Oct. 3, 1939. J. BLEWETT 2,175,075

LIFTING MECHANISM FOR PRESS BOXES

Filed April 29, 1939 3 Sheets-Sheet 1

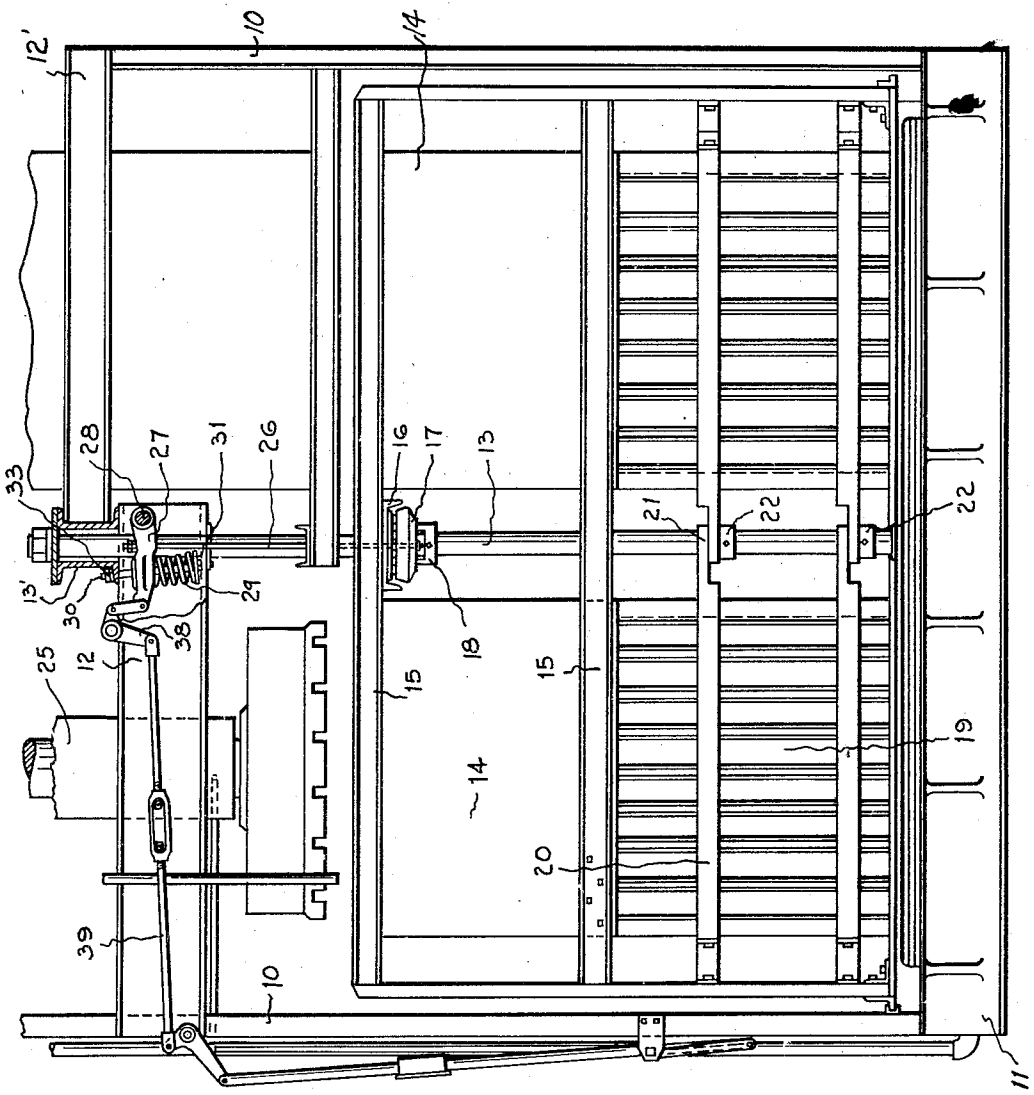


Fig. 1.

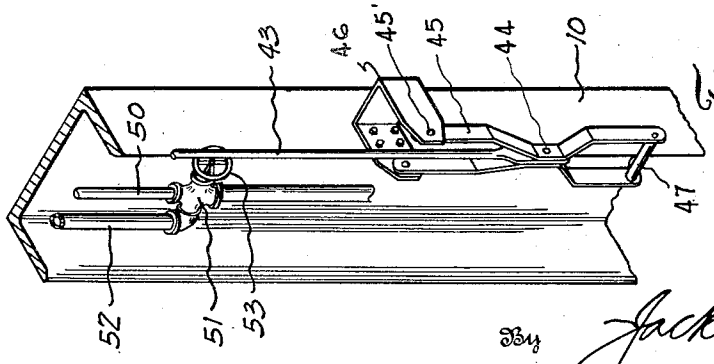


Fig. 6.

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LIFTING MECHANISM FOR PRESS BOXES

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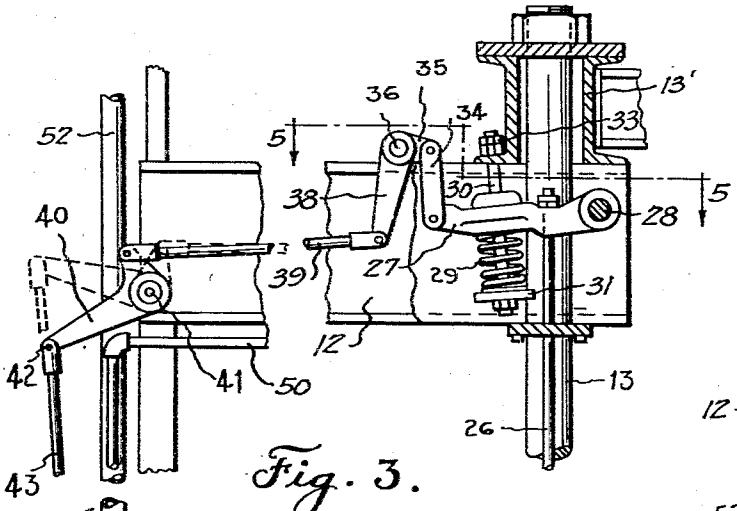


Fig. 3.

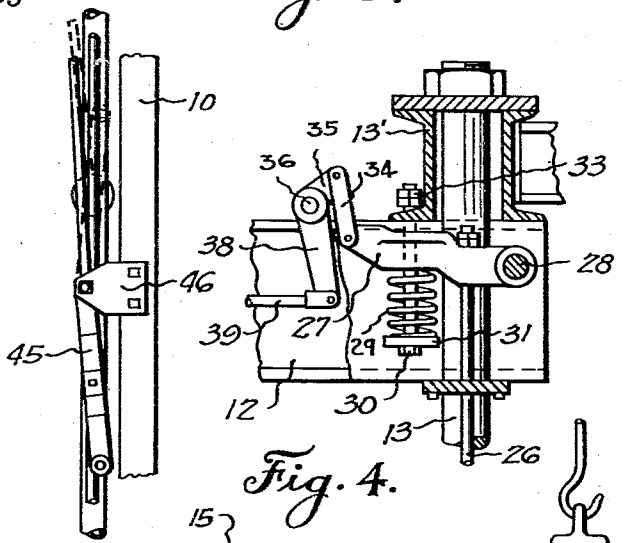


Fig. 4.

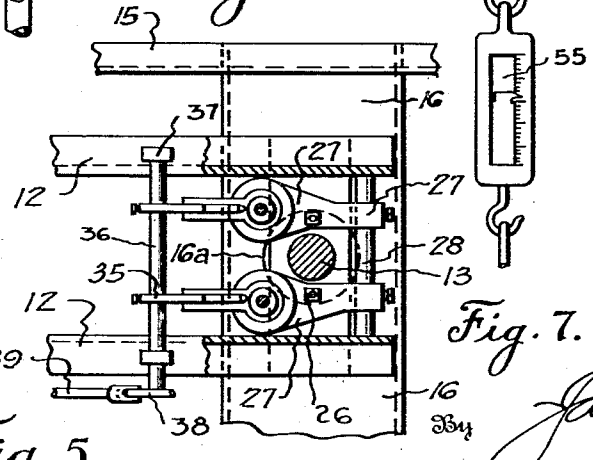


Fig. 5.

Fig. 2.

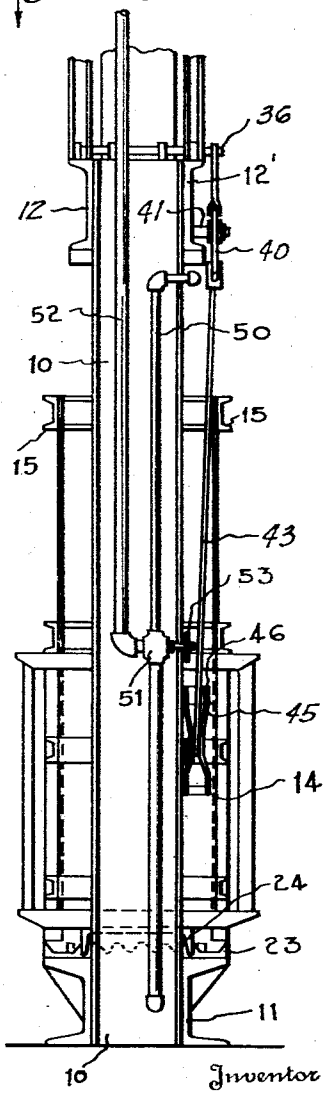


Fig. 7.

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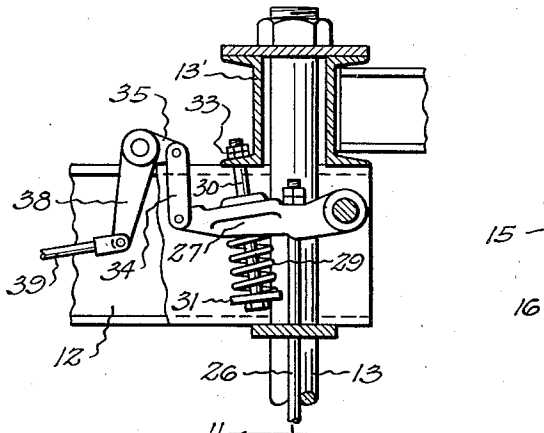
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LIFTING MECHANISM FOR PRESS BOXES

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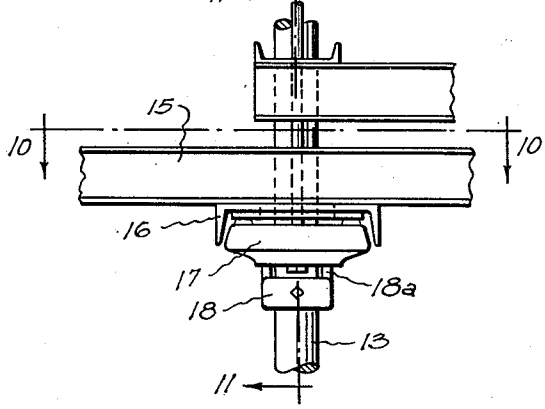


Fig. 9.

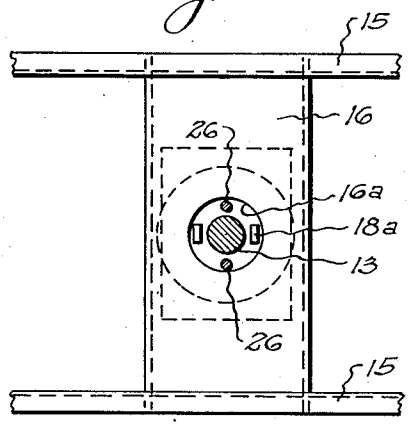


Fig. 10.

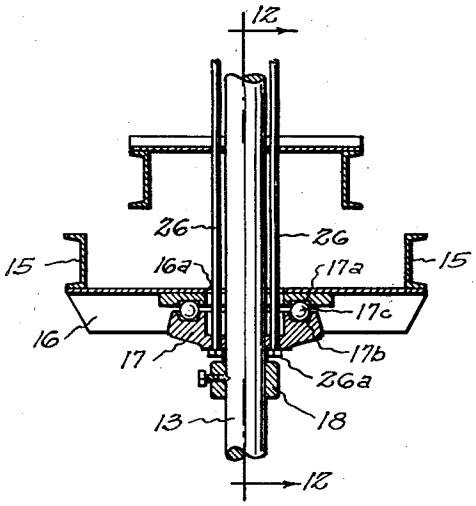


Fig. 11.

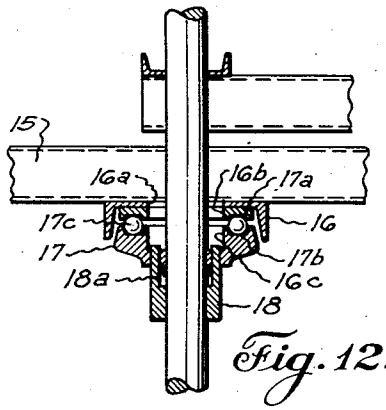


Fig. 12.

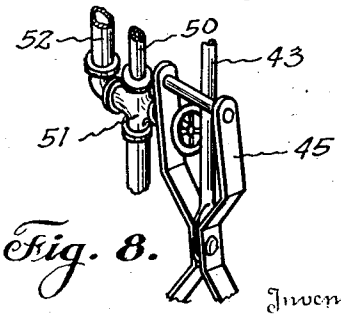


Fig. 8.

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Patented Oct. 3, 1939

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UNITED STATES PATENT OFFICE

2,175,075

LIFTING MECHANISM FOR PRESS BOXES

John Blewett, Dallas, Tex., assignor to The Murray Company, Dallas, Tex., a corporation of Texas

Application April 29, 1939, Serial No. 270,832

13 Claims. (Cl. 100—28)

This invention relates to new and useful improvements in lifting mechanism for press boxes.

One object of the invention is to provide an improved mechanism which is adapted to readily raise or lift the press boxes of a cotton press, whereby said boxes may be rotated as is the usual practice, said mechanism being simple in construction and being applicable to any standard press.

An important object of the invention is to provide an improved linkage which is connected to the press box frame so that actuation of said linkage raises or lowers said box; the linkage being manually operated and having improved counterbalancing means incorporated therein, whereby the lifting of said box may be accomplished with a minimum effort on the part of the operator.

Another object of the invention is to provide an improved mechanism for raising and lowering the boxes of a cotton press, which mechanism is so constructed that it automatically locks the boxes in an entirely raised or an entirely lowered position, whereby accidental or unintentional movement of the boxes is prevented.

A further object of the invention is to provide an improved lifting mechanism of the character described, which when applied to a press employing a hydraulic ram, coacts with the hydraulic control mechanism to prevent operation of the ram when the boxes are raised.

A construction designed to carry out the invention will be hereinafter described, together with other features of the invention.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawings, in which an example of the invention is shown, and wherein:

Figure 1 is a front elevation of a press box having a lifting mechanism, constructed in accordance with the invention applied thereto, the boxes being in a lowered position,

Figure 2 is a side elevation thereof,

Figure 3 is an enlarged elevation of the operating linkage,

Figure 4 is an elevation of the lifting arm in its raised position,

Figure 5 is a horizontal, cross-sectional view taken on the line 5—5 of Figure 3,

Figure 6 is an isometric detail of the operating lever,

Figure 7 is an elevation of a scale connected in the operating linkage,

Figure 8 is an elevation showing the operating lever swung over the hand wheel of the valve,

Figure 9 is a view, similar to Figure 3, and adding thereto the connection between the lifting rods and press box,

Figure 10 is a horizontal, cross-sectional view, taken on the line 10—10 of Figure 9,

Figure 11 is a transverse, vertical, sectional view, taken on the line 11—11 of Figure 9, and

Figure 12 is a transverse, vertical, sectional view, taken on the line 12—12 of Figure 11.

This application is filed as a continuation in part of my copending application filed August 30, 1937, Serial No. 161,538.

In the drawings, the numeral 10 designates the vertical side standards of a cotton press box frame. These standards are preferably channel members having their flanges directed outwardly and the lower end of said standards are connected by horizontally extending channel bars 11 which form the base of the assembly. The upper ends of the standards are connected by horizontal channels 12 and 12′ (Figure 1). Transverse channels 13′ are supported on the ends of the channels 12 and a vertically extending shaft 13 is mounted between these beams and the base 11. The press boxes 14 are mounted on this shaft so as to undergo rotation within the stationary frame.

As clearly shown in Figure 1, two press boxes are provided and are connected together by suitable connection members 15, which are located on each side of said box. The connecting members 15 at the tops of the boxes are fastened together by a transverse channel member 16 which member has a bearing 17 secured to its underside. The shaft 13 extends through the bearing 17 and said bearing normally rests on a supporting collar 18 which is secured on the shaft. The channel 16 is welded, or otherwise suitably secured, to the underside of the members 15 (Figures 9 to 12) and has an enlarged circular opening 16a at its central portion, through which the shaft 13 extends. As shown in Figure 10, the opening 16a is considerably larger than the diameter of the shaft. The upper, circular race 17a of the bearing 17 is formed in the underside of a rectangular plate which is fastened to the channel 16. The lower race 17b of the bearing is supported on the collar 18 and suitable balls 17c are interposed between the races. Rotation of the lower race member 17b is prevented by lugs 18a which extend upwardly from the collar 18 and engage within openings in the bottom of the race member. A circular opening 16b

is formed in the upper race plate and the upper end of the bore 16c of the lower race member 17b is enlarged, said enlarged portion being of the same diameter as the opening 16b and the opening 16a in the channel. With such arrangement, the members 15 of the boxes, as well as the boxes attached thereto, are rotatably mounted on the shaft, being rotatable on the bearing 17 which, in turn, is supported on the collar 18 secured to the shaft.

Each box is provided with a door 19 and horizontally extending bars 20 are fastened to the outer face of each door. The inner end of each of the bars 20 is formed with an extension or arm 21, which is journaled on the shaft 13. The arms are normally supported in position on such shaft by supporting collars 22 which are fixed on such shaft. Obviously, when the bars 20 are swung outwardly they will pivot on the shaft 13, whereby the doors 19 of the boxes may be opened. It is pointed out that the arms, or extensions 21 of the bars 20 are slidable vertically on the shaft 13.

When the bearing 17 is engaging its supporting collar 18 and the extensions 21 of the door bars 20 are engaging their respective supporting collars 22, the lower ends or bottoms of the boxes 14 are supported on channel members 23 and 24 (Figure 2), which channel members are mounted on the base 11 of the press box frame. The entire weight of the press boxes 14 is upon the base 11 and a rotation of said boxes on the shaft 13 is impossible. In operating position, one of the boxes 14 is located below the usual cotton tramper 25, while the other box is below the usual press ram (not shown).

The boxes are employed in the usual way during the baling operation with the cotton being fed to the box below the tramper 25 from the gin. While this box is being filled and the tramper 25 is operating to tamp the cotton within such box, the ram (not shown) is operating within the other box to press the cotton therein into a bale. After the bale is formed, it is removed from the box and the boxes 14 rotated so as to change their position beneath the tramper and the ram. This is the usual practice in baling cotton.

With the boxes 14 in the position shown in Figure 1, the lower end of said boxes are resting on the base member whereby the entire weight of said boxes is on said base. As has been pointed out, the weight of the boxes is such that rotation thereof on the shaft 13 is impossible while the boxes are engaging the base. Therefore, in order to permit a rotation of said boxes, it is necessary to lift or raise the same so that there is a clearance between the bottom of the boxes and the base 11.

For accomplishing the lifting or raising of the boxes 14, a pair of tie rods 26 have their lower ends extending through the opening 16a in the channel 16, opening 16b in the race plate 17a and also through the enlarged portion 16c of the bore of the lower race member 17b. The extreme lower ends of the rods pass through the bottom of the lower race member 17b and are provided with heads or nuts 26a which prevent upward displacement of the rods from said member (Figure 11). The rods 26 are located one on each side of the shaft 13, as is clearly shown in Figure 11, and the upper ends of said rods are connected to lifting arms or levers 27. Each arm 27 is pivoted at one end on a transverse shaft 28 whereby said arm may be swung vertically. It is noted that the rods 26 are connected to the arms 27 at a point near their pivotal mounting on the shaft 28, as is clearly shown in Figures 3 and 4 and when the arms 27 have their outer or free ends swung upwardly, it will be evident that an upward movement will be imparted to the rods 26, whereby the lower race member 17b is slid upwardly on the shaft 13 and the channel 16, members 15 and the boxes 14 are raised. A coiled spring 29 constantly urges each arm 27 upwardly and this spring is confined on a vertically extending bolt 30 which extends through the arm 27. The lower end of the bolt carries a washer 31 which engages the lower end of the spring, the upper end of said spring engaging the underside of the arm 27. The upper end of the bolt 30 extends through the arm 27 and through the lower flange of one of the transverse channels 13' which is mounted on the channel 12 of the press assembly frame. A nut 33 is screwed onto the upwardly extending portion of the bolt 30 and, obviously, with such arrangement the springs 29 constantly urge the arms 27 upwardly.

For swinging the arms 27 so as to raise and lower the boxes 14, the outer end of each arm is connected by a link 34 to an arm 35 which is secured on a rotatable shaft 36. The shaft 36 is mounted in bearing members 37 secured on the top of the frame channel 12. One end of the shaft 36 is extended beyond the frame and carries an arm 38 which is secured thereto and when said arm 38 is swung, the shaft 36 is rotated to swing the arms 35, and the swinging motion of the arms 35 is imparted to the lifting arms 27 through the links 34.

A longitudinal connecting rod 39 has one end pivotally secured to the outer end of the arm 38, while the other end is secured to one arm of a bell crank lever 40. The lever 40 is pivoted on a stub shaft 41 extending outwardly from one of the frame channels 12. The other arm of the bell crank lever 40 has its outer end pivoted at 42 to the upper end of an operating rod 43 which rod extends vertically on the outside of the frame standard 10. The lower end of the rod 43 is pivoted at 44 to the central portion of an actuating lever or handle 45. The inner end of the lever 45 is pivoted at 45' on a bracket 46 which is secured to one flange of the standard 10, as is clearly shown in Figure 6, while the outer end of the lever 45 is provided with a suitable handhold 47 which facilitates the manual operation of said lever.

With the parts in the position shown in Figure 1, the press boxes 14 are in their lowest position resting on the base 11 and the operating link is in the position shown in full lines in Figure 3. At this time the hand lever 45 has its outer end swung downwardly and inwardly adjacent the standard 10 and in this position the pivot 44 between the lever and the vertical rod 43 is out of vertical alinement with the pivot point 45' of the lever on the bracket 46. The springs 29 which are acting against the lifting arms 27 are also exerting an upward pull on the rod 43 through the various connecting arms, links and lever, but since the hand lever 45 is swung to a position where the pivot of the rod 43 is inwardly of the pivot 45' of said lever 45, the linkage cannot be operated until such time as the hand lever is swung outwardly so as to move the pivot 44 outwardly of the pivot 45'. Thus, the arrangement of the hand lever and its

connections with the rod 43 provides a self-locking arrangement for the operating mechanism.

When it is desired to raise the boxes 14, the hand lever is swung upwardly to the position shown in dotted lines in Figure 3. This causes an upward movement of the rod 43 which swings the bell crank lever 40 to impart a movement to the rod 39. Movement of this rod swings the arm 38 rotating the shaft 36 to swing the arms 35 and the arms 35, through the medium of the links 34, swing the lifting arms 27 upwardly. The coiled springs 29 are of sufficient strength to counterbalance the weight of the boxes so that when the hand lever 45 has moved the pivot 44 outwardly of the pivot 45', said springs immediately lift the arms 27 to lift the boxes 14 by means of the vertical connecting or tie rods 26. Therefore, the operator exerts very little energy to lift the comparatively heavy weight of the boxes 14, merely swinging the lever 45 to permit the coiled springs 29 to lift said box. The springs thus act as a counterbalance for the weight of the boxes and the arrangement provides for an easy lifting of said boxes. The movement of the boxes need only be sufficient to raise the bottom of said boxes from the base 11, after which a rotation of said boxes on the shaft 13 may be accomplished, such rotation resulting in the channel 16 and upper race plate 17a rotating on the balls 17c which are supported on the lower race member 17b. This latter member is, of course, stationary since it is secured to the tie rods 26. It is pointed out that as the boxes are raised or lifted, the bearing member 17 moves upwardly away from its supporting collar 18, while the arms 21 of the door bars 20 move away from their supporting collars 22.

When the boxes are in their completely raised position, with the hand lever 45 swung to the position shown in dotted lines in Figure 3, the pivotal connection 44 between the rod 43 and said lever has again moved inwardly with relation to the pivotal connection 45' between the lever in the bracket 46. This misalinement of the pivotal connection again prevents an operation of the linkage until such time as the lever is again swung outwardly. Therefore, the handle is so arranged that the linkage is self-locking in both of its extreme positions.

When it is desired to lower the boxes 14, it is only necessary to swing the lever 45 back to its original position or that shown in full lines in Figure 3. The bell crank lever 40 is again swung and by means of the rod 39 and arms 38 and 35, as well as by means of the link 34, the lifting arm 27 is swung downwardly to permit the boxes to again rest on the base 11.

It is, of course, desirable that some means be provided whereby the boxes 14 must be lowered to their position on the base 11 before the tramper or ram is operated. If the boxes are in a raised position and the ram or tramper operated, the downward pressure exerted by said ram or tramper would damage either the boxes or the operating mechanism for raising and lowering the same. When a hydraulic ram is employed, the pressure fluid line 50 is located adjacent to the standard 10 on which the hand lever bracket 46 is mounted. The line 50 extends vertically and has a control valve 51 connected therein. A by-pass line 52 is also connected to the valve. A hand wheel 53 is provided on the valve and, by manipulating said hand wheel, the pressure fluid may be conducted either to the ram or by-passed therearound. When the hand wheel is moved inwardly toward the valve, the fluid is by-passing the ram, whereby the latter is inoperative.

The valve 51 is so located in the line 50 that when the lever 45 is swung upwardly to the position shown in Figure 8, said handle overlies the hand wheel, whereby the sides of the lever extend contiguous to the hand wheel, as clearly shown in Figure 8, so that the operator cannot manipulate said hand wheel so long as the lever is in this position. However, when the hand lever 45 is swung downwardly to lower the boxes, it moves away from the hand wheel to permit manipulation thereof. With such arrangement, the lever 45 covers the hand wheel of the control valve 51 when the boxes are in a raised position and therefore it is impossible to manipulate the valve 51 to operate the ram until such time as the boxes have been returned to their lowermost position. This is a safety feature which prevents damage to the press boxes or their operating mechanism.

It has been found that the mechanism which raises and lowers the press boxes 14 may be used for weighing the cotton within the boxes. This can be done by connecting an ordinary scale 55 in the vertical operating rod 43, as is shown in Figure 7. The mechanism functions in exactly the same manner as described, to raise and lower the boxes, with the scale acting as a connecting link in the rod 43. The spring 29 beneath the lifting arms 27 is constructed so as to exactly balance the weight of the press boxes themselves. Then when the boxes are moved to a raised position, the weight of said boxes is counterbalanced by said spring and the additional weight of the cotton within said boxes moves the arms 27 downwardly under tension of said springs, the amount of movement being in accordance with the weight of said cotton. The downward movement of the arms 27 swings the arm 35 through the link 34, whereby the shaft 36 is rotated. Rotation of the shaft swings the bell crank lever 40 through the arm 38 and rod 39 and the swinging of the bell crank places a tension on the rod 43, tending to move the same upwardly. The lower end of the rod 43 is incapable of movement since it is locked in a fixed position by the hand lever 45, as has been explained. As a result the upper portion of the rod 43 moves upwardly and an indication on the scale, in accordance with the amount of movement, is given. Therefore, the weight of the cotton within the press boxes can be approximated by the scale 55 connected in the rod 43. It is particularly noted that the scale may be employed when desired, but the mechanism may operate efficiently without such scale.

The foregoing description of the invention is explanatory thereof and various changes in the size, shape and materials, as well as in the details of the illustrated construction, may be made, within the scope of the appended claims, without departing from the spirit of the invention.

What I claim and desire to secure by Letters Patent is:

1. A lifting mechanism for press boxes which are rotatable within a stationary frame including, a vertical tie rod secured to the boxes, a pivoted lifting arm mounted on the frame and having the upper end of said rod secured thereto, whereby swinging of the arm moves the rod to raise or lower the boxes, counterbalancing

means engaging the arm to urge the same upwardly, and manually operated means for imparting a swinging to the lifting arm.

2. A lifting mechanism for press boxes which are rotatable within a stationary frame including, a vertical tie rod secured to the boxes, a pivoted lifting arm mounted on the frame and having the upper end of said rod secured thereto, whereby swinging of the arm moves the rod to raise or lower the boxes, counterbalancing means engaging the arm to urge the same upwardly, a hand lever pivotally mounted on the frame, and a linkage connecting said lever with said lifting arm, whereby actuation of said lever swings the lifting arm to raise or lower the boxes.

3. A lifting mechanism for press boxes which are rotatable within a stationary frame including, a vertical tie rod secured to the boxes, a pivoted lifting arm mounted on the frame and having the upper end of said rod secured thereto, whereby swinging of the arm moves the rod to raise or lower the boxes, a coiled spring beneath the arm and urging the same upwardly, said spring being of sufficient pressure to counterbalance the weight of the boxes, and manually operated means connected with the arm for swinging the same.

4. A lifting mechanism for press boxes rotatably mounted within a stationary frame including, a vertical tie rod having its lower end secured to the boxes, a lifting arm pivoted on the frame and having the upper end of said rod secured thereto, a coiled spring engaging the lifting arm and urging the same upwardly, said spring being of sufficient pressure to counterbalance the weight of the boxes, a hand lever pivotally mounted on the frame, and a linkage connecting said lever with the lifting arm, the connection between the linkage and hand lever being such that said lever locks the linkage against operation by the spring and lifting arm when the boxes are in their lowered position, whereby the hand lever must be swung before the spring can act to raise the boxes.

5. A lifting mechanism for press boxes rotatably mounted within a stationary frame including, a vertical tie rod having its lower end secured to the boxes, a lifting arm pivoted on the frame and having the upper end of said rod secured thereto, a coiled spring engaging the lifting arm and urging the same upwardly, said spring being of sufficient pressure to counterbalance the weight of the boxes, a hand lever having one end pivoted to the frame, an operating rod having one end pivoted to the central portion of the lever, and means for connecting the other end of the operating rod with the lifting arm, whereby swinging of the hand lever from one extreme position to another will raise or lower the press boxes through the medium of the operating rod, connecting means and lifting arm.

6. A lifting mechanism for press boxes rotatably mounted within a stationary frame including, a vertical tie rod having its lower end secured to the boxes, a lifting arm pivoted on the frame and having the upper end of said rod secured thereto, a coiled spring engaging the lifting arm and urging the same upwardly, said spring being of sufficient pressure to counterbalance the weight of the boxes, a hand lever having one end pivoted to the frame, an operating rod having one end pivoted to the central portion of the lever, and means for connecting the other end of the operating rod with the lifting arm, whereby swinging of the hand lever from one extreme position to another will raise or lower the press boxes through the medium of the operating rod, connecting means and lifting arm, the pivot point of the lever on the frame being so located with respect to the pivotal connection between the lever and operating rod that the entire mechanism is locked when the lever is in its extreme lowered or raised position.

7. A lifting mechanism for press boxes movably mounted on a shaft within a stationary frame including, a pair of lifting arms pivoted on the frame adjacent the shaft above the boxes, a pair of vertical tie rods having their lower ends secured to the boxes and their upper ends fastened to the lifting arms near their pivoted ends, counterbalancing means engaging the arms and urging the same upwardly, and manually operated means mounted on the frame for swinging the arms.

8. A lifting mechanism for press boxes movably mounted on a shaft within a stationary frame including, a pair of lifting arms pivoted on the frame adjacent the shaft above the boxes, a pair of vertical tie rods having their lower ends secured to the boxes and their upper ends fastened to the lifting arms near their pivoted ends, a coiled spring beneath each arm urging the same upwardly, said springs having sufficient pressure to counterbalance the weight of the boxes, and manually operated means on the frame for swinging the arms.

9. A lifting mechanism for press boxes movably mounted on a shaft within a stationary frame including, a pair of lifting arms pivoted on the frame adjacent the shaft above the boxes, a pair of vertical tie rods having their lower ends secured to the boxes and their upper ends fastened to the lifting arms near their pivoted ends, a coiled spring beneath each arm urging the same upwardly, said springs having sufficient pressure to counterbalance the weight of the boxes, a hand lever pivotally mounted on the frame, and a linkage connecting said lever with the lifting arms, the connection between the linkage and hand lever being such that said lever locks the link against reverse operation by the lifting arms when the boxes are in their lowered position.

10. A lifting mechanism for press boxes movably mounted on a shaft within a stationary frame including, a pair of lifting arms pivoted on the frame adjacent the shaft above the boxes, a pair of vertical tie rods having their lower ends secured to the boxes and their upper ends fastened to the lifting arms near their pivoted ends, a coiled spring beneath each arm urging the same upwardly, said springs having sufficient pressure to counterbalance the weight of the boxes, a hand lever having one end pivoted to the frame, an operating rod having one end pivoted to the central portion of the lever, and means for connecting the other end of the operating rod with the lifting arms, whereby swinging of the hand lever from one extreme position to the other will raise or lower the boxes.

11. A lifting mechanism for press boxes movably mounted on a shaft within a stationary frame including, a pair of lifting arms pivoted on the frame adjacent the shaft above the boxes, a pair of vertical tie rods having their lower ends secured to the boxes and their upper ends fastened to the lifting arms near their pivoted ends, a coiled spring beneath each arm urging the same upwardly, said springs having sufficient pressure to counterbalance the weight of the boxes, a hand

lever having one end pivoted to the frame, an operating rod having one end pivoted to the central portion of the lever, and means for connecting the other end of the operating rod with the lifting arms, whereby swinging of the hand lever from one extreme position to the other will raise or lower the boxes, the pivot point of the lever on the frame being so located with respect to the pivotal connection between the lever and operating rod that the entire mechanism is locked when the lever is in its extreme lowered or raised position.

12. A lifting mechanism for press boxes rotatably mounted in a frame and having a hydraulic press ram operating therein including, a valve for controlling the fluid to the ram, a vertical tie rod secured to the boxes, a pivoted lifting arm mounted on the frame and having the upper end of said rod secured thereto, whereby swinging of the arm moves the rod to raise and lower the boxes, counterbalancing means engaging the arm to urge the same upwardly, and a hand lever mounted on the frame and connected with the arm to actuate the same, said lever being located adjacent the control valve for the ram whereby when said lever is moved so as to swing the arm to raise the boxes, it overlies the valve to prevent access thereto, thereby preventing operation of the ram while the boxes are raised.

13. A lifting mechanism for press boxes rotatably mounted within a stationary frame including, a vertical tie rod having its lower end secured to the boxes, a lifting arm pivoted on the frame and having the upper end of said rod secured thereto, a coiled spring engaging the lifting arm and urging the same upwardly, said spring being of sufficient pressure to counterbalance the weight of the boxes, a hand lever having one end pivoted to the frame, an operating rod having one end pivoted to the central portion of the lever, and a scale connected in the operating rod for indicating the weight of the cotton in said boxes.

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