United States Patent

Hargash

[15] **3,669,248**

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[54] TRAY FORWARDING MECHANISM

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[21] Appl. No.: **893**

[52] **U.S. Cl.** **198/221**

[51] **Int. Cl.** **B65g 25/08**

[58] **Field of Search** 198/221; 271/44

[56] **References Cited**

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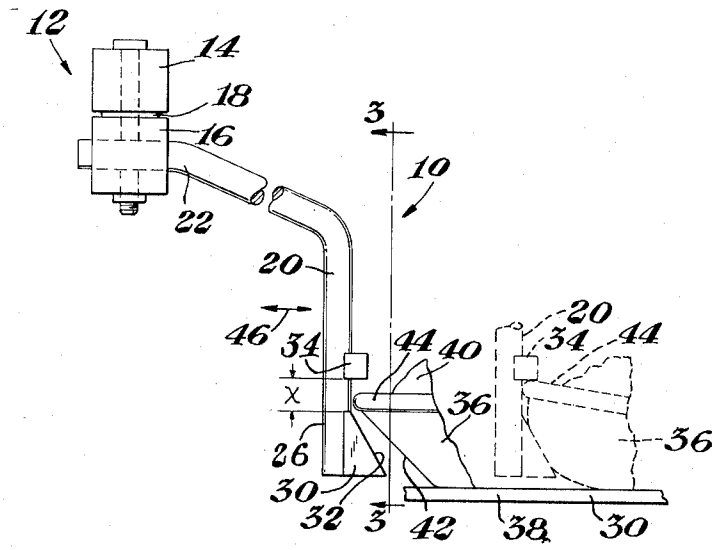
[57] **ABSTRACT**

A mechanism for pushing forward filled trays such as pulp or plastic trays comprising a shoe means having a slanted face inclined to flushly engage the tray sidewall, and slightly lift the same while forwarding such that the sidewall is lifted into pressure engagement against the underside of a stop means or stop block disposed above the shoe means. The stop block and shoe means cooperately operate to place the tray sidewall substantially in compression during forwarding. Such a mechanism is advantageously used for forwarding filled trays between various stations, conveyors, elevator lifts and the like as are used in automatic wrapping or packaging apparatus, and with a minimum incidence of tray breakage.

3 Claims, 4 Drawing Figures



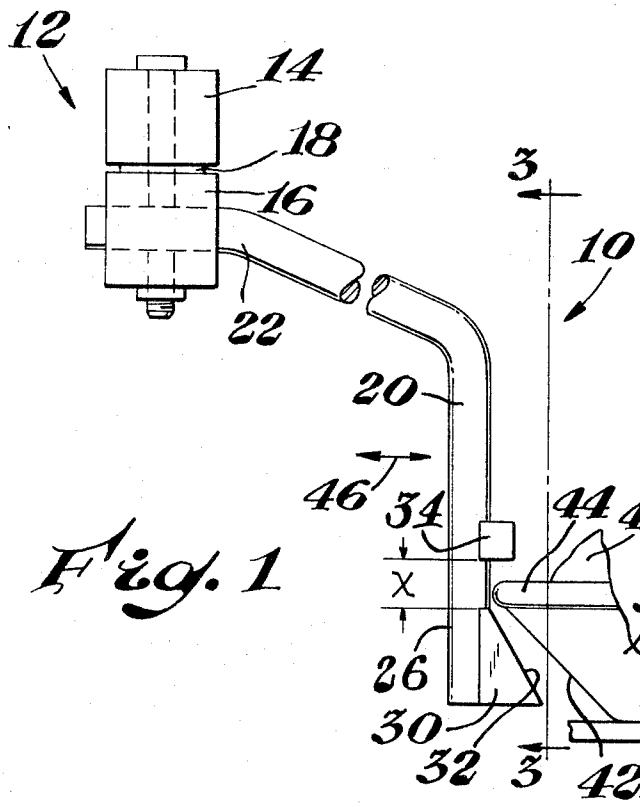


Fig. 1

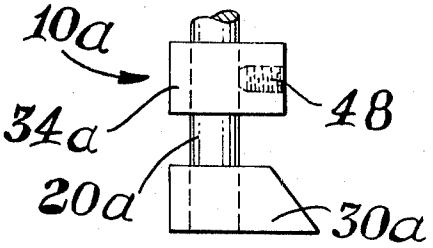


Fig. 4

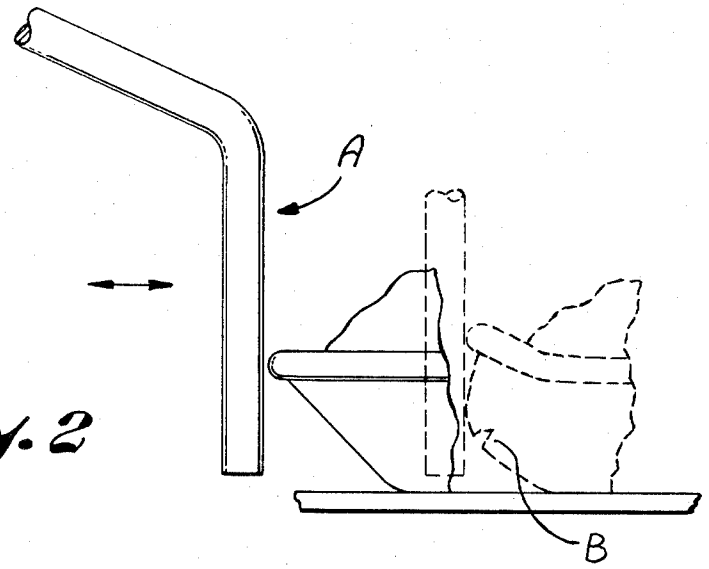


Fig. 2

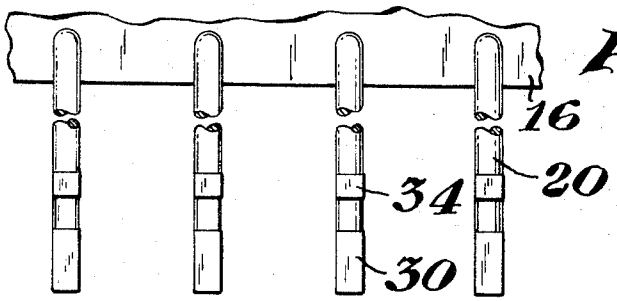


Fig. 3

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TRAY FORWARDING MECHANISM

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an improved finger mechanism for pushing forward filled trays such as plastic or foam trays, by exerting force against the tray sidewall. More particularly, the invention relates to such a finger mechanism having utility for use in package wrapping apparatus of the type adapted to receive plastic or pulp trays pre-filled, for example, with ground or cut meat products, and, thereafter, to wrap the tray and product in a hermetically tight envelope of transparent film, the finger mechanism being adapted to forward the trays to and from various stations such as, for example, wrapping, sealing and labeling stations.

2. Discussion of the Prior Art

Machine wrapping of packages including trays such as pulp or plastic foam trays, is frequently troubled by a high incidence of tray breakage. Plastic foam trays, for example, oftentimes weaken with age, that is, they become more brittle and therefore tend to fracture or break more easily following, for example, prolonged storage intervals. Even "fresh" plastic foam trays frequently show a high incidence of breakage in that the same are usually not of uniform quality. In other words, foam trays of poorer quality such as those having thin spots or thinner than usual sidewalls, oftentimes break or fracture when handled by present-day automatic wrapping apparatus.

Perhaps the most serious tray abuse by wrapping apparatus occurs when the tray in a filled condition, is pushed forward through a "tauntly" draped film to effect wrapping of the film about the tray. Packaging apparatus of a type frequently employing such film wrapping techniques, for example, is illustrated in some detail in U.S. Pat. No. 3,248,848.

Undoubtedly, of course, tray manufacturing and quality control standards can be raised in order to reduce the level of tray breakage when the same are handled by automatic wrapping equipment. For example, such trays could be formed from heavier or thicker foam sheet materials. By use of the principles of the present invention, however, tray breakage is reduced if not eliminated, and without the necessity of employing heavier or stronger and more expensive tray constructions.

It is therefore among the objects of the present invention to provide the following:

A forwarding or finger mechanism capable of pushing forward filled trays such as plastic or foam with minimum or no incidence of tray breakage;

Such a mechanism that exerts substantially a compressive force on the tray sidewall while pushing the same forward, and with minimum application of bending force, the latter of which can frequently crack or fracture the sidewall; and

Such a mechanism adapted for ready incorporation into automatic wrapping or packaging equipment.

BRIEF SUMMARY OF THE INVENTION

Briefly then, the present invention contemplates an improved forwarding mechanism for pushing forward filled trays such as those comprised of plastic foam or molded pulp, the mechanism being particularly adapted for incorporation into automatic package wrapping equipment. Such a mechanism can comprise a shoe member preferably having a slanted face inclined to flushly engage the tray sidewall. A stock block or stop means is disposed a spaced distance above the shoe. In operation, the shoe is moved against the sidewall lifting the tray slightly while pushing forward, and into pressure engagement against the underside of the stop block. The stop block and shoe means cooperatively operate to place the tray sidewall substantially in compression, with minimal or no bending forces placed thereon during forwarding or pushing forward. As will be explained more fully hereinafter, even trays of delicate or brittle sidewall construction or defect trays having sidewalls thinner than "specification," are forwarded without breakage by the aforedescribed finger mechanism. Moreover, such a mechanism is readily incorporated into present day wrapping apparatus with only minor changes, if any, necessary.

The preferred embodiment of the present invention is shown in the accompanying drawings wherein wheresoever possible like reference numerals designate corresponding materials and parts throughout the several views thereof wherein:

FIGS. **1** and **2** are side views schematically representing the forwarding mechanism of the present invention and that of the prior art, respectively;

FIG. **3** is a front view of the mechanism of the FIG. **1**; and

FIG. **4** is a view like FIG. **1** only showing a modified form of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIG. **1**, there is shown the forwarding or finger mechanism of the present invention as generally denoted at **10**, the same including a mounting assembly **12** having upper and lower parts **14** and **16**, respectively. Spacers **18** are fitted or interposed between parts **12** and **14**. By fitting more or fewer spacers **18** between parts **14** and **16**, a convenient method of adjustably lowering or raising mechanism **10** is provided, such adjustments being made simply by fastening and unfastening parts **14** and **16** and removing or adding spacers **18** to adjust to appropriate height.

Mechanism **10**, in addition, includes a plurality of elbow-shaped fingers or arms **20** (see FIG. **3**) aligned in series, and rigidly attached at one end **22** to part **16**, and which extend generally downwardly and outwardly therefrom, and then vertically downwardly at their lower end portions **26**, respectively. End portions **26** each rigidly mount a first member or shoe **30** having an inclined or slanted face **32**; and spaced above shoe **30**, a second generally rectangularly shaped member, stop means or block **34**.

Located to the right of fingers **20**, is a tray **36** supported on table means **38**, and filled with product **40**, the latter comprising, for example, ground beef, steak, chops or the like, and normally weighing 1 to 5 pounds depending on product type and accommodating tray size.

In operation, fingers **20** are forwarded by movement of mounting assembly **12**. Inclined face **32** of shoe **30** thus flushly engages the tapered sidewall **42** of the tray, slightly lifting while forwarding the same, whereby tray rim **44** is lifted into pressure engagement against the underside of stop block **34**, as is shown in dotted lines in FIG. **1** denoting a forwarded position of fingers **20**. While not precisely understood, the force applied to sidewall **42** cooperatively by stop block **34** and shoe **30**, apparently places the sidewall substantially in compression, and with minimum or no appreciable bending forces applied to the wall.

When adapted or incorporated into an automatic wrapping apparatus of a type such as is illustrated in U.S. Pat. No. 3,248,848, mechanism **10** can be operated automatically to move reciprocally as indicated by arrows **46** and, thereby repeatedly push forward filled trays **36** from and off table means **38**. Frequently, such wrapping apparatus requires the filled tray to be pushed through a taunt, vertically draped length of film to accomplish wrapping the film around the top and bottom sides of the tray and across its front portion. Subsequently, operations complete wrapping of the film in the form of an open-ended tube about the filled tray, and the tray is thereafter forwarded to a suitable station such that the ends of the film can be tucked and hermetically sealed.

In any event, movement of the tray through the film is accompanied by a certain degree of resistance, table means **38** adding to such resistance principally due to the appreciable weight of product **40** placed in tray **36**. It is not uncommon, therefore, that several pounds or more of pushing force is required to forward tray **36** such as off table means **38** and through a draped film as explained above. Using mechanism

10, however, five and ten fold the normally required force (approximately 15 to 30 pounds) has been exerted in trials against plastic foam trays **36** without incident of tray breakage. Thus, by practice of the present invention breakage problems, especially with brittle trays or those including structural deficiencies, are substantially, if not altogether, eliminated.

Preferably, face **32** of shoe **30** is smoothly finished to present a surface having a low co-efficient of friction, and is inclined or slanted an amount approximate to the taper of sidewall **42**. Face **32** can comprise, for example, stainless steel of substantially smooth surface characteristics. Optimally, the spacing X between stop block **32** and shoe **30** is in the range of about 1 ½ to about 4 times that of the thickness of rim **44**.

A modification of the present invention is illustrated in FIG. **4** showing a stop block construction **34***a* slidably raiseable and lowerable on finger **20***a* via loosening and tightening of set screw means **48**. Stop block **34***a* is thus conveniently movable to adjust mechanism **10***a* for application in forwarding trays **36** of variable sidewall heights.

The prior art mechanism A, as denoted in FIG. **2**, applies pressure principally at the top portion of the tray thereby exerting considerable bending forces to the tray sidewall. Such bending forces frequently result in breakage of the sidewall as denoted in dotted lines showing a forward position of mechanism A, and breakage of the tray at region B.

While certain representative embodiments and details have been shown for the purpose of illustrating the invention, it will be apparent to those skilled in the art that various changes and modifications can be made therein without departing from the spirit and scope of the invention.

Accordingly, what is claimed is:

1. A device for pushing forward product filled trays or like containers of a general type including a bottom wall, and an upstanding generally upwardly and outwardly tapered sidewall, said device comprising a table means defining a generally flat horizontal surface portion to receive and support the bottom wall of the container, a plurality of side by side, laterally spaced apart fingers, said fingers each including a pushing face positioned to engage the sidewall of said container, means to reversely move said fingers as a unit along a linear path traversing at least a part of said table means, said pushing faces being configured to generally flushly engage said sidewall and to slide said sidewall upwardly thereon away from said table means responsive to engagement therewith and forward movement of said fingers, and means to engage the top edge portion of said sidewall to restrain the same against the upward bias given thereto by said pushing faces accompanying forward movement of said fingers.

2. The device of claim **1** wherein said restraining means comprises an underside surface facing generally downwardly toward the plane of said table means.

3. The device of claim **2** wherein said underside surface overhangs at least a part of said pushing faces.

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