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METHODS AND APPARATUS FOR PARCELLING CARTONS OR THE LIKE

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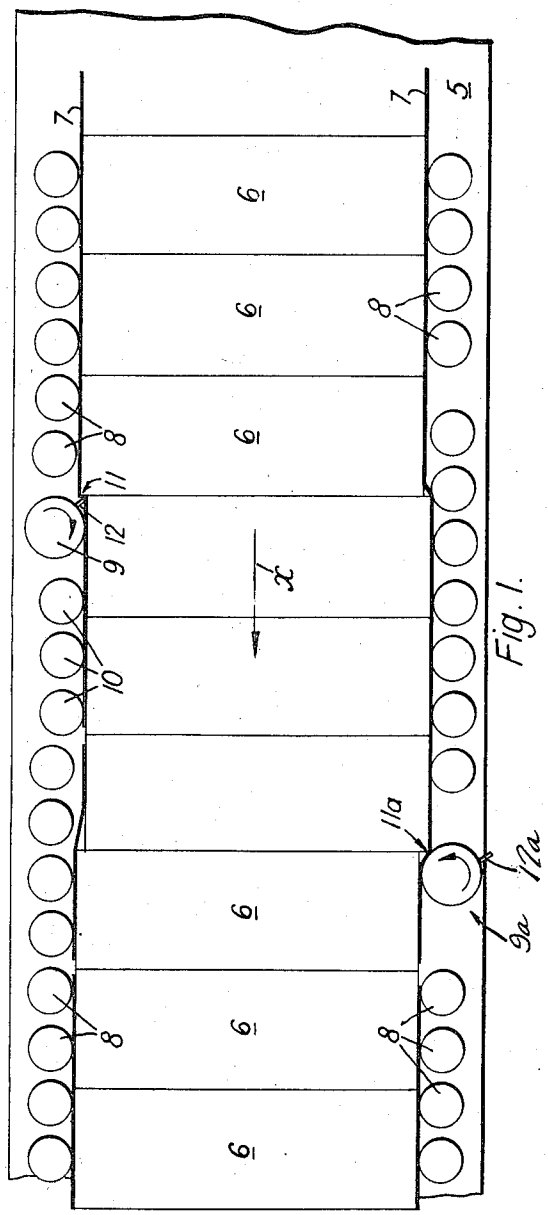


Fig. 1.

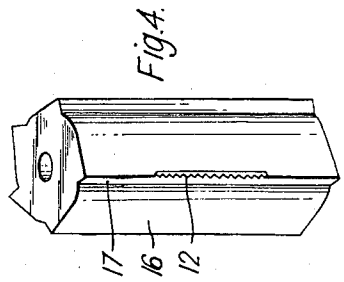


Fig. 4.

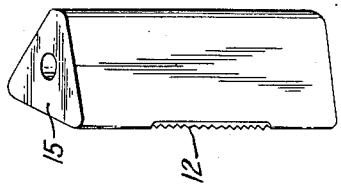


Fig. 3.

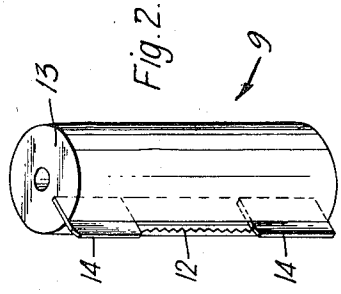


Fig. 2.

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METHODS AND APPARATUS FOR PARCELLING CARTONS OR THE LIKE

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8 Claims. (Cl. 225—4)

It is nowadays the practice to fasten together cartons or the like either because it is more convenient to handle them in groups or because they are sold under certain circumstances in groups rather than individually. For example with cartons of synthetic detergent it may be that the selling price of a group of two cartons is less than twice the price of each carton and it is then convenient to fasten two cartons together so that they may be handled by the retailer and customer as a single article or it may be that one of the cartons is a free sample given when the other carton is bought.

The present invention has for its object to enable cartons, usually after they have been filled, to be fastened together.

According to this invention there is provided a process for fastening together cartons or the like in groups comprising moving forward a line of cartons past a taping station at which adhesive tape is drawn off a roll by the forward movement of the line of cartons and applied thereto, some of the cartons being staggered sideways of the forward direction of travel, and separating successive groups from the line of cartons by severing the tape stretched across the step, formed by the said staggering, between the last carton of one group and the first carton of the next succeeding group. The cartons are preferably staggered as they are moved forward after the tape has been applied.

According to a feature of the invention the tape is severed by moving the line of cartons past a knife carried by or integral with a rotary member which engages the cartons and is driven thereby, rotation of the said member being interrupted immediately prior to, and during, the severing operation. It should be understood that the said knife may be a cutting edge formed on the said rotating member.

Suitable types of adhesive tape for use in the practice of the invention are, pressure sensitive adhesive tape, thermoplastic tape, gummed tape to which water is applied immediately before application of the tape to the cartons, and tape to which adhesive material is applied before the tape is applied to the cartons.

Practical applications of the invention will be described, by way of example only, with reference to the accompanying drawings which diagrammatically illustrate a preferred way of carrying the invention into effect.

In the drawings:

Figure 1 is a plan view of an apparatus according to the invention, and

Figures 2–4 are perspective views of cutter mechanisms which may be used with the apparatus of Figure 1.

A line of cartons is fed forward by a conveyor on to a "dead" plate upon which the cartons stand and along which they are moved by the cartons being pushed forward by the conveyor.

In Figure 1 the "dead" plate is indicated by the reference numeral **5** and the cartons are indicated by the reference numeral **6**. The cartons **6** are pushed along

the "dead" plate **5** by the conveyor (not shown) in the direction of the arrow *x*.

A roll of adhesive tape is suitably supported at each side of the line of cartons **6**, the tape being drawn off the roll and passed beneath a spring-pressed roller which applies the tape to the sides of the cartons. Preferably the assembly comprising the roll of tape and associated pressure roller is duplicated at each side of the line of cartons, the pairs of assemblies being spaced in the line of travel thereof. In this way immediately prior to one roll of tape becoming exhausted the operator draws the tape from the second assembly and applies it to the cartons, a fresh roll of tape being provided at the first assembly so that continuous operation is assured.

The taped cartons then pass along the "dead" plate to the apparatus shown in Figure 1. The adhesive tapes are indicated at **7**. The cartons pass between groups of vertical guide rollers **8** which engage the opposite taped sides of the cartons. Guide plates may be used instead of rollers and the latter, though it is preferred that they be idlers, may be driven. The rollers **8** are arranged so that their axes of rotation lie in planes parallel with the sides of the cartons. Interposed between the line of rollers **8** is a rotary cutter **9**, and associated therewith is a group of rollers **10** the axes of which lie in a plane offset with respect to the plane of the axes of the rollers **8** as shown in Figure 1. The effect is that each carton moving in the direction of the arrow *x* as it engages the rotary cutter **9** is moved sideways of the direction of travel *x* the effect being that such staggering produces a step **11** across which the adhesive tape is stretched. The staggered cartons are held in position by rollers **10**. When it is desired to parcel the cartons into groups of two it is arranged that the circumference of the rotary cutter **9** is more than the width, and less than twice the width, of a carton. Normally the rotary cutter **9** engages and is rotated by the cartons so they move forward in the direction of the arrow *x*. Referring more particularly to Figure 2 the rotary cutter **9** comprises a cylinder **13** which carries the cutter blade **12** between a pair of radially disposed fingers **14** having slightly curved ends. The fingers **14** are in line with the blade **12** and it is arranged that the tape **7** passes between the fingers **14** to engage the cutter blade.

The cutter cylinder **13** will be driven by the moving line of cartons until the fingers **14** engage with the sides of the cartons whereupon further rotation of the cutter cylinder is prevented. In view of the selection of the relative sizes of the circumference of the cutter cylinder in relation to the width of the cartons as mentioned above, it is ensured that this occurs before the cutter blade **12** reaches the step **11**. After the fingers **14** have engaged the cartons the latter are moved forward past the blade **12** to bring the portion of the tape stretched across the step **11** against the blade **12** so that with further movement of the line of cartons the tape is cut.

The cutter arrangement has been described as applied to one side of the cartons. A similar cutter **9***a* having a cutter blade **12***a* is provided for a step **11***a* on the other side, and this cutter **9***a* is preferably located three or more carton widths from the first cutter, depending on the number of cartons it is intended to parcel into each group.

Figure 3 shows a similar arrangement wherein the rotary cutter **12** is provided at the edge of a triangular member **15** which engages the line of cartons and is rotated thereby. With the arrangement of Figure 3 it is intended that the cartons be fastened together in groups of three. Each carton is staggered sideways as it moves past the triangular member an edge of the member entering the step **11** so that the tape is cut by blade **12**. Of course a cutting cylinder **9** as described with reference

to Figure 1 may also be used for groups of three cartons, the cylinder having a circumference greater than twice and less than three times the width of the cartons.

A cutter of square section may be used having a pair of blades projecting from diagonally opposite corners when each group comprises two cartons. Such a cutter with a single blade would be used for a group of four cartons.

Where the group of cartons comprises five or more cartons, the cutter may be provided with a corresponding number of sides and with a single blade. This is illustrated in Figure 4 which shows an arrangement in which the rotary cutter 12 is provided at the edge of a five-sided member 16. In order to prevent slipping between the member 16 and the cartons, a longitudinally extending groove 17 is formed in each side of the member, each groove 17 being disposed adjacent a corner of the member 16.

It is to be understood that the tapes may be attached to the top and bottom of the cartons instead of to the sides thereof.

While the cartons are preferably all the same width the invention has application to cartons of slightly different width and also to cartons of slightly different breadth i.e. the distance across the opposite taped sides may vary slightly.

I claim:

1. A method for severing into groups a series of cartons having a continuous strip of adhesive tape secured to at least one lateral surface thereof, comprising the steps of moving forward a line of cartons, displacing successive cartons normal to their forward direction of travel, and separating successive groups from the line of cartons by severing the tape stretched across the step, formed by the said normal displacement, between the last carton of one group and the first carton of the next succeeding group.

2. A method for severing into groups a series of cartons connected in abutting relation by a continuous flexible strip adhesively secured to one lateral surface thereof, comprising the steps of moving the cartons in the direction of the length of the strip in a predetermined path, displacing successive cartons laterally of the direction of movement thereof as the cartons pass a predetermined point in said path, whereby the strip is partly freed from a displaced carton and stretched across to the next succeeding carton to form momentarily a free bight in the strip, and periodically severing the strip by cutting the same at the bight thus formed to separate the series of cartons into groups, each group including a plurality of cartons.

3. Apparatus for severing into groups a series of cartons having a continuous strip of adhesive tape secured to at least one lateral surface thereof comprising means for moving a line of cartons, means for staggering some of the cartons normal to the forward direction of travel, and means for separating successive groups from the line of cartons by severing the tape stretched across the step, formed by the said staggering, between the last carton of one group and the first carton of the next succeeding group.

4. Apparatus for severing into groups a series of cartons connected in abutting relation by a continuous flexible strip adhesively secured to one lateral surface thereof, comprising means for moving the cartons in the direction of the length of the strip in a predetermined path, means located adjacent said path for engaging and displacing successive cartons laterally of the direction of movement thereof, whereof the strip is partly pulled away from a displaced carton to form momentarily a free bight in the strip, and a device operable to engage and sever selected bights only to separate the series of cartons into groups, each group including a plurality of cartons.

5. Apparatus for severing into groups a series of cartons havinug a continuous strip of adhesive tape secured to at least one lateral surface thereof comprising means for moving a line of cartons, means for staggering some of the cartons sideways of the forward direction of travel, means for separating successive groups from the line of cartons by severing the tape stretched across the step, formed by the said staggering, between the last carton of one group and the first carton of the next succeding group, said means for staggering the cartons acting to stagger the cartons as they are moved forward after the tape has been applied, said means for separating successive groups including a knife adapted to sever the tape as the cartons are moved past the knife, said knife being carried by a rotary member which engages the cartons and is driven thereby, rotation of the said member being interrupted immediately prior to and during the severing operation.

6. Apparatus as claimed in claim 5 in which the rotary member is a member having a number of sides corresponding to the number of cartons which are to be fastened together.

7. Apparatus as claimed in claim 6 in which the rotary member has at least five sides, a longitudinally extending grove disposed adjacent a corner of the member being formed in each side.

8. Apparaus for severing into groups a series of cartons having a continuous strip of adhesive tape secured to at least one lateral surface thereof comprising means for moving a line of cartons, means for staggering some of the cartons sideways of the forward direction of travel, means for separating successive groups from the line of cartons by severing the tape stretched across the step, formed by the said staggering, between the last carton of one group and the first carton of the next succeeding group, said means for staggering the cartons acting to stagger the cartons as they are moved forward after the tape has been applied, the means for moving the cartons comprises two sets of guide rollers, the sets being adapted to engage opposite sides of the cartons and each set of guide rollers comprising a group of rollers offset from the other rollers of the set in a direction normal to the direction of travel of the cartons.

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