July 29, 1924. 1,503,126

W. D. KIMBALL ET AL

SEALING MACHINE FOR FILLED CARTONS

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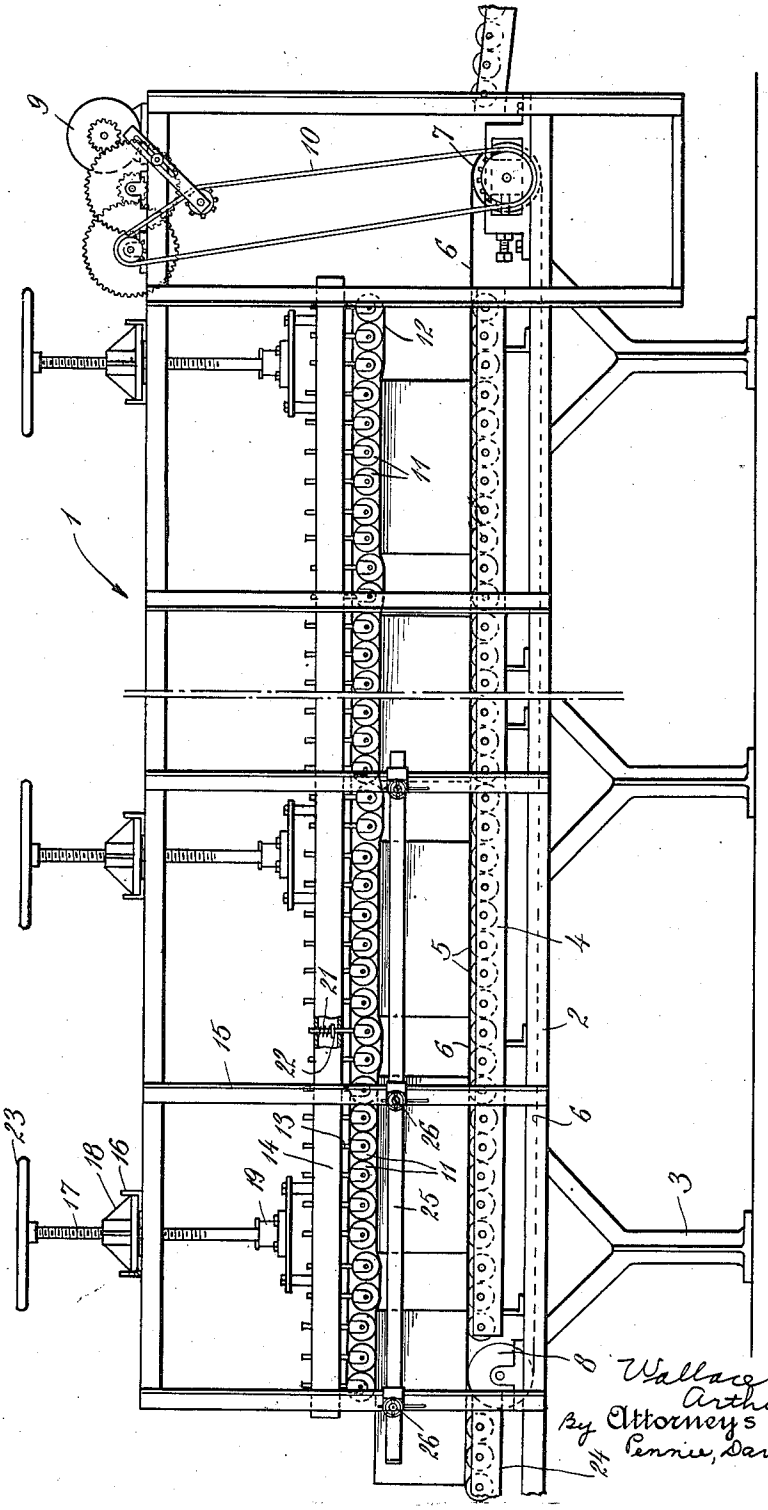


Fig. 1.

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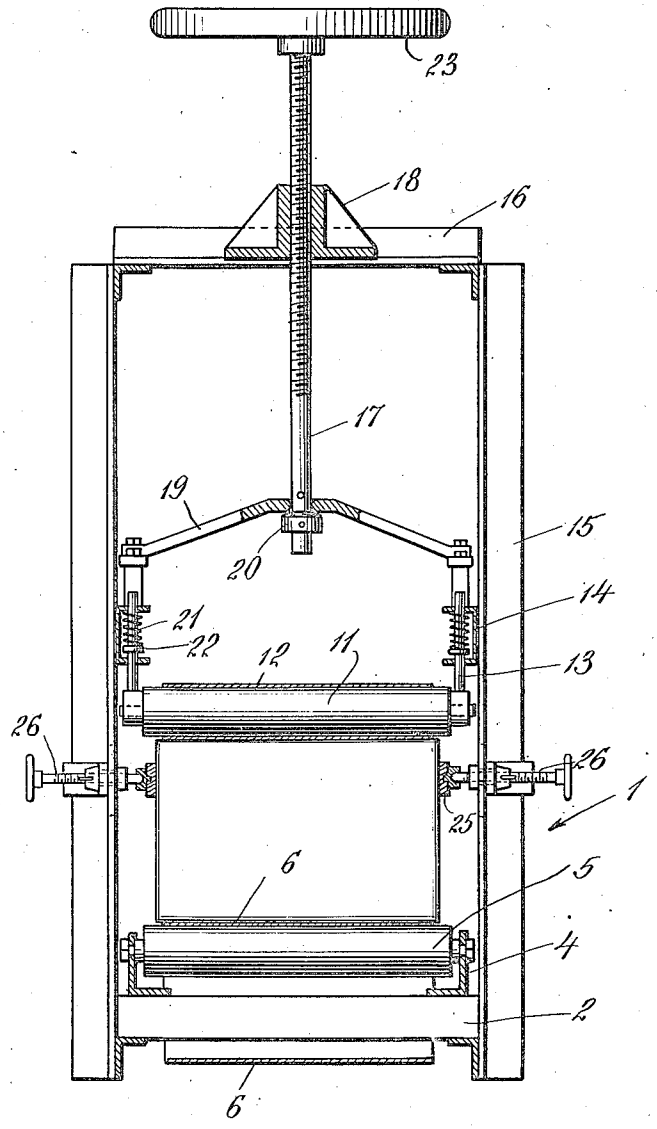
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Fig. 2.



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Fig. 4,

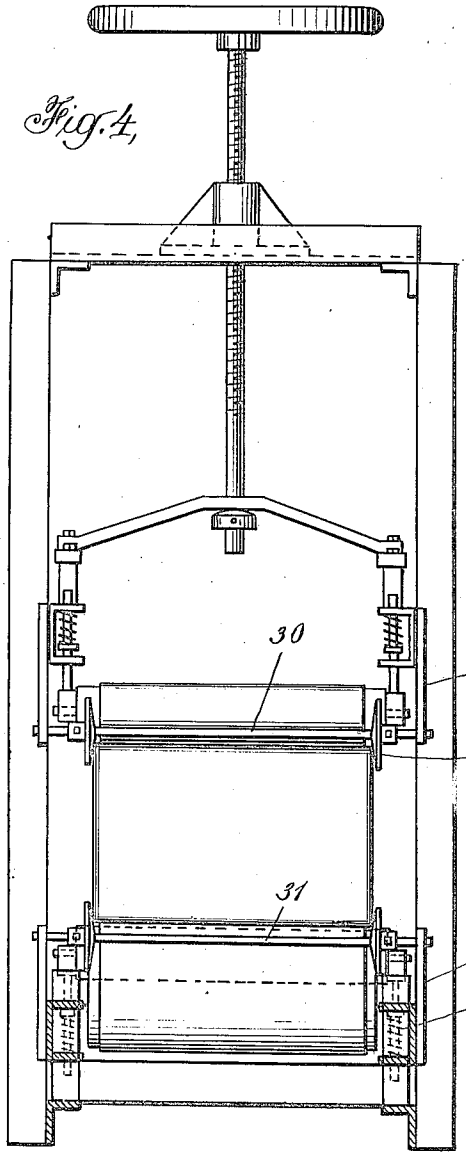


Fig. 5,

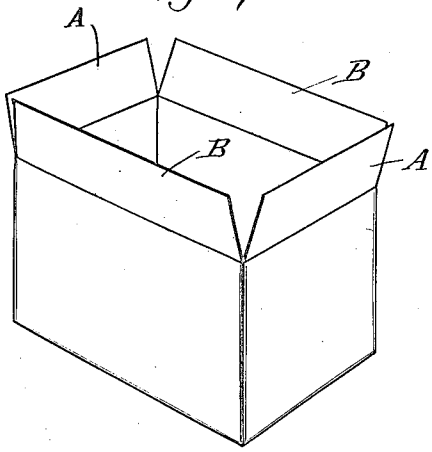


Fig. 6,

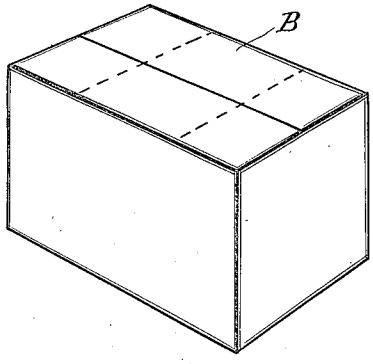
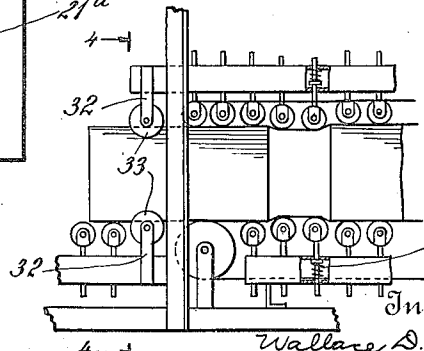


Fig. 3,



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Patented July 29, 1924. 1,503,126

UNITED STATES PATENT OFFICE.

WALLACE D. KIMBALL AND ARTHUR E. RIDEOUT, OF NEW YORK, N. Y., ASSIGNORS TO STANDARD SEALING EQUIPMENT CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

SEALING MACHINE FOR FILLED CARTONS.

Application filed July 15, 1920. Serial No. 396,362.

To all whom it may concern:

Be it known that we, WALLACE D. KIMBALL and ARTHUR E. RIDEOUT, both citizens of the United States, and residents of the city, county, and State of New York, have invented certain new and useful Improvements in Sealing Machines for Filled Cartons; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to sealing machines for filled cartons, and has for its object to provide a machine especially adapted for securing the proper sealing of the flaps of the large fibre board and corrugated board containers at the present time widely used as packing cases in lieu of the wooden boxes heretofore universally employed.

When properly sealed, fibre board and corrugated board packing cases, even for heavy material such as canned goods, etc., will stand the rough usage of shipping quite as well as wooden boxes, but if the sealing is defective, not only are the contents liable to come out, but the box itself is liable to be destroyed, as much of its strength depends upon the proper folding and sealing of its flaps.

Such difficulty has heretofore been experienced in sealing flaps and boxes with adhesive that the practice has become quite extensive of stitching the flaps together with wire, the stitched boxes being superior to the box poorly sealed with adhesive, but by no means equal to a box in which the flaps are securely pasted together. The chief difficulty heretofore encountered in securing a tight union of the flaps of the boxes has been the difficulty of applying sufficient pressure to the flaps without breaking down the corners of the box where the flaps are hinged to the side wall, and properly sealed boxes have not heretofore, as far as we are aware, been uniformly produced except by individually sealing the boxes by hand and applying weights to the overlapped flaps to secure them under pressure while the silicate or other adhesive is drying. This method is slow and costly and can not be employed where the character of the goods necessitates economy in packing.

By means of the improvement of the present machine the box flaps are securely pressed in place and maintained under pressure for a sufficient time to be thoroughly dried without breaking down the corners of the boxes. Moreover, the flaps are held together during the time the adhesive is drying in such manner that relative movement of the contacting adhesive coated surfaces is impossible whereby there is no tendency for the flaps to be pulled apart by the drag of the machine. This feature of the machine is of greatest importance where silicate is employed as the adhesive as its adhesion is completely destroyed by separation of the silicated faces while drying.

A further advantage of the invention is that with simple adjustments the machine is adaptable for cartons of various sizes and the sealing pressure applied to the cartons may be varied.

In the accompanying drawings there is illustrated a machine of simple design embodying the invention, and also a slight modification.

In said drawings,

Figure 1 is a side elevation of such machine;

Fig. 2 is a transverse sectional view at a point near the receiving end of the machine;

Fig. 3 is a side elevation on a smaller scale showing a portion of a modified structure;

Fig. 4 is a transverse section similar to Fig. 2 showing a modified structure.

Figs. 5 and 6 are perspective views showing the carton before and after the flaps are sealed.

Referring to the drawings, 1 indicates the frame of the machine, here shown as consisting of a horizontal table or frame 2 of structural iron supported on legs 3 at intervals in its length. The table may be of any desired length, but in any event should be long enough to hold the cartons at the desired speed of operation for a sufficient length of time for the silicate to dry.

Supported on the table 1 are a pair of channels 4 upon which are supported a series of rollers 5 upon which the cartons are carried in their passage through the machine. The rollers are set in the channels with their peripheries close together and trained over the rollers is a belt 6 prefer-

ably of heavy webbing and of appreciable thickness for a purpose to be later described. The belt is supported at one end upon a driving pulley 7 and at the opposite end upon an idler 8, the driving pulley 7 being driven from any suitable source of power, for instance, the electric motor 9 supported on the upper portion of the frame 1 and driving the pulley 7 through a suitable train of reducing gears and a sprocket chain 10. The pulley 7 is preferably adjustable toward and from the roller frame to tighten the belt as it becomes stretched to insure the belt being driven under the load of a series of cartons extending through the length of the machine.

The upper part of the framework 1 extends above the rollers 5 to a distance considerably greater than the height of the cortons to be closed, and forms a suspended support for an upper pressing mechanism comprising essentially a series of upper rollers 11 carrying a pressing belt 12. The rollers 11 are supported at their ends by hangers 13 whose stems project upwardly from the axles of the rollers through holes in the opposite flanges of channel bars 14 which extend longitudinally of the machine within the side members 15 of the frame 1, but spaced sufficiently therefrom to allow a slight lateral movement of the frame in adjusting itself to irregularities in the carton.

The channels are suspended from the upper cross bars 16 of the main frame by means of screw-threaded rods 17 threaded through fixed brackets 18 on the frame structure and supporting at their lower ends cross braces or arches 19 whose opposite ends are fixedly connected to the channels 14. The joints between the arches 19 and the screw threaded rod 17 is a floating joint and comprises preferably a collar 20 having a rounded upper surface upon which the arch rests with a pin through the rod 17 above the arch to prevent the arch being raised by the passage of the carton thereunder. The hole in the arch fits loosely on the rod so that the arch may be tilted freely within the limits allowed to equalize the pressure on the rollers, notwithstanding irregularities in the carton.

Each hanger 13 is provided with its separate pressure spring 21, the springs preferably lying between the webs of the channels and working against collars 22 attached to the hanger rods. In adjusting the machine for cartons of particular size, the screw threaded rod 17 which is preferably provided with an adjusting wheel 23 will be screwed down through the hanger 18 until the lower face of the belt 12 lies below the top of the carton, whereby the passage of the carton under the rollers will raise the rollers against the pressure of their springs 21. The frame 1 is preferably provided at its receiving end with a roller table, a portion of which is shown at 24 in Fig. 1, upon which the filled cartons will be supported while the operator applies the paste to their flaps and folds the flaps together. The receiving end of the table is also provided with side guides 25 which are supported on the vertical frame pieces 15 by means of adjusting screws 26 as shown in Figs. 1 and 2, whereby the side guides may be accurately set with relation to each other and with the feed belt so that they serve as abutments to square up the cartons and maintain them at the middle of the machine during the first portion of the advance of the cartons through the machine. The delivery end of the machine is also preferably provided with an inclined roller table or conveyor upon which the cartons will be delivered from the belt 6 and down which they will be pushed by the succession of cartons delivered from the machine as the machine continues in operation.

The machine of this application may be used for simultaneously sealing both ends of filled cartons or for sealing the upper flaps of the cartons where the bottom flaps were sealed prior to the filling of the cartons, as is desirable with some kinds of goods. In using the machine to seal both upper and lower flaps, the procedure is as follows: The operator opens up the flat carton and folds the two inner flaps A inwardly, and then silicates their outer surfaces and folds the outer flaps B against the silicated surfaces of the inner flaps, being careful that the meeting edges of the outer flaps do not overlap. The carton is then placed upon the roller table 24 and filled with the goods to be packed, the moist silicate having sufficient adhesiveness to hold the flaps against displacement while the box is being filled. The upper flaps are then folded and silicated in the same manner and the filled carton pushed from the roller table onto the continuously traveling lower belt of the machine, the guides 25 insuring that the sides of the carton will be maintained in parallelism and that it will be disposed on the belt with the side edges which form the fold lines for the outer flaps extending beyond the edges of the lower belt.

The upper belt is not driven and is quite loose so as to conform to the top of the box under the action of the spring-pressed rollers as the box travels through the machine. The upper belt is also narrower than the width of the box so that its edges will lie between the corners forming the fold lines of the outside flaps. The upper frame carrying the supporting rollers for the upper belt is adjusted before the boxes are fed into the machine to a height above the face of the lower belt such that the individual presser rollers will be raised against the

pressure of their springs as the box passes under them in the manner shown in Fig. 1. This arrangement secures a positive and secure sealing of the flaps from end to end. As the upper belt is loose, it will be pressed down over the front and rear ends of the box by the rollers which are immediately in front and behind the box as the latter moves along. The intermediate rollers will be raised by the box against the pressure of the springs and apply a firm pressure against the belt, which presses against the upper flaps. The weight of the contents of the box plus the pressure applied to the top flaps is usually sufficient to secure a satisfactory sealing of the lower flaps without drawing the belt over the ends of the box in the manner shown, although the rollers which support the lower belt may also be provided with presser springs to allow a slight yielding as the box is advanced, as shown in Figs. 3 and 4. We prefer, however, to mount the lower set of rollers unyieldingly in the manner shown in Fig. 1 and Fig. 2. It will be noted that we prefer employing a lower belt of a width less than that of the carton being sealed and also employing an upper belt of this nature.

The springs 21ª for the lower roller will be stiffer than the springs of the upper rollers, but otherwise the construction is the same, as will be obvious. By this arrangement the lower belt is pressed over the end corners of the carton in the same manner as the upper belt, thereby securing a perfect seal throughout the entire area of the flaps.

In Figs. 3 and 4 we have illustrated a somewhat modified structure wherein the side guides 25 are dispensed with and a rotary guide of novel design substituted, for the reason that the side guides, to be effective for their purpose, must have considerable friction to the passage of the cartons through the machine, and a machine equipped with them requires a larger driving motor than when they are not used. Our improved rotary guides comprise essentially a pair of cross shafts 30, 31, respectively, supported for rotation in suitable hangers 32 in advance of the end pulleys over which the upper and lower belts are trained. Disks 33 are attached to each of the shafts 30, 31 by set screws in the manner shown particularly in Fig. 4, whereby the distance between the disks may be varied to suit cartons of different sizes. The inner faces of the disks are tapered in the manner shown, so that the operator may easily and readily feed the cartons from the roller table between the disks, the disks centering the cartons with relation to the belts. When the disks are properly adjusted on their respective shafts the faces of the disks engage the cartons right at the corners where the tendency for the cartons to spread under the pressure of the belts is greatest. The disks therefore serve to hold the carton flaps in proper relative position as the carton is passing into the grip of the belts, and as the contact with the cartons is a rolling contact and of limited area, being only at the corners of the carton, the disks may be adjusted so as to exert a firm pressure on the cartons without unduly increasing the load on the machine.

The slack in the upper belt is sufficient to allow the belt to be drawn over the ends of all the boxes passing through the machine at the same time, the belt constituting chiefly a pad between the rollers and the box flaps to equalize the pressure on the flaps, particularly to secure a firm pressure at the ends of the flaps where they are most likely to be loosened in transit. Also, the belt serves to prevent pressure of the rollers being taken by the side walls of the box at the fold lines where the carton is stiffer than along the middle, particularly if the contents of the box is in any degree yielding. By using thick belts preferably of slightly elastic material such as heavy webbing, the pressure will be applied through the belt to the flaps and the flaps sufficiently compressed to secure a perfect sealing of the carton before the peripheries of the rollers contact with the edges of the cartons.

After the cartons are gripped between the belts the frictional engagement of the belts with their upper and lower faces under the pressure of the springs 21, 21ª is sufficient to hold the flaps of the cartons positively against slipping or pulling apart, so that the flaps, notwithstanding the movement of the carton through the machine, are pressed together as firmly as if secured by stationary weights.

The driving motor is geared down to the machine so that the lower belt travels slowly, the speed being timed with regard to the rapidity with which the operator can apply the silicate to the cartons, fill them, fold the flaps and deliver them to the machine. The belt should travel fast enough for the previously filled cartons to be carried away from the receiving end of the machine far enough to allow a space between the succeeding carton, as illustrated in the drawings.

We claim:

1. In a carton-closing machine, the combination of means to advance the cartons with the flaps gummed and folded, and means for applying pressure to the flaps comprising a presser member of less width than the width of the carton, the contacting surface of said member being stationary relative to the carton.

2. In a carton-closing machine, the combination of means to advance the cartons with the flaps gummed and folded, means

for applying pressure to the flaps comprising a presser belt of less width than the width of the carton, and a yielding backing for said belt comprising a plurality of transverse members having individual springs resiliently maintaining the belt in position to be raised by the passage of the carton thereunder.

3. In a carton-closing machine, the combination of a support for said cartons having its carton-engaging face narrower than the width of the cartons and contacting along the middle of the flaps and an opposed carton-pressing member having its face also narrower than the width of the cartons, whereby the side edges of the cartons forming the fold lines of the flaps will not be subjected to pressure.

4. In a carton sealing machine a traveling conveyor of a width less than that of the cartons supported thereon and engaging the carton along the middle of its face, a non-yielding backing for the said supporting conveyor and a presser member for applying pressure to the carton flaps, the contacting surface of said presser member being stationary relative to the carton.

5. In a carton-sealing machine, the combination of a supporting belt for advancing the cartons, a flap-pressing belt supported above said carrying belt and means for supporting said last named belt comprising a plurality of closely adjacent rollers individually supported for limited vertical movement and springs for holding said rollers pressed toward the carton-supporting belt, said pressing belt being narrower than the face of the carton being pressed and having an appreciable amount of slack whereby a number of cartons may be simultaneously passed beneath the belt without rendering the belt unduly taut, a frame on which said rollers are supported, a plurality of supports for said frame, and connections between said frame and supports permitting a limited angular adjustment of the frame to accommodate irregularities in the cartons.

6. In a carton sealing machine a traveling belt of a width less than that of the cartons supported thereon, a non-yielding backing for said supporting belt, a plurality of resiliently mounted rollers for applying pressure to the upper flaps of the carton, a presser belt of a width less than that of the cartons being pressed and preferably of a material thickness trained over said rollers whereby said belt may follow the irregularities of the carton surface and at the same time save the edges of the carton parallel to the sides of the belt from any contact with the pressure applying rollers to thereby prevent crushing thereof.

7. In a carton sealing machine, a pair of belts spaced apart to receive cartons between them with their gummed flaps engaged by the faces of the belts, said belts being narrower than the cartons to apply the pressure within the corner fold lines of the cartons.

8. In a carton sealing machine, a pair of belts spaced apart to receive a series of spaced cartons between them with their gummed flaps engaged by the faces of the belts, said belts being narrower than the cartons to apply the pressure within the corner fold lines of the cartons, and means for pressing the portions of the belts between the spaced cartons beyond the faces of the cartons to draw the belts over the transverse edges of the cartons.

9. In a carton sealing machine, a pair of belts spaced apart to receive a series of spaced cartons between them with their gummed flaps engaged by the faces of the belts, said belts being narrower than the cartons to apply the pressure within the corner fold lines of the cartons, and a series of individually spring pressed transverse rollers engaging the said belts to press the belts against the cartons and draw the slack portions of the belts between the cartons over the transverse edges thereof

10. In a carton sealing machine a presser belt of appreciable thickness and of width less than the width of the carton being pressed, the said presser belt engaging the carton within its corner fold lines and means whereby pressure is transmitted to the belt of the carton, the surface of the presser belt which contacts with the carton surface being stationary relative thereto.

In testimony whereof we have hereunto affixed our signatures.

WALLACE D. KIMBALL.
ARTHUR E. RIDEOUT.