Nov. 9, 1954 O. GARAPOLO 2,693,752

REPEAT ACTION PRESS

Filed March 26, 1952 5 Sheets-Sheet 1

Fig. 1

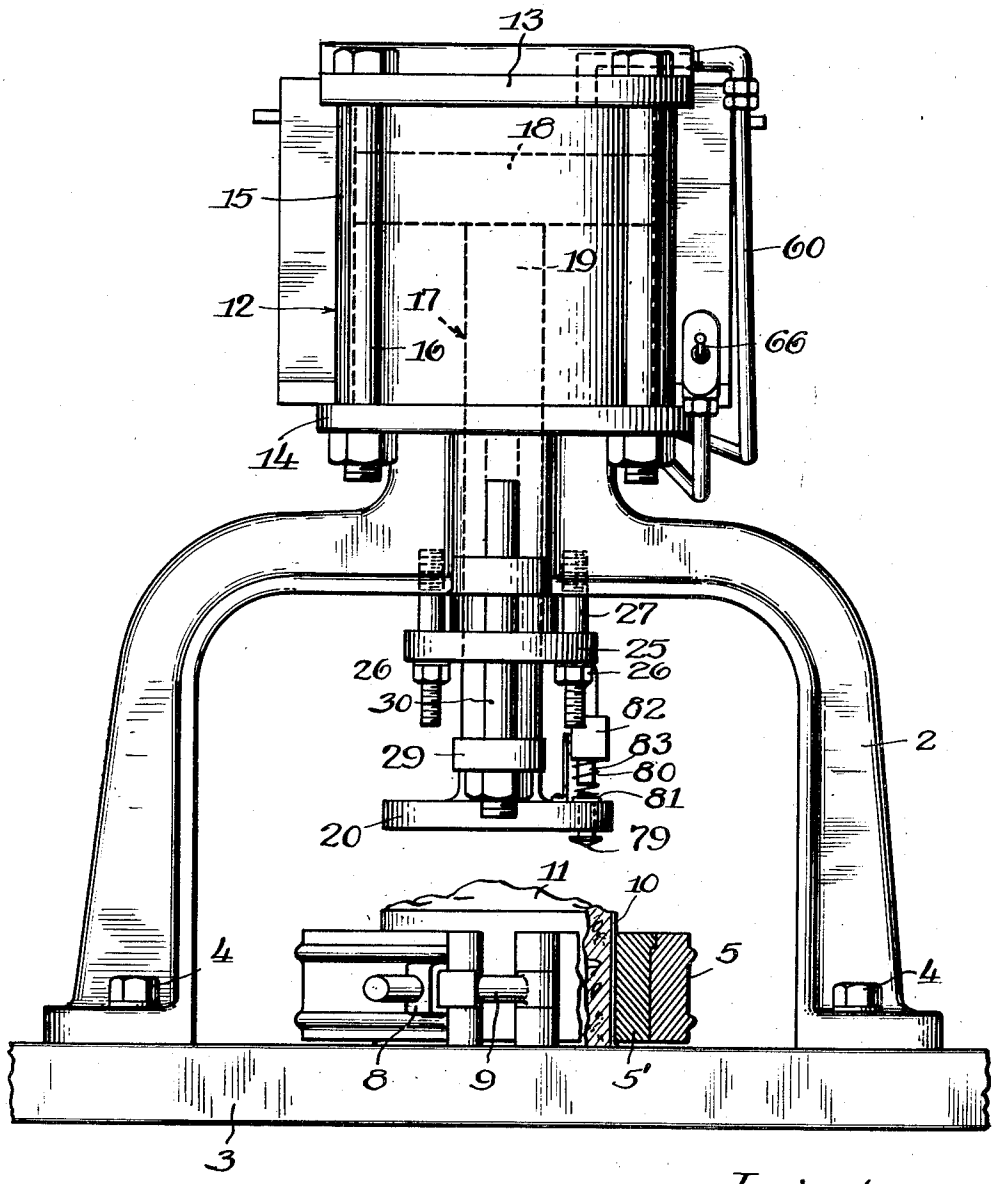

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Fig. 2

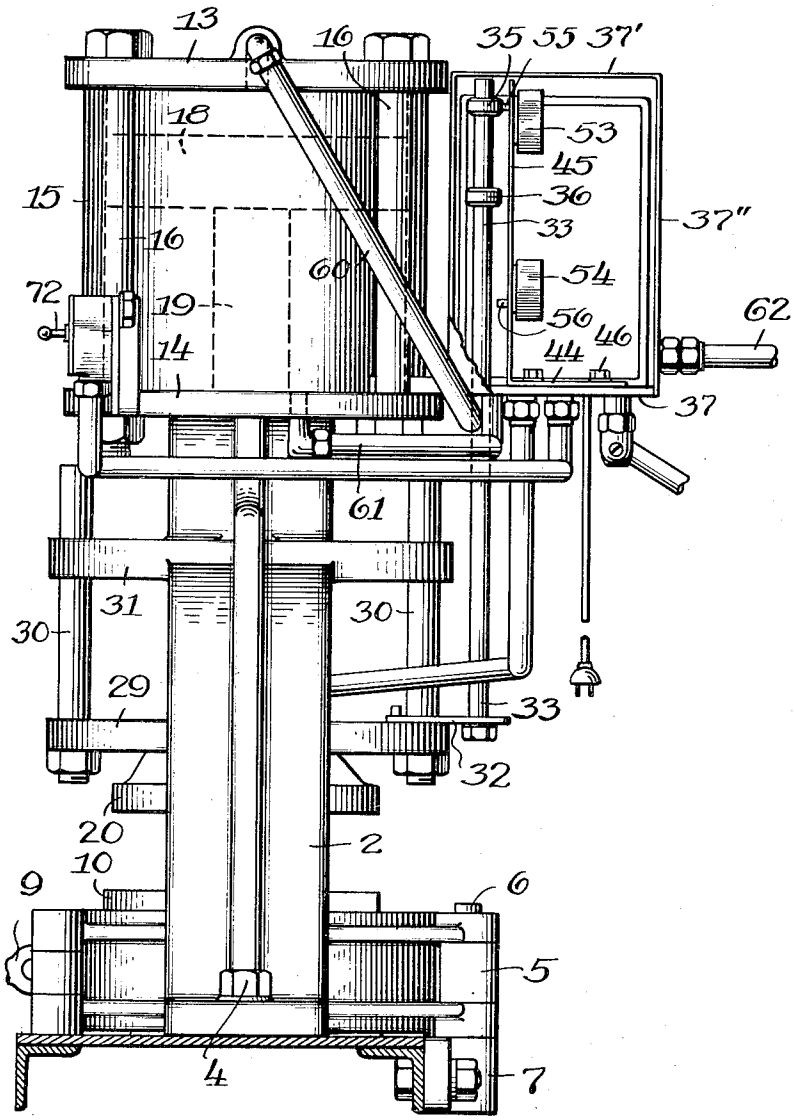

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Fig. 3

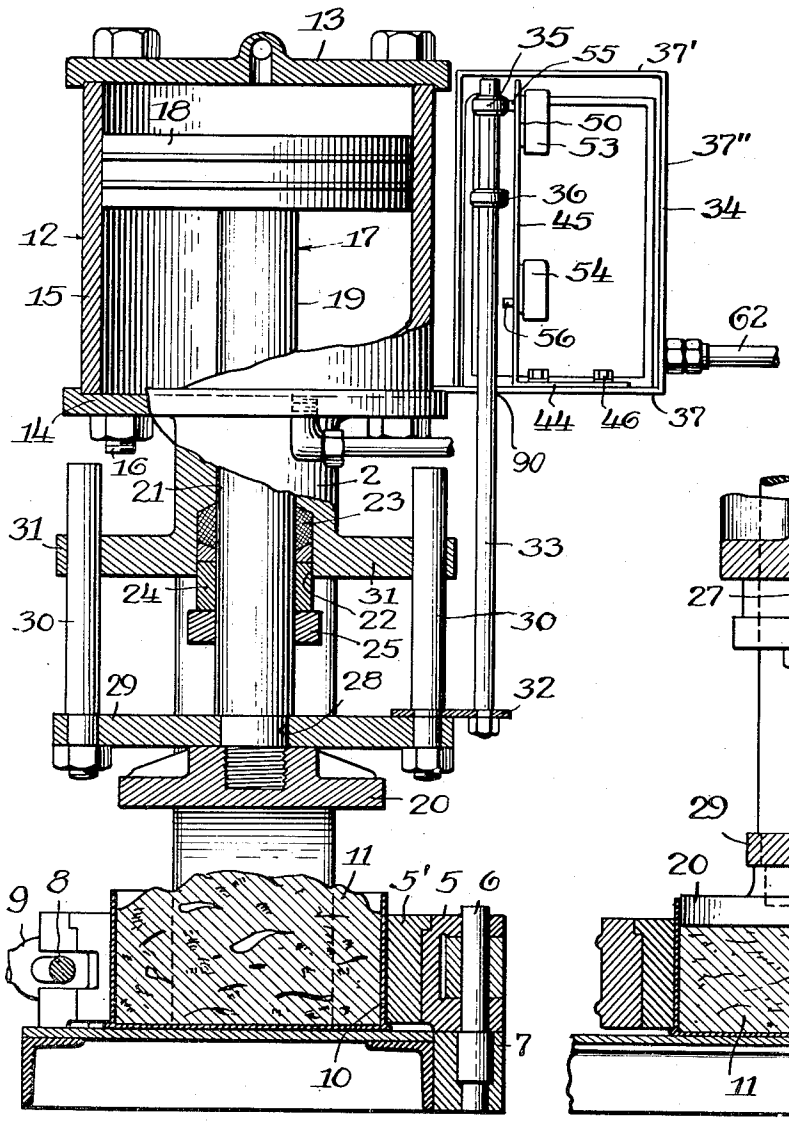
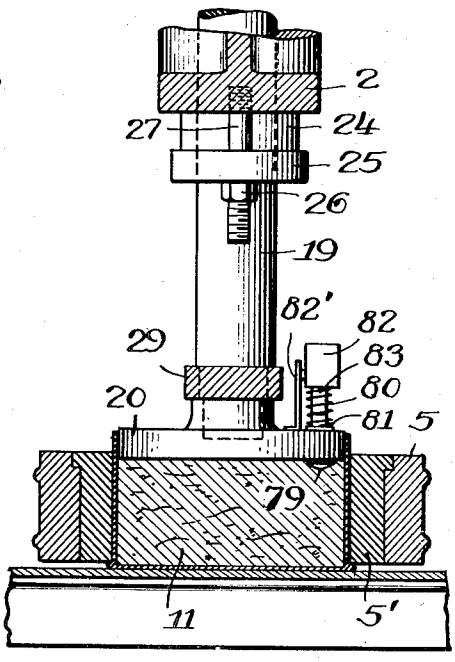


Fig. 4



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Filed March 26, 1952 5 Sheets-Sheet 4

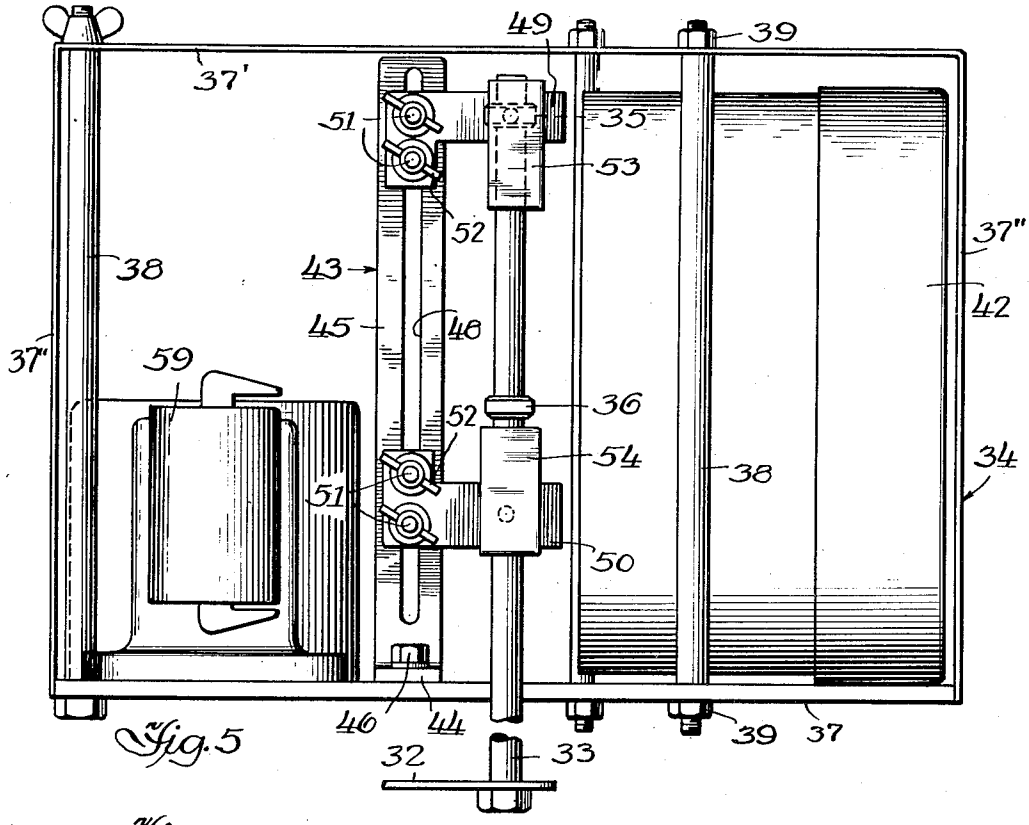
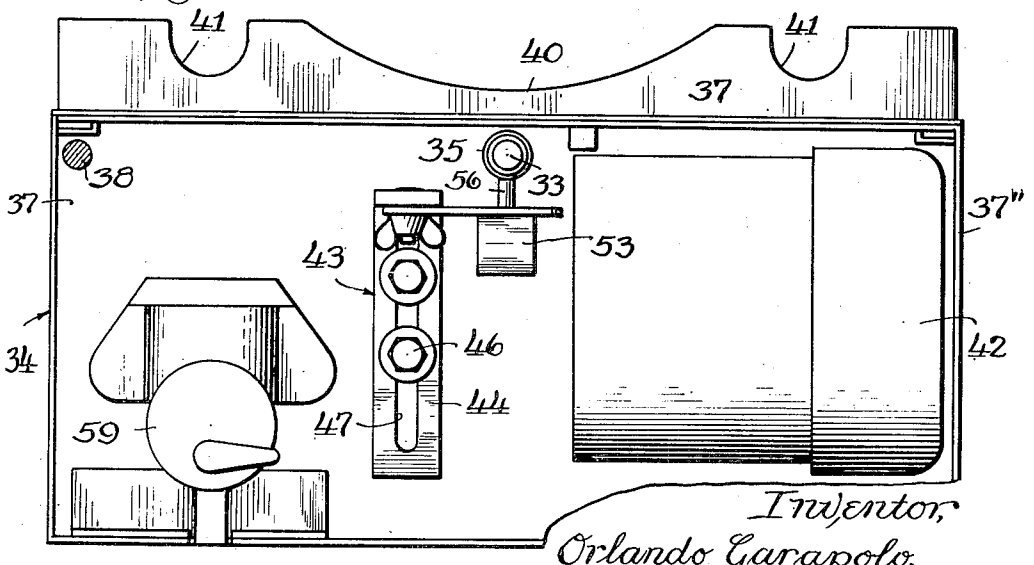


Fig. 5

Fig. 6



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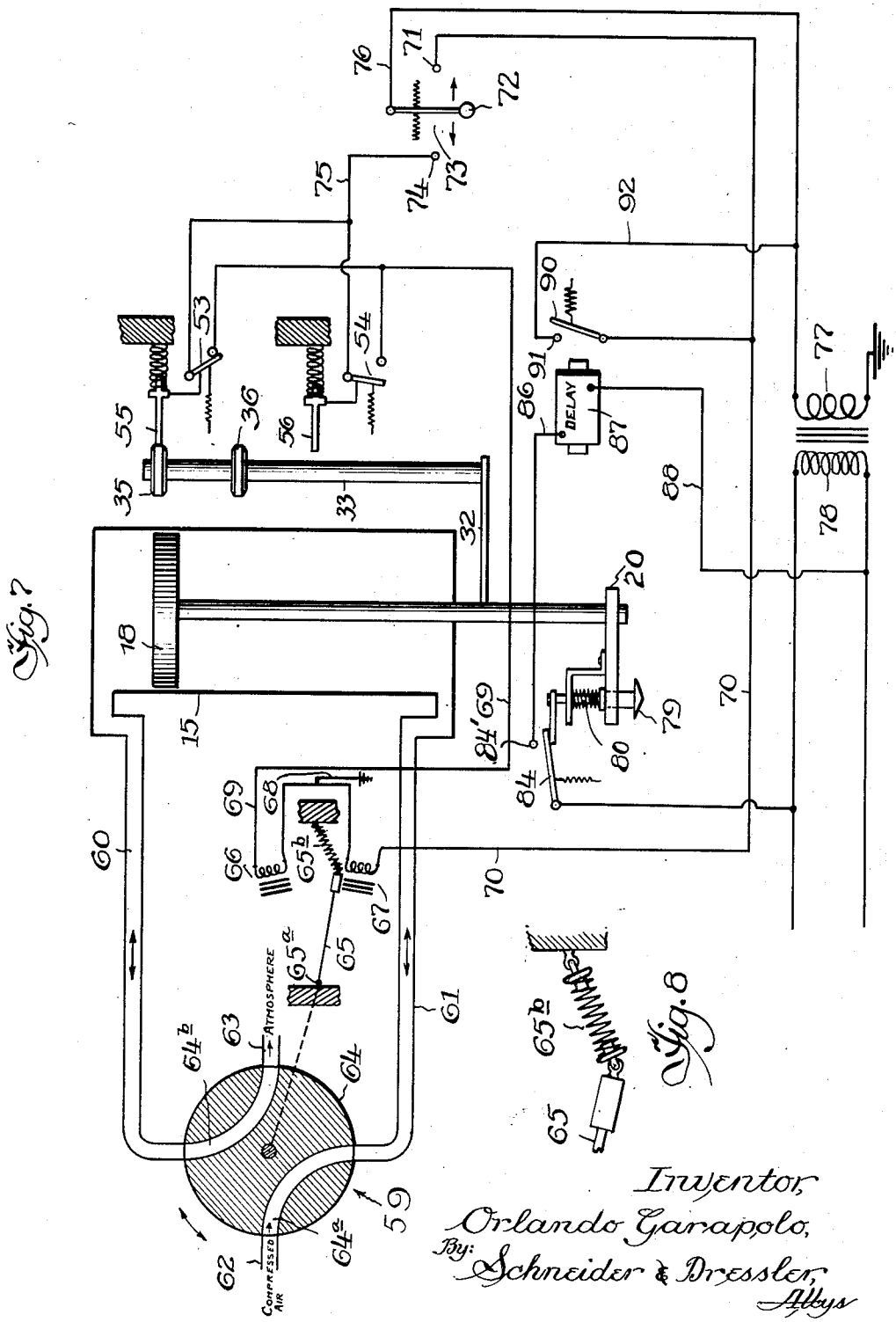

Fig. 7

Fig. 8

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United States Patent Office

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Patented Nov. 9, 1954

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REPEAT ACTION PRESS

Orlando Garapolo, Chicago, Ill., assignor to Wilson & Co., Inc., a corporation of Delaware

Application March 26, 1952, Serial No. 278,607

11 Claims. (Cl. 100—51)

This invention relates to a repeat action press and while generally useful in many fields is particularly useful in packing of foods such as ham, beef, chicken or the like.

In the packing of food into a container, it is of the utmost importance that perfect control over the operation of the press and safety of operation of the press be maintained. It is also desirable that the press be made as nearly automatic as possible with the operating cycles so divided that speedy and safe operation of the press is assured.

As an example, in the packing of boned ham in metal cans, it is customary to dispose initially a ham within an open topped container, usually a metal can. The ham as thus disposed extends above the open top of the container and the ham must be tamped to fit into the can so that the cover may be applied. Thorough tamping of the food product, such as ham, is essential to avoid air pockets which may have been created during boning of a ham or corresponding treatment of other product. Such air pockets are detrimental to uniform cooking. On the other hand, excessive tamping is to be avoided since the material may be unduly macerated. Thus, while tamping is relied upon for tenderizing certain material such as ham and beef, excessive tamping is in itself objectionable.

In accordance with this invention, a press is provided having means whereby controllable tamping periods are provided. Thus more uniform packing is made possible resulting in superior products.

In general, a press embodying the present invention is provided with a ram which is movable over a range. At one extreme end of the range, the ram is in an idle or off position. At the other extreme end of its range, the ram is in a pressure or on position where it tamps the material. Means are provided whereby the ram may be caused to move immediately toward the extreme idle position from any other position in its range. Means, normally inoperative, are also provided for moving the ram toward an on or pressure position. However, this inoperative ram-moving means is rendered operative at the extreme idle or off position of the ram and at one or if desired, more intermediate ram positions. A manual control is provided for selectively controlling said two means and thus selecting the direction of ram travel.

In order to provide predetermined tamping action, the control portion of the press embodying the present invention is so devised that, except for the manual control being in the ram-off position (where the ram is to be moved toward the extreme idle or off position) the ram, after reaching its on position, will be maintained in such on or pressure position for a predetermined time, independently of the manual control. Thus, a predetermined tamp duration is provided, permitting the food to adjust itself to a tamped position. After the expiration of the predetermined tamp period, automatic means operative for a desired period are provided for moving the ram away from the on position toward the off position. At the expiration of this last predetermined period, the manual control is again operative. The ram may thereupon be moved upwardly to the extreme off position or may be reversed from a predetermined position to repeat a tamping stroke. Thus, if desired, one or more deliberate, timed tamping strokes may be delivered to the food or other material being packed.

The structure by which the above mentioned and other advantages of the invention are attained will be described in the following specification, taken in conjunction with the accompanying drawings showing a preferred illustrative embodiment, in which:

Figure 1 is a front elevational view of a press embodying the invention, with the mold and can partially broken away and the ram being shown in an off position;

Figure 2 is a side elevational view of the press of Figure 1;

Figure 3 is a view similar to Figure 2 but showing certain parts in section;

Figure 4 is an enlarged sectional detail showing the ram of the press in its on or pressure position;

Figure 5 is a front elevation showing the timing adjusting means in its housing;

Figure 6 is a top view of the timing adjusting means shown in Figure 5 with the housing removed;

Figure 7 is a diagrammatic showing of the control means and circuit diagram of the electrical parts of the system in normal position, with the manual switch off;

Figure 8 is an enlarged detail of the snap action part of the valve.

Referring to the drawings, the press comprises a generally U-shaped frame **2** secured to base **3** by bolts **4**. There is provided a mold **5** which is split and the two parts of the mold are pivotally secured to pin **6**. Pin **6** is carried by lug **7** extending from base **3**. The free ends of the mold parts are provided with suitable latch means **8**, **9** so that the mold parts may be secured togethed around any suitable container as a can in which a ham **11** is to be packed. A ham is specifically referred to for convenience although any other material may be used. After the ham has been pressed into the can, the mold may be split to release the packed can for further processing. Removable mold liners **5'**, to fit smaller cans may be used in conjunction with mold **5**.

The motive power for actuating the press ram includes air cylinder **12** mounted on the top of frame **2**. Air cylinder **12** has end plates **13** and **14** retained on opposite ends of cylinder proper **15** by means of bolts **16**. A ram structure, generally indicated by **17**, includes piston **18** secured to piston rod **19** extending downwardly through end plate **14**. Pressure plate **20** is secured in any suitable manner to the lower end of the piston rod. To accommodate the piston rod, frame **2** is provided with bore **21** in the upper central portion thereof. The lower portion of bore **21** is enlarged, to provide counterbore **22**, to receive a packing gland **23** of any suitable composition. A collar **24** fitting around piston rod **19** fits within the end of counterbore **22** and serves as a plug to hold the packing gland in place. A plate **25**, apertured to fit around piston rod **19**, is positioned under collar **24** and this plate is held in position by nuts **26** threaded on bolts **27**. Bolts **27** are threaded into suitable recesses extending upwardly into the underside of frame **2** on opposite sides of the piston rod. Nuts **26** are tightened to force plate **25** upwardly against collar **24** and thereby force collar **24** against the packing gland.

Piston rod **19** is provided with a reduced portion **28** just above pressure plate **20**, and around reduced portion **28** is plate **29** apertured to accommodate the same. A plurality of guide pins **30**, secured to plate **29**, extend upwardly therefrom and pass through apertures in lugs **31** extending laterally from frame **2**. Plate **32** is rigidly secured to plate **29** by one of the guide pins **30** and projects laterally therefrom to support a rod **33**. Rod **33** extends upwardly into housing **34** (Figures 5 and 6). Collars **35** and **36** are mounted on the upper portion of rod **33** in vertically spaced relationship. The housing comprises a bottom wall **37**, having a suitable aperture **90** through which rod **33** extends, a top wall **37'**, and side walls **37''** which may be integral with top wall **37'**. A plurality of posts **38** (Fig. 5) pass through the top and bottom walls and are provided with nuts **39** threaded on opposite ends of each post to hold the housing members in assembled relationship. Bottom wall **37** comprises a comparatively heavy plate provided with cut out **40** (Fig. 6) which fits adjacent a portion of the periphery of air cylinder **12** and a pair of recesses **41** which fit around bolts **16** so that the housing **34** may fit closely adjacent the air cylinder. Housing **34** supports a closed

receptacle 42 which houses a variety of electrical equipment hereinafter described.

A bracket 43, comprising a horizontal leg 44 and a vertical leg 45, is adjustably secured to bottom wall 37 by means of bolts 46 which project through a slot 47 in leg 44. The vertical leg 45 is also slotted, as indicated at 48, and plates 49 and 50 are secured to the leg 45 in vertically adjustable position by means of a plurality of bolts 51 and wing nuts 52. A switch, such as for example a micro-switch 53, is rigidly mounted on plate 49, and a similar switch 54 is mounted on plate 50. Micro-switches are adapted to be operated with a small movement of an actuating member. Other kinds of switches may be used. Bolts 51 are provided for each plate to insure stability for the switch mounting. Plates 49 and 50 may be respectively adjusted to any vertical position along slot 48 by loosening wing nuts 52, shifting the plates to the desired position, and then tightening the nuts in place. Micro-switches 53 and 54 are normally open, and are provided, respectively, with plungers 55 and 56, (Fig. 3) each of which is effective to close its switch when it is operated. Collars 35 and 36 are adapted to actuate the plungers when a collar moves into proper position.

Referring to Figure 7, a diagrammatic showing of the press and the controls and electric circuits therefor are disclosed. In order to control the operation of piston 18 within cylinder 15, there is provided a combined air supply and exhaust valve 59. Any suitable two position valve which will supply compressed air to one side of piston 18 and exhaust the other side of piston 18 may be used. Thus an electrically controlled air valve manufactured by The Bellows Co. of Akron, Ohio may be used. It is also possible to have two separate cooperating valves for supplying air and exhausting to atmosphere. It is preferred to have a valve which will have only two definite stable positions for supplying compressed air to one side or the other side of piston 18, as desired. The exhaust valve will therefore also have only two stable positions.

Since valve 59 by itself forms no part of the present invention, it is shown diagrammatically. Thus valve 59 has outlets 60 and 61 communicating respectively with the interior of cylinder 15 above and below piston 18. Valve 59 has inlet 62 supplied with compressed air and exhaust 63 to atmosphere. Valve 59 has rotor 64 provided with elbow passages 64*a* and 64*b*.

By arranging ports at ninety degrees around rotor 64 and having ninety degree elbow passages, a desired valve action may be obtained. Thus as shown, air from inlet 62 goes through elbow passage 64*a* into pipe 61 and thence below piston 18. At the same time, air above piston 18 exhausts through pipe 60, elbow passage 64*b* and port 63. A ninety degree turn of rotor 64 will reverse conditions for piston 18 and cause downward movement of the piston.

Valve 59 is operated by suitable electromagnetic means. This is shown diagramatically. Thus arm 65 carrying shaft 65*a* has its free end spring loaded with coil spring 65*b*. The spring loaded arm may be snapped to either extreme position by energizing winding 66 or 67.

Windings 66 and 67 have common grounded terminal 68. The other terminal of winding 66 is connected by wire 69 to the fixed contacts of switches 53 and 54. The other terminal of winding 67 is connected by wire 70 to fixed contact 71 of manual switch 72. Manual switch 72 is mounted upon the press, convenient to the operator and has movable contact 73 operating between fixed contacts 71 and 74. The switch is biased to a dead center position as shown and may be thrown by the operator so that either one or the other of the fixed contacts may be engaged.

Fixed contact 74 of manual switch 72 is connected by wire 75 to the movable contacts of switches 53 and 54. Movable contact 73 of manual switch 72 is connected by wire 76 to one terminal of secondary 77 of a transformer. The other terminal of this secondary is grounded. The transformer has primary 78 connected to any suitable source of alternating current such as the conventional 110 volt 60 cycle line.

Means are provided for determining a definite tamping time independently of the manual control when the manual control is in the neutral (center) position or tamp stroke position. Such means are as follows:

A plunger 79, suitably mounted in pressure plate 20 so as to project therethrough, is pressed downwardly by a coiled compression spring 80 (Figure 4) which bears against a shoulder 81 and a switch housing 82, which is carried by a bracket 82′ mounted on the upper surface of pressure plate 20 (Figure 4). A plunger 83 extends downwardly from housing 82 in axial alignment with plunger 79 and both are encircled by spring 80 (see Fig. 1). Plunger 79 engages the meat being pressed just before the pressure plate 20 contacts the meat. Switch 84 is provided to be operated by plunger 79. The plunger 79 is pressed upwardly against the action of spring 80 to close switch 84. When plunger 79 closes switch 84, the piston 18 is substantially at the bottom of its stroke, neither of the collars 35 or 36 is in contact with plungers 55 or 56. Thus both switches 53 and 54 are open when the ram is in its on or pressure position. By controlling the spring force on the plungers, the time when switch 84 will be closed by contact of the plunger 59 with the ham can be controlled. Thus the plunger means may be adjusted so that the switch is closed at any part of the ram travel after the ham is reached by the plunger tip.

Switch 84 has the movable contact thereof connected to one side of the power line going to transformer primary 78. The fixed contact 84′ of switch 84 is connected by wire 86 to one terminal of the winding of delay relay 87. The other terminal of the winding of this delay relay is connected by wire 88 to the other line of the power source. Delay relay 87 has movable contact 90 connected to wire 70 and off-normal contact 91 connected by wire 92 to wire 76. Delay relay 87 may be one of a number of types of delay relays. The delay may be obtained by electrical, thermal or mechanical means. Such delay relays may have means for independent adjustment of the delay for closing contacts and delay for opening contacts.

The operation of the system and press will now be described. The parts are normally in the position shown in Figure 7 with the piston normally in the extreme idle or off position shown in Figures 1, 2 and 7. In this position, switch 53 is closed and switch 54 is open. Switch 84 is also open. The air valve is in a neutral position with air cut off from the valve to cylinder 15.

Now, if manual switch 72 is moved to the left or tamping position, movable contact 73 will close against fixed contact 74. This will complete a circuit from ground through secondary winding 77, switch contacts 73 and 74, wire 75, the closed contacts of switch 53, wire 69 through winding 66 and grounded terminal 68. Thus solenoid winding 66 will be energized and cause rotor 64 of valve 59 to be turned anti-clockwise ninety degrees from the position shown in Figure 7. Compressed air will reach the cylinder above piston 18 and cause the piston to move down.

For convenience, winding 66 will be referred to as a ram on or ram tamping winding. Winding 67 will be a ram off or ram idle winding.

When piston 18 reaches the on or pressure position, the ram is down upon the ham and plunger 79 has been moved upwardly to close switch 84. The closure of switch 84 energizes the winding for delay relay 87. This delay relay is slow to close and the delay in closing permits the ram to maintain pressure against the ham and set the ham. After a predetermined delay, contact 90 closes against contact 91 of the delay relay. This places a short circuit across contacts 71 and 72 of the manual switch and closes the circuit for solenoid winding 67. Switches 53 and 54 are both open, thus de-energizing winding 66 when the ram is in the on position. With winding 67 energized, the rotor of air valve 59 is returned to the position shown in Figure 7 and air is supplied to pipe 61 below piston 18. This causes piston 18 to move upwardly from its on or pressure position. After some upward movement of the ram, switch 84 opens. However, the action of delay relay 87 is such that contacts 90 and 91 remain closed for a short period of time even after switch 84 has opened. The ram will start moving upwardly from its on position and move for a predetermined distance, irrespective of the condition of the manual switch.

As soon as the ram is clear of the ham, the operator can see if the ham requires additional pressing. If the ham is tamped satisfactorily, nothing further need be done and the piston in cylinder 15 is permitted to move upwardly toward its normal position as shown in the drawing. Then the operator may open the mold and

remove the ham. However, if the ham requires additional tamping, the operator can operate the manual switch and move contact **73** against contact **74** to the tamping position as soon as he desires. Thus, if the operator is fast, he may catch piston **18** before it has moved up very far and before collar **36** has engaged finger **56**. If finger **56** is engaged by collar **36**, it is clear that the closure of switch **54** will permit the piston's movement to be reversed downwardly in the same manner as by the closure of switch **53** in the top position of the piston. Thus, the operator can catch the piston in either an intermediate or off position for securing reversal of piston travel for an additional tamping stroke.

The movement of the manual switch to the right to close contact **73** against contact **71** serves to energize solenoid winding **67** in the event that the delay relay contacts are open. Thus for example, if the operator should happen to catch his hand in the mechanism, he can close the manual switch to the right.

It is possible to eliminate switch **53** and have a control collar extending for a distance along rod **33**. Thus the collar would keep switch **54** closed in any piston position ranging from the extreme idle top position down to say three-fourths of the ram stroke. However, the ram travels quite fast so that the arrangement shown is highly effective.

It is clear therefore that the ram has an off or idle position at the top of its stroke and an on or pressure position at the bottom of its stroke. From any but the top position, the manual control is operative so that the ram is forced up immediately. From the top position, the manual control (for down movement of the ram) is operative only at the top and an intermediate ram position. At these two positions, rod **33** and its collars, travelling with the ram, render the piston energizing means susceptible to manual control. At other positions, the manual control for the tamping movement of the ram is inoperative, due to the fact that the means for moving the ram downwardly is normally inoperative, except at these two positions; i. e. off and intermediate ram positions. It is of course possible to change these two positions by adjusting the collars on rod **33**.

While I have described a preferred embodiment of my invention in considerable detail, it will be understood that the description is intended to be illustrative, rather than restrictive, as many details may be modified or changed without departing from the scope of the appended claims. Accordingly, I do not desire to be restricted to the exact structure described.

I claim:

1. A press comprising a base, means on said base for supporting a container into which material is to be compacted, a ram mounted on said base for compacting material, said ram having off or idle and on or tamping positions and being movable over a range between said two positions, a first means, normally inoperative, for moving said ram toward its on position, a second means for moving said ram toward its off position, manual means for selectively controlling said first and second ram-moving means, and means controlled by said ram for rendering said first ram-moving means operative in the off ram position and in an intermediate ram position so that at either of said two positions, said ram may be manually controlled to move toward its on position and may also be manually controlled to move toward the off position.

2. A press comprising a base, means on said base for supporting a container into which material is to be compacted, a ram mounted on said base for compacting material, said ram having off or idle and on or tamping positions and being movable over a range between said two positions, a first means, normally inoperative, for moving said ram toward its on position, means movable with said ram cooperating with said first ram-moving means to render the first ram-moving means operative at the ram off position and an intermediate ram position, a second means for moving said ram toward its off position, and manual means for selectively controlling said first and second ram-moving means, whereby said ram may be manually controlled to move from any position toward its off position and from only two positions toward its on position.

3. A press comprising a base, means on said base for supporting a container into which material is to be compacted, a ram mounted on said base for compacting material, said ram having off or idle and on or tamping positions and being movable over a range between said two positions, a first means, normally inoperative, for moving said ram toward its on position, a second means for moving said ram toward its off position, manual means for selectively controlling said first and second ram-moving means, means controlled by said ram for rendering said first ram-moving means operative in the off ram position and in an intermediate ram position, means cooperating with the compacted material at the on ram position for maintaining said ram in its on position for a predetermined time interval and for thereafter energizing said second ram-moving means for a predetermined time interval, whereby said ram may be manually controlled, when it is at its off position or one intermediate position, to move said ram toward its tamping position and whereby said ram may be manually controlled to move the same from any position toward its off position.

4. The structure according to claim 3 wherein said means for rendering the first ram-moving means operative includes a member movable with said ram and power-control means cooperating with said member at predetermined points in the path of movement of said member for controlling the power for initiating ram movement in a tamping direction.

5. A press comprising a base, means on said base for supporting a container into which material is to be compacted, a ram mounted on said base for compacting the material, said ram having off or idle and on or tamping positions and being movable over a range between said two positions, valve controlled air pressure means for moving said ram toward either its on or its off position, electro-magnetic means for controlling said valve, said electro-magnetic means including windings and energizing circuits for operating said valves, manual switch means for selectively energizing said valve controlling means so that said ram may be moved in a desired direction, a pair of switches in the circuit for controlling the valve to obtain tamping movement of said ram, the manual switch means being inoperative to select a tamping movement of the ram except when either one of said pair of switches is closed, one of said pair of switches being closed only when said ram is in its uppermost position, and means controlled by said ram at predetermined ram positions for closing the other switch of said pair of switches.

6. A press comprising a base, means on said base for supporting a container into which material is to be compacted, a ram mounted on said base for compacting material, said ram having off or idle and on or tamping positions and being movable over a range between said two positions, fluid means for moving said ram in either direction, valve means for controlling the supply of fluid to move said ram, said valve having an active on position where the ram is moved toward the on position and an active off position where the ram is moved to its off position, electro-magnetic means including windings for controlling said valve, there being on and off windings respectively which when energized actuate the valve to active on and active off positions, circuits for said windings, manual switch means in said circuits for selecting which of the two windings shall be energized, the on winding circuit including at least one additional normally open switch, and means controlled by the ram for closing said additional switch at predetermined ram positions.

7. The press according to claim 6 wherein a second additional switch means is provided in the off winding circuit in parallel to the manual switch means, and means responsive to the compacted material and associated with said second additional switch means for closing said second additional switch means after a predetermined time after arrival of the ram at its tamping position.

8. A press comprising a base, means on said base for supporting a container into which material is to be compacted, a ram on said base for compacting material, said ram having off or idle and on or tamping positions and being movable over a range between said two positions, fluid means for moving said ram in either direction, valve means for controlling said fluid means, said valve means having active on and active off positions corresponding respectively to the force on same ram to move the same toward its on position and the force on said ram to move the same toward its off position, windings for operating

said valve means, said windings, when respectively energized, being adapted to move said valve to the corresponding valve position, circuits including manual switch means for selectively controlling the energization of said windings, the on winding circuit including first additional switch means, means movable with said ram for closing said first additional switch means at the ram off and intermediate positions, said manual means being operative to energize the on winding only when said first additional means are closed, a second additional switch means in parallel to the manual switch means in the off winding circuit, means responsive to the compacted material for closing said second additional switch means at a predetermined time after said ram reaches its tamping position whereby said ram is maintained in a tamping position after it reaches the same for a predetermined time and is thereafter moved toward its off position independently of the manual control.

9. A press comprising a base, means on said base for supporting a container into which material is to be compacted, a ram mounted on said base for compacting material, said ram having off or idle and on or tamping positions and being movable over a range between said two positions, fluid means for moving said ram in either direction, valve means for controlling said fluid means, said valve means having active off and active on positions respectively corresponding to ram movement toward the off or on positions, electro-magnetic means including windings for operating said valve, said windings, when respectively energized, setting said valve to the corresponding off or on position, circuits including manual switching means for controlling the flow of current to said windings, a first additional switching means in series with the manual switching means in the on winding circuit, means actuated by said ram for closing said first additional switch means only at predetermined ram positions, delayed action switching means connected across the manual switching means only in the off winding circuit, and ram controlled means responsive to the compacted material for actuating said delayed action switching means when said ram reaches its tamping position whereby said manual control is effective in predetermined ram positions to cause tamping movement of the ram, said delayed action means maintaining the ram in the tamping position for a predetermined time after it has reached said tamping position, after which said ram is moved toward its off position, and said manual control when operated for off ram movement being effective at all times.

10. The press according to claim 9 wherein the ram controlled means for operating said delayed action switching means includes a finger on said ram for contacting the material being operated upon.

11. A press comprising a base, means on said base for supporting a container into which material is to be compacted, a ram mounted on said base for compacting material, said ram having off or idle and on or tamping positions and being movable over a range between said two positions, an air cylinder and piston for moving said ram in either direction, a valve having a compressed air inlet, an exhaust to atmosphere and two air outlets, pipes connecting the valve outlets to said cylinder on opposite sides of said piston, two position means in said valve for connecting the compressed air and exhaust to said pipes, said valve in one position supplying air to one pipe and exhausting the other pipe and in the other position reversing the connections, electro-magnetic means including windings for operating said valve, said windings, when respectively energized, setting said valve to a position for supplying air to one or the other of said pipes, circuits including manual switching means for energizing said windings, at least one additional switch in the winding circuit adapted, when energized, to set said valve in the position occupied by it when said ram is in the tamping position, said additional switch being in series with the manual switching means, a rod, means for securing said rod so that it moves with the ram, means on said rod for cooperating with said additional switching means to close said switching means at least at the off ram position, delayed action switching means including a winding, said delayed action switching means having switching contacts connected across the manual switching means only in said circuit, a plunger carried by said ram and adapted to be moved when said ram reaches the material in tamping position, a second additional switch operated by said plunger, and a circuit including said second additional switch and the winding on said delayed action switching means for closing the contacts of said delayed action switching means when said plunger is moved by the material being operated upon whereby said ram is retained in tamping position for a definite time and then moved toward the off position.

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