(No Model.)

J. GIBBINS.

HOISTING APPARATUS.

No. 456,763. Patented July 28, 1891.

Fig. 2

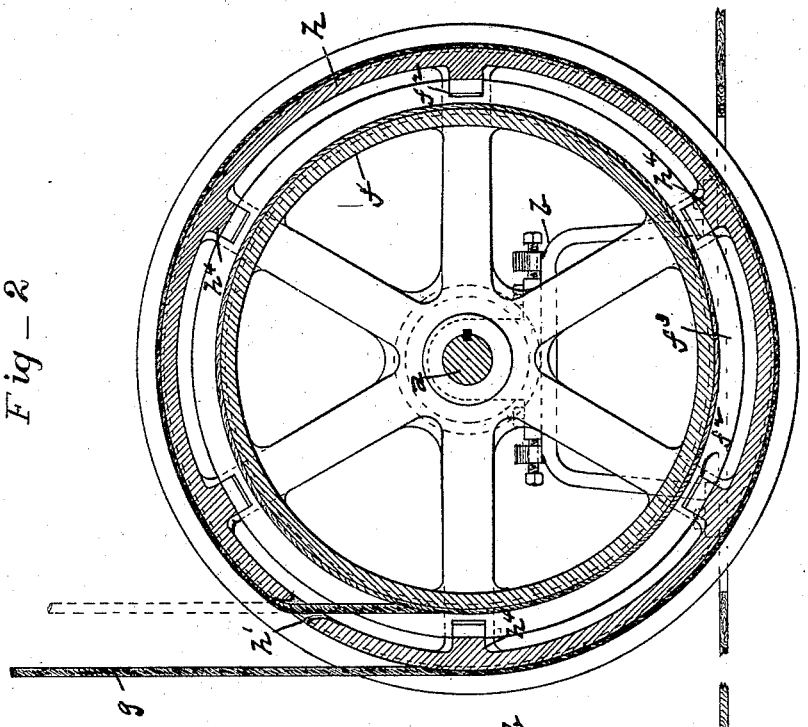
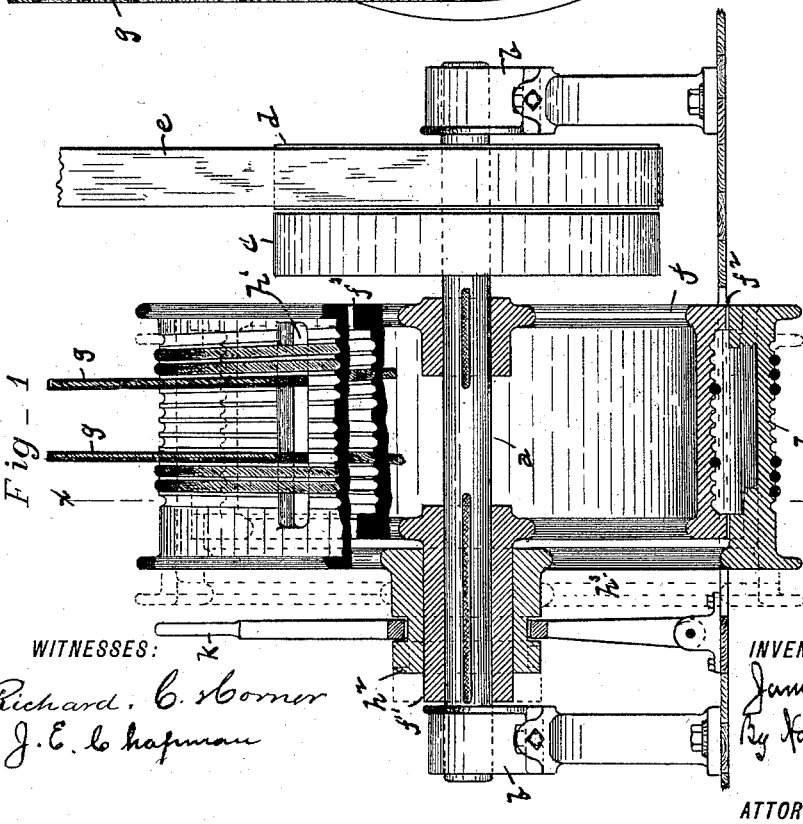


Fig. 1



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HOISTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 456,763, dated July 28, 1891.

Application filed December 15, 1890. Serial No. 374,828. (No model.)

To all whom it may concern:

Be it known that I, JAMES GIBBINS, of Springfield, in the county of Hampden and State of Massachusetts, have invented a new and useful Improvement in Hoisting Apparatus, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.

My invention relates to elevator mechanisms and hoisting apparatus generally, and has for its object to provide means whereby two winding-drums of different diameters can be arranged upon the same driving-shaft and in connection with the same cable or cables, to be used interchangeably to hoist the car or other weight attached to the cable or cables, and thus give to the driving-shaft two maximum hoisting capacities with the same power.

To this end my invention consists in the hoisting apparatus comprising a driving-shaft having mounted thereon two winding-drums of different diameters, one of which is inclosed within the other, and the outer one of which is provided with a transverse slot or opening to permit the passage of the cable to the inner one and with means whereby it can be caused to revolve with the shaft or to turn loosely thereon, as hereinafter fully described, and particularly pointed out in the claims.

Referring to the drawings, in which like letters designate like parts in the several figures, Figure 1 is a view, partly in side elevation and partly in vertical section, of a hoisting apparatus embodying the invention. Fig. 2 is a cross-section taken upon line x x of Fig. 1.

The letter a designates a driving-shaft supported in bearings b b and carrying fast and loose pulleys c d, by which motion is transmitted thereto from any suitable source of power by belt e, which shaft is herein shown as one example of driving-shafts generally, it being understood that so far as the present invention is concerned it can be supported and driven in any of the various ways in which the shafts of hoisting apparatus are now supported and driven. Upon said shaft is keyed or otherwise secured the winding-drum f to receive the cable or cables g and to co-operate with the latter to raise and lower an elevator-car or other weight in the usual manner. In adapting said drum to the work of raising and lowering an elevator-car, for example, its diameter and the power for driving it would be calculated with reference to the greatest weight which it is designed to place upon the car and the rate of speed at which it is desired the car shall move. Consequently, while the weight usually carried upon the car may fall far short of such maximum, the power necessary for the latter must be maintained at all times or provision must be made for temporarily increasing the power whenever the occasion therefor arises. Either of these plans materially increases the the cost of operating an elevator, and the latter leads to vexatious and expensive delays in the use of the same. With a view to obviating these objections to the use of a single winding-drum, I employ in connection therewith a second drum h of greater diameter, which surrounds said drum f and contains the transverse slot or opening h' to permit the passage of the cable or cables to the latter, and provide means whereby said outer drum can be caused to revolve in unison with the inner drum or be permitted to remain stationary at will. Said drum h is provided with hub h^2 and arms h^3 at one end thereof, its opposite end being open to adapt it to be placed in position about the inner drum, and it can be mounted, if desired, directly upon shaft a and have connected therewith suitable clutch mechanism for locking it to said shaft. I prefer, however, to provide the drum f with an elongated hub f' and to mount the hub h^2 of the outer drum thereon in such manner as to be capable of both a revolving and a limited endwise movement thereon, and to provide means for locking the peripheries of the drums together when it is desired that they shall revolve in unison. As herein shown, such locking means consist of inwardly-projecting lugs h^4 at each end of the outer drum and grooves or depressions f^2 in the rims f^3 of the inner drum to receive said lugs, said grooves or depressions being by preference located in radial alignment with the arms of said inner drum, as shown in Fig. 2. Said lugs on the outer drum are thus adapted to be engaged with and to be disengaged from the grooves or depressions on the inner drum by an endwise movement of the outer drum in opposite directions or from the position indicated by broken lines in Fig. 1 to the position shown by full lines, and vice versa. To produce such slight end-

wise movement of the outer drum, I have shown a lever k, carrying a yoke which enters a peripheral groove in hub h^2, similar to the ordinary clutch-lever; but any suitable means for such purpose can be employed. The slot or opening h' in said outer drum is of sufficiently greater length than the distance between the rims of the inner drum to permit the former to have the necessary endwise movement without engaging the cable, and has its edges beveled, as shown in Fig. 2, to prevent chafing of the cable. The cable or cables g being passed through said slot in the outer drum and secured to the inner drum in the usual manner, and the outer drum occupying the position indicated by broken lines in Fig. 1, said cable or cables can be wound upon and unwound from the inner drum as readily as if the outer drum were entirely removed from the shaft, the cable passing freely through the slot h', as indicated by broken lines in Fig. 2, and holding the outer drum against rotation. If now the outer drum be moved to the position shown by full lines in Fig. 1, thereby interlocking its lugs h^4 with the grooves f^2 of the inner drum, both drums will revolve in unison, and the cable will then be wound upon and unwound from the outer drum, as shown by full lines in Fig. 2. Such change from one drum to the other can be made almost instantly and without disturbing the cable.

In practice power will be provided for raising with the inner drum the maximum weight, as heretofore, and said drum will be used only when such maximum weight is to be raised, the outer drum being used for the ordinary lesser weights. The relative saving in power thus effected will of course depend upon the relative diameters of the two drums, which can be varied as may be desired. If, for example, the circumference of the inner drum be eight feet and that of the outer drum be twelve feet, a gain of four feet in the movement of the weight will be secured with each revolution of the driving-shaft and a corresponding gain in power will be secured. Such gain in power is particularly advantageous in connection with hydraulic elevators located in cities where the water consumed is metered, as the necessity heretofore existing for using a quantity of water greatly in excess of that actually required to raise the average weight carried upon the car is obviated, while the capacity of the elevator to raise the maximum weight remains unchanged, such result in my device being secured by shifting to the inner drum, as described.

By providing means for interlocking the peripheries of the two drums, as described, I secure a very strong and durable connection between the driving-shaft and the outer drum and in a simple and inexpensive manner; but it will be understood that any means for locking said outer drum to the shaft and releasing it therefrom can be employed.

As hereinbefore stated, the cable by passing through the slot in the outer drum holds the latter against rotation when not in use; but, if desired, means for positively holding said outer drum in such position can be employed.

It is obvious that three or more drums can be employed in a manner similar to the two drums herein shown and described, either of which can be used for raising and lowering the weight; but for all ordinary purposes two will be sufficient.

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

1. In a hoisting apparatus, the combination, with a driving-shaft having mounted thereon a winding-drum, of a second winding-drum of greater diameter loosely mounted upon said shaft and surrounding said first-mentioned drum, said outer drum having therein a transverse slot or opening to permit the passage of a cable to the inner drum, and means for locking the outer drum in a fixed relation to said shaft, substantially as set forth.

2. In a hoisting apparatus, the combination, with a driving-shaft having rigidly secured thereto a winding-drum, of a winding-drum of greater diameter loosely mounted upon said shaft and surrounding said first-mentioned drum, said outer drum being provided with a transverse slot to permit the passage of a cable to the inner drum, and means for locking said drums together to cause them to revolve in unison and for disconnecting the same, substantially as set forth.

3. In a hoisting apparatus, a driving-shaft, a winding-drum rigidly secured to said shaft, a second winding-drum of greater diameter surrounding said first-mentioned drum and provided with a transverse slot to permit the passage of a cable to the latter, and means for locking said drums together at their peripheries and for disconnecting the same, combined and operating substantially as described.

4. In a hoisting apparatus, the combination, with a driving-shaft, of a winding-drum rigidly secured thereto, said drum being provided at each end thereof with a projecting rim having therein a series of transverse grooves or recesses, a second winding-drum of greater diameter loosely mounted upon said shaft and capable of a limited endwise movement thereon, said drum surrounding the first-mentioned drum and being provided with a transverse slot to permit the passage of a cable to the latter, and with inwardly-projecting lugs at each end thereof which are adapted to enter the grooves or recesses in the inner drum to lock the two drums together, and means for imparting endwise movement to said outer drum, substantially as set forth.

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