April 4, 1944. J. ALBERTOLI 2,345,560

BOX LOADER FOR CANS

Filed April 8, 1941

Fig. 2.

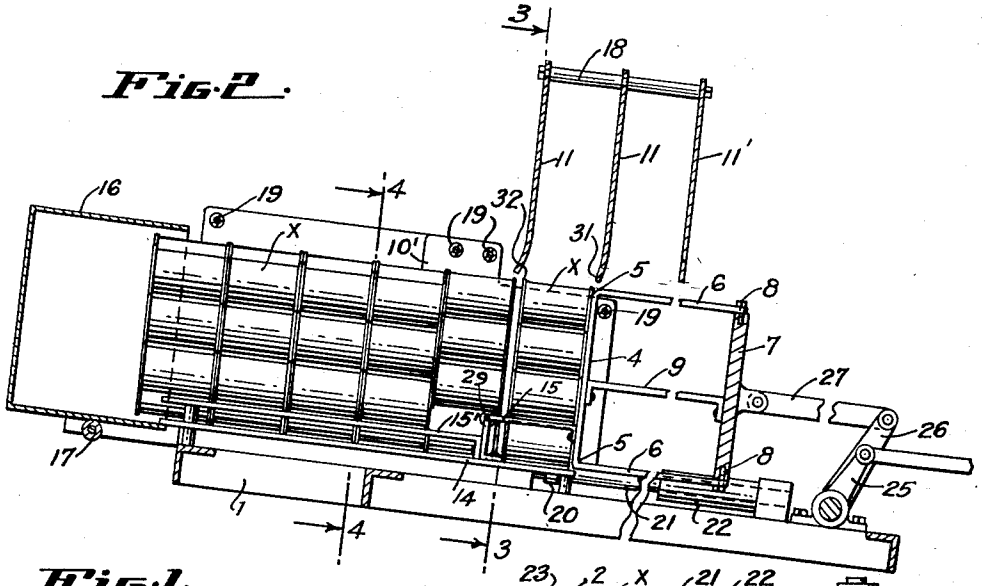
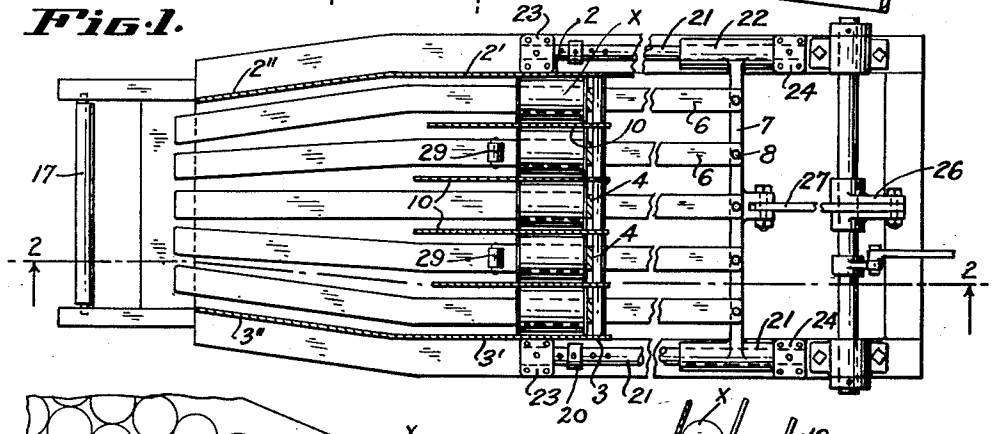



Fig. 1.



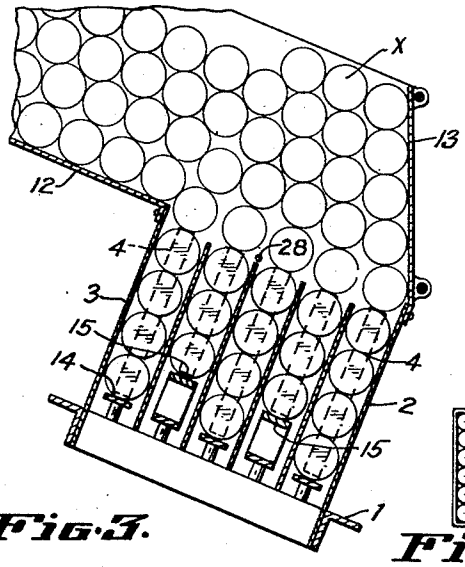




Fig. 3.

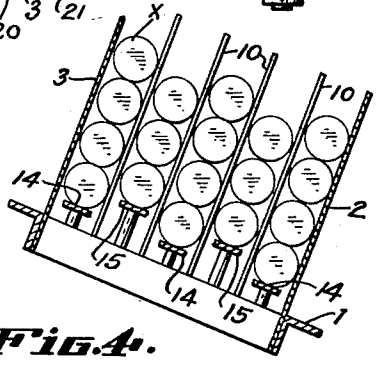



Fig. 4.

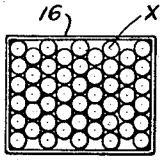



Fig. 5.

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Patented Apr. 4, 1944

2,345,560

# UNITED STATES PATENT OFFICE

2,345,560

## BOX LOADER FOR CANS

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Application April 8, 1941, Serial No. 387,387

7 Claims. (Cl. 226—15)

This invention relates to devices for loading canned goods into boxes or cartons.

The principal object of the invention is to provide such a device for loading cans which will load the cans into the box or carton in a staggered arrangement.

Special features and advantages of the apparatus are set out in the following description and are shown in the accompanying drawing.

In the drawing:

Fig. 1 is a plan view of my improved box loader but with the feed chute omitted.

Fig. 2 is a longitudinal vertical section of the apparatus of Fig. 1 as seen along the line 2—2 thereof.

Fig. 3 is a cross section of the can assembling compartment as seen along the line 3—3 of Fig. 2.

Fig. 4 is a cross section of the assembled cans in their compartments after reaching a position as shown along the line 4—4 of Fig. 2.

Fig. 5 is a plan view of a box loaded with cans in staggered relation.

Before describing the drawing in detail it may be said that the apparatus comprises generally, as is common with such can loading devices, a chute for feeding cans of canned goods to an assemblage compartment in the apparatus and wherein the cans are assembled into rows totaling an area equal to the capacity of the carton which is to receive them. A carton or box is placed over the end of the machine, and a pusher is operated either by hand or power such as a compressed air cylinder, and this pusher pushes the assembled cans along a guide and directly into the carton. Such apparatus has been made to handle any number of cans and push into the box either one layer, two layers or more layers of cans, and sometimes all the layers are pushed in at once and sometimes they are pushed in successively. Many variations of the machine are in common use.

The improvement to which the present application is directed has to do with an arrangement of devices whereby the successive rows of cans are staggered in relation to one another. That is, instead of being arranged with their axes in line in both directions, every other row is off-set the half diameter of a can so that the convex portions of one row of cans will fit within the concavity formed by two cans in the next row, and so on. By this method of packing cans, and which has been heretofore practiced by hand, a greater number of cans can be placed in a given box or carton, and the object of the present invention is to provide mechanical means for carrying out this loading of cans in place of the much slower hand operations heretofore required.

In the drawing, and which is for illustrative purposes only, the apparatus is shown as handling but a few rows of large cans, whereas in fact this type of loader is generally used on smaller cans, and several times as many as are shown in the drawing are assembled at a time for pushing into the carton. The present drawing, however, has been made to simplify the illustration while still clearly showing the principle involved, though Fig. 5 shows 50 cans in a box.

In the drawing 1 is a supporting frame preferably made of angle iron or other steel shapes, or of any other suitable construction to support the assemblage above it. It should be noted that the base or supporting frame is not level but is arranged at an angle tilting upward at the left hand end. The frame also is tilted in use from its far side higher than its near side as will be later described. These angles of tilting are subject to modification for various weights or sizes of cans.

Mounted transversely on the frame is a can assembling compartment arranged, in the present instance, to receive eighteen cylindrical cans X. The assembling compartment is defined by two upwardly standing walls 2 and 3 at the opposite ends of the compartment, and the rear side or transverse wall of the compartment is composed of several upwardly extending spaced bars 4 which at the top and bottom of the compartment are bent at right angles as at 5 to extend rearwardly at 6 where they are secured to a movable pusher head 7 by bolts or screws 8 to thus form a movable rear wall. The vertical bars 4 are spaced to fall in the center of each upwardly extending row of cans X and they are braced at a point about half their height by rearwardly extending braces 9 which are secured at one end to the upwardly extending rods and at the rear end to the pusher head 7. At 25, 26 and 27 is a crank and link connection for operating the pusher.

The front part of the assembling compartment is open but the compartment is divided by means of upwardly extending partitions 10 into smaller compartments each one of which is wide enough to receive one row of cans X with each can extending substantially horizontally between the partitions. In plan view of Fig. 1 these partitions 10 are seen to extend forwardly, or toward the left end of the machine for the purpose of retaining the cans in row position as they are being pushed out. It will also be seen in this figure

that the two outward partitions are somewhat shorter than the two central ones and for a reason which will be later explained.

Arranged substantially in line with and above the partitions is a can feeding chute formed of two side walls 11, a bottom 12 and an outer end wall 13. This chute is deep enough to accommodate several layers of cans one above the other and as indicated in the drawing. The chute extends downwardly to the assembling compartment as shown best in Fig. 3 so that the cans in rolling down the chute will drop in the compartments between the partitions 10 and fill up each one in rotation, for as the first one is filled the cans will roll over the top of the highest can to the next compartment and so on. After they are all filled the cans will still roll down the chute and will rest upon the uppermost cans already in the assembling compartment.

When the cans first fall into the assembling compartment they take the position shown in Fig. 3 and wherein it will be seen that there is a lower support or guide plate 14 under every other row holding (in the present instance) four cans above it to bring the top can into substantial alignment with the top of the partitions, and that every other row is composed of three cans supported by a lower guide plate 15 at a distance equal to the diameter of one can above the bottom of the longer rows. Thus the tops of all the rows alternately short and long are all substantially even on top to permit the oncoming cans from the feed chute to roll over them. More than this, I find it desirable in some instances to place one or more small bars as indicated at 28 just above the second and/or third partition or extend the partition this high as it tends to force the first partitions to fill up before the later ones, and lines up the cans above the rows better.

When the cans are supported in the manner shown in Fig. 3, and in which form they are also depicted in Fig. 2, they may be forced out of the assembling compartment by a forward movement of the pusher head 7, and while this is being done the upper horizontal or substantially horizontal run of bars 6 will support all of the cans above the rows in the assembling compartment. When the pusher head is pulled back again to the position shown in Fig. 2 it will release the cans above so that they can all fall again into the compartment for the next ejection of cans. It is manifest that the pusher could have a long stroke to push the cans directly into the box 16 to be loaded, but before the cans enter the box it is necessary for them to be converged together to take up the space previously occupied by the upwardly extending partitions 10, and it is also necessary for their relation to one another as shown in Fig. 3 to be modified so that they will be in staggered contacting relation as shown in Fig. 4, and in which latter relation it is desired that they be forced into the box. To carry this out the side walls 2 and 3 of the compartment are extended forwardly as at 2' and 3' and then converged toward the box as indicated at 2'' and 3'' in Fig. 1 to form guides so that the cans are forced together tightly as explained.

In order to change the vertical relation of the cans from that shown in Fig. 3 to that shown in Fig. 4 the guide plates 15 underneath the cans are lowered a distance equal to half a can as shown at 15' in Fig. 2. This lowered portion is in a position not immediately forward of the assembling compartment but the more elevated portion of the guides 15 extends somewhat forward of the compartment as indicated in Fig. 2 of the drawing, and is preferably provided with a roller 29 at its edge to prevent injury to the can labels. Also when the pusher is operated to push the cans from the compartment a distance forward a little more than a distance equal to their length, they will rest in the second position shown in Fig. 2 in line with the position which they occupied when in the assembling compartment. However, upon the next forward movement of the pusher a new assemblage of cans is forced out of the assembling compartment to the second position and the second position cans are forced forward, and the short rows fall from the elevated portion 15 of the guides to the lower guides 15' a distance equal to half the diameter of a can, so that the short row cans then are in centrally staggered relation with the longer rows as shown in Fig. 4.

By this means the cans advance step by step into the box 16 and which box is supported on its side, preferably upon a roller 17, where usually a workman stands steadying it and taking off the filled boxes and immediately places a new empty box in position.

It is of course evident that the stroke of the pusher may be, as stated, a little more than equal to the length of the cans or it may be about equal to three or four lengths of cans if they are small, so that the entire box can be filled at once. In packing large cans the forward movement of a little more than equal to the length of the cans is preferred but in the smaller cans a longer stroke is preferred. In order to accommodate more layers of cans in the assembling stage, it merely suffices to increase the number of loading chutes 11 by the addition of one or more vertical walls as designated at 11 in Fig. 2 and fill up the compartment from the several chutes successively. It is understood of course that the compartment below with its guides 14 and 15 and the pusher are made correspondingly longer. The length of stroke of the pusher may be determined by the position of a stop collar or collars 20 which may be variously secured along one or both of the guide bars 21 along which the pusher head slides, the pusher head being fitted at its lower edge with a pair of elongated bearings 22 bored to fit the guide bars 21. The guide bars are supported at opposite ends in suitable brackets 23 and 24, the latter of which forms a back stop for the return movement of the pusher. For smaller cans than those shown in the drawing it is manifest that shorter stay rods 18 are used to separate the walls of the feeding chutes as these should form a free feed over the length of the cans, to permit them to roll easily and fall into the assembling compartment but prevent them from turning out of alignment.

If several feed chutes are used, as suggested, the feed chutes should be plentifully supplied with cans, so that as the pusher is pulled back one layer of the assembling compartment will fill up before the cans start to fall in the next.

In regard to constructional points it might be noted that the side walls of the feeding chute will preferably be open on top so that the condition of the cans may be observed at all times and these side walls are spaced by suitable stay bolts 18. Also the combined side walls or guides 2 and 2'', 3 and 3'' are likewise rigidly spaced by suitable stay bolts 19, and which bolts also space the partitions which are extended as at 10' for this purpose. The two outer partitions extend a shorter distance to the left from the assem-

bling zone than do the more central partitions, as this facilitates the converging of the cans by the guides to the contacting staggered arrangement, in permitting the two outer rows (Fig. 1) to pass the ends of the two outer partitions first to be forced toward the next inner rows by the converging side walls 2'' and 3'', and after which the two short rows pass the two longer partitions 10 to be similarly urged inward to embrace the center rows.

Also, there is an angular guide plate at the lower edge of the chute wall or partition as at 31, which may be formed by bending the lower margin of the wall, and which is required for the purpose of urging the cans slightly forward as they drop into the assembling compartment, and thus bring the end flanges 32 of the cans in the compartment just forward of the end flanges of the cans in the feeding chute or hopper above. This is important in permitting ejection of the assembled cans, for otherwise they would tend to hook in back of the end flanges of the cans above.

As previously stated, in practice the apparatus is made to handle a much larger number of cans per box, and in Fig. 5 is shown a reduced size top view of a box or carton 16 with 50 cans X packed in 9 rows in staggered relation as would be performed automatically by my improved apparatus, arranged of course with 9 pusher bars or arms.

Having thus described my improved construction and the operation of my staggering can box loader, what I claim is:

1. In a machine for loading cans into boxes, an assembling compartment into which the cans are fed to lie parallel, a pusher for pushing the assembled cans longitudinally out of the compartment toward the box to be loaded, partitions in the assembling compartment spaced to hold the cans on their sides in upwardly extending single file adjacent rows, walls at the outer sides of both end rows, can supporting guide means between said partitions alternately offset to support the cans of alternate rows one can less in diametrical height than adjacent rows, said walls and supporting guide means extending beyond the assembling compartment a distance equal to the length of several cans so as to hold several assemblages of cans one behind the other, and said walls converging to progressively force the cans all into tight contact as they move along, as successive assemblies are pushed out of the compartment one behind the other by the pusher, said partitions extending substantially beyond the assembling compartment with said guide means.

2. In a machine for loading cans into boxes, an assembling compartment into which the cans are fed to lie parallel, a pusher for pushing the assembled cans longitudinally out of the compartment toward the box to be loaded, partitions in the assembling compartment spaced to hold the cans on their sides in upwardly extending single file adjacent rows, walls at the outer sides of both end rows, can supporting guide means between said partitions alternately offset to support the cans of alternate rows one can less in diametrical height than adjacent rows, said walls and supporting guide means extending beyond the assembling compartment a distance equal to the length of several cans so as to hold several assemblages of cans one behind the other, and said walls converging to progressively force the cans all into tight contact as they move along, as successive assemblies are pushed out of the compartment one behind the other by the pusher, said partitions extending substantially beyond the assembling compartment with said guide means, and terminating progressively in a manner to permit the outer rows of cans to move inwardly through the action of the converging walls as the cans are progressively pushed along, and thereafter the next adjacent rows of cans, to move inwardly.

3. In a structure as set out in claim 1 the offset guide means extending beyond the assembling compartment and the degree of their offset there reduced to bring the cans into staggered relation with respect to adjacent rows as they move toward the box to be loaded.

4. In a structure as set out in claim 2 the offset guide means extending beyond the assembling compartment and the degree of their offset reduced at points preceding the termination of said partitions.

5. In a structure as set out in claim 2 the offset guide means extending beyond the assembling compartment and the degree of their offset reduced at points preceding the termination of said partitions, and provided with rollers at such point.

6. In a machine for loading cans into boxes, an assembling compartment into which the cans are fed to all lie parallel, a pusher for pushing the assembled cans longitudinally out of the compartment toward the box to be loaded, partitions in the assembling compartment spaced to hold the cans on their sides in upwardly extending adjacent rows, walls at the outersides of both end rows, can supporting means below the rows offset at alternate rows sufficient to make such alternate rows each one can less in diametrical height from adjacent rows, and with the tops of all rows substantially on a plane, and means feeding cans to the upper end of said compartment in a manner to roll over the upper ends of said rows as they fill up and to fall into unfilled rows between the partitions, and guide means beyond the compartment arranged to change the offset rows of cans to staggered relation with respect to adjacent rows, as the cans are pushed from the assembling compartment.

7. In a machine for loading cans into boxes, an assembling compartment open on top and into which the cans are fed by gravity from a supply above, a pusher for ejecting the assembly of cans forwardly out of the compartment toward the box to be loaded, upwardly extending partitions in the compartment spaced to hold the cans on their sides in upwardly extending single file adjacent rows with the cans lying parallel to the supply of cans above the compartment, can guide walls spaced slightly back of the compartment, and means to advance the cans longitudinally slightly forward as they enter the compartment so as to bring the end flanges of the cans in the compartment forward of the end flanges of the supply of cans remaining above and whereby the ejection of the assembled cans from the compartment from under the cans above when the pusher is operated is facilitated.

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