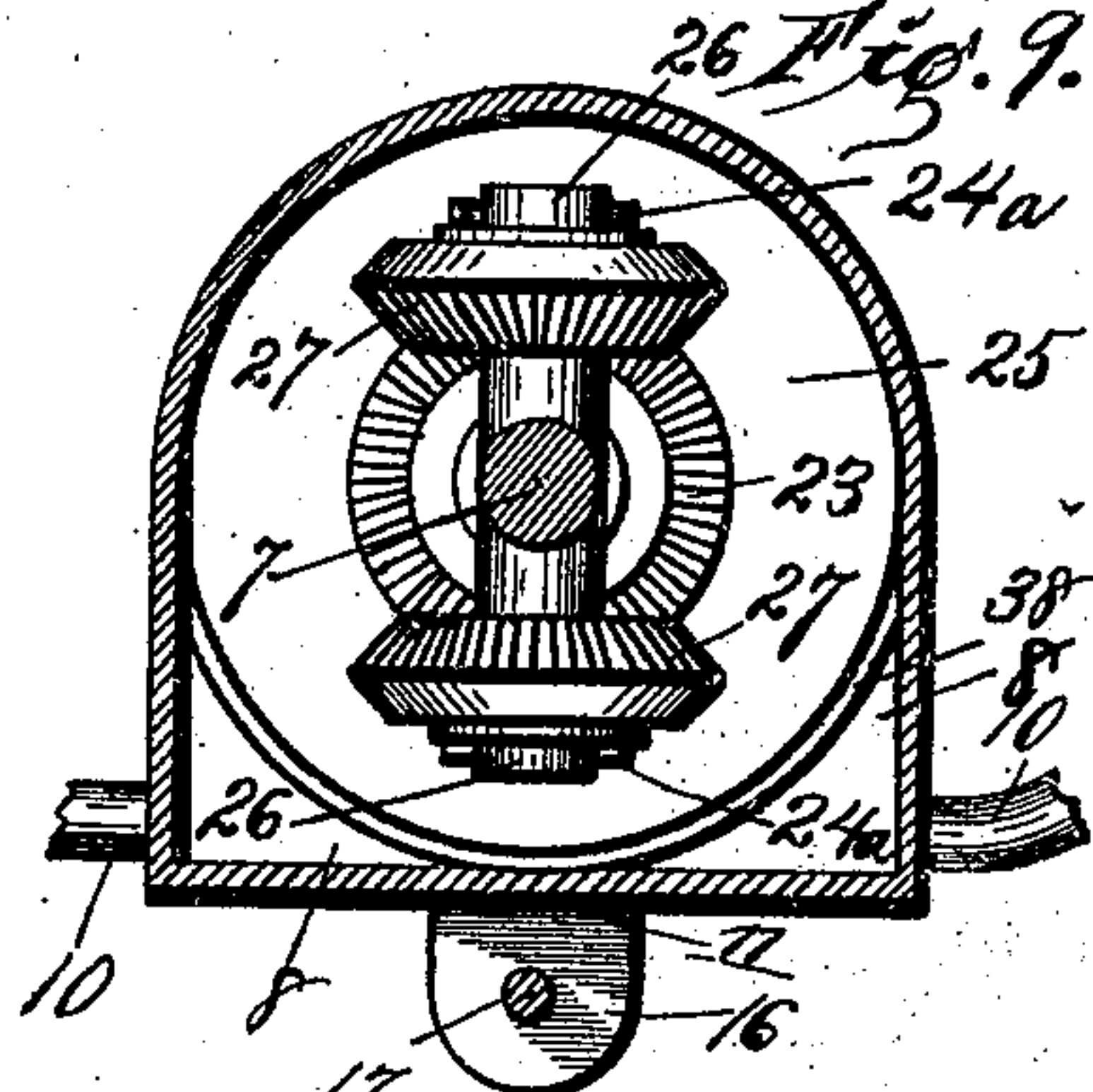
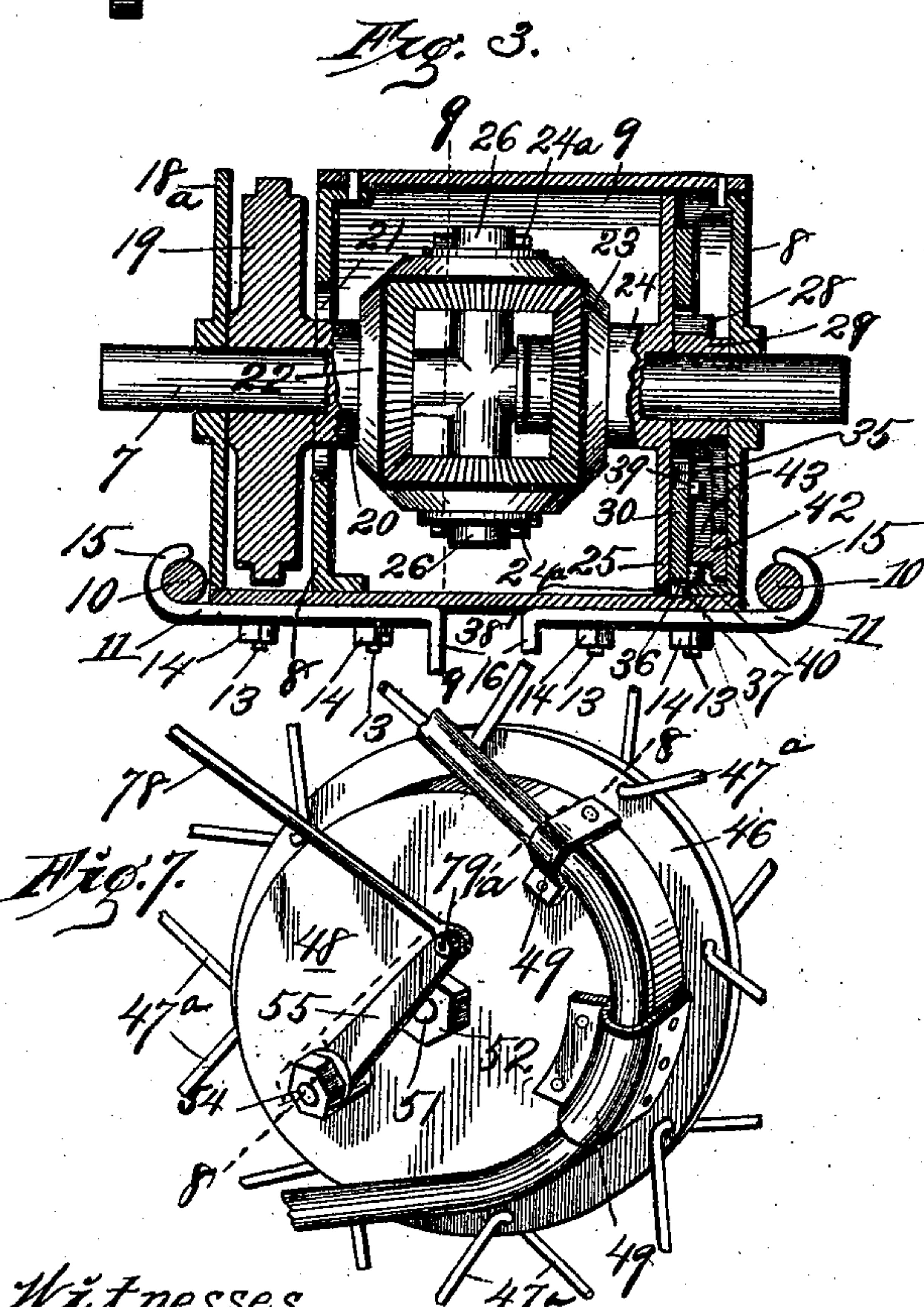
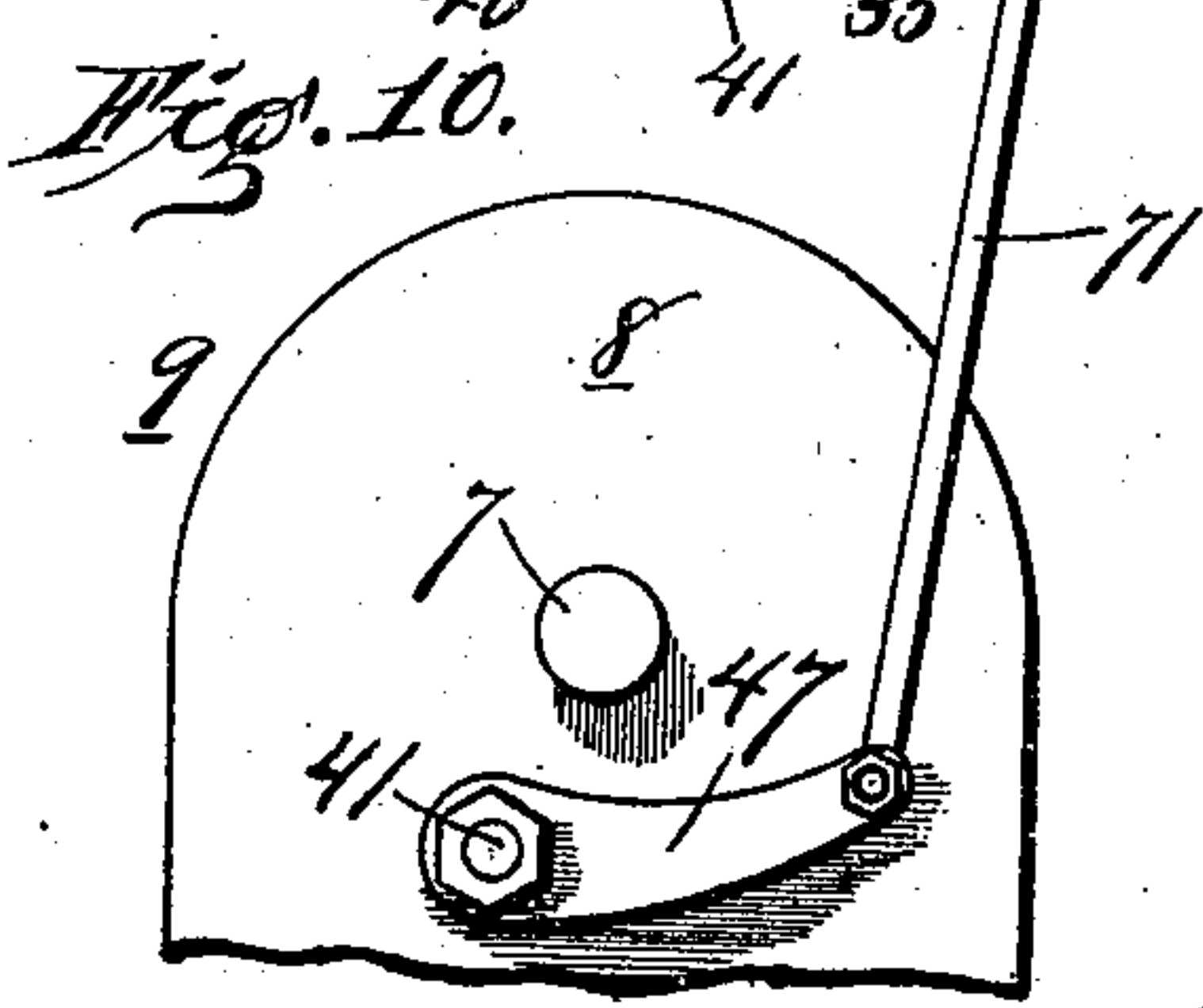
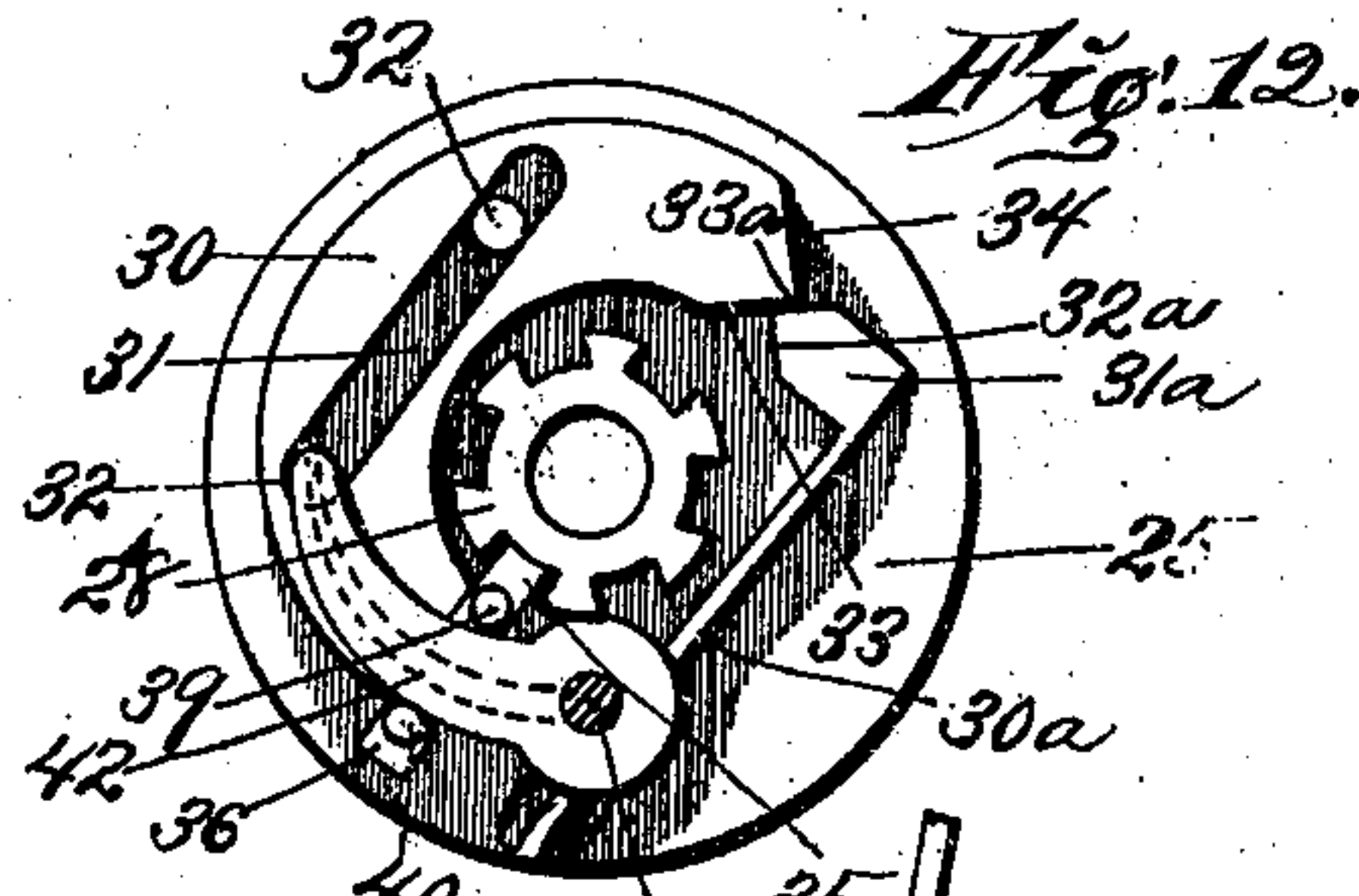
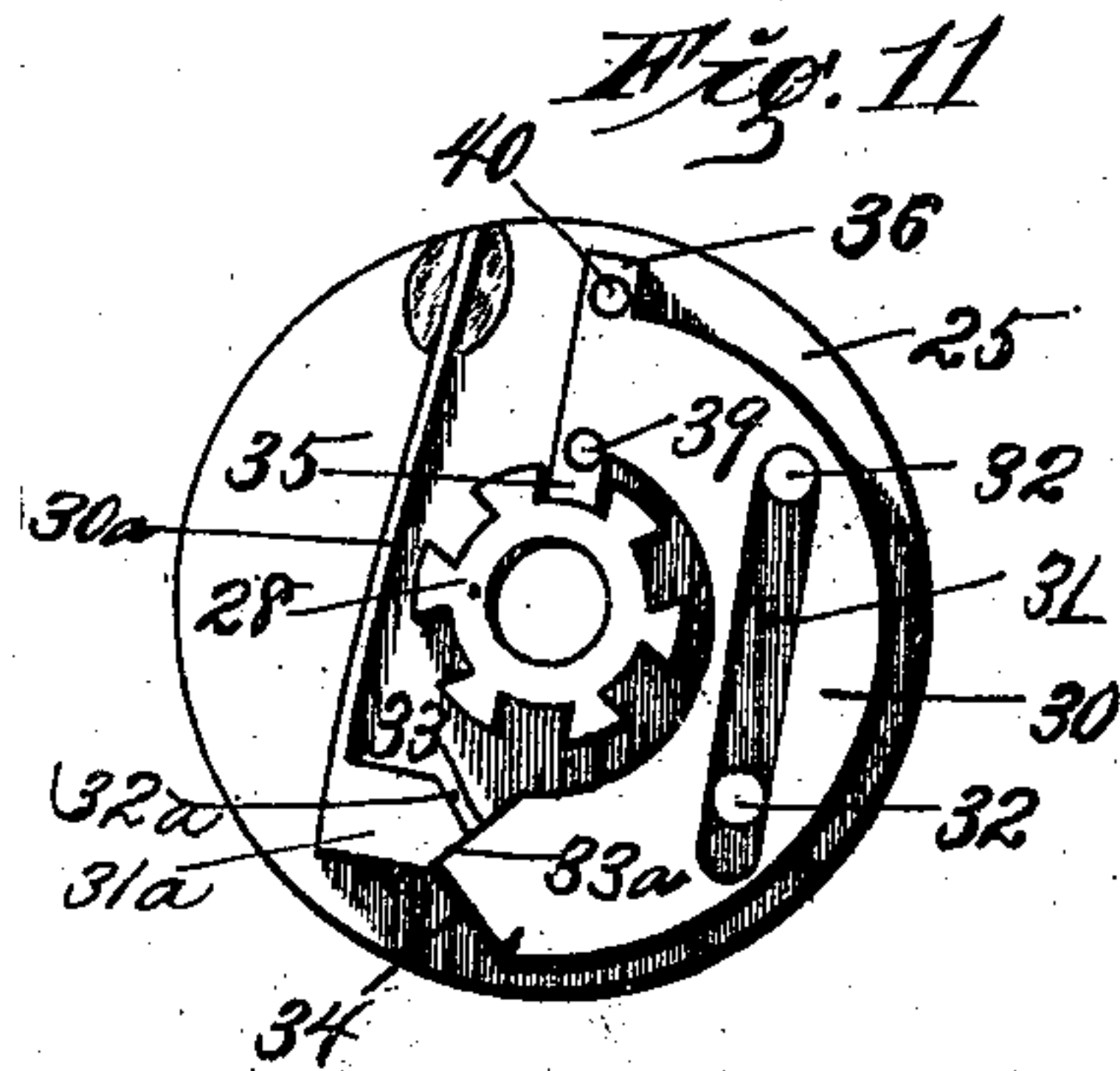
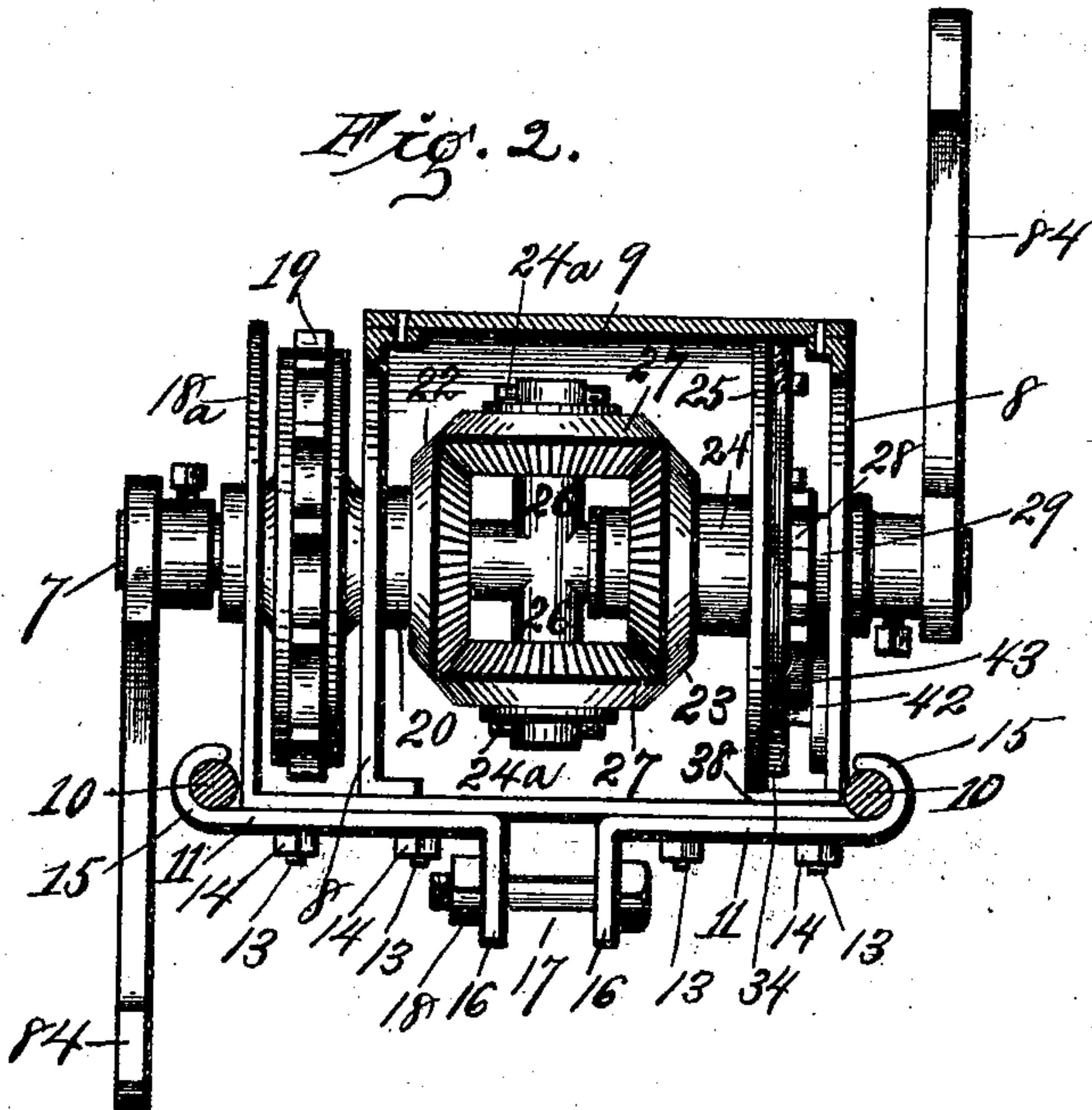
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3 Sheets—Sheet 2.

J. L. MORRIS.
ADJUSTABLE SPEED BICYCLE.

No. 504,168.

Patented Aug. 29, 1893.



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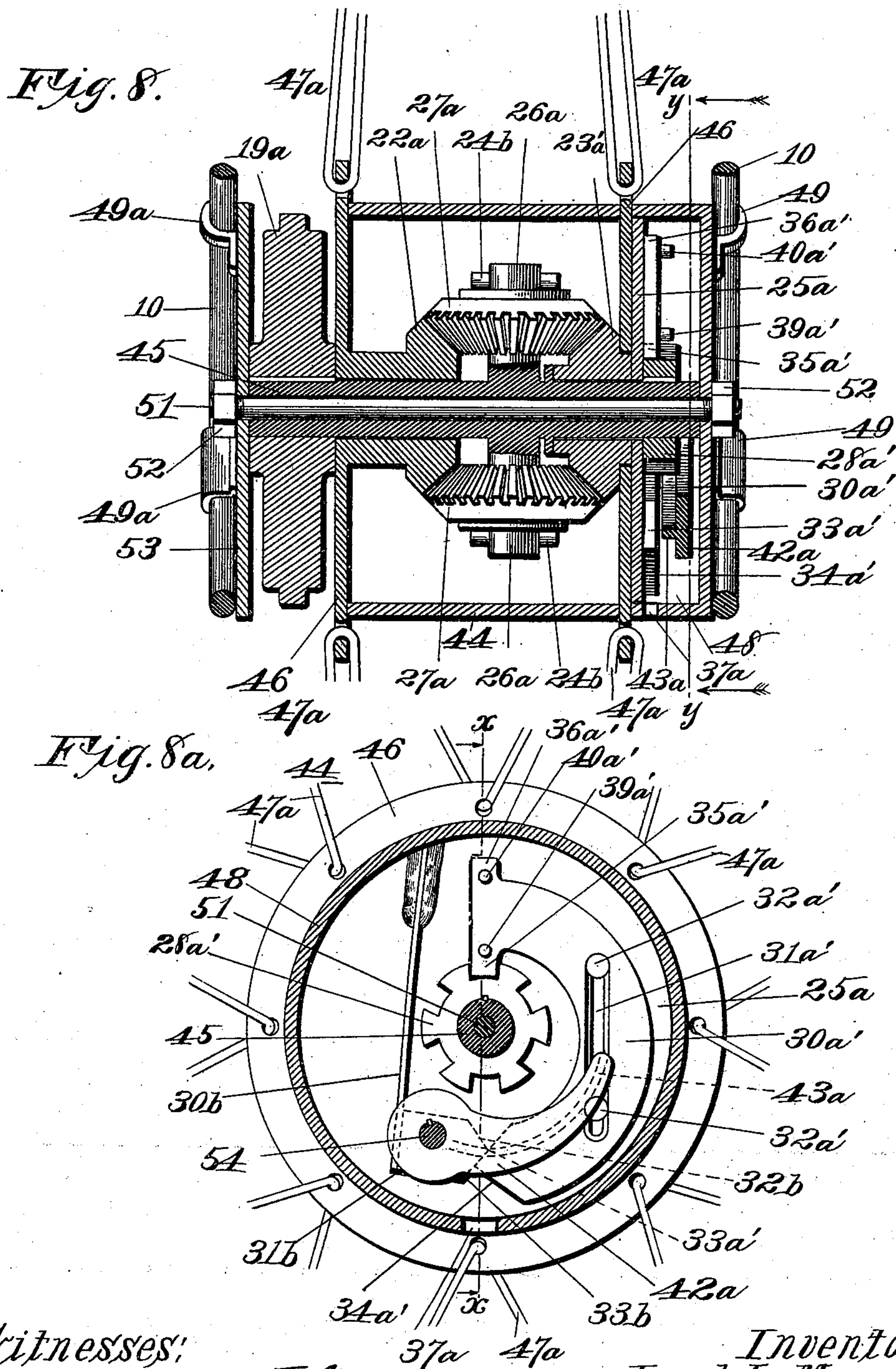
(No Model.)

3 Sheets—Sheet 3.

J. L. MORRIS.
ADJUSTABLE SPEED BICYCLE.

No. 504,168.

Patented Aug. 29, 1893.



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UNITED STATES PATENT OFFICE.

JOSEPH L. MORRIS, OF LAWRENCE, KANSAS.

ADJUSTABLE-SPEED BICYCLE.

SPECIFICATION forming part of Letters Patent No. 504,168, dated August 29, 1893.

Application filed December 23, 1892. Serial No. 456,134. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH L. MORRIS, of Lawrence, Douglas county, Kansas, have invented certain new and useful Improvements in Adjustable-Speed Bicycles, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to improvements in bicycles, and the objects of my invention, are to produce by a simple operation, and while the bicycle is in motion, a change in the speed, to increase or diminish the same at the will of the rider; and also to produce a bicycle, which is of strong and durable construction.

To the above purposes my invention consists in certain peculiar and novel features of construction and arrangement, as will be hereinafter fully specified and claimed.

In order that my invention may be fully understood, I will proceed to describe it with reference to the accompanying drawings, in which—

Figure 1, represents a perspective view of a bicycle, constructed in accordance with my invention. Fig. 2, is a view in elevation of the mechanism within the casing, one side of the casing being removed, and the top of the casing being shown in section. Fig. 3, is a vertical transverse sectional view of the casing taken on the line 2—3 of Fig. 1, and also showing a portion of the mechanism within the casing in section. Fig. 4 represents a side elevation of a portion of the upper bars of the frame-work, and showing also the upper ends of the hand rods, for operating the mechanism for changing the speed of the bicycle. Fig. 5, represents a top plan view of the mechanism shown in Fig. 4. Fig. 6, represents a vertical sectional view, taken on the line 6—6 of Fig. 4, and showing the position the rod assumes when it is depressed to operate the locking mechanism to increase the speed of the wheel. Fig. 7, represents a perspective view of one side of the hub casing, of the rear wheel, and showing secured thereto the rear end of the rod for actuating mechanism confined in the said hub-casing to increase or diminish the number of revolutions of the rear wheel. Fig. 8, is a vertical sectional view of the rear wheel casing and the mechanism therein, taken on the line $x-x$ of Fig. 8^a.

Fig. 8^a, is a vertical sectional view taken on the line $y-y$ of Fig. 8. Fig. 9 represents a vertical sectional view taken on the line 9—9 of Fig. 3, and showing the gear pinions in elevation. Fig. 10, represents a face view of the side of the casing inclosing the pedal-shaft, upon which is located the arm to which the lower end of the rod is connected, to actuate the mechanism for increasing or diminishing the number of revolutions of the pedal-shaft sprocket wheel. Fig. 11, represents an outer face view of the disk, carrying the locking plate thereon. Fig. 12, represents a similar view in a different revoluble position, and showing also the pivotal arm for operating the said locking plate. Fig. 13, represents a sectional view taken on the line 13—13 of Fig. 6. Fig. 14, represents a view of a modified arrangement of the gearing, incased around the crank-shaft. Fig. 15, represents a detail perspective view of one of the clamping plates, at the under side of the pedal-shaft casing.

In the drawings, 1 designates a bicycle, having the usual front and rear wheels 2 and 3, the handle bars 4, the brake 5, and the seat 6.

The frame of the machine may be of any desired shape, but I prefer to construct it approximately diamond shape, as illustrated. The crank or pedal-shaft 7, is journaled horizontally in the vertical side plates 8 of a closed casing 9, which is supported and secured, a slight distance in advance of the rear wheel 3, upon the lower part of the frame work 10 of the bicycle.

In the drawings accompanying this description, I show a pair of plates 11—11, having longitudinal slots 12, each of which engages a pair of pins or projections 13 arranged in alignment and transversely of the bottom of the casing, the lower ends of said pins being engaged by retaining nuts 14, to hold the plates 11—11, in position. These plates have their outer ends bent around the bars 10 of the frame at 15, and have depending ears 16 at their inner ends, which are connected by a bolt 17, the projecting end of which is engaged by a clamping nut 18, which secures the casing firmly and securely upon the frame 10, in the required position. A suitable distance from the right hand of the casing (looking from the rear) a plate 18^a is

vertically arranged and secured upon the bottom plate of the casing 9.

Mounted loosely upon the pedal-shaft 7, is the sprocket wheel 19, which is provided with
5 a hub 20, which projects inwardly therefrom, through an enlarged opening 21, in the adjacent side plate 8, of the casing, and has secured rigidly upon its inner end the beveled gear pinion 22. A similar beveled pinion 23,
10 is mounted rigidly upon the inner end of a hub 24 of a large disk 25, which is also mounted loosely upon the pedal shaft 7 and is located in the opposite side of the casing 9, from that occupied by the beveled gear
15 pinion 22. The pedal shaft is provided about centrally between the beveled pinions 22 and 23, with the diametrically projecting stub-shafts 26—26, upon which are loosely mounted the beveled gear pinions 27—27, which are
20 similar in size, and which each mesh with the oppositely disposed pinions 22 and 23. The pinions 27—27, are retained in position on the stub-shafts, by cross pins 24^a—24^a.

At the outer side of the disk 25, is provided
25 a toothed-hub 28, which is secured rigidly to the shaft and which bears against the outer side or face of said disk; this arrangement always holding the beveled pinion 23, surely in engagement with the beveled pinions 27—27
30 of stub-shafts 26—26. A locking plate 30, is carried upon the outer side of the disk 25, being provided with a slot 31, arranged to extend at right angles to a diametric line from the center of the disk, said slot engaging and
35 retained in position by the pins or projections 32 on the outer face of the disk. This locking plate 30, is approximately semi-circular in shape, and at one end is beveled at 33—34, to a point, and at the opposite end is pro-
40 vided with the inner and outer projections 35 and 36, which are in diametric alignment with the center of the disk 25, and arranged parallel with the slot 31 and the inner projection 35 is at times, adapted to engage the toothed
45 hub 28, of the shaft, while the outer projection 36, when the inner projection is not in engagement with the said toothed hub, is adapted to engage an opening or recess 37, in the circular flange or shoulder 38, projecting
50 from the inner side of the adjacent plate 8, of casing 9, the inner side of said flange, fitting closely against the periphery of the disk 25. The locking plate 30, is further provided with the outwardly projecting pins 39 and 40, lo-
55 cated adjacent to the projections 35 and 36.

Secured rigidly upon the inner end of a rock-shaft 41, pivotally secured through the vertical plate of the casing adjacent to the disk 25, is a rock-arm 42, which is provided
60 with a rib 43 on its inner side, projecting normally between the pins 39 and 40 of the locking plate 30, and is adapted to engage the one or the other alternately, to throw the pro-
65 jections 35 or 36, into engagement with the toothed hub 28 or with the opening or recess 37 in the flange of the casing as desired.

To prevent the locking-plate from accidental

movement toward locking or unlocking, I provide a spring-actuated dog or pawl, consisting of a spring-arm 30^a, soldered or otherwise
70 suitably secured at one end to the disk 25, adjacent to the end of the locking-plate carrying the projections 35 and 36, and the opposite end of said spring-arm carries at its in-
75 ner side a projection 31^a, having its inner and outer edges 32^a and 33^a, beveled to a point; the inner beveled edge 32^a, bearing against the beveled edge 34 of the locking-plate, when the locking-plate is in engagement with the
80 opening or recess 37 of the casing, and the outer beveled edge 33^a of the dog, bearing against the inner beveled end 33 of the locking-plate, when said locking-plate is in en-
85 gagement with the toothed-hub of the shaft, as shown in Fig. 11.

The arrangement of the mechanism within and also the construction of the hub-casing 44 inclosing the shaft 45 of the rear wheel is somewhat different to that already described. The hub-disks 46 to which are attached the
90 spokes 47^a, form the vertical side walls of the casing, which therefore is adapted to revolve. In this instance, a gear-pinion 22^a, is formed integral with the adjacent disk 46 as shown, or may be rigidly secured thereto in any suit-
95 able manner, and projecting inwardly of the casing loosely surrounds the shaft or axle 45, and meshes with the gear-pinions 27^a, carried loosely upon the radially and oppositely pro-
100 jecting stub-shafts 26^a of the shaft or axle, and held from accidental displacement by cross-pins 24^b. The sprocket-wheel 19^a, of the rear wheel is keyed or otherwise fixed upon the shaft 45 at the outer side of the hub-disk
105 carrying the gear-pinion, and a separate casing 48 is secured to the framework of the machine at the opposite side of the casing, and is held in position by metal straps 49, embracing the framework of the machine, or in any
110 other suitable manner. A disk 25^a, is mounted loosely upon the shaft 45 within said casing, and is interposed between the outer side of the adjacent hub-disk and the toothed-hub 28^a keyed upon the shaft 45. This disk also
115 carries a gear-pinion 23^a which projecting inwardly through the adjacent hub-disk 46, meshes with the gear-pinions carried by the stub-shafts 27^a. A slidable locking-plate 30^a, is formed with a slot 31^a engaging and re-
120 tained in position by pins or projections 32^a of the disk 25^a, and also is provided with inner and outer projections 35^a and 36^a and with the correspondingly located pins 39^a and 40^a; these several features being constructed and arranged to operate in a manner similar
125 to that before described. A spring-actuated dog or pawl is also provided to hold the locking-plate 30^a, from accidental movement and consists of the spring-arm 30^b, soldered to the disk 25^a, and the dog 31^b, having the inner
130 and outer beveled edges 32^b and 33^b, carried at the free end of said spring-arm, and adapted to engage respectively the outer and inner beveled ends 34^a and 33^a of the locking plate

30^a, to hold the locking plate into engagement with the hub 28^a or the opening 37^a of the stationary casing 48. A sprocket-chain 50, connects the wheels 19 and 19^a of the front and rear shafts or axles respectively, said sprocket wheels being preferably of the same size. The rear shaft or axle 45 is preferably tubular, and a tie-rod 51, extends there-through, and has its projecting screw-threaded ends engaged by retaining nuts 52, one of which bears against the outer side of the circular casing 48, and the other nut 52 bears against the outer side of the circular plate 53, secured by metal straps, 49^a or other suitable means, beyond the rear sprocket wheel 19^a, and to the frame-work 10 of the bicycle. The axle or shaft casing of the rear wheel, has on its outer side, and secured rigidly to the projecting end of the rock-shaft 54, corresponding to rock-shaft 41 of casing 9, a rock-arm 55, extending preferably rearward, as shown, and in nearly the same direction with the inner rock-arm 42^a.

Extending upwardly and rearwardly, from the bars 10 of the frame-work, and near opposite sides of the casing are the brace bars 56, the upper ends of which are secured in hollow cylindrical projections depending from the under side of the horizontal plate 57 through which the seat rod 58 is guided and supported. Secured to the under side of the plate 57, by screw-bolts 59, is a plate 60 provided with rearwardly extending ears 61, having aligned openings there-through. A pair of approximately vertical cylindrical casings 62—63, are provided with forwardly extending ears 64, at their front sides, having openings there-through, and these ears 64 are arranged between the ears 61, and a pivot rod secures their pivotal connection; thus allowing the independent pivotal connection of each cylindrical casing, with the stationary plate 60. Each of these upwardly extending cylindrical casings 62—63 is provided with a closed bottom 65, having an aperture 66 there-through, and diametrically arranged notches 67—67 on opposite sides and opening into the apertures 66, the object of which will be hereinafter explained. The upper ends of the cylindrical casings 62—63, are externally screw-threaded, and screw-caps 68 close the upper ends of said casings. The screw-caps are also each provided with a central aperture 69, and diametrically arranged notches 70—70 on opposite sides of said aperture; the apertures and notches of the caps being arranged in vertical alignment with the aperture and notches at the lower ends or bottoms of the casings 62 and 64.

Extending longitudinally through the casings 62—63, respectively, are rods 71 and 72, each of which is provided at its upper end with a knob or handle 73 and the lower end of the rod 71, is pivotally connected to the rear end of the rock-arm 47, of the pedal shaft casing; the lower end of the shorter rod 72, is pivotally connected to a forwardly extending rock-arm 74, the opposite end of which is secured to a

rock-shaft 75, which is pivotally supported by brackets 76, clamped or otherwise secured to the frame work.

Secured rigidly at its upper end to the rock-shaft 75, is a rock-arm 77, to the opposite end of which is pivotally connected the rod 78, which extends obliquely downward and rearward, and is pivoted at its lower end at 79^a to the rock-arm 55, of the casing 48 of the rear wheel. Each rod 71 and 72, is loosely surrounded by two collars 79—80, and by a coiled expansion spring 81, which is interposed between the collars 79 and 80 and holds them normally against the bottoms of the caps 68 and upon the bottoms of the casings, respectively. Each rod is further provided with upper and lower through pins 82—83, adapted to bear respectively against the upper and lower sides of the collars 79 and 80, when the rods are depressed or pulled upward, and which pins are adapted to pass through the notches 70 and 67 on opposite sides of the apertures in the caps, and in the bottoms of said casings.

The pedal cranks 84, are secured on the projecting ends of the pedal shaft 7, in the usual manner, and carry the usual pedals 84^a thereof in the usual manner.

The operation of increasing or decreasing the speed of the bicycle, is as follows: When the locking plates of the casings of the pedal shaft, and the rear wheel axle or shaft, are in their normal positions, the projections 35 and 35^a thereof, are in engagement with the toothed hubs 28 and 28^a of the shafts, and the revolution of the pedal shaft, by reason of the projecting stub-shafts 26—26 carrying pinions 27—27, causes the revolution of the mechanism within the casing, and the sprocket wheel 19. The revolution of the rear sprocket wheel 19^a, through the medium of the chain 50, causes the operation of the interior mechanism of the rear wheel casings. By reason of the similar size of the sprocket wheels 19—19^a, one revolution of the rear wheel is produced to one revolution of the pedal-shaft. To increase the speed of the machine one hundred per cent., while the bicycle is in motion, the rider depresses either one of the rods 71 or 72, (the pivotal connection with the plate 60 allowing the casings 62 and 63 to adjust themselves to the movement of the rods 71 and 72) causing the operation of the crank-arm 47 or 55 and the corresponding inner rock-arm, the projecting rib of which, bearing upon the inner side of the outer pin of the locking-plate as said plate revolves with its disk, causes the outer and corresponding projection thereof to bear upon the inner side of the circular flange 38 of the end plate of the pedal-shaft casing, or the inner side of the circular casing 48, according as the rod 71 or 72 is operated, until the opening in said plate or casing is reached, which it is induced by the pressure from its corresponding inner rock-arm to enter, and immediately the disk carrying said locking-plate and the corresponding pinion ceases

to revolve. The stoppage of the gear-pinion carried by said disk, causes each tooth thereof to become a fulcrum for the pinions loosely carried by the corresponding stub-shafts, causing said pinions to rotate upon the said stub-shafts. This revoluble movement of the pinions of the stub-shafts therefore causes the pinion of sprocket-wheel 19 to revolve twice around the pedal-shaft while the pedal-shaft makes one revolution, and through the medium of the sprocket-chain causes the rear wheel also to revolve twice to one revolution of the pedal-shaft, or (referring to the rear-wheel mechanism) the pinion 22^a is caused to revolve twice to one revolution of the shaft 45, and said pinion being carried by the hub-casing of the rear-wheel, therefore causes said wheel to make two revolutions to one revolution of the shaft 45. It will be seen, that owing to the arrangement of the collars 79 and 80, the interposed expansion spring and the through pins 82 and 83, the rod 72 will assume the depressed position shown in Fig. 6, to cause the inner crank-arm 42, to operate the locking plate, and immediately the pressure is removed from said rod, the expansion of said spring bearing at the under side of the collar 79, (which collar, at the time is in contact with the through pin 82,) will cause the rod to resume its normal elevated position, and the collar 79 will rest at the under side of the cap. The speed of the bicycle, may be increased, to double the speed now obtained, to the maximum or to an increase of three hundred per cent. over the speed of revolution of the pedal-shaft, by depressing the other locking plate, in a manner similar to that described. To decrease the speed of the bicycle while in motion, it is only necessary to lift either the locking plate out of engagement with the recess or opening 37, by pulling upward upon its corresponding rod 71 or 72, or both, as will be often found necessary in hill climbing, and when the minimum power is desired to be exerted.

It will be seen from reference to Fig. 12 of the drawings that the curved formation of the inner rock-arms and their ribs, allows the inner and outer pins of their corresponding locking-plate, when said locking plate is revolving, to pass by without interference from said rocking arm.

It is to be understood, that I do not confine myself to the precise mode of securing the casing 9 upon the frame 10, nor to the precise location of the rods for actuating the locking plate, except that they be placed in a position convenient to the rider.

In Fig. 14, I have shown a gearing, as a modified form to be carried by the pedal shaft or rear axle or shaft, which consists of the shaft 7^a, having stub-shafts 85, extending outwardly therefrom, at a suitable angle, and carrying loosely thereon, the gear pinions 86—86, meshing with a pinion 87, corresponding to the pinion 23 in purpose and arrangement, and with a larger pinion 88, cor-

responding to the pinion 22, carried by the sprocket wheel 19. This gearing, may be used preferably on bicycles for ladies, where, by an increase of speed, less than one hundred per cent., may be obtained at the pedal shaft, and at the axle or shaft of the rear wheel.

From the above description, it will be seen that I have produced a bicycle, from which the maximum and minimum of speed may be obtained, while in motion, which will be found of great advantage, in crossing sandy stretches of road, or in hill climbing, and further a bicycle which is of comparatively simple construction, and which is strong and durable.

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

1. A bicycle, comprising a frame mounted on wheels a stationary casing supported by said frame, and having vertical side plates or walls, a pedal shaft journaled in said side plates or walls, and having stub-shafts projecting from said shaft, and a toothed hub upon said shaft, gear-pinions carried loosely upon the stub-shafts, a sprocket-wheel mounted loosely upon the pedal-shaft and operatively connected to the rear wheel and a gear-pinion carried by said sprocket wheel and meshing with the gear-pinions carried by the stub-shafts, and a disk also loosely mounted upon the pedal-shaft, and a gear-pinion carried rigidly by said disk and also meshing with the pinions of the stub-shafts, and a slidable locking-plate also carried by said disk, and means to actuate said locking plate to engage the toothed-hub of the shaft or to engage the stationary casing, substantially as set forth.

2. A bicycle, comprising a frame mounted upon wheels a casing, supported by said frame, and having vertical side plates or walls, a pedal-shaft journaled in said side plates or walls, and having stub-shafts projecting from opposite sides of said pedal-shaft, gear-pinions carried loosely upon the stub-shafts, a sprocket wheel mounted loosely upon the pedal-shaft, and operatively connected to the rear wheel a gear pinion carried by the sprocket wheel, and meshing with the gear pinions carried by the stub-shafts, and a disk, also loosely carried by the pedal-shaft, and a gear pinion carried rigidly by the said disk, a toothed hub carried by the shaft, and a locking plate also carried by said disk, in combination with a rod, and a rock-arm to actuate the said locking plate to engage the toothed hub of the shaft, or to engage the casing, substantially as set forth.

3. A bicycle, comprising a frame mounted upon wheels a casing, supported by said frame, and a circular flange projecting inwardly of one of the side walls or plates of said casing, having an opening or recess therein, adjustable slidable plates, located at the under side of said casing, and engaging the

frame of the bicycle, a shaft journaled horizontally in the side walls or plates of said casing, stub-shafts projecting from opposite sides of the said shaft, and gear pinions loosely mounted upon said stub-shafts, a sprocket wheel loosely mounted upon said shaft and operatively connected to the rear wheel, and a gear pinion carried rigidly by said sprocket wheel a disk, also loosely carried by said shaft, and a gear pinion carried rigidly by said disk, and meshing with the gear pinions carried by the stub-shafts, a slidable locking plate carried by the said disk, and spring actuated dog or pawl engaging said locking plate, a toothed hub carried by the shaft, a rock arm at the inner side of the casing, and a rock arm at the outer side of the casing, and a rock-shaft or bolt connecting said rock-arm, and adapted to be operated to actuate the inner rock-arm to move the locking plate, substantially as described.

4. In a bicycle driving mechanism, the combination with a casing, a shaft journaled horizontally in said casing, stub-shafts projecting from opposite sides of said shaft, gear pinions carried loosely upon said stub-shafts, a sprocket wheel carried loosely upon said shaft and operatively connected to the rear wheel and a gear pinion carried rigidly by said sprocket wheel and meshing with the gear pinions carried by the stub-shafts, a disk also carried loosely by the said shaft, and a gear pinion carried rigidly by said disk and meshing with the gear pinions carried by the stub-shafts, and a locking plate carried by said disk, and a spring actuated dog or pawl also carried by said disk, and engaging the said locking plate, and a toothed hub carried by the shaft, of a rod, and a rock-arm operatively connected to said rod to actuate said locking-plate, to engage with the shaft, and an expansion spring, surrounding said rod, and a collar loosely engaging said rod at each end of the expansion spring, and a casing inclosing said rod, expansion spring and collars, and having a closed bottom and top provided with openings for the rod, and through pins carried by said rod, and notches in the tops and bottoms of the cylindrical casings for the passage of said through pins, and a knob or handle at the upper end of the rod, all arranged substantially as set forth.

5. In a bicycle, the combination with a wheel having a hub-casing comprising hub disks marginally connected together, a stationary plate at one side of the hub-casing and a stationary casing at the opposite side of the hub-casing, a shaft journaled loosely in the stationary plate and stationary casing and passing loosely and centrally through the hub-casing, stub-shafts carried by the said shaft, and gear pinions carried loosely upon said stub-shafts, a sprocket-wheel carried rigidly by said shaft, and a pinion carried rigidly by the hub-casing and meshing with the pinions of the stub-shafts, a disk carried loosely by the shaft, a

toothed-hub carried by the shaft adjacent to the disk, a gear-pinion carried by said disk and meshing with the pinions of the stub-shafts, a slidable locking plate carried by the said disk, and a spring-actuated dog also carried by said disk and engaging said locking-plate to hold it into engagement with the toothed-hub of the shaft or with the casing, of a rock-arm and a movable rod operatively connected to said rock-arm, and adapted to actuate the rock-arm to overcome the resistance of the spring-actuated dog, and move the locking-plate out of engagement with the toothed-hub of the shaft, or with the stationary casing, substantially as set forth.

6. In a bicycle, the combination with a wheel having a hub-casing, and a stationary casing located at one side of the hub-casing, and a stationary plate located at the other side of the hub-casing, a shaft extending loosely through the hub-casing and journaled near its opposite ends in the stationary plate and stationary casing, and having a toothed-hub and stub-shafts, and beveled gear-pinions mounted loosely upon the stub-shafts, and a beveled gear-pinion carried by the hub casing and meshing with the pinions of the stub-shafts, and a disk loosely mounted upon the shaft in the stationary casing and having a beveled gear-pinion meshing with the pinions of the stub-shafts, and a slidable locking plate, a rock-shaft journaled in the stationary casing, and a rock-arm carried at the outer side of the stationary casing upon the rock-shaft and an inner rock-arm carried by said rock-shaft, and adapted to actuate or move the locking-plate, a pivoted cylindrical casing, and a rod extending longitudinally through said casing, a spring surrounding said rod to return it to its normal position after being depressed or raised, a bearing, a rock-shaft carried thereby and having a rock-arm pivotally connected to the rod passing through the cylindrical casing, a second rock-arm carried by the rock-shaft, and an obliquely arranged rod pivotally connecting the last mentioned rock-arm and the outer rock-arm of the stationary casing, substantially as set forth.

7. In a bicycle, the combination with a casing supported by the frame-work of the bicycle and having an opening therein, and a pedal shaft journaled in said casing, and having a toothed hub and stub-shafts, and pinions mounted loosely upon the stub-shafts and a sprocket-wheel mounted loosely upon the shaft, and a pinion carried rigidly by said sprocket-wheel, and meshing with the pinions upon the stub-shafts, of a disk mounted loosely upon the shaft, and guide-pins projecting from said disk, and a locking-plate carried by said disk and having a slot engaging the pins projecting from the disk, and also having inner and outer projections, and pins projecting from the locking-plate adjacent to said projections, and a rock-arm, and means

to actuate said rock-arm to engage the pins adjacent to the projections so that the outer or inner projection will respectively engage the opening in the casing, or the toothed hub of the shaft, substantially as set forth.

8. In a bicycle, the combination with a casing supported upon the framework of the bicycle, a pedal shaft journaled therein, and having a toothed hub and stub-shafts, and pinions mounted loosely upon said stub-shafts, and a sprocket-wheel mounted loosely upon the shaft, and a pinion carried rigidly by said sprocket-wheel and meshing with the pinions of the stub-shafts, of a disk loosely mounted upon the shaft, and a slidable locking-plate carried by said disk having inner and outer projections and having one end formed with an inner and an outer bevel, and means to move the slidable locking-plate so that the outer projection will engage the opening of the casing or the inner projection will engage the toothed-hub of the disk, and a spring-actuated dog carried by the locking-plate and having an inner beveled end adapted to bear against the outer beveled end of the locking-plate to hold it into engagement with the casing, and also formed with an outer beveled end adapted to bear against the inner beveled end of the locking-plate to hold said locking plate into engage-

ment with the toothed-hub of the shaft, substantially as set forth.

9. A bicycle, comprising a wheel having a hub-casing, a stationary plate located at one side of said hub-casing and secured to the framework of the bicycle, and a stationary casing located at the opposite side of the hub-casing and also secured to the framework of the bicycle, a tubular-shaft passing loosely through said hub-casing and journaled loosely in the stationary plate and the stationary casing, and having a toothed-hub and radial stub-shafts, and gear-pinions revolvably mounted upon said stub-shafts, and a gear-pinion carried by the hub-casing and meshing with the said pinions, and a sprocket-wheel rigidly mounted upon the shaft between the hub-casing and the stationary-plate, and a tie-rod passing through said tubular shaft, and clamping nuts engaging the opposite ends of said tie-rod, and bearing against the outer sides of the stationary plate and the stationary casing, substantially as set forth.

In testimony whereof I affix my signature in the presence of two witnesses.

JOSEPH L. MORRIS.

Witnesses:

W. W. FLUKE,
W. H. SIMONS.