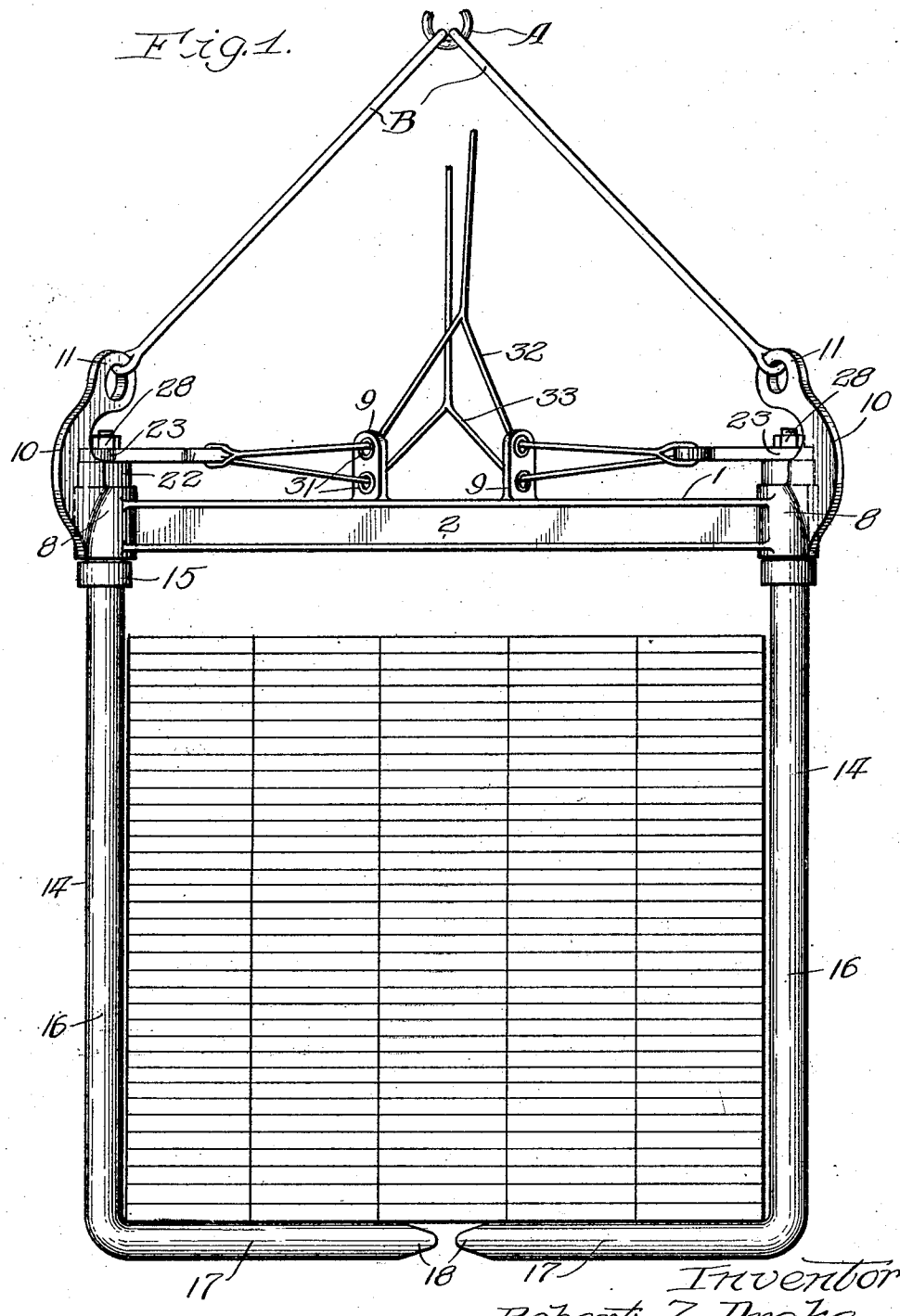
Oct. 1, 1929. R. Z. DRAKE 1,730,128

GRAB

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Fig. 1.



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Fig. 2.

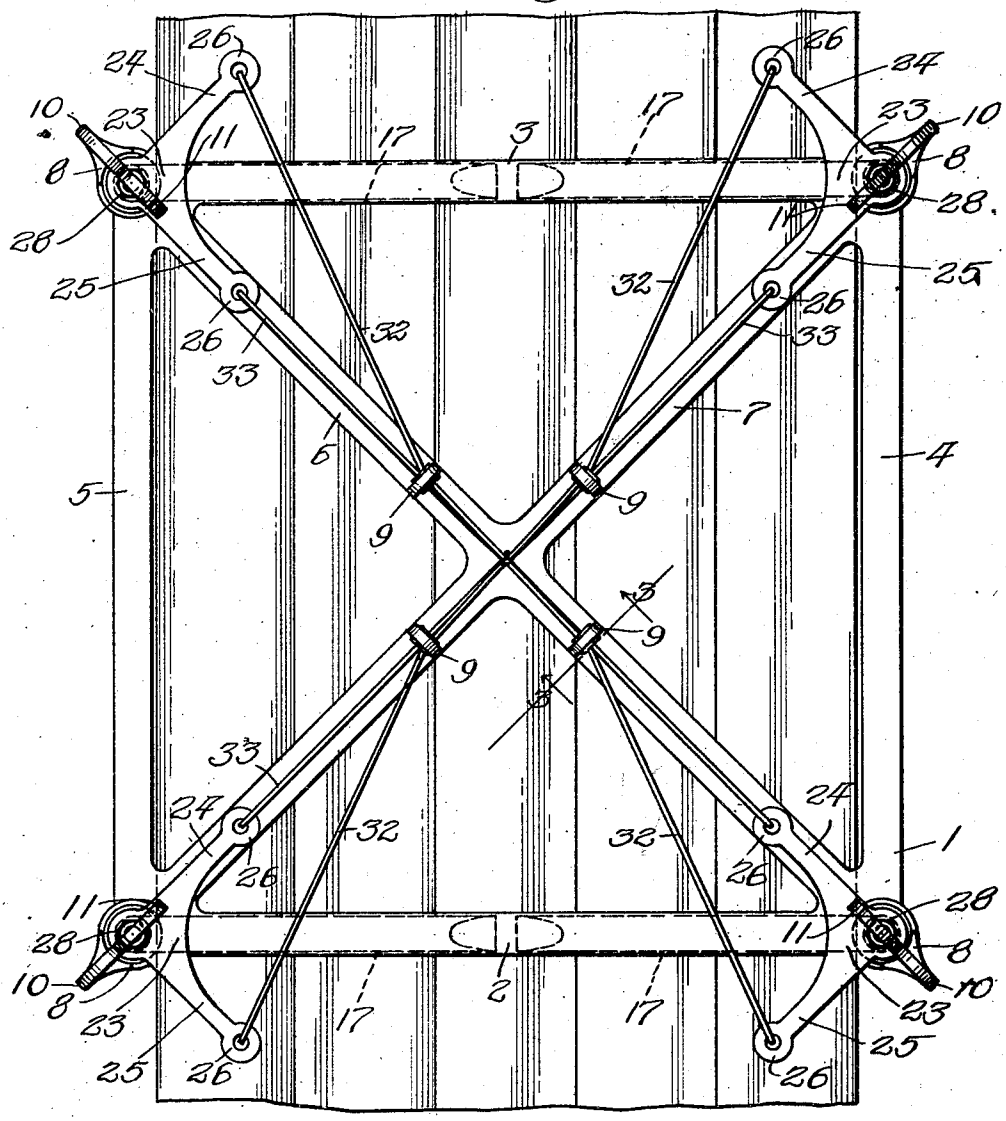


Fig. 3.

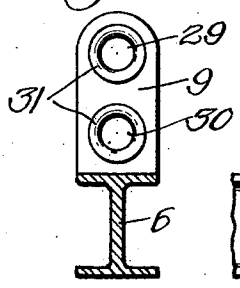
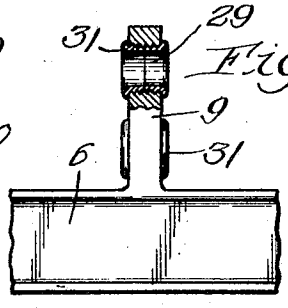


Fig. 4.



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Fig. 5.

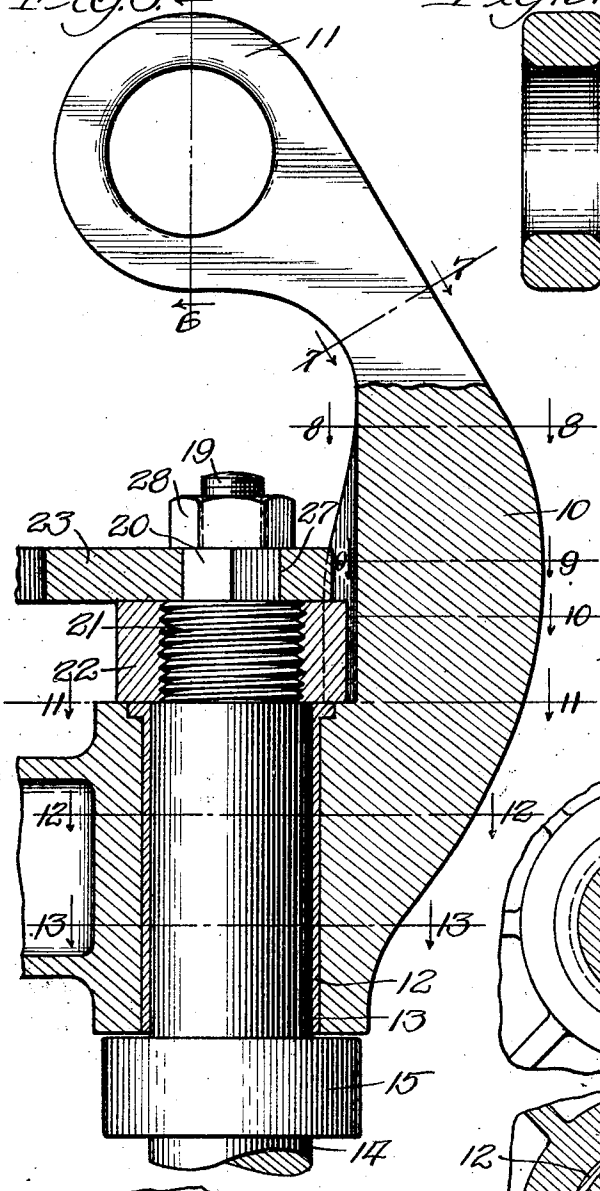


Fig. 6.

Fig. 7.

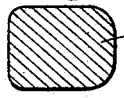


Fig. 8.



Fig. 9.

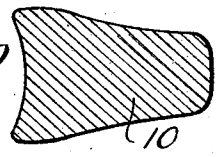


Fig. 10.

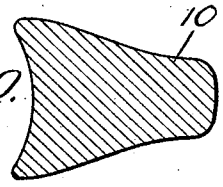


Fig. 11.

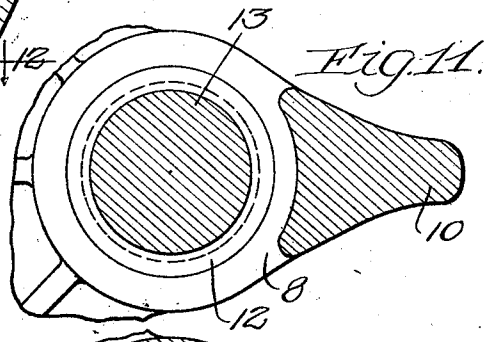


Fig. 12.

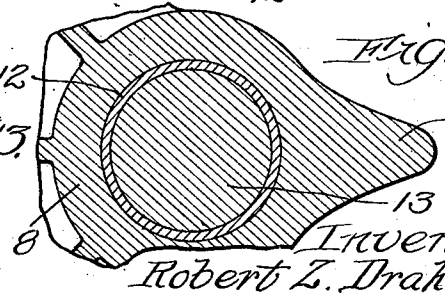
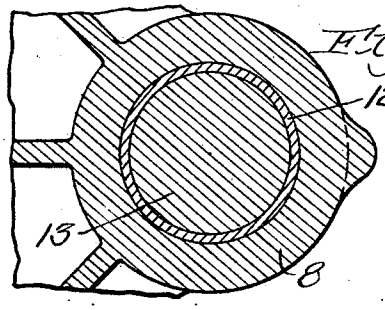


Fig. 13.



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Fig. 14.

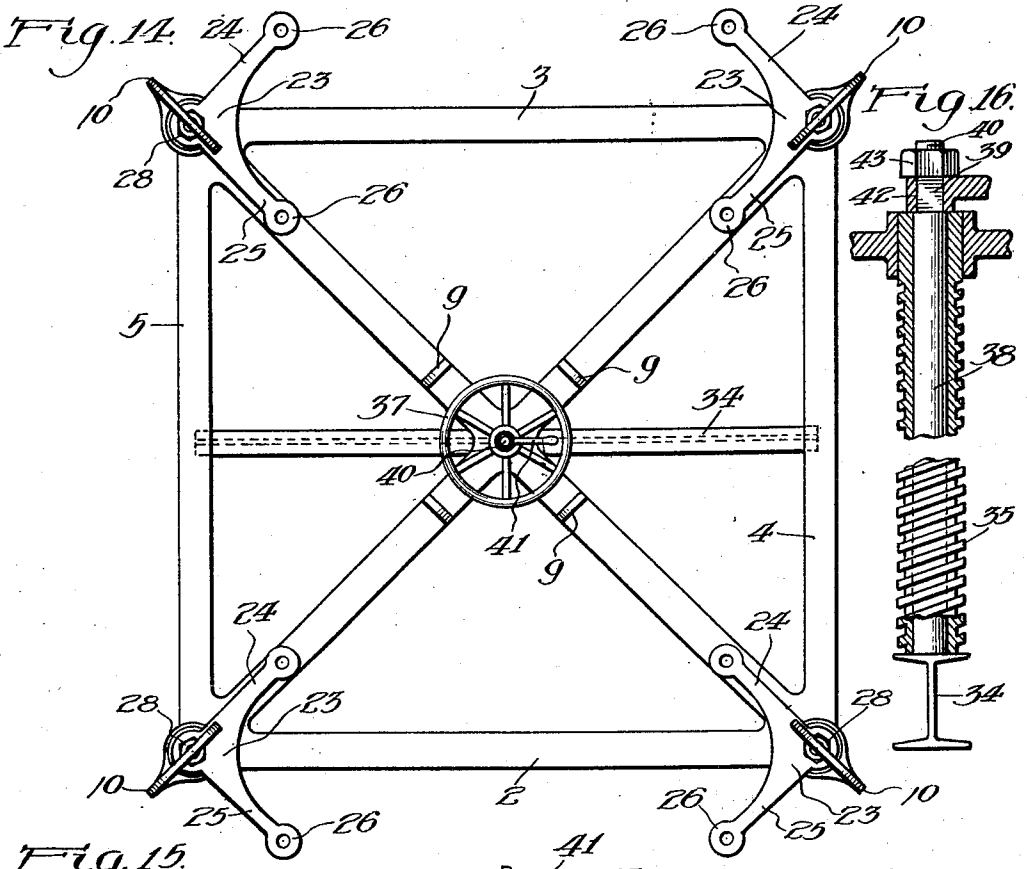
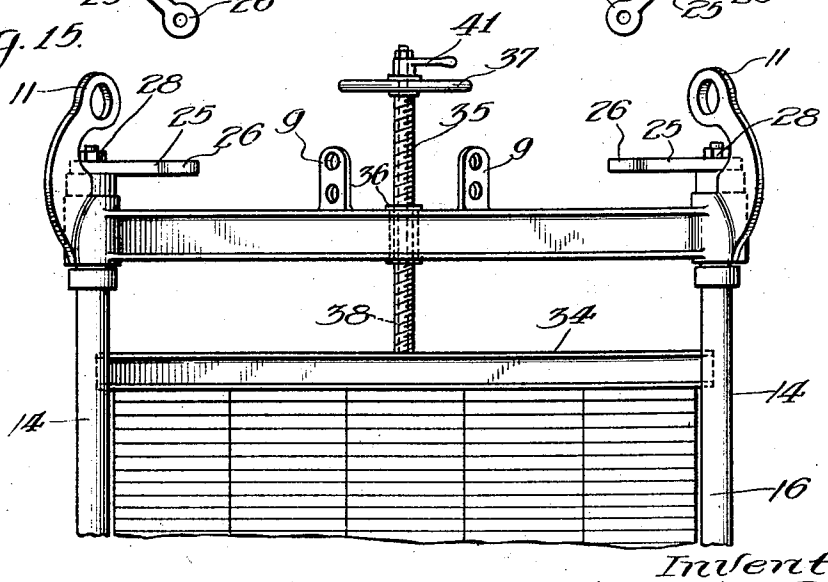


Fig. 16.

Fig. 15.



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Patented Oct. 1, 1929 1,730,128

UNITED STATES PATENT OFFICE

ROBERT Z. DRAKE, OF OMAHA, NEBRASKA

GRAB

Application filed March 31, 1928. Serial No. 266,311.

This invention relates to grabs or lifting mechanism, and more particularly to the provision of a grab for safely and expeditiously lifting and carrying large quantities of lumber, iron or other materials.

Among the objects of my invention are to provide a grab for lifting and carrying large quantities of lumber, iron or other materials, from supporting cars, trucks, platforms or the like, carrying the same to the places where it is being loaded or deposited and then quickly unloading the same; further to provide a new and improved construction of hanger arms; further to provide a new and improved construction of cast steel or other metallic frame having a maximum strength and durability; further to provide a grab or lifting mechanism of maximum simplicity, efficiency, economy, and ease of operation; and such further objects, advantages and capabilities as will later more fully appear.

My invention further resides in the combination, construction and arrangement of parts illustrated in the accompanying drawings, and while I have shown therein a preferred embodiment, I desire it to be understood that the same is susceptible of modification and change, without departing from the spirit of my invention.

In the drawings:

Fig. 1 is a view in end elevation of the grab as applied to the lifting and carrying of a stack of lumber.

Fig. 2 is a plan view of the grab, showing the means for operating the hanger arms for engaging or disengaging the object or objects that are being carried.

Fig. 3 is a view in cross section on a line 3—3 of Fig. 2.

Fig. 4 is a fragmentary view with a part thereof in cross-section, taken at right angles to Fig. 3.

Fig. 5 is a fragmentary view in side elevation with a portion thereof in cross section, showing my improved construction of supporting eyes at the corners of the frame member, and the means of attaching the hanger head and hanger arms to the frame member.

Figs. 6, 7, 8, 9, 10, 11, 12, and 13 are cross-sectional views of the supporting eyes or corner members taken on the lines 6—6, 7—7, 8—8, 9—9, 10—10, 11—11, 12—12, 13—13, respectively of Fig. 5, the cross-sectional views showing the construction of the supporting eyes or corner members.

Fig. 14 is a top plan view and Fig. 15 is a fragmentary end elevation of my grab illustrating the means for pressing down upon the stack of lumber, iron or other materials that is being moved about and locking the stack in place, thereby preventing any displacement of the material, especially when the grab is not full.

Fig. 16 is a fragmentary view partly in side elevation and partly in vertical cross-section of the central threaded shaft shown in Figs. 14 and 15.

Referring to the drawings, my improved grab or lifting mechanism comprises a frame 1. This frame is rectangular in shape and comprises the side members 2, 3, 4 and 5, and diagonal brace members, 6 and 7. At each corner of the rectangular frame is an upstanding supporting eye or corner member 8. As disclosed in Figs. 1, 2, and 5, this supporting eye or corner member is cast or formed integral with the frame thus giving it greater rigidity and strength, although the same may be cast or formed separately and attached to the frame member by any suitable means. An extension or shoulder 9 is provided on each of the four sections of the diagonal brace members 6 and 7. These extensions or shoulder members may be cast or formed integrally with said brace members or they may be formed separately and attached to said braces in any suitable manner.

As shown more clearly in Figs. 5 to 13 inclusive, the supporting eyes or corner members comprise an upstanding portion 10 and an eye 11. As clearly shown in these figures, the upstanding portion of the supporting eye or corner member gradually merges to a thickened portion at the center thereof and then gradually decreases in cross-sectional area until it reaches the portion disclosed in Fig. 7, and as marked 7—7 on Fig. 5, and then the same gradually merges into the eye member 11. A bushing 12, usually of brass or similar material, is inserted in the open-

ing 13 of the lower portion of the supporting eye or corner member. The opening 13 and bushing 12 are adapted to receive a hanger arm 14. Attached to the hanger arm 14 is a collar 15, held in place by welding or other suitable means.

The hanger arm comprises a vertical member 16, the lower end of which is bent at right angles thereto so as to form a horizontal portion 17 to provide a holding means. This horizontal portion 17 is provided with a tapered end 18. The taper is at the upper and bottom portions and because of the tapered or sharpened end portion, the hanger arm may be more readily inserted or swung beneath a pile of lumber or other material. The vertical portion of the hanger arm is provided at its upper end with a reduced threaded portion 19. Directly below the reduced threaded portion is another reduced portion in the form of a rectangle 20, the purpose of which will be later more fully explained. Below the rectangular portion 20, is another threaded portion 21, the cross-section of which is slightly less than the cross-section of the hanger arm. This larger threaded portion 21, is adapted to receive a threaded collar 22 for holding the hanger arm in engagement with the supporting eye of the frame member.

A hanger head or bell crank 23 is provided with arm members 24 and 25, each of which is provided with an eye 26. A rectangular opening 27 in the hanger head or bell crank is adapted to engage with the rectangular portion 20 of the hanger arm, as clearly shown in Fig. 5 of the drawings, the lower portion of the hanger head resting on the upper side of the threaded portion 21 and the threaded collar 22. A lock nut 28 holds the hanger head or bell crank in place.

Each of the diagonal brace members is provided with a pair of upstanding shoulders or arm extensions 9. The construction of the arm extensions or shoulders is more clearly disclosed in Figs. 3 and 4 of the drawings. Each of these arm extensions or shoulders is provided with an upper eye 29 and a lower eye 30, each of which is provided with a ferrule 31, preferably of brass or the like. The ferrules 31 consist of two pieces threaded together and their ends swedged out and smoothed. These eyes are adapted to receive a pair of trip-lines, the upper, the long trip-line 32, and the lower, the short trip-line 33. These trip-lines engage with the eyes in the hanger heads or bell cranks 23 which are pivoted at each corner of the frame. The trip-lines are connected to suitable mechanism for tripping the same by pulling on either of the lines. As shown in Fig. 1, the hanger arms engage and hold a stack of lumber. By pulling on the long trip-line, the horizontal portion of the hanger arm would be caused to move through an arc of ninety degrees before disengaging from the lumber. The horizontal portion of the hanger arm moving through this arc would move toward the center of the rectangular frame, that is from a position shown in Fig. 2 to a position parallel to the longitudinal axis of the lumber. Thus they would move substantially ninety degrees or at right angles to their position as shown in Fig. 2. The arms of the hanger head which is engaged by the long trip-line would assume the position formerly assumed by the arm of the hanger head which engages the short trip-line, and thus the hanger head or bell crank would move through an angle of substantially ninety degrees from its original position. The swinging of all of the hanger heads or bell cranks is accomplished by substantially vertical pull on either the long or short trip-line, according to whether the lumber is to be engaged or disengaged by the horizontal portion of the hanger arms.

A lift chain or cable at A connects with the four leads B, which latter in turn engage the supporting eyes or corner members 11. Due to the pull upon the supporting eyes or corner members necessary to raise the entire frame with its cargo, these supporting eyes or corner members must be exceedingly rigid and have great strength to withstand the heavy load and pull that is being exerted upon them. Therefore, I have provided an upstanding member having the contour and cross-sectional area as clearly shown in Figs. 5 to 13 inclusive. The greatest amount of stress is sustained by the substantially central portion of the supporting eye or corner member and it is at this portion that the cross-sectional area of the member is the greatest.

In Figs. 14 and 15, is disclosed a means for pressing or exerting a force downward upon the stack of lumber, iron or other material that is being carried by the grab and preventing the displacement of the material, especially when the grab is not full. This locking means comprises a lock beam or cross arm 34 controlled by a threaded sleeve 35 passing through and in engagement with a threaded bushing 36 located in the center of the diagonal brace members 6 and 7 of the frame. A hand wheel 37 is attached to and rotates the threaded sleeve 35 for forcing the lock beam against the material being carried by the grab. A shaft 38 is attached to the lock beam, passing through the threaded sleeve 35. This shaft is reduced at its upper portion in the form of a rectangle 39 and threaded at its extreme upper end as at 40. A handle 41, provided with a rectangular opening 42 engages with the portion 39 of the shaft, and provides a means for turning the shaft and the lock beam 34 attached thereto. A lock nut 43 holds the handle in place. The handle enables the op-

erator to place the lock beam in the most desirable position to thus grip or exert a force on the load for the purpose of closely holding the same in the grab.

As clearly shown in Fig. 16, the handle rests upon the upper edge of the sleeve 35 so that said handle, the shaft 38 and the cross beam 34 move vertically together with the sleeve 35.

In the operation of my invention, the horizontal portions of the hanger arms always move horizontally and thus my invention may be applied to the lumber whether the same is in the position shown in Fig. 2 of the drawings or whether the lumber is in a position at a right angle thereto. The lift chain or cable is attached to any suitable mechanism such as a crane, hoist, winch or the like, for raising, transporting and lowering the lifting mechanism or grab from one position to another depending upon the position of the material to be moved and its destination. When a stack of lumber is to be engaged, the lifting mechanism with the horizontal axis of the hanger arm located parallel to the longitudinal axis of the material to be lifted, is lowered over the same. When the lower portions of the hanger arms are located below the lower edge of the material to be lifted, a pull on either the short or long tripline, depending upon the position of the horizontal portions of the hanger arms, will move the hanger arms under the material and in the position disclosed in Fig. 2 of the drawings. The bevelled edges of the horizontal portion of the hanger arms, will because of their narrowed ends, more easily pass under the material to be lifted. In their operative position, the horizontal portions of the hanger arms will be in a position transverse to the longitudinal axis of the material that is being lifted or moved and the same will be positively and firmly held by the arms.

When it is desired to prevent displacement of the material being carried, the lock beam 34 is manipulated by means of the wheel 37 and handle 41 and is brought into contacting relation with the top of the load held in the grab. Thus it is possible to carry any load in the grab, no matter whether the grab is full or not. The beam locks the material in the grab and prevents it from being inadvertently moved sidewise when the grab is not full.

While I have referred more particularly to the lifting and moving of stacks of lumber, I wish it to be understood that my invention is readily adapted to the lifting of material other than lumber. Furthermore, the same is adapted for a variety of uses and due to its rigid construction, extremely heavy material may be lifted and moved thereby. The operator can stand on the top of the grab and operate both the lifting device and the grab from his position.

Having now described my invention, I claim:

1. A lifting device comprising a frame member, means for raising same, a series of hanger arms pivotally held in said frame member, means for moving said hanger arms into or out of engagement with objects to be lifted, a locking member, means for locating said member in desired direction over said objects and means for applying said member upon the upper surface of said objects.

2. A lifting device comprising a frame member, means for raising same, a series of hanger arms pivotally held in said frame member, means for moving said hanger arms into or out of engagement with objects to be lifted, a locking member, a threaded member adapted to force the locking member upon said objects and supporting means rotatable relative to said threaded member for supporting said locking member.

3. A lifting device comprising a frame member, means for raising same, a series of hanger arms pivotally held in said frame member, means for moving said hanger arms into or out of engagement with objects to be lifted, a locking bar, a sleeve threading in said frame member, a supporting shaft extending through said sleeve and rotatable therein, the lower end of said shaft being rigidly attached to said bar, means for rotating said shaft and means for rotating said sleeve for the purpose of causing said bar to engage the objects being lifted.

4. A lifting device comprising a substantially rectangular frame, vertical hanger arms pivotally mounted therein, said arms having horizontal portions at their lower ends, bell crank levers mounted on the upper end of said hanger arms, guide means located diagonally with respect to said hanger arms and flexible means attached to said bell crank levers passing through said guide means whereby said levers may be operated in either direction at will, to engage or disengage objects to be lifted.

5. In a lifting device, a frame comprising a rectangular structure provided with supporting eyes in the corners thereof, hanger arms pivotally held in said frame and supporting eyes, bell cranks mounted on said hanger arms, and means for pulling either of the two levers of each of said bell cranks into predetermined directions for moving said hanger arms into or out of engagement with objects being lifted.

6. A lifting device comprising a frame constituted by rectangular and diagonal brace members, vertical hanger arms rotatably mounted at the corners of said frame, said hanger arms having horizontal extensions at their lower ends, bell cranks mounted on the upper ends of said hanger arms, guide means carried on said diagonal brace members, and flexible means connected to

said bell cranks and passing through said guide means whereby the hanger arms may be rotated to engage and disengage objects to be lifted.

7. A lifting device comprising a rectangular frame, hanger arms pivotally mounted in the corners of said frame, upstanding members at said corners integral with said frame and comprising thickened central portions and eyes at their upper end, said upstanding members curving outwardly from said frame and then inwardly thereover into a direction in substantial alignment with supporting means adapted to be engaged in said eyes.

8. A lifting device comprising a rectangular frame, hanger arms pivotally mounted in the corners of said frame and having horizontal lower portions provided with tapered ends, upstanding members at said corners integral with said frame extending outwardly therefrom and curving inwardly over the upper ends of the hanger arms and being provided at their upper ends with eyes for engagement with hoisting members.

In witness whereof, I hereunto subscribe my name to this specification.

ROBERT Z. DRAKE.