

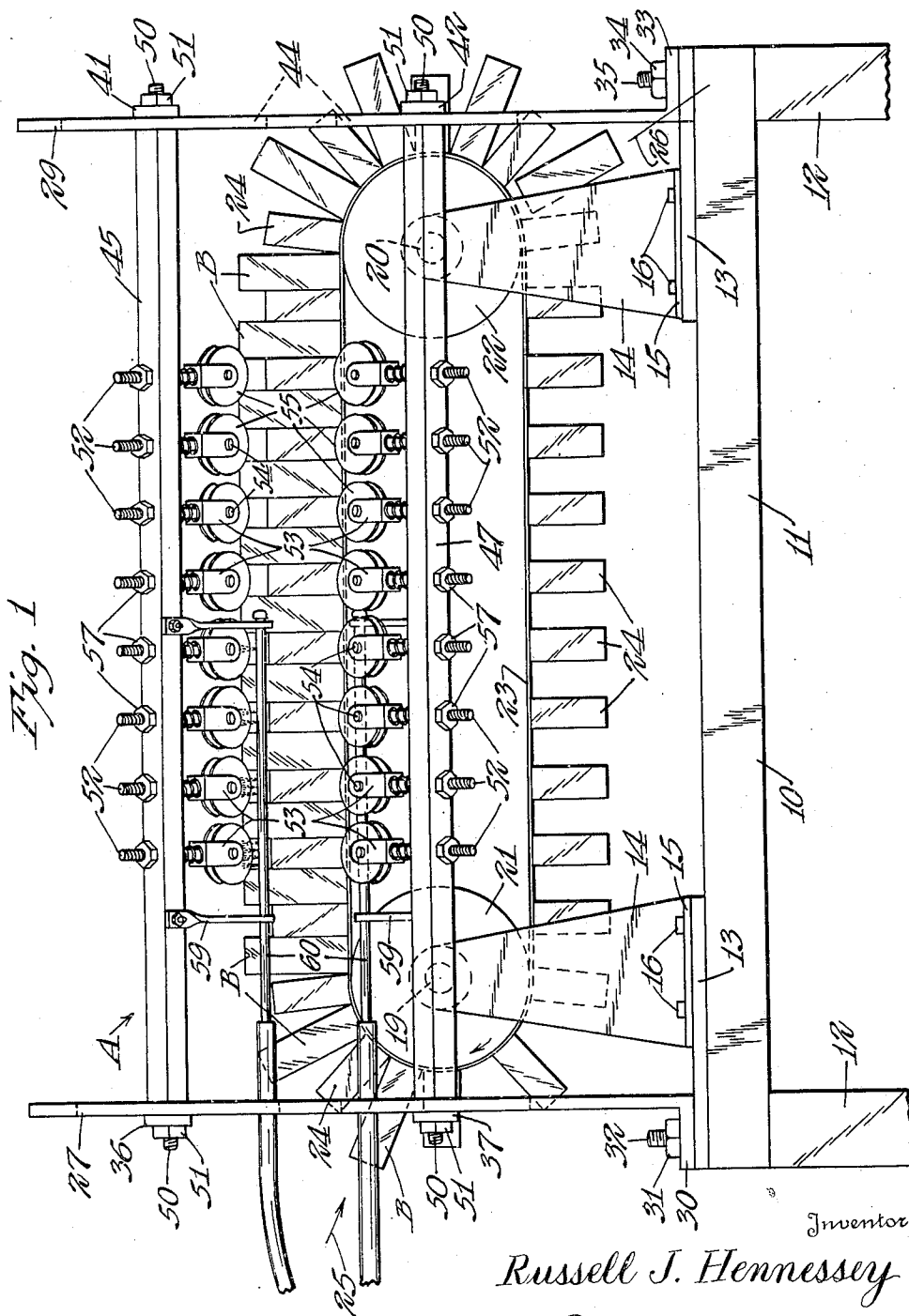
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CARTON MOLDING APPARATUS

2,490,299

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2 Sheets-Sheet 1



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Fig. 2

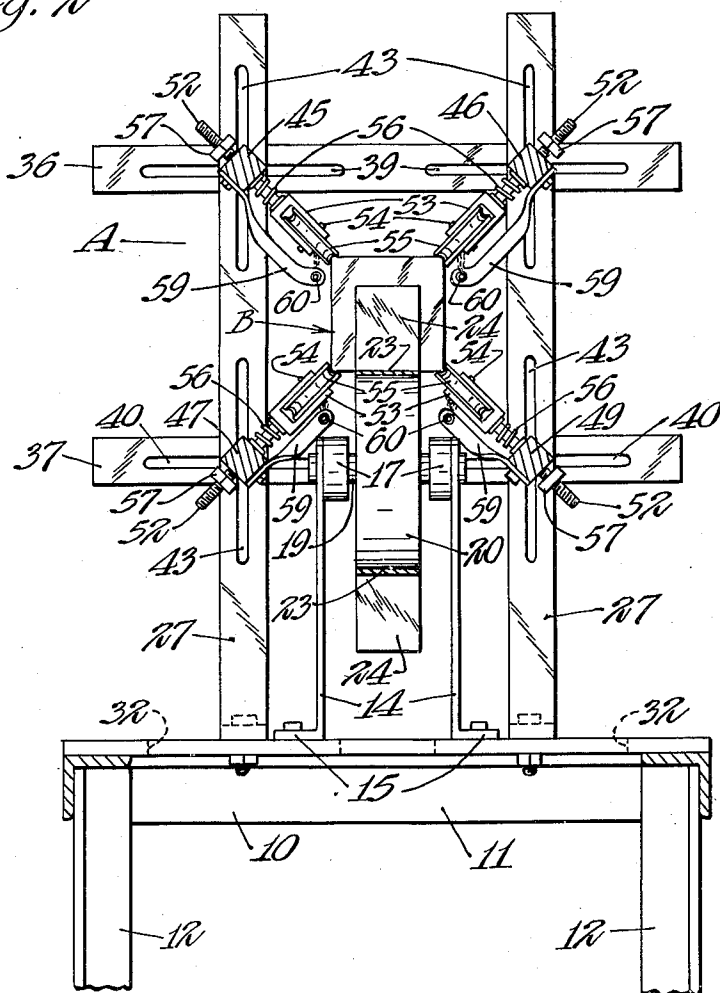
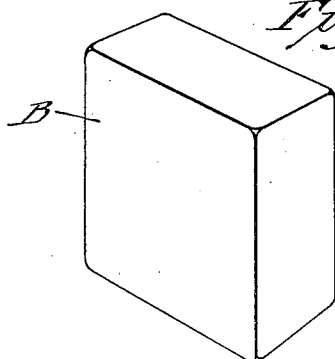


Fig. 3



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UNITED STATES PATENT OFFICE

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CARTON MOLDING APPARATUS

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12 Claims. (Cl. 18—1)

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My invention relates to an improvement in method and machine for sealing cartons, wherein it is desired to provide a simple and efficient mechanism for rendering cartons sift-proof.

In the application of Reynolds Guyer, Serial No. 495,053, now abandoned, a method of molding the corners of cartons was described. In this application the advantage of molding the cartons, particularly at the corners thereof, was described. The cartons after the filling operation are sealed in the usual manner. The corners of the carton are then molded inwardly, preferably under heat and pressure, so as to seal the carton corners and to render the same sift-proof.

An object of the present invention lies in the provision of a simple and effective means for molding the carton corners. The cartons are successively moved between a series of rollers which engage against the corners of the cartons. These rollers are urged inwardly under pressure so that the passage of cartons therebetween tends to resiliently force the rollers outwardly under spring tension. As considerable force is necessary to urge the rollers outwardly, the corners contacted by the rollers are deformed in such a manner that the material at the carton corners is formed or molded inwardly.

A feature of the present invention lies in the fact that the rollers engaging the longitudinal fold lines connecting adjacent panels of each carton, tend not only to mold the forward corners first presented to the rollers, but also tend to mold inwardly the rear corners at the ends of the fold lines. As the cartons pass between the rollers the springs urging the rollers inwardly tend to force the rollers inwardly before the cartons have entirely passed from between the rollers. As a result all of the corners of a carton may be molded inwardly by the various rollers.

An object of the present invention lies in providing a movable support for a series of cartons, capable of moving a series of aligned cartons, and to provide a series of rollers engageable against each of the parallel fold lines connecting the various panels of the cartons. Rectangular cartons will thus be engaged by four sets of rollers, each of which is resiliently urged diagonally against its respective fold line. The rollers are so arranged as to lie in the path of the corners of the carton, and are so mounted as to move outwardly under tension when engaged by the cartons. As a result, pressure is simultaneously exerted against the cartons from four directions, these rollers acting to effectively seal the corners of the cartons.

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A further feature of the present invention lies in the fact that each series of rollers may be adjustably mounted so that cartons of various sizes and shapes may be accommodated. By adjusting the positions of the various sets of rollers, larger or smaller cartons may be sealed thereby.

A further feature of the present invention lies in the fact that certain of the rollers may be heated, while other of the rollers may remain unheated. As a result the carton corners may first be sealed under heat and pressure, and later the molded corners may be held in molded relation during the time the carton cools. This is of importance, as the cartons are preferably moistened or provided with a thermo plastic adhesive medium before the molding operation, and it is desirable to hold the cartons in molded formation until the cartons have cooled or the thermo plastic material used has become set.

These and other objects and novel features of my invention will be more clearly and fully set forth in the following specification and claims.

In the drawings forming a part of my specification:

Figure 1 is a side elevational view of my carton molding apparatus showing the construction thereof.

Figure 2 is an end elevation view of the apparatus illustrated in Figure 1.

Figure 3 is a perspective view of one of the cartons after the molding operation has been completed.

My molding apparatus A, illustrated in Figures 1 and 2 of the drawings, is preferably mounted upon a base 10 of any suitable type or description. The base 10 is shown including a rectangular frame 11 having supporting legs 12 therefor. The rectangular frame 11 is provided with a pair of transversely extending table portions 13 thereupon, which are mounted upon the frame 11, and which connect opposed sides of the frame adjacent each end thereof.

Mounted upon the table portions 13, I provide a pair of upright supporting brackets 14 which extend upwardly from the table portions 13 in spaced parallel relation, as best indicated in Figure 2 of the drawings. Flanges 15 at the lower extremities of the supports 14 are secured by bolts 16, or other suitable means, to the table portions 13. Bearings or journals 17 are provided at the upper extremities of the supports 14 to provide a suitable support for the transversely extending shafts 19 and 20. These shafts 19 and 20 support pulleys 21 and 22 respectively on which the conveying mechanism is mounted.

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The shaft 20 may be provided with an external pulley or sprocket connected to a suitable source of the supply of power, not illustrated in the drawings. Any well known drive apparatus may be provided connected to the shaft 20 to drive the same.

The pulleys 21 and 22 support an endless belt 23, which forms the conveyor for conveying the cartons through the molding process. The conveyor belt 23 is shown provided with spaced blocks or carton gripping elements 24 which engage between adjacent cartons B to space the cartons in proper spaced relationship and also to engage the cartons to hold the same during the molding operation. The cartons B are fed between the spaced blocks or spacing elements 24 from the general direction illustrated by the arrow 25. The cartons are fed intermittently between adjacent spacing blocks 24, while the blocks 24 are spread apart due to the angularity of the pulley 21. During the movement of the belt 23 about the pulley 21, the blocks 24 remain on a plane substantially radial with respect to the shaft 19. Thus the cartons B may readily enter between adjacent blocks, while the outer extremities thereof are spread substantially apart. As the belt 23 nears a horizontal position at the top of the pulley 21, however, the angular distance between the cartons B and the spacer blocks 24 decreases so that when the belt 23 reaches the pulley 21, the blocks 24 are in close contact with opposite surfaces of the cartons B.

The cartons B are discharged from the conveying mechanism during the time the belt 23 is travelling about the pulley 22. As the belt reaches the top of the pulley 22, the blocks 24 begin to spread apart so that after the cartons have been carried somewhat more than ninety degrees about the pulley 22 they may be discharged from the conveyor in the general direction of the arrow 26.

Extending upwardly from each end of the frame 11, I provide spaced standards 27 and 29. The standards 27 are secured on the table portion 13 at the left hand end of the apparatus as illustrated in Figure 1 of the drawings. Flanges 30 at the lower ends of the uprights 27 are secured to the table portions 13 by suitable bolts 31, which extend through elongated slots 32 in the table portion 13. These slots 32 extend in aligned position and transversely of the frame so that the standards 27 may be secured in any desired spaced relationship. When desired the standards 27 may be moved relatively close together or may be spaced a considerable distance apart, depending upon the size of the cartons B to be molded.

The uprights 29 extend upwardly from the table portion 13 at the right hand end of the frame 11, as illustrated in Figure 1 of the drawing. The uprights 29 are provided with flanges 33 at the lower ends thereof which form feet to be bolted against the table portion 13. Bolts 34 are provided which extend through slots 35, extending in alignment transversely of the table portion 13. The slots 35 are so arranged that the standards 29 may be moved closer together or farther apart.

In order to brace the respective standards 27 and to hold them in proper spaced relationship, transversely extending bars 36 and 37 are provided. These bars 36 and 37 are equipped with longitudinally extending aligned slots 39 and 40, respectively, to permit the standards 27 to be moved closer together or farther apart. The

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means of holding these bars 36 and 37 to the standards 27 will be later described in detail.

Cross bars 41 and 42, similar to the cross bars 36 and 37, are provided connecting the standards 29. These cross bars 41 and 42 are longitudinally slotted in a manner similar to the bars 36 and 37, these slots being positioned in the same manner as the slots 39 and 40 in the previously described cross bars.

The vertical standards 27 are provided with spaced vertically extending slots 43 therein, to permit the cross arms 36 and 37 to be vertically adjusted in position. The upright standards 29 are likewise provided with slots 44, identical to the slots 43 in the standards 27, these slots 44 permit the vertical adjustment of the cross bars 41 and 42.

Roller supporting beams 45, 46, 47 and 49 extend in parallel relationship longitudinally of the frame 10, and are supported by the uprights 27 and 29. Studs 50 on the ends of the various beams extend through the slots on the uprights and on the cross members to hold these parts in assembled relationship. For example, the studs 50 at one end of the uppermost beams 45 and 46 extend through the slots 39 in the cross member 36 and through the slots 43 in the uprights 27. Nuts 51 are provided upon the ends of the stud to hold the beams 45 and 46 secured to the upright standards 27, and the cross arm 36.

Similarly, the studs 50 on one end of the lowermost beams 47 and 49 extend through the slots 40 in the cross arm 37 and through the slots 43 in the uprights 27. Nuts 51 also hold these elements in proper relation.

In the same manner the studs 50 of the uppermost beams 45 and 46 extend through the slots 44 in the uprights 29 and in the transverse slots in the cross member 41 to hold these elements in proper position. The studs 50 on the lowermost beams 47 and 49 extend through the slots in the transverse member 42 and also through the slots 44 in the uprights 29 so as to hold the beams in proper relationship to the uprights.

Each beam is provided with a series of spaced parallel apertures therethrough to support threaded shanks 52. These shanks 52 are secured to yokes 53 which support the axes 54 of grooved rollers 55. Springs 56 are provided on the shanks 52 between the yokes 53 and the roller supporting beams. Nuts 57 are provided on the shanks 52 so as to limit inward movement of these shanks. Means are preferably provided for holding the shanks 52 from rotation with respect to the supporting beams. For example, the portions of the shanks 52 connected to the yokes 53 may be square in cross section, or these shanks may be keyed in their respective supporting beams 45, 46, 47, and 49. Thus the rollers extend in alignment in position to engage the corners of the cartons B as they are moved past the rollers by the conveyor belt 23.

Bracket arms 59 are connected to the various beams to support longitudinally extending gas pipes 60 which extend beneath certain of the rollers 55. Openings are provided in these gas pipes 60 so as to direct a blast of combustible gas or the like toward the first rollers of the series of rollers 55. These gas flames are provided to heat the first rollers of the series so that the compression of the corners of the cartons may take place under heat and pressure.

As illustrated in Figure 1 of the drawings, the first roller 55 of the series is heated by a series of jets of flame. The next roller of each series

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is heated by a lesser number of jets. Progressively the amount of heat directed against the rollers 55 is decreased so that the temperature of the rollers decreases progressively. The remaining rollers are unheated and act to hold the molded corners of the box in their molded formation during the cooling of the contacted portion of the cartons.

In operation the beams 45, 46, 47, and 49 are secured in proper position to properly position the rollers 55 to engage the cartons B with the proper tension. As will be noted the tension of the springs 56 may be adjusted by the position of the supporting beams. The cartons B are fed into the interstices between the spacing blocks 24 on the conveyor belt 23 and are carried between the diagonally opposed sets of rollers 55. These rollers 55 are normally urged inwardly so that a portion of each roller lies in the path of the cartons. As each carton B is carried along by the conveyor belt 23, the rollers are urged outwardly in unison compressing the springs 56. However, prior to being forced outwardly the roller has acted upon the forward corners of the carton to mold the same inwardly.

Intermediate the front and rear corners of the carton the rollers have a tendency to roll the edges of the carton so as to more firmly seal these edges. As the rollers 55 approach the rear corners of the carton the springs 56 urge the rollers inwardly so that as the rollers leave the rear corners of each carton the rollers mold these corners inwardly. In other words, the pressure of the springs 56 is sufficient to mold the box corners inwardly, but these springs will be depressed when the roller bears against an edge of the carton. It is only when the rollers are partially unsupported by the carton that the molding of the corners takes place to any great extent.

The space between adjacent cartons B is sufficient to permit the various rollers to be urged inwardly by the springs 56 intermediate each adjacent pair of cartons. As a result each carton is uniformly molded at all of the corners thereof. By adjusting the relative positions of the beams 45, 46, 47, and 49, the apparatus may be adjusted to accommodate cartons of various sizes.

As the first rollers of the series are heated the corners are molded under heat and pressure. The remaining rollers are unheated so that the corners of the carton gradually cool but are held molded inwardly during the cooling operation.

In accordance with the patent statutes, I have described the principles of construction and operation of my method and apparatus for molding carton corners, and while I have endeavored to set forth the best embodiment thereof, I desire to have it understood that obvious changes may be made within the scope of the following claims without departing from the spirit of my invention.

I claim:

1. A carton molding machine comprising a series of movably mounted rollers, means for holding a carton, means for actuating said carton holding means to move said carton with respect to said rollers to consecutively subject a corner of said carton to each of the rollers in the series, means supporting said rollers for movement into and out of the path of movement of the said corner of the carton as the carton is moved by said carton holding means, means urging said rollers into the path of movement of said carton corner and resisting movement of the rollers toward a position out of the path of

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movement of the carton corner, the urging means being sufficient to compress the carton corners before the roller moves out of its path.

2. The structure defined in claim 1 in which the rollers are heated.

3. A carton molding machine for cartons having three panels joining to form a corner therebetween, the machine including a series of movably mounted rollers, means for holding a carton, means for actuating said carton holding means to move said carton with respect to said rollers to consecutively subject said corner of said carton to each of the rollers in the series, means supporting said rollers for movement into and out of the path of movement of the said corner of the carton as the carton is moved by said carton holding means, means urging said rollers into the path of movement of said carton corner and resisting movement out of the path of movement of the carton corner, the urging means being sufficient to compress the carton corner before the roller moves out of its path.

4. The structure defined in claim 3 in which the roller supporting means supports the rollers for movement diagonal relative to two of the three joining panels.

5. A carton molding machine for cartons having three panels joining to form a corner therebetween, the machine including a roller mounted in the path of movement of the corner to be engaged thereby, a carton holding means, means for actuating said holding means relative to said roller to move the carton relative to said roller to move said corner against said roller, means yieldingly supporting said roller for movement into and out of the path of relative movement of said carton corner, said roller supporting means urging said roller into the path of relative movement of said corner and yielding after engagement therewith after compressing said corner inwardly.

6. The structure described in claim 5 in which the roller supporting means supports the roller for movement diagonal to two of the three adjoining panels.

7. The structure defined in claim 5 in which the roller is heated.

8. A carton molding machine for molding the corners of rectangular cartons, the corners being located at the juncture of three carton panels, the machine including means for holding the cartons, means for actuating said holding means to move the cartons, corner compressing means yieldingly supported in the path of movement of corners of said carton, said means being normally urged into the path of movement of the corners and yieldable to a position out of the path of movement of the corners, said means compressing the corners engaged before yielding.

9. The structure described in claim 8 in which the yieldingly supported corner compressing means is heated.

10. A carton molding machine for molding the corners of a rectangular carton, the carton having a forward face and rectangularly arranged wall panels connected to the edges thereof, the corners being located at the juncture of said forward face and each two adjoining wall panels, the machine including means for moving the carton in a direction perpendicular to said forward face, a roller yieldingly mounted in the path of movement of each of said corners, means movably supporting said rollers for movement into and out of the path of movement of said corners, means urging said rollers into the path of movement of said carton corners, said carton moving

said rollers out of the path of movement of said corners after engagement therewith.

11. The structure defined in claim 10 in which the rollers are heated.

12. The structure defined in claim 10 in which the movably supporting means for the rollers supports the rollers movable in a direction diagonal to the side wall panels engaged.

RUSSELL J. HENNESSEY.

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