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D. W. LLOYD.

RETAINING BRAKE.

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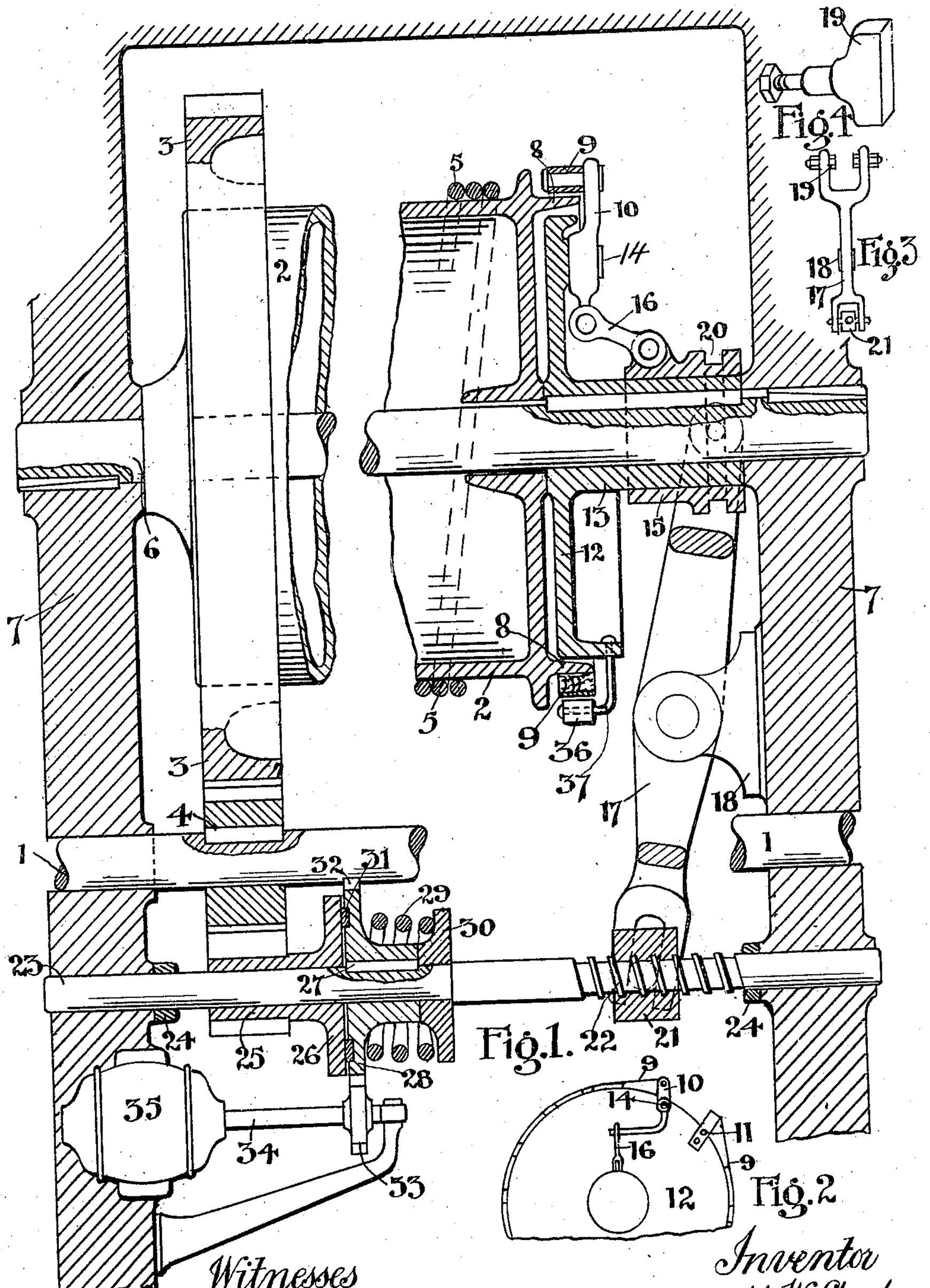

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RETAINING-BRAKE.

No. 846,802. Specification of Letters Patent. Patented March 12, 1907.

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To all whom it may concern:

Be it known that I, DONALD W. LLOYD, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Retaining-Brakes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to retaining-brakes for hoisting mechanisms; and it pertains more particularly to a brake-band which is automatically set to prevent rotation of the drum when the motive power is thrown off and is released to permit the load to lower by means under the control of the operator.

In the accompanying drawing, forming a part of this application, Figure 1 is a view, partly in section and partly in elevation, of a hoisting-drum and its driving and braking mechanism. Fig. 2 is a view of the brake, showing the means for tightening the same. Fig. 3 is a view of the shirting-lever for the brake, and Fig. 4 is a perspective view of a detail.

Referring now to the drawing for a fuller disclosure of the invention, 1 represents the main shaft, which receives its power from any suitable source, and 2 is a hoisting-drum, said drum being geared to the driving-shaft by means of the gear 3 and a pinion 4, said gear and pinion being suitably secured to the drum and shaft, respectively.

5 shows the hoisting-cable, which is carried by the drum, said drum being loosely mounted upon a shaft 6, that is keyed in the side frames 7, so as to be held against rotation. At one of its ends the hoisting-drum is provided with a projecting flange 8, upon which the brake-band 9 operates. This brake is of the ordinary construction, consisting of a steel band secured at one of its ends to a stationary part and at its opposite end to a bell-crank lever 10, said lever being adapted to rock, so as to tighten or loosen the brake-band. It will be understood that the brake-band is lined with suitable frictional devices, such as basswood blocks.

The stationary end of the brake-band is secured at a point 11 to a stationary disk 12, said disk being provided with a sleeve or hub 13, through which the shaft 6 for the hoisting-drum projects. The sleeve or hub 13 is keyed or otherwise secured to the shaft 6, and as said shaft is secured within the side frames it will be understood that the disk 12 is a stationary part of the mechanism. The bell-crank lever 10 is pivoted to the disk 12 at a point 14, and the brake-band is attached to its shorter end. Mounted to slide back and forth on the hub 13 of the disk is a shifting collar 15, said collar being connected with the long end of the bell-crank through the medium of a link 16. From this description it will be understood that as the shifting collar is moved toward the left in Fig. 1 the bell-crank will be rocked, so as to cause the friction-band to tightly grip and hold the drum.

For moving the shifting collar I employ a shifting-lever 17, (shown in detail in Fig. 3,) said lever being pivoted near its center to a bracket 18 of the main frame. The upper end of the shifting-lever is forked, so as to pass on opposite sides of the shifting collar, and the ends of the forked portions carry pivoted inwardly-projecting blocks 19, that extend into an annular groove 20 in the shifting collar. These pivoted blocks are shown in detail in Fig. 4. The lower end of the shifting-lever is also forked, so as to conveniently attach the same to the opposite sides of a movable nut 21, said nut being adapted to travel back and forth on a screw-thread portion 22 of a shaft 23, said shaft being journaled in the side frames 7 and being held against longitudinal movement by suitable collars 24, which bear against the inner sides of the opposing frame-pieces. As the shaft 23 is rotated in one direction the nut 21 being held from rotation therewith will travel in one direction upon the screw-threads, and if the shaft is turned in the opposite direction the nut will also travel in a reverse direction to that first taken. This shaft is turned by means of the following mechanism: 25 is a pinion that is loosely mounted upon the shaft 23, said pinion gearing with the pinion 4 on the main drive-shaft. This pinion carries at one side a friction member 26, said member being in the form of a disk. Secured to the shaft by means of a feather-key 27 is a second friction member 28, said second member being pressed toward the disk 26 by means of a coiled spring 29, which bears with one of its ends against the member 28 and with its opposite end against a collar 30 on the shaft 23, said shaft being slightly shouldered, so as to prevent the backward movement of the collar. Between the friction members 26 and 28 I employ a suitable friction-ring 31.

From the above description it will be understood that as the drive-shaft is turned in a proper direction for hoisting the shaft 23

will be turned through the medium of the friction device mounted thereon in one direction, said direction being such as to move the nut 21 on the shaft to the left, as shown in Fig. 1, so as to cause the brake to release the hoisting-drum. The nut continues to travel until the shifting collar 15 abuts against the frame 7, when the shaft becomes locked, the friction device yielding as the shaft continues to turn. When the load has been raised and the power taken off of the drive-shaft, the load will start to descend, and in so doing the shaft 23 will turn in the opposite direction from that taken by said shaft while hoisting, with the result that the nut 21 will be moved to the right, which will cause the friction-brake to engage the drum and arrest its motion. The load would thus be held in an elevated position and would remain there unless some means were employed to loosen the friction-brake. For this purpose, therefore, I provide the friction member 28 with a set of peripheral teeth 32, with which engage a pinion 33 on the shaft 34 of an auxiliary motor 35. Suitable means are employed to change the direction of rotation of this motor, and by its connection with the member 28 the shaft 23 can be rotated in either direction, thereby causing the nut 21 to tighten or loosen the brake-band, as desired. If when when the load is suspended it is desired to lower the same, the motor is turned in a proper direction to move the nut 21 to the left, which will release the brake. It will be understood that as soon as the motor 35 is stopped the friction members 26 and 28 will again turn the shaft 23 in a direction to set the brake, so that the auxiliary motor must be continuously driven while the load is lowering. In order to prevent the brake-band from sagging at its lower part, I provide supporting-rollers 36 therefor, said rollers being carried by arms 37, that project from the disk 12.

The controlling mechanism for the brake may be placed at any convenient point in the hoisting device, and various other changes in the details of construction shown and described may be made without departing from the spirit of my invention. I desire it to be understood, therefore, that the following claims are not limited any further than is rendered necessary by their specific terms or by the prior state of the art.

Having thus described my invention, I claim—

1. In a hoisting device, a hoisting-drum, gearing for driving said drum for hoisting, a normally loose band-brake for the drum, and means connected with the gearing for automatically tightening the band of said brake at the end of the hoisting operation.

2. In a hoisting device, a hoisting-drum, gearing for driving said drum, a normally loose band-brake for the drum, and means connected with the gearing for automatically tightening the band of said brake as the load begins to descend.

3. In a hoisting device, a drum, means for turning said drum for hoisting, an external band-brake for controlling the drum, and connections between the driving means and the brake for automatically tightening the band of the brake at the end of the hoisting operation.

4. In a hoisting device, a drum, means for turning said drum for hoisting, a normally loose brake-band for controlling the drum, and connections between the driving means and the brake for automatically setting the brake as the load begins to descend

5. In a hoisting device, a drum, gearing for turning said drum, a band-brake for controlling the drum, and a friction device between the said gearing and brake for automatically tightening the band of the brake.

6. In a hoisting device, a drum, gearing for turning said drum, a brake for controlling the drum, and a friction device between the said gearing and brake for automatically setting the brake as the load begins to descend.

7. In a hoisting device, a drum, gearing for driving said drum, a brake for controlling the drum, a screw-threaded shaft connected to the driving-gears for the drum, a nut adapted to travel on the threads of said shaft, and means connecting the nut with the brake, whereby the brake is set when the nut travels in one direction and is released when the nut travels in the other direction.

8. In a hoisting device, a drum, gearing for driving said drum, a brake for controlling the drum, a screw-threaded shaft connected to the driving-gears for the drum, a nut adapted to travel on the threads of said shaft, a pivoted lever having one end engaging the nut and the other end connected with the brake, whereby the brake is set when the nut travels in one direction and is released when the nut travels in the other direction.

9. In a hoisting device, a drum, means for driving said drum, a screw-threaded shaft, a nut traveling on threads of said shaft, a brake for controlling the drum, connections between said nut and brake, a friction member loose on said shaft and driven by the driving mechanism of the drum, and a friction member keyed to the shaft and coöperating with the first friction member, whereby the shaft is driven in opposite directions as the load is raised or lowered, and the brake is correspondingly released and set.

10. In a hoisting device, a drum, means for driving said drum, a screw-threaded shaft, a nut traveling on a thread of said shaft, a brake for controlling the drum, a pivoted lever having one end engaging the nut and the other end connected with the brake, a fric-

tion member loose on said shaft and driven by the driving mechanism of the drum, and a friction member keyed to the shaft and cooperating with the first friction member, whereby the shaft is frictionally driven in opposite directions as the load is raised or lowered, and the brake is correspondingly released and set.

11. In a hoisting device, a drum, gearing for driving said drum, a shaft, a gear on said shaft that is driven from the driving-gears for the drum, said gear being provided with a friction-surface, a friction member keyed to said shaft, a spring for forcing the friction members together so that the shaft is turned with the driving-gears of the drum, a nut adapted to travel on a screw-threaded portion of said shaft, a brake for controlling the drum and means connecting the brake and nut.

12. In a hoisting device, a drum, gearing for driving said drum, a shaft, a gear on said shaft that is driven from the driving-gears of the drum, said gear being provided with a friction-surface, a friction member keyed to said shaft, a spring for forcing the friction members together so that the shaft is turned with the driving-gears of the drum, a nut adapted to travel on a screw-threaded portion of said shaft, a brake for controlling the drum and a fulcrumed lever having one end engaging the nut and the other end connected with the brake.

13. In a hoisting device, a drum, a band-brake for controlling the drum, a train of gearing for turning the drum, a shaft, means for driving the shaft from the driving-gears for the drum, a nut adapted to travel on a screw-threaded part of said shaft, connections between said nut and the said brake, whereby the brake is set when the nut moves in one direction and is released when the nut moves in the opposite direction, a friction device connecting the said shaft with the driving-gears of the drum, whereby the shaft is turned and the nut moved in one direction to loosen the brake as the load is lifted and is moved in the opposite direction to secure the drum as the load begins to lower, and an auxiliary mechanism for controlling the friction device so as to maintain the brake in loose condition, in order that the load may be lowered.

14. In a hoisting device, a drum, a band-brake for controlling the drum, a train of gearing for turning the drum, a shaft, means for driving the shaft from the driving-gears for the drum, a nut adapted to travel on a screw-threaded portion of said shaft, connections between said nut and the said brake, whereby the brake is set when the nut moves in one direction and is released when the nut moves in the opposite direction, a friction device connecting the said shaft with the driving-gears of the drum, whereby the shaft is turned and the nut moved in one direction to loosen the brake as the load is lifted, and is moved in the opposite direction to secure the drum as the load begins to lower, and a motor for controlling the friction device so as to maintain the brake in loose condition in order that the load may be lowered.

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

DONALD W. LLOYD.

Witnesses:
S. E. FOUTS,
ALBERT H. BATES.