

No. 689,492.

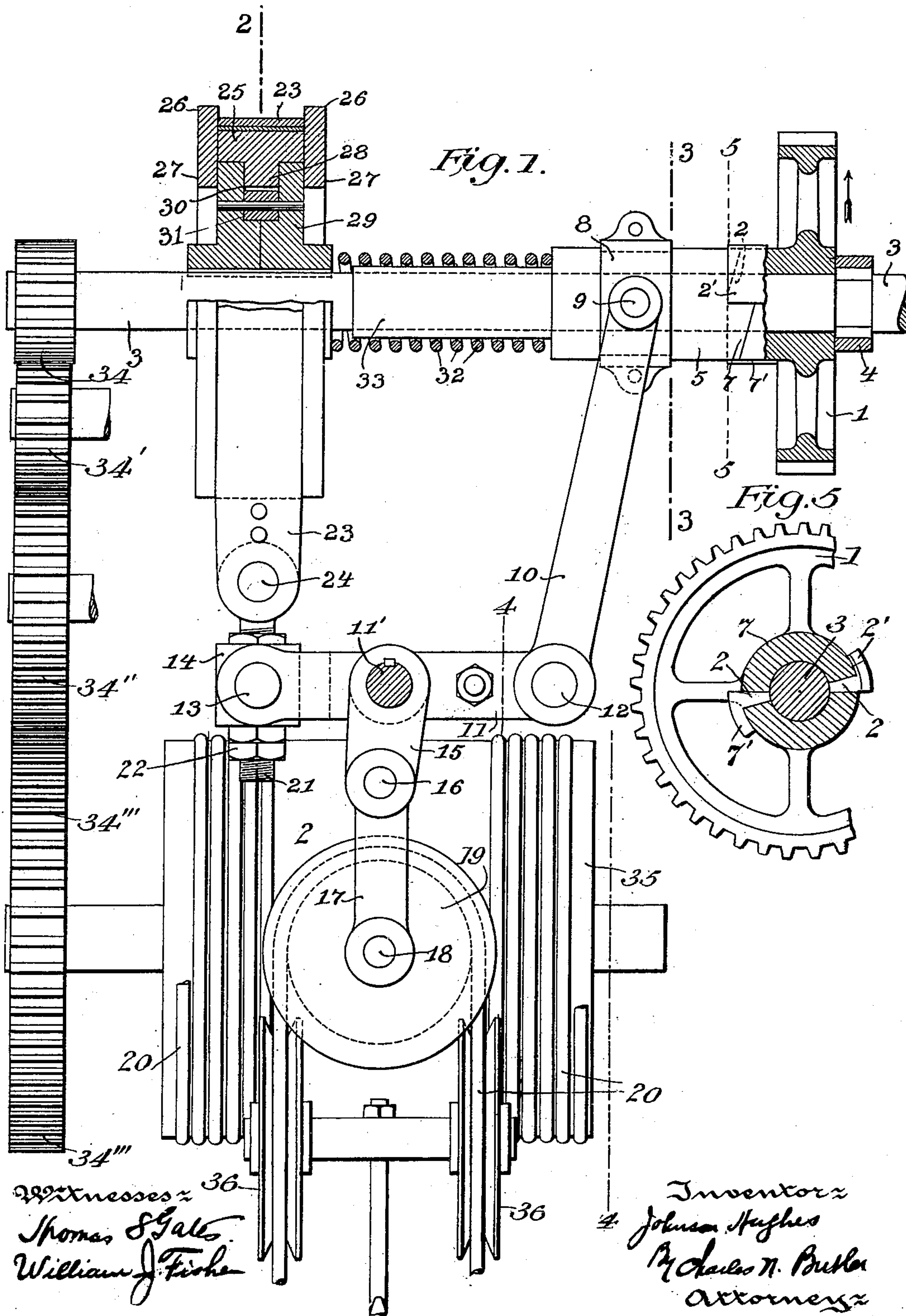
Patented Dec. 24, 1901.

J. HUGHES.
AUTOMATIC BRAKE.

(Application filed Feb. 5, 1901.)

(No Model.)

3 Sheets—Sheet 1.



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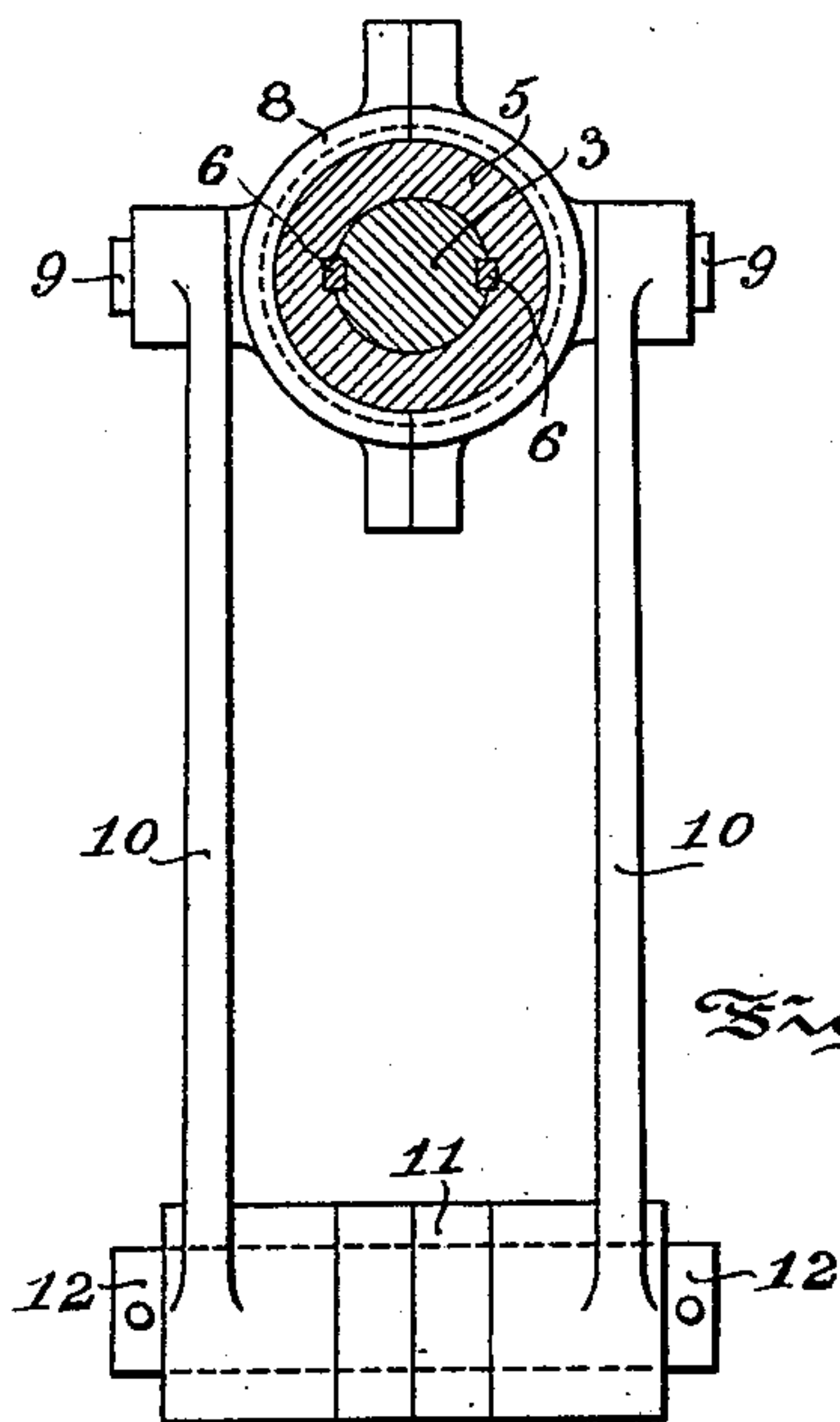


Fig. 3.

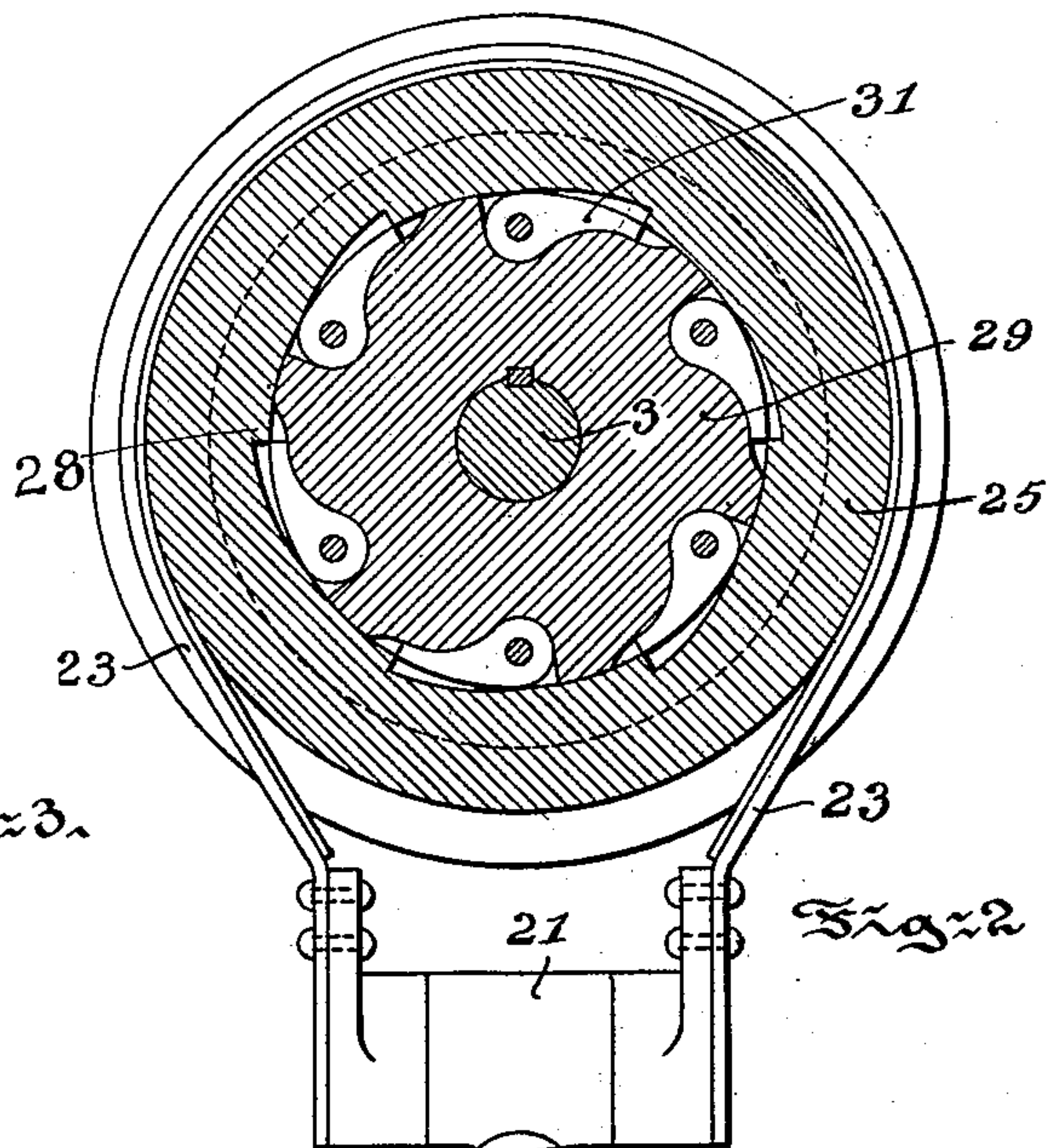


Fig. 2.

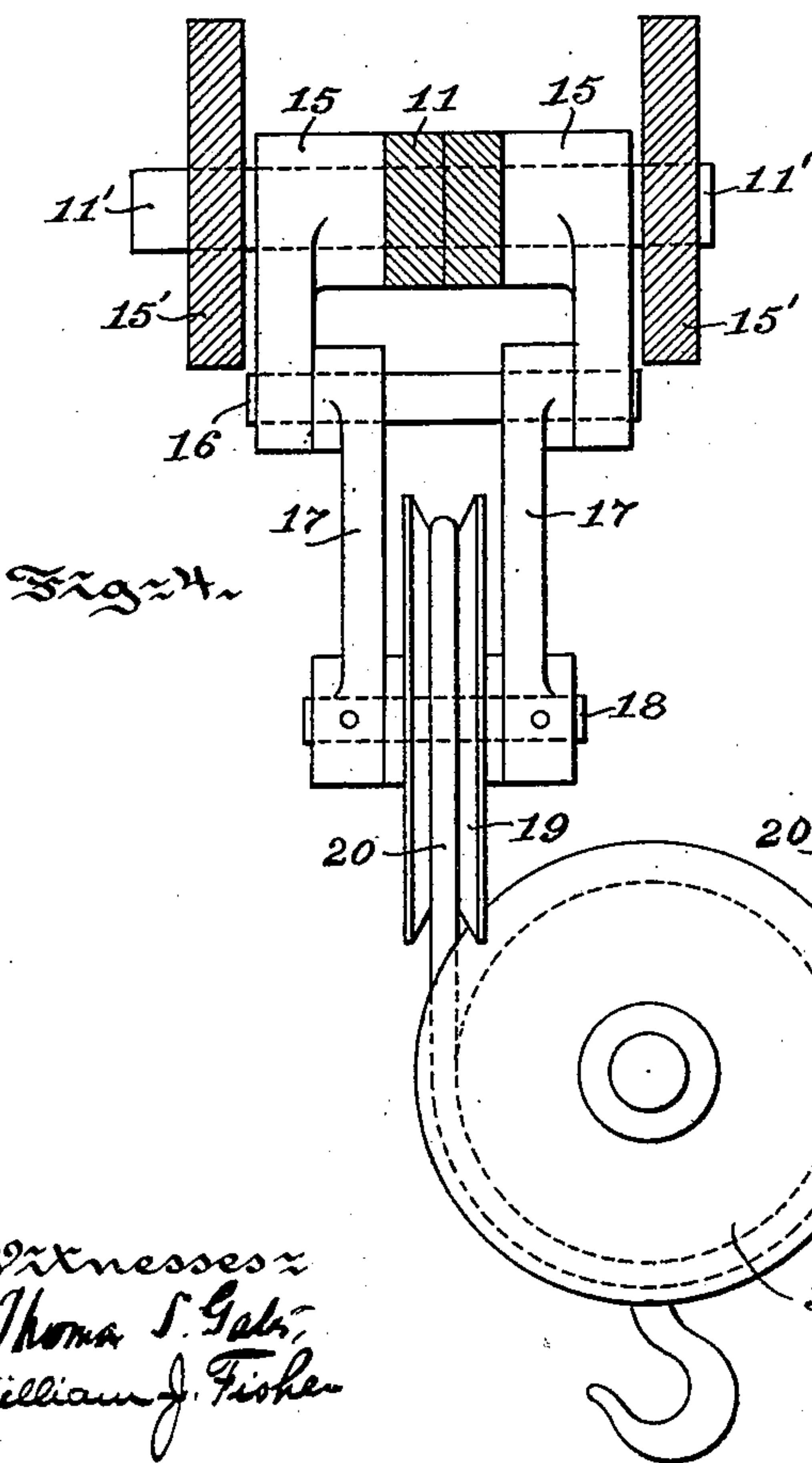
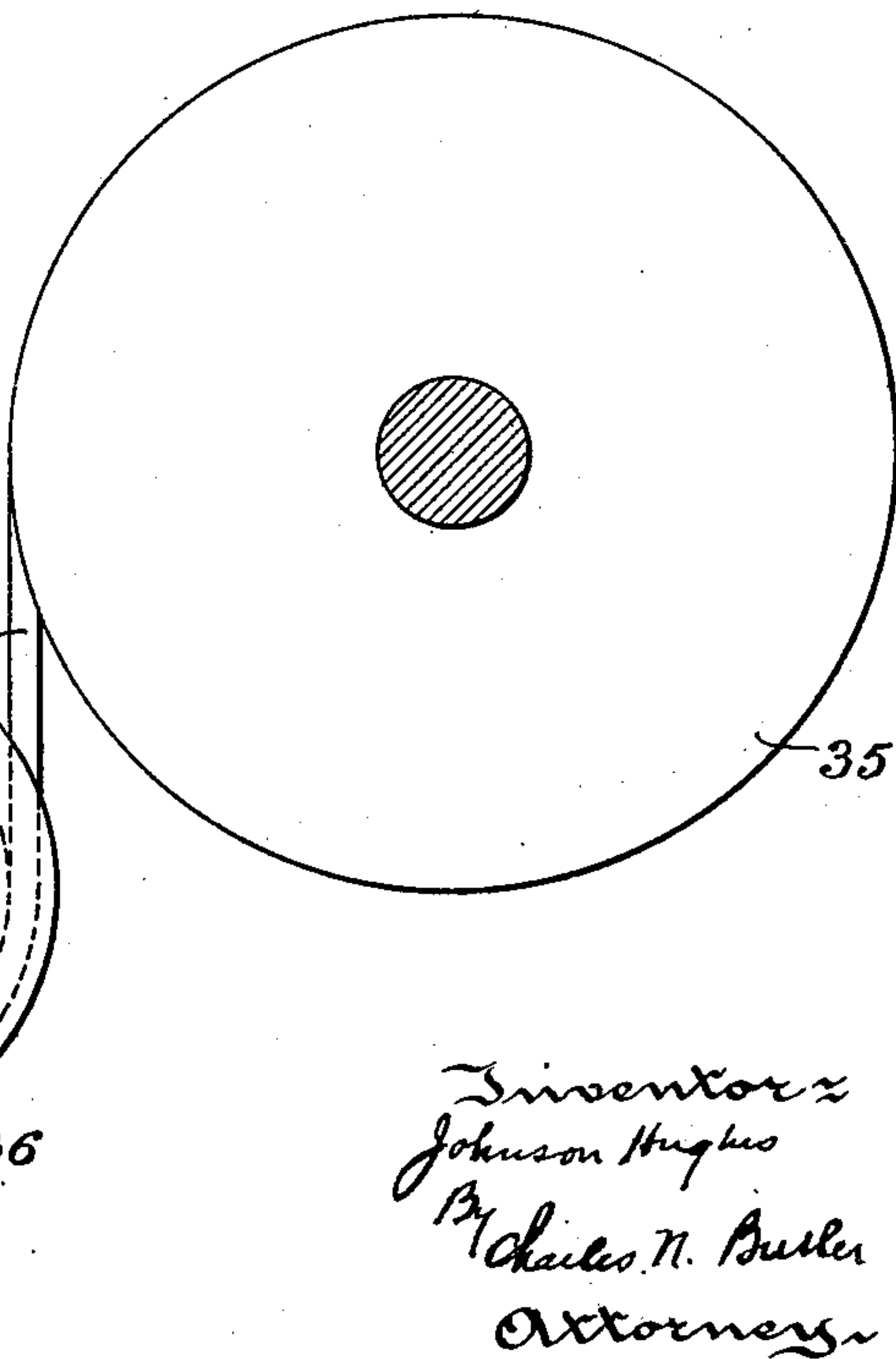
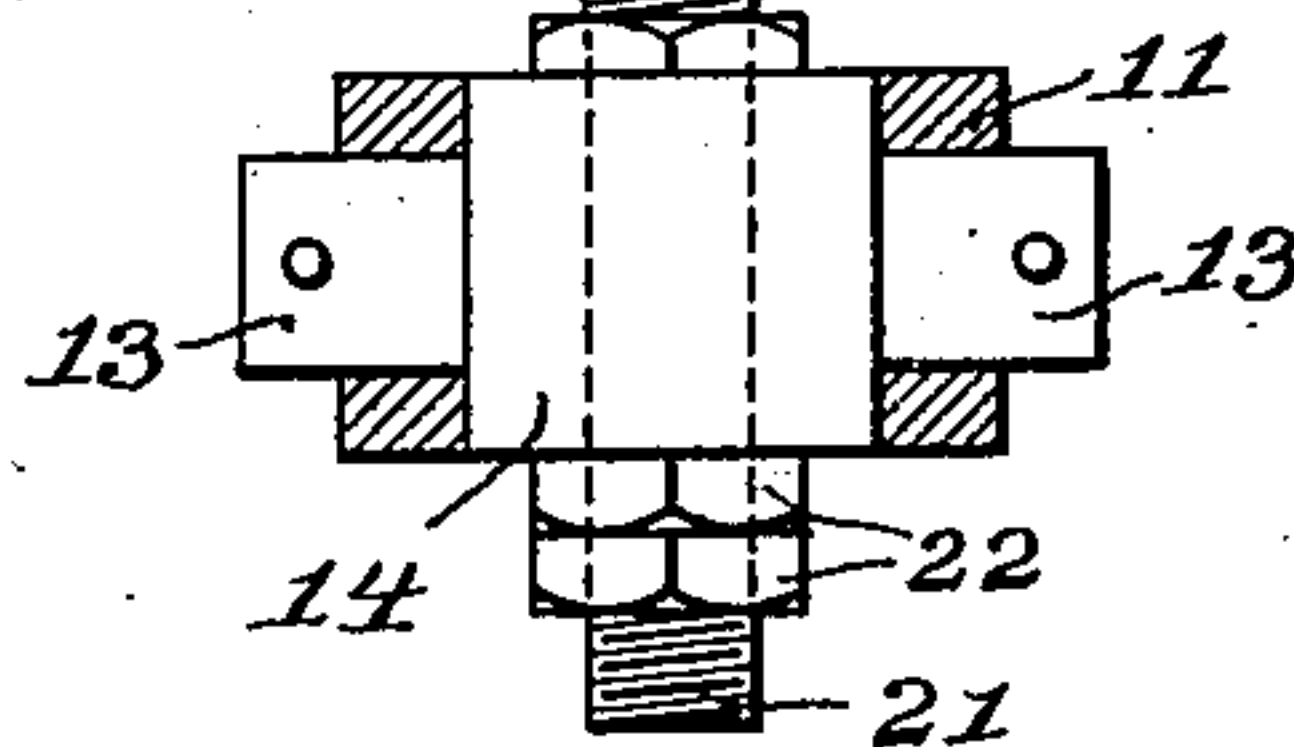


Fig. 4.



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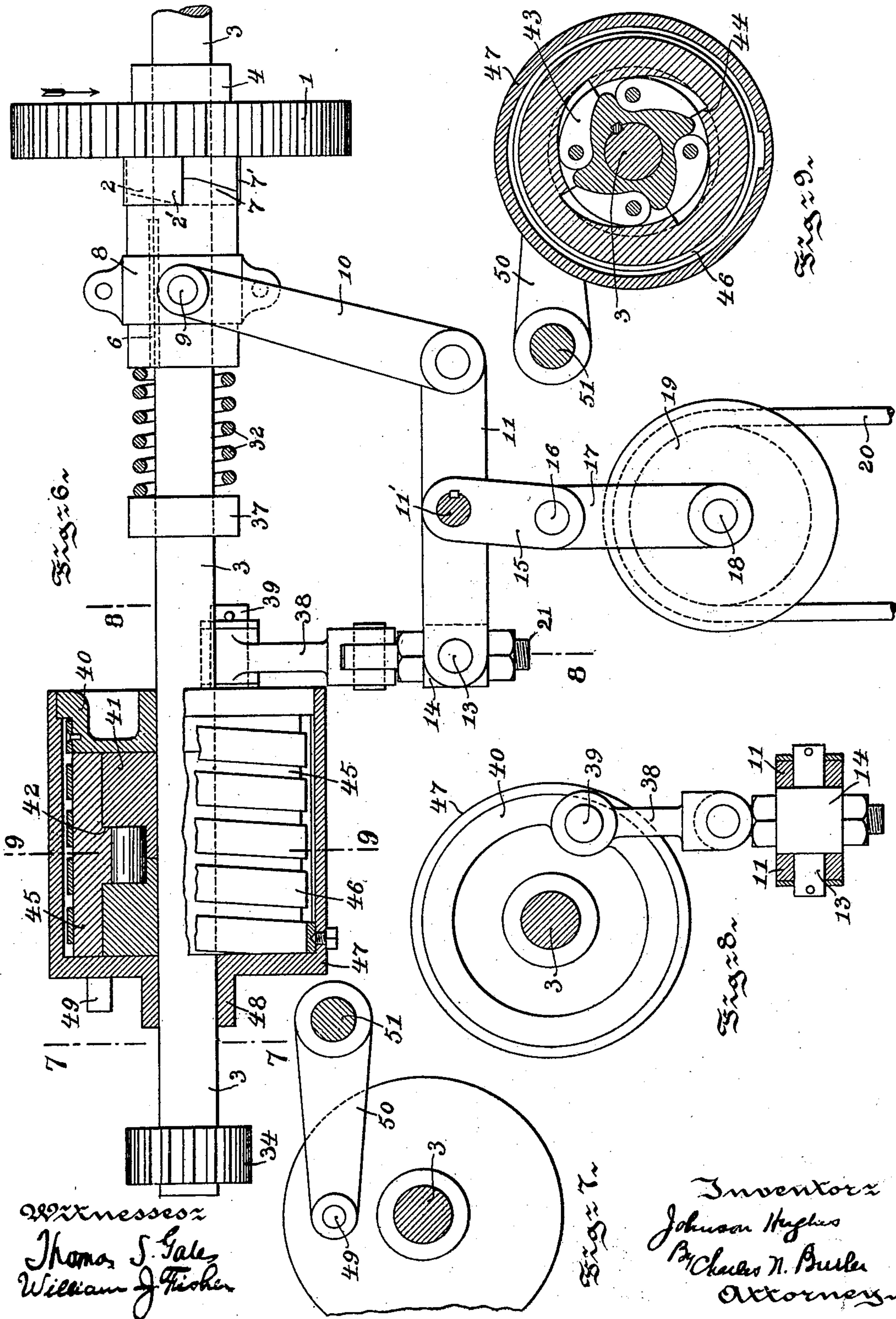
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UNITED STATES PATENT OFFICE.

JOHNSON HUGHES, OF WISSAHICKON, PENNSYLVANIA.

AUTOMATIC BRAKE.

SPECIFICATION forming part of Letters Patent No. 689,492, dated December 24, 1901.

Application filed February 5, 1901. Serial No. 46,059. (No model.)

To all whom it may concern:

Be it known that I, JOHNSON HUGHES, a resident of Wissahickon, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Automatic Brakes, of which the following is a specification.

The improvements of this invention are designed to effect the automatic adjustment of the brake to the load controlled thereby. The mechanism employed is regulated by the power, so that the load is carried down by gravity at the desired speed. The grinding and gripping tendencies of brakes commonly employed are corrected by my mechanism.

The characteristic features and further advantages will be seen from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a view showing a side elevation of my invention, parts being shown in section. Fig. 2 is a sectional view taken on the line 2 2 of Fig. 1. Fig. 3 is a sectional view taken on the line 3 3 of Fig. 1. Fig. 4 is a sectional view taken on the line 4 4 of Fig. 1. Fig. 5 is a sectional view taken on the line 5 5 of Fig. 1. Fig. 6 is a side elevation, partly in section, in illustration of a modified construction. Fig. 7 is a sectional view taken on the line 7 7 of Fig. 6. Fig. 8 is a sectional view taken on the line 8 8 of Fig. 6, and Fig. 9 is a sectional view taken on the line 9 9 of Fig. 6.

As shown in the drawings, the driving-wheel 1, having the clutch-jaws, as 2, and the lug, as 2', fixed thereon, is revolvably mounted on the shaft 3 and held in longitudinal position thereon by the ring 4. A sleeve 5, longitudinally movable on the shaft 3, but revolvably held thereto by the splines 6, has clutch-jaws, as 7, and a lug, as 7', adapted to engage the wheel clutch-jaws 2 and lug 2'. The jaws 2 and 7 are engaged positively when the wheel is revolved in the direction of the arrow; but when revolved in the opposite direction the engaging inclined faces of the jaws 2 and 7 permit them relative motion of revolution, which is limited by the engagement of the lugs or stops 2' and 7'. A collar 8, revolvably loose but longitudinally fixed on the sleeve 5, has the short axles 9, which sustain the links 10, pivoted thereon. A lever 11, connected at one end by the pivot 12 with the

links 10 and at the other end by the pivots 13 with the block 14, is rigidly fixed to a short shaft 11', pivoted in bearings 15'. Fixed to the shaft 11' are the slightly-inclined levers or arms 15, which are pivotally connected by the short shaft 16 with the links 17, having the pivotal connection 18 with the wheel 19, which carries the hoisting-rope 20. The block 14 is supported by the screw-threaded hanger 21, extending therethrough, the position of the hanger with reference to the block being adjustable by means of the nuts 22. As illustrated in Figs. 1 to 3, inclusive, the hanger has the pivotal connection 24 with a friction band or strap 23, which passes over a friction ring or drum 25. This ring has the flanges 26, which guide the band 23, and the flanges 27, which inclose the periphery of a bearing or hub 29, fixed to the shaft 3, and provide a receptacle for retaining a lubricant to reduce the friction between the ring and the hub. A ratchet-ring 28 on the ring 25 lies in the groove 30 of the hub 29, the ratchet being adapted to be engaged by the pawls 31, pivoted to the hub. A coiled spring 32, surrounding a sleeve 33, loose on the shaft 3, bears at one end against the hub 29 and at the other end against the sleeve 5, which is thereby normally held in clutching engagement with the wheel 1. The longitudinally-movable sleeve 33 by contact with the hub 29 provides means for limiting the longitudinal movement of the sleeve 5 and the consequent disengagement of its clutch-jaws 7 from the clutch-jaws 2. The shaft 3 has a gear-wheel 34 fixed on the end thereof, which may be connected in any usual manner, as by the gear-train 34' 34'' 34''' with the hoisting-drum 35, over which and the sheaves 36 the hoisting-rope 20 is carried from the wheel or equalizer 19.

As illustrated in Figs. 6 to 9, inclusive, the hanger 21 is connected by a link 38 with a pivot 39 on the disk 40, which is loose on the shaft 3. A hub 41, fixed on the shaft 3, is provided with the groove 42, in which the pawls 43 are pivoted. A ratchet-ring 44 on the friction ring or drum 45 lies in the groove 42, the pawls 43 being adapted to engage the ratchet 44. A band or strap 46 is wound around the periphery of the drum 45, one end of the strap being fixed to the disk 40 and the

other end to a cylinder 47. The disk 40 closes the end of the cylinder 47, the hub 41, the drum 45, and the strap 46 being thus inclosed in the cylinder. A stud 49 on the cylinder engages an arm 50, fixed to a shaft 51, stationary relative to the shaft 3, the cylinder being thus anchored in fixed position relative to the shaft 3. A ring 37, fixed on the shaft 3, holds the spring 32.

10 In lifting the load the wheel 1 revolves in the direction of the arrow, and the jaws 2 and 7 being positively engaged the shaft 3 is revolved through the sleeve 5, thus transmitting power through the gear-wheel 34, its train, and the drum 35 to the load depending from the sheaves 36, the brake mechanism being entirely free, since there is no tendency to move the sleeve 5 longitudinally, and the hub 29 or 41, fixed on the shaft, revolves

15 free of the ring 25 or 45. In lowering the load, the required tension of the strap 23 or 46 with reference to the drum 25 or 45 having been effected by the adjustment of the nuts 22 on the hanger 21, the wheel 1 revolves in the direction opposite to that of the arrow, and the shaft 3 is revolved in the same direction through the action of the load. The descent is controlled by the brake, which is now applied through the engagement of the

20 pawls 31 or 43 on the hub 29 or 41 with the ratchet 28 or 44 of the friction-ring 25 or 45. The strap 23 or 46 is connected with the load through the slightly-inclined lever 15, which draws or acts to hold down the hanger 21 and the mechanism connecting the same with the

25 friction-strap. In case the brake is applied so that the resistance retards the revolution of the shaft 3 or causes it to lag behind the revolution of the wheel 1, then the inclined face of the jaw 2, acting on the inclined face of the jaw 7, effects the longitudinal movement of the sleeve 5 away from the wheel 1, moving the links 10 toward the vertical and elevating the hanger 21, thus releasing the

30 tension on the brake-strap and permitting the acceleration of the speed of the shaft 3 to that of the wheel 1.

Having described my invention, I claim—

1. In a brake mechanism, a revoluble shaft, a wheel having a clutch-jaw revolubly mounted on said shaft, a sleeve having a clutch-jaw longitudinally movable on said shaft, a friction-ring, mechanism connecting said shaft and ring whereby said ring is engaged with

35 said shaft in its revolution in one direction and free thereof in its revolution in the other direction, a brake-band on said friction-ring, and mechanism connecting said sleeve and band for the purpose set forth, substantially

40 as specified.

2. In a brake mechanism, a revoluble shaft, a wheel having a clutch-jaw revolubly mounted on said shaft, a sleeve having a clutch-jaw longitudinally movable on said shaft, a ring

45 revoluble with relation to said shaft, clutching mechanism for engaging said ring and shaft, a brake-band on said ring, and lever

mechanism connecting said sleeve and band, substantially as specified.

3. In a brake mechanism, a revoluble shaft, a wheel having a clutch-jaw mounted on said shaft, a sleeve having a clutch-jaw longitudinally movable on said shaft, a ring revoluble with relation to said shaft, a brake-band on said ring, a clutch mechanism for engaging

50 said ring with said shaft, a link pivotally connected with said sleeve, and a lever pivoted to said link and having a pivotal connection with said band, substantially as specified.

4. In a brake mechanism, a revoluble shaft, a bearing fixed on said shaft, a ring revolubly mounted on said bearing, a clutch mechanism connecting said ring and bearing, a brake-band on said ring, a lever connected with said brake-band, a sleeve longitudinally

55 movable on said shaft, and a link connecting said sleeve with said lever, substantially as specified.

5. In a brake mechanism, a revoluble shaft, a sleeve longitudinally movable on said shaft, a link pivotally connected with said sleeve, a friction-brake, clutch mechanism for connecting said brake with said shaft, and releasing

60 mechanism connecting said link with said brake, substantially as specified.

6. In a brake mechanism, a revoluble shaft, a sleeve revolubly fixed but longitudinally movable on said shaft, a collar revolubly loose on said sleeve, a link pivotally connected with said collar, a friction-brake comprising

65 a rotary member and a band thereon, clutch mechanism for connecting said rotary member with said shaft, and a lever connecting said band with said link, for the purpose specified.

7. In a brake mechanism, a revoluble shaft, a hub fixed on said shaft, said hub having a peripheral groove therein, one or more pawls pivoted in said groove, a ring revolubly mounted on said hub and having a ratchet-

70 ring adapted to be engaged by said pawls, a friction-band on said ring, and a hanger connected to said band, substantially as specified.

8. In a brake mechanism, a revoluble shaft, a hub fixed on said shaft, a ring revolubly mounted on said hub and having flanges inclosing the periphery of said hub, clutch mechanism for engaging said ring with said hub, a friction-band on said ring, and a hanger pivotally connected to said band, substantially

75 as specified.

9. In a brake mechanism, a friction-brake, a fulcrumed lever having an adjustable connection with said brake, a second lever rigidly connected with said first lever, mechanism

80 connecting said second lever with the load, and mechanism for automatically controlling the action of said fulcrumed lever upon said brake, substantially as specified.

10. In a brake mechanism, a revoluble shaft, a friction-brake connected with said shaft, a fulcrumed lever connected with said brake, mechanism for connecting said fulcrumed lever with the load, a link connected

85

with said fulcrumed lever, and mechanism connecting said link with said shaft for automatically adjusting said brake, substantially as specified.

5 11. In a brake mechanism, a revoluble shaft, a ring on said shaft, mechanism for clutching said ring to said shaft, a band on said ring, a cylinder fixed relative to said shaft and having one end of said band connected therewith, a disk loose on said shaft
10 and having the other end of said band connected therewith, a fulcrumed lever connected with said disk, and automatic mechanism for controlling said fulcrumed lever, substantially as specified.

15 12. In a brake mechanism, a revoluble shaft, a sleeve revolubly fixed but longitudi-

nally movable on said shaft, a collar on said sleeve, a link pivotally connected with said collar, a fulcrumed lever pivotally connected 20 to said link, a block pivotally connected to said fulcrumed lever, a friction-brake comprising a rotary member and a band thereon, an adjustable hanger connected with said block and band, and mechanism for clutching said 25 rotary member to said shaft, substantially as specified.

In testimony whereof I have hereunto set my hand, this 2d day of February, 1901, in the presence of the subscribing witnesses.

JOHNSON HUGHES.

Witnesses:

THOMAS S. GATES,

PERCIVAL H. GRANGER.