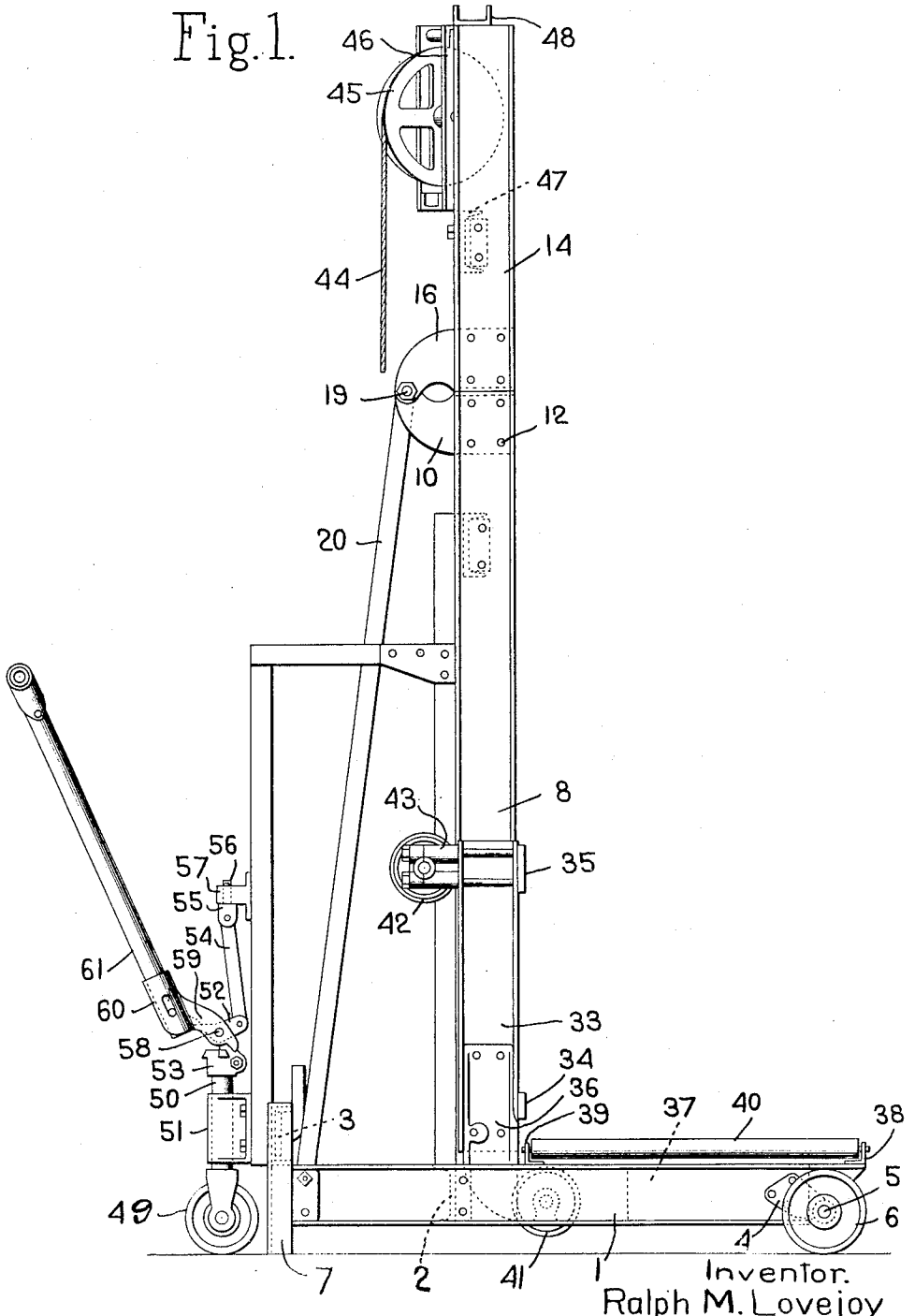
April 26, 1927. 1,626,141

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STANDARD LOCKING MECHANISM FOR HOISTING MACHINES

Original Filed July 12, 1922 2 Sheets-Sheet 1

Fig. 1.



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Fig.2.

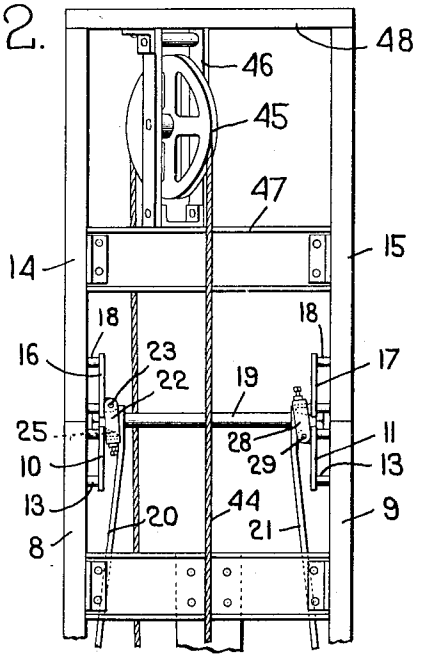


Fig.3.

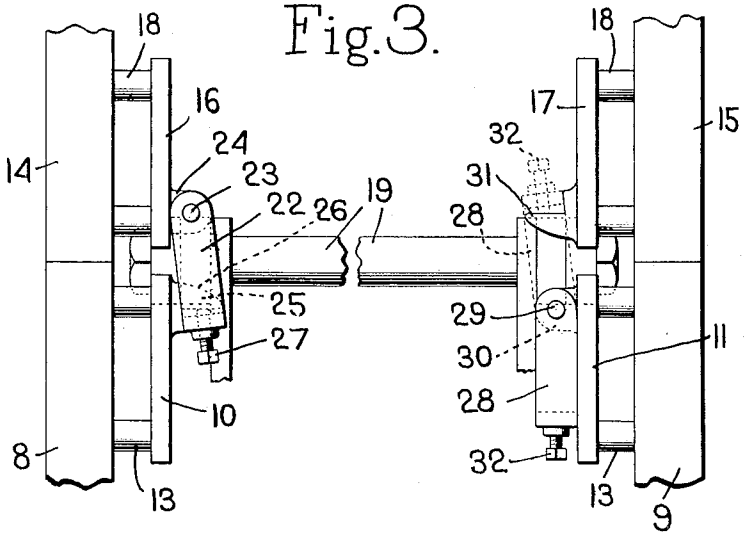
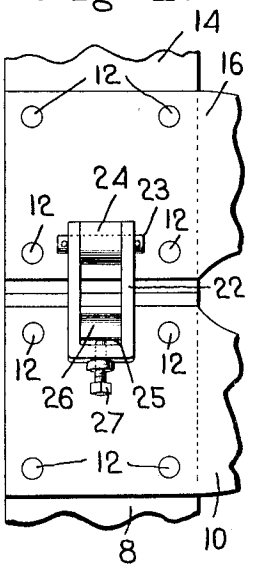


Fig.4.



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UNITED STATES PATENT OFFICE.

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STANDARD-LOCKING MECHANISM FOR HOISTING MACHINES.

Original application filed July 12, 1922, Serial No. 574,517. Divided and this application filed February 7, 1925. Serial No. 7,508.

This invention relates to improvements in hoisting devices having load supporting means adapted to be raised and lowered to receive and discharge loads. Such hoisting devices when constructed to raise loads to a considerable height require standards of such length that the hoisting machine cannot be passed through doorways and under low ceilings without being dismantled, or provided with sectional upright standards adapted to be raised into and lowered from extended position. Usual vertical standards in hoisting machines are formed in sections which abut at their ends and are hinged together in such a manner as to permit the upper sections of the standard to be folded downwardly. In previous constructions the standard sections when arranged in vertical alinement have been locked together by bolts extending through projections or extensions from the respective standards. When said bolts are released or removed the upper sections of the standard are free to fall and are liable to injure the operator. When the upper sections of the standard have been raised to vertical or extended position they are likely to fall while the operator is preparing to place the connecting bolts in position and accidents have occurred under such circumstances.

The object of the present invention is to provide novel mechanism for locking the standards in alinement which will automatically engage when the upper standards are raised into vertical position in alinement with the lower standards and thus avoid injury to the operator.

A further object of the invention is to provide a locking device of the character specified in which the locking mechanism can be manipulated while the operator can conveniently control the vertical standard during the time required to release the locking mechanism.

A further object of the invention is to provide locking mechanism which will more conveniently and securely retain the sections of the standard in securely locked position.

A further object of the invention is to provide a machine of this character with a plurality of means for locking the sections of the standard together when in alinement which cannot be simultaneously or accidentally unlocked so that accidental falling of the standard will be prevented.

Other objects and features of the invention will more fully appear from the following description and the accompanying drawings and will be particularly pointed out in the claims.

In the drawings:

Fig. 1 is a side elevation of a hoisting machine of the type known as a "tiering machine" in which the standards are formed in superimposed alined vertical sections;

Fig. 2 is a detailed rear elevation of the upper portion of the hoisting machine illustrated in Fig. 1;

Fig. 3 is an enlarged detail view of the adjacent end portions of the upper and lower standard sections showing more clearly the preferred locking means forming the present invention; and,

Fig. 4 is a side elevation of the gravity operated locking device illustrated at the left in Fig. 3.

This application constitutes a division of the prior application No. 574,517 filed by me July 12, 1922 which has matured into a patent Number 1,542,067 granted June 16, 1925 and which illustrates and describes in detail the hoisting mechanism in addition to the mechanism illustrated herein.

The hoisting device illustrated in the accompanying drawings comprises a main frame having side bars 1, preferably of channel form, connected by a central transverse girder 2 which preferably is also of channel form and rests upon and is secured to the inner flanges of the side bars 1, and a front transverse girder 3, which preferably is of channel form and rests upon and is se-

cured to the upper flanges of the side bars 1. Brackets 4 secured to the rear ends of the side bars 1 are provided with suitable journals to receive a shaft 5 having wheels 6 to support the rear end of the frame. A pair of legs 7, which are secured to the front cross girder 3, serve normally to support the front end of the frame, suitable means which will hereinafter be described being provided for raising the front end of the frame when the hoisting device is to be transported from place to place.

A pair of vertical guiding standards 8 and 9 desirably are supported substantially centrally of the main frame and are secured to the cross girders 2 and are connected together adjacent their upper ends by a suitable cross girder preferably of channel form. These standards desirably are made in sections connected by hinges. In the construction illustrated herein the upper ends of the lower standard sections 8 and 9 are provided respectively with forwardly extending hinge members 10 and 11 which are secured to the hinge members by suitable bolts or rivets 12 and are spaced apart from the standard sections by sleeves 13 surrounding the bolts or rivets in order that the hinge members may not interfere with the passage of the wheels of the elevating mechanism which engage the edges of the standards as will hereinafter more fully appear.

The upper standard sections 14 and 15 when in vertical position are superimposed upon the lower sections and are preferably in axial alinement therewith, the lower ends of the upper section abutting upon the upper ends of the lower sections. The lower ends of the upper sections are likewise provided with forwardly extending hinge members 16 and 17 which, like the hinge members of the lower sections, are riveted to the standard sections and spaced apart therefrom by spacing sleeves 18 surrounding the rivets 12. The forward ends of the hinge sections are pivotally connected by a horizontal shaft 19.

Desirably a pair of bars or braces 20 and 21, which are secured at their upper ends to the shaft 19 and at their lower ends to the side bars 2, are provided to more rigidly support the vertical standards and prevent vibration thereof.

The means for locking the standard sections together when superimposed in axial alinement are, as above stated, particularly designed to enable the upper section to be automatically retained in place when raised to a vertical position. The locking means is also so constructed that one locking mechanism may be released and moved out of locking position to enable the operator to release the other locking member while standing in a position to grasp and steady or lower the upper standard section. The purpose of this novel mechanism is to insure the locking of the upper section when raised to vertical position and to prevent accidental locking of the upper section by the operator when the locking mechanism is released.

The preferred means comprises two similar pivotally mounted locking members reversely arranged upon the upper and lower sections of the respective standards and cooperating devices upon the complementary standard sections. One of the pivotally mounted locking devices is operable by the action of gravity to lock the standard sections together when raised into axial alinement, while the other section is detachable and adapted when released to be retained out of locking position by the action of gravity.

The particular construction illustrated herein comprises a U-shaped strap or keeper 22 which is pivotally mounted upon a pintle 23 mounted in a boss 24 projecting inwardly from the hinge member 16. The strap is adapted to engage beneath the under surface or shoulder of a projection or horn 25 which extends laterally from the complementary hinge member 10. The upper portion of the projection or horn preferably is provided with a downwardly inclined or curved surface 26 which is adapted to swing the strap 22 laterally as the lower end of the upper standard section approaches the upper end of the standard section 8 until the lower or looped end of the strap swings beneath the shoulder of the projection or horn. A set screw 27, or other clamping device, is mounted upon the lower or looped portion of the strap 22 and is adapted to engage the shoulder of the horn 25 and when set up serves to lock the parts firmly in position.

The other locking device comprises a similar U-shaped strap 28 which is pivotally mounted upon a pintle 29 which is mounted in a boss 30 projecting inwardly from the hinge member 11. The strap 28 is adapted to engage the shouldered face of a projection or horn 31 which extends inwardly from the complementary hinge member 17. A set screw 32 mounted in the looped portion of the strap 28 serves when set up to clamp the parts firmly in position.

In the operation of the device, assuming that the upper sections of the standard are in lowered or folded position to enable the hoisting machine to be passed through a doorway or beneath an overhead structure and that it is desired after passing beyond such doorway or structure to raise the upper standards in alinement to enable articles to be raised to a high level, the upper section of the standard is swung upwardly into alinement with the lower section. As the upper section approaches vertical position the depending strap 22 will engage the in-

clined surface 26 of the projection or horn 25 and slip over the end of the same and then will be swung by gravity so that the lower horizontal portion of the strap will swing beneath the shoulder of the projection or horn 25 as illustrated in Fig. 3. Thus the upper section will be automatically locked against descent and accidental dropping of the upper section prevented after it has once been raised. The other strap member 28 may then be swung, from its normal depending position illustrated in full lines in Fig. 3, upwardly until its looped portion passes over the projection or horn 31, as illustrated in dotted lines in Fig. 3. The set screw 32 may then be set up so that it will effectively lock the parts in position. Likewise the set screw 27 may be set up to lock the strap 22 firmly upon the projection or horn 25. Thus the upper and lower sections of the standard are secured firmly in position.

When it is desired to lower the upper section of the standard the set screw 32 will be backed off, thus releasing the strap 28 from engagement with the projection or horn 31 whereupon the strap 28 will swing by gravity to its depending position as illustrated in Fig. 3. Thus this strap will be released and will be retained out of possible engagement with its co-operating projection or horn. The operator may then back off the set screw 27 and while holding the upper section of the standard with one hand swing the depending strap 22 out of its engagement with the projection or horn 25 and then lower the upper section of the standard, both hands being free to receive and hold the descending upper portion of the standard as the weight to be sustained increases as it is swung from vertical position. By reason of the fact that the locking strap 22 automatically engages the horn 25 when the upper standard section is raised to vertical position and also by reason of the fact that the locking members must be released separately when the upper section of the standard is to be folded down there is practically no danger of unexpected or inadvertent dropping of the upper section of the standard and the possibility of injury to the operator.

Any suitable vertically movable load supporting means may be mounted upon and guided by the vertical standards and suitable hoisting mechanism such as that illustrated in my prior application above referred to may be employed for raising and lowering the load supporting means. As illustrated herein the load supporting means is in the form of a carriage having a vertically movable frame slidably mounted upon the standards and provided with a horizontal platform. The carriage frame illustrated comprises a pair of vertical side members 33, preferably channel bars, located outside of the standards 8 and 9 and adjacent thereto with connecting cross members 34 and 35 and L-shaped platform members the vertical ends 36 of which are riveted to the vertical members 33 and the horizontal members 37 of which constitute the girders of the platform.

Any suitable platform may be mounted upon these girders. As illustrated herein the platform comprises a pair of angle bars 38 and 39 which rest upon the girders 37 and form supports for the ends of a series of rollers 40 which extend longitudinally of the platform. These rollers permit heavy articles to be readily loaded upon and removed from the platform. Of course, the rollers may if desired be suitably mounted to extend transversely of the platform or any other suitable platform provided for the particular character of work to which the hoisting machine is to be mainly adapted.

The platform is guided in its vertical movement by rollers 41 which are mounted in brackets in the horizontal web of the girders 1 and engage the front face of the vertical standards and complementary rollers 42 which are mounted in suitable journals in brackets 43 secured to the upper ends of the vertical sections 33 of the platform frame and engage the opposite face of the vertical standards.

Any suitable hoisting mechanism may be provided such as a cable 44 secured to the platform frame and passing over a sheave 45 carried by a bracket or frame construction 46 which may be conveniently mounted between a transverse girder 47 connecting the upper sections 14 and 15 of the standard and a top girder 48 also connecting the sections 14 and 15. The cable which passes over the sheave 45 is connected to a windlass which may be actuated in any suitable manner as will be readily understood by those familiar with the art.

Any suitable mechanism may be employed for raising the front end of the hoisting machine so that it, as well as the rear end of the machine, may be supported upon wheels to enable the machine to be moved from place to place. A novel and convenient construction which is illustrated herein comprises a steering wheel 49 having a steering post 50 which is rotatably and slidably mounted in a bracket 51 upon the front of the frame of the hoisting machine. A toggle comprising a bell crank lever 52 pivotally mounted upon the head 53 of the steering post and having one end connected to the lower end of a link 54 the upper end of which is pivotally connected to a swivel 55 having a stem 56 rotatably mounted in a bracket 57 in vertical alinement with the axis of the steering post connects the head of the steering post to the frame. The bell

crank lever is pivotally mounted upon a stud 58 upon the head of the steering post and is provided with an arm 59 which is adapted to be detachably engaged by relatively telescoping members 60 and 61 of a steering tongue so that the bell crank 52 can be actuated by the depression of the tongue to straighten the toggle and thereby lift the platform from the floor and upon sufficient downward movement of the tongue to throw the pivotal connection between the bell crank lever and link into or beyond axial alinement with the axis of the steering post and swivel and thereby retain the tongue in elevated position.

The construction is also such that by relatively moving the telescoping members of the steering tongue the tongue can be detached from the bell crank lever and raised and lowered freely when it is desired to pull or to push the truck. By reason of the vertical alinement of the axis of the steering post and swivel the front end of the truck may be elevated or lowered with the tongue in any steering position. Inasmuch, however, as the steering mechanism forms no part of the invention claimed in this application further detail description of the same is unnecessary.

It will be understood that the embodiment of the invention herein is of an illustrative character and is not restrictive and that the mechanisms herein claimed may be adapted for other purposes than in a hoisting machine within the spirit and scope of the following claims.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is:

1. In a hoisting machine comprising a frame, a vertical guiding standard mounted thereon comprising a lower section, an upper section pivotally mounted thereupon and movable into alinement therewith to form an extension of said lower section, releasable locking means comprising relatively movable members upon the respective sections of said standard automatically movable into engagement when the sections are in extended position and adjustable means operable to clamp said locking means in locked position, and vertically movable load supporting means mounted upon said standard.

2. In a hoisting machine comprising a frame, vertical guiding standards mounted thereon each formed of a lower section and an upper section hinged to the lower section, co-operating releasable locking means upon said standard sections movable into engagement by the action of gravity when the upper sections are swung into vertical alinement with the lower sections and vertically movable load supporting means mounted upon said guiding standards.

3. In a hoisting machine comprising a frame, vertical guiding standards mounted thereon each formed of a lower section and an upper section hinged to said lower section, releasable locking means for connecting said standard sections when in vertical alinement comprising a strap pivotally mounted upon the upper section and a shouldered projection on the lower section having a curved upper surface positioned to deflect said pivoted strap laterally as the upper section is swung down toward vertical position and to permit said strap to swing beneath its shoulder by the action of gravity when the upper section is in alinement with the lower section and a vertically movable load supporting means mounted upon said guiding standards.

4. In a hoisting machine comprising a frame, vertical guiding standards mounted thereon each formed of a lower section and an upper section hinged to said lower section, releasable locking means for connecting said standard sections when in vertical alinement comprising two pairs of oppositely arranged pivotally mounted gravity actuated locking devices one of which tends normally to move into locking position when the upper section is swung into vertical alinement with the lower section and the other of which tends normally to swing away from locking position and means for securing the respective members in locking position and vertically movable load supporting means mounted on said guiding standards.

5. In a hoisting machine comprising a frame, vertical guiding standards mounted thereon each formed of a lower section and an upper section hinged to said lower section, releasable locking means for connecting said standard section when in vertical alinement comprising a strap pivotally mounted upon the upper section of one of said standards and a shouldered projection on the lower section of said standard having a curved surface to deflect said pivoted strap laterally as the upper section is swung upwardly toward vertical position and to permit said strap to swing beneath its shoulder by the action of gravity and a set screw in said strap to engage the under face of said lug and operable to clamp the sections rigidly in position.

6. In a hoisting machine comprising a frame, vertical guiding standards mounted thereon each formed of a lower section and an upper section hinged to said lower section, releasable locking means for connecting said standard sections when in vertical alinement comprising a strap pivotally mounted upon the upper section of one of said standards and a shouldered projection on the lower section of said standard having a curved surface to deflect said pivoted strap laterally as the upper section is swung upwardly toward vertical position and to per-

mit said strap to swing beneath its shoulder by the action of gravity and a set screw in said strap to engage the under face of said lug and operable to clamp the sections rigidly in position, a strap pivotally mounted upon the lower section and a shouldered projection upon the upper section adapted to be engaged by said strap and a set screw in said strap adapted to engage the shoulder of said projection and operable to clamp the sections rigidly in position.

In testimony whereof, I have signed my name to this specification.

RALPH M. LOVEJOY.