G. W. MURRAY.

HOISTING MECHANISM.

APPLICATION FILED NOV. 16, 1908.

962,779.

Patented June 28, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

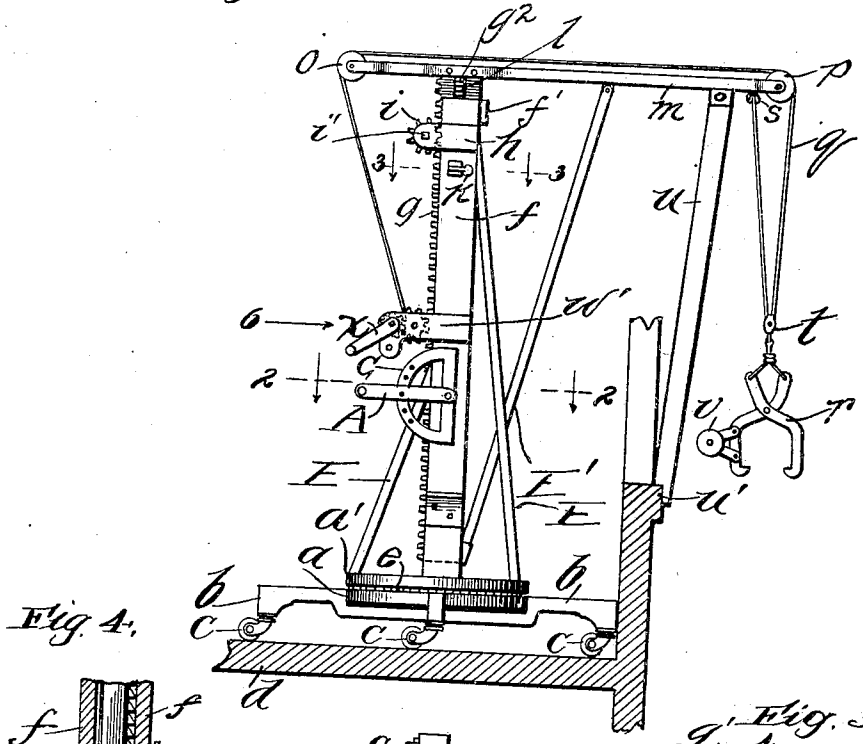

Fig. 4.

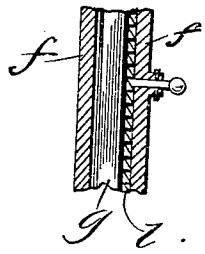

Fig. 3

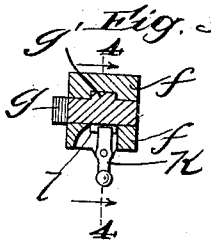

Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 5.

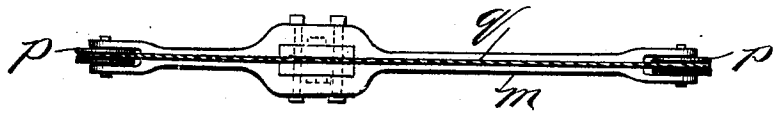



Fig. 6.

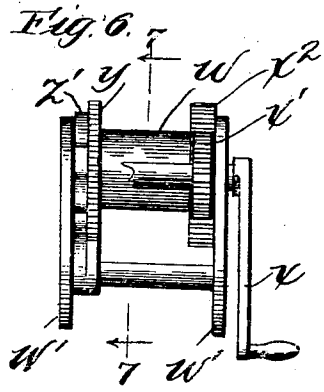



Fig. 7.

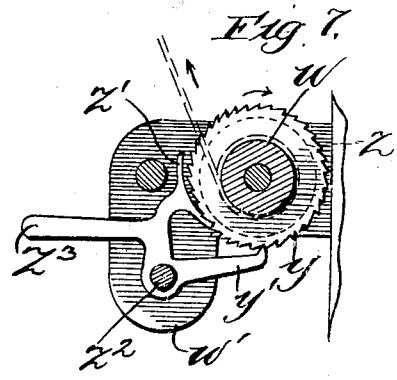



Fig. 9.

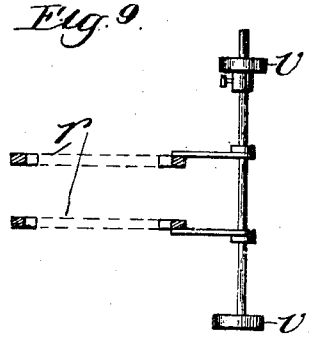
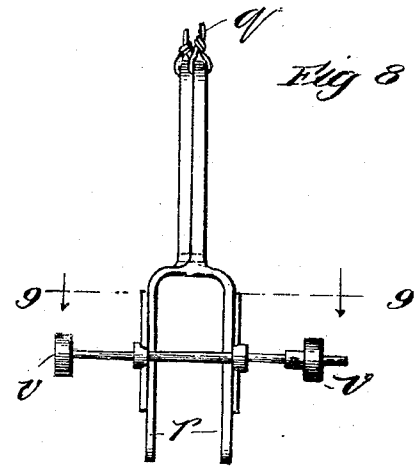



Fig 8

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# UNITED STATES PATENT OFFICE.

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## HOISTING MECHANISM.

962,779. Specification of Letters Patent. Patented June 28, 1910.

Application filed November 16, 1908. Serial No. 462,785.

*To all whom it may concern:*

Be it known that I, GEORGE W. MURRAY, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Hoisting Mechanism, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to hoisting mechanism by means of which burdens may be lowered, elevated and transposed.

The invention will be readily understood by reference to the accompanying drawings, showing the preferred embodiment thereof, in which—

Figure 1 is a side elevation of the machine constructed in accordance with my invention. Fig. 2 is a sectional plan view on line 2 2 of Fig. 1. Fig. 3 is a sectional plan view on line 3 3 of Fig. 1. Fig. 4 is a sectional elevation on line 4 4 of Fig. 3 of a part of the structure. Fig. 5 is a plan view of the upper portion of the structure appearing in Fig. 1. Fig. 6 is a view of a part of the structure taken in the direction of arrow 6 of Fig. 1. Fig. 7 is a sectional view of the mechanism appearing in Fig. 6 on line 7 7 of Fig. 6. Fig. 8 is an elevation of the grappling mechanism that preferably enters into the construction of my invention. Fig. 9 is a sectional plan view on line 9 9 of Fig. 8.

Like parts are indicated by similar characters of reference throughout the different figures.

The apparatus of my invention is adapted for use in various associations. When made of one size, it may be employed as a household convenience, and in the embodiment of the invention shown in Fig. 1, the form of the invention that is adapted for household service is illustrated. When made in other sizes, it may be adapted for heavier work and for use upon the exterior of buildings and in factories.

The apparatus of my invention is desirably made portable, to which end its base *a* is provided with suitable supporting means that permits the base together with the superposed structure, to be moved about. This supporting means, in the embodiment of the invention illustrated, includes a cross-shaped structure *b*, the arms of which are provided with roller bearing casters *c* at their outer extremities, which casters rest upon the floor or other supporting body *d* over which the hoisting apparatus is to be moved.

The base *a* of the structure of my invention is desirably made in two symmetrically arranged parts each having a ball race-way for receiving ball-bearings *e*. By forming the base *a* in two parts and having the upper part rest upon balls that are supported upon the lower part, the hoisting apparatus proper may be rotated to certain selected positions without the necessity of bodily shifting the entire base structure. Parallel rack-guiding members or standards *f* are mounted upon the upper and rotatable half $a^1$ of the foundation *a*, these rack-guiding members being held a fixed distance apart by means of their mounting upon the movable element $a^1$ of the base structure and by means of the distance-preserving device $f^1$ at the upper portion of the structure, distance preserving device $f^1$ being merely a cleat that is secured to the members *f* to hold the same a fixed distance apart. A vertically movable rack bar *g* is disposed between the members *f f* and is guided thereby in vertical travel, the opposed faces of the members *f f* desirably having vertically disposed grooves which receive ribs $g^1$ $g^2$, whereby the rack bar *g* is confined to a straight line vertical movement.

The standards *f* support a bracket structure *h* that affords a journal mounting for an actuating pinion *i* in mesh with the teeth of the rack bar *g* (Fig. 1). The shaft of the pinion *i* is made square at $i^1$ so as to be adapted to engage a correspondingly-shaped opening in an operating handle which is desirably removably located upon the portion $i^1$. When the operating handle is in position, the pinion may be turned in one direction or the other to elevate or lower the rack bar *g*, the structure shown in Figs. 1, 3 and 4 being employed to hold said rack bar in its position of vertical adjustment. The said structure shown in Figs. 1, 3 and 4 includes a pivotally mounted locking dog or detent *k* which may be swung into and out of alinement with teeth *l* formed upon the rib $g^2$. When the rack bar is to be elevated or lowered, the detent *k* is swung out of position, and when said rack bar has been brought to the selected position, said detent *k* is swung back until it engages one

of the teeth $l$, whereby the descent of the rack bar is thereafter prevented.

The rack bar $q$ supports at its upper end a suitable grapple-carrying beam $m$, which, in the embodiment of the invention illustrated, extends upon both sides of said rack bar and is provided with sheaves or pulleys $o$ and $p$ located at the ends of the grapple-supporting element $m$, whereby, by means of the cable or rope $q$ and mechanism to be described, the grappling mechanism $r$ which is adapted to engage the load to be lifted, lowered or transposed, may be operated. The rope $q$ at one end is connected with suitable winding mechanism to be described and is anchored at its other end to an eye $s$ provided beneath the beam $m$. The grappling mechanism $r$ is desirably of usual construction, having pivotally united crossed members whose upper ends are carried by pulley mechanism $t$ rolling within a bight of the rope $q$. When the grappling mechanism $r$ is to be engaged with a load, the lower portions of the tong-shaped members are spread apart sufficiently to enable the hook portions thereof to engage the load, whereafter an elevation of the rope $q$ will force the lower portions of the tong-shaped members together, thereby enabling the same to engage the load, whereafter the load may be swung merely by rotating the structure upon the lower half of the base element $a$ or may be shifted by bodily moving the structure upon the casters $c$ and which load may be elevated or lowered by operating the pinion $i$, it being understood, of course, that the load may also be elevated and lowered by taking up or paying out the rope $q$, the prime, but not the only, function of the mechanism that adjusts the position of the beam $m$ being to approximately adjust the height to which or from which the grappling mechanism $r$ may transfer a load, the load, in ordinary operation, being thereafter manipulated by the rotating or bodily movements of the structure which have been described and by taking up and paying out the rope $q$.

Where the structure is to be used within the interior of a building and is to be adapted to be projected through the building, in order that loads upon the exterior of the building may be manipulated, I desirably provide the beam $m$ with a supporting strut $u$ pivotally mounted beneath the beam $m$ and connected therewith and provided with an angular formation at its lower end adapted to engage with a sill $u^1$.

In the embodiment of the invention shown and particularly described, I provide the grappling mechanism $r$ with roller mechanism $v$ (Figs. 1, 8 and 9), so that violent contact of the grappling mechanism or load with the wall of the building may thereby be avoided, the roller mechanism $v$ further preventing the load and grappling mechanism from scraping the wall as said load and grappling mechanism are moved.

As mechanism for taking up and paying out the rope $q$, I prefer the structure illustrated most clearly in Figs. 1, 6 and 7, which includes a rope-winding drum $w$ journaled upon a bracket structure $w^1$ carried by the standard structure $f$. The operating handle $x$ is illustrated upon the shaft of a pinion $x^1$ that is in mesh with a spur-gear $x^2$ fixed upon and co-axial with the drum $w$, a turning movement imparted to the handle operating the pinion $x^1$, thereby occasioning the rotation of the spur-gear $x^2$ together with the drum $w$ fixed with respect to said spur-gear. The pinion $x^1$ being of smaller diameter than the spur-gear $x^2$, increases the power transmitted from the handle $x$ to the winding drum. The drum $w$ about which the rope $q$ is to be wound has fixed thereupon a ratchet $y$ whose teeth are adapted to be engaged by a locking pawl or detent $y^1$ that is pivotally mounted upon the same bracket structure that carries the drum $w$. A braking-wheel $z$ is fixed upon and concentric with relation to the winding drum $w$ and is designed to coöperate with a shoe $z^1$ of a brake, which brake-shoe is fixed with respect to the detaining pawl $y^1$, the elements $y^1$ and $z^1$ being together mounted upon a common pivot $z^2$. When the rope is being wound about the drum $w$, the pawl $y^1$ will automatically escape the teeth of the ratchet wheel $y$, but when lifting action upon the load is removed, the load will tend to rotate the wheel $y$ in an opposite direction, the detaining pawl $y^1$ thereupon exercising its office to prevent the unwinding of the drum $w$. When it is desired to pay out rope to lower the load carried by the grappling mechanism $r$, I may release the engagement between the ratchet wheel $y$ and the detaining pawl or locking dog $y^1$, but in order that the descent of the load may not be too abrupt, the rotation of the drum $w$ is to be checked by means of the braking mechanism $z$ $z^1$. The pawl mechanism $y^1$ and the brake mechanism $z^1$ are desirably provided with a common actuating handle $z^3$, by the movement of which in one direction the pawl $y^1$ may be disengaged from the teeth of the wheel $y$ and the brake-shoe $z^1$ may be moved toward the brake-wheel $z$. A movement of the handle $z^3$ in the reverse direction causes the brake-shoe $z^1$ to recede, a sufficient movement of the handle $z^3$ in this reverse direction permitting of the reëngagement of the locking pawl $y^1$ with the ratchet wheel $y$. The relation of the elements $y^1$ $z^1$ is such that the element $z^1$ may not be applied to the braking-wheel $z$ until an appreciable time after the pawl $y^1$ has been disengaged from the ratchet wheel $y$. If desired, the handle $x$

may be grasped to check the rotation of the drum $w$ during the interval existing between the time that the pawl $y^1$ is disengaged from the wheel $y$ and the brake-shoe $z^1$ is brought into engagement with the brake-wheel $z$. Thereafter, by suitable manipulation of the handle $z^3$, the descent of the grappling mechanism and the load carried thereby may readily be regulated.

Inasmuch as the apparatus of my invention is preferably constructed in portable form, I preferably provide in association therewith a handle structure illustrated in Figs. 1 and 2 including a handle bail A carrying the handle grip B at one end and pivoted at its other end to the bases of segmental locking plates C mounted upon the standards $f^1$, said handle bail and segmental locking plates being provided with apertures that may be brought into register to permit of the reception of locking pins D, whereby the handle structure may be adjusted at convenient angles.

Suitable bracing mechanism E intervenes between the base member $a^1$ and the standards $f$, there being desirably four struts included within the bracing mechanism E that unite the element $a^1$ with the standards. An additional bracing device $E^1$ is interposed between the lower end of the rack bar $g$ and the beam $m$. The bracing mechanism E uniting the standards $f$ with the base element $a^1$ and the bracing mechanism $E^1$ uniting the rack bar $g$ with the beam $m$, coöperate to secure a very rigid inter-relation of the beam $m$, the standards $f$ and the base element $a^1$, even though the beam $m$ be elevated. For purpose of shipment and storage, the upper end of the brace $E^1$ is desirably separable from the beam $m$ and the beam $m$ is desirably in movable or separable relation with the rack bar $g$, whereby these parts may be collapsed.

While I have herein shown and particularly described the preferred embodiment of my invention, I do not wish to be limited to the precise construction shown, as changes may readily be made without departing from the spirit of my invention.

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

1. Hoisting mechanism including a base, standards supported upon the base, a rack bar guided by the standards in vertical movement and located between the standards, mechanism for effecting vertical movement of the rack bar, a load-supporting beam carried by the rack bar at its upper end, a brace intervening between the beam and the rack bar, and bracing mechanism intervening between the standards and the base of the structure.

2. Hoisting mechanism including a base, standards supported upon the base, a rack bar guided by the standards in vertical movement and located between the standards, mechanism for effecting vertical movement of the rack bar, a load-supporting beam carried by the rack bar at its upper end, a brace intervening between the beam and the rack bar, bracing mechanism intervening between the standards and the base of the structure, and rope and pulley mechanism carried by the beam.

3. Hoisting mechanism including a rotatable base, standards supported upon the base, a rack bar guided by the standards in vertical movement and located between the standards, mechanism for effecting vertical movement of the rack bar, a load-supporting beam carried by the rack bar at its upper end, a brace intervening between the beam and the rack bar, and bracing mechanism intervening between the standards and the base of the structure.

4. Hoisting mechanism including a rotatable base, standards supported upon the base, a rack bar guided by the standards in vertical movement and located between the standards, mechanism for effecting vertical movement of the rack bar, a load-supporting beam carried by the rack bar at its upper end, a brace intervening between the beam and the rack bar, bracing mechanism intervening between the standards and the base of the structure, and rope and pulley mechanism carried by the beam.

5. Hoisting mechanism including a base, standards supported upon the base, a rack bar guided by the standards in vertical movement and located between the standards, mechanism for effecting vertical movement of the rack bar, a load-supporting beam carried by the rack bar at its upper end, a brace intervening between the beam and the rack bar, bracing mechanism intervening between the standards and the base of the structure, and a carrier for the base provided with casters whereby the base may be bodily shifted.

6. Hoisting mechanism including a base, standards supported upon the base, a rack bar guided by the standards in vertical movement and located between the standards, mechanism for effecting vertical movement of the rack bar, a load-supporting beam carried by the rack bar at its upper end, a brace intervening between the beam and the rack bar, bracing mechanism intervening between the standards and the base of the structure, rope and pulley mechanism carried by the beam, and a carrier for the base provided with casters whereby the base may be bodily shifted.

7. Hoisting mechanism including a rotatable base, standards supported upon the base, a rack bar guided by the standards in vertical movement and located between the standards, mechanism for effecting vertical

movement of the rack bar, a load-supporting beam carried by the rack bar at its upper end, a brace intervening between the beam and the rack bar, bracing mechanism intervening between the standards and the base of the structure, and a carrier for the base provided with casters whereby the base may be bodily shifted.

8. Hoisting mechanism including a rotatable base, standards supported upon the base, a rack bar guided by the standards in vertical movement and located between the standards, mechanism for effecting vertical movement of the rack bar, a load-supporting beam carried by the rack bar at its upper end, a brace intervening between the beam and the rack bar, bracing mechanism intervening between the standards and the base of the structure, rope and pulley mechanism carried by the beam, and a carrier for the base provided with casters whereby the base may be bodily shifted.

In witness whereof, I hereunto subscribe my name this thirteenth day of November A. D., 1908.

GEORGE W. MURRAY.

Witnesses:
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L. G. STROH.