ABSTRACT: An apparatus for selectively dispensing cartons or boxes of various sizes to a working station from a plurality of stacks of boxes.
CARTON DISPENSING APPARATUS

This invention relates to an apparatus for dispensing boxes, and more particularly to an apparatus for dispensing the bottom carton from a vertical stack of cartons.

In packaging garments into boxes or cartons, the packaging lines are operated at a relatively high rate of speed, and for efficient operation the cartons must be properly positioned on a worktable at the desired time. It is also important that when different type garments are being packaged simultaneously, various size cartons can be conveniently supplied in a sequential manner to the worktable. Since the garment packer works at a high speed, the stack of boxes must be very tall, therefore, if he takes a box from the top of the pile each time, as the height of the pile varies the efficiency of his motions change accordingly. That is, if the stack of boxes is very tall, he must reach to the top of the stack in order to obtain a carton, which operation takes considerably more time than if the carton was positioned on the worktable at the desired location each and every time. It has been contemplated that the boxes could be stacked adjacent the work station and the packer merely pull the bottom box or carton from the stack. This would eliminate the necessity of him reaching to the top of the stack each time, but when the stack is very tall there is a tremendous amount of weight on the bottom carton which impedes pulling a carton therefrom.

Accordingly it is an important object of the present invention to provide a carton-dispensing apparatus which will dispense a desired size carton to a particular packaging location by merely manipulating a foot pedal or push button.

Another important object of the present invention is to provide a relatively simple carton-dispensing apparatus which can dispense the cartons to a particular location in units, which would normally be a top and a bottom carton, or one by one.

Another important object of the present invention is to provide a carton-dispensing apparatus wherein a packer can select a desired size carton by merely pressing a particular foot pedal.

Still another important object is to provide a carton dispenser which permits storage of cartons in a normally unproductive space (overhead), yet permits dispensing of the carton to be used conveniently within reach of an operator.

The construction designed to carry out the invention will be hereinafter described, together with other features thereof.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawings wherein an example of the invention is shown and wherein:

FIG. 1 is a side elevational view illustrating a magazine having a plurality of stacks of nested cartons therein which are to be dispensed to a packaging station;

FIG. 2 is an enlarged perspective view illustrating a carton in an unfolded or open position;

FIG. 3 is an enlarged sectional view illustrating a bottom carton of a nested stack being pushed off a supporting flange; and

FIG. 4 is an enlarged side sectional elevation of the magazine and a schematic illustration of the pneumatic system for the pushers.

The drawing illustrates an apparatus for dispensing cartons from a stack of nested flat cartons. Such includes a plurality of hoppers A for retaining the cartons in vertical stacks. Each of the hoppers have opposed sidewalls in which flange members B extend inwardly. The flange members B engage the bottom carton of a stack adjacent opposite edges thereof for aiding in supporting the stack of cartons. Power operated pushers are provided adjacent each of the opposed flange members and are aligned with the bottom carton. Means are provided for activating the power operated pushers C for shifting the opposed pushers inwardly to push the bottom carton from opposite sides. This buckles the bottom carton causing such to drop off the opposed flange members. Thus, the cartons can be dispensed from the hopper sequentially by merely manipulating the means for activating the power operated pushers.

While the apparatus is being described as dispensing cartons one by one from the magazines or hoppers, it is to be understood that such can be dispensed in units. That is, frequently it is desired to dispense two bottom cartons and top carton. Therefore, instead of merely dispensing the bottom carton, it may be desirable to dispense both a bottom and top simultaneously as a unit.

Referring in more detail to the drawing, the hopper A may be constructed of any suitable material, such as plywood, and has a pair of opposed sidewalls 11 and 12, respectively, which are joined by vertical end walls 13 and 14, respectively. Spaced vertical interior walls 15 and 16 extend between and join the sidewalls 11 and 12 so as to define three magazines 17, 18 and 19, respectively, which retain the different size stacks of cartons. Normally, the dimensions of the magazines are slightly larger than the dimension of a carton 20, which is to be placed therein, in a collapsed condition. As can be seen, the sidewall 12 only encloses the lower portion of the hopper A so as to provide access to the magazines 17, 18 and 19, respectively. Vertical elongated piano hinges 21 are mounted by any suitable means on the interior walls 15 and 16, and the end wall 14, for retaining the cartons within the magazines after such have been placed therein. The hinges are pivoted outwardly when the cartons are being loaded within the magazines. The cartons 20 can also be loaded from the top of the magazine which is usually left open.

The hopper A has a bottom 22 which extends from the end wall 14 and terminates short of the end wall 13 so that an inclined ramp 23 can pass through an open end adjacent the end wall 13. It is, also, noted that the end wall 13 terminates short of the bottom so as to provide an opening for the inclined ramp 23. The inclined ramp 23 is positioned directly beneath each of the magazines so that as the carton is dispensed therefrom, such falls on the inclined ramp 23 and slides downwardly onto a table 24 where the packer is packaging the garments.

The cartons may be any conventional carton which are used for packaging garments, such as dresses, and when in the collapsed condition the thickness of the carton adjacent the end which rests on the flange B is slightly more than twice the thickness of the carton along the sides in the middle portion thereof.

When the carton 20 is in a collapsed position, the end walls 25 are folded down flat adjacent the bottom 26 of the carton which causes the sidewalls to fold inwardly along the creased line 27 so that the thickness adjacent the end is four sheets of material plus the thickness of a rectangular square 28 which is positioned in each corner to aid in holding the carton in an erected position when unfolded. In other words, the thickness of the carton adjacent the ends, when in a collapsed position, is five layers of cardboard, wherein the thickness adjacent the middle portion of the carton, generally designated by reference character 29, is two layers of cardboard. Thus, when the cartons are nested in a vertical stack substantially all the weight of the stack is supported adjacent the ends of the cartons, and normally the middle portions 29 of the cartons do not exert force on adjacent cartons.

Flange members B are mounted in the sidewalls 11 and 12 by means of an angle-brace 30 and extend inwardly within each of the magazines for supporting one end of the cartons 20. The other end of the cartons are supported on an inclined member 31 which is carried on the walls 14, 15 and 16, and is constructed of any suitable low friction, high abrasion resistance material, such as nylon or polypropylene. The portion of the flange member 31 upon which the end of the carton rests is inclined at about 30° from the vertical so that when the carton is pushed off the flange members B it will pivot downwardly, such as illustrated in broken lines in FIG. 1, then drops off the inclined member onto the ramp 23. The inclined member minimizes pinching by the weight of the stack. Mounted on the side of the walls 13, 15 and 16 is a %-inch board 32, which terminates approximately one quarter of an inch above the bottom dimension of member 31. The amount of offset of the
forded by the ¼-inch board 32 is selected to give adequate room for the carton to pivot and move forward down member 31 without hitting the sidewall of the magazine, while keeping the offset small enough to minimize the overall outside dimensions of the magazine assembly. The offset should begin approximately one carton thickness (at the thickest point on the folded edge) above flange member B. The board 32 is one particular embodiment, is the same width as the interior wall 15 and extends from the sidewall 11 to the sidewall 12, and from adjacent the flange member B to the top of the hopper A.

The pushers C in the particular embodiment illustrated, include a pneumatic cylinder 33. The pneumatic cylinder 33 has a reduced forward end 34 which extends through a hole in a vertical portion 35 integral with the inner end of the flange member B, and is secured thereto by a locknut 36. A piston rod 37 extends out of the cylinder 33 and has a slidable member 38 screwed on the outer threaded end thereof. The slidable member 38 has a vertical portion 39 which terminates in a flat horizontal portion which is substantially the same thickness as the folded end portion 26 of the carton. The slidable member 38 is the preferred embodiment, is constructed of any suitable material, such as nylon, so as to avoid a metal to metal contact when the pusher is shifted across the upper face of the flange member B. Normally, the flange member B is constructed of any suitable material, such as aluminum. A restraining member 41 is carried on two vertically extending flat head screws or bolts 42 for holding the slidable member 38 flush against the flange member B when the pneumatic cylinder 33 is activated. Nuts 43 are positioned on both sides of the restraining bar thereon. The lower ends of the bolts 42 have heads therein, which are recessed in said flange member B for securing such thereto. It is noted that the boss bolt 44 which has a nut on the end thereof, passes through the flange member B and the angle brace 30 for securing the flange member thereto. Another screw 45 secures the angle brace 30 to the wall 12. As can be seen, the walls 11 and 12 have openings therein for receiving the pushers C.

Each of the cylinders 33 have a forward and rear port 46 and 47, respectively, to which pneumatic lines 48 are coupled. The pneumatic lines 48 are, in turn, coupled to means for activating the power operated pushers C which include a foot operated valve 49 (shown schematically) which has its other side connected to a suitable pressurized source of air shown schematically by the tank 50. While the valve 49 is shown as being operated by a foot pedal, it is to be understood that such could be operated by a pushbutton.

When the foot pedal 51 is depressed by the packer such allows air to flow in the rear port of the cylinder 33 causing the pusher C to be shifted inwardly. As the slidable member 38 is shifted inwardly the flat horizontal portion 40 engages the edge of the bottom carton 20 pushing such inwardly. Since the carton is also being pushed from the other side by the pusher C carried in the other wall, the carton is buckled slightly and drops off the inclined wooden member 31 onto the ramp 23 and slides onto the worktable 24.

As previously mentioned, frequently it is desired to dispense a bottom and top carton simultaneously. In order to do such it is only necessary to use a slidable member 38 which has a flat horizontal portion 40 of substantially the same thickness as the top and bottom cartons together. Thus, when the pusher C is moved inwardly the end of the horizontal portion 40 engages both the bottom and top carton, buckling such and causing them to fall off the flange members B. When the presser removes his foot from the foot pedal 51 the valve 49 is returned to its initial position by a spring wherein pressurized air flows into the forward port 46 of the cylinder retracting the pusher C. As can be seen by the schematic representation of the pneumatic lines in FIG. 4, a single foot pedal is used to operate the opposed pushers for each magazine. Separate foot pedals are provided for operating each pair of pushers C for a particular magazine. Thus, there are three foot pedals which are coupled to a single source of pressurized air for selectively dispensing a carton from a particular magazine.

While the cartons have been described as being dispensed from the magazines by a pair of power operated pushers C, it is to be understood that it is within the scope of the present invention that other means, such as the operator's hand, can be used to cause the bottom carton to buckle and drop off said flange members. In other words, the bottom carton can be pulled down manually, snapping such out smartly from the magazine.

While a preferred embodiment of the invention has been described using specific terms, such description is for illustrative purposes only, and it is to be understood that changes and modifications may be made without departing from the spirit or scope of the following claims.

We claim:

1. An apparatus for dispensing cartons and the like from a stack of nested flat cartons comprising: a hopper for retaining said cartons in a vertical stack having opposed sidewalls; opposed flange members extending inwardly from said opposed sidewalls, said flange members engaging the bottom carton of said stack adjacent opposite edges thereof for aiding in supporting said stack of cartons; power operated pushers carried adjacent each of said opposed flange members aligned with a bottom carton; means for activating said power operated pushers for shifting said opposed pushers inwardly pushing said bottom carton off said flange members from opposite sides buckling said bottom carton causing such to drop off said flange members, whereby said cartons can be dispensed from said hopper sequentially by manipulating said means for activating said power operated pushers.

2. The apparatus as set forth in claim 1, wherein said hopper has opposed end walls which join said opposed sidewalls; said opposed flange members being carried on said opposed sidewalls adjacent one of said end walls, an inclined member carried on said other end wall for aiding in supporting the bottom carton in a plane substantially even with said flange members, whereby when said pushers buckle said bottom carton the edge of said carton adjacent said one end wall which is supported on said flanges drops prior to the portion of said carton being supported on said inclined member causing said carton to pull free from said inclined member and said stack.

3. The apparatus as set forth in claim 1, further comprising an inclined ramp carried adjacent the bottom of said hopper for receiving said carton as such drops from said hopper, whereby said carton slides down said inclined ramp to a work station.

4. The apparatus as set forth in claim 1, wherein each of said power operated pushers includes a pneumatic cylinder, a piston rod extending out of said cylinder, and a slidable member carried on an end of said piston rod for pushing said bottom carton off said flange when activated.

5. The apparatus as set forth in claim 1, wherein said cartons are folded so that the thickness of the end portions located over said flanges is greater than the thickness of the center portion of said carton, whereby substantially all of the weight of said stack of cartons is supported through the end portions of said cartons.

6. In combination an apparatus for dispensing cartons and the like from a stack of nested flat cartons comprising: a hopper having sidewalls for retaining said cartons in a vertical stack, opposed flange members extending inwardly from said sidewalls, said cartons being folded so that the thickness of the end portions is greater than the thickness of the center portion, said vertical stack of cartons being supported on said opposed flanges with said end portions resting on said flanges, whereby substantially all of the weight of said stack of cartons is supported through the end portions of said cartons, means for engaging said bottom carton pushing said bottom carton off said flange members buckling said bottom carton for causing such to drop off said flange members, whereby said cartons can be sequentially dispensed from said hopper.