Oct. 9, 1934. G. L. HURST 1,976,128

PNEUMATIC CASER

Filed May 17, 1930 3 Sheets-Sheet 1

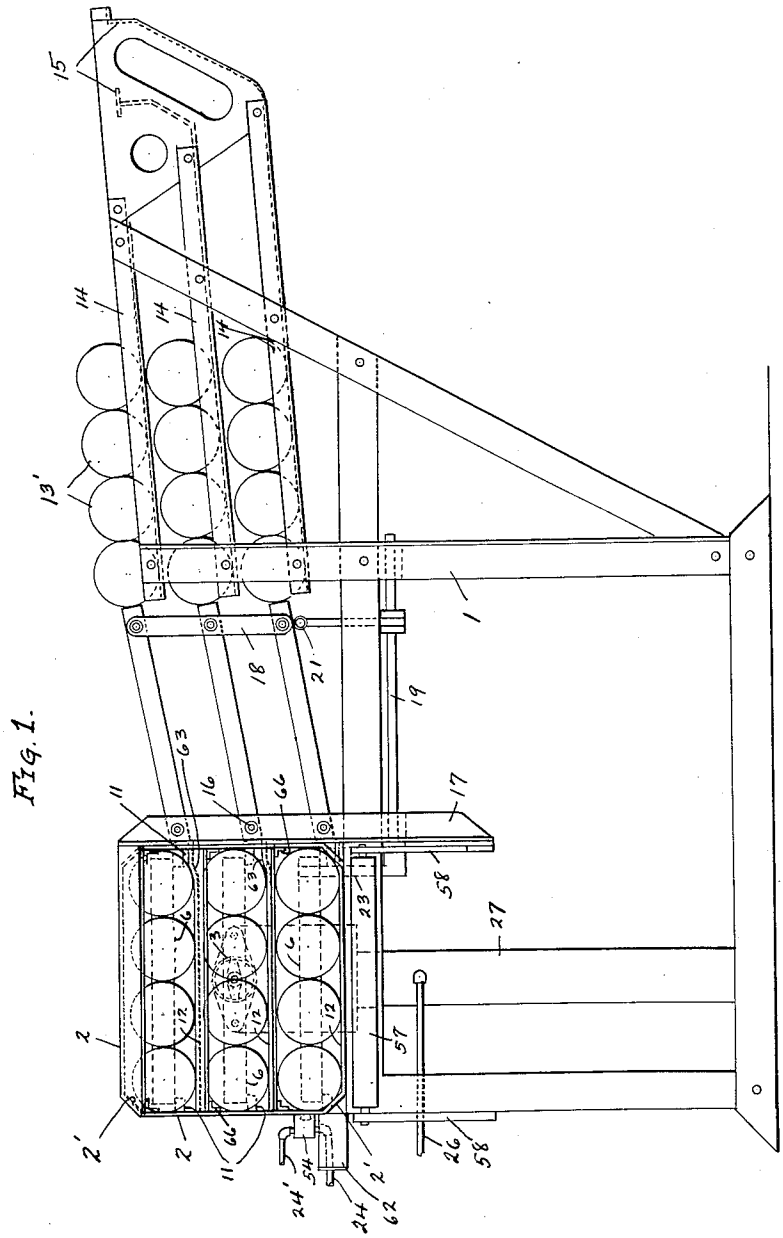


FIG. 1.

INVENTOR.
GEORGE L. HURST
BY Miller, Boyken & Brice
ATTORNEYS.

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FIG. 2.

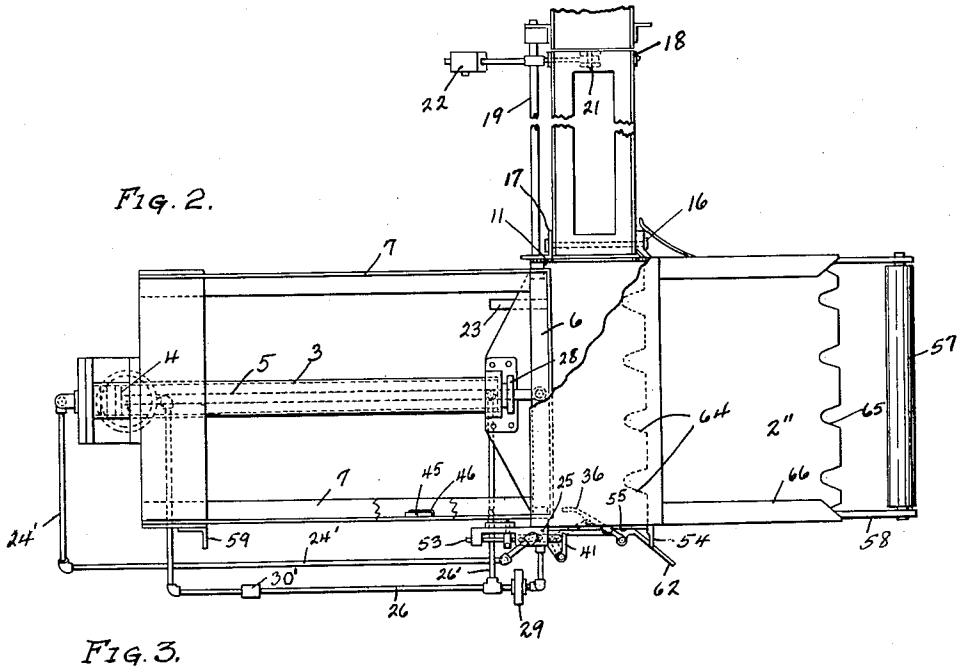
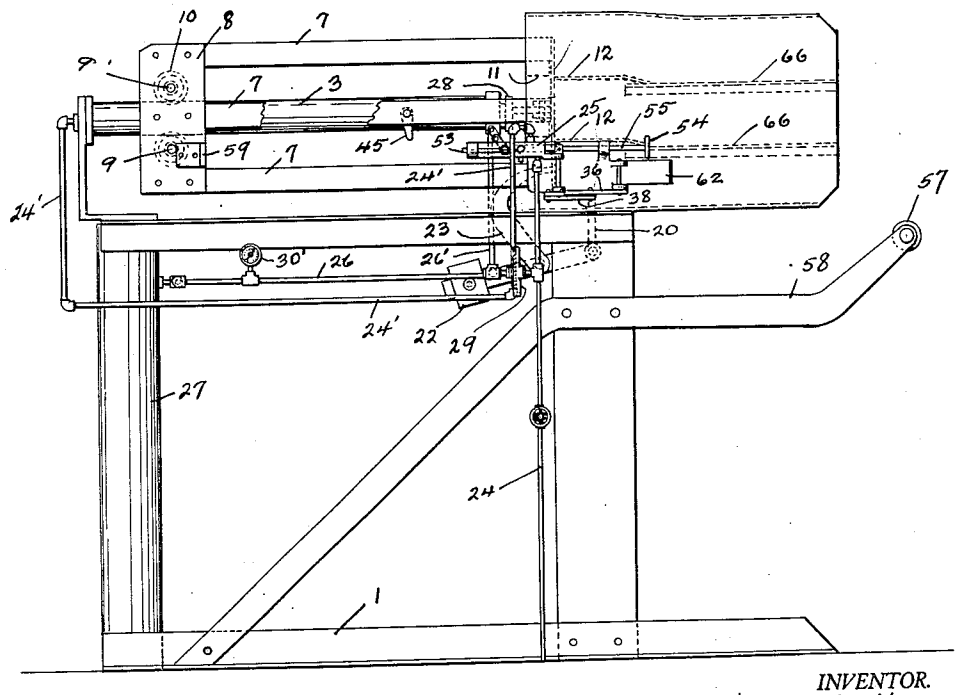


FIG. 3.



INVENTOR.
GEORGE L. HURST
BY Miller Boykin & Bried
ATTORNEYS.

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FIG. 4.

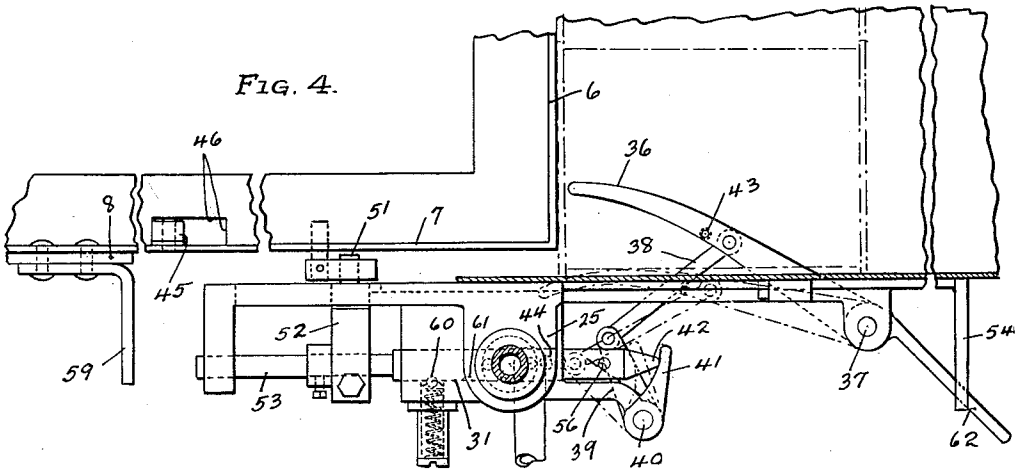
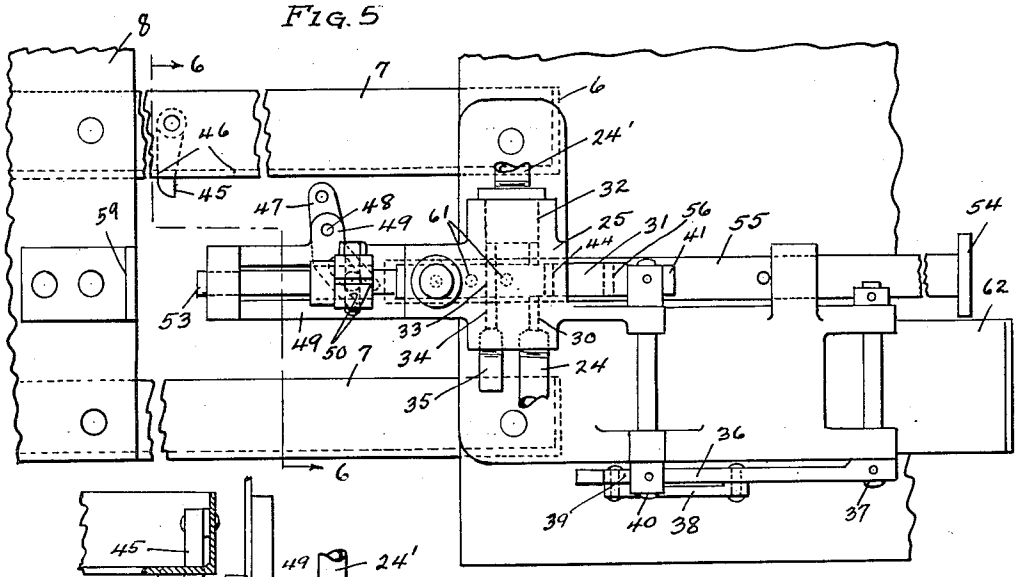


FIG. 5



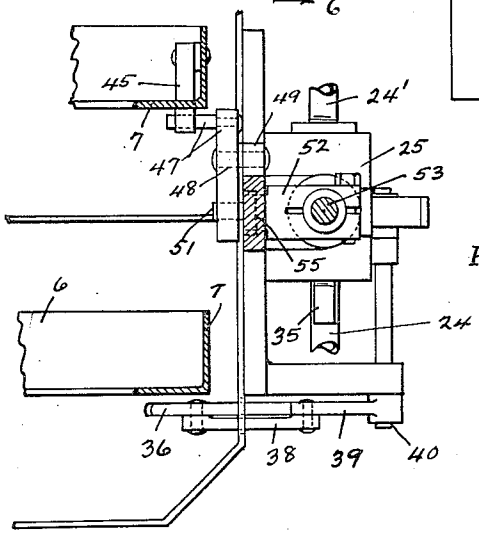


FIG. 6.

INVENTOR.
GEORGE L. HURST
BY Miller, Boyken & Brice
ATTORNEYS.

Patented Oct. 9, 1934 1,976,128

UNITED STATES PATENT OFFICE

1,976,128

PNEUMATIC CASER

George L. Hurst, San Francisco, Calif.

Application May 17, 1930, Serial No. 453,215

13 Claims. (Cl. 226—15)

This invention relates to machines or "casers" for filling boxes or fiber cases with cans of commodities preparatory to closing and shipping the boxes or cases, and the objects of the invention are to provide improvements in this class of machine whereby the operations of the machine are automatically carried out, also whereby compressed air is used as the motive force and thus a gentle starting motion is given the reciprocating parts and the machine can stop at any point of its cycle without danger of injury in case the cans get stuck, also such a machine which will effectually separate the proper quantity of cans for each case and which will eject several layers of cans to completely fill the case automatically upon tripping of a trigger by the case presented to the machine by an operative.

Other objects and features of the invention will appear in the following specification and accompanying drawings.

In the drawings:—

Fig. 1 is a front elevation of the machine as seen from the operative's position.

Fig. 2 is a plan view of the machine with a portion of the can feeding tracks broken away.

Fig. 3 is an elevation of the side of the machine opposite the can feeding tracks.

Fig. 4 is an enlarged plan view of a portion of the machine showing the automatic air valve for actuation by the incoming cans and tripping mechanism.

Fig. 5 is an elevation of the valve and tripping mechanism of Fig. 4.

Fig. 6 is a cross section of Fig. 5 as seen from the line 6—6 thereof.

Briefly described, my machine comprises a frame supporting at convenient height a horizontally extending can-holding rack adapted to hold the desired number of cans for a box or case and of a size so that the open end of the case may be slipped horizontally over the outer end of the rack while held in the hands of an operative and then pushed further over the rack to thereby trip an air valve which operates an air plunger to eject the cans into the case and push it from the rack back into the hands of the operative who deposits the filled case on some adjacent conveyor for removal.

In further detail the frame of the machine is shown at 1, the can-holding rack 2, horizontally supported air cylinder 3 containing a double acting piston 4 having a piston rod 5 connected at its outer end to the central one of three transversely disposed pusher bars 6 which are secured to the forward free ends of a rectangular frame or pusher carriage having six rearwardly extending side members 7 connected together at their rear ends by plates 8. Supported by plates 8 are shafts 9 which extend across above and below the air cylinder and carry grooved rollers 10 rollable on the cylinder so that the rear end of the carriage is guided for horizontal reciprocation upon movement of the air piston.

The forward ends of horizontal members 7 are vertically spaced and slidably guided by means of short blocks secured to the sides of the can-holding rack 2 as indicated at 11 in Fig. 3.

The can-holding rack is a substantially rectangular sheet metal box with corners removed as at 2' and of a size to hold a number of cans to go within the box or case, and is provided with three shelves 12 supporting the cans for free rolling to position 13 shown in Fig. 1 from three superimposed tracks 14 feeding the can by gravity through openings in the side of the box.

Tracks 14 receive the cans from any source such as a conveyor or chute not shown and are formed at their receiving ends as at 15 to split a layer of rolling cans into several layers for feeding along the tracks by gravity into the machine. For a distance corresponding to the width of the holding rack a section of each track is cut and pivoted as at 16 to a brace or angle 17 on the side of the rack so as to swing upward to break the continuity of the tracks and the track sections are pivotally linked together as at 18 for simultaneous lifting of their outer ends at certain intervals during the operation of the machine.

These swinging sections of track upon being raised effect two important operations, first they discharge a measured number of cans into the holding rack 2, and second they effectually act as a stop or gate against the oncoming supply of cans to the machine.

The track sections are automatically lifted upon return stroke of the pusher bars 6 through means of a counterbalanced link and shaft connection operated by and upon return of the pusher bars, and which mechanism includes a small horizontal shaft 19 rotatably supported on the frame of the machine an arm 20 secured to the shaft pivotally linked at its forward end at 21 to the lowermost track section and counterweighted at 22 to take part of the weight of the track sections so that they can be lifted with little effort, while on the end of the shaft adjacent the can rack is secured an arm 23 formed in a manner to be struck by the lower-

most pusher bar upon its return movement to thus lift the tracks and discharge the cans upon them into the rack 2.

The gate lifting arm 23 is set to lift the track sections just before complete return of pusher bars so that side members 7 will obstruct the rolling of the cans into the rack until the oncoming cans 13' on the main tracks have been blocked off by the raised gate sections of track.

To operate the air piston, air under pressure is delivered to the machine in a pipe 24 to a special slide valve 25 which controls the motions of the pusher bars, and from this valve the air pipe leads to the rear end of the air cylinder 3 as at 24' while a line takes off from the incoming air pipe at a point before the valve 25 and is branched as at 26, 26' leading respectively to a reserve air chamber 27 and to the forward end of the air cylinder 3 just in back of the stuffing box 28 for the piston rod.

An automatic pressure regulator 29 of conventional construction holds a relatively low pressure in pipes 26, 26' and chamber 27 as this air functions merely as a spring to return the pusher bar carriage after each forward stroke upon exhaust of the power stroke air through valve 25 as later described.

Chamber 27 conveniently takes the form of a vertical cylinder closed at both ends and serving as the main post of the machine frame at the rear end of the air cylinder, while a gage 30' on pipe 26 or chamber 27 indicates the properly reduced pressure.

The air valve 25 is arranged to trip for different lengths of strokes so as to successively push layers of cans forward in the holding rack 2 and then to eject them with a long stroke into a box or case pushed over the laterally projecting end of the rack. The valve generally designated 25 is of the piston type with different transverse passages or grooves to produce the required results, and is best shown in the enlarged Figs. 4, 5 and 6.

In these figures the incoming air pressure pipe 24 is indicated with its valve port 30 blocked by piston 31 and air pipe 24' from the power end of air cylinder 3 exhausting through chamber 32 piston port 33, body port 34 and exhaust pipe nipple 35 to atmosphere, so that with valve in this position low pressure air in chamber 27 will of course return pusher carriage to the left so that a set of cans will be rolled from pivoted track sections into the holding rack.

With the above exhaust condition of the valve, a charge of cans rolling into the can-holding rack the end of a lever 36 in the path of the leading lower can will be tripped to shift the valve. This lever is pivoted at its other end at 37 to a lug on the side of the can-holding rack and pivotally linked at 38 to the end of one arm 39 of a bell crank pivotally supported at 40 on the valve body and having its other end 41 flattened and overlying the end 42 of the piston valve which is of wedge form with end rounded to make a good working contact.

The arrangement of lever, link and bell crank form a toggle which is easily operated by the rolling cans, and a stop such as a pin 43 on lever 36 strikes link 38, as indicated in dotted position of the parts, to prevent the toggle straightening beyond the point shown so that a reverse movement of the valve will be able to reset lever 36. Lever 36 when once tripped by the entering cans remains down until later restored at the long forward stroke of the pusher carriage.

Upon lever 36 being moved by the layer of cans rolling into the can-holding rack the valve is moved to the left and port 33 is displaced to close the exhaust and a port 44 is aligned with the air pressure port 30 to at once cause air piston 4 to force pusher carriage to the right and move the layer of cans forwardly in the can-holding rack. However, as soon as the cans have advanced far enough to clear a space for a fresh layer of cans to enter, a swinging latch 45 pivoted to the side of one of the carriage members 7 and projecting through an opening 46 in the lower web of the bar, strikes the upper end 47 of a small crank arm pivoted at 48 to a bracket 49 extending from the valve and the other end of which crank arm is slotted as at 50 and engages a pin 51 on a lug 52 secured to a reduced extension 53 of valve 31 so that the valve is again moved to the left.

Upon this second movement to the left of valve 31, port 44 is shifted from inlet 30 to outlet 34 so that the carriage at once returns after the short forward stroke and another layer of cans roll into the rack just in back of the first layer which now occupy a forward position in the rack.

There are now two layers of cans in the rack and which is the usual quantity required in an ordinary fiber case of canned goods, and the operative now slips a case or box over the outer end of the rack and pushes it well on until its leading edge strikes the outwardly turned end 54 of a trip rod 55 which is slidably supported alongside the can rack and has its rear end positioned adjacent the lug 52 of the valve extension, so that the valve is once more slid to the left to thereby break the exhaust connection of port 44 and bring still another port 56 into alignment with the power port 30.

The valve is now to the left as far as it will go with valve extension 53 projecting to the left of supporting bracket 49, so that upon connecting of port 56 the carriage moves forward a full stroke and the pusher bars eject the cans into the case and the filled case into the hands of the operative while partially supported on a roller 57 mounted on a pair of outwardly extending frame braces 58.

This long forward stroke of the pusher carriage causes a lug 59 at the side of the carriage to strike the end of valve extension 53 and return the valve past all the ports to the starting position as well as to reset can trip levers 36, 47 and 55. At the final end of the forward stroke the exhaust 34 is open as shown in the drawings.

To insure alignment of the various valve ports as the valve is slid step by step to the left I provide a spring ball detent 60 working in depressions 61 properly spaced along the side of the valve.

As fiber cases have hinged cover flaps at the forward edges I provide an angular guard member 62 adjacent valve trip 54 so as to turn the flap on that side inward and guide it so that it will operate the trip.

Within the can-holding rack the shelves 12 are each given a slight downward bend at 63 so as to retain the cans in place against rebound when received from the titled track sections, and these shelves are formed with scalloped out portions 64 at their forward edges so that the cans in being pushed from the shelves will fall gently to rest upon one another in the forward part of the rack and without danger of scraping the labels.

The forward end of the rack is of somewhat reduced size so as to crowd the cans together and has no shelves. Its bottom 2'' is scalloped at the forward edge at 65 to prevent labels being scraped as the cans and box are ejected.

Small stiffening angles 66 are provided on the side walls and placed in a position so as not to contact with the cans.

In operation of the machine, the return after ejecting a filled case and the short stroke of the carriage are entirely automatic and the can-holding rack is thus filled with cans almost before the filled case has been removed by the operative, so that the cases are filled just as fast as a man can place empty cases over the end of the rack.

The yielding nature of the power application with just enough pressure to make it operate gives absolute insurance against accident or injury to the machine, as the machine will instantly stop at any excessive overload resulting from any cause.

Having thus described my invention it will be apparent that changes may be made without affecting the operation of the machine as expressed within the scope of my appended claims.

I claim:

1. A machine of the character described comprising a can-holding rack adapted to receive and hold a plurality of cans for ejecting into a case, an ejector mounted for reciprocable movement in the rack for ejecting the cans, a pneumatic cylinder operatively connected to said ejector, means for supplying air to opposite ends of said cylinder for operating said ejector alternately in opposite directions and means tripped by the case for operating said pneumatic cylinder.

2. A machine of the character described comprising a can-holding rack adapted to receive and hold a plurality of cans for ejecting into a case, an ejector mounted for reciprocable movement in the rack for ejecting the cans, a pneumatic cylinder operatively connected to said ejector, and means for supplying air to opposite ends of said cylinder for operating said ejector alternately in opposite directions, the air for the return stroke being in non-exhausting confinement.

3. A machine of the character described comprising a can-holding rack adapted to receive and hold a plurality of cans for ejecting into a case, an ejector mounted for reciprocable movement in the rack for ejecting the cans, a pneumatic cylinder operatively connected to said ejector, means for supplying air to opposite ends of said cylinder for operating said ejector alternately in opposite directions, the air for the return stroke being in non-exhausting confinement, and means maintaining the confined air for the return stroke at substantially constant reduced pressure as compared with the air for the power stroke.

4. In a can caser, a rack for holding the cans to be cased, a horizontally disposed power cylinder provided with a piston and a piston rod projecting therefrom, a can pusher carriage secured to the free end of the piston rod and arranged in straddling relation to said cylinder, and means supporting said carriage on said cylinder for reciprocation upon movement of said piston.

5. In a can caser, a rack for holding the cans to be cased, a horizontally disposed power air cylinder provided with a piston and a piston rod projecting therefrom, a cam pusher carriage secured to the free end of the piston rod arranged in straddling relation to said cylinder, and a roller carried by said carriage rollable along said cylinder.

6. In a can caser, a rack for holding the cans to be cased, a horizontally disposed power cylinder provided with a piston and a piston rod projecting therefrom, a cam pusher carriage secured to the free end of the piston rod and arranged in straddling relation to said cylinder, means supporting said carriage for reciprocation upon movement of said piston, and a multiple ported air valve on said machine provided with a plurality of tripping devices adapted variously to actuate said power cylinder upon movement of said carriage.

7. In a can caser, a rack for holding the cans to be cased, a horizontally disposed power cylinder provided with a piston and a piston rod projecting therefrom, a cam pusher carriage secured to the free end of the piston rod arranged in straddling relation to said cylinder, means supporting said carriage for reciprocation upon movement of said piston, and a multiple ported air valve on said machine provided with a plurality of tripping devices adapted variously to actuate said power cylinder, one of said trips adapted for actuation by cans fed to the rack and another by a case placed upon the same.

8. In a can casing machine, a can-holding rack adapted to hold a plurality of superimposed rows of cans for ejecting into a case to be filled, plates supporting the cans in layers for sliding therealong, and means for sliding the cans along the plates, the leaving edges of said plates being scalloped to reduce scraping action on the cans.

9. A machine of the character described comprising a can-holding rack adapted to receive and hold a plurality of cans for ejecting into a case, a pneumatically actuated ejector mounted for reciprocable movement in the rack for ejecting the cans, means arranged and adapted to control the movement of the ejector for giving said ejector short and long strokes whereby a row of cans is moved forward in the rack upon a short stroke and ejected upon a long stroke.

10. A machine of the character described comprising a can-holding rack adapted to receive and hold a plurality of cans for ejecting into a case, a pneumatically actuated ejector mounted for reciprocable movement in the rack for ejecting the cans, means arranged and adapted to control the movement of the ejector for giving said ejector short and long strokes whereby a row of cans is moved forward in the rack upon a short stroke and ejected upon a long stroke, the short stroke controlling means being in the path of incoming cans for operation thereby.

11. A machine of the character described comprising a can-holding rack adapted to receive and hold a plurality of cans for ejecting into a case, a pneumatically actuating ejector mounted for reciprocable movement in the rack, means arranged and adapted to control the movement of the ejector for giving said ejector a short and long stroke whereby a row of cans is moved forward in the rack upon a short stroke and ejected upon a long stroke, the long stroke controlling means being in the path of a case to be filled when applied over said rack.

12. In a machine as defined in claim 11, the short stroke controlling means being in the path of incoming cans for operation thereby and the long stroke controlling means being in the path

of the case to be filled when applied over said rack.

13. In a can casing machine, a can-holding rack adapted to hold a plurality of superimposed rows of cans, said rack being extended to receive the open end of a case to be filled, a pneumatically actuated ejector mounted for reciprocable movement in the rack, means arranged and adapted to control the movement of the ejector for causing the ejector to move to eject the cans into the case and a trip for applying the pneumatic pressure to the ejector for actuating said ejector arranged for operation by contact with said case as it is pushed over the rack and pneumatic means arranged to automatically return said ejector to its initial position for ejecting cans into the case upon said ejector reaching the end of the ejection stroke.

GEORGE L. HURST.