T. A. WESTON.

Hoisting-Drum and Shaft for Windlasses, &c.

No. 217,031. **Patented July 1, 1879.**

Fig 1.

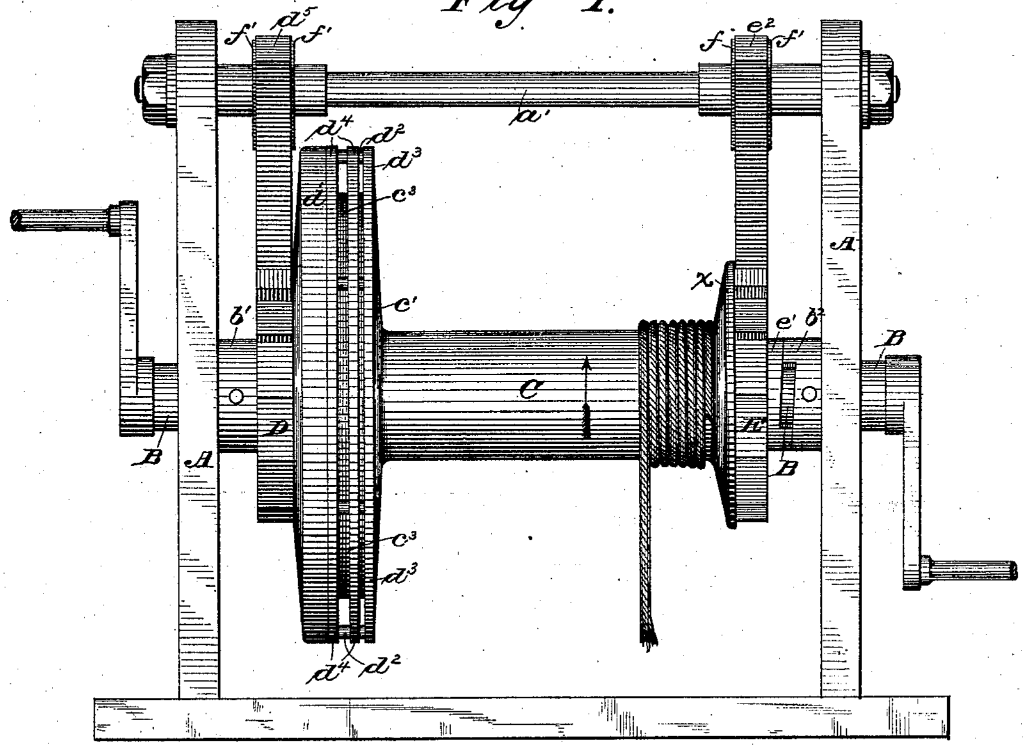
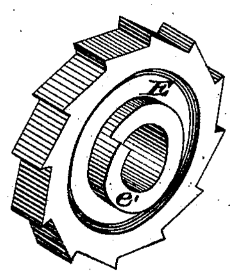


Fig 6.



WITNESSES

Wm A Skinkle

Geo W Breck.

INVENTOR

Thomas. A. Weston.

By his Attorneys

Baldwin, Hopkins, & Peyton.

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Fig 2.

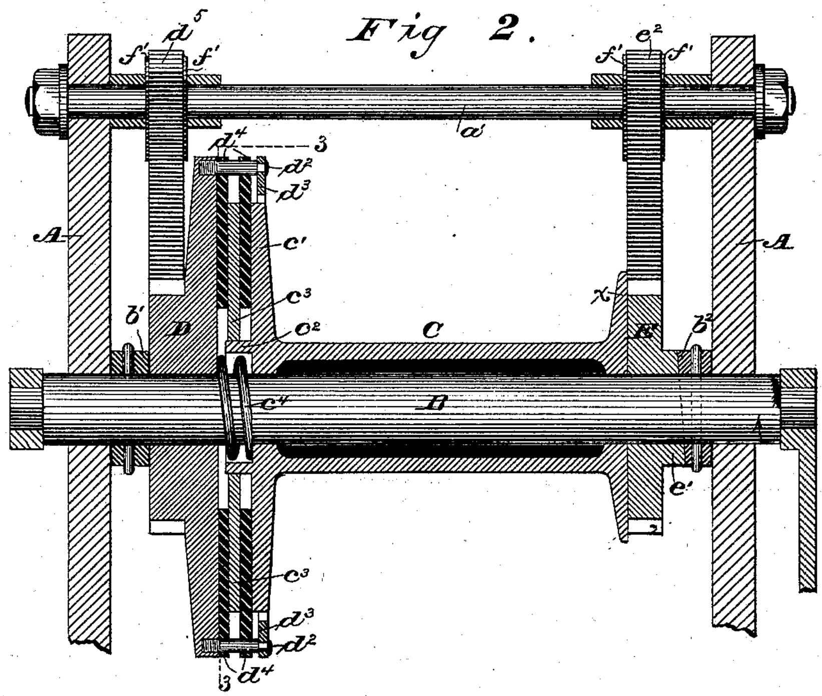
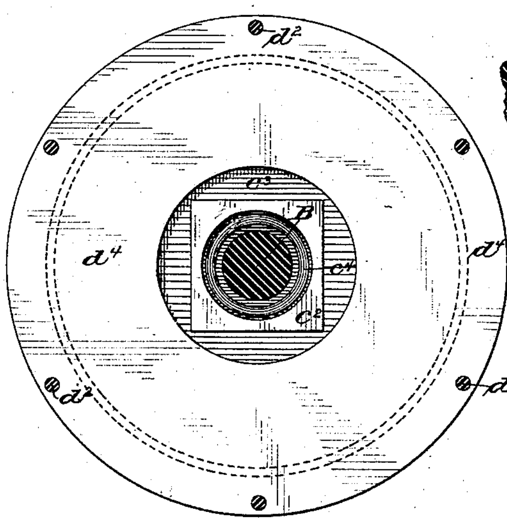
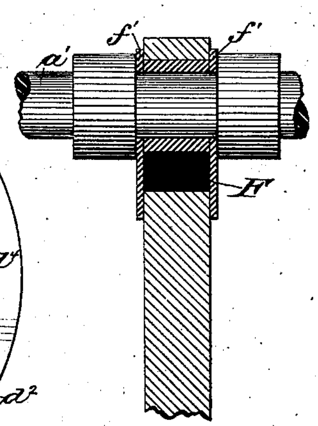
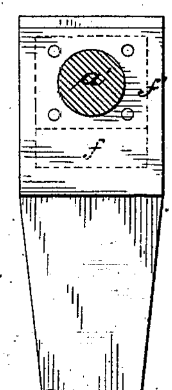


Fig 3. *Fig 4.* *Fig 5.*







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UNITED STATES PATENT OFFICE.

THOMAS A. WESTON, OF STAMFORD, CONNECTICUT, ASSIGNOR TO THE YALE LOCK MANUFACTURING COMPANY, OF SAME PLACE.

IMPROVEMENT IN HOISTING-DRUM AND SHAFT FOR WINDLASSES, &c.

Specification forming part of Letters Patent No. **217,031**, dated July 1, 1879; application filed August 26, 1878.

To all whom it may concern:

Be it known that I, THOMAS A. WESTON, of Stamford, in the county of Fairfield and State of Connecticut, have invented certain Improvements in Hoisting-Machines, of which the following is a specification.

My invention relates, chiefly, to improvements in, or which are applicable to, the devices for which I obtained Letters Patent of the United States, March 3, 1868, No. 75,227, and December 14, 1869, No. 98,000, parts of my invention being otherwise applicable than to hoists, as explained hereinafter.

In the accompanying drawings, representing my improvements as applied to an oyster-winch for oyster-dredging, Figure 1 is a longitudinal elevation. Fig. 2 is a longitudinal section. Fig. 3 is a section on the line 3 3, Fig. 2. Fig. 4 is an enlarged sectional view of a pawl. Fig. 5 is a side view of the same enlarged. Fig. 6 is a perspective view of the supplementary ratchet-wheel and incline boss.

A is the supporting-frame of the winch. a' is a stay-bar uniting the frame-sides and carrying the pawls d^5 e^2. B is the shaft, carrying a plain fixed collar, b^1, and another fixed collar, b^2, provided with an incline or screw-faced boss, corresponding to and working upon the similar incline boss shown in Fig. 6. C is the winding-drum, loose on the shaft, and having an enlarged flange, c^1, with a square central boss, c^2, and a disk, c^3, loosely fitted thereon. c^4 is a spring to push the drum toward the collar b^2, and insure frictional contact at all times between the ratchet-wheel E and contiguous end of the drum.

D is the main ratchet-wheel, loose upon the shaft, with a flange, d^1, provided with a circle of pins, d^2, the ends of which are united in a ring, d^3. d^4 are friction-disks, carried by the pins d^2. d^5 is a pawl to check back motion by engaging with the teeth of the ratchet-wheel D.

E is the supplementary ratchet-wheel, loose upon the shaft, and having an incline or screw-faced boss, e^1. e^2 is the pawl of the said ratchet-wheel.

The pawls d^5 e^2 are each provided with an elastic cushion, F, at their pivoted ends, to soften the shock of contact and engagement with the ratchet-teeth.

The cushions F may be of india-rubber or other yielding material, or metallic springs may be substituted. f' are side plates to inclose and secure in position the said springs or elastic substance.

The friction-disks and inclined bosses are more fully described, as to their general nature, in the two United States Letters Patent hereinbefore referred to, and the system of pins d^2 and connected parts, forming an open cage or circular frame for carrying the said disks d^4, are more particularly explained and set forth in my application for Letters Patent of the United States bearing even date herewith, and entitled "Improvements in Friction-Brake Clutches."

The first mode of operation is as follows: The pawl e^2 being in position for acting upon and checking the backward motion of the ratchet-wheel E, and the pawl d^5 being thrown backward out of gear with its ratchet-wheel D, the operators may turn the cranks and shaft B in the direction for coiling the rope upon the drum, as indicated by the arrows. Such rotatory motion of the cranks and shaft will first cause the incline face of the collar b^2 to ascend slightly the incline face of the ratchet-wheel E, forcing it longitudinally along the shaft, and pressing its flat side or flange against the adjacent flange x of the drum, the resultant friction thereon and upon the collar b^1 serving to transmit to the drum the rotation of the crank-shaft, and thus haul in and coil upon the drum the rope, and raise the attached dredge-scoop or other load. When thus hoisting, should the dredge-scoop foul upon any obstacle, or become entangled therewith so as to resist and overcome the men at the cranks, the ratchet-wheel E and its acting pawl e^2 will then prevent the cranks from being forced backward upon the operators more than a few inches, or sufficiently for the backward-moving ratchet-wheel E to abut fairly against its pawl. The drum may then continue to run backward, uncoiling its rope under the excessive load or resistance, without further effect upon the cranks or danger to the men. The said backward motion of the drum, however, is still resisted by its friction upon the side of the now stationary ratchet-wheel E and upon the collar b^1; but the said resisting friction may be instantly removed, if desired, by giving a slight backward motion to the cranks and shaft, so as to retire the incline collar b^2 from its screw-like pressure upon the ratchet-wheel E and drum.

When it is desired to turn ahead and again wind up the rope or check the backward motion of the drum, the operators have only to rotate the cranks in the direction for hoisting, as at first. Thus the cranks are operative as brake-levers to check the independent or automatic backward motion of the drum, or to release it wholly from the shaft, and to recommence hoisting at any moment, with perfect security against injury to the operators.

The several functions enumerated, being automatically controlled by the cranks alone, avoid the use of extra levers, clutches, and gearing employed in the older forms of oyster-winches for operating the brake and restoring the apparatus to a position for hoisting after the automatic release of the drum has occurred under an excessive load.

In the first mode of operation now described, no allusion is made to the ratchet-wheel D and its disks, as they are thus far inoperative and unused.

In the second mode of operation, the pawl e^2 is thrown back out of gear with its ratchet-wheel, and the pawl d^5 is thrown into action upon its wheel D. The cranks and shaft being turned in the direction for hoisting, (indicated by the arrows,) the incline face of the collar b^2, by its screwing action upon the incline face of the ratchet-wheel E, presses the latter into frictional connection with the adjacent flange x of the drum. The drum, likewise yielding to the pressure or end-thrust of the inclines, compresses the disks d^4 c^3 against the ratchet-wheel D and fixed collar b^1. The disks are thus frictionally connected, and thereby the drum and ratchet-wheel D, carrying them.

Upon ceasing to hoist, the load is sustained upon the pawl d^5. To lower the load the cranks and shaft must be turned backward contrarily to the direction of the arrows. Such motion retires or unscrews the incline of the collar b^2 from the incline of the ratchet E. The latter, being free from its pawl, becomes, under the pressure of the inclines and load, frictionally attached to the adjacent flange x of the drum, so that in effect the incline boss of the ratchet-wheel may be regarded as affixed to the drum end. This result is due to the excess of diameter in the flat side of the ratchet-wheel E over the diameter of its incline side, and the constant frictional contact of the said ratchet-wheel with the drum-flange x upon one side and the incline collar b^2 on the other, secured always by the spring c^4 and by the inclines when they are forced to ascend each other by the hoisting motion of the cranks and shaft. The ratchet-wheel therefore tends always to move with, or remain at rest with, the drum when free from the action of its pawl e^2, as it is in this second mode of operation, wherein lowering is effected by continually winding the cranks and shaft backward.

With both pawls acting upon their ratchet-wheels, the automatic release under an excessive load, as first explained, may occur, but with much greater resistance to the backward motion of the drum, as the frictional adhesion of the disks has in this case to be overcome. For the easy and quick automatic release of the drum, so desirable in oyster-dredging, the pawl e^2 should therefore alone be in gear or acting on its ratchet-wheel.

Although I have described my invention as applied to an oyster or fishing winch, my said improvements are of general utility in other forms of hoisting apparatus. Thus, in a geared hoisting-machine, my improvements could be applied to the pinion-shaft by simply substituting for the smooth surface of the drum C a toothed surface or pinion, to gear into a spur-wheel connected with a hoisting-drum. The said pinion employed in lieu of the drum C could, in this case, be operated by my improvements with like results to those obtained by applying them direct to a drum, as hereinbefore set forth.

The advantages of my invention are, in brief, the providing a single winch barrel or shaft in a hoisting-machine with a slow safety or self-arrested lowering motion, a quick lowering motion under control of the cranks or shaft, an automatic release of the drum and winding-rope under excessive strains, and an automatic replacement of the parts to their normal position ready for hoisting.

In lieu of the crank-handles, sprocket-wheels or any other convenient means of driving may be employed.

I claim as my invention—

1. In a hoisting-machine, the combination of a driving-shaft having a shoulder or collar, b^1, and an incline-faced collar, b^2, an incline-faced ratchet-wheel, E, and its pawl, a winding-drum or its equivalent, and a ratchet-wheel, D, with its pawl, substantially as described.

2. In a hoisting-machine, the combination of a driving-shaft having a shoulder or collar, b^1, and an incline-faced collar, b^2, an incline-faced ratchet-wheel, E, and its pawl, a winding-drum or its equivalent, a ratchet-wheel, D, with its pawl, and the friction-disks d^4 c^3, substantially as described.

In testimony whereof I have hereunto subscribed my name.

THOS. A. WESTON.

Witnesses:
M. S. HOPKINS,
F. STITH.