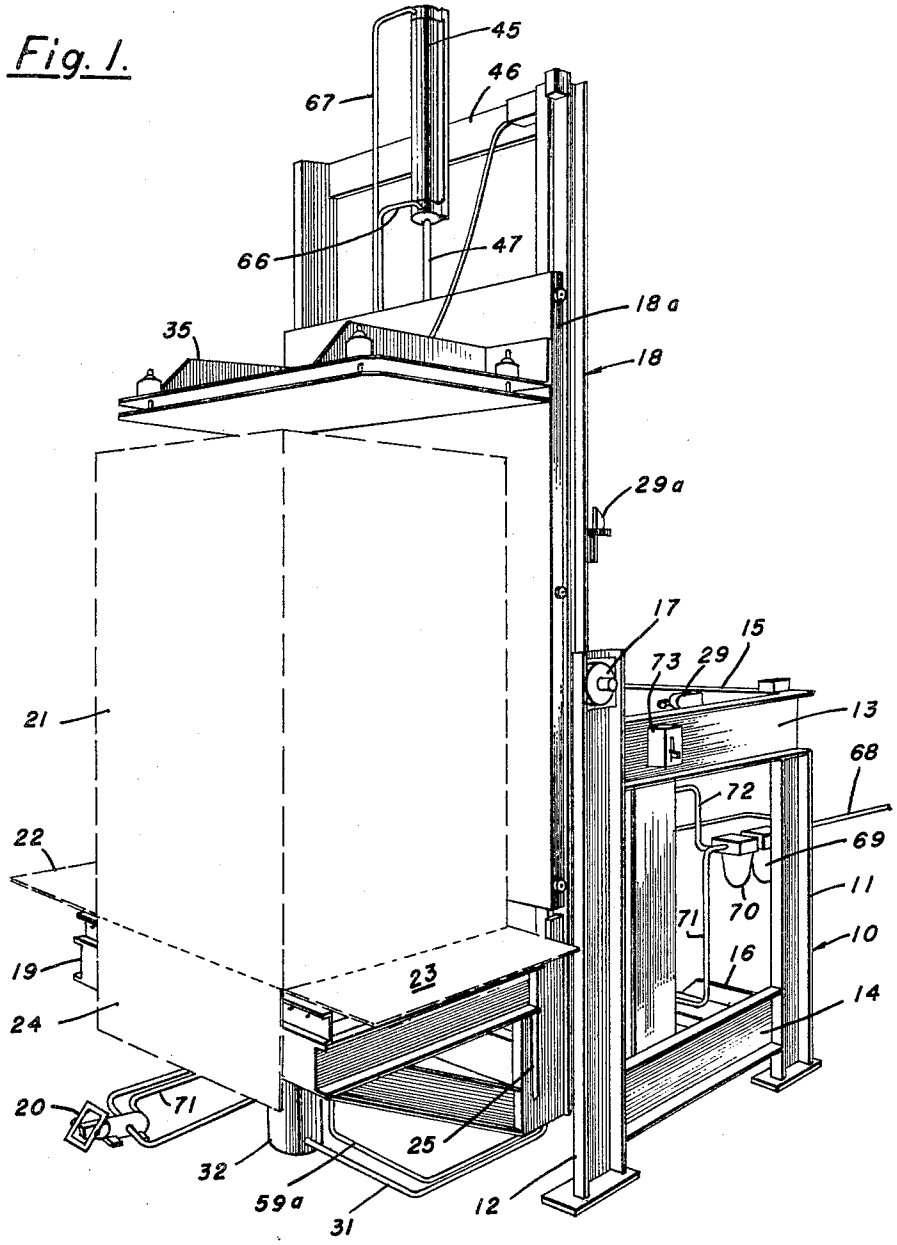
Dec. 25, 1962 V. L. NIELSEN 3,069,828

MACHINE FOR POSITIONING LARGE CARTONS

Filed Jan. 9, 1961 4 Sheets-Sheet 1

Fig. 1.



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Dec. 25, 1962 V. L. NIELSEN 3,069,828

MACHINE FOR POSITIONING LARGE CARTONS

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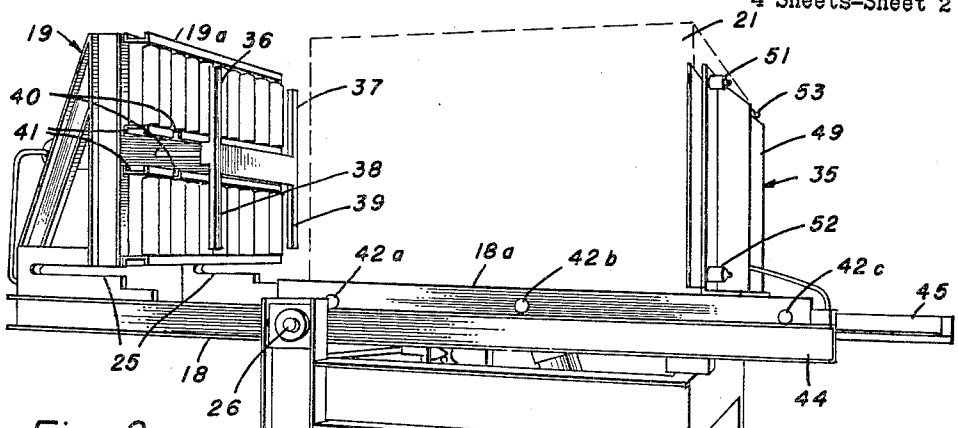
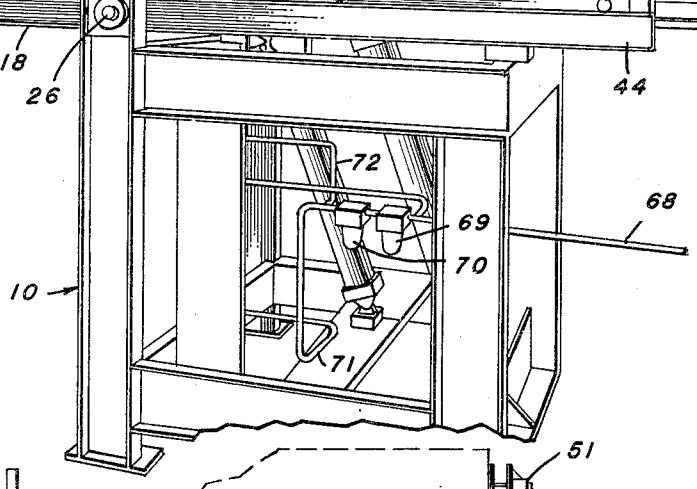


Fig. 2.



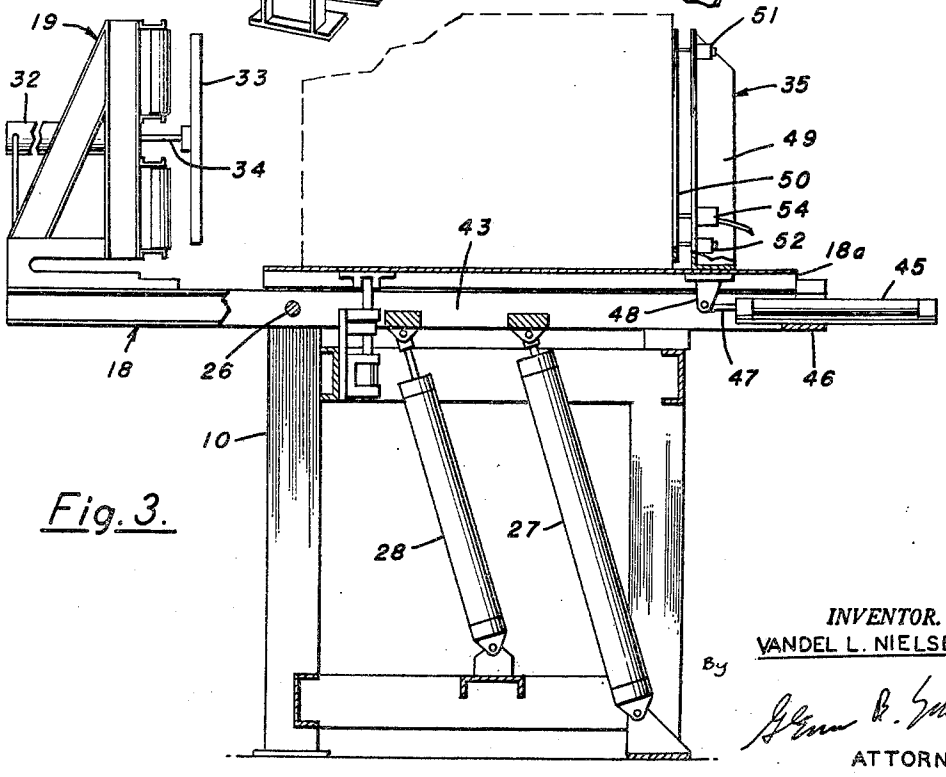


Fig. 3.

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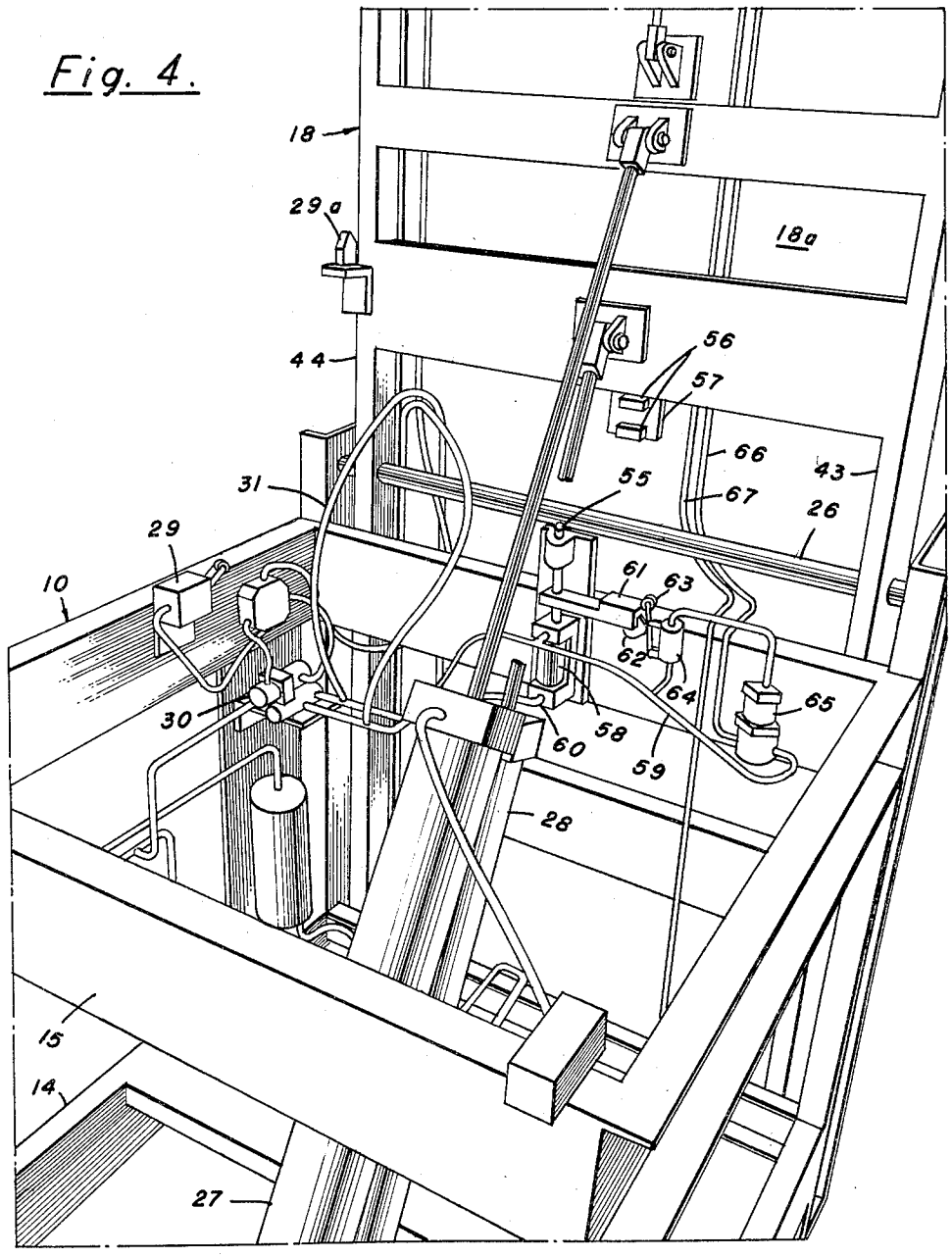
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MACHINE FOR POSITIONING LARGE CARTONS

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Fig. 4.



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MACHINE FOR POSITIONING LARGE CARTONS

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Fig. 5.

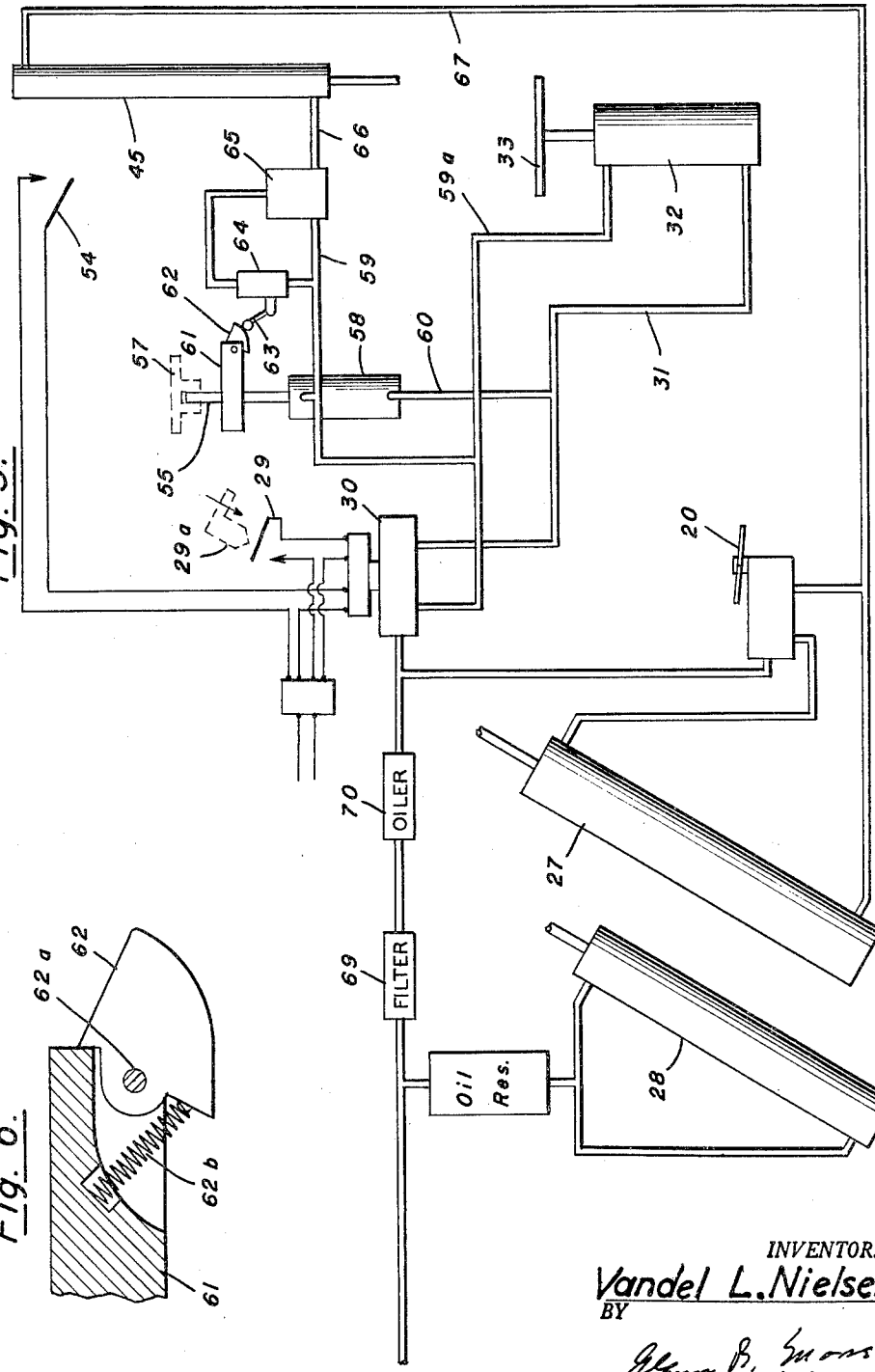


Fig. 6.

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3,069,828

MACHINE FOR POSITIONING LARGE CARTONS

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Filed Jan. 9, 1961, Ser. No. 81,564
6 Claims. (Cl. 53—374)

This invention relates to packaging machinery, and provides a machine for handling large cartons during the closure and sealing of the flaps. The invention has been adapted primarily as a piece of production line equipment for use in the manufacture of large household appliances such as stoves, refrigerators, washing machines, dryers, etc. It is conventional practice to complete the assembly of these appliances with the underside of them supported on a pallet carried on a conveyor. At the end of the assembly operations, a carton is slipped over the top of the appliance, and the top flaps of the carton are closed and sealed.

Closing and sealing the bottom flaps presents a greater problem, as the support of the appliance must be temporarily altered. A machine embodying this invention rotates the carton with the appliance preferably 90 degrees to a new position of rest, places the appliance in proper position in the carton, and provides clearance for the closure of the flaps opposite the bottom of the appliance. The several features of the invention will be discussed in further detail through an analysis of the particular embodiment illustrated in the accompanying drawings. In the drawings:

FIGURE 1 presents a perspective view of the machine in the initial position, with an appliance within a carton, and the upper flaps of the carton presumed closed.

FIGURE 2 presents a perspective view in side elevation illustrating a subsequent position of the machine, with the carton rotated to a new rest position, and with the bottom flaps closed after the appliance has been properly placed within the carton.

FIGURE 3 is a fragmentary sectional elevation of the machine in the position shown in FIGURE 2.

FIGURE 4 presents a perspective view of the rear portion of the machine in the FIGURE 1 position, and illustrating the position and relationship of the active components.

FIGURE 5 is a schematic diagram showing the operating circuits of the machine.

FIGURE 6 is a fragmentary view on an enlarged scale of the one-way valve actuator.

The illustrated machine includes a base generally indicated at 10 formed by similar structure at the opposite ends, which includes the uprights 11 and 12, the horizontals 13 and 14, and horizontal members 15 and 16 interconnecting the ends. The structural details of the base are of secondary importance, and may be altered to suit the materials available. The primary function of the base 10 is to provide a pivotal support at the bearings 17 for the movable frame 18.

The preferred form of the frame 18 is essentially L-shaped in configuration, and has portions which receive the carton in two different positions, respectively. The first of these portions is indicated generally at 19, and includes a supporting structure of interconnected steel beams of convenient cross section which serve as a mounting for the section of roller conveyor indicated at 19*a*. When in the FIGURE 1 position of the machine, this section of roller conveyor forms a continuing part of the assembly conveyor of the factory. When a carton reaches the position shown in FIGURE 1, the machine is energized by the foot control 20, and the operation of the machine begins. When the carton indicated in dotted lines at 21 was placed over the contained appliance, the two flaps 22 and 23 will normally

lay along the surface of the conveyor, in the position illustrated in FIGURE 1. The flap 24 can hang down over the edge of the conveyor as shown, and the opposite flap can be accommodated in similar position as a result of the presence of the slots 25 in the beam structure 19. As an alternative to this arrangement, a deflector of conventional design may be incorporated in the conveyor to gradually move the rear flap into a position extending upwardly from the corner of the carton along the side of the carton.

With the frame 18 supported on the shaft 26 in the bearings 17, actuation of the air cylinder 27 against the action of the damping cylinder 28 will move the frame 18, together with the appliance and carton, from the FIGURE 1 position to the FIGURE 2 position. The opposite ends of both the cylinders 27 and 28 are pivotally connected to the base 10 and to the frame 18, respectively. The damping cylinder 28 is essentially a conventional hydraulic unit functioning as a governor, and controlling the rate of rotation of the frame as a function of the amount of constriction in the hydraulic lines.

The rotation of the frame 18 into the FIGURE 2 position proceeds until the fixed cam 29*a* (refer to FIGURE 4) contacts the arm of the limit switch 29. This switch controls one circuit of the solenoid-operated air valve 30, and supplies air pressure through the conduit 31 to the positioning cylinder 32 secured to the portion 19 of the frame. The ram member 33 is mounted on the piston rod 34 controlled by the cylinder 32, and actuation of the cylinder applies a force which shoves the appliance and the carton to the right, as shown in FIGURE 3, away from the portion 19 and against the barrier 35. In the retracted position of the cylinder 32, the arms 36—39 are received in notches 40 in the central rails 41 of the roller conveyor section 19*a*. The arms 36—39 are in position to fit down between the rollers so that the plane of tangency at the top of the rollers is not intersected by the arms in the retracted position.

In the preferred form of the invention, the member supporting the carton in the FIGURE 2 position is a carrier 18*a* supported on rollers bearing on the side members 43 and 44 of the frame 18 as shown at 42*a–c*, and on similar rollers at the opposite side of the machine. The purpose of the carrier 18*a* is to provide for easier movement of the carton 21 as it is shifted from one position to another. The cylinder 45 is mounted on the cross member 46 of the frame 18, and the rod 47 of the cylinder 45 is connected to the bracket 48 of the carrier 18*a*. The barrier structure 35 includes a fixed member 49 secured to the carrier 18*a* in perpendicular relationship, and a plate 50 is resiliently mounted with respect to the member 49 on the spring units 51, 52, 53, and a similar spring unit (not shown) in a position diagonally opposite from the unit 51.

As the cylinder 32 forces the contents of the carton into the carton and against the plate 50, the limit position is reached in which the switch 54 is actuated. The switch 54 controls a circuit of the solenoid valve 30 which reverses the pressure at the cylinder 32 and retracts the member 33. Prior to this time, the actuation of the switch 29 has caused the valve 30 to extend the lock bar 55 into position between the abutments 56 mounted on the plate 57 secured to the carrier 18*a* to hold it against the force of the cylinder 32. To permit the cylinder 45 to position the carrier 18*a* for flap-closure clearance, the solenoid valve 30 is also connected to cause the withdrawal of the bar 55 in response to the actuation of the switch 54 through the supply of pressure to the cylinder 58 through the conduit 59. Placement of the bar 55 in locking position had been in response to pressure sup-

plied to the conduit 60. The solenoid valve 30 is a standard device, the structure of which forms no part of this invention. The conduit 59*a* is connected to induce retraction of the cylinder 32 by pressure supplied from the conduit 59.

The withdrawal of the locking bar 55 carries with it the transverse extension 61 carrying the pivoted dog 62 mounted to control the arm 63 of the valve 64. This valve controls a delay device 65 which determines the application of air to the retraction side of the cylinder 45 through the conduit 66. The carrier 18*a* is retracted under these conditions to the right, as shown at FIGURE 2, and remains there until opposite actuation of the foot valve 20, which applies pressure to the conduit 67 to move the carrier to the left and place the carton against the roller conveyor section 19*a* The dog 62 is pivotally mounted on the pin 62*a* of the extension 61 so that the valve arm 63 is actuated only on downward movement. As the locking bar 55 is extended upwardly into engagement with the abutment 56, on the next cycle of the machine, the dog 62 will move past the arm 63 against the action of the spring 62*b* without actuating the valve 64.

Air pressure is supplied to the machine through the conduit 68, and the installation preferably includes a filter 69 and an oiler 70 in the air circuit. After the air has passed through the filter and oiler, one branch of the circuit extends to the foot valve 20 through the conduit 71, and the other to the solenoid valve 30 through the conduit 72. An off-on switch 73 is preferably included for the electrical power supply.

The particular embodiments of the present invention which have been illustrated and discussed herein are for illustrative purposes only and are not to be considered as a limitation upon the scope of the appended claims. In these claims, it is my intent to claim the entire invention disclosed herein, except as I am limited by the prior art.

I claim:

1. A machine for positioning cartons, said machine comprising: a frame having first and second carton-receiving portions substantially perpendicular to each other; ram means mounted on said first portion for exerting forces against the contents of cartons in a direction perpendicular to said first portion; carton-carriage means movably mounted on said second portion for movement toward and away from said first portion, said carriage means including a barrier for engaging cartons to prevent them from sliding along said carriage means; locking means for preventing movement of said carriage with respect to said second portion; means for releasing said locking means in response to pressure on said barrier; actuating means for positioning said carriage with respect to said second portion; a base structure pivotally supporting said frame; and means for selectively rotating said frame between positions in which said first and second portions are in horizontal supporting position.

2. A machine for positioning cartons, said machine comprising: a frame having first and second carton-receiving portions substantially perpendicular to each other; ram means mounted on said first portion for exerting forces against the contents of cartons in a direction perpendicular to said first portion; carton-carriage means movably mounted on said second portion for movement toward and away from said first portion, said carriage means including a barrier for engaging cartons to prevent them from sliding along said carriage means; locking means for preventing movement of said carriage with respect to said second portion; actuating means for positioning said carriage with respect to said second portion; a base structure pivotally supporting said frame; and means for selectively rotating said frame between positions in which said first and second portions are in horizontal supporting position.

3. A machine for positioning cartons, said machine comprising: a frame having first and second carton-receiving portions substantially perpendicular to each other; ram means mounted on said first portion for exerting forces against the contents of cartons in a direction perpendicular to said first portion; carton-carriage means movably mounted on said second portion for movement toward and away from said first portion, said carriage means including a barrier for engaging cartons to prevent them from sliding along said carriage means; actuating means for positioning said carriage with respect to said second portion; a base structure pivotally supporting said frame; and means for selectively rotating said frame between positions in which said first and second portions are in horizontal supporting position.

4. A machine for positioning cartons, said machine comprising: a frame having first and second carton-receiving portions substantially perpendicular to each other; ram means mounted on said first portion for exerting forces against the contents of cartons in a direction perpendicular to said first portion; a barrier for engaging cartons to limit movement thereof with respect to said frame means; actuating means for positioning cartons with respect to said second portion toward and away from said first portion; a base structure pivotally supporting said frame; and means for selectively rotating said frame between positions in which said first and second portions are in horizontal supporting position.

5. A machine for positioning cartons, said machine comprising: a frame having first and second carton-receiving portions substantially perpendicular to each other; ram means mounted on said first portion for exerting forces against the contents of cartons in a direction perpendicular to said first portion; actuating means for positioning cartons on said second portion toward and away from said first portion; a base structure pivotally supporting said frame; and means for selectively rotating said frame between positions in which said first and second portions are in horizontal supporting position.

6. A machine for positioning cartons, said machine comprising: a frame having first and second carton-receiving portions substantially perpendicular to each other; ram means mounted on said first portion for exerting forces against the contents of cartons in a direction perpendicular to said first portion; control means operable to actuate and retract said ram means; a base structure pivotally supporting said frame; and means for selectively rotating said frame between positions in which said first and second portions are in horizontal supporting position.

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