(No Model.) 2 Sheets—Sheet 1.

C. G. TOENSE.

WINDLASS.

No. 405,446. Patented June 18, 1889.

Fig. 1.

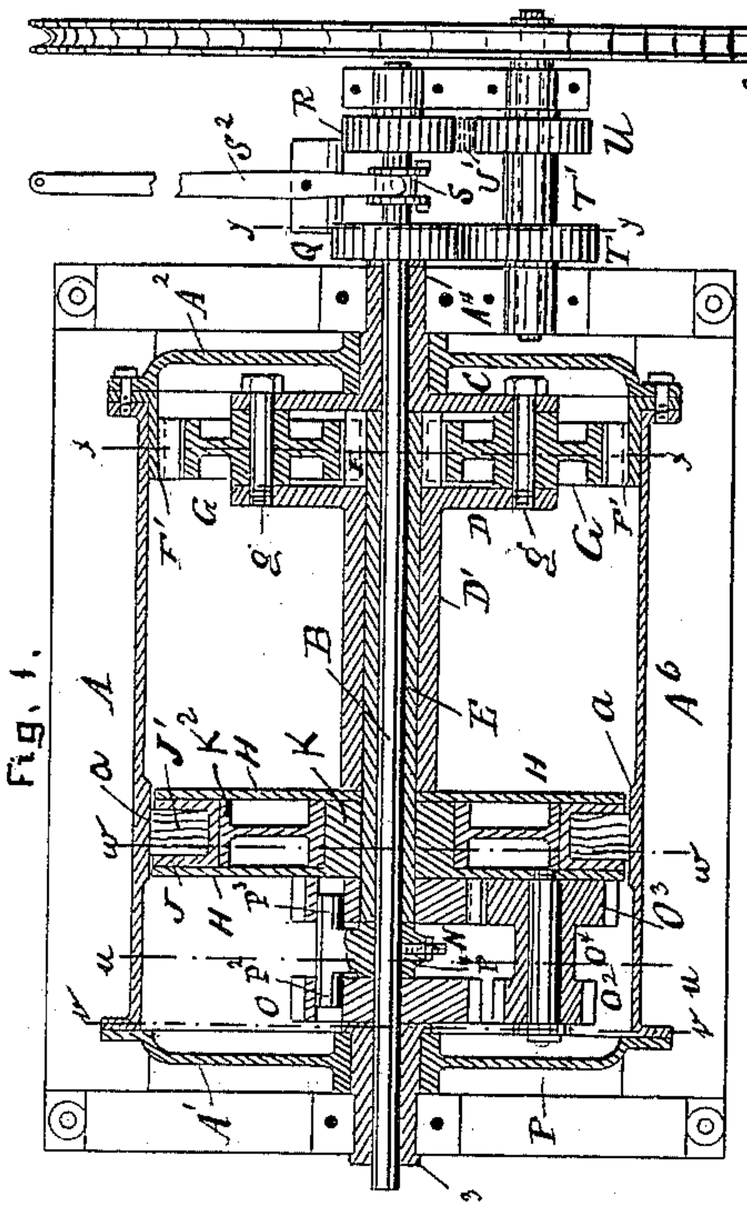


Fig. 2.

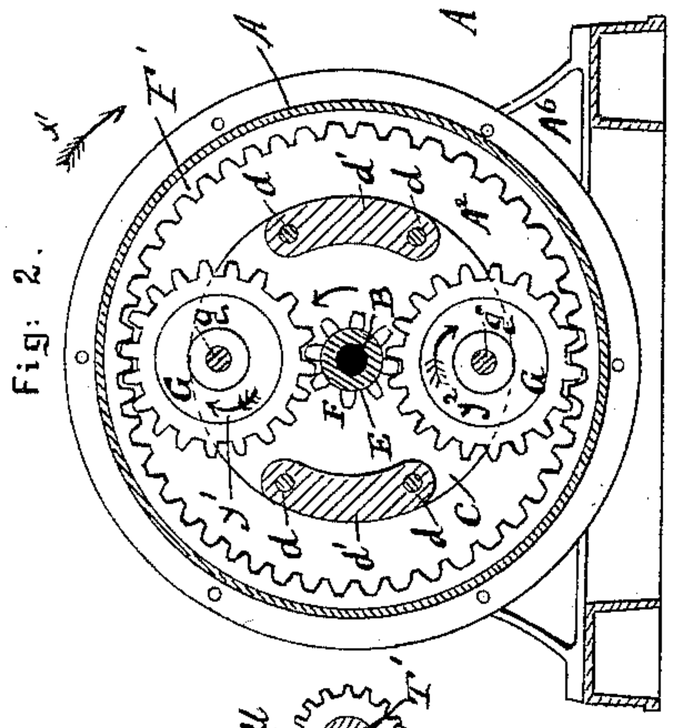


Fig. 3

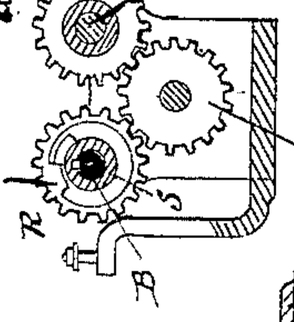


Fig. 4

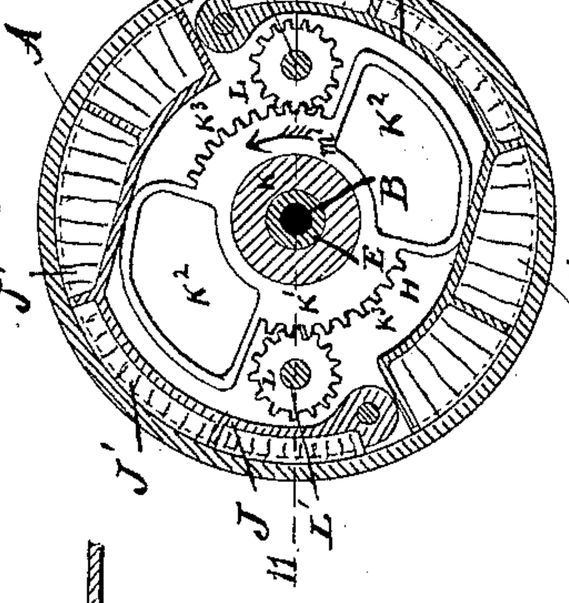


Fig. 5.

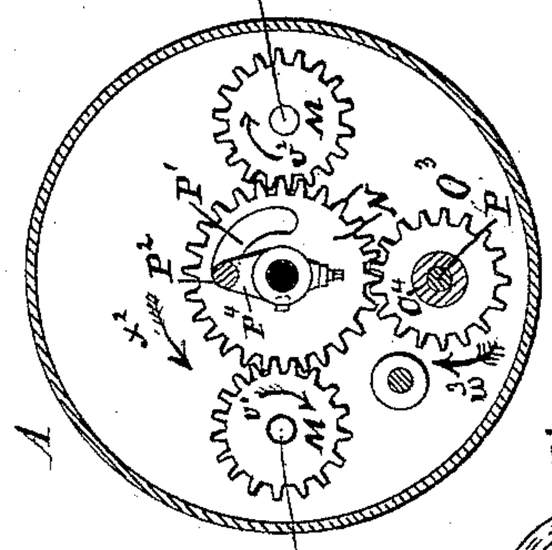


Fig. 6.

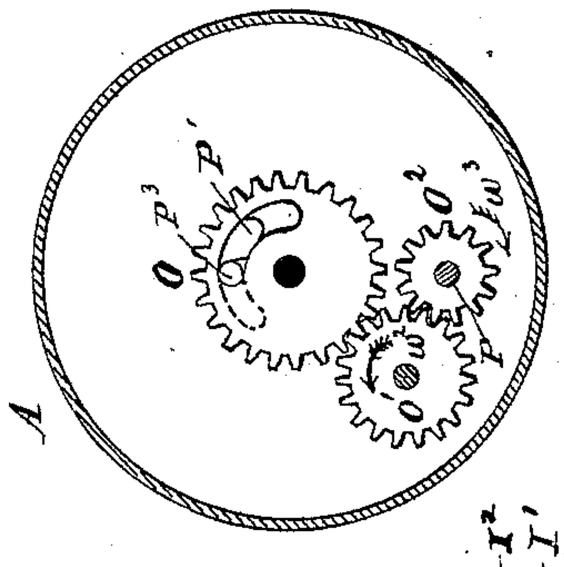


Fig. 7

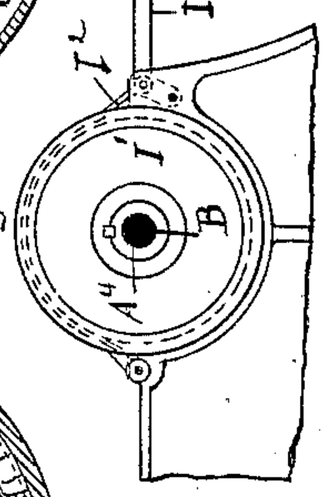


Fig. 8

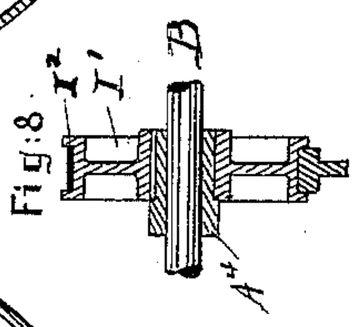
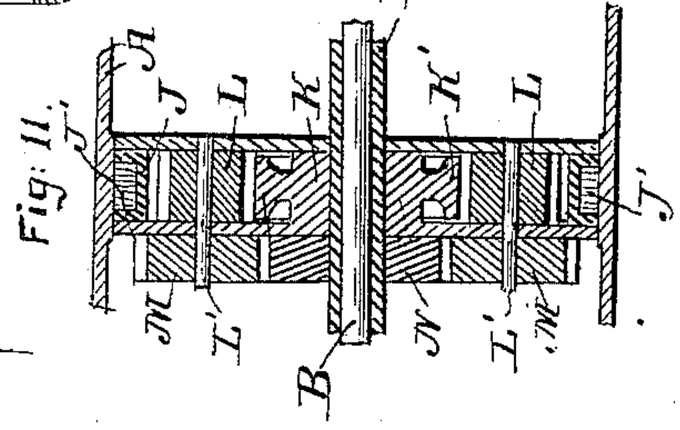


Fig. 11.



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(No Model.) 2 Sheets—Sheet 2.

C. G. TOENSE.

WINDLASS.

No. 405,446. Patented June 18, 1889.

Fig: 9

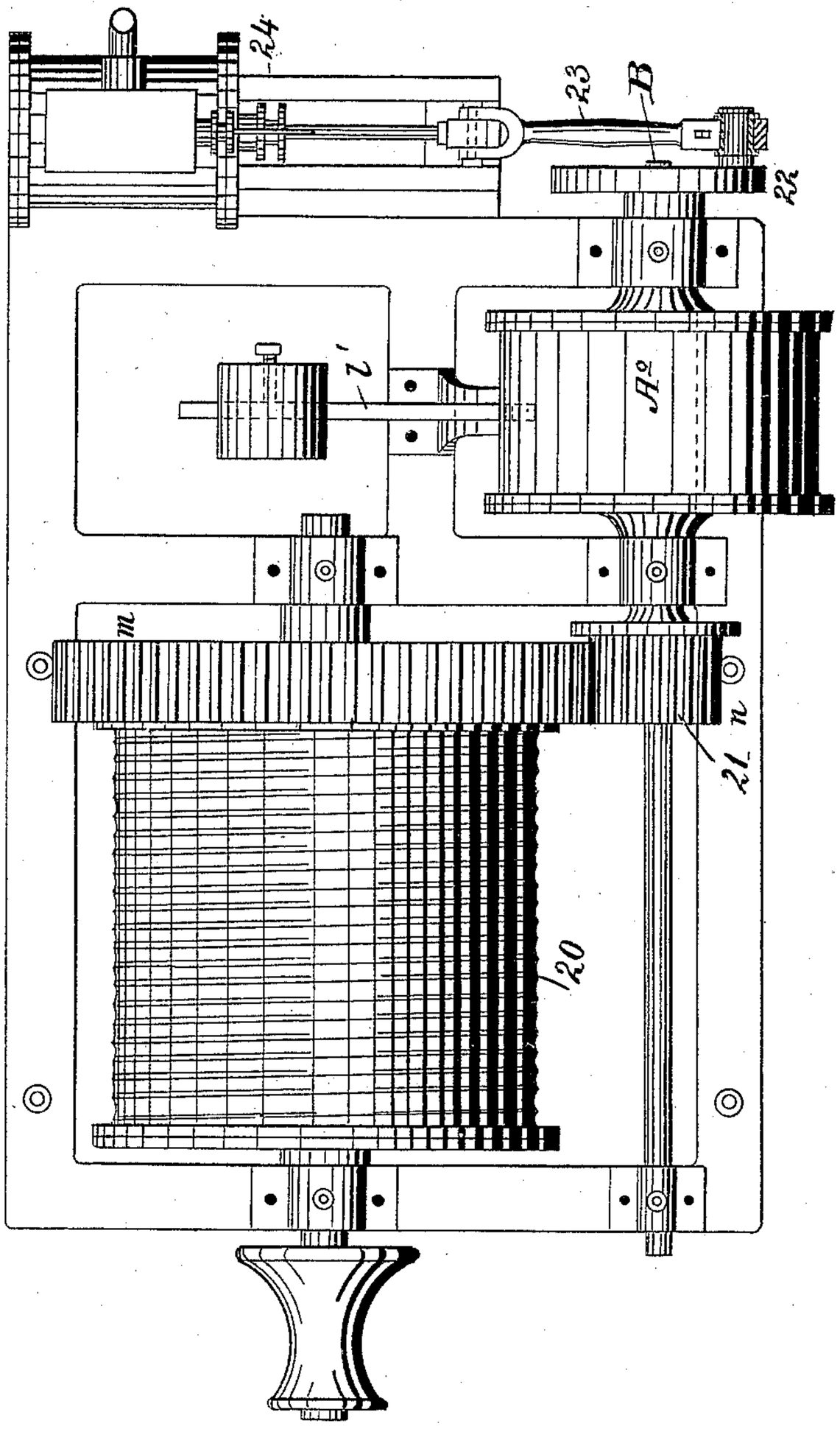
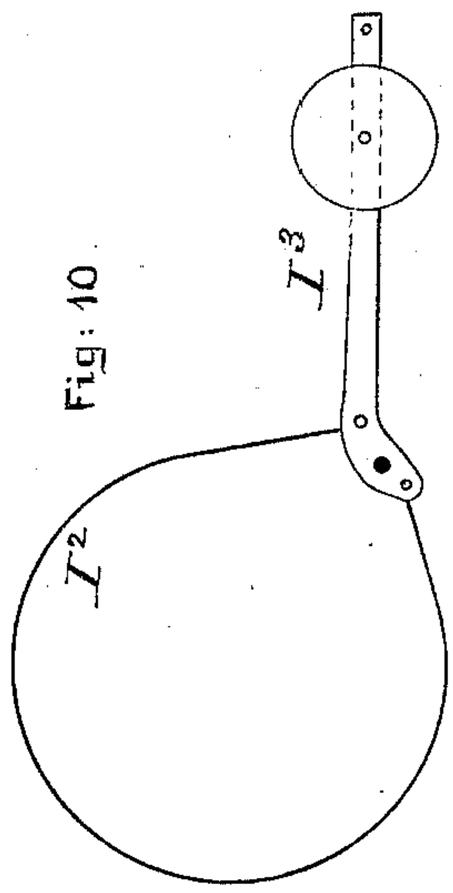


Fig: 10



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UNITED STATES PATENT OFFICE.

CARL G. TOENSE, OF PITTSBURG, PENNSYLVANIA.

WINDLASS.

SPECIFICATION forming part of Letters Patent No. 405,446, dated June 18, 1889.

Application filed June 13, 1888. Serial No. 277,000. (No model.)

To all whom it may concern:

Be it known that I, CARL G. TOENSE, of Pittsburg, in the county of Allegheny, State of Pennsylvania, have invented certain new and useful Improvements in Windlasses, of which the following is a specification.

This invention relates to windlasses used for hoisting and like purposes; and the object of my invention is to provide a new and improved windlass which is so constructed that it is checked automatically whenever the motor stops or the motor or driving-gear for operating the same breaks, but which windlass also permits of lowering the load at high or low speed, as may be desired.

In the accompanying drawings, Figure 1 is a horizontal sectional view of my improved windlass. Fig. 2 is a transverse vertical sectional view on the line *x x*, Fig. 1. Fig. 3 is a transverse vertical sectional view on the line *y y*, Fig. 1. Fig. 4 is a transverse vertical sectional view on the line *w w*, Fig. 1. Fig. 5 is a transverse vertical sectional view on the line *u u*, Fig. 1. Fig. 6 is a transverse vertical sectional view on the line *v v*, Fig. 1. Fig. 7 is a detail side view of a brake-drum that may be mounted on one of the bearing-sleeves of the drum and a side view of the brake band and lever. Fig. 8 is a transverse sectional view on Fig. 7. Fig. 9 is a plan view of a modified construction of the windlass, showing a secondary drum for holding the rope. Fig. 10 is a side view of the brake band and lever for the stop-drum. Fig. 11 is a longitudinal section through a portion of the drum on line 11 11 of Fig. 4.

Similar letters of reference indicate corresponding parts.

The hollow cylinder A may constitute the winding-drum of the windlass, as shown in Figs. 1 to 6, or a cylinder A^0, of similar construction, may be used as a brake-drum, as shown in Fig. 9. The cylinder A is provided with the heads A′ and A^2, provided with central apertures through which the bearing-sleeves A^3 and A^4 respectively pass, on which sleeves the heads can rotate. The main shaft B passes longitudinally and loosely through the two sleeves A^3 and A^4, which are fixed in the frame A^6. The bearing-sleeve A^4 is provided at its inner edge with the flange C, and a short distance from the same a like flange D is located, which is formed on the end of the sleeve D′, constituting the bearing for the sleeve E, through which the shaft B passes longitudinally. The two heads or flanges C and D are united by bolts *d*, passing through blocks *d′* placed between the said heads or flanges, and said flanges are also united by bolts *g*, on which are mounted two cog-wheels G, engaging at opposite points the pinion F on the sleeve E and the internal annular gear F′ on the inside of the cylinder A.

At the end of the sleeve D′ two disks H are mounted loosely on the sleeve E, and between them two brake-shoes J are pivoted, in which a series of brake-blocks J′ are held, the outer surface of which brake-blocks can impinge on the raised annular portion *a* on the inner surface of the drum A. One of the disks H has a hub K, provided with a disk K′, provided with two opposite cams K^2, that are adapted to act on the under side of the pivoted brake-shoes J. Said disk K′ is provided with opposite segmental gears K^3, with which two cog-wheels L engage, mounted on the ends of shafts L′, that are mounted in turn in the disks H, and on the opposite ends of said shafts the cog-wheels M are mounted, that engage with a cog-wheel N, rigidly mounted on the end of the sleeve E. A cog-wheel O, of the same size as the cog-wheel N, is loosely mounted on the shaft B, and engages with an intermediate cog-wheel O′, engaging with a cog-wheel O^2, mounted on one end of a tubular shaft O^4, on the opposite end of which a cog-wheel O^3 is mounted, that engages with the cog-wheel N. The tubular shaft O^4 is mounted to rotate on a bolt P, having one end secured in one of the disks H.

The wheels O and N have two like segmental notches P′, in which the two pins P^2 and P^3 project from an arm P^4, fixed on the shaft B between the cog-wheels O and N. On the shaft B the two cog-wheels Q and R are mounted loosely, and between them the clutching-sleeve S is mounted on the shaft B to turn with the same and to slide longitudinally on the shaft, said clutch being provided with two opposite lugs that can enter notches S′ in the wheels Q and R. Said sleeve S is mounted to rotate between the forked end of a pivoted lever S^2, that is to be used for shift-

ing said clutching-sleeve. The wheel Q engages directly with the wheel T, mounted on a shaft T′, carrying the pulley T^2 for the driving-cable, and on said shaft T′ is also rigidly mounted the cog-wheel U, that engages with an intermediary cog-wheel U′ on the shaft U^2, engaging the cog-wheel R.

In Fig. 9 the cylinder A^0, which is constructed in its interior in a manner corresponding with the construction of the cylinder A, is connected with a secondary winding-drum 20 by means of a pinion *n* on the shaft B and a cog-wheel *m* of the secondary drum. In this construction the shaft B may be provided with a crank 2, to which a connecting-rod 23 of a motor 24 is pivoted, and a brake-band *l*, connected with the weighted lever *l′*, is passed around the cylinder A^0.

The operation is as follows: To wind the rope or cable on the cylinder A, so as to raise the load, the lever S^2 is shifted to engage the clutch-sleeve S with the wheel Q, which is rotated by means of the cog-wheel T directly from the shaft T′, carrying the driving-cable pulley T^2. Thereby the shaft B is rotated in the direction of the arrow x^2, as is also its arm P^4, Fig. 5. The pin P^2 of the arm P^4, acting on the left-hand end of the slot P′ in the wheel N, also rotates the wheel N, the sleeve E, on which said wheel is fixed, and pinion F on said sleeve in the direction of the arrow x^2. From the said pinion F the cog-wheels G G are rotated in the direction of the arrows y' y^2, Fig. 2, and as they engage the annular gear F′ on the inner side of the cylinder A rotate said cylinder in the direction of the arrow x'. As the cog-wheel N is rotated in the direction of the arrow x^2 by the arm P^4, it rotates the cog-wheels M M and their shafts in the direction of the arrows v' and v^2, and as the pinions L L are on the same shafts with the cog-wheels M M they are likewise rotated in the direction of the arrows v' v^2 and rotate the disk K in the direction of the arrow m', Fig. 4, whereby the cams K^2 are moved from the brake-shoes J, which are thus released. The pinions L and cog-wheels M are only rotated until the pinions L arrive at the ends of the gears K^3, when the disks H begin to travel around in the direction of the arrow x^2. The wheel N, when it is rotated in the manner described, rotates the cog-wheel O^3 in the direction of the arrow w^3, Fig. 5, and thus the cog-wheel O^2 is rotated in the same direction and rotates the cog-wheel O′ in the direction of the arrow w^2, and that in turn rotates the cog-wheel O in inverse direction of the arrow x^2; but as the left hand of the slot P′ of the wheel O is slightly to the left of the pin P^3 such slight movement of the wheel O is possible. This movement can be but very small, as the disks H begin to rotate with the shaft B after the wheel N has been rotated but a short distance.

In case the motor is stopped or any part of the same breaks the rope rotates the cylinder A in the inverse direction of the arrow x', the annular rack F′ rotates the wheels G G in the inverse direction of the arrows y' y^2, and they rotate the pinion F, sleeve E, and cog-wheel N on the end of the sleeve E in the inverse direction of the arrow x^2. The wheel N rotates the cog-wheels M in the inverse direction of the arrows v' v^2, and thus the wheels L L are likewise rotated in the inverse direction of the arrows v' v^2. Thereby the disk K′ is rotated in the inverse direction of the arrow m', and the cams K^2 press the brake-shoes and brake-blocks in the same against the inside of the drum A, which is thus stopped.

When the machine operates properly, the shaft B, cog-wheel N, sleeve E, and pinion F, and the disks H, carrying the brake-shoes, rotate much more rapidly than the drum. When the brake-blocks are applied on the cylinder, the cylinder is coupled to the disks H. It follows that when the brake-blocks are pressed against the inner surface of the cylinder such difference of motion must cease and the cylinder is arrested.

In case the load is to be lowered, the clutch-sleeve S is shifted by means of the lever S^2 to engage the wheel R, which is rotated from the wheel U on the shaft T′ by means of the intermediate cog-wheel U′, and thus the motion of the shaft B is reversed. The arm P^4 is rotated in the inverse direction of the arrow x^2 and strikes the right-hand end of the slot P′ in the wheel O, said right-hand end of the slot P′ of the wheel O being slightly to the left of the right-hand end of the slot P′ in the wheel N. Thereby the wheel O is rotated in the inverse direction of the arrow x^2 and rotates the wheel O′ in the direction of the arrow w^2, and the wheel O′ in turn rotates the cog-wheel O^2 in the direction of the arrow w^3, and, as said pinion O^2 and the wheel O^3 are on the same shaft, the wheel O^3 is also rotated in the direction of the arrow w^3, whereby the wheel N is rotated in the direction of the arrow x^2, and by means of the cog-wheels M, pinions L, and racks K^3 moves the cams K^2 from the brake-shoes in the manner previously described, thus permitting the brake-blocks to run free in the cylinder A.

In case the motor stops or breaks, the rope suddenly rotates the cylinder A in the inverse direction of the arrow x', and thereby the brakes are applied in the manner previously described. In some cases it may be necessary to permit the load to descend very rapidly, and to permit of this the bearing-sleeves A^3 A^4 are not fixed to the frame A^6, but are mounted to turn. On the bearing-sleeve A^4 the brake-wheel I′ is keyed, Fig. 7, and is surrounded entirely or partly by the brake-band I^2, secured at one end to the pivoted weighted lever I^3. When the band acts on the brake-wheel, it locks it and the bearing-sleeve A^4 in place, and the windlass can operate in the manner described. When it is desired to permit the load to descend rapidly, the lever I^2 is raised, so as to permit the sleeves A^3 A^4 to rotate in the supporting-frame A′. As no

part of the mechanism in the cylinder is connected with a fixed part—such as the frame—which is necessary for the operation of the device in the manner set forth, it is evident that the cylinder A can rotate with the sleeves A^3 A^4 without bringing the brake mechanism in the cylinder into operation.

In the construction shown in Fig. 9 the automatic brake mechanism is contained in the separate drum *p*, and in all respects operates in the manner previously described, the said cylinder being fixed. In case it is desired to permit the load to descend very rapidly, the cylinder *p* is mounted to rotate, and is surrounded by the brake-band *l*, secured to a weighted lever *l'*. When the brake-band is applied tightly, the cylinder *p* cannot rotate and the internal automatic brake mechanism can operate. When the load is to descend rapidly, the brake-band is released and the cylinder can rotate with the automatic brake mechanism in the same.

My improved windlass is thus stopped and held automatically in case the motor stops or breaks. It can be used to raise and lower loads at will, and it can be adjusted to permit the load to descend with great rapidity.

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

1. In a windlass, the combination, with a cylinder, of a longitudinal independent shaft in the same, a sleeve surrounding the shaft and driven from the same, gearing for driving the cylinder from said sleeve, a brake in the drum, and gearing for operating the brake from the shaft in the drum, substantially as herein shown and described.

2. In a windlass, the combination, with a cylinder, of a longitudinal independent shaft in the same, a sleeve surrounding the shaft and driven from the same, gearing for driving the cylinder from the sleeve, a brake in the drum, an arm on the shaft, and gearing for operating the brake, said gearing being operated by the arm on the shaft, substantially as herein shown and described.

3. In a windlass, the combination of a hollow cylinder, bearings on which said cylinder rotates, an independent shaft extending longitudinally through the cylinder and its bearings, gear-wheels supported in part by one of said bearings, an internal gear on the inside of the cylinder meshing with said gear-wheels, a sleeve on said shaft, a pinion on said sleeve, said pinion engaging said gear-wheels, an arm on the shaft, and a cog-wheel on the sleeve, said cog-wheel being driven from said arm, substantially as described.

4. In a windlass, the combination, with a cylinder, of an independent longitudinal shaft on the same, a sleeve surrounding the shaft and driven from the same, gearing for driving the cylinder from said sleeve, an arm on the shaft having two opposite pins, a cog-wheel mounted loosely on the shaft and having a segmental slot, a cog-wheel fixed on the sleeve and having a like segmental slot, the above-mentioned pins entering said slots, a brake, and gear-wheels for operating the brake from said fixed and loose cog-wheels, substantially as herein shown and described.

5. In a windlass, the combination, with a cylinder, of an independent longitudinal shaft in the same, a sleeve surrounding the shaft and driven from the same, gearing for driving the cylinder from said sleeve, the arm P^4 on the shaft, provided with the two opposite pins P^2 P^3, the cog-wheel N, mounted on the end of the sleeve and having a segmental slot into which the pin P^2 passes, the cog-wheel O, mounted loosely on the shaft and having a segmental slot into which the pin P^3 passes, the disks H, mounted loosely on the sleeve, the brake-shoes J, pivoted between the disks H, the hub K, having the racks K^3 and cams K^2, and gearing for operating the racks K^3 from the cog-wheel N, substantially as herein shown and described.

6. In a windlass, the combination, with a cylinder, of a longitudinal independent shaft in the same, a sleeve surrounding and driven from said shaft, gearing for driving the cylinder from said sleeve, the cog-wheel N, mounted rigidly on the end of the sleeve and having a segmental slot, a like cog-wheel O, mounted loosely on the shaft and having a segmental slot, the arm P^4 on the shaft, having the opposite pins P^2 P^3 entering the slots in the wheels N and O, the disks H, mounted loosely on the shaft, the brake-shoes J, pivoted between said disks, the hub K, having the racks K^3 and cams K^2, the pinions L on the shafts L', mounted in one of the disks H, the cog-wheels M, mounted on the opposite ends of the shafts L' and engaging the cog-wheel N, the cog-wheels O^2 and O^3 on the same shaft, and the cog-wheel O', engaging the cog-wheels O and O^2, substantially as herein shown and described.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

CARL G. TOENSE.

Witnesses:
CHAS. LANG,
W. H. H. KLEBER.