No. 679,001. Patented July 23, 1901.

J. HUGHES.

AUTOMATIC BRAKE.

(Application filed Jan. 28, 1901.)

(No Model.) 2 Sheets—Sheet 1.

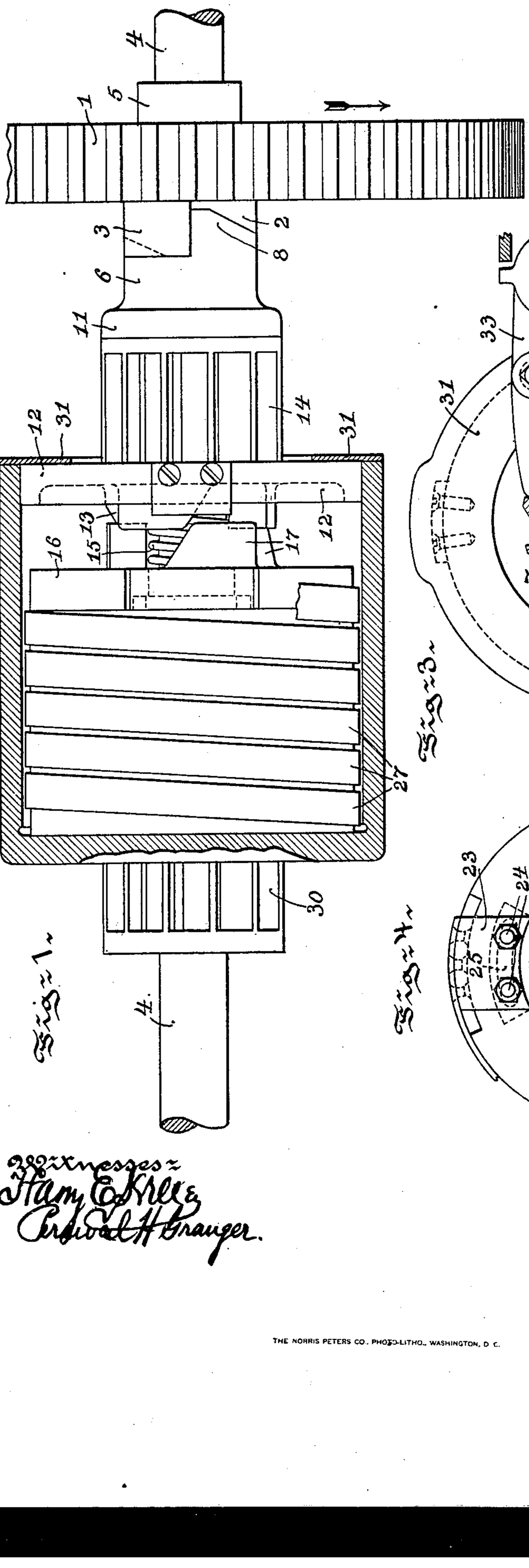

Fig. 1.

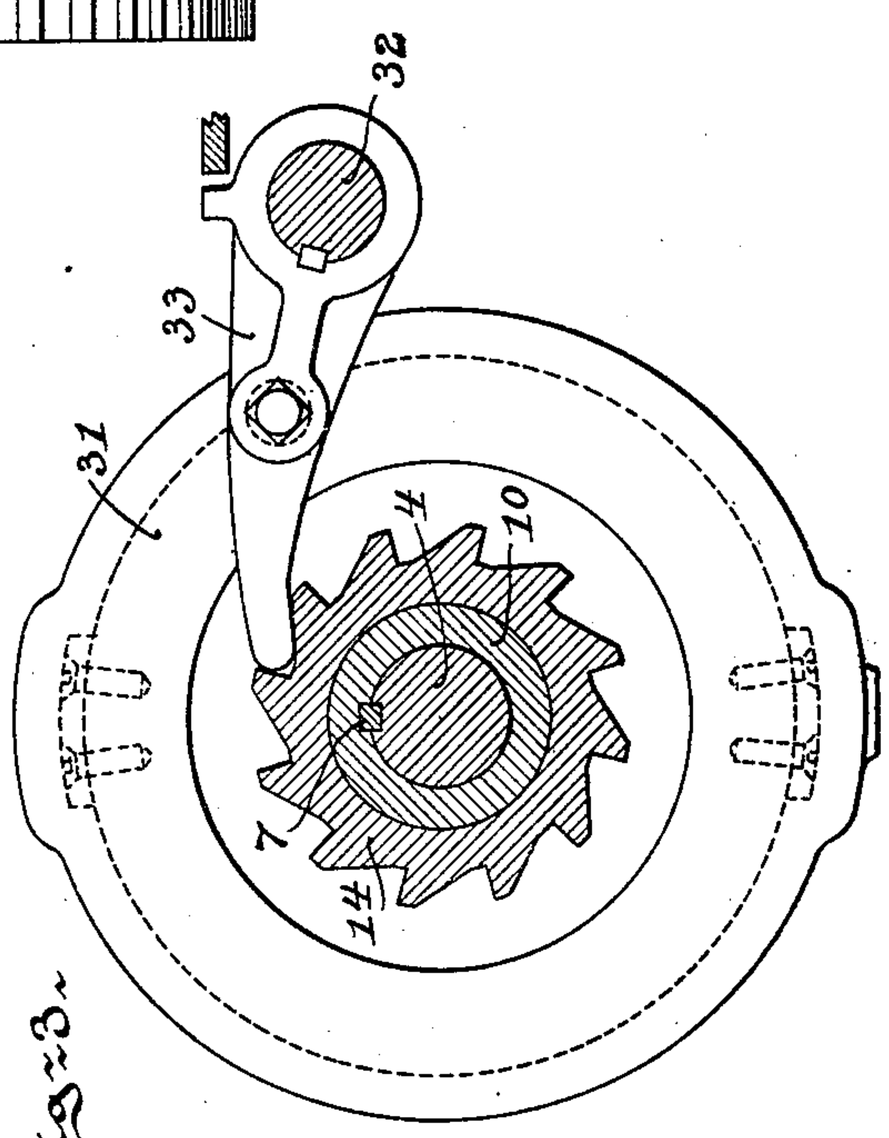

Fig. 3.

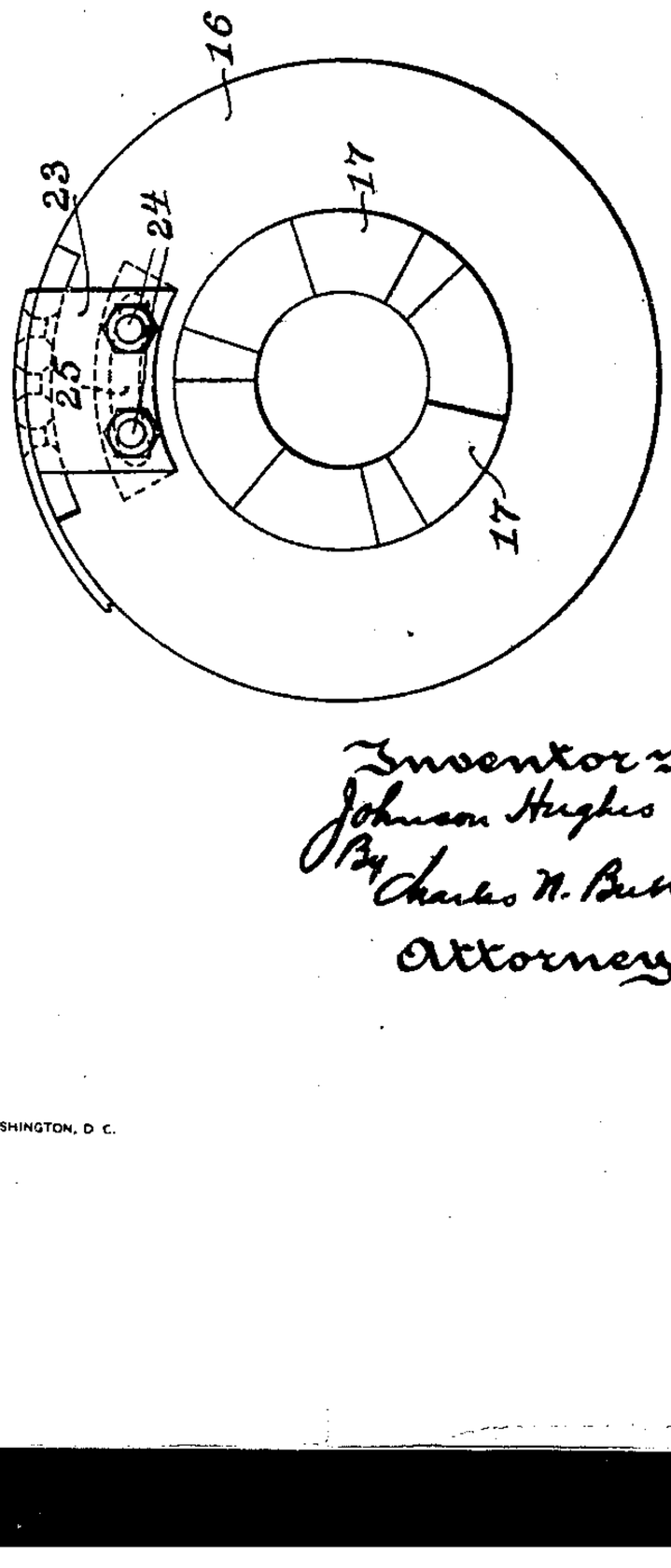

Fig. 4.

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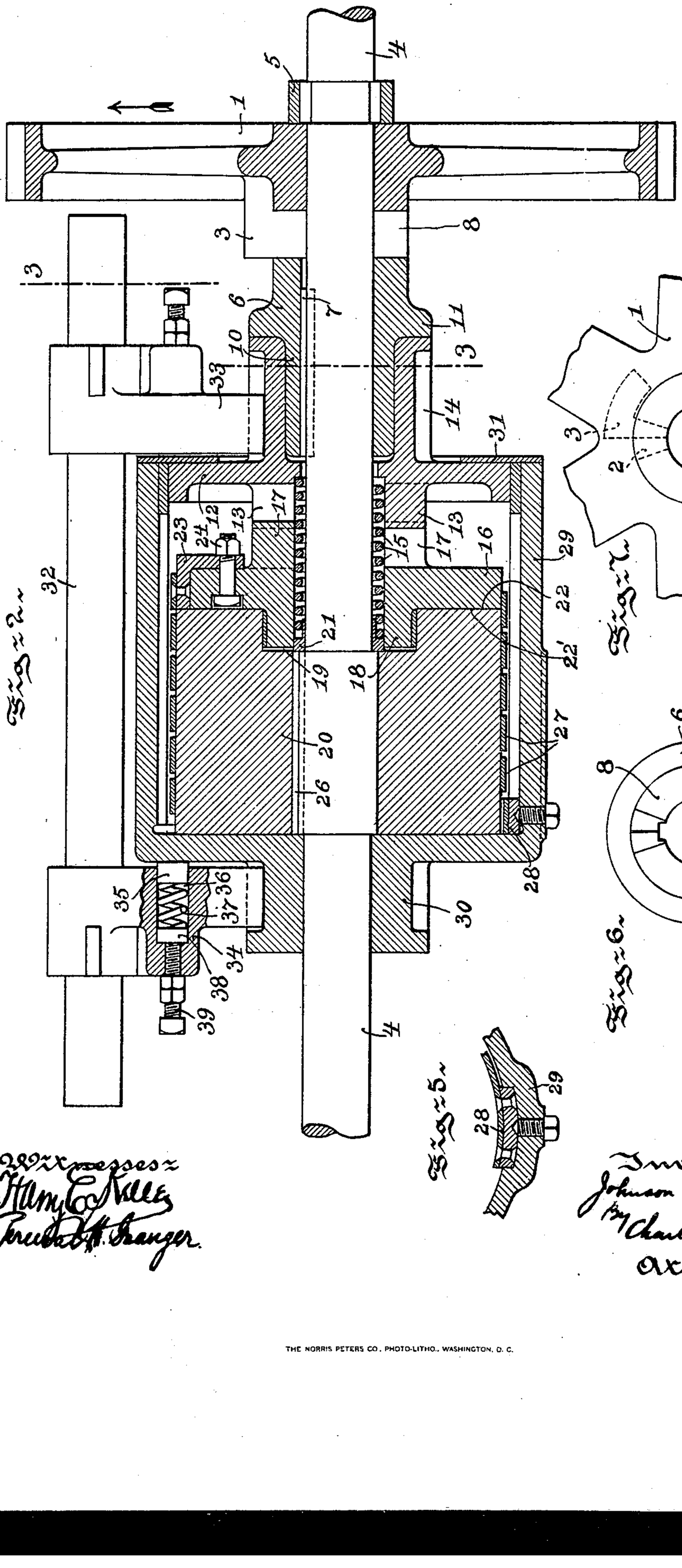

Fig. 1.

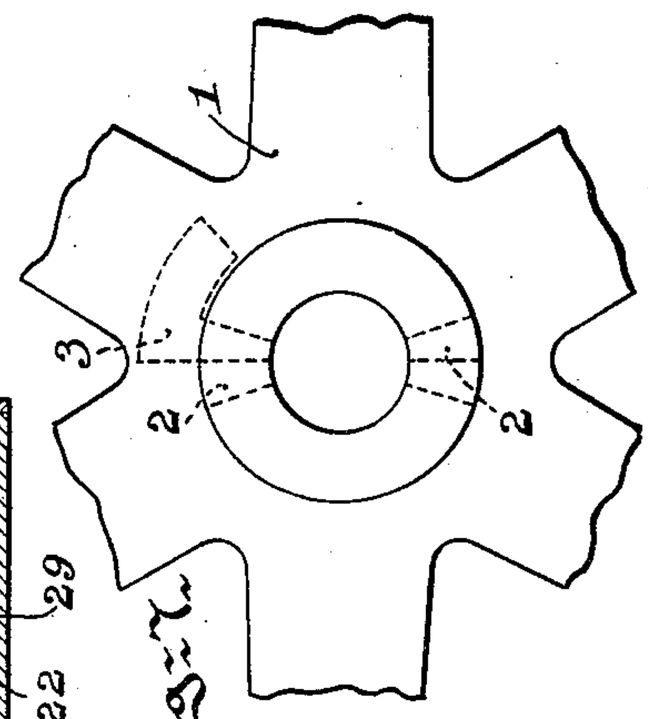

Fig. 2.

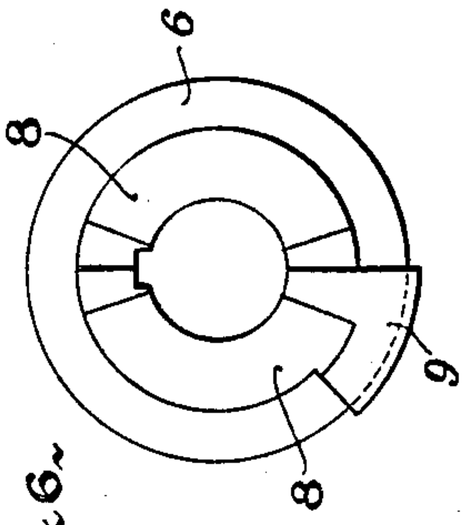

Fig. 6.

Fig. 5.

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UNITED STATES PATENT OFFICE.

JOHNSON HUGHES, OF WISSAHICKON, PENNSYLVANIA.

AUTOMATIC BRAKE.

SPECIFICATION forming part of Letters Patent No. 679,001, dated July 23, 1901.

Application filed January 28, 1901. Serial No. 44,954. (No model.)

To all whom it may concern:

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

This invention relates particularly to hoisting mechanism; and it is primarily designed to effect the automatic adjustment of the brake acting between the power and the load. The improved mechanism employed provides means by which the brake is automatically adjusted to the load by the power. The defective action of former mechanism of this character is corrected, as where the power is required to lower the load or frictional gripping occurs in raising the load.

The further characteristics and purposes will fully appear from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a view in side elevation in illustration of my invention, parts being shown in section. Fig. 2 is a longitudinal central sectional view thereof. Fig. 3 is a sectional view taken on the line 3 3 of Fig. 2. Fig. 4 is a face view of the friction-disk, illustrating its connection with the brake-strap and the mechanism for controlling its position. Fig. 5 is a sectional view of a detail, illustrating the connection of the brake-strap with the cylinder which serves to anchor it. Fig 6 is a view of the clutching end of the sleeve which engages with the driving mechanism, and Fig. 7 is an end elevation of the driving-wheel hub.

As shown in the drawings, the driving-wheel 1, having the clutch-jaws 2 and the lug 3 thereon, is loosely sleeved on the shaft 4 and held in longitudinal position by the ring 5. A sleeve 6, longitudinally movable along the shaft 4 and held to revolve therewith by the spline 7, is provided with the clutch-jaws 8, which are adapted to engage with the clutch-jaws 2, as also with the lug 9, which is adapted to engage the lug 3. A disk 12, loose upon the shaft 4, has the wedging projections 13 and the toothed collar 14, which latter is sleeved on the sleeve's wrist 10 and limited in longitudinal movement by the sleeve's hub 11. This disk is normally held in the position shown by means of a coiled spring 15 on the shaft, one end of the spring bearing against the disk, while the other end is held by the ring 21. A friction-disk 16, loose on the shaft, is provided with the wedging projections 17, adapted to be engaged by the corresponding projections 13, with the hub 18, adapted to turn in the recess 19 of the drum 20, with the friction-face 22, adapted to engage a like friction-face 22′ of the drum, and with a bracket or anchor 23, held to the disk by the bolts 24 and adjusted with relation thereto by means of the slot 25.

The drum 20 is fixed to the shaft 4, as by a spline 26, and has the strap 27 wound around its periphery, one end of the strap being fixed to the adjustable bracket 23 and the other end having an anchor connection 28 with the hollow cylinder 29.

The cylinder 29 is provided with a toothed hub 30, connected with the closed end thereof, the hub being loosely sleeved on the shaft 4. The other end of the cylinder is provided with the ring 31, which incloses the periphery of the disk 12. There is thus formed a closed cylinder adapted to retain oil for lubricating the parts revoluble therein.

The shaft 32, fixed relative to the shaft 4, carries the pawls 33 and 34, which engage, respectively, with the toothed hubs 14 and 30. To throw them into and out of engagement with the respective toothed hubs, each of the pawls is provided with a frictional connection comprising a block 35, which lies in the recess 36 and bears against the corresponding end of the cylinder 29, a coiled spring 37, which holds the block in frictional engagement with the cylinder, a block 38, and a screw 39 for regulating the tension of the spring. This mechanism effects the engagement of each pawl with its toothed hub in the application of the brake and disengages the same when the brake is out of action.

In the operation of hoisting, the driving-wheel 1 is turned in the direction of the arrow, and, the jaws 2 and 8 being squarely engaged, the sleeve 6 is revolved and the power is directly transmitted thereby through the shaft 4 to the load. The revolution of the shaft in lifting the load, revolving the drum 20 therewith, tends to slacken or unwind the brake-strap 27 through the drum's

frictional action on the disk 16 and the head of the cylinder 29, they being free on the shaft. Hence in lifting the load the brake can offer no gripping or retarding influence. In the operation of lowering, the power mechanism being reversed, the load reverses the revolution of the shaft and drum. The pawl 34 being thrown into engagement with the toothed hub 30 holds the cylinder 29 against revolution and anchors the end of the brake-strap connected therewith, while the strap is drawn tight upon the drum's periphery by the revolution of the disk 16 through the frictional engagement of the drum therewith. The frictional tendency to tighten the brake, so as to effect the retardation of the load relative to the power or so that power is required to carry the load down against the brake action, is corrected by the action of the inclined faces of the jaws 2 on the inclined faces of the jaws 8, the resultant pressure between which moves the sleeve 6 away from the wheel 1 and brings the wedging projections 13 into engagement with the wedging projection 17, thus throwing the disk 16 back and loosening the strap. The lugs 3 and 9 prevent the jaws 2 from slipping past the jaws 8. The descent of the load is thus accelerated, accelerating the speed of the shaft to that of the power-wheel, the spring 15 restoring the disk 12 and the sleeve 6 to their original position. It will be understood that the disk 12 is designed to move longitudinally in the cylinder 29 and the toothed hub to move longitudinally with relation to the pawl 33. It will now be seen that the brake effects no retarding action in lifting the load, the parts thereof being held free and the power directly transmitted through a single shaft, and, further, that the automatic action of the brake effects the lowering of the load without grinding or requiring the application of power to carry it down.

Having described my invention, I claim—

1. In a brake mechanism, a revoluble shaft, a wheel having a clutch-jaw revoluble on said shaft, a sleeve having a clutch-jaw revolubly fixed but longitudinally movable on said shaft, said wheel being adapted to revolve said sleeve and to move the same longitudinally, a brake, and mechanism connecting said brake and sleeve whereby the application of said brake is automatically adjusted, substantially as specified.

2. In a brake mechanism, a revoluble shaft, a wheel having one or more clutch-jaws and a lug or stop thereon, said wheel being revolubly mounted on said shaft, in combination with a sleeve having one or more clutch-jaws and a lug or stop thereon adapted respectively to engage with the corresponding parts of said wheel, for the purpose set forth, said sleeve being longitudinally movable and revolubly fixed on said shaft, a brake, and mechanism connecting said brake and sleeve whereby the application of said brake is automatically adjusted, substantially as specified.

3. In a brake mechanism, a revoluble shaft, a drum fixed thereon, a friction-brake adapted to control the revolution of said drum, a sleeve longitudinally movable on said shaft and mechanism operated by said sleeve adapted to automatically adjust said brake, substantially as specified.

4. In a brake mechanism, a revoluble shaft, a drum fixed thereon, a friction-brake adapted to control the revolution of said drum, a stop adapted for limiting the application of said brake, a sleeve longitudinally movable on said shaft and mechanism operated by said sleeve adapted to automatically adjust said brake, substantially as specified.

5. In a brake mechanism, a revoluble shaft, a drum fixed thereon, a brake adapted to control the revolution of said drum, a disk adapted to frictionally engage said drum and apply said brake, and mechanism adapted to automatically adjust said brake, substantially as specified.

6. In a brake mechanism, a revoluble shaft, a drum on said shaft, a friction-brake for controlling the revolution of said drum, a disk frictionally engaging said drum for the application of said brake, a wheel on said shaft, and mechanism connecting said wheel and disk for automatically adjusting said brake, substantially as specified.

7. In a brake mechanism, a revoluble shaft, a drum on said shaft, a friction-brake for controlling the revolution of said drum, a disk frictionally engaging said drum for the application of said brake, a wheel having a clutch-jaw revoluble on said shaft, a sleeve having a clutch-jaw revolubly fixed but longitudinally movable on said shaft, said wheel being adapted to revolve said sleeve and to move the same longitudinally, and mechanism connecting said sleeve and disk for automatically adjusting said brake, substantially as specified.

8. In a brake mechanism, a revoluble shaft, a wheel having a clutch-jaw revoluble on said shaft, a sleeve having a clutch-jaw revolubly fixed but longitudinally movable on said shaft, said wheel being adapted to revolve said shaft and to move the same longitudinally, a collar having a projection connected therewith longitudinally movable along said shaft, and a friction device having a projection adapted to be engaged by said first-named projection, substantially as specified.

9. In a brake mechanism, a revoluble shaft, a drum fixed on said shaft, a cylinder having a toothed hub loose on said shaft, a pawl for engaging said hub and controlling said cylinder, a friction-disk loose on said shaft, a brake-strap on said drum connected with said cylinder and disk, a second disk loose on said shaft and longitudinally movable in said cylinder, and mechanism whereby the longitudinal movement of said second disk adjusts

the position of said first disk, substantially as specified.

10. In a brake mechanism, a revoluble shaft, a drum fixed on said shaft, a cylinder having a toothed hub loose on said shaft, a friction-disk loose on said shaft, a brake-strap on said drum connected with said cylinder and disk, a second disk having a toothed collar longitudinally movable on said shaft, said second disk being movable in said cylinder and having means for controlling the action of said first disk, and a pawl for engaging said toothed collar, substantially as specified.

11. In a brake mechanism, a revoluble shaft, a drum fixed on said shaft, a cylinder having a toothed hub loose on said shaft, a friction-disk loose on said shaft and having a wedging projection, a brake-strap on said drum connected with said cylinder and disk, a second disk movable on said shaft within said cylinder and having a wedging projection adapted to engage said first-named projection, said second disk having a toothed collar, and a pawl for engaging said collar and controlling said disks through said projections, substantially as specified.

12. In a brake mechanism, a shaft, a sleeve revolubly fixed and longitudinally movable on said shaft, a toothed collar loose on said shaft, a pawl for controlling said toothed collar, a projection connected with said toothed collar, a friction-disk having a projection thereon, said projections controlling the position of said disk, and a coiled spring for controlling the position of said collar, substantially as specified.

In witness whereof I have hereunto set my hand, this 26th day of January, 1901, in the presence of the subscribing witnesses.

JOHNSON HUGHES.

Witnesses:
THOMAS S. GATES,
PERCIVAL H. GRANGER.