July 6, 1937. H. C. PIERCE 2,086,283

BOX SQUEEZE

Filed June 10, 1935 2 Sheets-Sheet 1

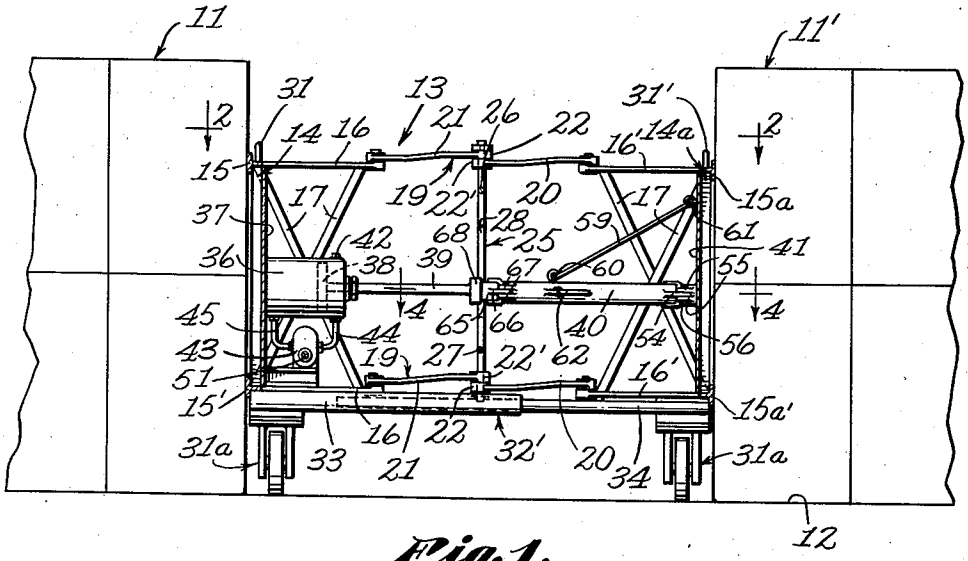


Fig. 1.

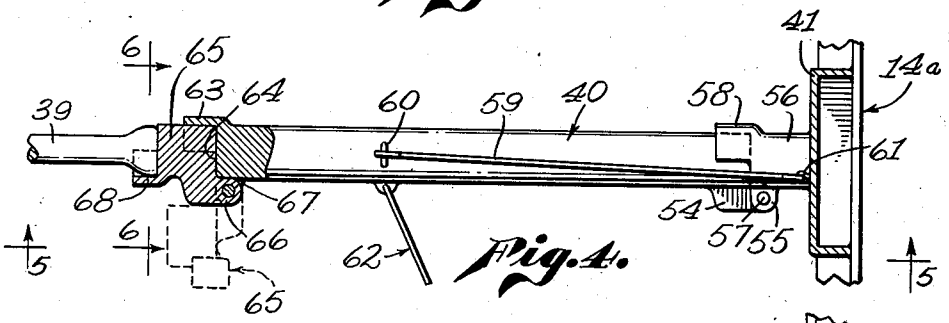


Fig. 4.

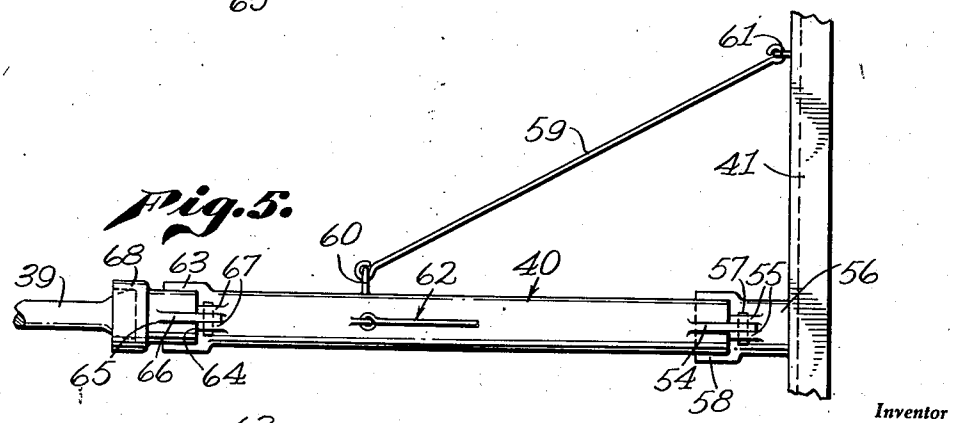


Fig. 5.

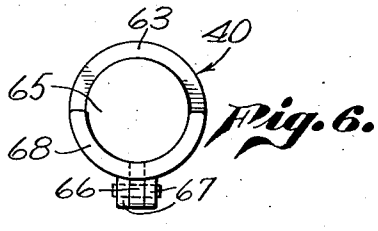


Fig. 6.

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BOX SQUEEZE

Filed June 10, 1935 2 Sheets-Sheet 2

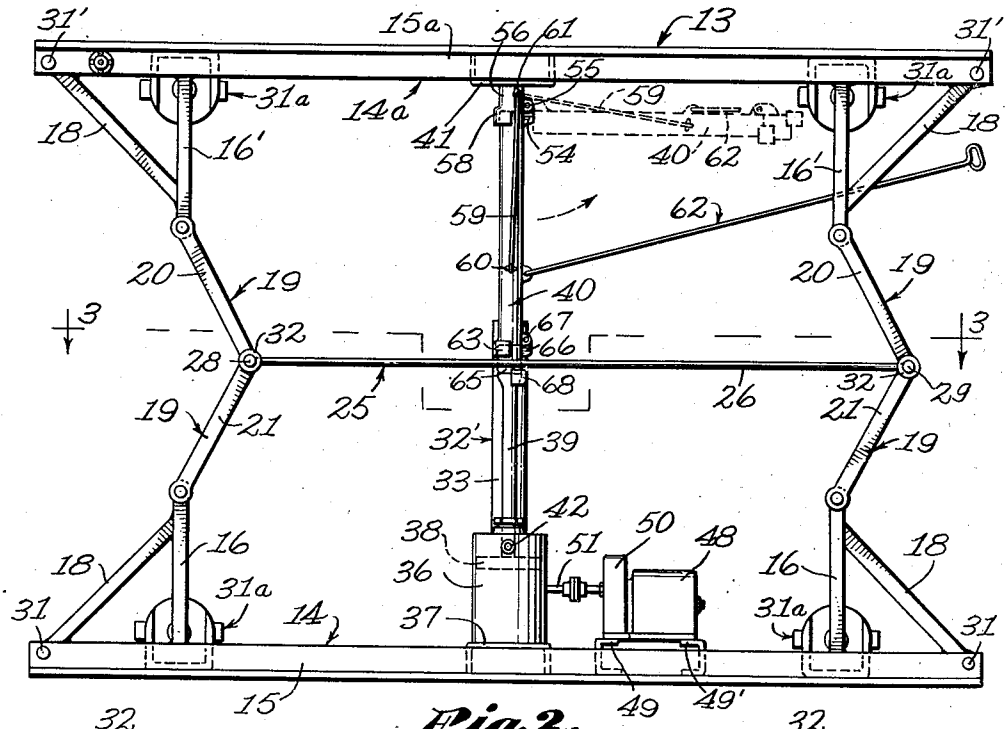


Fig. 2.

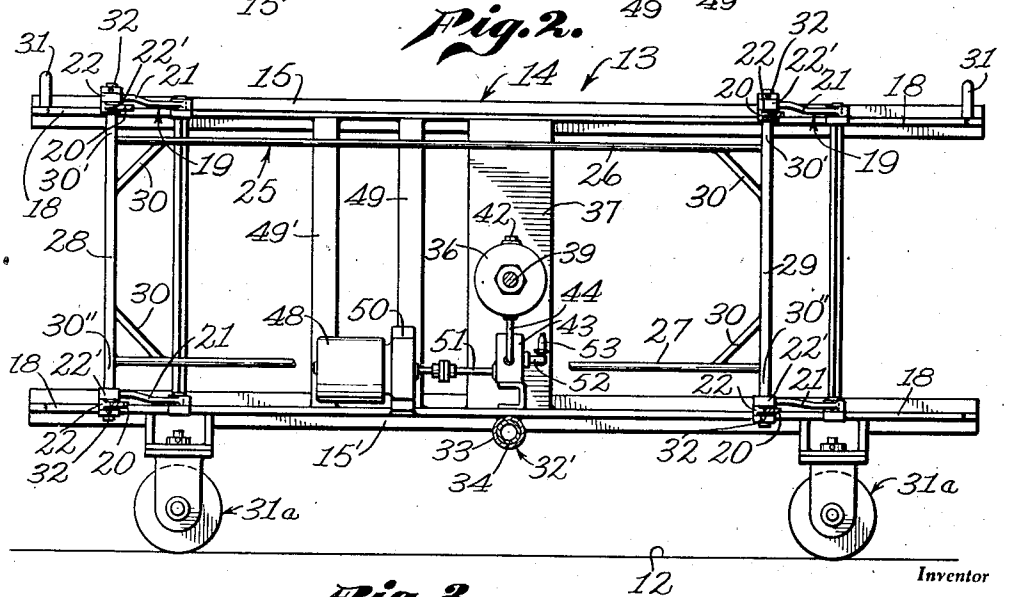


Fig. 3.

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Patented July 6, 1937 2,086,283

UNITED STATES PATENT OFFICE

2,086,283

BOX SQUEEZE

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Application June 10, 1935, Serial No. 25,859

12 Claims. (Cl. 105—369)

This invention has to do in a general way with the art of loading boxes, crates, cases and the like in railroad cars, and is more particularly related to improvements in machines known as box squeezes which are used for the purpose of compressing or squeezing the tiers of boxes in the two ends of the cars away from the space adjacent the door to obtain sufficient space therein for the reception of the last rows or tiers of articles.

As is well known to those familiar with the art, it is the usual practice, in loading refrigerator cars or other box cars with crates of oranges or the like, to fill the two ends of the cars, bringing the tiers or rows of boxes up to a point adjacent the door. Inasmuch as it is impossible to pack the boxes or crates tightly in the cars, this operation does not leave sufficient space adjacent the door to receive the rows or tiers of boxes which complete the filling of the car. It is necessary, therefore, to employ some kind of mechanical squeeze which will force the two end rows or tiers of boxes outwardly toward the ends of the cars away from the space adjacent the door to permit the reception of the last rows or tiers of boxes.

The machines which are at present used for this purpose consist of a pair of frame members mounted on casters and having sets of jack screws, designed to operate in opposite directions, mounted between the ends of the two frames. These jack screws are centrally provided with sprocket wheels over which a sprocket chain extends, and one of the sprocket wheels is associated with ratchet means whereby it can be actuated through the medium of a long lever member. Inasmuch as the space to be obtained through the action of the squeeze is substantially wider than the door through which the squeeze is admitted to the car, it is necessary to rotate these jack screws so as to bring the two frames close together before the machine can be pushed into the car, and then it is necessary to again rotate the jack screws over a substantial period of time to expand the squeeze to a point at which it engages the boxes. The elimination of this time consuming method, whereby the squeeze or machine is collapsed for admission to and withdrawal from the car, constitutes one of the primary objects of this invention. Furthermore, in the old conventional type of squeeze it was necessary, in order to obtain sufficient pressure to advance the boxes to the desired extent, to employ, as pointed out above, an elongated lever member which ordinarily requires the force of two men in order to apply the required pressure. It therefore becomes a further object of this invention to provide a machine of the class described which is equipped with power means whereby the required pressure can be applied without manual operation which, together with the collapsible feature pointed out above, makes it possible for one operator to operate and control the machine in a much shorter period of time than has heretofore been possible with two operators.

It is a noteworthy feature of a preferred form of my invention that the power means employed for applying the necessary pressure to the squeeze is in the nature of a hydraulic ram. It is a further feature of this invention that such hydraulic ram is operated by a motor which is carried on the machine itself, the cylinder of the ram being equipped with a reversible pump which connects both ends of the cylinder so that, by reversing the operation of the motor, the system can be operated in either direction.

It is a further feature of this invention that the two frames which engage the boxes are interconnected in a manner such that they are held in substantially parallel relation with each other and, further, that they are provided with interconnected supporting means which hold the frames in substantially vertical position and prevent their being tilted during the application of the squeezing pressure.

The details in the construction of a preferred form of my invention, together with other objects attending its production, will be best understood from the following description of the accompanying drawings, which are chosen for illustrative purposes only, and in which.

Fig. 1 is a side elevation illustrating a preferred embodiment of my invention in section and further illustrating the manner in which the same is applied for the purpose for which it was designed;

Fig. 2 is a plan view which may be considered as having been taken along the line 2—2 of Fig. 1;

Fig. 3 is a sectional elevation taken in a plane represented by the line 3—3 of Fig. 2;

Fig. 4 is an enlarged fragmentary plan view with parts in section taken along the line 4—4 of Fig. 1;

Fig. 5 is an elevational view taken in a plane represented by the line 5—5 of Fig. 4; and

Fig. 6 is an end elevation taken along the line 6—6 of Fig. 4.

More particularly describing the invention as herein illustrated, with particular reference to Fig. 1, numerals 11 and 11' indicate two rows or tiers of boxes which are shown as being supported on the floor 12 of a car or the like. Reference numeral 13 indicates a box squeezing or compressing machine which is shown as being interposed between the inner ends of the two rows or tiers of boxes and is illustrated as having been expanded to impart pressure to the two rows of boxes, thereby widening the space therebetween so as to admit the reception of the last rows

or tiers which are to be placed therein before the door is closed.

Referring now to Figs. 2 to 6, inclusive, in addition to Fig. 1, the box squeeze or press 13 is shown as comprising a pair of oppositely disposed frame members 14 and 14a. These two frame members, which are substantially identical in construction, each consists of a pair of top and bottom rails indicated by numerals 15, 15' and 15a, 15a'. Mounted near the end portions of the two sets of rails are forwardly extending arm members indicated by reference numerals 16 and 16'. These arms are rigidly secured by means of welding or other suitable means to the end portions of the respective side rails, and for the purpose of holding the side rails in vertically spaced relation with each other, each set of vertically spaced arms are provided with cross braces 17 which are rigidly secured to the arms by means of welding or in any other suitable way. As a further means of bracing the arms with respect to their corresponding rails, I provide them with additional angle braces indicated by numeral 18.

The inner ends of the arms 16 are provided with lever members generally indicated by reference numeral 19, and it is to be understood that all of the arms and lever members are of equal length.

The two lever members 19 of each set are offset in opposite directions with respect to each other as indicated at 20 and 21 in Fig. 1, and their free ends are provided with eyes or bearing bosses 22 and 22' adapted to receive pivot means and thereby constitute a hinge. In order that all of the hinges formed in this manner may be tied in to give a uniformly distributed motion to the two frames, and a uniform application of pressure during the expansion of such frames, I employ a central frame generally indicated by reference numeral 25.

This central frame, which is best illustrated in Fig. 3, consists of vertically spaced longitudinal members 26 and 27 which are welded or otherwise secured at their ends to end shafts 28 and 29. The frame is braced by means of corner braces 30 and the end shafts 28 and 29 are of a length such that they have upper and lower vertical projections indicated at 30' and 30'' which are received in the eyes or bearing bosses of the four hinge members formed in the manner described above. Any suitable means, such as pins and collars, indicated at 32, may be employed for holding the extensions 30' and 30'' in their respective bearing bosses.

It will be observed that, through the arrangement described above, the two frames 14 and 14a are supported in parallel relation with each other so that they have free movement toward and away from each other and, during such movement, are at all times substantially parallel. The unit can be expanded by applying expansion force between the two frame members and the two frame members can be readily collapsed toward each other merely by applying compressive force to the two frames. For this latter purpose I provide the end portions of the two frames with upwardly extending handle members indicated by reference numerals 31 and 31'. To facilitate the movement of the assembly in all directions, I provide both frames near their end portions with wheels or caster assemblies of any conventional type indicated generally by reference numeral 31a.

In order to act efficiently in accomplishing the purpose contemplated by this invention, it is necessary that, in addition to being parallel, the two frames must also maintain a substantially vertical position at all times. In order to assist the hinge members in effecting this last mentioned objective, I provide the two frames with telescoping guide means generally indicated by reference numeral 32'. This guide means may be of any conventional form but is shown as comprising a pipe or tube 33 welded or otherwise secured beneath the central portion of the frame 14 and another tube or rod 34 which is welded beneath the central portion of the other frame 14a. The rod or tube 34 telescopes within the tube 33 and thereby constitutes a guide which will prevent the frames tilting from the vertical during the application of expanding pressure between the two frame members.

For the purpose of applying an expanding force between the two frame members, to effect the squeezing action on the two tiers of boxes, I employ a hydraulic cylinder 36 which is shown as being mounted on the inner face of a plate member 37, such plate member having its top and bottom ends welded or otherwise secured to the midportions of the two rails which constitute the frame member 14. This hydraulic cylinder contains a piston member 38 which has a piston rod 39, the inner end of which is adapted to engage a post member 40 which is shown as being secured to another plate member 41 mounted between the rails of frame 14a in opposed relation with the plate member 37.

The cylinder 36 is filled with a hydraulic fluid such as oil, a plug opening 42 being provided for that purpose, and such hydraulic fluid is circulated under pressure from one end of the cylinder to the other by means of a conventional gear pump 43 which, as is well known to those familiar with the art, is reversible in its operation. One side of this gear pump is connected through a pipe 44 with the inner end of the cylinder 36, and the other side of the gear pump is connected through a pipe 45 with the other end of the cylinder.

It will thus be seen that, by reversing the operation of the gear pump, the hydraulic fluid is delivered under pressure to either side of the cylinder 36, thereby effecting a movement of the piston and its associated piston rod 39 in either direction. For the purpose of actuating the gear pump 43, I employ a reversible motor 48 which is shown as being mounted upon angle members 49 and 49' suitably secured to the two rails of frame 14. The motor 48 is shown as being associated with a reduction gear 50 which drives the pump through a shaft indicated at 51. The motor is, of course, connected through a suitable reversing switch, not shown but preferably positioned near one of the handle members 31 or 31', to a source of electric power.

It will thus be seen that, when the motor is operated, to drive the gear pump 43 in a direction such that the hydraulic fluid is taken from the inner end of the cylinder 36 through the pipe 44 and is delivered outwardly through the pipe 45 into the rear or outer end of the cylinder 36, the piston member is advanced toward the opposite frame and, when engaged by the post member 40, is effective to expand the squeeze; in other words, to move the two frames away from each other. Likewise, when the pump is reversed, the piston member is moved in the opposite direction so as to carry the piston rod away from the post member 40 if the frame has been expanded. As

a precautionary measure, to prevent breakage in the apparatus, and to avoid overloading the motor, in the event the articles have been moved to their limit of movement, I employ a gear pump 43 which has a by-pass connection 52 between the two sides thereof. This by-pass connection is provided with a conventional pressure relief valve indicated at 53 which is set so as to operate when the resisting pressure in the cylinder reaches a predetermined point. When the pressure relief valve 53 is open, the liquid is merely circulated from one side to the other of the gear pump in a manner well known to those familiar with this type of construction.

It was previously pointed out as a primary object of this invention to provide a device of the class described with means whereby the two frames could be collapsed with respect to each other almost immediately after the work of the machine had been completed. This object is accomplished by employing a post member 40 which is hinged to the supporting plate 41. Various types of hinge connection may be employed for this construction and in the form shown the post 40 is illustrated as being provided with a boss member 54 which is received between ears 55 formed on a rigid supporting socket 56. The boss member and the ears are provided with openings to receive a pivot pin 57 and the socket member 56 is provided with a forwardly extending flange segment 58 positioned on the side opposite the boss 54 and arranged so as to support the post member 40 in alignment with the piston rod 39.

For the purpose of holding the post member 40 in engagement with the stop flange 58, I employ a tension brace 59 which is shown as being secured through an eye connection 60 to an intermediate portion on the post member and has its other end secured through an eye connection 61 to the plate member 41. It will be observed that the connection 61 is offset from the axial plane containing the eye connection 60 so that when the post member 40 is swung beyond the 45° point this extension brace is effective to carry it on into the position shown in Fig. 4 where it engages the stop member 58. For the purpose of initiating the swinging movement of the post member to and from its piston rod engaging position, I provide a handle rod generally indicated by reference numeral 62.

The forward end of the post member 40 is shown as being formed with a segmental flange which forms what is in effect a socket member. This flange is indicated by reference numeral 63 and partially surrounds a flat surface 64 which, under some circumstances, will be engaged by the end of the plunger member.

The machine contemplated by this invention has been especially designed for use by packing houses and, since such packing houses handle both lemons and oranges, and since the boxes used for these two fruits are of different dimensions, it is a further feature of this invention that the squeeze can be efficiently operated for both dimensions of boxes. In other words, my invention contemplates the use of a post member which may be extended for use in connection with the smaller sizes of boxes or crates. The means whereby the post member is extended comprises an extension socket 65 which is shown as being provided with a hinged boss 66 adapted to be received between ears 67 formed on the ends of the post member 40 behind the flat surface 64. This extension socket is also shown as having a stop flange 68 which forms a partial socket for the reception of the end of the piston rod 39.

It is to be understood that, while I have herein described and illustrated one preferred form of my invention, the invention is not limited to the precise construction described above but includes within its scope whatever changes fairly come within the spirit of the appended claims.

I claim as my invention:

1. A box squeeze of the class described embodying: a pair of frame members adapted to engage oppositely disposed rows of boxes; hinge means interconnecting said frames and supporting same for movement toward and away from each other; a hydraulic cylinder on one of said frames; a piston in said cylinder; an inwardly extending piston rod mounted on said piston; a post member hingedly mounted on the other frame and adapted to be positioned in alignment with said piston rod; and means for applying hydraulic pressure to opposite sides of said piston.

2. A box squeeze of the class described embodying: a pair of frame members adapted to engage oppositely disposed rows of boxes; hinge means interconnecting said frames and supporting same for movement toward and away from each other; a hydraulic cylinder on one of said frames; a piston in said cylinder; an inwardly extending piston rod mounted on said piston; a post member hingedly mounted on the other frame and adapted to be positioned in alignment with said piston rod; stop means associated with said post member for holding the same in alignment with said piston rod, and means for applying hydraulic pressure to opposite sides of said piston.

3. A box squeeze of the class described embodying: a pair of frame members adapted to engage oppositely disposed rows of boxes; hinge means interconnecting said frames and supporting same for movement toward and away from each other; a hydraulic cylinder on one of said frames; a piston in said cylinder; an inwardly extending piston rod mounted on said piston; a post member hingedly mounted on the other frame and adapted to be positioned in alignment with said piston rod; stop means associated with said post member for holding the same in alignment with said piston rod; means for releasably holding said post member against said stop; and means for applying hydraulic pressure to opposite sides of said piston.

4. A box squeeze of the class described embodying: a pair of frame members adapted to engage oppositely disposed rows of boxes; hinge means interconnecting said frames and supporting same for movement toward and away from each other; a hydraulic cylinder on one of said frames; a piston in said cylinder; an inwardly extending piston rod mounted on said piston; a post member hingedly mounted on the other frame and adapted to be positioned in alignment with said piston rod; stop means associated with said post member for holding same in alignment with said piston rod; a tension brace interposed between said post member and said frame for releasably holding said post member against said stop; and means for applying hydraulic pressure to opposite sides of said piston.

5. A box squeeze of the class described embodying: a pair of frame members adapted to engage oppositely disposed rows of boxes; hinge means interconnecting said frames and supporting same for movement toward and away from

each other; a hydraulic cylinder on one of said frames; a piston in said cylinder; an inwardly extending piston rod mounted on said piston; a post member hingedly mounted on the other frame and adapted to be positioned in alignment with said piston rod; an extension socket hingedly mounted on the end of said post member for optional engagement with the end of said piston rod; and means for applying hydraulic pressure to opposite sides of said piston.

6. A box squeeze of the class described embodying: two frames, each comprising a pair of vertically spaced compression rails, forwardly extending arms rigidly secured to the end portions of said compression rails, and braces interposed between the respective sets of arms; lever members attached to the inner ends of the respective arms; a center frame having end posts engaging and interconnecting the free ends of said lever members, thereby providing two sets of upper and lower hinge connections between said frames; oppositely disposed plate members mounted on the midportion of the respective frames; a hydraulic cylinder and piston assembly mounted on one of said plate members; an inwardly extending piston rod mounted on the piston therein; a compression post hingedly mounted on the other plate member and adapted for alignment with said piston rod; and means for alternatively applying hydraulic pressure in opposite ends of said hydraulic cylinder.

7. A box squeeze of the class described embodying: two frames, each comprising a pair of vertically spaced compression rails, forwardly extending arms rigidly secured to the end portions of said compression rails, and braces interposed between the respective sets of arms; lever members attached to the inner ends of the respective arms; a center frame having end posts engaging and interconnecting the free ends of said lever members, thereby providing two sets of upper and lower hinge connections between said frames; telescoping guide means interposed between the center bottom portion of said frames; oppositely disposed plate members mounted on the midportion of the respective frames; a hydraulic cylinder and piston assembly mounted on one of said plate members; an inwardly extending piston rod mounted on the piston therein; a compression post hingedly mounted on the other plate member and adapted for alignment with said piston rod; and means for alternatively applying hydraulic pressure in opposite ends of said hydraulic cylinder.

8. A box squeeze of the class described embodying: two frames, each comprising a pair of vertically spaced compression rails, forwardly extending arms rigidly secured to the end portions of said compression rails, and braces interposed between the respective sets of arms; lever members attached to the inner ends of the respective arms; a center frame having end posts engaging and interconnecting the free ends of said lever members, thereby providing two sets of upper and lower hinge connections between said frames; oppositely disposed plate members mounted on the midportion of the respective frames; a hydraulic cylinder and piston assembly mounted on one of said plate members; an inwardly extending piston rod mounted on the piston therein; a compression post hingedly mounted on the other plate member and adapted for alignment with said piston rod; and pump means carried by the cylinder supporting frame for alternatively applying hydraulic pressure in opposite ends of said hydraulic cylinder.

9. A box squeeze of the class described embodying: a pair of frame members adapted to engage oppositely disposed rows of boxes; hinge means interconnecting said frames and supporting same for movement toward and away from each other; a hydraulic cylinder on one of said frames; a piston in said cylinder; an inwardly extending piston rod mounted on said piston; adjustable collapsible means between said piston rod and the opposite frame member; and means for applying hydraulic pressure to opposite sides of said piston.

10. A box squeeze of the class described embodying: a pair of frame members adapted to engage oppositely disposed rows of boxes; hinge means interconnecting said frames and supporting same for movement toward and away from each other; a hydraulic cylinder on one of said frames; a piston in said cylinder; an inwardly extending piston rod mounted on said piston; a collapsible post between said piston rod and the opposite frame member, said post being adapted to be brought into alignment with said piston rod; means for releasably holding said post in alignment with said piston rod; and means for applying hydraulic pressure to opposite sides of said piston.

11. A box squeeze of the class described embodying: two frames; each comprising a pair of vertically spaced compression rails, forwardly extending arms rigidly secured to the end portions of said compression rails, and braces interposed between the respective sets of arms; lever members attached to the inner ends of the respective arms; a center frame having end posts engaging and interconnecting the free ends of said lever members, thereby providing two sets of upper and lower hinge connections between said frames; telescoping guide means interposed between the center bottom portion of said frames; oppositely disposed plate members mounted on the midportion of the respective frames; a hydraulic cylinder and piston assembly mounted on one of said plate members; an inwardly extending piston rod mounted on the piston therein; a collapsible compression post between said piston rod and the other plate member, said post being adapted for alignment with said piston rod; and means for alternatively applying hydraulic pressure in opposite ends of said hydraulic cylinder.

12. A box squeeze of the class described embodying: a pair of frame members adapted to engage oppositely disposed rows of boxes; hinge means interconnecting said frames and supporting same for movement toward and away from each other; a hydraulic cylinder on one of said frames; a piston in said cylinder; an inwardly extending piston rod mounted on said piston; a post member mounted on the other frame and adapted to be positioned in alignment with said piston rod; an extension socket hingedly mounted on the end of said post member for optional engagement with the end of said piston rod; and means for applying hydraulic pressure to opposite sides of said piston.

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