

Jan. 31, 1933.

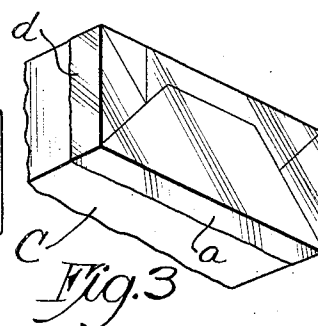
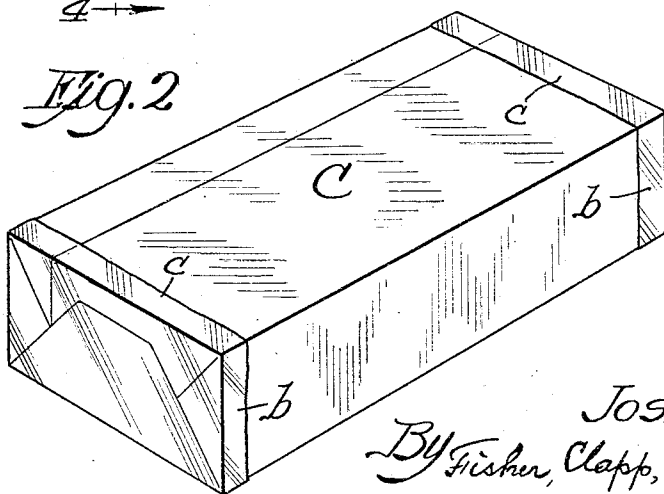
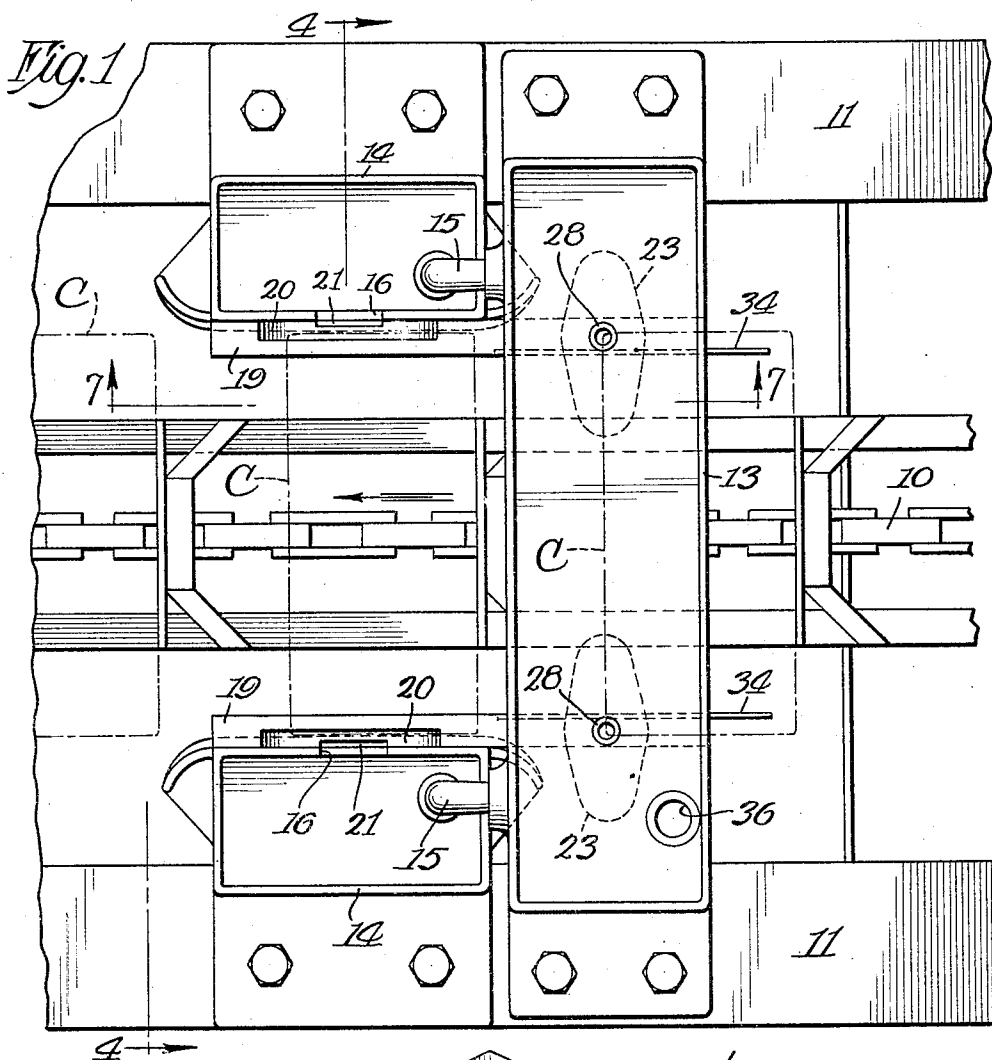
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SEALING APPARATUS FOR CARTONS

Filed July 6, 1931

3 Sheets-Sheet 1



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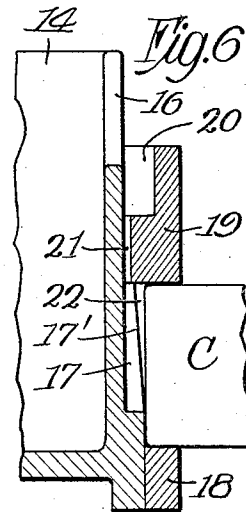
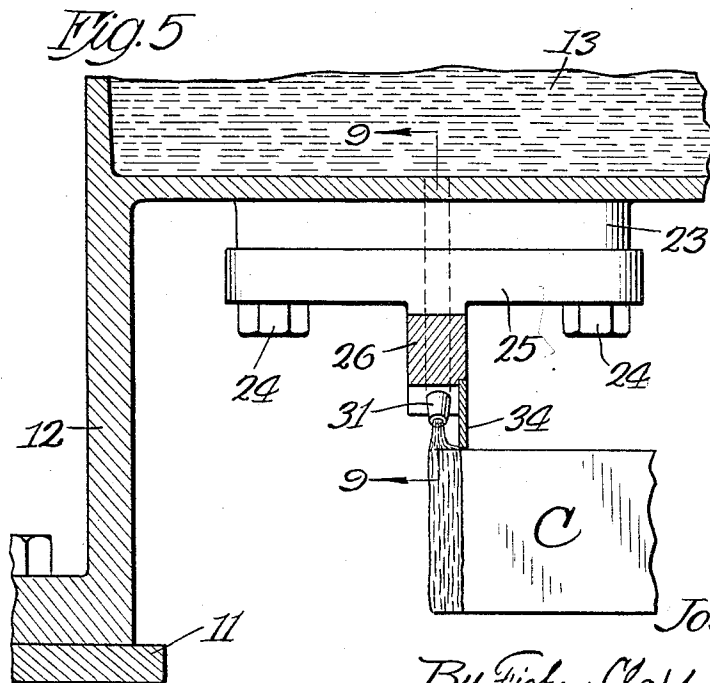
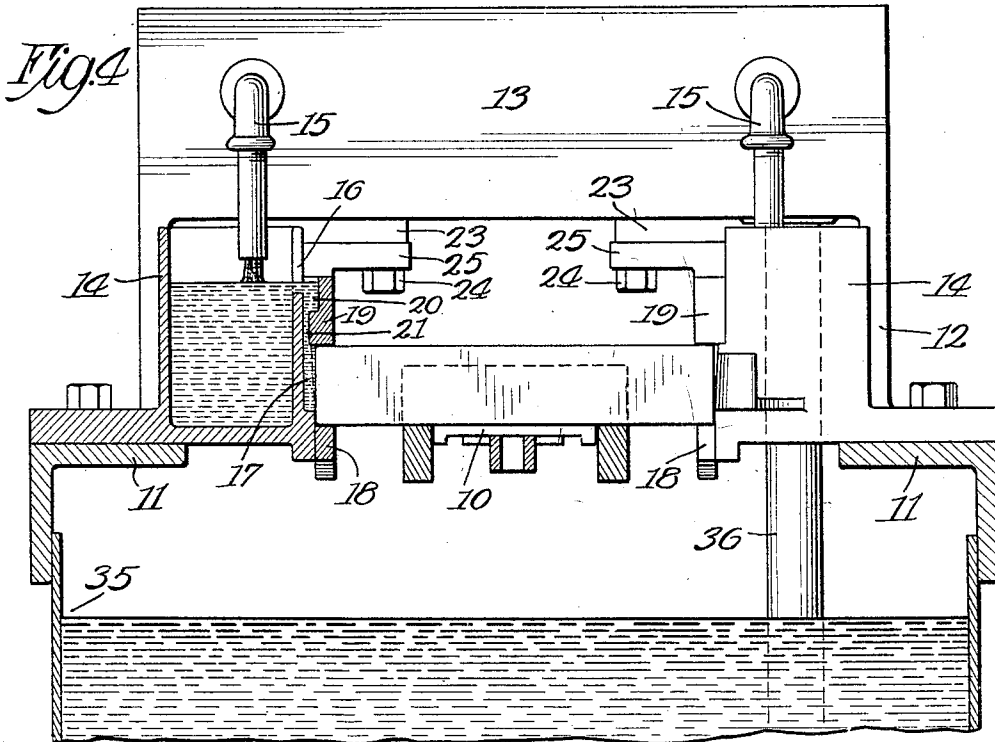
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3 Sheets-Sheet 2



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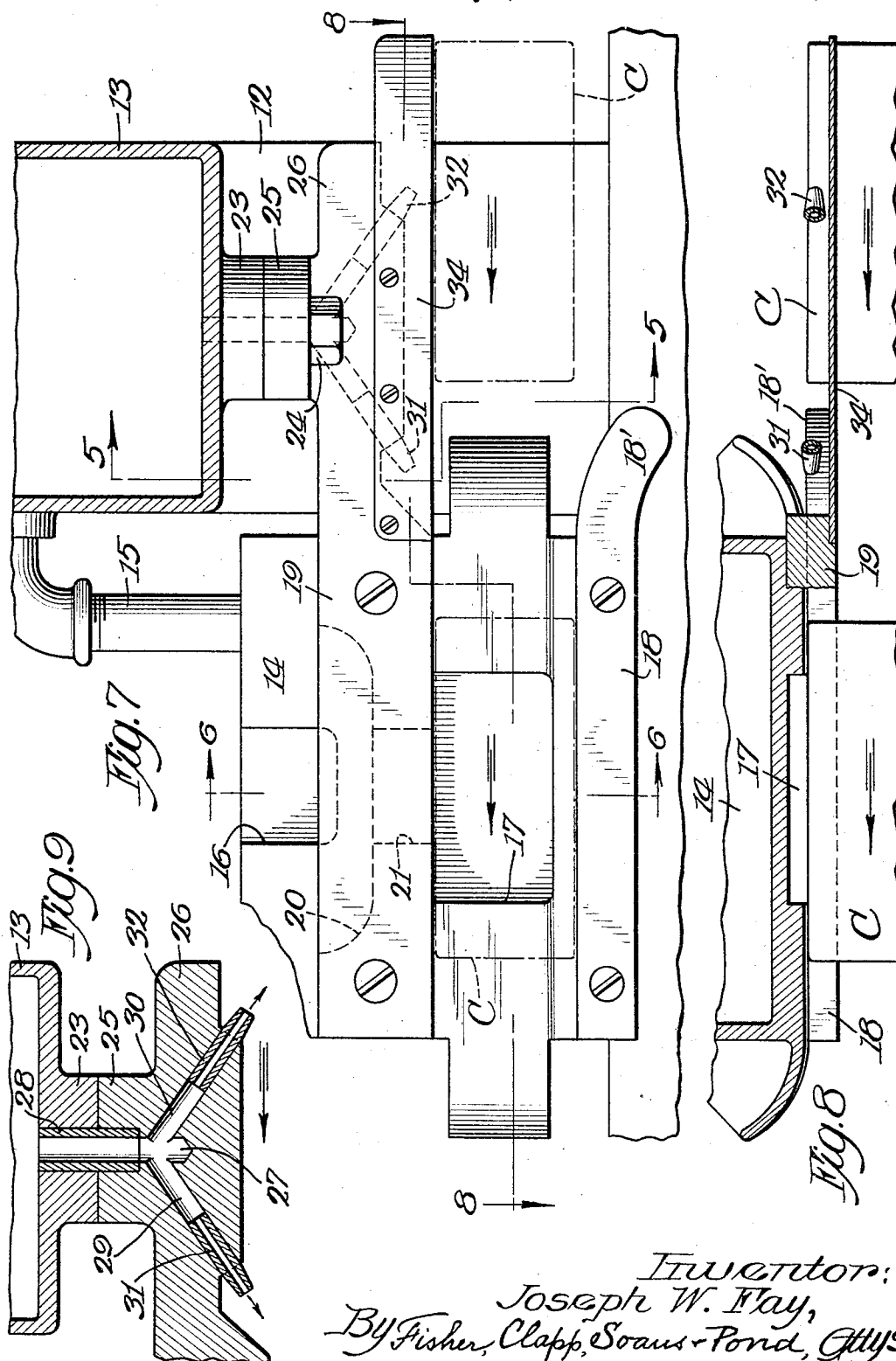
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SEALING APPARATUS FOR CARTONS

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3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

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SEALING APPARATUS FOR CARTONS

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This invention relates to an improvement in apparatus for sealing cartons against the effects of atmospheric or other moisture on the contents of the carton.

Many edible products are packaged and marketed in cartons, and, in the cases of products peculiarly sensitive to atmospheric moisture, such, for instance, as pop corn confections, it has been the practice to wrap each carton in a sheet of waxed paper, pressing the folds of the paper together with a heated iron to make them adhere. This, however, does not completely seal the carton, especially at the ends of the latter where there are multiple overlapping folds of the paper, and several means have heretofore been proposed for sealing the folded ends of the wrapping sheet on the carton so as to effectively prevent the penetration of moisture therethrough.

The most efficient method of sealing the ends thus far known is to dip the ends of the wrapped carton in a body of melted wax or like sealing material, thus permitting the latter to flow into and close the cracks and joints of the folded wrapper, the carton being dipped sufficiently deep to deposit a film of wax not only on the end wall, but on the end portions of the top, bottom and side walls. Where such dipping is done by hand, the work is slow and the cost is high.

Another method of sealing has been to subject each end of the carton, as it is carried on a conveyor, to a falling stream or cascade of liquid wax in the form of a sheet of sufficient width to wipe over the entire end wall and end corners of the wrapped carton. This is only partly efficient since the period of contact of the continuously flowing stream of wax with the carton is so short that a perfect closure of the cracks and joints of the folded wrapper on the end wall is not secured.

The device of my present invention may be said to involve a combination of the two methods above outlined, whereby I obtain the efficiency of the dipping method and the economy and speed of operation of the cascade method.

An apparatus embodying in one practical form the principle of my present invention

is illustrated in the accompanying drawings, in which—

Fig. 1 is a top plan view.

Fig. 2 is a perspective elevation of a wrapped and sealed carton treated by the apparatus.

Fig. 3 is a fragmentary perspective view of one end portion of the sealed carton as seen from beneath.

Fig. 4 is a vertical transverse section taken on the offset line 4—4 of Fig. 1.

Fig. 5 is a fragmentary vertical section taken on the offset line 5—5 of Fig. 7.

Fig. 6 is a fragmentary vertical section taken on the line 6—6 of Fig. 7, and showing on a larger scale than in Fig. 4, the structure that applies the coating film or seal to the end wall.

Fig. 7 is an enlarged vertical longitudinal section taken on the line 7—7 of Fig. 1.

Fig. 8 is a horizontal longitudinal section taken on the offset line 8—8 of Fig. 7.

Fig. 9 is a fragmentary vertical longitudinal section taken in the plane of the line 9—9 of Fig. 5.

Referring to the drawings, at 10 I have indicated a fragment of a horizontal endless conveyor by which the wrapped cartons C disposed transversely on the conveyor are carried through the field of operation of the sealing device. On either side of the conveyor are stationary angle bar supports 11 on which are mounted vertical legs 12 (Fig. 5) supporting a main tank 13 that contains liquid sealing medium, such as melted wax. Below and at one side of the main tank 13 are mounted on the supports 11 a pair of auxiliary tanks 14 laterally adjacent to the sides of the conveyor 10. Overflow pipes 15 conduct the sealing medium from the main tank 13 into the auxiliary tanks 14. Since the seal-applying equipment associated with the auxiliary tanks 14 is the same on both sides, a description of one will suffice for both, the same reference numerals being used to identify similar parts on both sides.

Referring more particularly to Figs. 4 and 6, in the side wall of the tank 14 that is nearest the conveyor is formed a discharge or overflow opening 16, and in the outer side

of the same wall directly below the opening 16 is formed a shallow recess 17 of slightly less height than the height of an end wall of the carton, and formed with bottom and end walls and an open side. Attached to the same wall of the tank 14, below the recess 17, is a ledge 18 (see Figs. 7 and 8); and similarly attached to the said wall above the recess 17 is a strip 19. This strip 19 is cut away in its upper edge to form a shallow basin 20 opposite to and of somewhat greater width than the discharge opening 16; and the bottom of said basin communicates, through a restricted flow passage 21, with the upper end of the recess 17. As shown in Fig. 7, the receiving end of the ledge 18 is downwardly curved at 18' so that the bottom wall of the carton C is guided onto the ledge 18 and into sliding contact at its top wall with the lower edge of the strip 19 so that, as it travels past the open side of the recess 17 it practically closes the latter. The basin 20 is maintained nearly full of sealing liquid by overflow through the discharge opening 16, and this liquid, flowing down through the passage 21, maintains the underlying recess 17 practically full of liquid by reason of the recess closing effect of the end walls of the cartons which successively pass the recess in close order. As a consequence of this construction, the down flowing body of sealing liquid, instead of rapidly wiping over the end of the carton, is retarded in its flow sufficiently to allow the mobile liquid to enter and fill the cracks and joints in the end folds of the wrapper and deposit a continuous and unbroken film of wax on the end wall. One function of the ledge bar 18, however, is to deposit a narrow strip or film *a* of wax on the end portion of the bottom wall; and to insure this, an escape flow of a portion of the sealing liquid in the recess 17 onto the ledge 18 is provided for by slightly inclining the outer face of the wall in which the recess 17 is formed, as shown at 17' in Fig. 6, so that at each end of the recess there is a narrow outflow passage or crack 22 for the liquid to escape and run down onto and coat the ledge 18.

I have also provided an auxiliary device by which narrow films of wax, similar to the film *a*, are applied to the end portions of the top and side walls of the carton.

Referring more particularly to Figs. 5, 7 and 9, attached to a boss 23 on the bottom wall of the main tank 13 as by machine screws 24 is an attachment plate 25, integral with the lower side of which is a forwardly and rearwardly extending block 26 that in practice may consist of an extension of the strip 19, and is drilled to provide a central vertical duct 27 (Fig. 9) communicating with the tank 13 through an inserted pipe section 28, and a pair of oppositely inclined branch ducts 29 and 30, the outer ends of which are fitted with jet discharge pipes or nozzles 31

and 32, respectively. As best shown in Fig. 5, the nozzles 31 and 32 are disposed slightly above the path of travel of the top wall of the carton, in a position to discharge streams of sealing liquid onto the end portions of the top and side walls as the carton travels beneath the nozzles. The direction of travel being that indicated by the arrow in Figs. 1, 7 and 9. As the end of the carton approaches the nozzle 32, a jet of sealing liquid is discharged against the advancing side wall of the carton laying a narrow film *b* (Fig. 3) thereon. As the carton continues to travel past the nozzle, the nozzles 32 and 31 successively deposit narrow films, indicated at *c* (Fig. 2) on the top wall of the carton; and as the carton leaves the nozzle 31, the latter deposits a narrow film *d* (Fig. 3) on the trailing side wall of the carton. Thus not only the folded portions of the wrapper on the end wall are sealed, but the seal extends over the corner edges and onto the top, bottom and side walls, thus producing a shallow cap-like wax closure on each end of the carton. The two end sealing devices being located directly opposite each other, as shown in Fig. 1, the sealing of the two ends takes place simultaneously. A guard strip 34 attached to the outer face of the block 26 has its lower edge in sliding contact with the top wall of the carton and thus roughly defines and limits the width of the sealing films *b*, *c* and *d*, the bottom sealing film *a* being defined by the ledge 18.

Underlying the two sealing appliances and that portion of the conveyor lying between them, is a sump 35 (Fig. 4) into which the excess of sealing liquid flows, and this excess is returned by a pump (not shown) through a pipe 36 back into the main tank 13; sufficient sealing liquid being added from time to time to make up for that used on the cartons and thus maintain the volume of the working body of liquid substantially constant.

Practical experience with a sealing machine from which the present drawings were made, has demonstrated that the cartons are sealed thereby with an efficiency fully equaling that of the old and more expensive and cumbersome method of dipping, and with remarkable celerity of operation. Of course, structural details of the apparatus may be widely varied from those herein shown and described, and I do not limit the invention to such details except to the extent clearly indicated in specific claims.

I claim:

1. In a sealing apparatus of the character described, the combination of a conveyor for cartons, a tank for containing a liquid sealing medium, a wall disposed in laterally adjacent relation to said conveyor, said wall being formed in the side thereof adjacent to said conveyor with a shallow recess having bottom and end walls and an open side which

open side is adapted to be passed over and substantially closed by the end walls of cartons traveling on said conveyor, and means for directing a flow of the sealing medium from said tank to said recess.

2. In a sealing apparatus of the character described, the combination of a conveyor for cartons, a tank for containing a liquid sealing medium, a wall disposed in laterally adjacent relation to said conveyor, said wall being formed in the side thereof adjacent to said conveyor with a shallow recess having bottom and end walls and an open side, means for directing a flow of the sealing medium from said tank to said recess, and means for guiding the end of a carton past the open side of said recess in substantially sliding contact with said wall.

3. In sealing apparatus of the character described, the combination of a conveyor for cartons, a tank for containing a liquid sealing medium in laterally adjacent relation to said conveyor, a wall of said tank being formed in the side thereof adjacent to said conveyor with a shallow recess having bottom and end walls and an open side, which open side is adapted to be passed over and substantially closed by the end walls of cartons traveling on said conveyor, and means for directing a flow of the sealing medium from said tank into the upper end of said recess.

4. In sealing apparatus of the character described, the combination of a conveyor for cartons, a tank for containing a liquid sealing medium in laterally adjacent relation to said conveyor and formed with a discharge opening in the wall thereof adjacent to said conveyor, said wall having a shallow recess formed with bottom and end walls and an open side below and communicating with said discharge opening, and means for guiding the end of a carton past the open side of said recess.

5. In sealing apparatus of the character described, the combination of a conveyor for cartons, a tank for containing a liquid sealing medium located laterally opposite said conveyor and formed with an overflow opening in the wall thereof adjacent to said conveyor, said wall having a shallow recess formed with bottom and end walls and an open side below and communicating with said overflow opening, a ledge on said wall below said recess, and a strip on said wall above said recess, said ledge and strip overlapping the end portions of the bottom and top walls of a carton as an end wall of the latter travels across the open side of said recess.

6. In a sealing apparatus of the character described, the combination of a conveyor for cartons, a tank for containing the liquid sealing medium located laterally opposite said conveyor and formed with an overflow

opening in the wall thereof adjacent to said conveyor, said wall having a shallow recess formed with bottom and end walls and an open side below and communicating with said over-flow opening, and the outer face of the portion of said wall containing said recess being slightly inclined from the vertical, a ledge on said wall below said recess, and a strip on said wall above said recess formed with a flow passage for the liquid from said over-flow opening to the top of said recess, said ledge and strip overlapping the end portions of the bottom and top walls of a carton as an end wall of the latter travels across the open side of said recess.

7. In a sealing apparatus of the character described, the combination of a conveyor for cartons, a tank for containing a liquid sealing medium, a wall disposed in laterally adjacent relation to said conveyor, said wall being formed in the side thereof adjacent to said conveyor with a shallow recess having bottom and end walls and an open side, which open side is adapted to be passed over and substantially closed by the end walls of cartons traveling on said conveyor, means for directing a flow of the sealing medium from said tank to said recess, and means for directing the sealing medium against an end portion of the top and side walls of the cartons.

8. In a sealing apparatus of the character described, the combination of a conveyor for cartons, a tank for containing a liquid sealing medium, a wall disposed in laterally adjacent relation to said conveyor, said wall being formed in the side thereof adjacent to said conveyor with a shallow recess having bottom and end walls and an open side, which open side is adapted to be passed over and substantially closed by the end walls of cartons traveling on said conveyor, means for directing a flow of the sealing medium from said tank to said recess, and a pair of oppositely inclined pipes communicating with said tank and suitably located to direct jets of sealing medium against an end portion of the top and side walls of the cartons.

9. In a sealing apparatus of the character described, the combination of a conveyor for cartons, a tank for containing a liquid sealing medium, a wall disposed in laterally adjacent relation to said conveyor, said wall being formed in the side thereof adjacent to said conveyor with a shallow recess having bottom and end walls and an open side, which open side is adapted to be passed over and substantially closed by the end walls of the cartons traveling on said conveyor, means for directing a flow of the sealing medium from said tank to said recess, a pair of oppositely inclined pipes communicating with said tank and suitably located to direct jets of sealing medium against an end portion of the top and side walls of the cartons, and a guide strip locat-

ed opposite the discharge ends of said pipes adapted to be slidingly engaged by the top walls of the cartons and to limit the width of the film of sealing material applied to said top walls by said pipes.

10. In a sealing apparatus of the character described, the combination of a conveyor for cartons, a main tank for containing a liquid sealing medium mounted above and crosswise of said conveyor, auxiliary tanks disposed on opposite sides of said conveyor, respectively, flow pipes connecting said main tank with said auxiliary tanks, the inner wall of each of said auxiliary tanks being formed in the side thereof adjacent to said conveyor with a shallow recess having bottom and end walls and an open side, which open side is adapted to be passed over and substantially closed by the end walls of cartons traveling on said conveyor, a ledge on each of said walls below said recess, a strip on each of said walls above said recess, said ledges and strips overlapping the end portions of the bottom and top walls of the cartons as the end walls of the latter travel across the open sides of said recesses, a pair of oppositely inclined pipes on each side of said conveyor communicating with said main tank and suitably located to direct jets of sealing medium against the end portions of the top and side walls of the cartons, and a sump underlying said conveyor adapted to receive the surplus discharge from said recesses and said pipes.

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