No. 789,615. PATENTED MAY 9, 1905.

A. L. LE GRAND.

HOISTING APPARATUS.

APPLICATION FILED JULY 14, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

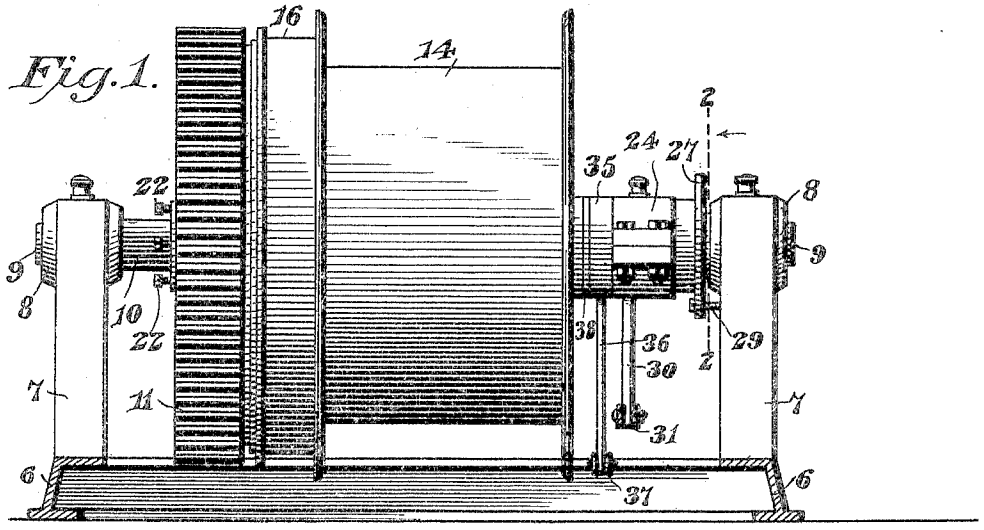


Fig. 5.

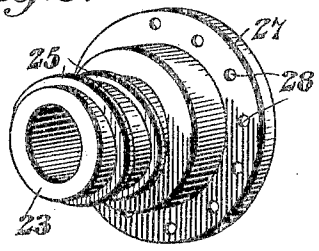


Fig. 4.

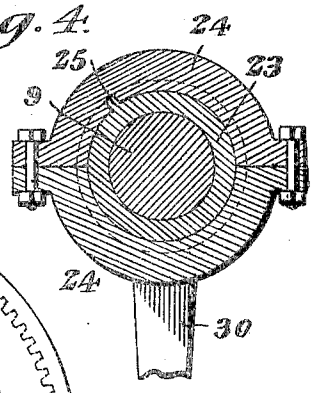


Fig. 2.

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Witnesses

Jas. K. McCutchan

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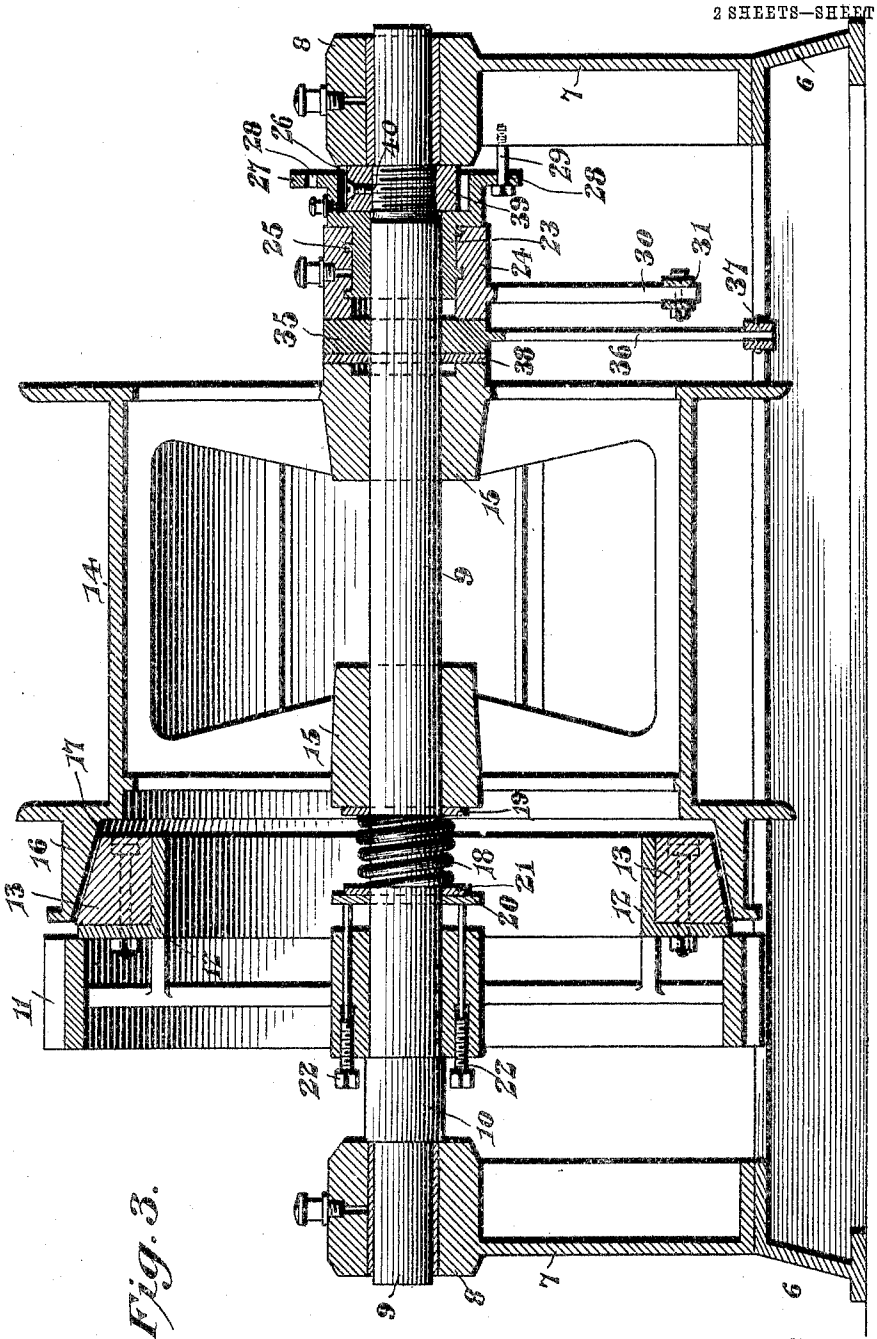


Fig. 3.

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No. 789,615. Patented May 9, 1905.

UNITED STATES PATENT OFFICE.

AUGUSTUS L. LE GRAND, OF PITTSTON, PENNSYLVANIA.

HOISTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 789,615, dated May 9, 1905.

Application filed July 14, 1904. Serial No. 216,591.

To all whom it may concern:

Be it known that I, AUGUSTUS L. LE GRAND, a citizen of the United States, residing at Pittston, in the county of Luzerne and State of Pennsylvania, have invented a new and useful Hoisting Apparatus, of which the following is a specification.

This invention relates more particularly to means for moving the drum of a hoisting-machine into and out of coaction with the driving means therefor, though the said invention is undoubtedly capable of successful and advantageous employment in other mechanisms of an analogous nature.

The object is to provide a structure of a novel character and simple conformation wherein the engagement of the drum or driven member with the disengagement of the same from the driving means can be directly secured without strain upon the shaft-bearings, the necessary wear on the members may be readily taken up, and the mechanism dismembered for the purpose of repairing or renewing any of the elements.

An embodiment of the invention which is at present considered the preferable one is illustrated in the accompanying drawings, wherein—

Figure 1 is a side elevation of the improved mechanism as applied to a hoisting-drum, the drive-shaft and pinion being removed. Fig. 2 is a sectional view through the same on the line 2 2 of Fig. 1 and showing said drive-shaft and pinion. Fig. 3 is a longitudinal sectional view on an enlarged scale. Fig. 4 is a detail sectional view through the actuating means for moving the drum. Fig. 5 is a detail perspective view of one of the elements of said actuating means.

Similar reference-numerals indicate corresponding parts in all the figures of the drawings.

In the embodiment illustrated a base-frame 6 is employed, having upstanding spaced standards 7, carrying journals 8 at their upper ends, in which is journaled a shaft 9. The shaft is provided just inside one of the standards with an enlargement 10, and keyed or otherwise secured to said shaft at the inner end of the enlargement is a gear-wheel 11, constituting the driving member. This gear-wheel carries a clutch element consisting of an annular ring-seat 12, provided with a tapering shoe 13, constituting the male member of the clutch. The driven member comprises a drum 14, having hubs 15 loosely mounted upon the shaft 9, said drum being longitudinally movable upon the shaft and having at the end adjacent to the gear-wheel a female clutch member 16, provided with a tapering socket 17, that receives the shoe 13. The drum or driven member 14 is urged away from the driving member by means of a spring 18, coiled upon the shaft and bearing against a friction-washer 19, interposed between one end of said spring and one of the hubs 15, said washer being preferably composed of Babbitt or other suitable metal. A washer 20 bears against the other end of the spring, said washer being provided with an antifriction-facing 21 and being borne against by the inner reduced ends of adjusting-screws 22, threaded through the hub of the gear-wheel.

The actuating means employed for moving the drum into coaction with the driving member consists of overlapping tubular elements 23 and 24, comprising collars having interlocking threads 25 of comparatively high pitch, or, in other words, one of said elements or collars having a screw that engages in the other. The member 23 is loosely fitted upon the shaft and is capable of being rotated thereon. It has in the outer end a seat 26 and is furthermore provided with an outstanding annular flange 27, provided with a series of openings 28 therethrough. A holding-bolt 29, arranged to be passed through any of the openings 28, is screwed into the adjacent standard 7 and constitutes means for holding the element 23 against rotation, but in different positions. The element 24 receives the element 23 and is capable of a spiral movement thereupon and upon the shaft, being therefore loose with respect to the shaft. It is provided with a depending arm or stem 30, having a link connection 31, with an operating-lever 32, suitably mounted at one end on the frame and carrying a dog 33, engaging a quadrant-rack 34. Interposed between the inner end of the element 24 and the ad-

jacent hub 15 of the drum is an abutment-sleeve 35, surrounding the shaft and capable of longitudinal movement thereon. It is held against rotary movement, however, by an arm 36, depending therefrom and having a link connection 37 with the base-frame 6. An antifriction-washer 38 is preferably interposed between the abutment 35 and the head 15. The outward pressure upon the element 23 is received by a collar 39, located just inside the adjacent standard 7 and preferably threaded upon the shaft, being held against movement thereon, however, by a suitable set-screw, as 40, the collar 39 being preferably received in the recess 36 of the element 23 and the inner end constituting a shoulder against which the said element or collar 23 abuts.

It is believed that the operation of the apparatus can now be clearly understood. When the lever 32 is moved in one direction, the actuating element 24 will spirally move toward the adjacent standard and the spring 18 will consequently move the drum longitudinally upon the shaft, so that the clutch elements are disengaged. Said drum will therefore be free of the driving means. If now the operating-lever 32 is swung in an opposite direction, the element 24 will be moved spirally in a direction to move the drum longitudinally, so that the clutch members will become engaged and said drum consequently frictionally locked to the driving means. The drum will thus be rotated thereby.

Among the advantages secured by the arrangement and combination illustrated the following are thought to be worthy of note. In the first place it will be observed that the end thrusts caused by the mechanism will be received by the enlargement 10 and the collar 39 on the shaft, so that the standards and bearings are relieved therefrom. The necessary wear incident to use can be readily taken up by revolving the actuating element 23 and securing it in different positions, the rotation or partial rotation thereof effecting the feeding forward of the element 24 toward the drum. The use of an abutment between the element 24 and the drum, said element being capable of sliding movement, but being held against rotation, is an important feature, for if the element 24 is operated directly against the adjacent hub of the drum the friction between these parts would have a tendency to carry the element 24 in the direction in which the drum is revolving. This tendency when the drum is running in one direction would be to apply the friction-clutch, a very serious objection under certain circumstances. Attention is invited to the means for varying the tension of the return-spring, said means being entirely accessible and easily operable.

It will be noted that the various parts can be readily reached and removed for the purpose of repair or renewal. In this connection attention is invited to the fact that the element 24 is in the form of a split collar, as shown in Figs. 1 and 4, so that it can be segregated, the drum moved longitudinally, and thus access gained to the shoes.

From the foregoing it is thought that the construction, operation, and many advantages of the herein-described invention will be apparent to those skilled in the art without further description, and it will be understood that various changes in the size, shape, proportion, and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

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

1. In mechanism of the class described, the combination with rotatable driving and driven members relatively movable toward and from each other, of movable actuating means for moving one of said members toward the other, an abutment located between the actuating means and the member moved thereby, said abutment having one end face bearing against the movable member and its opposite end face borne against by the actuating means, and means for holding said abutment against movement.

2. In mechanism of the class described, the combination with a shaft, of rotatable driving and driven members mounted on the shaft, one of said members being secured to the shaft, the other member being movable toward and from the same, movable actuating means for moving the said member toward the other, an abutment located between the actuating means and the member moved thereby, one end of the abutment coacting with the said movable member, the opposite end face being borne against by the actuating means, and means for holding said abutment against rotation with the shaft.

3. In mechanism of the class described, the combination with a shaft, of a driving member fixed to the shaft, a driven member loosely mounted on the shaft and movable longitudinally thereof into and out of coaction with the driving member, an actuating device mounted on the shaft and having a spiral movement thereon to move the driven member, and an abutment interposed between the actuating device and the driven member, said abutment being slidable on the shaft and held against rotation therewith, one end coacting with the driven member, the opposite end being borne against by the adjacent end of the actuating device.

4. In mechanism of the class described, the combination with a shaft, of a gear-wheel fixed to the shaft and carrying a shoe member, a drum loosely mounted on the shaft and having a socket member that receives the shoe member, said drum being longitudinally mov-

able on the shaft, actuating means comprising elements located upon the shaft and having a threaded connection, one of said elements being secured against rotation, means for moving the other element, an abutment-sleeve interposed between the movable element and the drum, and including a washer at one end that bears against the drum, said abutment member having its opposite end face borne against by the movable element and said member furthermore having an arm, and means engaging the arm for holding the abutment against rotation with the shaft but permitting its sliding movement thereon.

5. In mechanism of the class described, the combination with driving and driven members relatively movable toward and from each other, of means for moving one of the members toward the other, said means comprising coacting elements, one of which has a spiral movement with respect to the other, said other element being rotatable, and means for holding the rotatable element against movement and in different positions.

6. In mechanism of the class described, the combination with a shaft, of driving and driven members mounted on the shaft and relatively movable toward and from each other, means for moving one of the members toward and from the other, said means comprising coacting elements mounted on the shaft, one of the elements having a spiral movement on the shaft and the other being rotatable on said shaft, and means for holding the rotatable element against movement and in different positions.

7. In mechanism of the class described, the combination with a shaft, of a driving member fixed to the shaft, a driven member loosely mounted on the shaft and movable longitudinally thereon into and out of coaction with the driving member, actuating means mounted on the shaft and comprising overlapped elements having threaded engagement, one of said elements having a spiral movement upon the shaft for the purpose of moving the driven member, the other element being rotatable upon the shaft, and means engaging the rotatable element for holding the same against rotation and in different positions.

8. In mechanism of the class described, the combination with a shaft, of a driving member secured to the shaft, a drum loosely mounted on the shaft, said drum and driving member having clutch elements, means for moving the drum longitudinally upon the shaft, said means comprising overlapped elements having threaded engagements, one of said elements having an outstanding flange provided with an annular series of openings, said element being rotatable upon the shaft, a holding-bolt arranged to be passed through any of the openings for securing the elements against rotation and in different positions, the other element having a spiral movement about the shaft, and means for moving said latter element.

9. In mechanism of the class described, the combination with driving and driven members, one of which is movable toward and from the other, of a spring located between the members for separating the same, and means extending through one of the members for varying the tension of the spring.

10. In mechanism of the class described, the combination with driving and driven members, one of which is movable toward and from the other, of a spring bearing against one of the members for separating said members, and means carried by the other member for varying the tension of the spring.

11. In mechanism of the class described, the combination with a shaft, of a driving member fixed to the shaft, a drum loosely mounted and longitudinally movable on the shaft, said drum and driving member having clutch elements, a spring coiled upon the shaft and bearing against the drum for urging the same away from the driving member, a washer located on the shaft and bearing against the spring, and adjusting-screws carried by the driving member and bearing against the washer.

12. In mechanism of the class described, the combination with a frame including spaced standards, of a shaft journaled in the standards, a gear-wheel secured to the shaft and having a clutch element comprising a shoe, a drum loosely mounted on the shaft and having a clutch element provided with a socket that receives the shoe, a spring coiled upon the shaft and bearing against the drum for moving the same away from the gear-wheel, a washer located on the shaft and bearing against the spring, means carried by the gear-wheel and engaging the washer for varying the tension of the spring, actuating means for moving the drum toward the gear-wheel, said means comprising overlapped elements mounted on the shaft and having threaded engagement, one of said elements being rotatable upon the shaft, a holding-bolt engaging the rotatable element for preventing the rotation thereof and holding the same in different positions, means engaging the other element for turning the same, an abutment located between the said other element and the drum and having an arm, and a link connection between the arm and the frame.

13. In a hoisting mechanism, a shaft having a friction member fixed thereto and a friction-drum loose thereon, a collar fast to the shaft, a non-rotating collar loose on said shaft and engaging said fast collar, a thrust-collar between said non-rotating collar and drum, a screw in one of said last-named collars and operating against the other, and means to turn said screw.

14. In a hoisting mechanism, a shaft having a shoulder thereon, a friction member fixed to

said shaft and a friction-drum loose thereon, means to cause said drum to engage said friction member, said means including a plurality of collars loose on said shaft, and between the shoulder and friction-drum, a thrust-screw carried by one of said collars and operating against the other, and means for effecting a relative rotation of the collars to operate the screw.

15. In a hoisting mechanism, a shaft, a friction member fixed thereto, a friction-drum loose thereon, and means to cause said drum to engage the friction member, said means comprising a collar fast to the shaft, two non-rotary collars loose on the shaft between said fast collar and friction-drum, a screw in one of said loose collars, said screw surrounding the shaft and operating against the other collar, means for revolving the screw around the shaft to give said screw a limited turning movement, and adjusting devices to compensate for wear.

16. In a hoisting mechanism, a shaft, a friction member fixed thereto, a friction-drum loose thereon, and means to cause said drum to engage the friction member, said means comprising a collar fast to the shaft, two non-rotary collars loose on the shaft between said fast collar and the friction-drum, a screw in one of said loose collars, said screw surrounding the shaft and operating against the other collar, and means for revolving the screw around the shaft to give said screw a limited turning movement.

17. In a hoisting mechanism, a shaft having a friction member fixed thereto and a friction-drum loose thereon, a collar fast on said shaft, and two collars loose thereon, one of said loose collars having a stem projecting therefrom, means to engage said stem and hold said collar from turning, a screw rigidly carried by the other of said loose collars and operating against the first-mentioned collar, means for turning the collar carrying the screw to give said screw a limited turning movement, and adjusting devices coöperating with one of the collars to compensate for wear.

18. In a hoisting mechanism, a shaft having a friction member fixed thereto, and a friction-drum loose thereon, a collar fast to the shaft, a non-rotating collar loose on said shaft and engaging said fast collar, a thrust-collar between the said non-rotating collar and the drum, and means for causing the separation of the non-rotating and thrust collars when it is desired to throw the clutch into operation, said means being rotatable on the shaft and having its axis of rotation substantially coincident with the axis of the shaft.

19. In a hoisting mechanism, a shaft having a friction member fixed thereto and a friction-drum loose thereon, an abutment-collar fixed to the shaft, a loose collar between the abutment-collar and the friction-drum, a screw carried by the loose collar and surrounding the shaft, a thrust-bearing engaging the friction-drum, and means for rotating the loose collar to rotate the screw.

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

AUGUSTUS L. LE GRAND.

Witnesses:
ALEX MACDOUGALL,
H. W. HARTLAND.