Feb. 24, 1931. A. H. E. LIBERGE 1,794,306

AUTOMATIC LIFTING DEVICE

Filed Sept. 30, 1929 2 Sheets-Sheet 1

Fig. 1.

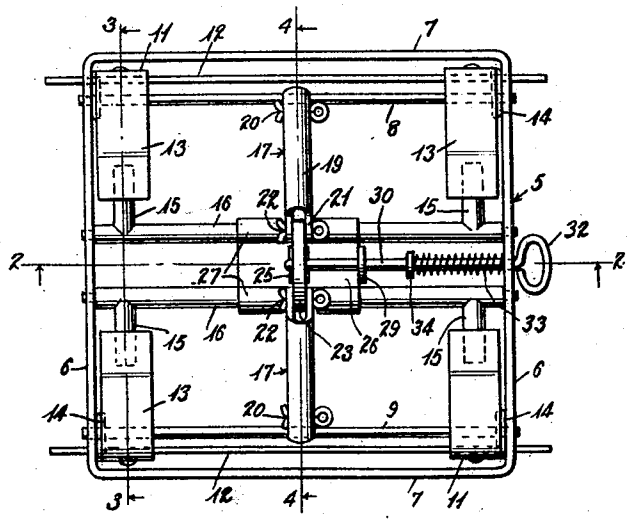


Fig. 2.

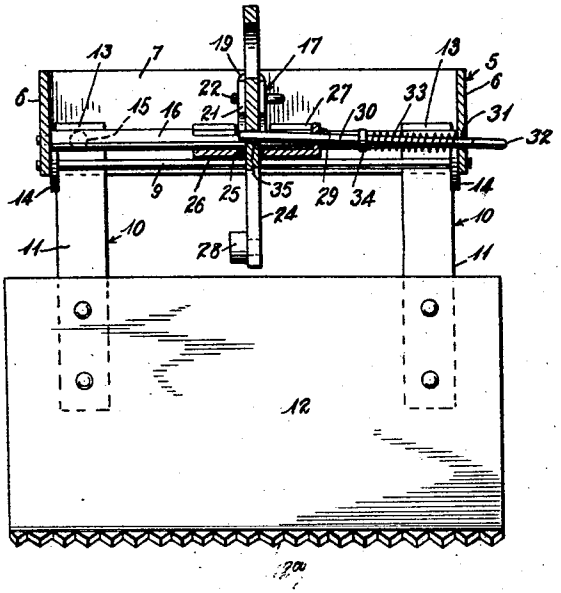
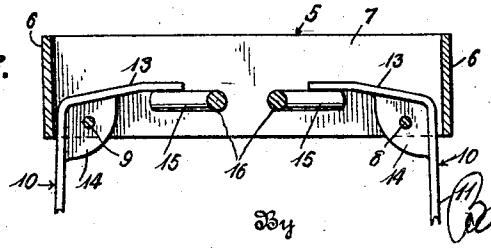


Fig. 3.



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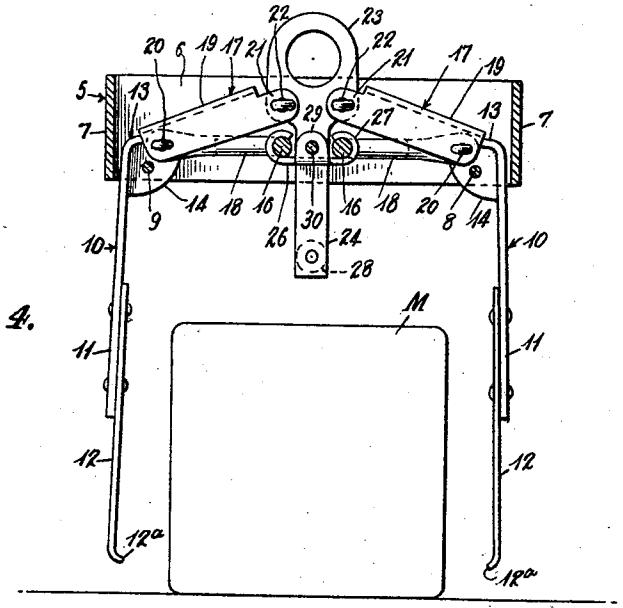


Fig. 4.

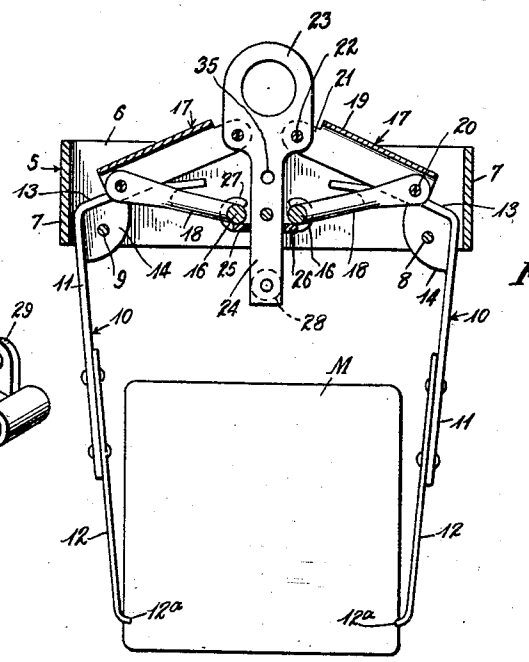


Fig. 6.

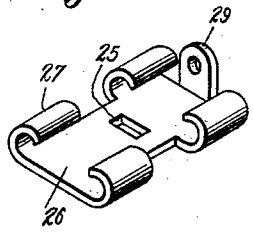
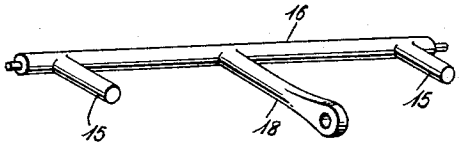


Fig. 5.

Fig. 7.



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UNITED STATES PATENT OFFICE

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AUTOMATIC LIFTING DEVICE

Application filed September 30, 1929. Serial No. 396,365.

This invention relates to new and useful improvements in automatic lifting devices and deals particularly with a lifting device adapted for the manipulation of piled up or stacked materials.

The primary object of the invention is to provide a lifting device designed for being handled or actuated by means of a power or manually operable hoisting mechanism, such as a boom equipped with a suitable form of cable hoist, the said lifting device being designed especially for the manipulation of materials arranged in orderly piles or stacks.

A further object of the invention is to provide an automatic lifting device of the above mentioned type which may be lowered into a proper position with respect to a stack or pile of material and automatically moved into lifting or gripping engagement with said material.

A further object of the invention is to provide a lifting device, for piled or stacked material, which is of a material gripping type as distinguished from a scooping type of lift.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this specification and in which like numerals are employed to designate like parts throughout the same,

Fig. 1 is a top plan view of the automatic lifting device embodying this invention,

Fig. 2 is a vertical sectional view taken upon line 2—2 of Fig. 1,

Fig. 3 is a detail vertical sectional view taken upon line 3—3 of Fig. 1,

Fig. 4 is a vertical sectional view taken on line 4—4 of Fig. 1,

Fig. 5 is a similar view to Fig. 4 but illustrates the material gripping members in lifting engagement with a stack of material, and

Figs. 6 and 7 are detail perspective views of structural elements embodied in the lifting device.

In the drawings, wherein for the purpose of illustration is shown a preferred embodiment of the invention, the numeral 5 designates a hollow frame portion which functions as the main body part of the lifting device. Suitably mounted in the end walls 6 of the frame, and adjacent the side walls 7 are the parallel shafts 8 and 9. These shafts have rigidly secured thereto the intermediate portions of angle brackets 10. These brackets each include a depending branch 11 secured at its lower end to a material engaging or gripping panel or plate 12. The remaining branch 13 of each bracket 10 extends substantially at right angles to the branch 11 and is directed toward the transverse center of the frame 5. Figs. 3 to 5 inclusive disclose a web portion 14 which is positioned in the angle of each bracket 10 and has the shaft 8 or 9 passed therethrough.

It will be noted that the shafts 8 and 9 support the material gripping or engaging panels 12 in depending relation with respect to the frame 5 and in substantial parallelism with respect to each other. It is to be understood that the shafts 8 and 9 may be rigidly connected to the webs 14 of the brackets 10 and the ends of the said shafts journaled in the end walls 6 of the frame 5 or the shafts may be immovably connected to the frame at their ends and with the webs rotatably associated with the shafts. The principle of operation of this lifting device necessitates the pivotal connection of the lifting panels with respect to the frame 5. In view of this fact, any other suitable form of connection may be employed.

By inspecting Figs. 2 and 3, it will be noted that the four brackets 10 are arranged with their branches 13 extending laterally inwardly toward the transverse center of the frame 5. These branches are engaged by arms 15 formed on the rock shafts 16. The said shafts are journaled at their ends in the end walls 6 of the frame 5 and are arranged in parallelism with respect to each other.

Each rock shaft 16 is provided with a toggle joint 17 which includes an arm 18 rigidly connected to its respective rock shaft 16 and a link 19 connected to the free end of the arm 18 to form the knee of the joint. The link 19 is of channel formation and straddles the free end of the arm 18, being

pivotally connected thereto by the pin 20. The opposite sides of the channel formation are extended to provide apertured ears 21 for receiving the pivot pins 22 by means of which the toggle joints 17 are connected to a hoisting eye 23.

This hoisting eye is formed with a depending stem or shank 24 which passes through a guiding slot 25 formed in a lock plate 26. This plate is provided with four curved lugs 27 which partially encircle the rock shafts 16 for properly positioning the said plate. The shank or stem 24 of the hoisting eye is provided with a stop pin 28 at its lower end and this stop pin functions to limit the upward movement of the stem or shank with respect to the lock plate 26. It will be understood that when the pin 28 engages the lower face of the plate 26, further upward movement of the hoisting eye will be prevented.

The locking plate 26 is formed with a perpendicularly extending, apertured ear 29 which is arranged at one end of the plate. The aperture of this ear is intended to slidably receive a locking pin or bolt 30 which also passes through an aperture 31 formed in one of the end walls 6 of the frame 5. The pin or bolt 30 is formed with an operating handle 32 at its free end and is encircled by an actuating spring 33 which bears at one end against the adjacent end wall 6 and at its opposite end against an abutment 34 which is rigidly secured to the pin or bolt 30. The stem or shank 24 is formed with a bolt receiving aperture 35 intended to receive the inner end of the said pin or bolt 30.

The work engaging or gripping member 12 is illustrated in the various figures as consisting of a substantially rectangularly shaped panel or plate with laterally projecting teeth 12*a* formed on its free edge. It is to be understood that the work engaging or gripping elements may take many other different forms depending upon the kind of materials to be handled. The said elements 12 may rely entirely upon frictional contact with the materials for lifting the latter and in such a case, the inner faces of the panels may be provided with friction increasing surfaces or materials. In any event, the material engaging or gripping members should be designed so as to grip and hold piled up or stacked materials.

The operation of this automatic lifting device may be described as follows:

With the hoisting eye 23 properly connected to hoisting apparatus, not shown, and with the locking pin or bolt 30 positioned within the aperture 35 in the shank 24, the toggle joints 17 are collapsed, as best illustrated in Fig. 4, for locking the arms 15 on the rock shafts in a horizontal plane which will permit the work engaging or gripping elements to depend substantially vertically with respect to the frame and in parallelism with respect to each other. With the elements 11 so relatively positioned, the lifting device may be moved or lowered into the position illustrated in Fig. 4 with respect to a stack or pile of material M. The operator of the device then should move the locking pin or bolt 30 against the tension of the spring 33 for withdrawing the end of the element 30 from the aperture 35. This releases the stem or shank 24 and causes the weight of the lifting device to move the frame downwardly with respect to the hoisting eye 23. It is understood that the said eye is connected to a hoisting device and will not drop unless the said hoisting device is actuated to cause the eye to be lowered. This relative movement of the eye 23 with respect to the frame 5 will cause the toggle joints 17 to rock the shafts 16. This movement of the shafts will cause their arms 15 to swing upwardly and the engagement of the same with the branches 13 of the brackets 10 which support the elements 12 will cause the said material gripping elements to move so that their lower edges will approach each other. This movement of the panels or plates 12 will cause the same to grip the material M whereupon actuation of a suitable hoisting mechanism connected to the eye 23 will cause the eye to be lifted relative to the frame and its gripping panels 12 so that the said panels will be forced into tight gripping engagement with the material M. Fig. 5 discloses the teeth 12*a* as biting into the side faces of the pile or stack of material. It is to be understood, however, that the teeth 12*a* may be positioned below the bottom edges of the stack or pile of material so that the said stack may be lifted without being damaged in any way.

It is to be understood that the form of this invention herewith shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size, and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

Having thus described the invention, what I claim is:

1. A lifting device of the type described comprising a frame, an angle bracket pivotally mounted within the frame on each side thereof, a material gripping panel connected to each bracket, a pair of rock shafts journaled within the frame, arms carried by the shafts and loosely engaging the brackets for operatively connecting said rock shafts to said brackets, and hoist operated toggle devices for actuating the rock shafts for causing movement of the brackets to force the material gripping members toward each other.

2. A device of the type described comprising a frame member, a pair of load gripping members pivotally connected to the frame, a pair of closely positioned rock shafts jour-

naled in the frame substantially at its transverse center, operative connections between the rock shafts and the load gripping members including overlapping loosely engaging members for causing rocking of the shafts to move the members toward each other, and means for rocking said shafts.

3. A device of the type described comprising a frame member, a pair of load gripping members pivotally connected to the frame, a pair of closely positioned rock shafts journaled in the frame substantially at its transverse center, operative connections between the rock shafts and the load gripping members for causing rocking of the shafts to move the members toward each other, and a hoist operated toggle joint for operating each rock shaft.

4. A device of the type described comprising a frame member, a pair of load gripping members pivotally connected to the frame, a pair of rock shafts journaled in the frame, operative connections between the rock shafts and the load gripping members for causing rocking of the shafts to move the members toward each other, a toggle joint connected to each rock shaft, and a hoisting eye operatively connected to both of the toggle joints.

5. A device of the type described comprising a frame member, a pair of load gripping members pivotally connected to the frame, a pair of rock shafts journaled in the frame, operative connections between the rock shafts and the load gripping members for causing rocking of the shafts to move the members toward each other, a toggle joint connected to each rock shaft, a hoisting eye operatively connected to both of the toggle joints, and means for locking said toggle joints against operative movement.

6. A device of the type described comprising a frame member, a pair of load gripping members pivotally connected to the frame, a pair of rock shafts journaled in the frame, operative connections between the rock shafts and the load gripping members for causing rocking of the shafts to move the members toward each other, a toggle joint connected to each rock shaft, a hoisting eye operatively connected to both of the toggle joints, and locking means operatively associated with said hoisting eye for preventing actuation of the toggle joints.

7. A hoisting device of the type described comprising a hollow frame, a pair of parallel shafts mounted within the frame, a pair of angle brackets mounted on each shaft, each angle bracket having a depending branch and a laterally extending branch, a material gripping panel connected to the depending branches of the brackets mounted on each shaft, and toggle operated rock shafts carried by the frame and having arms for operating upon the laterally projecting branches of said brackets for moving the material gripping members toward each other.

8. A device of the type described comprisin a frame member, a pair of load gripping members pivotally connected to the frame, a pair of rock shafts journaled in the frame, operative connections between the rock shafts and the load gripping members for causing rocking of the shafts to move the members toward each other, a toggle joint connected to each rock shaft, a hoisting eye operatively connected to both of the toggle members, and means carried by the rock shafts and the hoisting eye for guiding the movement of the said eye.

9. A device of the type described comprising a frame member, a pair of load gripping members pivotally connected to the frame, a pair of rock shafts journaled in the frame, operative connections between the rock shafts and the load gripping members for causing rocking of the shafts to move the members toward each other, a toggle joint connected to each rock shaft, a hoisting eye operatively connected to both of the toggle joints, said hoisting eye having a depending stem, and a plate supported by the rock shafts and slidingly receiving the stem for guiding the movement of said eye.

10. A device of the type described comprising a frame member, a pair of load gripping members pivotally connected to the frame, a pair of rock shafts journaled in the frame, operative connections between the rock shafts and the load gripping members for causing rocking of the shafts to move the members toward each other, a toggle joint connected to each rock shaft, a hoisting eye operatively connected to both of the toggle joints, relatively movable means carried by the rock shafts and the hoisting eye for guiding the movement of said eye, and locking means for said relatively movable means to prevent operation of said toggle joints by said hoisting eye.

In testimony whereof I affix my signature.

ANDRÉ LIBERGE.