O. KUEHNE.

WINDLASS.

APPLICATION FILED OCT. 9, 1908.

914,582. Patented Mar. 9, 1909.

Fig. 1.

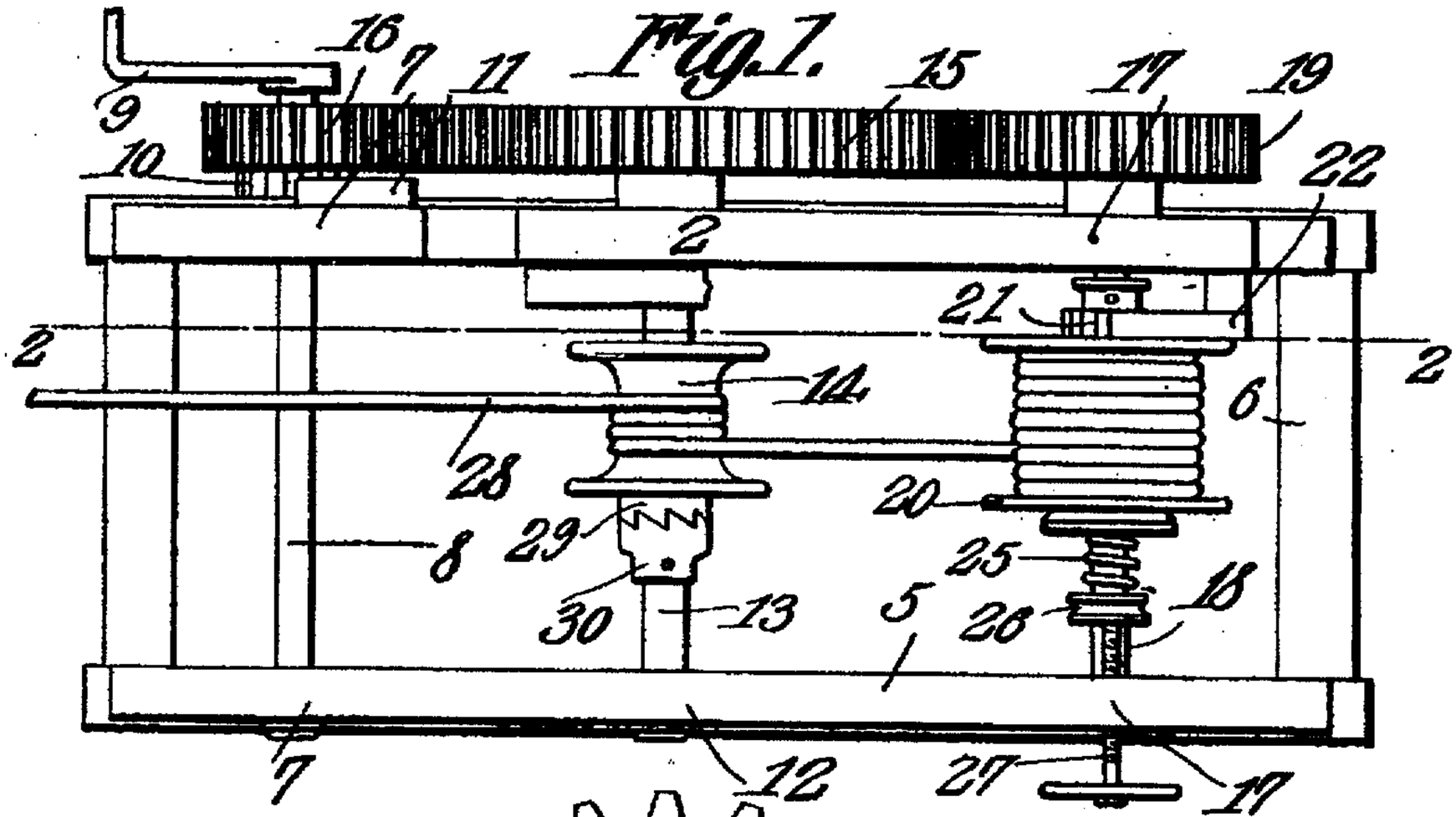


Fig. 2.

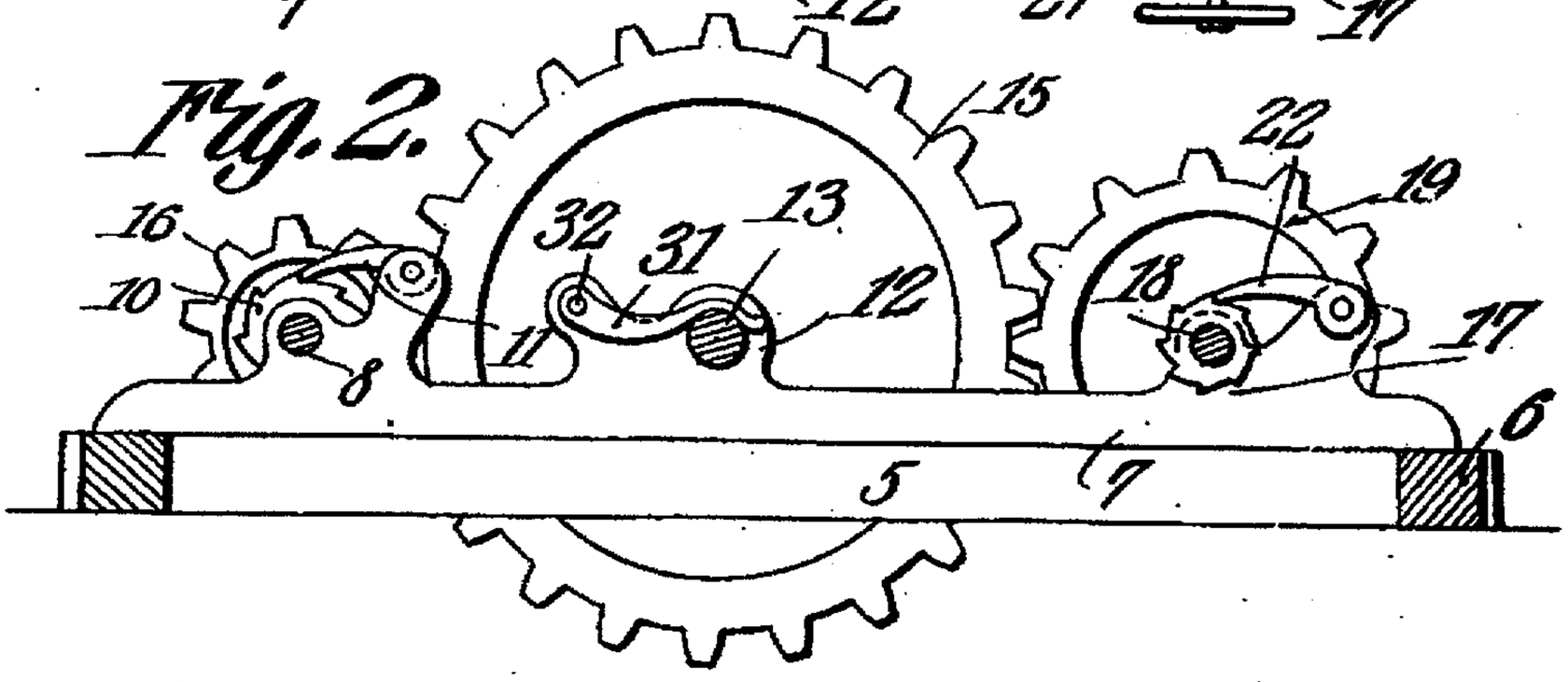


Fig. 3.

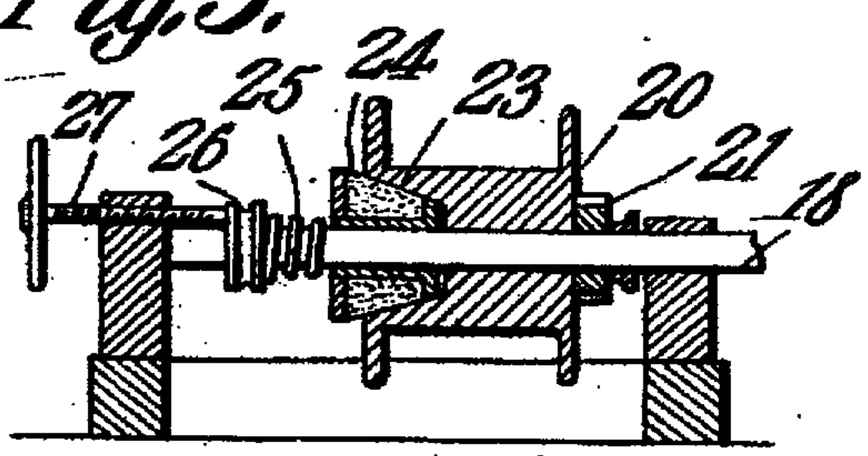
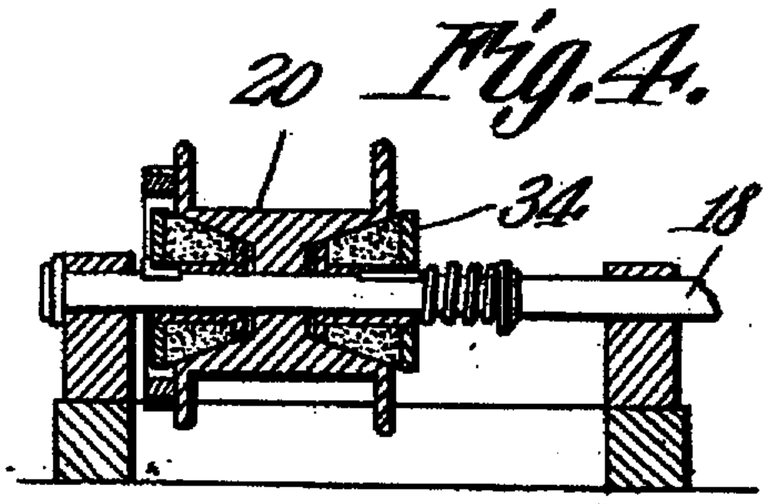


Fig. 4.



Witnesses

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WINDLASS.

No. 914,582. Specification of Letters Patent. Patented March 9, 1909.

Application filed October 9, 1908. Serial No. 456,945.

To all whom it may concern:

Be it known that I, OSCAR KUEHNE, a citizen of the United States, residing at San Antonio, in the county of Bexar and State of Texas, have invented a new and useful Windlass, of which the following is a specification.

This invention relates to windlass construction, and has, as its primary object, to provide, in a windlass, means for taking up the slack of the cable as it is wound up by the rotation of a winding spool or its equivalent, and to provide, in connection with such cable-storing means, a drive means therefor, so constructed and arranged as to compensate for the difference in the speed of rotation of the said winding-spool or its equivalent, and the said cable-storing means, which means is broadly embodied in a rotatable drum. In the construction of ordinary hoisting mechanism of this class, no provision is made for storing the cable as it is wound by the winding-spool, it being customary for one or more workmen to pull upon the cable, as it is wound up by the spool, and store it in a coil; and, where such a construction is not employed, it is usually customary to wind the cable directly upon a drum; but both of these arrangements are undesirable and present disadvantages which I have aimed, by the present invention, to overcome. In the first mentioned arrangement it is necessary that the workmen hold the cable taut in order to be sure of the cable frictionally gripping the winding-spool, so that this arrangement presents a certain element of danger and chance of injury to the material or machinery being hoisted. In the other arrangement mentioned the power must be constantly increased as the cable is wound upon the drum, in order to provide for the increase in circumference of the cable coil, increase of power being required in ratio to the increase in the length of cable wound upon the drum. The fact will be appreciated that the first described arrangement overcomes the disadvantages presented by the second, and vice versa, and, in carrying out my invention, I have therefore aimed to overcome the disadvantages of both arrangements, and preserve the advantages of both.

In the accompanying drawings:—Figure 1 is a top plan view of the windlass embodying my invention; Fig. 2 is a vertical transverse sectional view therethrough, taken in a line with the axis of the cable-storing drum. Fig. 3 is a vertical longitudinal sectional view on the line 3—3 of Fig. 1. Fig. 4 is a view similar to Fig. 2, but illustrating a slight modification.

As shown in the drawings, the mechanism embodied in the windlass is mounted in a base frame and is comprised of a pair of side sills 5, connected adjacent their ends by means of end cross-sills 6. Journaled in suitable bearing boxes 7, which are mounted one upon each of the side sills 5, is a drive-shaft 8, upon one end of which is fixed a crank handle 9, by means of which the shaft may be rotated. This shaft 8 carries a ratchet 10 and the bearing-box 7 adjacent which the ratchet is located, has pivoted upon it a pawl 11, which coöperates with the said ratchet to prevent backward rotation of the shaft. Bearing-boxes 12 are also fixed upon the side sills 5 of the base frame, and journaled in these latter bearing-boxes is a winding shaft 13, which carries a winding-spool 14 of ordinary construction, and has, at one end, a gear 15, which is in mesh with a gear 16, fixed upon the drive-shaft 8, preferably directly outwardly of the ratchet 10, the gear 15 is preferably of considerably greater diameter than the gear 16, so that but little power will be required to rotate the shaft 13 through the medium of the drive shaft 8 and the gear connections described. In addition to the journal boxes 7 and 12, are other journal boxes 17, mounted upon the side-sills of the said frame, and journaled in these latter bearing-boxes is a drum shaft 18, upon one end of which is fixed a gear 19, which is in mesh with the gear 15; it being understood that rotation of the drive shaft 8 serves to drive both the shaft 17 and the drum shaft 18.

Loosely mounted upon the drum shaft 18 is a cable-storing drum 20, which is provided with a ratchet 21, having a pawl 22 coöperating therewith to prevent backward rotation of the drum upon the shaft. It is intended that the cable-storing drum 20 be normally held for rotation with the drum shaft 18, upon which it is moved and mounted, and, in order that this may be accomplished, I have provided a friction clutch device which will now be described.

The cable-storing drum 20, above referred to, is provided with an interior conical friction surface 23, and splined upon the drum

shaft 18 is a frusto-conical friction clutch element 24, constructed and arranged to fit into the clutch bearing formed in the drum for the purpose of clutching the drum for rotation with the shaft, said element being normally held in such position and engagement with the drum through the medium of a spring 25, which is engaged upon the shaft 18, and bears at one end against the said element, and at its other end against a collar 26, adjustable upon the shaft longitudinally thereof by means of a hand screw 27, it being understood that the tension of the spring will be adjusted by adjusting said collar upon the shaft, so as to hold the friction element more or less firmly against the friction surface of the drum.

A hoisting cable 28 is secured at one end to the cable-storing drum, and is passed one or more times around the winding spool 14, and is connected at its other end to the weight to be lifted, in ordinary manner.

It will be understood, from the foregoing description of the invention, that, upon rotation of the power shaft 8, the winding shaft 13 will be rotated, together with the winding spool carried thereby, and that the frictional gripping of this spool by the cable, will result in the cable being wound to shorten its length between the spool and the weight or load.

As will be observed from the drawings, the gear connection between the winding spool shaft 13 and the drum shaft 18 is such that the latter shaft will be rotated at a higher rate of speed than the former, and, as a consquence, the cable, as it is wound up by the spool 14, will not become slack between the spool and the said drum, but will be taken up by the rotation of the drum and be stored thereon, the friction clutch device connecting the drum for rotation with the shaft serving to permit of the slack of the cable being taken up without exerting any undue strain thereon. It will also be understood, in connection with the foregoing description, that should the cable, by accident, slip upon the spool 14, it will not unwind from the cable-storing drum, inasmuch as the pawl and ratchet associated with the drum will prevent its backward rotation upon the shaft 18. Furthermore, it will be noted that it is not necessary, as the cable is wound by the winding spool, to increase the power, but that the power is constant, and that there is no possibility of the slipping of the hoisting cable, such as is liable to occur when a winding spool is employed without a means for taking up the slack of the hoisting cable.

In unwinding the rope from the cable-storing drum 20, it is desirable that manual rotation of the shaft be avoided. In order to accomplish this result, I form the winding drum 14 with a clutch collar 29, which is normally in engagement with a similar collar 30 splined or keyed upon the shaft 13, it being understood that the drum may be moved longitudinally of the shaft to disengage its collar 29 from the collar 30, and that after so moving the drum, it may rotate freely upon the shaft, the cable-storing drum 20 being also rotatable freely upon its shaft, but its speed being slightly retarded by the friction elements 23 and 24.

A brake-shoe 31 is pivoted as at 32 to one of the bearings 12, and normally rests upon the shaft 13 between the said bearings and the adjacent end of the winding drum 14, it being understood that when this drum is shifted longitudinally of its shaft, to bring the collar 29 out of engagement with the collar 30, the shoe 31 is to be swung back upon its pivot, so as not to interfere with the said drum.

In the form of my invention as illustrated in Fig. 3 of the drawings, I provide, in addition to the clutch element, which is above described as being splined upon the shaft 18, a clutch element 34, which is fixed upon said shaft in opposition to the first mentioned clutch element, the ratchet for the cable-storing drum, in this form of the invention being of annular construction and encircling the said clutch element.

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

1. In a windlass, a winding spool, a cable-storing drum, and a friction drive for said drum.

2. In a windlass, a winding spool, means for taking up the slack of the cable wound by the spool, and a common drive for the spool and the said means.

3. In a windlass, a winding-spool, a cable-storing drum, and gear connections between the spool and the drum arranged to drive the drum from the spool, and to compensate for the difference in the speed of rotation of the spool and drum.

4. In a windlass, a winding-spool, a cable-storing drum, a friction drive for said drum, and positive means for preventing backward rotation of said drum.

5. In a windlass, a winding-spool, a cable-storing drum, a friction drive for said drum, a ratchet carried by the drum, and a pawl positioned for coöperation with the ratchet.

6. In a windlass, a winding-spool, a shaft, gear connections between the spool and shaft, a cable-storing drum loosely mounted upon the shaft, and friction means normally clutching the drum for rotation with the shaft.

7. In a windlass, a winding-spool, a shaft, gear connections between the spool and shaft, a cable-storing drum loosely mounted on the

shaft, a friction means normally clutching the drum for rotation with the shaft, and positive means for preventing backward rotation of the drum upon the shaft.

8. In a windlass, a winding-spool, a shaft driven from the spool, a cable-storing drum loosely mounted upon the shaft, said drum being provided with a friction surface, a friction clutch element mounted upon the shaft, means for normally holding the said element in the friction surface of the drum for normally clutching the drum for rotation with the shaft, and means for preventing backward rotation of the drum upon the shaft.

9. In a windlass, a winding-spool, a shaft, a drum loosely mounted upon the shaft, positive means for driving the shaft from the spool, and means upon said shaft for normally frictionally clutching the drum for rotation with the shaft.

10. In a windlass, a winding-spool, a shaft driven from the spool, a drum mounted upon the shaft, said drum being provided with a friction surface, a friction clutch element mounted upon the shaft in opposition to the said friction surface upon the drum, a collar upon the shaft, a spring interposed between the collar and the said element for normally holding the element in frictional engagement with the drum, means for holding the collar at various adjustments upon the shaft, and positive means for preventing backward rotation of the drum upon the shaft.

11. In a windlass, a drive shaft, a ratchet upon the shaft, a pawl arranged for coöperation with the ratchet, a second shaft, a winding spool upon the said second shaft, positive gear connections between the drive shaft and the second mentioned shaft, a drum shaft, positive gear connections between the second mentioned shaft and the drum shaft, a cable-storing drum loosely mounted upon the drum shaft, means for normally frictionally clutching the drum for rotation with the shaft, and means for preventing backward rotation of the drum upon the shaft.

12. In a windlass, a cable-storing drum, a shaft, a cable-winding drum loosely mounted upon the shaft and shiftable longitudinally thereof, the said drum being provided with a clutch portion, a clutch collar fixed upon the shaft and in engagement normally with the clutch portion of the drum, and means for rotating both of the drums.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

OSCAR KUEHNE.

Witnesses:
FRED BREDOW,
T. H. FLANNERY