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MACHINE FOR SEALING CARTONS

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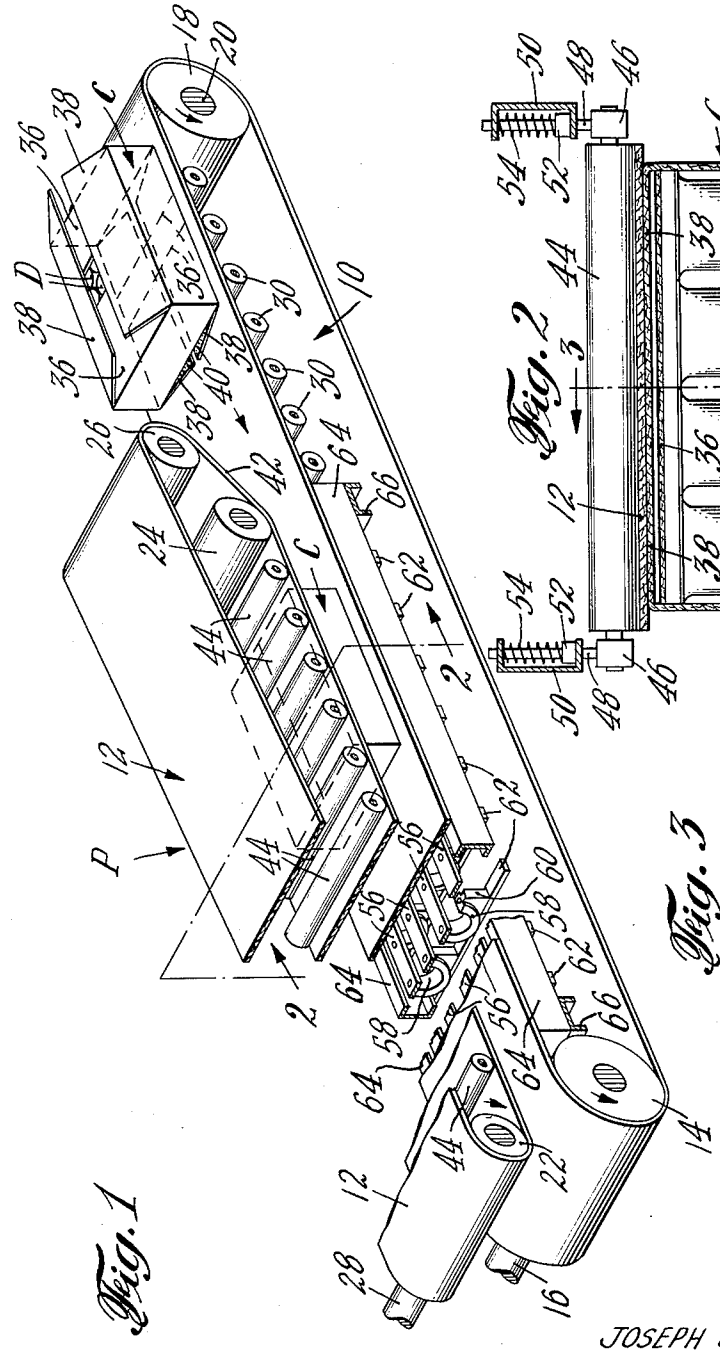


Fig. 1

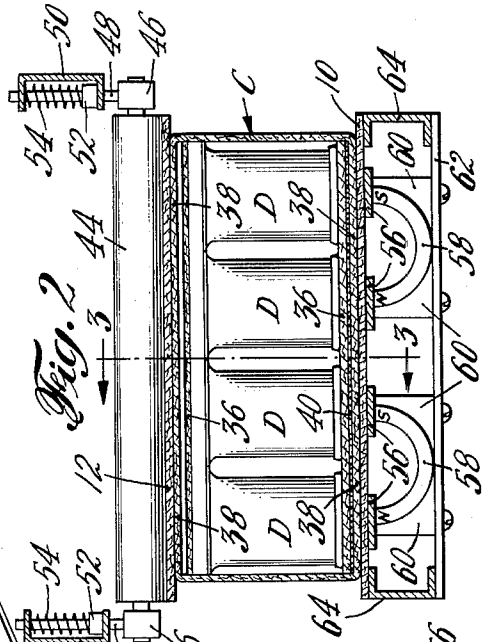


Fig. 2

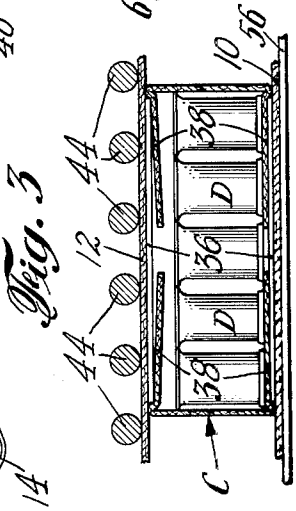


Fig. 3

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# MACHINE FOR SEALING CARTONS

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The present invention relates to a machine for insuring a secure adhesive bond between the folded bottom flaps of shipping cartons which contain magnetizable articles which are shorter than the internal depth of the cartons.

In the can manufacturing industry, empty cans are frequently packed into rectangular fibreboard cartons at the can manufacturing plant for shipment to packer customers. Since these customers in turn use the same cartons for reshipment of the filled cans to their own customers, only the flaps at the bottom of the cartons are normally sealed at the can factory.

These cartons are usually received by the can plant in flattened condition and are set up and filled with the empty cans in an automatic casing machine. An adhesive such as glue is then applied to the inside surfaces of the outer bottom flaps of the carton, and the carton with its flaps folded into substantially closed position is then passed through a compression device, which usually comprises spaced upper and lower pressure belts, which holds the glue-bearing outer bottom flaps against the inner bottom flaps until the adhesive sets. Normally, the height of the cans in the carton equals the internal depth of the carton, and the cans contact the inner flaps at both the top and bottom of the carton. As a consequence, the pressure exerted by the upper belt is transmitted via the cans to the inner bottom flaps to back them up and hold them firmly in contact with the glue-bearing outer flaps until the glue sets.

However, there are many instances where incomplete cans are shipped by the can plant, as, for instance, where can parts such as valves or nozzles are added to the cans by the packer after the product has been filled into the cans. These parts increase the height of the cans, and thus the original cartons, which are used by both the can manufacturer and the packer, must initially be made with sufficient depth to accommodate the subsequently increased height of the can. As a result, the cartons are somewhat higher than the incomplete cans which are packed into them at the can factory, and a space exists between the upper ends of the cans and the upper flaps of the cartons. Because of this space, the cans are not pressed against the bottom inner carton flaps, and, since these inner flaps frequently have a tendency to bend upwardly out of engagement with the glue bearing outer flaps unless firmly backed up by the cans, a secure glue seal is not consistently obtained.

The present invention solves this problem by the utilizing magnets disposed beneath the carton to create a strong magnetic field which pulls the magnetizable cans downwardly against the inner carton flaps to thus hold them in firm engagement against the glue-bearing outer flaps while the glue sets. Thus, the fact that the cans are of less height than the full interior depth of the carton does not prevent the formation of a secure glue seal, since the pressure of the upper belt is no longer relied upon to maintain the cans against the inner flaps of the carton.

An object of the invention therefore is the provision of a machine for insuring a secure adhesive seal between the bottom flaps of a carton which contains lightweight magnetizable articles such as empty cans, which articles may be of less height than the inside depth of the carton.

Another object of the invention is the provision of such a mechanism which may be readily embodied in conventional carton sealing machines without affecting the normal operation of such machines.



Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

FIGURE 1 is a perspective view of a carton sealing machine made according to the principles of the instant invention with parts broken away, this view also serving to illustrate the method steps of the invention;

FIG. 2 is an enlarged vertical section taken substantially along the line 2—2 in FIG. 1, and

FIG. 3 is a vertical section on a slightly reduced scale taken substantially along the line 3—3 in FIG. 2, parts being broken away.

As a preferred and exemplary embodiment of the instant invention, the figures illustrate a machine designed to obtain secure glue seals between the bottom flaps of cartons C which are filled with lightweight empty cans D which are made of magnetizable material such as tin plate, terne plate, or the like, and are of less height than the internal depth of the cartons C. The machine comprises a lower nonmagnetic belt 10 and an upper nonmagnetic belt 12, the lower flight of the upper belt 12 being parallel to and spaced vertically above the upper flight of the lower belt 10 a distance substantially equal to or slightly less than the external height of the cartons C which are passed therebetween.

The lower belt 10 operates around a driving drum 14 which is mounted on a constantly rotating drive shaft 16, and an idler drum 18 which is mounted on an idler shaft 20. The upper belt 12 is shown as operating around three drums 22, 24 and 26. As shown, the drums 24 and 26 are idler drums, while the drum 22 is a driving drum and is mounted on a constantly rotating drive shaft 28. The drive shafts 16, 28 are rotated by any suitable driving mechanism (not shown). It will be understood that this machine may be quite lengthy and, if necessary, additional idler drums may be provided to support the upper flight of the upper belt 12. The belts 10, 12 are preferably driven at the same speed, but it should be understood that the upper belt 12 need not be positively driven, since it will be set into motion by reason of its frictional contact with a carton C whenever a carton is positioned between the belts 10, 12.

As seen in FIG. 1, the lower belt 10 is somewhat longer than the upper belt 12. The lead-in end of the lower belt 10 (to the right as seen in FIG. 1) is supported on spaced anti-friction rollers 30 and receives the cartons C which have previously been filled with the empty magnetizable cans D.

The cartons C are of the conventional type and are usually rectangular in shape and are provided both at the top and bottom with opposed pairs of transverse inner flaps 36 and longitudinal outer flaps 38. These cartons C are normally received in a flattened condition with these flaps unsealed, and are then set up in can-receiving position with the top flaps in open position and the bottom flaps folded in closed but unglued relationship. The empty cans D are then placed in the cartons C, either manually or by a can casing machine. The outer bottom flaps 38 are then swung outwardly and a film of suitable adhesive such as glue 40 is applied to their inner surfaces, after which they are again folded into closed position. These steps may be accomplished in any suitable manner, either automatically or manually.

The cartons C are then placed on the receiving end of the belt 10 and the upper flaps 36, 38 are folded into approximately closed position shown in FIG. 1. This,

too, may be done either automatically or manually. As seen in FIG. 1, the upper flaps of the cartons have a tendency to spring open when the cartons are first received on the belt 10, due to the fact that the fibres of the fibreboard material from which the cartons are made have not been sufficiently broken to permit these flaps to lie flatly in closed position. The bottom flaps, too, frequently assume a partially open position, as seen in FIG. 1, since the weight of the empty cans D is insufficient to hold them in closed position against the tendency of the fibres to move them to open position.

The forward motion of the belt 10 carries the cartons D to the left and into engagement with the upper belt 12. As seen in FIG. 1, the drum 26 of the belt 12 is mounted at a higher elevation than is the drum 24, thus resulting in an inclined lead-in belt portion 42, which initially contacts the cartons C and gently presses the partly open flaps into closed position as the carton is fed between the oppositely disposed parallel flights of the belts 10, 12 and into what may be called the compression portion of the machine, which portion comprises the remaining length of the machine, as indicated by P in FIG. 1.

The lower flight of the upper belt 12 in this compression portion is preferably backed-up by a plurality of weight rollers 44 which are mounted in vertically movable bearings 46 which depend from vertical pins 48 which pass through vertically aligned openings formed in longitudinally extending channel bars 50 which form a part of the main frame of the machine. The pins 48 are provided with stop collars 52 which limit the downward movement of the rollers. Springs 54 are interposed between the stop collars 52 and the upper legs of the channel bars 50 to increase the resistance of the rollers 44 against upward movement. For the sake of simplicity and clarity of illustration, these details of construction are not shown in FIGS. 1 and 3.

The normal distance between adjacent flights of the belts 10 and 12 is preferably substantially equal to the external height of the cartons C, so that the belt 12 thus exerts sufficient downward pressure against the top ends of the cartons C to press the bottom flaps of the cartons C flatly against the upper flight of the lower belt 10 and hold them in closed position, as seen in FIGS. 2 and 3. This upper flight of lower belt 10 in the compression portion P of the machine is supported against downward deflection by a plurality of elongated magnetic steel strips 56 which extend longitudinally along the inner surface of the belt 10 between the anti-friction rollers 30 and the belt driving drum 14. The strips 56, in addition to their function of supporting the upper flight of the belt 10, also serve as magnetic pole pieces and create magnetic fields which extend upwardly through the upper flight of the belt 10 and the bottom flaps of the carton C and thus pull the magnetizable cans D downwardly against the inner bottom flaps 36 of the cartons C to hold these flaps firmly in face-to-face contact with the glue bearing outer carton flaps 38.

As may be clearly seen from the position of the upper inner carton flaps 36, as shown in FIGS. 2 and 3, the inner flaps 36 at both the top and bottom of the cartons C frequently do not lie flatly against the outer flaps 38 but have a tendency to assume a slightly inclined position. One reason for this is that the score lines which set off the lines of bend at the bases of both the inner and outer flaps at both the top and bottom of the carton are disposed in substantially the same plane. Thus, when the outer carton flaps 38 are pressed into closed position by the belts 10, 12, they first engage the inner flaps 36 adjacent their bases and spring them inwardly. It is to prevent this undesired normally inwardly inclined position of the bottom flaps 36, which inclination would not ordinarily be overcome by the weight of the empty cans D, that the magnetic fields created by the pole pieces 56 are utilized.



The illustrated embodiment of the invention embodies two sets of pole piece strips 56 which are equally spaced apart transversely across the machine. Each set of pole piece strips 56 is connected to the poles of a plurality of powerful horseshoe magnets 58 which are mounted in nonmagnetic mounting blocks 60 which in turn are secured to nonmagnetic cross-pieces 62. The cross-pieces 62 are secured to longitudinal side channel bars 64 which in turn are mounted on transverse channel bars 66 which form a part of the main frame of the mechanism.

The magnets 58 are disposed equidistantly along the entire length of the side channel bars 64, the distances between the magnets 58 being determined by the desired strength of the magnetic fields. The magnets 58 are so arranged that each pole piece strip 56 contacts only poles of like polarity, so that uniform magnetic fields of maximum strength extending substantially the whole length of the compression portion P of the machine are thus obtained.

As seen clearly in FIG. 2, the pole piece strips 56 are preferably positioned in vertical alignment with the rows of longitudinally aligned cans D within the cartons C. This insures that the greatest possible mass of metal in the cartons C is concentrated adjacent the strongest areas of the magnetic fields. As a consequence, the magnetically attracted cans D firmly hold the bottom inner flaps 36 against the glue-bearing bottom outer flaps 38 for the whole distance of travel of the cartons C through the compression portion P of the machine. The speed of the belts is so adjusted that the time required for the cartons C to traverse this distance is of sufficient duration for the glue 40 to set and thus create a permanent bond between the inner and outer bottom flaps 36, 38. Thus, when the cartons C are discharged from between the belts, their bottom ends are permanently sealed so that the influence of the magnetic fields is no longer required. The upper ends, of course, are not sealed. However, it is obvious that if it were necessary to permanently seal both ends of the cartons C in the can manufacturing plant, it would only be necessary to invert the cartons, apply glue to the other set of outer flaps 38 and again pass the cartons C through the machine.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction, and arrangement of parts of the apparatus mentioned herein and in the steps and their order of accomplishment of the method described herein, without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the apparatus and method hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. Means for adhesively sealing the bottom end of a rectangular fibrous carton filled with upright sheet metal cans of less height than the depth of the carton, comprising a pair of horizontal endless belts disposed in vertically spaced relation for compressing and advancing therebetween a closed carton having inwardly folded outer and inner side and end flaps at its top and bottom ends disposed in overlapping relation with certain of the flaps on the carton bottom bearing a freshly applied adhesive, back-up means for engaging and yieldably urging the lower flight of the upper belt downwardly against the top surface of said carton to press the latter against the upper flight of the lower belt to maintain all of the carton flaps in closed position, and a plurality of fixed parallel magnetic pole piece strips having magnets for magnetizing the same disposed between the flights of said lower belt for backing up and rigidly supporting the upper flight thereof, said pole pieces exerting magnetic attraction through said upper belt flight upon the can bottoms to urge the cans downwardly with the inner bottom carton flaps to force such flaps against the outer bottom car-

ton flaps to facilitate sealing together of said bottom flaps by and during the setting of said adhesive.

2. The combination recited in claim 1 wherein said back-up means is a plurality of resiliently supported spaced and parallel weighted rollers disposed between the flights of and extending transversely of said upper belt.



**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 2,135,806 | Fermann | Nov. 8, 1938 |
| 2,712,209 | Brabender | July 5, 1955 |