April 12, 1932. E. L. SMITH ET AL 1,854,075

CARTON SEALING MECHANISM

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Fig. 1.

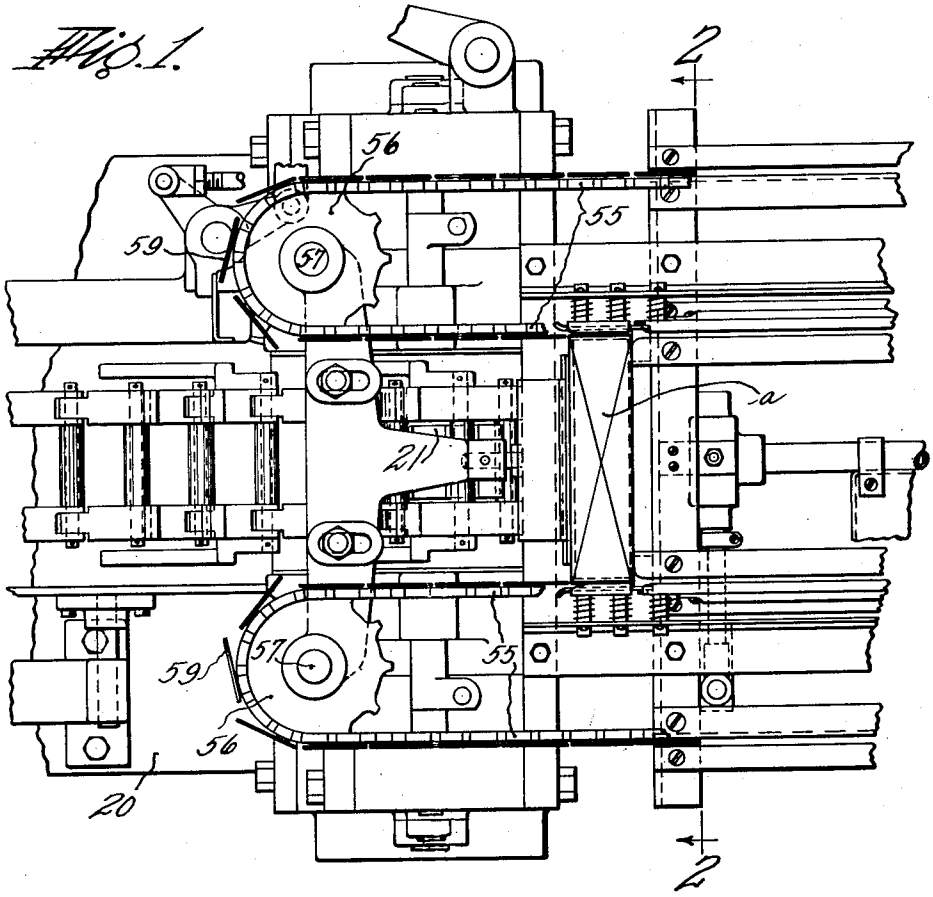
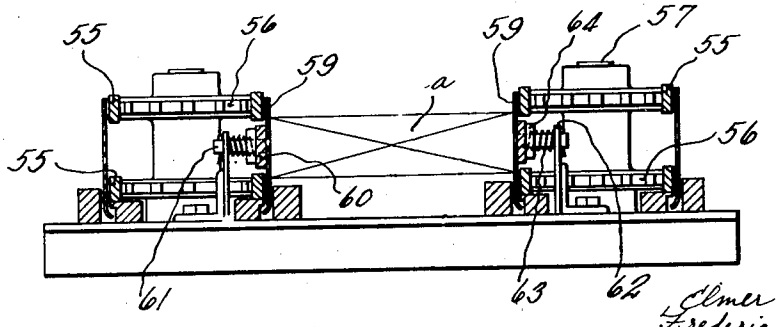


Fig. 2.



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CARTON SEALING MECHANISM

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Fig. 4.

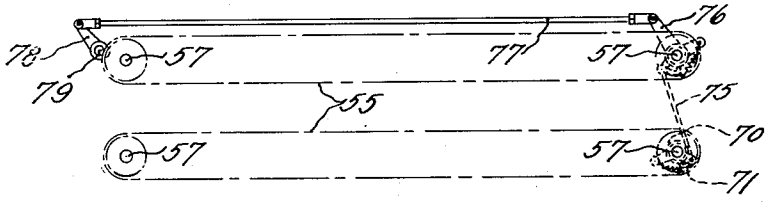
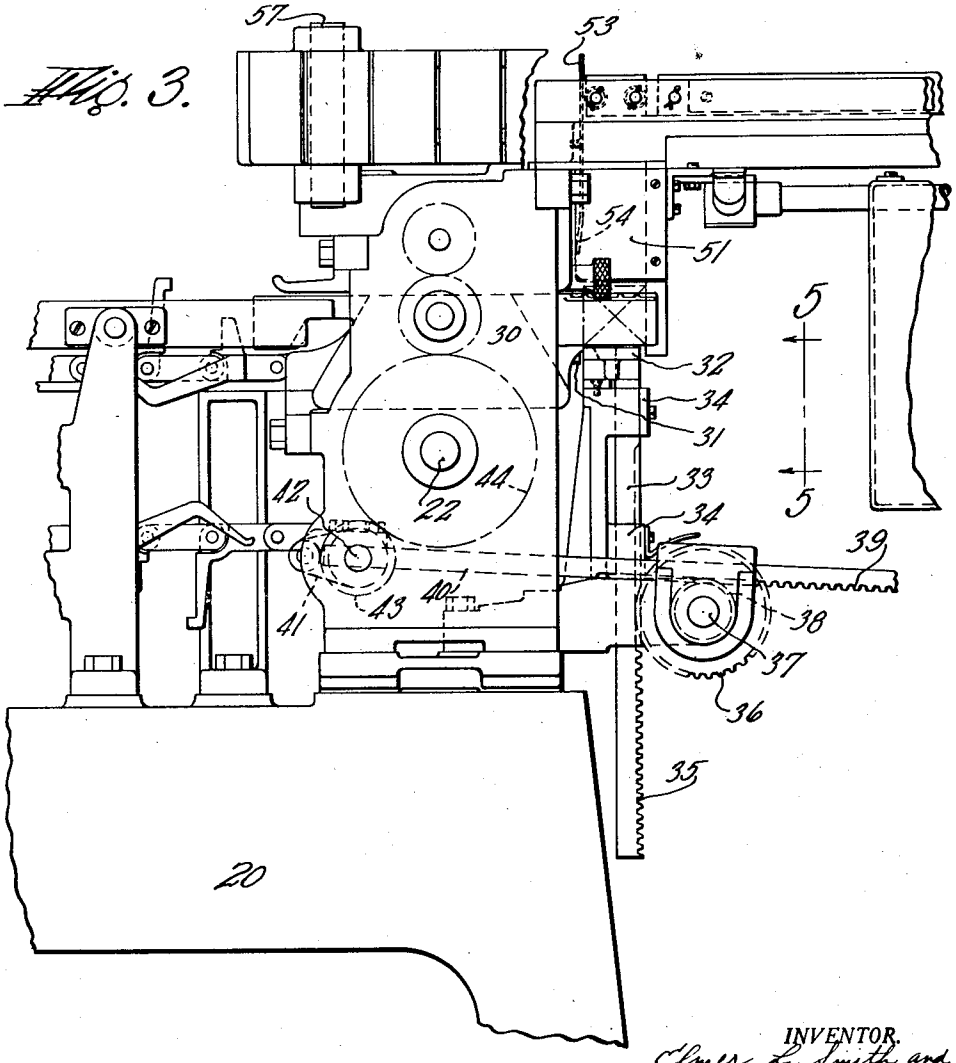


Fig. 3.



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CARTON SEALING MECHANISM

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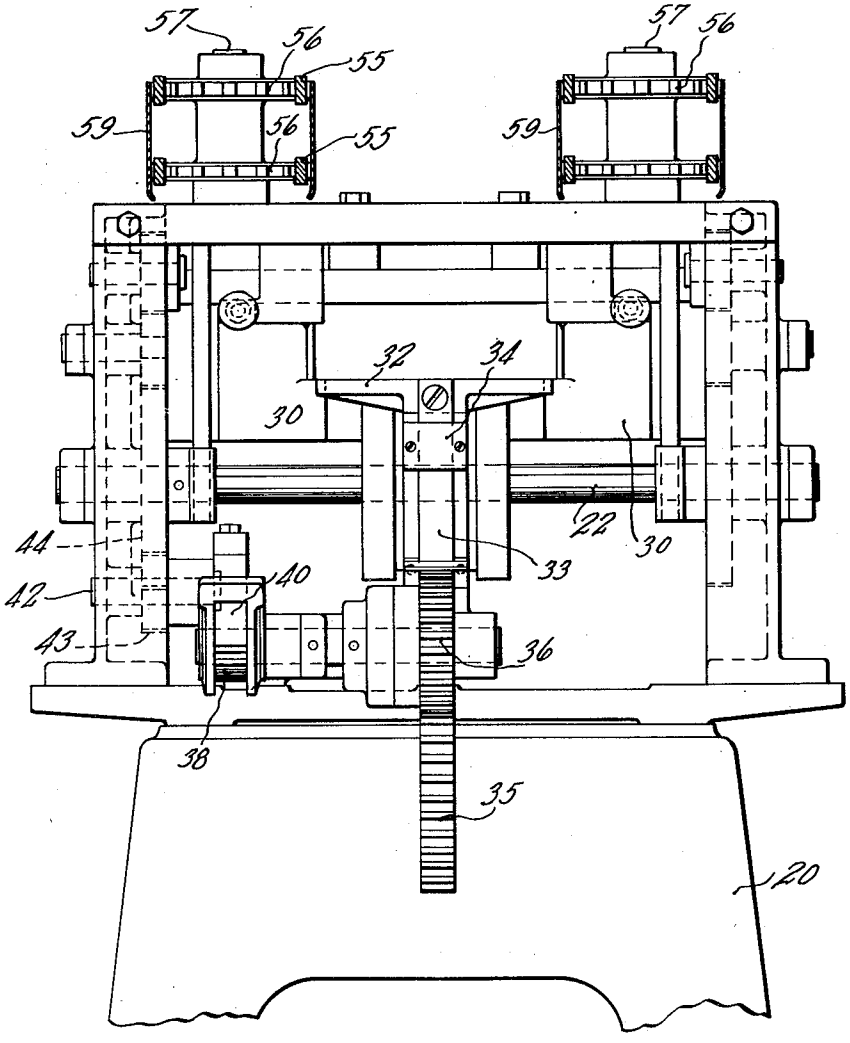
Fig. 5.



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CARTON SEALING MECHANISM

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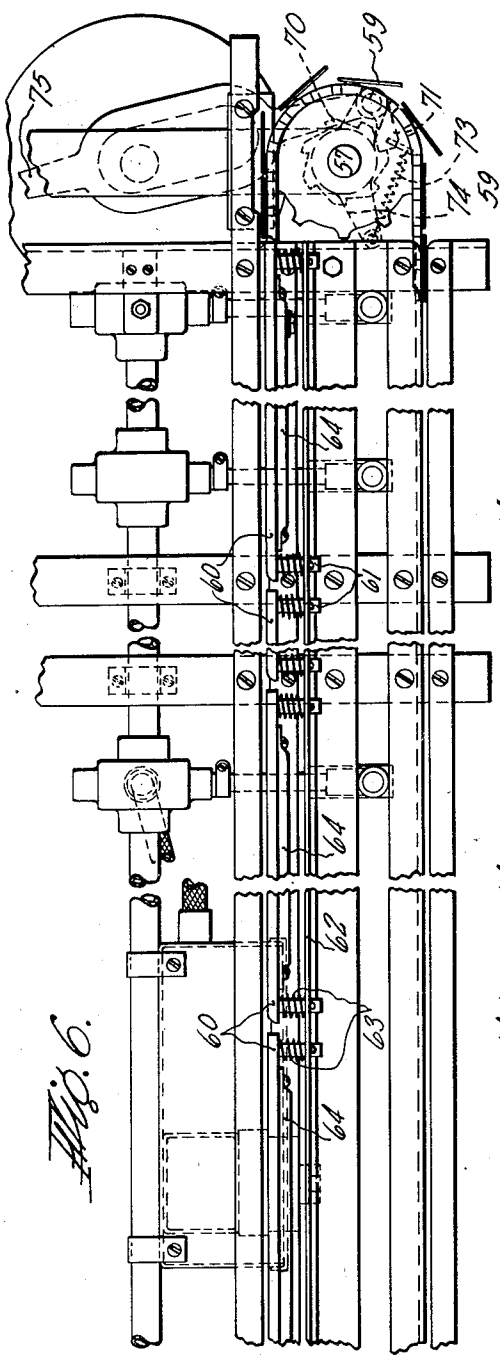

Fig. 6.

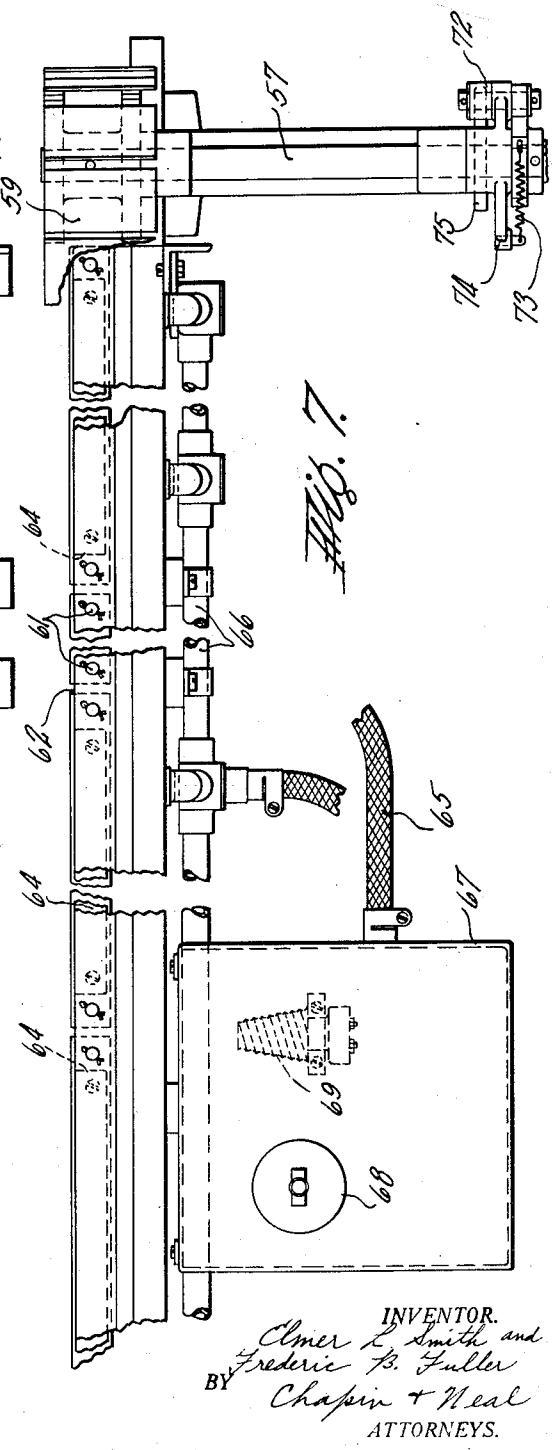

Fig. 7.

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CARTON SEALING MECHANISM

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Fig. 8.

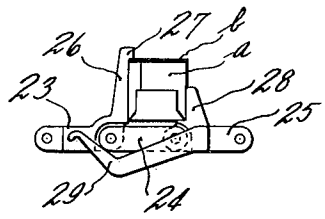


Fig. 9.

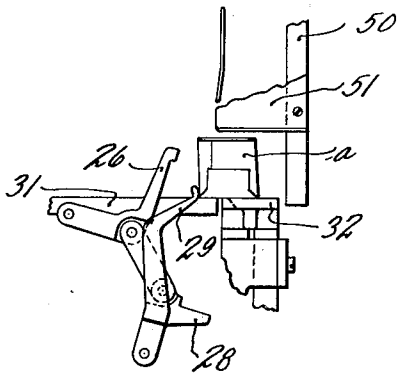


Fig. 10.

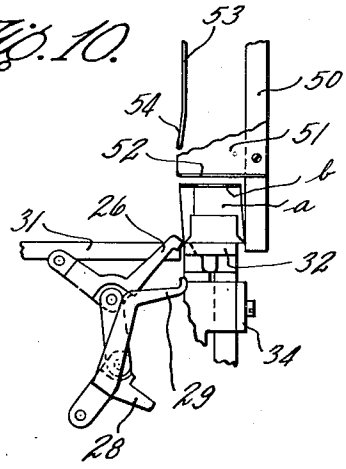


Fig. 11.

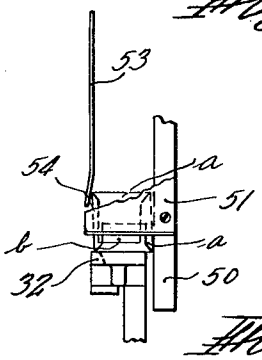


Fig. 14.

Fig. 12.

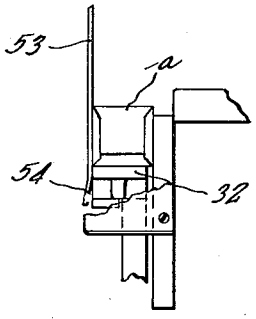
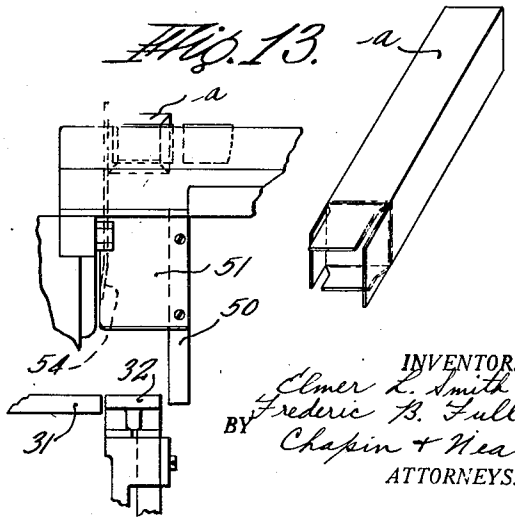


Fig. 13.



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Patented Apr. 12, 1932 1,854,075

UNITED STATES PATENT OFFICE

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CARTON SEALING MECHANISM

Application filed October 4, 1929. Serial No. 397,421.

This invention relates to mechanism for sealing adhesively the end flaps of cartons. It has particular reference to improvements in the sealing mechanism described in our prior application for patent, Serial No. 308,801, filed September 27, 1928.

In that prior application, two modified forms of delivery mechanism were described, these forms being designed to deal with the problem of the tendency of resilient cartons to spring back out of square into a diamond shape. The present invention is intended to meet the same difficulty, but in a different way. In the present case, the carton is released from the setting-up conveyor with the top end flaps glued but unsealed. The carton in this condition is received upon a transfer mechanism consisting preferably of an elevator which moves the carton first past flap closing devices and then into a straightening channel which corrects any tendency of the carton to assume a diamond shape. At the end of the straightening channel the carton is received between a pair of conveyors each provided with heated metal plates which at once hold the carton flaps pressed tight and cause the adhesive to dry during the passage of the carton to the delivery end of the machine. The straightening of the carton is thus accomplished after it has been glued, and just prior to its positioning between the final delivery belts.

The invention will now be described with reference to the accompanying drawings, in which:

Fig. 1 is a top plan view of a portion of the improved machine, illustrating its association with the carton conveyor of our prior application;

Fig. 2 is a section on line 2—2 of Fig. 1;

Fig. 3 is a side elevation of that portion of the mechanism shown in Fig. 1;

Fig. 4 is a partially diagrammatic view showing the manner in which the delivery belts are driven;

Fig. 5 is an end elevation of the machine with the delivery belt and associated parts removed, looking from the direction of the arrows 5—5 of Fig. 3, and intended to illustrate the construction of the carton elevating mechanism;

Fig. 6 is a fragmentary plan view of the machine, showing the construction of one of the delivery belts, and being in effect a continuation of a portion of Fig. 1;

Fig. 7 is a side elevation of that portion of the mechanism shown in Fig. 6;

Fig. 8 is a detail illustrating one of the pockets of the carton conveyor with a carton therein in the condition it assumes prior to the folding of the last flap;

Fig. 9 is a detail showing the ejection of a carton from the carton conveyor and its reception upon the elevator;

Fig. 10 is a detail showing the carton completely received upon the elevator, and illustrating the distortion sometimes resulting in the case of resilient cartons;

Fig. 11 is a similar view, showing the folding of the last carton flap and the beginning of the straightening operation;

Fig. 12 is a similar view showing the carton at an intermediate position in its passage through the straightening channel;

Fig. 13 is a similar view showing the carton positioned between the delivery belts; and

Fig. 14 is a perspective view of the carton, showing the flaps unfolded.

That portion of the machine which serves to open the cartons and to fold and glue their flaps will not be described in detail herein since it is fully illustrated in the application referred to above. The machine is carried upon a frame 20 in which a sprocket 21 (Fig. 1) is mounted upon a shaft 22 (Fig. 3). This shaft corresponds to shaft 71 in the prior application, and is driven continuously by mechanism set forth fully therein and therefore unnecessary to consider here. Around the sprocket 21, and around a corresponding one at the other end of the machine, runs a chain composed of successive identical sequences of three links each. These links are denoted 23, 24 and 25 (Fig. 8). Upon the link 23 of each set is a carton pusher 26 having an overhanging hook 27. Link 24 is a spacing link only. Link 25 bears a forward carton abutment 28 and a rearwardly extending ejector 29. These parts are the

same as those in the prior application and operate so that the pocket closes to squeeze a collapsed carton to open position as the chain passes around the sprocket opposed to sprocket 21. As the chain passes continuously around the sprocket 21 the pockets open (as shown in Fig. 9) causing the carton, indicated generally by *a*, to be ejected onto rails 31. The upper flap *b* of the carton has preferably been glued on its lower surface by the mechanism described in our prior application, acting prior to the ejection of the carton onto the rails.

While the carton is passing the gluing and main flap-folding devices shown in the earlier application, it is held in a squared condition by the pusher 26 and the forward abutment 28. When it is released on the rails 31, however, there is a tendency for the carton to spring towards the flattened form in which it was supplied to the machine. The resistance of the contents, and to a lesser extent the breaking of the rigidity of the creases by the operation of opening the carton, prevent the carton from moving very far out of square, but sufficient distortion results to make the package unsightly.

To square up the carton after its release from the chain conveyor, it is forced through a channel having a portion of gradually narrowing cross-section which progressively restores the carton to its proper squared form. The rails 31 terminate just short of the lowermost position of an elevator 32, so that the carton is pushed by the ejector fingers 29 directly onto the elevator (Fig. 10). A square rod 33 (Fig. 3), running in ways 34, supports the elevator, and is formed near its lower end with rack teeth 35. These teeth mesh with those of a gear 36 fixed on a shaft 37 carrying also a pinion 38. A second rack 39, formed on a rod 40, is pivoted to a crank arm 41 carried on a shaft 42. By a gear 43 on this shaft and a gear 44 on the shaft 22, the elevator is driven in timed relation to the movement of the carton conveyor, making one full vertical reciprocation for every carton which the conveyor delivers.

The carton straightening channel through which the cartons are carried by the elevator is composed of a back wall 50 (Fig. 10), side plates 51 curved outwardly at 52, and a front plate 53 having a slanting lower portion 54. As the carton ascends, the top flaps *b*, which have just previously been glued, are folded down upon the other folded flaps by contact with the lower curved ends 52 of the side plates. The spacing of the side plates is preferably such as to hold the flaps *b* closely against the carton ends but without sealing pressure, leaving this to be applied when the carton reaches the final delivery belt. The carton next contacts with the slanting surface 54 of the wall 53, by means of which the carton is again squared up. During the squaring up, the flap *b* slips over the others the slight amount necessary, the light pressure with which it is held permitting this.

The delivery conveyor is constructed with two opposed pairs of chains 55 running around sprockets 56 mounted upon vertical shafts 57. Each chain has at least some of its links in the form of blocks to which are attached metal plates 59. The plates extend across both chains of each pair, and form during their effective movement practically continuous metal surfaces bearing against the two ends of the carton. The plates are preferably secured adjacent their rear vertical edges only to the chain blocks, so that when the chains pass around the sprockets at the end of their carton-holding run the rear edges of the plates will not be caused to project into the carton path. This action is clearly apparent in Fig. 6. Heater members 60 are mounted alongside of the conveyors so as to contact with the plates 59. For this purpose the members 60 are mounted on studs 61 passing through holes in rails 62 carried by the frame, and carry springs 63 by which they are constantly urged towards the plates with a yielding pressure. Each of the members 60 has an electrical resistance heating element 64 associated with it by means of which it is kept at a constant temperature. Current is supplied to these heating elements through flexible wiring 65, passing in part through conduits 66 and coming from a control box 67. A switch 68 and a line resistance 69, both in the control box, permit regulation of the current in a well known manner.

The delivery conveyor is operated intermittenty instead of continuousy, as is the carton conveyor, and at a decreased speed, so that while the cartons are spaced say six inches apart in the carton conveyor, they are practically adjacent one another between the delivery belts. This permits a very great decrease in the overall length of the machine and at the same time an increase in the time allowed for drying the adhesive. The intermittent drive for the delivery belts is obtained as follows. To the lower end of each of the shafts 57 at one end of the conveyor is secured a ratchet 70 (Figs. 4, 6 and 7) coacting with which is a pawl 71 mounted on a pawl carrier 72 and held yieldably against the ratchet teeth by a spring 73 strained between the pawl and the arm 74 projecting from the pawl carrier. The two pawl carriers 72 are connected together by a link 75 so that they operate simultaneously to cause movement of the two opposed sets of conveyor chains. One of the pawl carriers has an arm 76 (Fig. 4) joined by a link 77 with a crank arm 78 on a shaft 79. This shaft corresponds to the shaft 96 in our prior application, and is oscillated intermittently by mechanism such as is shown in that case.

It will be seen that, as compared with the machine of our prior application, the present improvement gives the cartons the shortest possible travel in the pocketed conveyor, and then releases them completely. The released cartons are given a short vertical movement which closes the last flap and straightens the carton if any tendency to distortion is present. When the cartons are successively received by the delivery conveyor, they are held tightly so that their end flaps will be securely sealed, and are spaced closely adjacent each other so that there will be no waste space between them. The heated metal plates of the delivery conveyor furnish the maximum possible drying heat, and thus shorten the time necessary to hold the carton before its discharge. All of these features combine to produce a machine requiring the least possible floor space and delivering the sealed cartons in perfectly squared condition.

Claims:

1. A machine of the class described comprising means for delivering a carton with one flap at each end unsealed, a channel having walls for engaging the carton, means for forcing the carton through the channel to close the said flaps and straighten the carton, and a delivery conveyor engaging the folded flaps as the cartons emerge from the channel to hold them for sealing purposes.

2. A machine of the class described comprising a generally horizontal pocketed conveyor continuously movable to deliver cartons with their flaps partially folded, a vertical channel having walls for engaging the cartons, means for carrying the cartons delivered from said conveyor successively through the channel whereby the carton-engaging walls of the channel straighten the cartons and complete the folding of their flaps, and a generally horizontal intermittently movable conveyor engaging the folded flaps of the cartons as the latter emerge from the channel to hold the flaps for sealing purposes with the cartons in closely spaced relation.

3. A machine of the class described comprising a generally horizontal pocketed conveyor continuously movable to deliver cartons with their flaps partially folded, a vertical channel having walls for engaging the cartons, means for carrying the cartons delivered from said conveyor successively through the channel whereby the carton-engaging walls of the channel straighten the cartons and complete the folding of their flaps, and a gen erally horizontal intermittently movable conveyor engaging the folded flaps of the cartons as the latter emerge from the channel to hold the flaps for sealing purposes with the cartons in closely spaced relation, said delivery conveyor comprising opposed endless carriers, each provided with a series of flat metal plates forming when in engagement with the carton flaps a substantially continuous wall, and means for heating the plates.

4. A machine of the class described comprising a generally horizontal pocketed conveyor continuously movable to deliver cartons with their flaps partially folded, a vertical channel having walls for engaging the cartons, means for carrying the cartons delivered from said conveyor successively through the channel whereby the carton-engaging walls of the channel straighten the cartons and complete the folding of their flaps, and a generally horizontal intermittently movable conveyor engaging the folded flaps of the cartons as the latter emerge from the channel to hold the flaps for sealing purposes with the cartons in closely spaced relation, said delivery conveyor comprising opposed endless carriers, each provided with a series of flat metal plates forming when in engagement with the carton flaps a substantially continuous wall, and stationary heated members over which the plates pass whereby heat is transferred through the plates to the carton flaps.

5. A machine of the type having devices for closing and sealing the end flaps of a succession of cartons, comprising a pair of delivery conveyors having straight portions between which the two ends of the cartons are held, each of said conveyors having a series of metal plates forming during said straight portion of the conveyor travel a substantially continuous metallic wall, and stationary heated members spring pressed towards the plates in the direction of the cartons whereby the flaps of the carton will be held tightly with a yielding pressure and heat will be supplied to them through said plates.

6. A machine of the type having devices for closing and sealing the end flaps of a succession of cartons, comprising a pair of delivery conveyors having straight portions between which the two ends of the cartons are held, each conveyor comprising a pair of spaced chains, and metallic plates bridging the two chains and connected to corresponding links thereof, and stationary heated members positioned between the two chains of each conveyor and bearing against the plates to supply heat thereto.

7. A sealing conveyor for a sealing or wrapping machine comprising an endless carrier, a series of metal plates each secured at one side to the carrier and forming a substantially continuous surface during the straight portion of the travel of the carrier, and stationary heated members over which the plates pass to transfer heat to them.

8. A sealing conveyor for a sealing or wrapping machine comprising opposed pairs of spaced chains, a series of metal plates bridging the two chains of each pair, one edge of each plate being secured to corre-

sponding links of the two chains of a pair, and stationary heated members located between the two chains of a pair and spring pressed into contact with the series of plates to transfer heat thereto and to urge them yieldably towards the plates carried by the opposite pair of chains.

9. A machine of the class described comprising a channel having generally parallel walls spaced apart a distance corresponding to the width of a carton, one of said walls being flared outwardly at the entrance to the channel to receive and straighten a carton which is out of square, means for carrying a carton through the channel, and flap folding walls positioned at right angles to the parallel carton holding walls.

10. A machine of the class described comprising a conveyor provided with movable walled pockets adapted to convey a carton and hold it in squared-up form, a plunger upon which the carton is delivered by the opening up of the walls of the pocket, and a four-walled channel through which the carton is moved by the plunger, two opposite walls of the channel being converging so as to straighten up a distorted carton, and the remaining two walls being adapted to fold down the end flaps of the carton.

11. A machine as claimed in claim 10 in which the first conveyor moves continuously and the second intermittently.

12. A sealing device for a sealing or wrapping machine comprising a conveyor, a succession of metallic plates secured to the conveyor, metallic members over which the plates pass in contact while in contact with the articles, and means for controlling the temperature conditions in the member to control thereby the temperature conditions in the plates.

13. A sealing device for a sealing or wrapping machine comprising a pair of spaced parallel chain conveyors, a succession of metallic plates bridging the two chains of each pair, metallic members over which the plates pass in contact while in contact with the articles, and means for controlling the temperature conditions in the members to control thereby the temperature conditions in the plates.

In testimony whereof we have affixed our signatures.

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