Jan. 23, 1962 J. RODISH 3,017,730

CARTON COMPRESSING AND PACKAGING MACHINE

Filed April 11, 1960 2 Sheets-Sheet 1

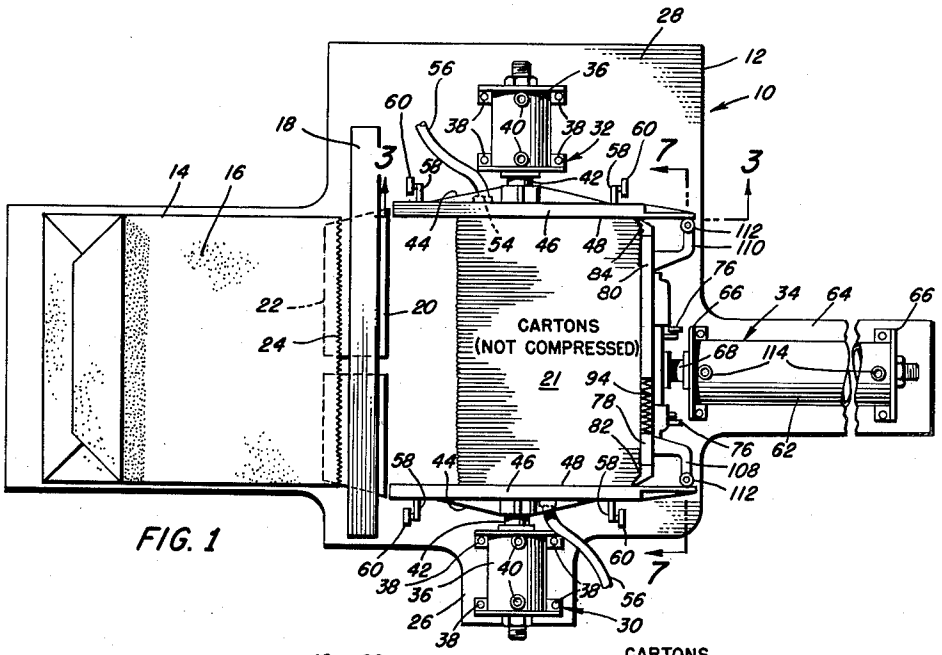


FIG. 1

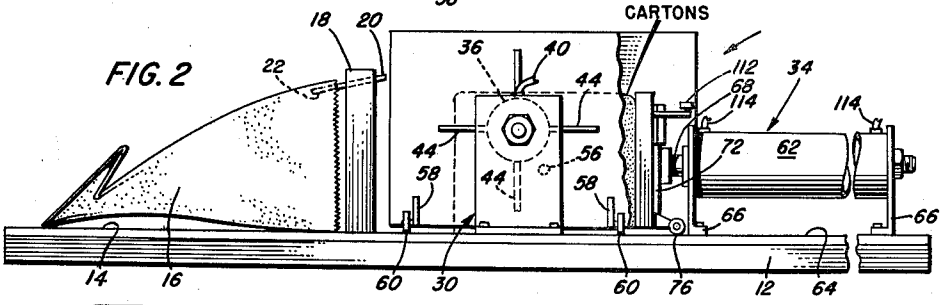


FIG. 2

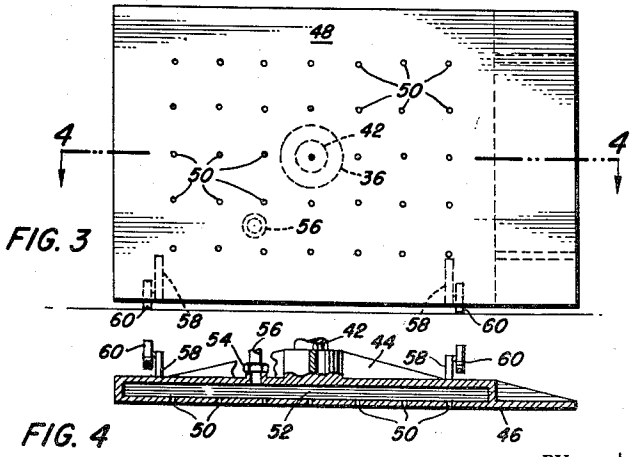


FIG. 3

FIG. 4

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CARTON COMPRESSING AND PACKAGING MACHINE

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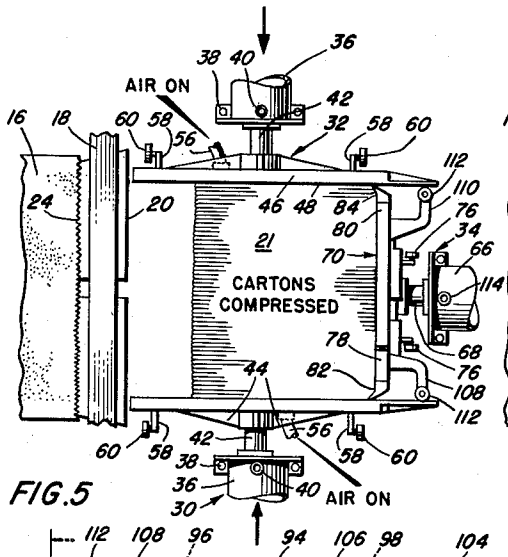


FIG. 5

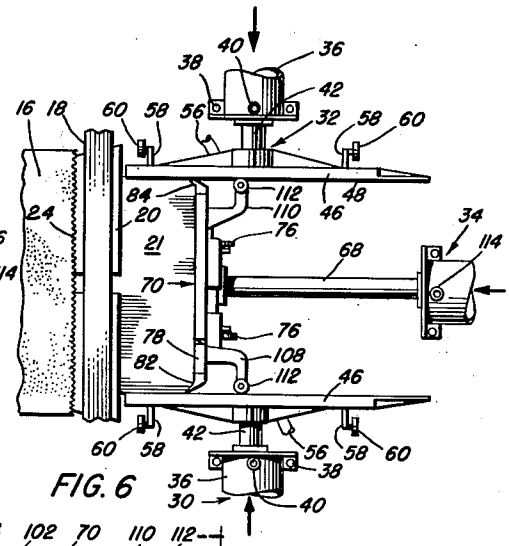


FIG. 6

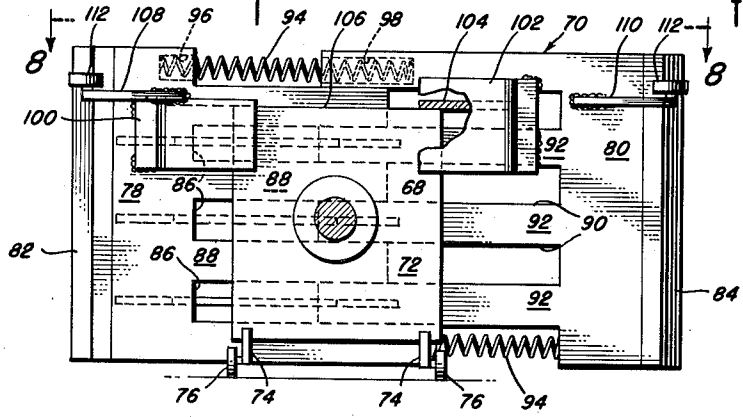


FIG. 7

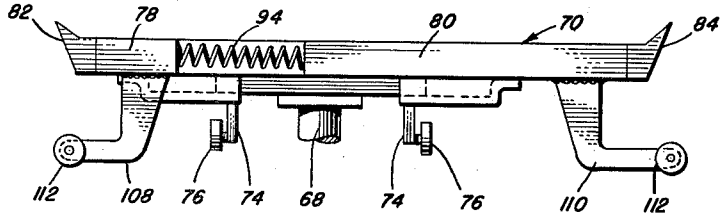


FIG. 8

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CARTON COMPRESSING AND PACKAGING MACHINE

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6 Claims. (Cl. 53—124)

This invention relates generally to the packaging art, and is more particularly concerned with apparatus for the insertion of a plurality of juxtaposed folded cartons into a suitable container.

Folded cartons, such as egg cartons, drink carriers, etc. have a structure permitting the cartons to be compressed when stacked or in juxtaposed relation, and it is practical and economical to compress the folded cartons and insert them into a container, such as a bag or the like, where the strength of the bag is not of primary concern since the compressed cartons will be, in effect, "self-supporting" to afford a ready means for shipping and storing the cartons together with a desirable economical package.

A primary object of the invention is to provide apparatus which facilitates the compressing and insertion of folded cartons into a container.

Another object of the invention is to provide means for compressing juxtaposed folded cartons together with means for inserting the compressed cartons into a folded bag whereby movement of the compressed cartons is "pneumatically lubricated."

A still further object of the invention is to provide an apparatus for the purpose set forth and means whereby different size packages may be formed.

Other objects and the nature and advantages of the instant invention will be apparent from the following description of the preferred embodiment taken in conjunction with the accompanying drawings, wherein:

FIG. 1 is a top plan view of the novel apparatus, with a portion broken away, and with a plurality of juxtaposed cartons disposed on edge and in an uncompressed condition;

FIG. 2 is a side elevation of the apparatus of FIG. 1, with a portion broken away for the purpose of clarity;

FIG. 3 is an enlarged elevation of one of the "pneumatically lubricated" pressure plates, the view being taken substantially on line 3—3 of FIG. 1;

FIG. 4 is a sectional view taken on line 4—4 of FIG. 3;

FIG. 5 is a view, similar to FIG. 1 on a slightly reduced scale, illustrating the disposition of the parts after the cartons are compressed and prior to pushing them into a container;

FIG. 6 is a view, similar to FIG. 5, showing the manner in which the compressed cartons are moved into a guide sleeve maintaining a bag in an open condition to receive the compressed cartons;

FIG. 7 is an enlarged vertical section taken substantially on line 7—7 of FIG. 1, showing the rear view of the extendible pusher plate of the apparatus, portions being broken away and shown in section for clarity; and

FIG. 8 is a top plan view of FIG. 7 looking in the direction of line 8—8 of FIG. 7.

Referring to the drawings in detail, the novel carton compressing and packaging machine is indicated generally at 10, and includes a suitably mounted platform 12 which has an irregular cruciform shape, as seen in FIG. 1. The platform 12 includes a rearwardly extending portion 14 upon which a suitably folded container, such as a bag 16, is disposed. Extending transversely of the platform portion 14 is a suitably supported collar 18 having a forwardly opening throat 20, see FIG. 2, for

receiving compressed cartons 21 therein, the throat 20 converging rearwardly, as indicated at 22, and providing a portion over which the open end 24 of the sack 16 is disposed.

Mounted on support platform portions 26 and 28 are opposed compression plate assemblies indicated generally at 30 and 32, respectively. These compressor plate assemblies are substantially identical and, accordingly, only one will be described in detail. The compressor plate assemblies are disposed on opposite sides of the open throat 20 of the guide receiving the compressed cartons 21, see FIG. 5, and assembly 32 is of greater length than assembly 30. However, it is readily apparent that assemblies 30, 32 may be identical and have the same amount of inward travel. The compressor plate assemblies will be moved toward each other, as seen in FIG. 5, and a forwardly disposed pusher plate assembly, indicated generally at 34, includes means whereby the compressed cartons will be urged through the open throat 20 of the guide 18.

Each of the compressor plate assemblies 30, 32 comprises a pneumatically or hydraulically controlled two-way fluid motor or cylinder 36, which is anchored on the platform portion 26 or 28 by means of suitable fasteners 38. The fluid motor 36 includes suitable connections 40 to be connected to compressed air or hydraulic lines not shown in detail. Extendible out of the cylinder 36 is a piston rod 42 which is connected to a reinforcing and mounting portion 44 on the rear side of a substantially hollow and rectangular, vertically extending pressure plate 46. The forward surface 48 of the pressure plate is substantially planar and has extending transversely therethrough on two inch centers, for example, a plurality of apertures 50 of relatively small diameter and which communicate with a hollow compressed air chamber 52 which communicates with a suitable connector 54 connected to a compressed air line 56. Suitable secured to the rear of the pressure plate 46 are support elements 58 upon which are journaled antifriction wheels 60 which engage the upper surface of the support platform and facilitate movement of the pressure plates 46 toward and away from each other.

The pusher plate assembly 34 includes a hydraulic or pneumatic fluid motor or cylinder 62 mounted on a forwardly extending support plate portion 64 by means of suitable support elements 66. The cylinder 62 has extendible therefrom a piston rod 68 which is connected to the rear portion of a laterally expansible pusher plate, indicated generally at 70.

The pusher plate 70 includes a rectangular mounting plate 72 connected to the piston rod 68 and having depending from its lower edges a pair of support elements 74 upon which are journaled antifriction wheels 76 engaging the support surface of the platform. The assembly 70 includes a pair of plate elements 78 and 80, each terminating in a vertical, outwardly tapered, feathered edge 82 and 84, respectively, which will be disposed adjacent the inner surface of a compressor plate 46, as clearly seen in FIGS. 5 and 6, for example. The plates 78 include a plurality of notched-out portions 86 forming vertically spaced fingers 88 which are received in cooperating vertically spaced slots 90 of the plate 80, the slots 90 forming fingers 92 received within the previously mentioned slots 86 of the plate 78. Thus, the plates 78 and 80, which include the fingers 88 and 92, may be described as having these fingers in interdigitated relationship. The plates 78 and 80 have extending therebetween compression springs 94 which urge the plates apart, the springs 94 being incorporated in suitable recesses 96 and 98 of the plates 78 and 80, respectively, for example.

The plates 78 and 80 each have secured thereto rear-

wardly extending plates **100** and **102** which include a support flange **104**, see FIG. 7, for example, which guidingly engages the upper edge **106** of the mounting plate **72** to which is connected the piston rod **68**. The plates **78** and **80** have projecting rearwardly and laterally therefrom support elements **108** and **110**, see FIG. 8, for example, which have journaled thereon antifriction wheels **112**, which will engage the inner surface of the pressure plates **46** as the pusher plate **70** is moved from the position shown in FIG. 5 to that of FIG. 6. The wheels **112** will be disposed laterally a greater distance than the feathered edges **82**, **84** so that the edges do not engage the inner surfaces of plates **46** to cause friction and wear thereon, see FIG. 7, for example.

The cylinders **36** and **66** are of the two-way type and include line connections **40** and **114** respectively at opposite ends.

Considering FIG. 1, a plurality of uncompressed cartons **21** are disposed between the pressure plates **46**, piston rods **42** of the assemblies **30** and **32** are being withdrawn within the cylinders **36**. Pressurized fluid is directed to the cylinders **36** wherein the pressure plates **46** are urged together, see FIG. 5, for example, wherein the compressed cartons **21** will be compressed sufficiently to be received within the guide sleeve **18** to fill the container **16**. The movement of plates **46** toward each other is facilitated by the antifriction wheels **60**. During the movement of the pressure plates **46** of the assemblies **30** and **32** toward each other, the pusher plate **70**, including the interdigitated sides **78** and **80**, will be moved toward each other, thus compensating for the change in size between the uncompressed and compressed cartons.

The compressed cartons **21** are now compressed to the condition to facilitate their insertion in the container **16**, and as the piston rod **68** of the pusher plate assembly **34** is extended from the cylinder **62**, at the same time compressed air is communicated through conduits **56** to the interior chamber **52** of the pressure plates **46** and out of the apertures **50** to "pneumatically lubricate" the movement of the compressed cartons between the pressure plates **46**. The tapered ends **82** and **84** of the plates **78**, **80**, respectively, will also facilitate the movement of the cartons into the container **16**. The antifriction wheels **76** and **112**, respectively engageable on the support platform and pressure plates, will facilitate the rectilinear movement of the pusher plate assembly **70**. The apertures **50** are of such size to permit pressure to be maintained in the chamber **52** and when the compressed cartons are moved.

Although not shown, a suitable control means will be provided wherein the pneumatic pressure will be cut off when the pusher plate **70** moves the cartons **21** into the container **16**, and the machine will then be automatically returned to the beginning position for the next cycle.

There has been provided apparatus for compressing and inserting juxtaposed folded cartons into a container, this apparatus fully conforming with and affording the benefits and objects of the invention heretofore set forth.

It will be obvious to those skilled in the art that various changes may be made without departing from the spirit

of the invention and, therefore, the invention is not intended to be limited to what is shown in the drawings and described in the specification but only as set forth in the appended claims.

What is claimed is:

1. Apparatus for compressing and moving a plurality of flat, juxtaposed articles to a receiving station comprising support means, opposed presser means on said support means for compressing juxtaposed articles together, and pusher means on said support means and including a portion movable between said presser means for moving compressed articles toward the receiving station, said presser means including opposed surface portions including aperture means communicating with a source of pneumatic pressure for "pneumatically lubricating" movement of the compressed articles toward the receiving station.

2. Apparatus for compressing and moving a plurality of flat, juxtaposed articles comprising support platform means, opposed presser plate assemblies for compressing articles therebetween, and a pusher plate assembly on said support platform and including a pusher plate portion movable between said presser plate assemblies for moving compressed articles from between said presser plate assemblies, said presser plate assemblies including opposed surface portions including aperture means communicating with a source of pneumatic pressure for "pneumatically lubricating" movement of the compressed articles from between said presser plate assemblies.

3. The structure of claim 2; said presser plate assemblies being power operated, and antifriction means on said presser plate assemblies facilitating movement thereof over said support platform.

4. The structure of claim 2; said pusher plate portion being yieldably extendable between said presser plate surface portions, and tapered edge portions at opposite ends of the pusher plate portion positionable adjacent the surface portions of said presser plate assemblies.

5. The structure of claim 4; said presser plate portion being power operated and including antifriction means engageable with said support platform and the surface portions of said presser plate assemblies.

6. The structure of claim 2; said presser plate assemblies being substantially hollow, the interior of said assemblies communicating with said aperture means, said aperture means being regularly disposed on said assembly to provide a substantially uniform pneumatic cushion on the portions of the presser plate assemblies engageable with articles being compressed.

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