

United States Patent

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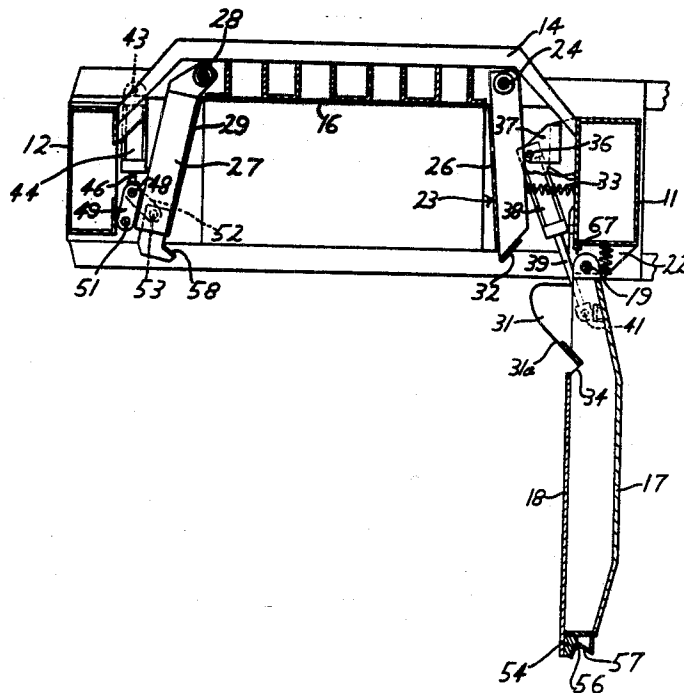
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[54] PRESS BOX WITH IMPROVED DOOR
ARRANGEMENT
10 Claims, 4 Drawing Figs.

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[50] Field of Search..... 100/53,
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ABSTRACT: A door system for press boxes in which the closing of a side door automatically closes one of a pair of end doors and in which the other end door closes after the side door is closed. Lock means on the free end of the other end door engages complementary lock means on the free end of the side door, thus to hold all the three doors in locked position thereby to form three walls of the press box. Power means is provided to close and open the side door and said other end door.



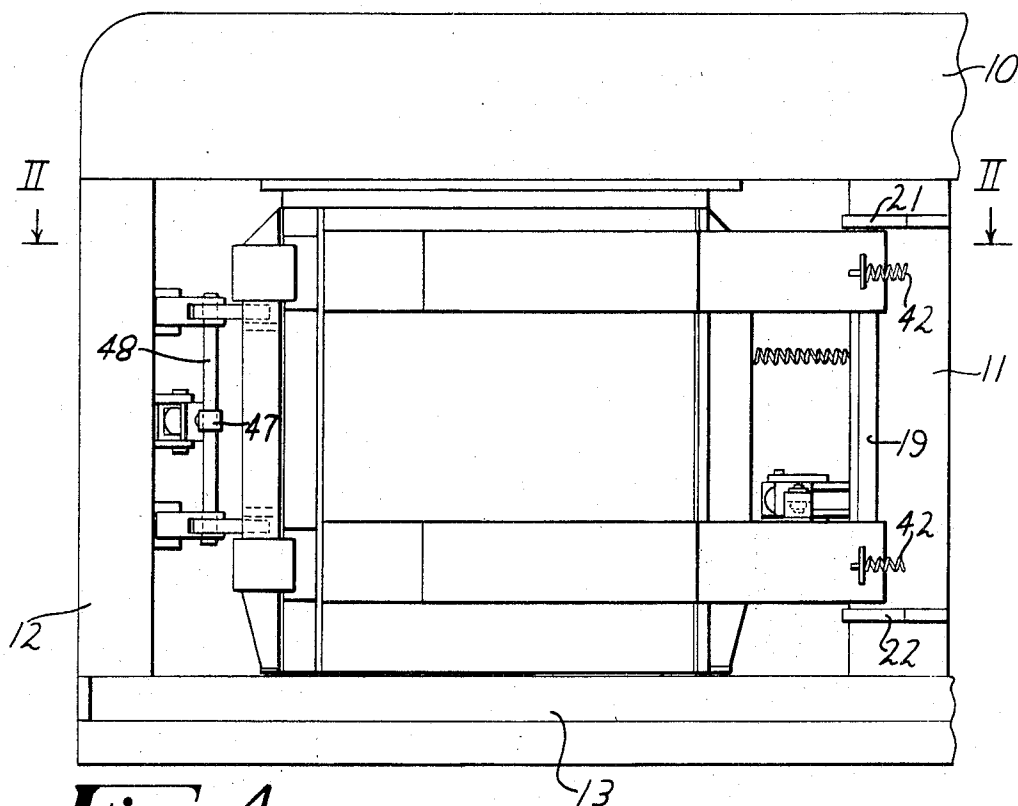


Fig. 1

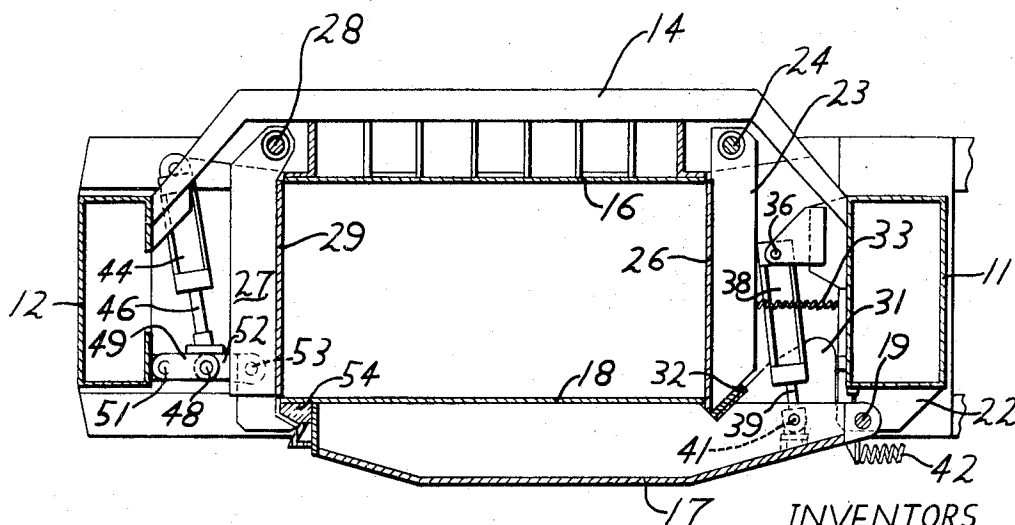


Fig. 2

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Fig. 3

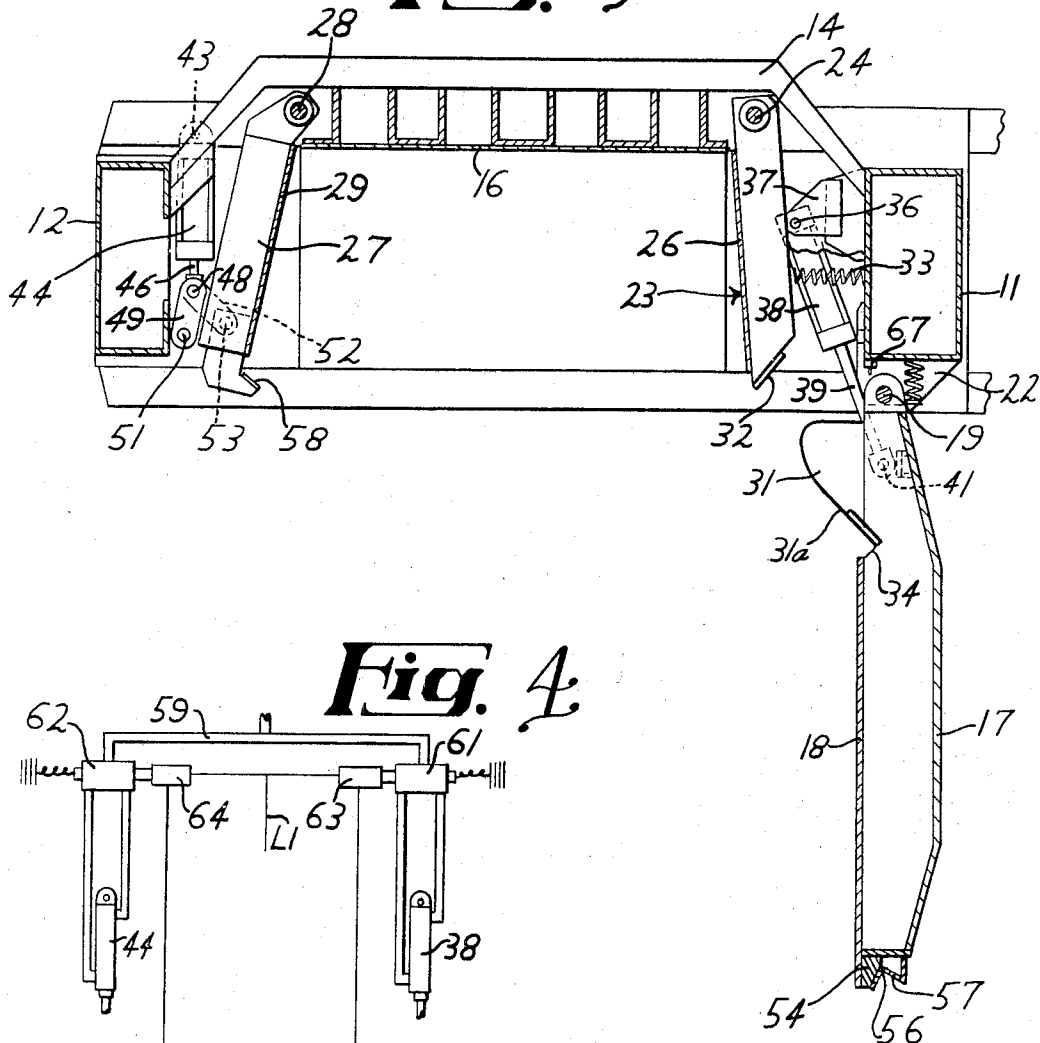
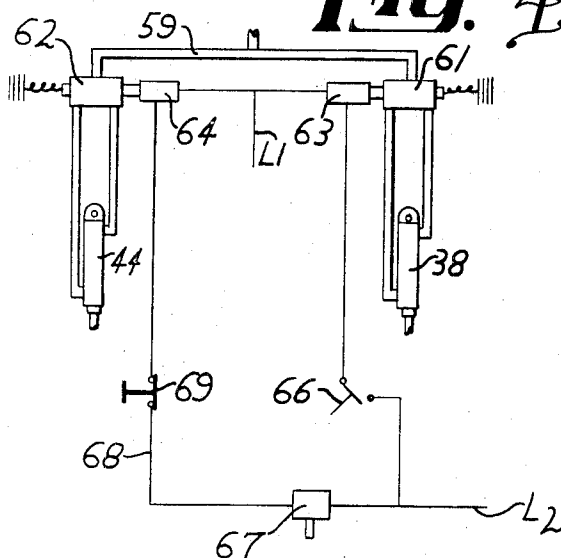


Fig. 4



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PRESS BOX WITH IMPROVED DOOR ARRANGEMENT

Our invention relates to a press box particularly of the kind provided with doors which may be opened after formation of a bale, bundle, package, or the like, thereby to permit the bale to be discharged from the press box.

An object of our invention is to provide a press box having at least one side and two end doors, the side door being pivoted at one end to span the free ends of the end doors when closed, together with means effective upon closing the side door automatically to close the end door nearest the pivoted end of the side door, and further, means to close the other end door after the side door is closed, together with means to lock the doors in closed position responsive to closing of said other end door.

Another object of our invention is to provide power means effective to close said side door and said other end door, thereby to automate the operation of the doors.

A more specific object of our invention is to provide a press box of the character designated in which the box is provided with a fixed wall opposite the side door, thereby facilitating the pivoting of the end doors adjacent the ends of said sidewall.

Apparatus illustrating features of our invention is shown in the accompanying drawings forming a part of this application in which:

FIG. 1 is a front elevational view of a press box equipped with our improved door system, the same forming one-half of a double press box, the right half being broken away;

FIG. 2 is a detail sectional view taken generally along line II-II of FIG. 1 and showing the doors closed and locked;

FIG. 3 is a view corresponding to FIG. 2 and showing the doors open; and,

FIG. 4 is a highly schematic, and quite diagrammatic diagram illustrating the controls for the cylinders for operating the doors.

Referring now to the drawing for a better understanding of our invention we illustrate one side of a double box, up-packing baling press. However, our invention is fully applicable to an up-packing, single box press and to a down-packing press. It will be understood that if desired the mechanism herein to be described may be duplicated on the right side of the apparatus whereby one may provide a rotary, two-box press. In the drawings, we show the press box as embodying the heavy, upper beam or frame structure 10. A vertical column 11 in the form of a heavy box beam may be provided between the two press boxes. Another vertical box beam 12 is provided at the end of the press box. Similarly, the beams 11 and 12 are joined by substantial bottom members 13.

The press box may be provided with a rear wall 14 made of the horizontal and vertical members as illustrated. The wall may be lined with a plate 16, thus to form one side of the press box.

Our improved press box is provided with a side door 17 having a linear plate 18. The door 17 may be pivotally mounted on a vertically extending rod 19 which is journaled in upper and lower plates 21 and 22 forming a part of and being secured to the column 11.

A first end door 23 is pivotally mounted on a vertically extending rod 24 which conveniently may be journaled in the rear wall 14, adjacent one end thereof. It will be noted that this first end door is pivotally mounted nearest the pivoted end 19 of the side door 17. Likewise, the end door 23 is provided with a liner plate 26. A second end door 27 is similarly mounted on a vertical rod 28 in turn secured in the opposite end of the back wall of the press box. A liner 29 completes this door.

As shown more particularly in FIG. 3, the door 17 is provided, adjacent its pivoted end, with a cam member 31. This cam member is disposed, when the door 17 starts its closing action, to engage a wear plate 32 on the free end of the door 23. Thus, as the door 17 starts toward closed position as presently will appear the free end of the door 23 is cammed and moved inwardly toward the opposite end door 27. A

spring or other means indicated at 33 biases the end door 23 to open position as illustrated in FIG. 3.

It will also be noted that adjacent the end 31a of the cam member 31, the door 17 is provided with a notched section 34. This section 34 is adapted to engage the outermost edge of the free end of the door 23, thus securely to lock the door 23 against opening movement when the door 17 is closed as is clearly shown in FIG. 2.

Pivotally mounted as at 36 to suitable brackets 37 is a fluid pressure cylinder 38 having a piston rod 39. The piston rod 39 is pivotally connected at 41 to the door 17. As will later appear cylinder 38 is double acting so that upon admitting fluid to proper ends of the cylinder the door 17 may be opened and closed. If desired, bumper springs 42 may be provided on the door and these, when the door is opened, strike the front wall of the column 11, thus to cushion the opening of door 17.

Pivotally mounted to suitable portions of the framework, as at 43, is another double acting cylinder 44. The cylinder 44 has a piston rod 46 connected at 47 (FIG. 1), to a vertically extending rod 48. Adjacent the upper and lower ends of the rod 48 are sets of toggle links. In view of the fact that the upper and lower sets of these are identical, a description of one will suffice for both. Thus, each set of toggle links embodies toggle bar 49 having one end pivotally connected to the vertical rod 48 and the other end pivotally connected at 51 to a bracket extending outwardly from the column 12. Similarly, another link 52 is pivotally connected about the rod at one end and at 53 to the door 27. It will thus be apparent that when the cylinder 44 is energized in a manner to extend the piston rod 46, the toggle links move from the position of FIG. 3 to the position of FIG. 2, namely, from door open to door closing position.

It will be noted that the free end of door 17 is provided with a heavy bar 54 securely fastened to the free end thereof. The door is provided with a seat 56 and a bracket plate 57. The free end of door 27 is provided with a hooked portion 58 adapted, when the door 17 is closed to engage against the surface 56, thus to lock the doors together.

Referring now to FIG. 4, we show a wholly schematic, diagrammatic wiring and pressure line diagram. Thus, cylinders 38 and 44 may be supplied with fluid under pressure from a source not shown, through a line 59, under control of valves 61 and 62. The valves 61 and 62 may be controlled by solenoids 63 and 64 and may be spring biased to a position for the valves to hold the doors open as shown in FIG. 3.

The solenoid 63 and hence cylinder 38 may be under control of a manually operated switch 66.

Mounted on the framework, in position to be engaged by the door 17 when it is in substantially fully closed position, is a normally open electric switch 67. In the line 68 leading to the solenoid 64 we may provide a normally closed push button switch 69.

From what has been described it is now possible more fully to explain the operation, construction and advantages of our invention. With the press box open as shown in FIG. 3, when it is desired to close the same the operator closes switch 66. Power is thus supplied to solenoid 63, moving valve 61 to a position to admit fluid to the cylinder 38 in a direction to withdraw the piston rod 39. This initiates closing of door 17. As this closing proceeds, cam 31 strikes the wear plate 32 on the free end of door 23, starting it on its closing movement. During this time, of course, cylinder 44 will remain in the position illustrated, holding door 27 open. As soon as door 17 reaches substantially fully closed position a portion thereof strikes switch 67, closing it, thereby energizing cylinder 44 in a direction to extend its piston rod 46. This brings the locking section 58 on the free end of door 27 into contact with the locking portion 57 on the free end of door 17. By this time it will be seen that the free end of the door 23 will have effectively engaged in the V-shaped portion 34 of door 17. Furthermore, we so design the apparatus that the toggle bars operated by cylinder 44 never quite "break," that is, so that the rod 48 never quite passes a line drawn between the pivot points 51

and 53. Therefore, all three of the doors are effectively locked, in the sequential fashion set forth above. To open the doors push button switch 69 is opened, deenergizing solenoids 63 and 64, permitting their valves to move to a position to energize the cylinders 38 and 44 in door opening direction.

Our invention is particularly adapted for inclusion in an automated press system. That is, the highly diagrammatic circuitry shown in FIG. 4 is capable of being integrated with other circuitry to affect complete, one-man, pushbutton operation of the entire press and baling system. It will also be appreciated that the pressure required to be applied to cylinder 38 is relatively low inasmuch as only a small amount of force is required to close the door 17 and door 23, or to open door 17. Therefore, we have provided a safety feature inasmuch as should an operator be in the way of the closing or opening of door 17, the low pressure in cylinder 38 and the low force required may easily be overcome by a person simply exerting a small force against the same. Therefore, there is no danger of a worker being crushed by being caught in the door 17 or being injured when it is opening. It will be appreciated that effective locking and securing force is applied by the cylinder 44 when it moves the door 27 into locking position relative to the free end of the door 17.

In actual operation our invention has proven to be extremely practical. As stated, by using a fixed back wall 14 this may serve as a support for various mechanisms such for instance as the guide ways for strapping material, if the press box is to be equipped with an automatic strapping or banding apparatus. However, it will likewise be apparent that our invention could be employed with a press box in which the wall 14 was a door, permitting the bale or package to be removed from the press box through either side thereof.

While we have shown our invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various other changes and modifications without departing from the spirit thereof.

We claim:

1. In a press box:

- a. at least one side and two end doors;
- b. means pivotally mounting the end doors for the free ends thereof to move toward each other;
- c. means pivotally mounting the side door in position to span the free ends of the end doors;
- d. cam means on the free end of the end door nearest the pivoted end of the side door;
- e. cam means on the side door cooperable with the cam means on said nearest end door and effective upon closing movement of the side door to contact said end door cam means and close said nearest end door as the side door closes;
- f. cooperating lock means on the free end of said other end door and on the free end of the side door effective when engaged to hold the doors locked, thereby to define three walls of the press box;
- g. power means for closing said other end door; and

h. means effective upon substantially complete closing of the side door to energize said power means, whereby, when the side door reaches substantially completely closed position said other end door closes, thereby to bring said cooperating lock means together to hold the doors locked.

2. Apparatus as defined in claim 1 in which means is provided to open said doors by first pivoting said other end door away from the free end of the side door, thereby to disengage said locking means, and thereafter to move the side door to open position, permitting said nearest end door to be opened.

3. Apparatus as defined in claim 1 in which power means is provided for closing and opening said side door.

4. Apparatus as defined in claim 1 in which the end door nearest the pivoted end of the side door is biased toward open position, thereby to be self-opening in response to opening of the side door.

5. Apparatus as defined in claim 1 in which the means for closing said other end door embodies a toggle interposed between the power means therefor and said door.

6. In a press box:

- a. one sidewall, one side door and two end doors;
- b. means pivotally mounting the two end doors to the side wall for the free ends thereof to move toward each other;
- c. means pivotally mounting the side door; and
- d. means on the side door cooperable with means on the free ends of the end doors to hold the doors in closed position thus to form a four-walled chamber in combination with said sidewall.

7. In a press box:

- a. two end doors pivoted on vertical axes adjacent the ends of one side of the box;
- b. a side door on the side of the box opposite the pivoted ends of said end doors; and
- c. means on the side door cooperable with means on free ends of the end doors to hold said three doors closed, thus forming a four-walled chamber in combination with the other side, said other side being a fixed wall or a door.

8. In a press box:

- a. two end doors pivoted on vertical axes adjacent the ends of one side of the box;
- b. a side door pivoted adjacent one end on a vertical axis, said side door being located on the side of the box opposite the pivoted ends of the end doors;
- c. means to open said doors by first pivoting the free end of the end door nearest the free end of the side door away from said free end of the side door; and
- d. means responsive to substantially full opening of the side door to open the other end door.

9. Apparatus as defined in claim 8 in which power means is provided for opening and closing said side door.

10. Apparatus as defined in claim 8 in which the end door nearest the free end of the side door is equipped with power means for opening and closing it, and a toggle operatively interposed between said power means and said end door.