May 7, 1963 R. H. PENLEY 3,088,257

BOX LOADING APPARATUS

Filed Jan. 4, 1960 2 Sheets-Sheet 1

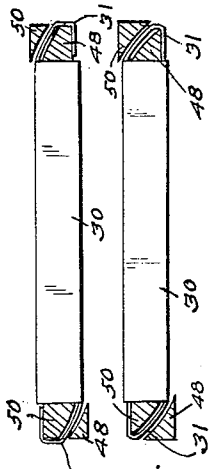


Fig. 7.

Fig. 8.

Fig. 1.

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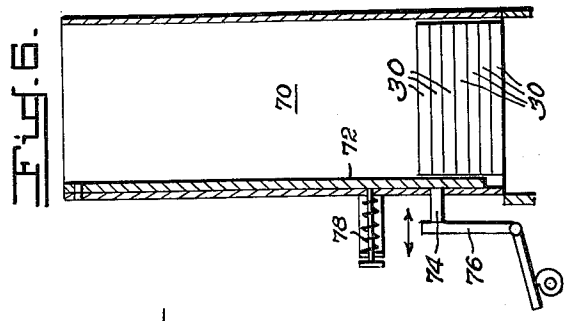


Fig. 6.

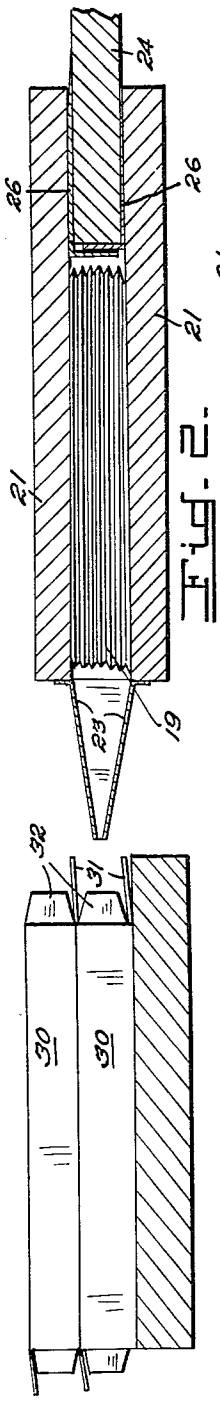


Fig. 2.

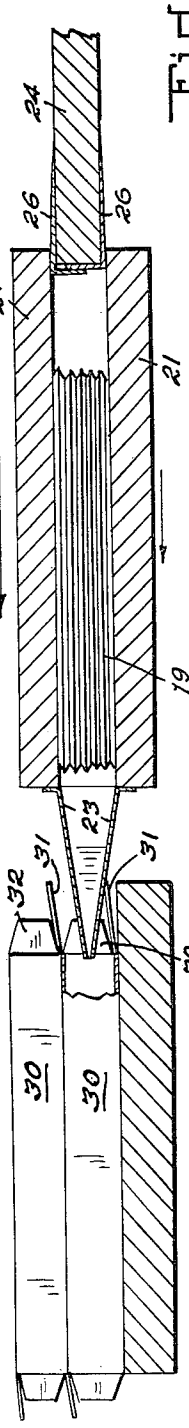


Fig. 3.

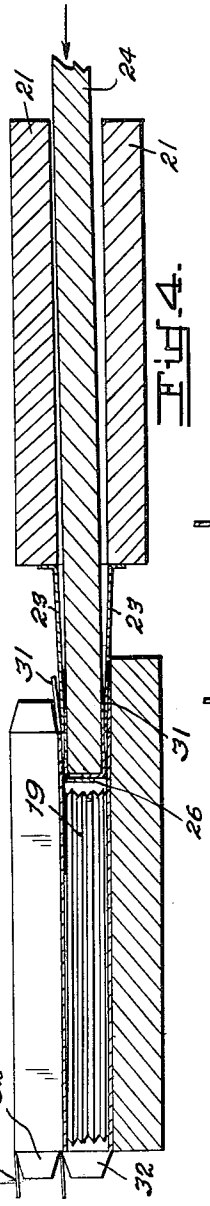


Fig. 4.

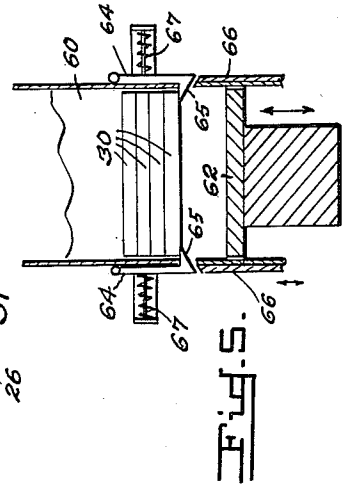


Fig. 5.

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BOX LOADING APPARATUS

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Filed Jan. 4, 1960, Ser. No. 284
14 Claims. (Cl. 53—159)

The present box loading apparatus, while being adaptable for many purposes, is particularly usable as an attachment for a headache powder packaging machine as described in my Patent No. 2,628,465, dated Feb. 17, 1953. My previous patent discloses apparatus for taking headache powder from a hopper and placing it in individual piles or doses on a moving tape of waxed paper. The waxed paper is folded into a flat tube-like formation and is then cut into lengths, or packets, with a dose of powder in each length. The ends of each tube length are folded over and two or more of these doses are placed into an envelope. I have many machines and envelope loaders in operation, of the type described in my previous patent, for placing two to six headache powders in envelopes. It is now found desirable to place such powder packets in cardboard boxes, each box containing a predetermined number of packets, such as twelve for example.

Thus, the present apparatus was invented to place a predetermined number of packets, such as headache powders, into empty boxes, and such apparatus takes the boxes from a magazine, inserts the packets therein, closes the tabs on both ends of the boxes, closes the covers on both ends of the boxes, and stacks the loaded boxes in a receiving magazine.

Referring to the drawings;

FIG. 1 is a perspective view of my box loading apparatus;

FIG. 2 illustrates the receiver magazine with packets ready for loading into an empty box;

FIG. 3 is similar to FIG. 2, the receiver magazine having been moved to its leftmost position;

FIG. 4 shows the apparatus of FIGS. 2 and 3, the plunger having been moved to the left to move the packets into the box;

FIG. 5 shows details of the loaded box receiving magazine;

FIG. 6 shows details of the empty box holding magazine;

FIGS. 7 and 8 are taken on lines 7—7 and 8—8 respectively of FIG. 1 and show details of the curved guide flap closers.

In FIG. 1, I have shown a side perspective view of my box loading apparatus. At 12 I show one packet containing a dose of powder for example. Fingers 14 are in position to be moved downwardly and this motion of fingers 14 presses the center section of the packet down while stationary blocks 15, reciprocable fingers 17, and other apparatus shown in my prior patent, cause the ends of the packet to be folded over. During this operation, fingers 16 are moved to the left in FIG. 1 so that the packets are pushed down in front of fingers 16. Reciprocable fingers 17 hold the packets down while fingers 14 are returned to their uppermost position. After a predetermined number of packets are pressed down in front of fingers 16 they are moved to the position illustrated in FIG. 1. This motion of fingers 16 places a stack of packets in the position illustrated at 18, and fingers 16 are returned to the left so that another stack of packets can be brought out on the next movement of the fingers. In the drawing I illustrate two stacks of packets side by side at 18 and 19, but any number of stacks could be placed in this position for insertion into the boxes to be loaded. If only one stack of packets is to be placed into the boxes then it may be desirable to load the boxes

while standing in an edgewise position rather than while lying flat. As the fingers 16 return with another stack of packets for the position illustrated at 18, the packets at 18 are pushed over to the position illustrated at 19. When the packets come to rest at 18, 19 they are within a receiver magazine 21 which can be reciprocated slightly by bracket 22 on the bottom side thereof. Magazine 21 is equipped at its left end with resilient flat funnel-like guide 23 which is inserted into the open end of the box 30 to be filled just prior to ejection of the stacks of packets by plunger 24. Plunger 24 is reciprocated within magazine 21 by bracket 25.

In FIGS. 2, 3 and 4 I have illustrated details of the magazine and plunger parts and the steps of loading the packets into a box 30. In FIG. 2 the magazine 21 has just been filled by a predetermined number of packets and plunger 24 is in its retracted position. An envelope 30, with flaps 31 and tabs 32, is in place for loading. FIG. 3 illustrates the position wherein magazine 21 has been moved to the left so as to insert guide 23 into the open end of box 30. As illustrated in FIG. 4, following this motion of magazine 21 to the left, plunger 24 is reciprocated to the left to eject the packets from the magazine and, as the flaps of guide 23 are pressed apart, the packets 18, 19 are guided into box 30. Then, magazine 21 and plunger 24 are returned to the right so as to clear the loaded box.

Plunger 24 is preferably made with resilient members 26 at the end thereof so that the plunger end will completely fill the magazine at all times, and will have resilient contact with the walls of guide 23 as the plunger moves into and out of said guide.

During the time when box 30 is being filled, it is desirable to hold the box so it will not slide. For this purpose I provide three fingers 33 for the left end and front edge of the box. These fingers are in the uppermost position as illustrated while the box is being loaded. For raising and lowering fingers 33 I provide bracket 34. In addition, I provide clamping fingers 36 to engage the rear edge of the box. Thus, arm 37 may be made rigid with fingers 36 and cam 38 may rock the fingers into engagement with the box to clamp it between fingers 36 and 33. As fingers 36 engage the box 30 they push it slightly ahead of conveyor bar 41 and clamp the box against fingers 33. The leftmost finger 33 assures that there will be no endwise motion of the box while it is being loaded.

Boxes to be loaded are stacked one above the other in a loading magazine rack 70 as shown in FIG. 6. This magazine is omitted for clarity in FIG. 1.

As the boxes are loaded they are removed from the loading magazine rack and are moved along by a conveyor having chain 40 with bars 41 carried thereby. Each bar 41 pushes a box ahead of it to the right in FIG. 1. The conveyor is preferably operated intermittently as each box is loaded. Prior to the time when the lowermost box is loaded fingers 36 and 33 have performed their clamping operation and when the loading is completed plungers 45 are reciprocated to the right in FIG. 1. These plungers push the two tabs 32 on the rear edge of the box into their folded position. At this time clamping fingers 36 are pivoted to the left and fingers 33 are retracted downwardly. This leaves the loaded box free to move as the bar 41 behind the loaded box comes into contact with the box. As the box is moved to the right, the two tabs 32 on the front edge of the box strike stationary members 48 and are folded in. Also, the ends of flaps 31 on both ends of the box enter into curved guideways 49 formed between members 48 and 50. These guideways begin the process of folding over and closing the flaps. As plungers 45 are retracted and

as the box moves to the right, I provide pivoting members 55 to press and hold the two rear tabs 32 in their folded position. Thus, all four tabs of the box are held folded in while the two flaps are being closed.

As the box is moved along by the conveyor, the curved guideways 49 will press the flaps substantially into the closed position. By the time this has taken place the box is nearing the receiving magazine 60 at the right end of the machine. Prior to reaching the receiving magazine a final closing operation is preferably performed on the boxes. Pivotal arms 56 are swung up behind the box and shove it ahead of the pushing bar 41 so that the box may come to rest momentarily even though the conveyor is still moving. At this moment, bars 58 are moved inwardly to clamp the box between them and press the flaps into their final neatly closed position. Arms 56 are retracted until the next operation and then a bar 41 on the conveyor reengages the box to move it over beneath the receiving magazine 60. (It is obvious, if one end of the boxes were already closed, the curved guides and box end closing mechanism nearer the observer in FIG. 1 could be omitted.) The loaded box is moved under magazine 60 and is pressed upwardly from beneath by reciprocable plunger 62 (note especially FIG. 5). I provide retainers 64, each with a catch 65 thereon projecting into the magazine 60 to engage the lower edge of the box and hold the stack in its elevated position as the plunger is retracted downwardly. A cam bar 66 is preferably provided to swing each retainer 64 and catch 65 outwardly as the box is moved upwardly by plunger 62. This avoids possible damage to the box as it passes by the catches 65. Springs 67 may be provided to urge the catches inwardly.

In FIG. 6 I have illustrated the special loading magazine rack 70 which I prefer. This magazine holds the boxes 30 prior to loading. As the lowermost box 30 is dropped out of the magazine into loading position it is desirable to prevent the other empty boxes from sliding down temporarily. For this purpose I provide resilient fingers 72 secured to the wall of magazine 70. These fingers are provided with plungers 74 which press the fingers 72 in as arms 76 are swung about their pivot. Coil springs 78 may be used to retract fingers 72 if desired. With this arrangement, arms 76 are swung to the right when it is desired to prevent the stack of boxes 30 from sliding down, and fingers 72 frictionally engage the sides of the boxes.

I claim:

1. Apparatus for placing a predetermined number of objects in a box having open ends and flaps to close said ends comprising; means to select said predetermined number of objects and place them into a magazine, means to eject said objects from said magazine into a box to be loaded, finger means to positively grip said box by its edges while it is being loaded and to release it after being loaded, guide means to close flaps on said box, means to move said box along a predetermined path so that its flaps move into said guide means, said guide means being formed to close said flaps as said box is moved along said predetermined path, and means to receive the box when it is loaded and its flaps are closed.

2. Apparatus for placing a predetermined number of objects in a box having open ends and flaps to close said ends comprising; means to select said predetermined number of objects and place them into a magazine, means to eject said objects from said magazine into a box to be loaded, finger means to positively grip said box by its edges while it is being loaded and to release it after being loaded, said box having tabs thereon to be closed, said apparatus including means to close said tabs prior to closing of said flaps, guide means to close flaps on said box, means to move said box along a predetermined path so that its flaps move into said guide means, said guide means being formed to close said flaps as said box is moved along said predetermined path, and means to receive the box when it is loaded and its flaps are closed.

3. Apparatus for placing a predetermined number of objects in a box having open ends and flaps to close said ends comprising; means to select said predetermined number of objects and place them into a magazine, means to eject said objects from said magazine into a box to be loaded, finger means to positively grip said box by its edges while it is being loaded and to release it after being loaded, said box having tabs thereon to be closed, said apparatus including means to close said tabs prior to closing of said flaps, guide means to close flaps on said box, means to move said box along a predetermined path so that its flaps move into said guide means, said guide means being formed to close said flaps as said box is moved along said predetermined path, further means to clamp the flaps neatly into position, and means to receive the box when it is loaded and its flaps are closed.

4. Apparatus for loading boxes with packets containing material therein comprising means to fold the ends of the packets and stack them, means to transfer the loaded packets to a magazine, means to hold an empty box with open ends and outwardly extending tabs and flaps, means including a plunger with a resilient guide finger to eject the packets from the magazine, resilient means on the magazine to guide the packets into the box, means to prefold two of the tabs on said box, means to move the box from its loading position, means to fold the other two tabs, means to clamp the first two prefolded tabs in their folded position, means to partially close said flaps simultaneously, means to complete the flap closing, and means to receive the loaded box.

5. Apparatus for loading boxes with packets containing material therein comprising means to transfer the loaded packets to a magazine, finger means to positively grip an empty box with open ends and outwardly extending tabs and flaps, means to eject the packets from the magazine, resilient means on the magazine to guide the packets into the box, said resilient means being insertable into and withdrawable from said box, means to fold two of the tabs on said box, means to move the box from its loading position, means to fold the other two tabs, means to partially close said flaps simultaneously, means to complete the flap closing, and means to receive the loaded closed box.

6. Apparatus as set forth in claim 5 wherein the empty box is dropped into loading position from an empty box magazine, said magazine having at least one member therein which can be urged into engagement with the penultimate box from the bottom, and means to urge said member against at least said penultimate box and thereby prevent the stack of boxes from sliding down at a predetermined time in the cycle of operation.

7. Apparatus as set forth in claim 5 wherein said loaded box receiver is a magazine having a reciprocable plunger therein to lift the loaded boxes in said magazine, said magazine having retainer catches to prevent the loaded boxes from sliding down as the plunger is lowered.

8. Apparatus as set forth in claim 7 wherein means is provided to positively retract said catches as the plunger lifts another loaded box into position above the catches.

9. Apparatus for use in box loading apparatus comprising a receiver magazine to receive articles to be placed in boxes, said magazine having an open side through which the articles are brought in, an outlet opening from said magazine, resilient guide means at said outlet opening, said magazine being movable to position said resilient guide means into proximity to a box to be loaded, and means to eject said articles from said magazine through said resilient guide means.

10. A plunger for ejecting articles from a magazine having rigid sidewalls, said plunger having a rigid stem portion which does not fill said magazine completely, said stem having a resilient finger attached thereto which projects forwardly into said magazine and is folded over

ahead of said plunger to resiliently engage a side of said magazine, and at least one other resilient finger on another side of said plunger to resiliently engage at least one other side of the magazine, the two or more such fingers thus completely filling said magazine.

11. Apparatus as set forth in claim 10 wherein said magazine has resilient guide fingers on the end opposite said plunger, said resilient fingers on said plunger being adapted to resiliently engage said magazine guide fingers as said plunger moves into said guide fingers, thus assuring that no article or material being pushed by the plunger can slip past the plunger.

12. Apparatus for placing packets of powder in boxes and closing said boxes comprising; means for stacking said packets in predetermined quantities, means for removing said stack of packets and transferring same to a magazine, means for taking a box from another magazine and holding same, momentarily stationary, with an open end toward said first mentioned magazine, means for ejecting said packets from said first mentioned magazine into said box, said box having a flap thereon, means for moving said loaded box along a predetermined path, curved guide means for substantially closing said box flap as said box is advanced along said path, means for momentarily speeding up movement of said box and then momentarily stopping said box, means to positively clamp said box flap to a neatly closed position while said box is momentarily stopped, and means for stacking said box in a receiver magazine.

13. Apparatus as set forth in claim 12 wherein said first mentioned magazine has an open side through which said packets are brought in, said first mentioned magazine

having resilient guide fingers thereon, and means to reciprocate said first mentioned magazine to insert said guide fingers into the open end of said box prior to ejection of said packets from said first mentioned magazine into said box.

14. Apparatus as set forth in claim 12 wherein additional curved guide means is provided to close an opposite end flap of said box, and additional means is provided to positively clamp said opposite end flap to a neatly closed position.

References Cited in the file of this patent

UNITED STATES PATENTS

1,641,794	Weber	Sept. 6, 1927
1,839,925	McKaig	Jan. 5, 1932
1,955,533	Coffman	Apr. 17, 1934
2,243,919	Paxton et al.	June 3, 1941
2,263,250	Singer	Nov. 18, 1941
2,324,930	Joa	July 20, 1943
2,488,674	Molott	Nov. 22, 1949
2,590,327	Kay	Mar. 25, 1952
2,648,181	Dalton	Aug. 11, 1953
2,699,862	Walter	Jan. 18, 1955
2,744,372	Cleaveland et al.	May 8, 1956
2,792,950	Fenton et al.	May 21, 1957
2,811,240	Fenton	Oct. 29, 1957
2,857,058	Campbell	Oct. 21, 1958
2,883,812	Pechy	Apr. 28, 1959
2,915,867	Frank et al.	Dec. 8, 1959
2,923,112	Harker	Feb. 2, 1960
2,925,694	Walther et al.	Feb. 23, 1960