April 28, 1959 H. OBERWELLAND 2,884,114

CONVEYING AND TRANSFER MECHANISM

Filed July 7, 1954 2 Sheets-Sheet 1

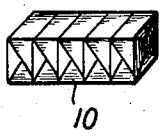


Fig.1

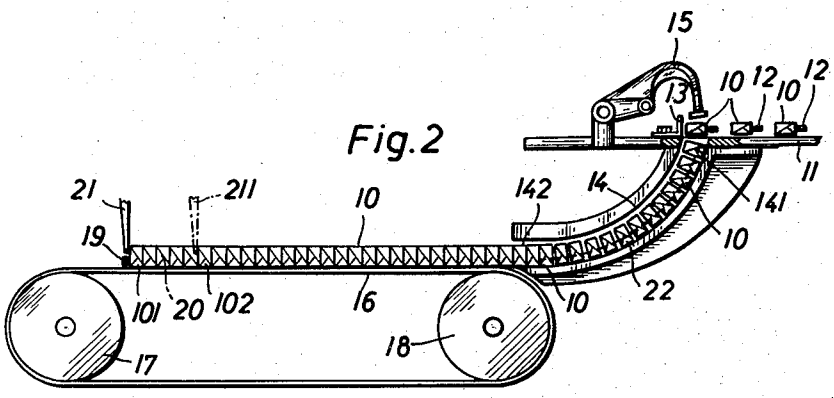


Fig.2

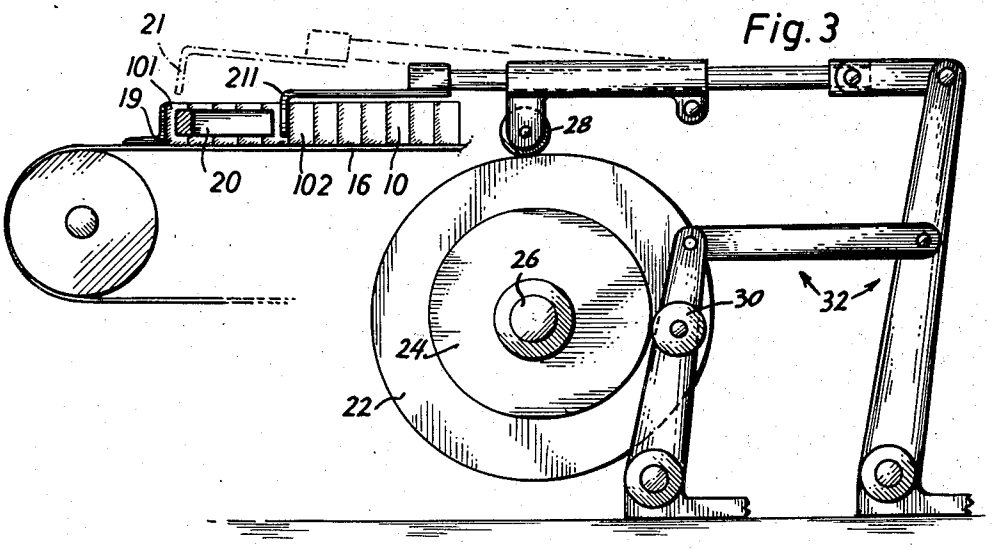


Fig.3

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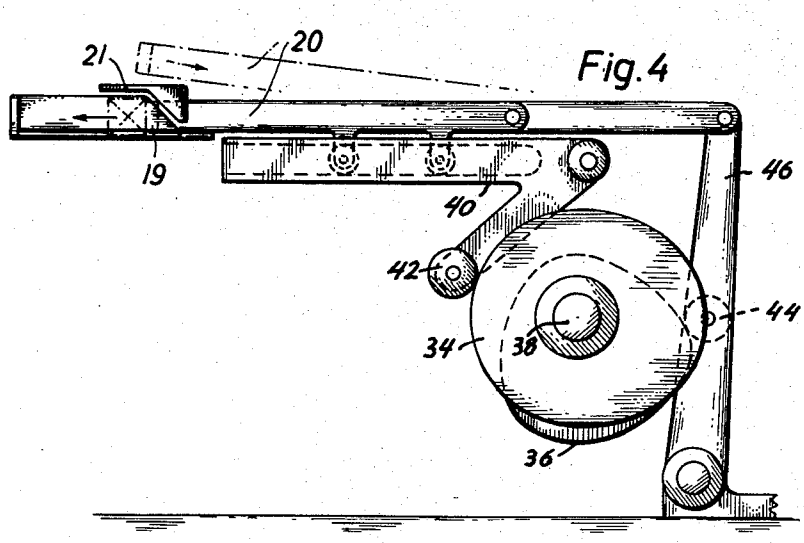


Fig.4

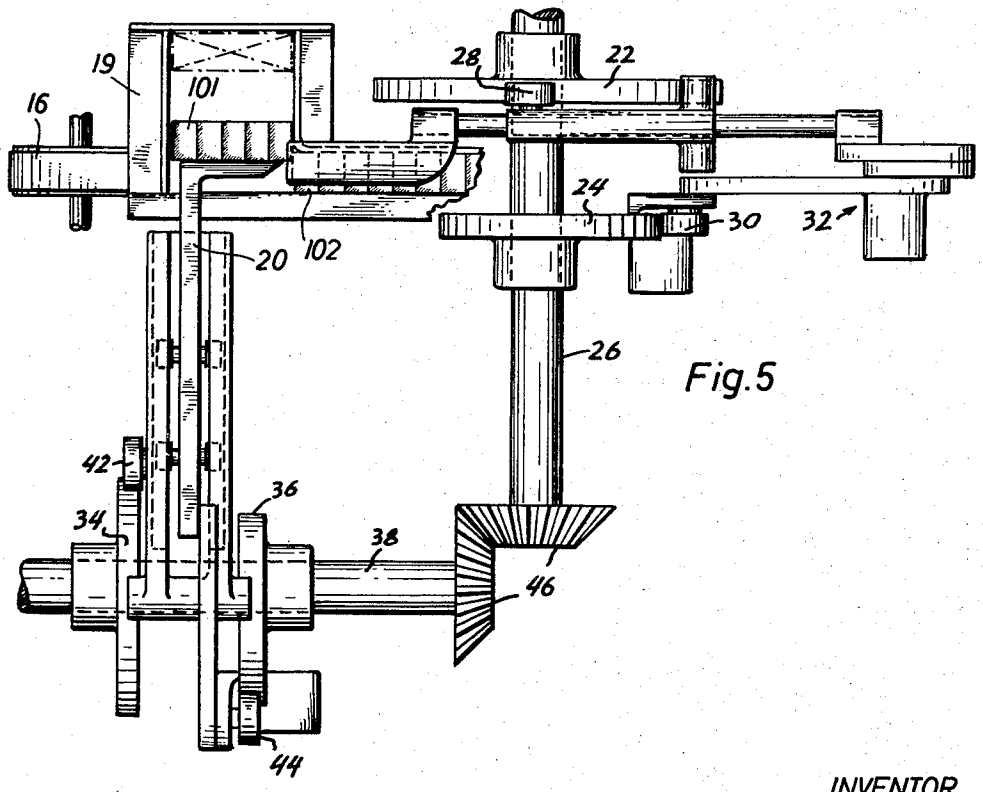


Fig.5

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CONVEYING AND TRANSFER MECHANISM

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7 Claims. (Cl. 198—24)

This invention relates to a wrapping device, and more particularly to a device for, and a method of, groupwise wrapping a plurality of individually wrapped objects.

It is known to place candies or other objects in individual wrappers and then to wrap a stack of such individually wrapped objects in an additional common cover. For instance, individually wrapped hard candies are stacked one on top of the other, or placed next to one another, and then wrapped as a group. Up to now, individual pieces were wrapped in a first packing machine and then set up in groups by hand, and such groups were fed to a second wrapping machine. Such procedure, however, is cumbersome. Also, with the high speed operation of modern wrapping machines, several persons are required to set up the pieces in the referred to fashion.

Based on this experience, it has also been proposed to push individually wrapped objects, as they leave the first packing machine, upwardly into a collecting channel. As soon as the number which is to be combined in a stack is reached, the entire group is ejected to one side. Each group of objects is introduced in a conveyor cell and then transferred from there to the second wrapping machine to receive the outer cover for the entire group. A device of this kind involves substantial structural outlay. Due to the multiplicity of transfer points for the individual pieces and the combined groups between the two packing machines, this arrangement is probably readily subject to breakdowns.

One object of my invention is to provide a device for the wrapping of a plurality of objects, such as candies, each piece of candy being individually wrapped.

Another object of my invention is to overcome the disadvantages of the setting up of objects by hand and of the aforementioned collecting channel.

The primary object of my invention is to generally improve the groupwise wrapping of a plurality of objects.

More specifically, the present invention aims to simplify, cheapen, and speed up such groupwise wrapping.

To the accomplishment of the foregoing objects and such other objects as will appear hereinafter, my invention consists in a wrapping device, its elements, a wrapping method, its steps, and the relation of these elements and steps, respectively, one to the other, as are more particularly described in the following part of the specification.

The specification is accompanied by a drawing in which:

Fig. 1 is a perspective view of a plurality of individually wrapped objects which are to be enclosed in a common wrapper of cellophane or similar material;

Fig. 2 is a side elevation of a device according to my invention which is to be disposed between two wrapping machines;

Fig. 3 is a detail elevational view of parts actuating a so-called finger;

Fig. 4 is a detail elevational view of parts actuating a pushing member; and

Fig. 5 is a plan view of the parts shown in Figs. 3 and 4 in associated condition.

Referring to the drawings in greater detail, and initially to Fig. 2, individually wrapped objects **10**, coming from the first wrapping machine which is not shown, slide forward in a flat position on the guide way **11**, fed by dogs **12**. Closely ahead of the stop **13**, a chute **14** branches off from the plane **11** downwardly, for instance, at right angles, to curve gradually into a horizontal direction. The individual objects **10** are engaged by a pusher **15** and moved into the chute **14**. The pusher moves up and down in a rhythm corresponding to the movement of the dogs **12**. While passing through the chute, the objects turn from the flat to an upright position. In the upper portion **141** of the chute, the objects still lie more or less flatly one on top of the other. Due to a rapid feed of the objects into the chute and the curved shape of the chute, at **142** the objects are already upright, that is, they stand next to one another and rest on their narrow sides. In such position, the objects are received by the endless conveyor belt **16** which is supported by the two drums **17** and **18**. The speed of the belt **16** is controlled so as to be equal to, or slightly greater than, the speed at which the objects **10** descend at **141**.

While moving over the guide way **11**, the individually wrapped objects have the tonguelike end folds of their wrappers, clearly shown in Fig. 1, parallel to the guide way, and while moving through the chute **14**, the end folds of the wrappers gradually turn from the horizontal to the vertical position.

The densely packed row of objects is moved forward by the conveyor belt to the stop **19**. The individual objects, with the tonguelike end folds of their wrappers on their large flat surfaces, press against one another elastically. Ahead of the stop **19**, a pushing member **20** which is clearly shown in Figs. 3, 4 and 5 moves at right angles to the direction of the movement of the conveyor belt. The pusher **20** is so wide that on each operative stroke it contacts a predetermined number of objects (five in the present case) and pushes them out of the row on the belt and off to one side. A group of objects, as shown in Fig. 1 as an example, is then fed in a known way to the second wrapping machine (not shown) which provides the group with a common wrapper of cellophane, paper, etc.

With the very rapid movement of the individually wrapped objects on the conveyor belt **16**, the operation could easily be interrupted if the foremost object, **101** or **102**, were to tilt before it came to a halt by striking against the stop **19**. This is prevented by providing a movable finger **21** which reciprocates between the positions **21** and **211**. As soon as the foremost group is sufficiently displaced by the pushing member **20** to permit passage of the finger **21** (see Fig. 5), the latter moves into the row of objects as shown at **211** (see Figs. 2 and 3). The finger **21** is transversely tapered toward its lower edge (Fig. 4). The point thus formed assumes its position in front of the piece **102** when the preceding group has been pushed aside by the pushing member about one half to three quarters the width of an object. This insertion of the point suffices to prevent tilting of the piece **102**. The finger **21**, while in the position **211**, is further lowered slightly, but does not yet move forward. Only after the pusher **20** is returned to its starting position, the finger moves from the position **211** toward the left until it reaches the position **21** and the object **101** abuts against the stop **19**.

Referring to Fig. 3, the motions, the finger **21** has to perform, are received from cams **22** and **24**, which are mounted on a common shaft **26**. A follower roller **28** cooperates with the cam **22** and causes the finger **21** to move upward, after it has reached the position **21**,

and downward, after it has moved, while raised, back to the position 21l. A follower roller 30 cooperates with the cam 24 and causes the finger 21, with the aid of a linkage generally designated 32, to move forward and backward.

In the mechanism to transmit motions to the pushing member 20, as shown in Fig. 4, use is made of two cams 34 and 35 mounted on a common shaft 38. A link 40 carries a cam follower roller 42 to cooperate with the cam 34 and to move the pushing member 20 upwardly and downwardly. A cam follower carried by a rod 46 cooperates with the cam 36. The rod 46 forms a part of a linkage which imparts a lengthwise reciprocating motion to the pushing member 20.

From Fig. 5 it will be seen that the intersecting shafts 26 and 38 are driven by bevel gears 46 and communicate their motions over the referred to cams, follower rollers, and linkages, in a positive manner and in a mutually timed sequence, to the finger 21 and the pushing member 20, respectively.

Practical experience has shown that with the device of the invention it is possible to feed the objects 10 without additional hand labor at the normal production rate of the first wrapping machine where they are individually wrapped, to the second machine where they are provided with a common cover, for instance, of cellophane.

To prevent lateral displacements of the objects, the guide way 11, the chute, and/or the conveyor, or portions thereof, are provided with slightly projecting guide ridges.

It is believed that the method of my invention, as well as the construction and operation of a form of apparatus for practicing the invention, and the many advantages thereof, will be understood from the foregoing detailed description.

Some of the features and advantages are reviewed hereinafter.

Preferably, the individually wrapped objects are fed in a flat position to the pusher 15. The guide way 11 constitutes a first conveying way. Then the objects pass through the downwardly curved chute to the second conveyor. According to one feature of my invention, the objects are fed into the chute singly but continuously by the pusher 15 in such a way that the tonguelike end folds of the wrapper of each of the objects of the series transported through the chute and over the second conveyor will be contiguous to the smooth wrapping surface of the adjoining object. Thus, while passing through the curved chute, the objects are automatically set up in an erect position, and while the transversely acting pushing member 20 moves a group of most advanced objects to the second wrapping machine, the remaining objects, especially the object leading the remaining objects, are held in their upright position. The tonguelike end folds of the individual wrappers permit compression in the row of objects transported on the second conveyor. The referred to "remaining objects" are supported in the upright position preferably by a reciprocating member.

It will be understood that the term "leading object" as used in this specification is not intended for the very first individually wrapped object of the entire row of such objects but for the first object behind the group next to be fed to the second wrapping machine.

The finger 20 will intervene in front of the leading object and will then travel at the speed and in the direction of the conveyor belt 16 so as to prevent the advancing objects from tilting until they finally reach a fixed stop and a group of these objects is ejected sideways. The finger then flicks back and resumes a position in front of the then leading object. This cycle is repeated continuously.

The finger is preferably designed so as to be able to assume its position in front of the leading object before the preceding group of objects is fully ejected from the row. The finger, after snapping back, may preferably be made to stand still for a short while until the movement of the transverse plunger is completed, whereupon the finger resumes its movement with the conveyor belt.

In accordance with the present invention, advantage is taken of the compressibility of the row of wrapped objects to equalize the continuous feed of objects and the discontinuous ejection in groups. The compressibility compensates for the intermittent ejection.

It will be apparent that while I have shown and described my invention in one form only, many changes and modifications may be made without departing from the spirit of the invention defined in the following claims.

I claim:

1. A device to be interposed between a continuously operative machine individually wrapping objects so that the end folds of the individual wrapping are disposed at one side of the latter and a machine applying common wrappers to groups of the individually wrapped objects; said device comprising a first conveyor continuously transporting individually wrapped objects received from the individual wrapping machine, a second conveyor disposed at a level below the first conveyor, feeding means gravitationally and successively transferring individually wrapped objects from said first conveyor to said second conveyor to form a row of individually wrapped objects on said second conveyor with the end folds of the individual wrappings being disposed between the successive objects so that said row is resiliently compressible in the direction of movement of said second conveyor, pushing means normally disposed at one side of said second conveyor and movable across the latter to push a group of individually wrapped objects at the head of said row laterally off said second conveyor for feeding, as a group, to the group wrapping machine, and means operative to hold the object on said second conveyor immediately behind said group of objects at the head of the row during the movement of said pushing means across the second conveyor, while wrapped objects are added to the row and the latter is compressed, and to move with the held object in the direction of movement of said second conveyor following the lateral removal of a group of objects from the second conveyor and the return of said pushing means to said one side of the latter.

2. A device according to claim 1; wherein the object holding means includes a retaining member reciprocable along said second conveyor through a stroke substantially equal to the length of a group of wrapped objects to be removed from the head of said row, said retaining member projecting into the path of said wrapped objects on said second conveyor when it is disposed at the limit of its stroke in the direction opposed to the conveyor movement and being removed from the path of the conveyed objects following the completion of the stroke of said retaining member in the direction of the conveyor movement for the return stroke in the opposed direction.

3. A device according to claim 2; further comprising a stop located adjacent the position of said retaining member at the completion of the stroke of the latter in the direction of movement of said second conveyor and holding the foremost wrapped object of the row against movement with said second conveyor during said return stroke of the retaining member in the direction opposed to the conveyor movement.

4. A device according to claim 3; wherein said retaining member is shaped to fit between the last of the group of objects and the object next in line in the row on said second conveyor before said group of objects has been completely removed from said second conveyor.

5. A device according to claim 3; wherein said retaining member remains at the limit of its stroke in the direction opposed to the movement of said second conveyor and projects into the path of the objects in the

row during the lateral removal of said group of objects from the second conveyor.

6. Method of feeding groups of objects that are individually wrapped in a first continuously operative machine, so that the wrapping of each object has end folds at one side of the latter, to a second machine where a group of objects is enveloped in a common wrapping; comprising the steps of feeding the individually wrapped objects from the first machine along a first conveyor, with the end folds of the individual wrappings being substantially parallel to the conveying surface of the first conveyor, and along a guide member onto a conveyor to form a row of wrapped objects on the latter with the end folds of the individual wrappings being substantially vertical to the conveying surface of the second conveyor and disposed between the successive objects of said row to provide resiliently compressible material between the successive objects so that the row of objects can be resiliently compressed in the longitudinal direction, compressing said row in the longitudinal direction after the addition of each wrapped object thereto to prevent toppling of the wrapped objects in said row, and intermittently removing groups of individually wrapped objects from the head of said row on the conveyor so that the removed groups can be fed to the second machine for envelopment in common wrappers, the longitudinal compressibility of said row of individually wrapped objects permitting the feeding of additional individually wrapped objects to said conveyor during the periods when groups of wrapped objects are being removed from the head of the row.

7. In the device according to claim 1, said first conveyor singly transporting the individually wrapped objects with the end folds of the individual wrappings being on a side of the objects substantially parallel to the conveying surface of the first conveyor, said feeding means including a curved guide member opening upwardly adjacent the first conveyor to successively receive the individually wrapped objects from the latter, and opening horizontally adjacent said second conveyor to guide the individually wrapped objects and to discharge the latter in a row onto the second conveyor, said object holding means being operable to help crowd the individually wrapped objects on the second conveyor, with the second conveyor in continuous operation, to cause the objects to assume positions with said wrapping end folds being substantially vertical to the conveying surface of the second conveyor and disposed between successive objects, and an oscillating pusher to successively engage and move the individually wrapped objects from the first conveyor into the upwardly opening end of the curved guide member.

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