Dec. 2, 1930. A. C. SCHROEDER ET AL 1,783,814

CARTON HANDLING AND SEALING APPARATUS

Filed Feb. 21, 1927 4 Sheets-Sheet 1

Fig. 1.

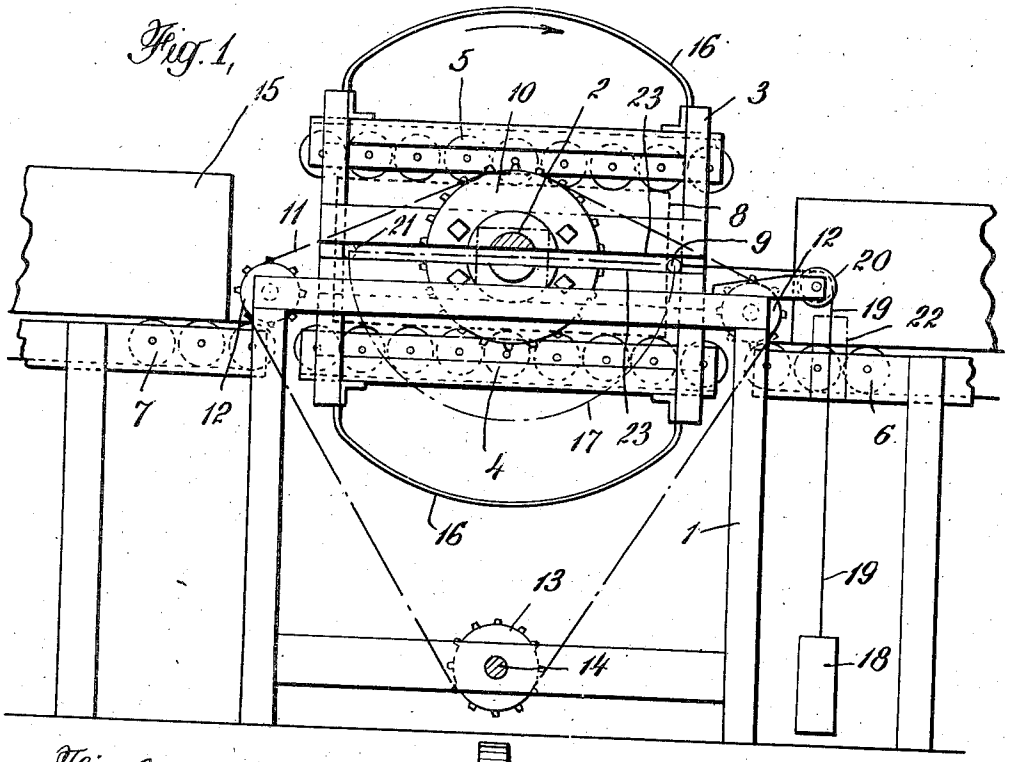
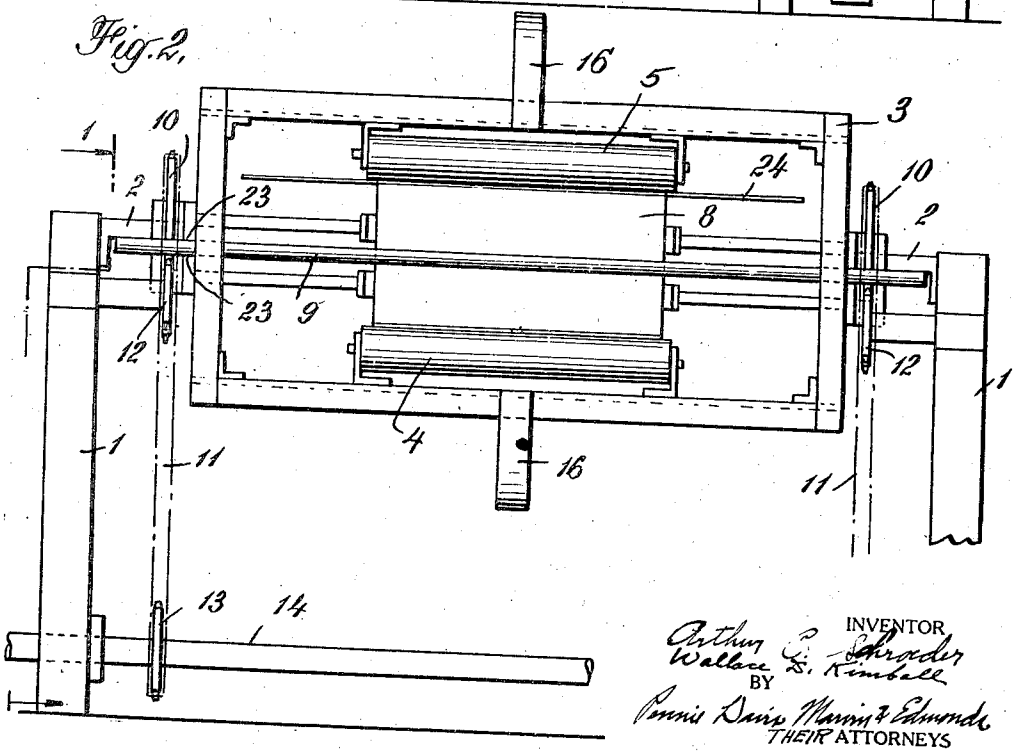


Fig. 2.



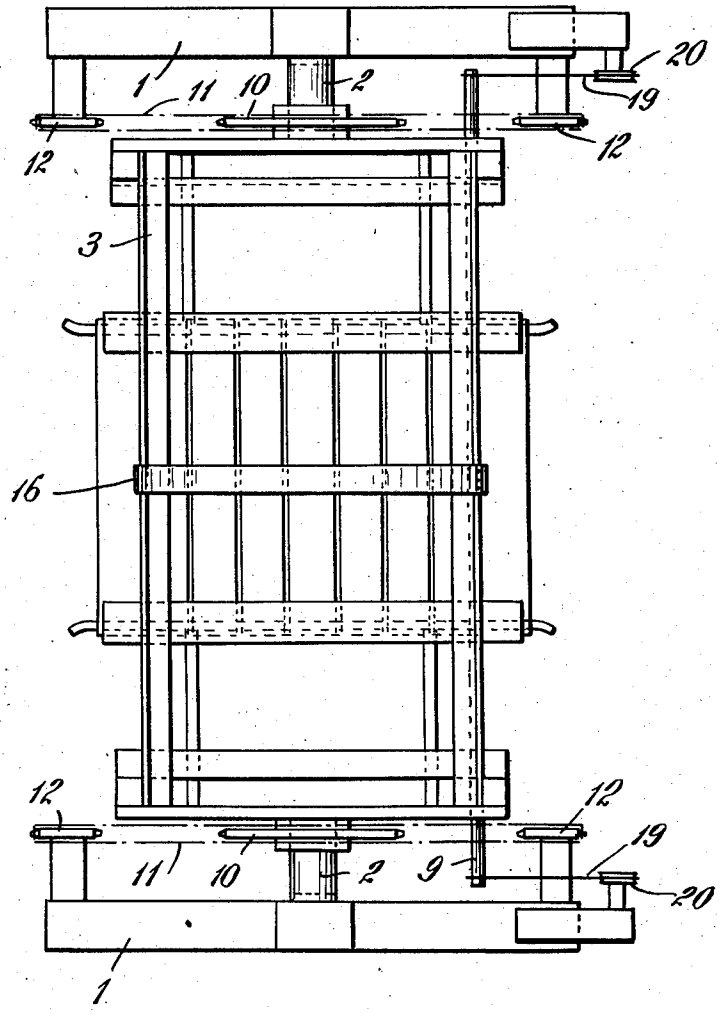
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CARTON HANDLING AND SEALING APPARATUS

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Fig. 3,



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CARTON HANDLING AND SEALING APPARATUS

Filed Feb. 21, 1927 4 Sheets-Sheet 3

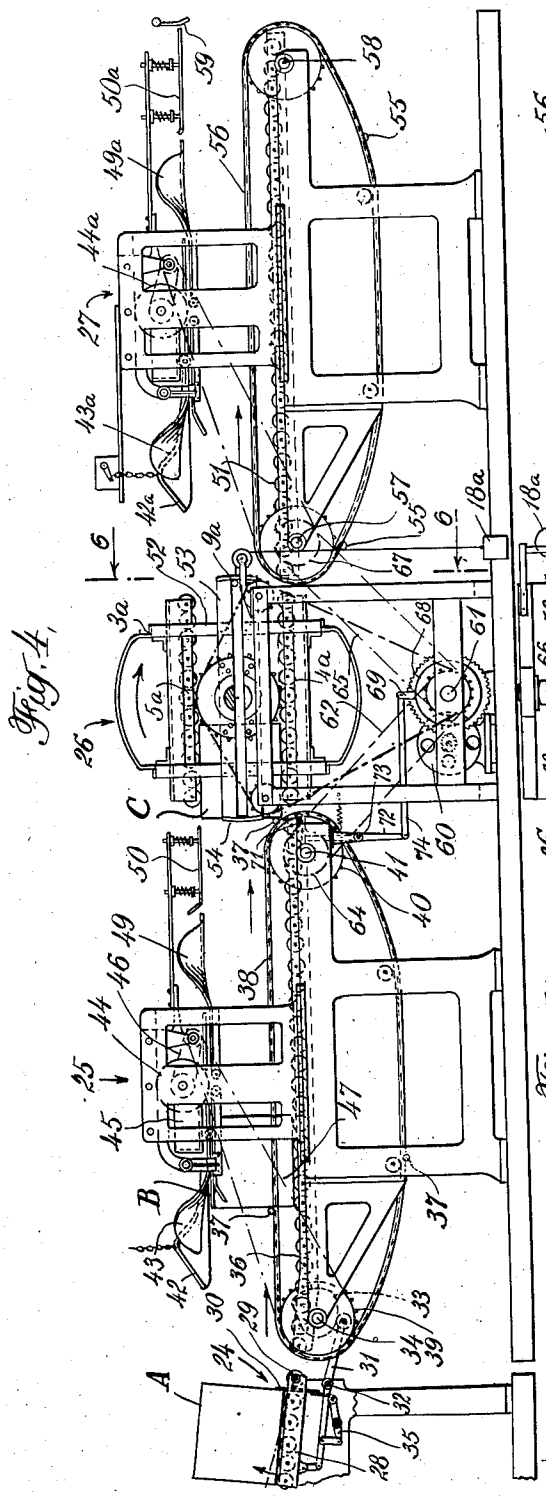


Fig. 4.

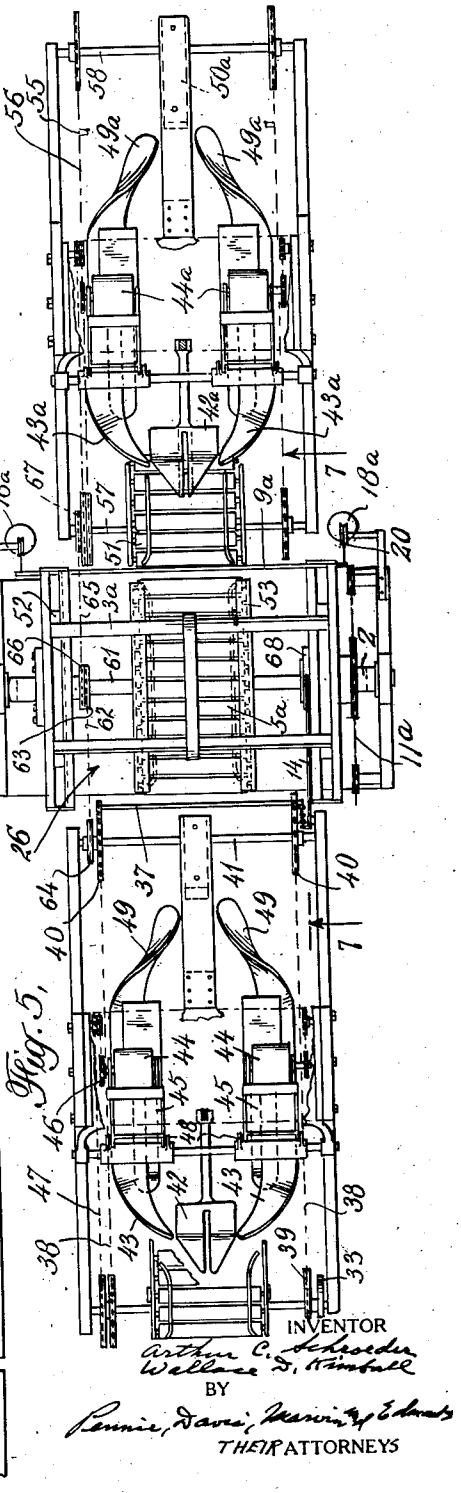


Fig. 5.

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CARTON HANDLING AND SEALING APPARATUS

Filed Feb. 21, 1927 4 Sheets-Sheet 4

Fig. 6,

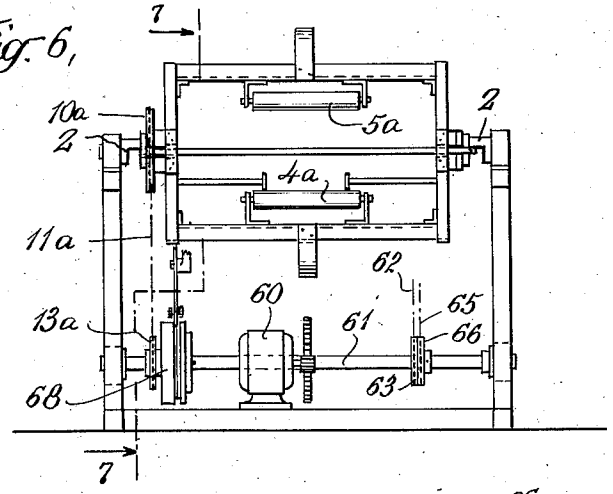
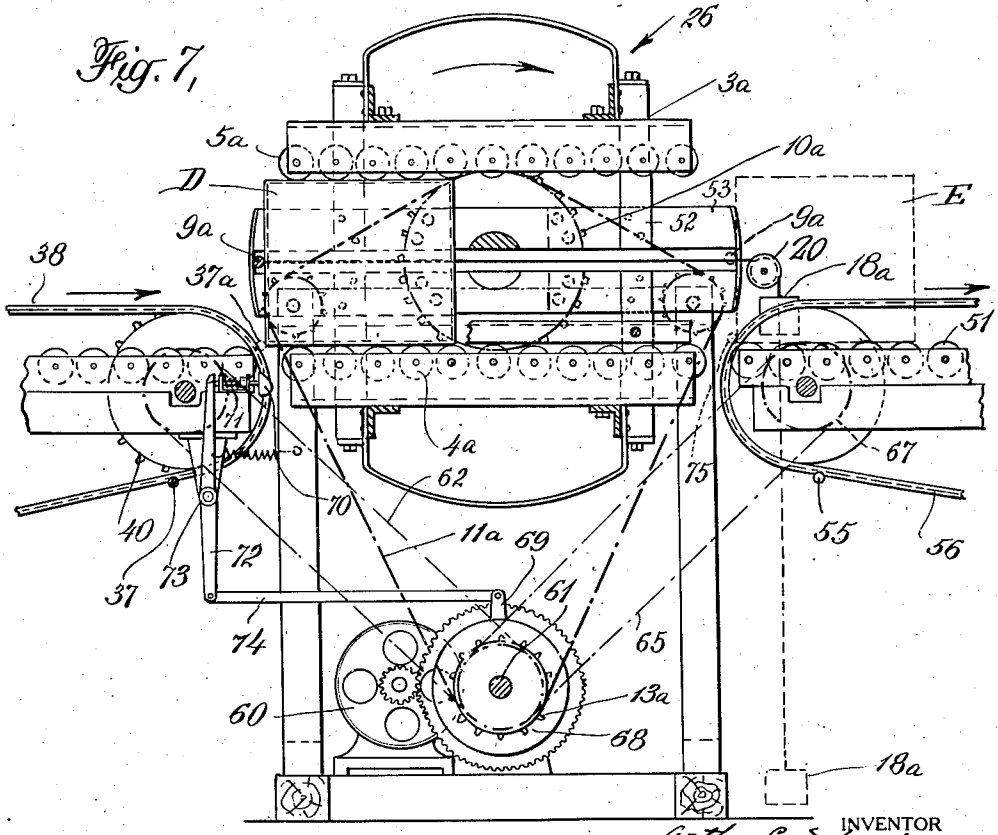


Fig. 7,



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Patented Dec. 2, 1930 1,783,814

UNITED STATES PATENT OFFICE

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CARTON HANDLING AND SEALING APPARATUS

Application filed February 21, 1927. Serial No. 169,889.

The present invention relates to carton handling and sealing apparatus and has to do particularly with the handling of filled cartons as they come from the packer in order to thereby avoid the necessity of manually lifting and turning them, and to the provision of an improved apparatus for sealing cartons which is entirely automatic in its operation.

Fibre board or composition cartons are at the present time commonly used for the shipment of merchandise such as packaged goods, canned goods and the like. In packing, the goods to be shipped are usually placed in the carton arranged with its bottom flaps folded shut but not sealed. The filled carton, with its upper flaps loosely folded into such position as they may assume without being subjected to any closing pressure is then passed along to the sealing apparatus where a suitable coating of adhesive is applied to its flaps after which the flaps are closed and are held in closed position until the adhesive has set. The carton is then ready for shipment.

The filled unsealed cartons are commonly transferred from the place at which they are packed to the sealing apparatus by means of a traveling belt or similar type of conveyer. If the gumming of the carton flaps is to be accomplished manually, the operator unfolds the outer top flaps, applies adhesive to their undersides and then closes the gummed flaps into such position as they are intended to occupy in the sealed carton. He then inverts the filled carton in order to get access to the flaps at the other side of the carton for the purpose of gumming and sealing them. The filled cartons are usually heavy, and considerable manual effort is therefore required on the part of the operator in thus continually turning over the cartons during the flap sealing operation. In addition to this, care must be exercised in order to avoid disturbing the contents of the carton. The necessity of thus manually inverting each carton involves a large proportion of the total time and energy required in the gumming and sealing of the flaps. Even where certain types of sealing machines are employed, manual turning over of the carton is necessary in order that the flaps may be properly extended into position for receiving the adhesive.

It is an object of this invention to provide an apparatus for receiving the filled unsealed cartons as they come from the packing tables and automatically inverting the cartons without necessity of manual attention or effort, certain parts of the present apparatus being of value whether the cartons are sealed manually or in automatic sealing apparatus. In the case of manual sealing of the cartons, the present apparatus is utilized to invert the carton after its top flaps have been sealed so that the other flaps are accessible to the operator for the purpose of applying the adhesive to them and sealing them. Where, in certain cases the sealing is accomplished by mechanical means, the carton turning mechanism of the present apparatus serves as a means of facilitating the unfolding of the carton flaps to thus put them into position for receiving adhesive from the adhesive applying rolls of the sealing apparatus. The operator extends the outer top flaps of the carton before introduction of the carton into the device. Thus after the carton is inverted, its bottom flaps are extended, and the operator may extend its then upper flaps so that the carton may be passed along with its flaps extended into the sealing machine. Where, in certain other cases the entire manipulation of the flaps, and the application of adhesive thereto is accomplished by mechanical means which is entirely automatic in its operation, the improved turning mechanism of the invention serves to automatically invert the carton between the sealing of the top and bottom flaps thereof.

It is also an object of this invention to provide an apparatus of the class described which is of simple and inexpensive construction and which occupies a minimum amount of space. In fact, the inversion of the carton is accomplished in a space which is entirely comparable with the length of the carton itself. This feature of the apparatus renders it particularly effective in its adaptation to the limited space requirements of the average carton packing installation.

The apparatus may be placed at exactly the desired point without necessity of sacrificing an unduly large amount of floor space for the purpose. A further advantage is that the present apparatus may be placed near the point where the sealed cartons are taken up for shipment, and this fact gives rise to the advantage that no particular care need be exercised in the transfer of cartons from the packing tables to the point of shipment for they are not sealed until they reach the latter point.

It is a further object of the invention to provide an apparatus for receiving cartons which are supplied to it in haphazard fashion and discharging the cartons one by one in definite timed relation. The intervals at which the cartons are discharged may be regulated as desired. This feature is of especial value in cases where cartons are supplied to the apparatus from several packing tables and it is desired to pass out the packed cartons in definitely spaced relation. The receiving of the cartons and discharging of them in timed relation is accomplished in the present apparatus without necessity of any manual attention.

It is a still further object of this invention to provide an apparatus which performs the operation of inverting the carton, discharging the inverted carton and receiving a fresh carton in a short time interval so that a large number of cartons may pass through the apparatus in a specified length of time.

It is a further important object of the present invention to associate the carton turning or inverting mechanism with suitable mechanism for opening, gumming, and closing the flaps in such manner as to provide a machine for receiving filled cartons with their flaps closed but unsealed and discharging them in sealed condition, the operation of this apparatus being entirely automatic.

The invention is illustrated in the accompanying drawings and its scope is set forth in the appended claims. In these drawings,

Fig. 1 is a transverse sectional view showing the carton turning apparatus embodying the invention;

Fig. 2 is an end view showing the apparatus of Fig. 1 as viewed from the entrance end;

Fig. 3 is a plan view of the apparatus shown in Figs. 1 and 2;

Fig. 4 is a side elevation of the complete carton sealing apparatus of our invention which is wholly automatic in its operation;

Fig. 5 is a plan view of the apparatus of Fig. 4;

Fig. 6 is a transverse section taken on line 6—6 of Fig. 4; and

Fig. 7 is an enlarged vertical section of the central part of the machine taken on line 7—7 of Figs. 5 and 6.

Referring to the drawings, 1 indicates the frame or supporting structure of the carton handling or turning apparatus. Mounted in this frame structure 1 are stationary shafts or trunnions 2 which serve to carry the movable element of the apparatus. This movable element consists of a frame structure or element 3 carrying upper and lower roller beds 5 and 4. The entire frame 3 together with its roller beds is, through the medium of the trunnions 2, free to rotate with respect to the main frame 1. The lower portions of the trunnions 2 are cut away as shown in Figs. 1, 2, 4 and 6 for a purpose which will hereafter appear.

The carton handling apparatus of the present invention is here shown employed in conjunction with apparatus for gumming and sealing the carton flaps. The initial end of this gumming and sealing apparatus is indicated at 6, and may be an apparatus of the type disclosed in the copending application of Kimball, Rideout and McFaull, Serial No. 747,186, now Patent No. 1,615,631, assigned to the present assignee, which apparatus is arranged to receive a filled carton with its outer top and bottom flaps extended, apply adhesive to the extended flaps and then close the gummed flaps into the position which they are to assume in the sealed carton. The present carton handling apparatus may also be employed to advantage when used in connection with other types of apparatus or when used alone. A conveyer 7 is here shown at the initial end of the carton handling apparatus to serve the purpose of conveying to the apparatus the cartons as they come from the packing tables or the like.

The cartons are passed along the conveyer 7 in indiscriminate fashion until one of the cartons is introduced into the rotatable element 3 into the position indicated at 8. Introduction of the carton into the position 8 is accomplished by reason of the pressure of the other cartons passing along the conveyer 7, the pressure being secured by the driving movement of the belt on the conveyer 7 or, if feasible, by means of a gravity chute. The location of the carton 8 in the rotatable element 3 is determined by means of a stop or rod 9 which contacts with the frame members of the element 3 at its discharge end, as shown in Fig. 1, and thus serves to retain the carton in a predetermined position. Actuation of the rotatable element 3 is secured through an appropriate sprocket and chain arrangement which consists of a main sprocket wheel 10 concentric with the trunnions 2 and secured to the frame 3, so that rotation of the sprocket 10 will produce bodily rotation of the element 3 together with the carton 8 contained in the element. Sprocket 10 is actuated by means of a chain 11 which passes over the sprocket and over

idler sprockets 12 as well as a driving sprocket 13 carried by the main driving shaft 14 suitably mounted for rotation in the main frame structure 1. In case the present apparatus is employed in conjunction with other carton handling apparatus, the driving shaft 14 will be connected up to operate synchronously with such cooperating apparatus. If the present apparatus is not employed in conjunction with other special apparatus, the driving shaft 14 is driven in any desired manner and may be actuated to effect rotation of the element 3 at desired intervals.

The movable element 3 is preferably rotated in a clockwise direction as indicated by the arrow in Fig. 1. Upon the beginning of the rotation of the element the cartons 15 resting on the conveyer 7 adjacent the carton 8, which has already been introduced into the rotatable element 3, are pushed back into the position indicated in Fig. 1 in case they have followed the carton 8 forward as it entered the rotatable element. During the rotation of the element 3 the carton 15 is held back in the position shown by reason of the spacing members 16 provided on the element.

When the element 3 has been rotated through 180°, the carton 8 has been bodily inverted and the stop rod 9 then lies at the initial end of the apparatus instead of at the discharge end. The path of rod 9 during the rotation of the element 3 is indicated at 17. Attached to the rod 9 at each end is a weight 18 connected to the rod by means of a suitable chain 19 operating over a sprocket 20, so that during the movement of the rod 9 from the position shown in Fig. 1 along the path 17 to the position indicated in dotted lines at 21 the weight 18 is elevated into the position indicated at 22. Inasmuch as the lower portions of the trunnions 2 are cut away, the chains 19 extend in straight lines from the dotted position 21 over the tops of sprockets 20 as indicated by the dot and dash line in Fig. 1. The rod 9 is movable longitudinally of the rotatable element 3 along guide-ways 23, sprocket 10 being split to permit passage of the rod. When, therefore, the element 3 has rotated through 180° and the carton 15 on the conveyer 7 is permitted to move into contact with the carton 8, the pressure of the incoming cartons together with the pull of the weight 18 on the rod 9 serves to positively discharge the carton 8 from the element 3 and permit entry of the carton 15. The downward movement of the weight 18 continues until rod 9 reaches the end of the apparatus as shown in Fig. 1, whereupon the carton 15 will be positioned within the rotatable element 3 exactly as was the carton 8 so that the cycle of operation may be repeated.

The apparatus just described serves to invert each carton which it receives from the conveyer 7. This is of particular advantage in the handling of filled cartons preparatory to sealing. When the turning apparatus is used in conjunction with the sealing machine above referred to and indicated at 6 in Fig. 1, the operator extends the outer top flaps of the carton just before the carton is introduced into the rotatable element 3 so that the flaps are extended as indicated at 24 when the carton is in the element 3. Upon actuation of the element 3 the carton is inverted and the extended flaps then are at the bottom of the carton. Upon issuance of the carton from the element 3 the operator unfolds the then top flaps of the carton and permits the carton to pass along into the sealing machine 6 with both its top and bottom flaps extended in position to receive the adhesive. In this fashion, the operator is not required to manually invert or otherwise handle the carton and the result is that a material increase in the output of each operator is effected.

It will be noted that with the rotatable element 3 operated in definitely timed relation, the turning mechanism serves as a means for receiving cartons supplied to it in disorderly fashion and discharging the cartons at definitely spaced intervals. This feature is of value not only in connection with other apparatus such as flap folding and gumming apparatus, sealing apparatus and the like, but also in instances where it is desired to pass the cartons along a conveyer at definitely spaced intervals. The turning mechanism occupies a notably small amount of floor space. The inverting and timing of the discharged cartons is accomplished in an apparatus which is entirely comparable with the entire length of the carton. In fact, the space required by the apparatus is but a few inches more than the actual length of the carton.

Up to this point we have discussed only the construction of the carton handling or turning mechanism illustrated in Figs. 1 to 3 of the drawings. We will now describe the construction and operation of the complete automatic carton sealing apparatus of our invention which is illustrated in Figs. 4 to 7 inclusive. Briefly, this apparatus comprises feeding mechanism for admitting or delivering the cartons to the sealing apparatus, means for manipulating the flaps at the top of the carton to seal the same, turning mechanism for inverting the carton, and means for manipulating the bottom flaps of the carton to seal the same, these flaps having been turned so as to be at the top of the carton.

The cartons which are received from the feeding mechanism are carried forward through the two flap manipulating mechanisms by suitable carton advancing means such as a feed chain, and the cartons advance

continuously from the time they are fed into the machine until the time they are discharged in completely sealed condition, except for the time when they are in the turning mechanism. The feeding mechanism is operatively connected with the mechanism of the sealing apparatus so as to admit the cartons one at a time in timed relation to the operation of the sealing apparatus. The two carton advancing devices are driven synchronously, and means are provided for automatically controlling the operation of the carton inverting mechanism in timed relation to these means, so that the cartons will be fed to and discharged from the turning mechanism at the proper time.

Referring now to Figs. 4 and 5 of the accompanying drawings, the feeding mechanism is indicated generally at 24, the sealing mechanism for sealing the top flaps of the carton at 25, the turning mechanism at 26, and the mechanism for sealing the bottom flaps of the carton after the carton has been turned upside down at 27.

The cartons to be sealed are brought up to the machine upon a suitable conveyer such as a belt or roller table (not shown) and move from this table onto the feeding mechanism 24 which comprises a tilting table 28 composed of a section of roller table pivoted at its front end at 29. Tilting table 28 is normally in an inclined position as shown in Fig. 4 and the foremost carton A therefore advances against a stop which consists of a withdrawable trigger 30. The tilting table is adapted to be tipped about its pivot 29 in the direction of the arrow to bring its axis approximately to the position shown by the dotted line. This tilting is effected by a lever 31 pivoted at 32 and actuated by a cam 33 on shaft 34 of the sealing apparatus. Simultaneously with the tipping of table 28, trigger 30 is withdrawn below the surface of the table by means of linkage indicated at 35, and this allows the carton A to go forward under the influence of gravity onto the roller table 36 of sealing mechanism 25, the forward end of this roller table being preferably inclined.

Upon reaching the roller table 36, one of a plurality of driving bars 37, which are carried in spaced relation by a pair of drive chains 38, comes up behind the carton and pushes it along the surface of the roller table. One of these bars is shown in contact with the rear of the carton which has now advanced to position B.

The drive chains 38 are carried one at each side of the machine upon suitable sprockets 39 on shaft 34 at the entrance end of the apparatus, and on similar sprockets mounted on shaft 41 at the opposite end of the sealing mechanism 25. These chains are positively driven in the direction of the arrows in a manner to be described later on.

As the carton is advanced along roller table 36 the top flaps, which because of their natural resiliency, tend to open up somewhat, are engaged by an unfolding head 42 which opens the flaps sufficiently wide for them to be engaged by the unfolders 43. These unfolders comprise a pair of warped metal surfaces, one located on each side of the machine, (see Figs. 4 and 5) which unfold the flaps outwardly about their hinges to the horizontal position.

After being thus unfolded the flaps pass beneath gumming rolls which apply suitable adhesive to the upper surfaces of the unfolded flaps, this adhesive being received onto the surfaces of the rollers 44 from an adhesive receptacle 45. Adhesive rollers 44 are positively driven by means of chains 46 and 47 from shaft 34. The adhesive receptacles 45 are pivotally mounted on the frame of the sealing mechanism as indicated at 48, and adhesive rollers 44 are carried upon the pivoted adhesive rceptacles so that the adhesive rollers can be lifted momentarily, by means of a cam (not shown) so as to leave spaces at the centers of the flaps uncoated with adhesive.

After the carton advances to the right beyond the adhesive rollers 44, the outer top flaps are again folded inwardly to their original position in contact with the inner top flaps by means of refolders 49. These refolders are somewhat similar to the unfolders 43, but are shaped to return the flaps substantially to the horizontal position where they are received beneath a presser bar 50 which is resiliently mounted upon the frame of the machine and presses the margins of the two outer flaps firmly against the inner flaps and holds them in this close contact while the carton is moved forward into the turning mechanism 26. In position C the carton has been pushed into the turning mechanism by means of the bar 37, and is ready to be inverted.

The inverting or turning mechanism 26 is similar to that described in connection with Fig. 4 except that the length of the frame structure 3*a* has been increased so as to give a greater length of travel to the rod 9*a*. This increased length of travel assists in ejecting the carton onto roller table 51 of the bottom flap sealing mechanism 27. In order to provide for this increased travel of rod 9*a* the vertical members 52 have been severed between the horizontal members 53 and members 53 are held together at their ends by members 54.

Before taking up the description of the driving and synchronizing mechanism, we will complete the operations upon the carton after leaving the turning mechanism, since this can be very briefly described. After the carton has been inverted it advances along the roller table 51 of the bottom flap sealing mechanism 27 under the pressure exerted by one of a plurality of driving bars 55 similar

to driving bars 37. Driving bars 55 are mounted upon endless chains which are carried upon sprockets on shafts 57 and 58 respectively.

In passing along roller table 51 the bottom flaps of the carton which remain unsealed and which have been turned to the upper position, are acted upon in a manner exactly similar to that described in connection with the top flap sealing mechanism 25.

The outer bottom flaps are unfolded by an unfolding head 42*a*, and unfolders 43*a*. Then adhesive is applied by adhesive rollers 44*a*, and immediately afterwards the flaps are reclosed by the refolders 49*a*, and the gummed and closed outer flaps are pressed against the inner flaps by the presser bar 50*a*.

The top flaps which were sealed by mechanism 25 are held firmly in closed position by the sections of rollers in the turning mechanism, and by the pressure caused by the weight of the contents of the carton as the carton moves along roller table 51 in the inverted position. The adhesive applied to the top flaps is therefore partially set so that there is very little danger of these flaps becoming unsealed even without further application of sealing pressure. The flaps that have just been sealed by the sealing mechanism 27, however, may need to be held in the closed position for a short period of time in order to allow the adhesive to set. Appropriate mechanism for providing this sealing pressure may be provided to receive the cartons from the right hand or discharge end of the apparatus shown in Fig. 4. The apparatus shown in application Serial No. 151,663, filed November 30, 1926, in the names of Wallace D. Kimball and Arthur E. Rideout, may be used for this purpose, if desired, and member 59 is a switch member for automatically actuating the driving motor of such apparatus by contact with the upper surfaces of the carton which is about to be discharged from the sealing mechanism.

Returning now to the means for synchronizing the drive of turning mechanism 26 and sealing mechanisms 25 and 27, and referring particularly to Figs. 4, 6 and 7 an electric motor 60 is operatively connected with main drive shaft 61 to drive this shaft continuously in the same direction at uniform speed at all times during which the sealing apparatus is operating. Carton advancing chain 38 of the sealing mechanism 25 is driven from shaft 61 by a chain 62 which passes over a sprocket 63 on the main shaft, and a sprocket 64 on shaft 41. Carton advancing chain 56 of the sealing mechanism 27 is similarly driven by means of a chain 65 passing over sprocket 66 on main shaft 61, and sprocket 67 on shaft 57. Chains 38 and 56 are therefore mechanically geared together and are driven simultaneously from the same main driving shaft 61, and these chains are therefore always in motion whenever energy is supplied to driving motor 60.

The turning mechanism 26 is actuated by chain 11*a* passing over sprockets 13*a* and 10*a*, sprocket 10*a* having twice as many teeth as sprocket 13*a*, so that one revolution of sprocket 13*a* rotates the turning mechanism through an angle of 180° only. Sprocket 13*a* is not fixed to rotate with shaft 61 as are sprockets 63 and 66, but is positively connected with the driven member of a one-revolution clutch indicated diagrammatically at 68. The one-revolution clutch 68 is provided with an actuating lever 69 (Fig. 7), and the construction of this clutch is such that as long as the operating lever 69 remains in the normal vertical position sprocket 13*a* remains stationary.

When, however, lever 69 is moved to the right from the position shown in Fig. 7 the clutch is thrown into gear and sprocket 13*a* is rotated through one revolution only. Moreover, the driving and driven clutch members positively engage one another by a jaw action, the engagement taking place always at the same angular position of shaft 61, and the members automatically becoming disengaged at the same angular position of said shaft. Hence, after the rotation of sprocket 13*a* has been initiated, its rotation always continues for a complete revolution of sprocket 13*a* and causes the rotation of sprocket 13*a* to cease at a definite fixed angular position. The construction of this type of one-revolution clutch is well known and it has not been believed necessary to illustrate its details. Because of the 2:1 gear ratio between sprockets 13*a* and 10*a*, the carton turning frame structure or element 3*a* is rotated through exactly an angle of 180°, and the roller beds 4*a* and 5*a* thereof always are in the horizontal position in alignment with the roller beds 38 and 51 of the sealing mechanism when the turning movement is completed.

It is important that the actuation of the carton turning element 3*a* be timed in relation to the delivery of the carton into turning mechanism by the carton advancing chain 38. The rotation of the turning element does not commence until after the carton has been placed within the turning element, for otherwise the carton would be damaged, and, moreover, this turning movement should commence promptly upon the reception of the carton within the turning element. For this reason the sprockets 40 of the sealing mechanism 25 are placed as close as possible to the receiving end of turning mechanism 26, and still allow the rotation of this mechanism without its striking any part of the sealing mechanism. The operation of the apparatus when the carton is at this point in its path through the machine is seen in Fig. 4, as well as in Fig. 7. Fig. 7, however, illus-

trates the positions of the various elements, both before and after the turnover mechanism has operated. In Fig. 7 the carton which is shown in full lines within the turning element 3*a* has been inverted and its inverted position is indicated by the letter D. The dotted position 37*a* of one of the drive bars 37, however, shows the bar just passing a corner of the carton as it pushed the carton into the turning element 3*a* before the turning over movement commenced. Since the turning over mechanism is symmetrical, the position of the carton indicated at D and that indicated at C are identical except for the fact that the carton has been inverted, and in one case the stop or rod 9*a* is in front of the carton and in the other case, behind it. Rod 37 in the position indicated at 37*a* has just pushed the carton into the turning element where it is entirely supported between the roller beds 4*a* and 5*a* of the turning element 3*a*.

After rod 37 passes the lower corner of the carton it engages the sloping surface of a plunger head 70 which normally is in the path of the bars 37 as they travel around the periphery of sprockets 40. Plunger head 70 is slidably mounted as illustrated in Fig. 7 and urged out into the path of the bars 37 by means of a spring 71. The inward movement of the plunger head which is caused by the bar 37 causes a slight rocking of a lever 72 pivoted on the frame of the apparatus at 73, the motion of which is transmitted to operating lever 69 of the one-revolution clutch by link 74. This displacement of operating lever 69 thereby starts the sprocket 13*a* on its travel through one revolution, which causes the turning of the element 3*a* through 180°, thus turning the carton upside down. The stopping of the turning element 3*a* is caused by the structure of the one-revolution clutch as above described.

Some time during the turnover movement, the carton usually slides forward between the roller beds 4*a* and 5*a* against the stop or rod 9*a* shown in dotted position at the right of Fig. 7. The rotation of the turnover element 3*a*, however, carries the rod 9*a* in a path similar to that indicated by the dotted line 17 in Fig. 1, and when the turning over movement has been completed the rod 9*a* is behind the carton in the full line position shown at the left of Fig. 7. The lower portions of the trunnions 2 being removed, the chains by which the weights 18*a* are attached to the rod 9*a* pass in straight lines from the full line position of rod 9*a* through the center of rotation of the turning mechanism 26 and over the tops of the sprockets 20. This movement of the rod 9*a* has elevated weights 18*a* from the dotted position of Fig. 7 to the full line position, and as the end of the turnover movement is completed, weights 18*a* descend, causing rod 9*a* to move the carton out of the turning element 3*a* and onto the roller table 51.

The dotted position of rod 9*a* in Fig. 7 illustrates the advance of the carton from position D to position E where it is shown in dotted lines supported entirely upon roller table 51. Since the drive chains 38 and 56 are both driven from the common shaft 61, and since the one-revolution clutch 68 always initiates the turnover movement at a definite angular position of shaft 61, and completes this movement at another angular position of the same shaft, the position of the drive bars 55 on chain 56 may be easily chosen so as to cause one of these bars to advance to the dotted position 75 (Fig. 7) behind the carton at position E as soon as the carton has been advanced to this position by means of the rod 9*a*.

It will be understood from the foregoing that the carton feeding mechanism 24, the flap manipulating or sealing mechanism 25, the carton turning or inverting mechanism 26, and the flap manipulating or sealing mechanism 27, are all appropriately timed together to cooperate with one another as a single apparatus which automatically receives the cartons successively one at a time from the supply table, and delivers the cartons in completely sealed condition at the right hand end of the apparatus. In this machine the flaps are manipulated while the cartons advance along a supporting table, and the cartons are inverted by turning them about substantially their own axes so that space is economized, and at the same time the flaps are properly secured together.

We claim:

1. Carton handling apparatus of the class described comprising a conveyer having a plurality of cartons thereon, a receiving element for receiving cartons successively discharged from said conveyer, means for arresting the movement of the received carton in said receiving element, means for actuating said receiving element at predetermined timed intervals to invert the carton therein and means for actuating said arresting means to effect discharge of the inverted carton from said element.

2. Carton handling apparatus of the class described comprising a carton receiving element, a stop for engaging the forward end of a carton entering said element and arresting the movement thereof, means for bodily inverting said carton receiving element and its contained carton, whereby said stop is placed at the rear of said carton, and means actuated simultaneously with the inverting of said receiving element for effecting discharge of the carton.

3. Carton handling apparatus of the class described comprising an element for receiving a carton, a stop for engaging the forward end of the carton and arresting the movement

thereof within said receiving element, means for inverting said carton receiving element together with the carton contained therein, whereby said stop will be at the rear of said carton, and means actuated by the inverting movement of said element for moving said stop lengthwise of said receiving element to thereby effect discharge of the carton.

4. Carton handling apparatus of the class described comprising an element for receiving a carton, a stop member for engaging the forward end of the carton and arresting the movement thereof within said receiving element, means for inverting said carton receiving element together with the carton contained therein, whereby said stop member will be in contact with the rear end of said carton, guideways for permitting movement of said stop member lengthwise of said carton receiving element, and a weight connected to said stop said weight being elevated by the said inversion of the carton receiving element whereby, after the inverting of said element, the weight descends by gravity and thereby moves said stop member along its guideways to effect discharge of the carton from said element.

5. Carton handling apparatus of the class described comprising a conveyer for supplying cartons to the said apparatus, an element for successively receiving the said cartons, means for effecting periodical bodily rotation of said carton receiving element to thereby invert the carton contained therein, means for restraining forward movement of succeeding cartons onto said conveyer during said rotative movement, and means for discharging the carton from said receiving element and permitting entry of a fresh carton.

6. Carton handling apparatus of the class described comprising a conveyer for supplying cartons to the said apparatus, an element for successively receiving cartons from said conveyer, a bar constituting a stop for arresting the movement of the carton entering said receiving element, limiting means for determining the extent of movement of said bar, guideways for permitting movement of said bar lengthwise of said carton receiving element, means for periodically effecting bodily inversion of said receiving element, a weight elevated by said inversion, and connections between said weight and said bar whereby said weight descends by gravity to move said stop lengthwise of said receiving element to its limiting position and thereby discharge the carton contained in said element and permit entry of a fresh carton into the position formally occupied by said discharged carton.

7. A machine for sealing cartons comprising a table for receiving a carton resting on its bottom flaps with its bottom flaps closed but unsealed, means for advancing the carton along said table, means for sealing the top flaps thereof while the carton is in motion, means for inverting the carton, and means for sealing the bottom carton flaps while the carton is in the inverted position.

8. A machine for sealing cartons comprising a table for receiving a carton resting on its bottom flaps with its bottom flaps closed but unsealed, means for advancing the carton along said table, means for sealing the top flaps thereof while the carton is in motion, means for inverting the carton, a second table for receiving the carton from said inverting means, means for advancing the carton along said second table, and means for sealing the bottom flaps of the carton as the carton advances along said second table.

9. In a machine for sealing filled cartons, the combination of a pair of sealing tables, each having means associated therewith for sealing a portion of the carton flaps as the carton passes thereover, carton advancing means for each table for advancing the cartons successively over said tables, and means for transferring the cartons from one table to the other including means for inverting the carton during said transfer.

10. In a machine for sealing filled cartons, the combination of a pair of sealing tables, each having means associated therewith for sealing a portion of the carton flaps as the carton passes thereover, said sealing means for the two tables being disposed substantially in the same plane, carton advancing means for each table for advancing the cartons successively over said tables, and means for transferring the cartons from one table to the other including means for inverting the carton during said transfer.

11. In a machine for sealing filled cartons, the combination of a pair of sealing tables, each having means associated therewith for sealing a portion of the carton flaps as the carton passes thereover, carton advancing means for each table for advancing the cartons successively over said tables, means for transferring the cartons from one table to the other including means for inverting the carton during said transfer, and means for actuating said carton advancing means, and said transferring means in timed relation.

12. In a machine for sealing filled cartons having their flaps closed but unsealed, the combination of a pair of sealing tables each having flap manipulating devices associated therewith for opening the outer carton flaps at the upper face of the carton, applying adhesive thereto, and closing the same against the inner carton flaps, carton advancing means for each table for advancing the cartons successively over said tables, and carton inverting mechanism disposed between said tables for turning the carton to present an unsealed carton face to the action of the flap manipulating devices of the second table.

13. Carton inverting apparatus of the class described comprising a framework, a pair of carton-supporting surfaces facing inwardly toward one another disposed near the top and bottom of the framework, the framework having openings at opposite sides for admitting a carton to and discharging it from said carton-supporting surfaces, a guideway extending midway across each end of said framework, a rod mounted in said guideways to serve as a stop for a carton entering the apparatus, stationary bearings projecting into supporting engagement centrally with the ends of the framework to permit it to rotate bodily to invert the carton therein, the lower portion of each of said bearings being cut away to allow said rod to slide in said guideways to eject the inverted carton from the apparatus.

14. A machine for inverting cartons comprising a framework having a bearing at each end thereof for rotatably supporting the same and permitting said framework to rotate bodily, said framework carrying a pair of carton supporting surfaces facing toward one another disposed near the top and bottom of the framework, the sides of said surfaces being spaced from the ends of the framework so as to provide space for receiving the extended flaps of the carton, the portions of the framework extending beyond the sides of said carton supporting surfaces serving to protect said extended flaps.

15. Carton handling apparatus of the class described comprising a pair of tables for conveying cartons horizontally, a carton inverting element between the adjacent ends of said tables, bearings for supporting said inverting element to permit vertical rotation thereof, said element being provided with two carton supporting surfaces arranged equi-distant from the axes of said bearings, and means for rotating said element, said carton supporting surfaces being thereby brought successively to the same elevation as said tables.

In testimony whereof we affix our signatures.

ARTHUR C. SCHROEDER.
WALLACE D. KIMBALL.