July 29, 1958 W. A. RINGLER 2,844,929

MECHANISM FOR FORMING AND FILLING CIGARETTE CARTONS

Filed May 26, 1955 3 Sheets-Sheet 1

FIG. 1.

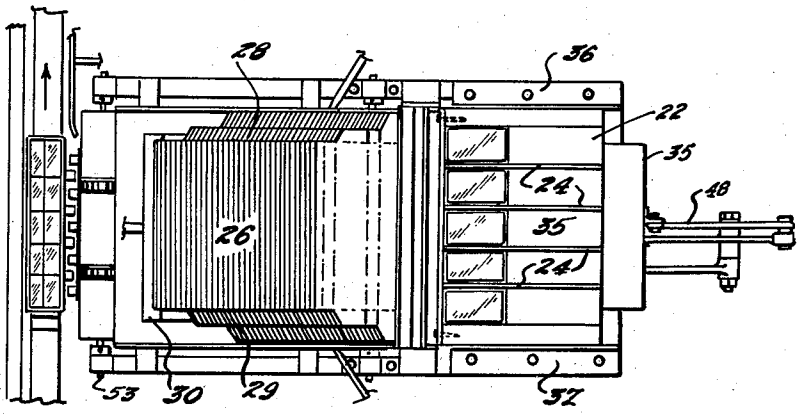



FIG. 2.

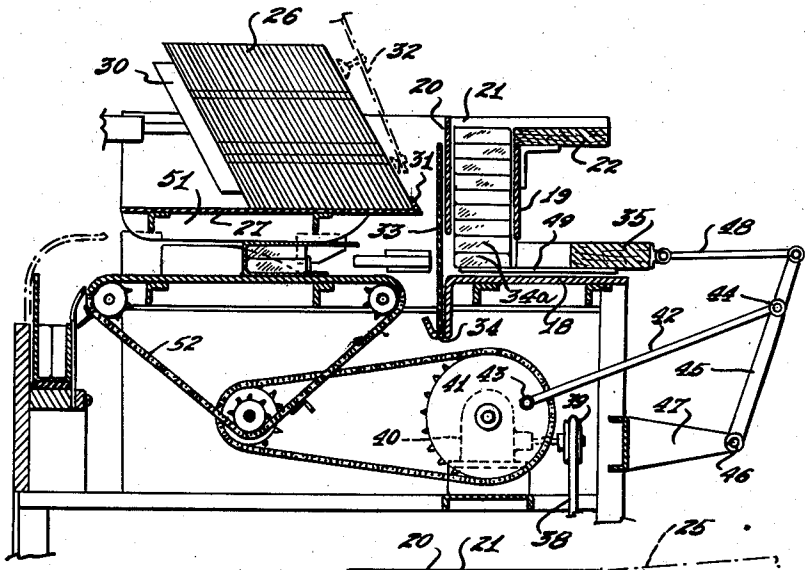
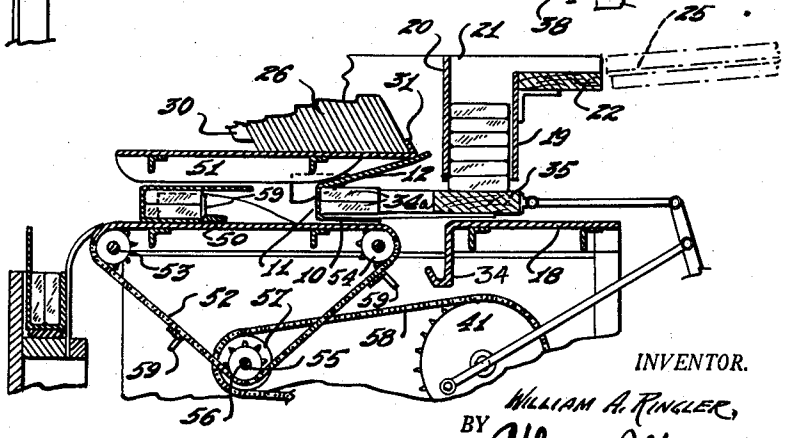



FIG. 3.




INVENTOR.
WILLIAM A. RINGLER,
BY Allen & Allen
ATTORNEYS.

July 29, 1958 W. A. RINGLER 2,844,929

MECHANISM FOR FORMING AND FILLING CIGARETTE CARTONS

Filed May 26, 1955 3 Sheets-Sheet 2

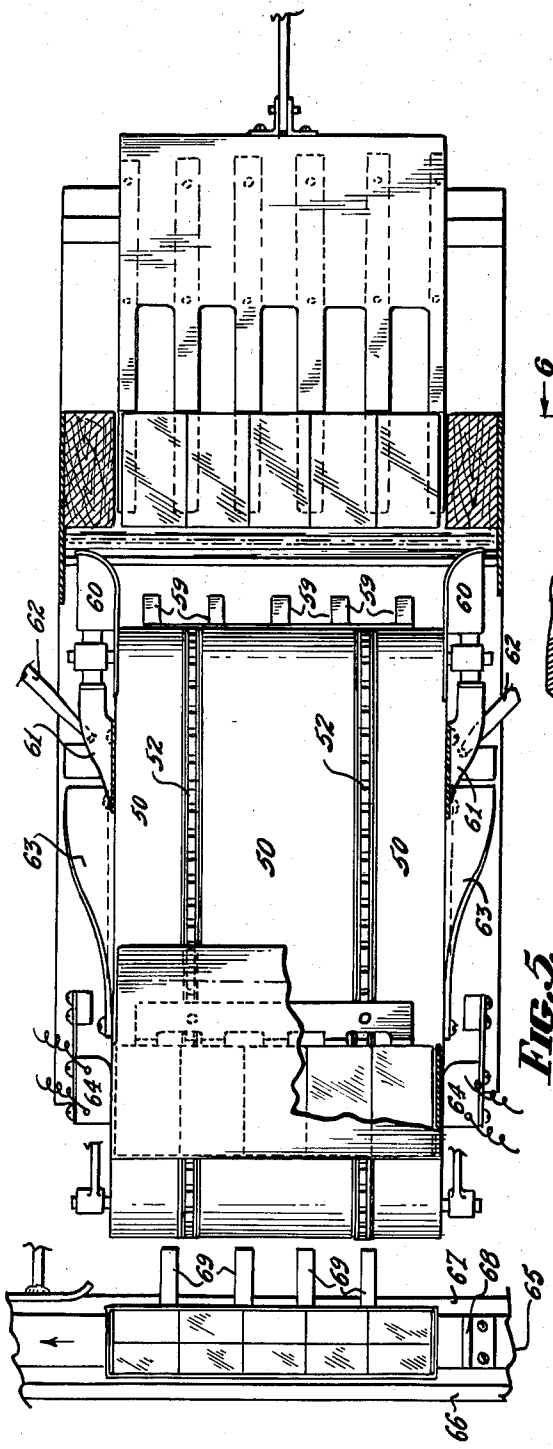


FIG. 5.

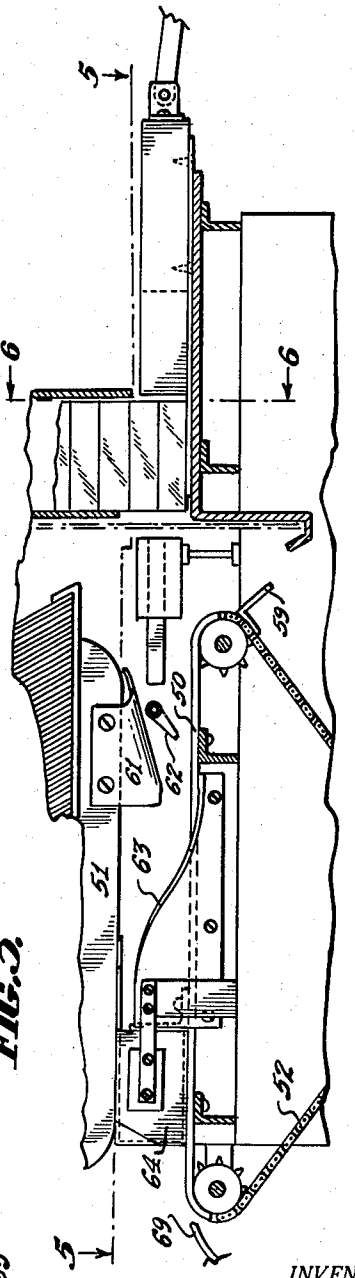


FIG. 4.

INVENTOR.
WILLIAM A. RINGLER,
BY Allen & Allen
ATTORNEYS.

July 29, 1958 W. A. RINGLER 2,844,929

MECHANISM FOR FORMING AND FILLING CIGARETTE CARTONS

Filed May 26, 1955 3 Sheets-Sheet 3

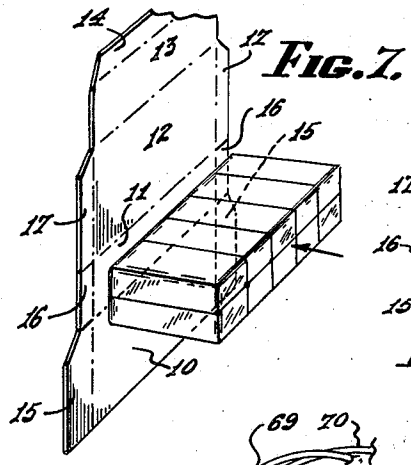



FIG. 7.

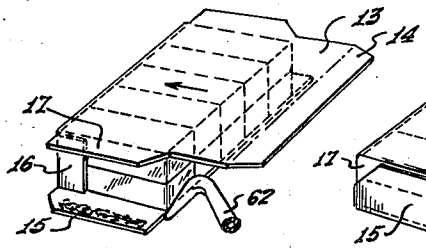



FIG. 8.

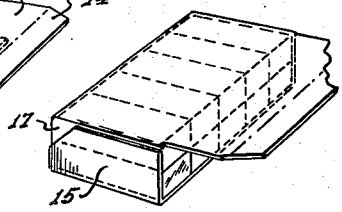



FIG. 9.

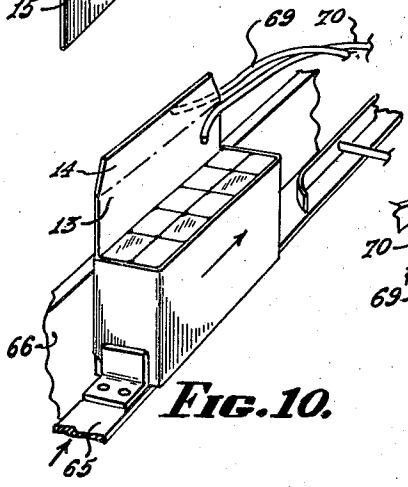



FIG. 10.

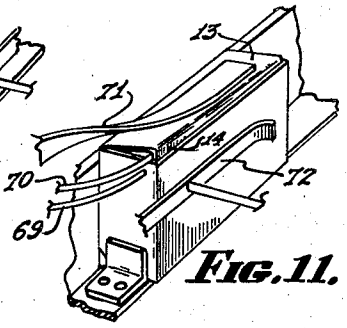



FIG. 11.

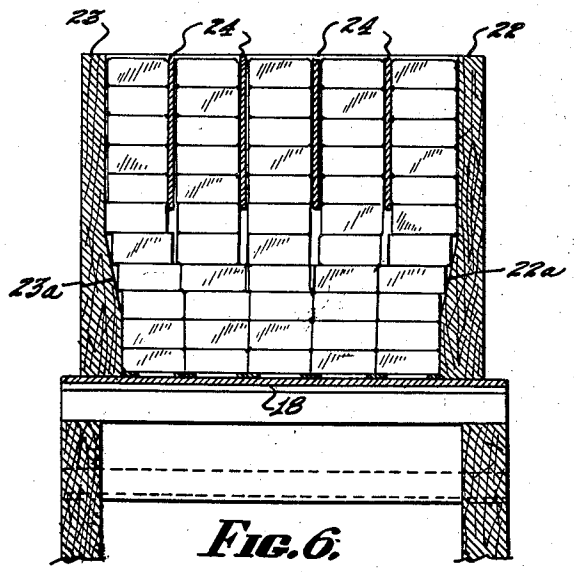



FIG. 6.

INVENTOR.
WILLIAM A. RINGLER.
BY Allen & Allen
ATTORNEYS.

United States Patent Office 2,844,929 Patented July 29, 1958



2,844,929

# MECHANISM FOR FORMING AND FILLING CIGARETTE CARTONS

William A. Ringler, Wayne, Pa., assignor, by mesne assignments, to The Diamond Match Company, New York, N. Y., a corporation of Delaware

Application May 26, 1955, Serial No. 511,195

6 Claims. (Cl. 53—230)

The invention relates to the packaging of wrapped packs of cigarettes (or like articles) in paperboard cartons. In the practical art as it exists today cigarettes are manufactured by high speed machines; twenty cigarettes are assembled in a group, wrapped in foil, enclosed in a paper wrapper which constitutes a label and to which a revenue stamp is affixed, and enclosed in an over-all wrapper of cellophane, these operations all being accomplished by mechanism. Ten packs of cigarettes are placed in an appropriate paperboard carton, the cartons themselves are set up and glued on "Brightwood" machines; but the cartons are filled and closed by hand.

The hand filling and closing of the cigarette cartons is expensive and inconvenient; and a primary object of the present invention is to provide a simple and positively acting mechanism for filling and closing such cartons.

It is also an object of the invention to provide a mechanism for forming cartons about a prearranged assembly of articles such for example as the conventional group of ten cigarette packs, whereby the mechanism eliminates previously required machines for setting up and gluing the cartons preparatory to filling them.

It is also an object of the invention to provide a cigarette carton and assembly of non-conventional form, such for example as will facilitate the affixing of State revenue stamps and the like where these must be employed.

These and other objects of the invention which will be set forth hereinafter or will be apparent to one skilled in the art upon reading these specifications, are accomplished by that structure and arrangement of parts of which an exemplary embodiment will now be described. Reference is made to the accompanying drawings wherein:

Figure 1 is a plan view of the machine of the exemplary embodiment.

Figure 2 is a longitudinal sectional view thereof.

Figure 3 is another longitudinal sectional view showing the mechanism in another stage of operation.

Figure 4 is a partial longitudinal section on an enlarged scale showing various flap closing and sealing devices.

Figure 5 is a longitudinal sectional view taken along the section lines 5—5 of Figure 4.

Figure 6 is a vertical sectional view through the feed hopper for the articles, taken along the section line 6—6 of Figure 4.

Figure 7 is a partial perspective view of a blank for a carton together with an assembly of articles ready for packaging.

Figure 8 is a perspective view showing the blank partially folded about the assembly of articles.

Figure 9 is a similar perspective view showing the body of the blank completely folded and secured about the assembly of articles but with the top and tuck flap open.

Figure 10 is a partial perspective view showing an initial engagement of the top elements of the carton by folding and closing means.



Figure 11 is a similar perspective view showing the operation of completing the closure of the carton and the apparatus used therefor.

Briefly, in the practice of the invention a hopper type of mechanism is provided for creating an assembly of articles suitable for packaging. Although the invention is not limited thereto, it will be described in an exemplary embodiment suitable for the packaging of packs of cigarettes as referred to above. The assembly of articles in this instance will comprise two rows of five cigarette packs each, one row being superposed on the other.

The machine comprises a hopper for holding a plurality of flat carton blanks, and suitable means are provided for feeding these blanks one by one to a position adjacent the prearranged assembly. The assembly is thereupon thrust against the bottom portion of the wall of the carton blank, and the blank and assembly are concurrently caused to enter a throat. This results in the front wall, bottom wall and back wall of the carton being folded about the article assembly.

The carton and assembly are caused to move through the throat, during which movement end flaps on the carton walls are closed and secured together. The composite article which now has the form of the assembly enclosed in an open carton is delivered from the far end of the throat onto a transversely moving conveyor, which carries it endwise past means which act to close the top of the carton.

Whereas hitherto cigarette packs have been arranged flatwise in cartons in such manner that when the lid of the carton is open the broader sides of the packs are exposed, in the cartons of this invention the carton tops open on end portions of the cigarette packs. This facilitates the attachment of State stamps, as will be understood by the skilled worker in the art, these stamps being normally affixed to the ends of the packs. The cartons of the present invention do not require to be sealed closed, obviating the present problem of opening the ends of the cartons, removing the packs, affixing State stamps to them, and reinserting them.

The form of the cartons of this invention is best illustrated in Figure 7. The blank comprises a front wall **10**, a bottom wall **11**, a back wall **12**, a top wall **13** and a tuck flap **14** in the order named. The front, bottom and back walls carry at their ends sealing flaps **15**, **16** and **17** respectively.

The machine elements may be assembled to any suitable machine frame and driven in any suitable fashion. As best shown in Figures 2 and 3, the front end of the machine comprises a table **18** above the rear end of which is a hopper for forming article assemblies. This hopper has a front wall **19** and a back wall **20** together with end walls, one of which is shown at **21**. A projecting ledge **22** joins the upper edge of the front wall **19**. There are interior partitions within the hopper, indicated in Figure 1 at **24**. As shown in Figure 6 these interior partitions lying between the hopper end walls **22** and **23** terminate short of the bottom of the hopper. They serve to confine the individual packs, both on the ledge **22** and in the upper part of the hopper to separate paths, but these paths merge at the bottom of the hopper so that the packs come together laterally under the influence of slantwise disposed portions **22***a* and **23***a* of the side walls. The lowermost two rows of cigarette packs just above the table **18** constitute the article assembly aforesaid. The hopper may be fed by hand or by means of chutes, one of which is indicated in dot dash lines at **25** in Figure 3. These chutes may come from the same or different cigarette pack-making machines.

Behind the hopper for the cigarette packs is another hopper for carton blanks. An assembly of blanks is indi-

cated at **26** in Figures 1, 2 and 3. The blank hopper has a platform **27** and side members **28** and **29**. At the rear there is a pushing device **30** designed to keep the stacked cartons at the forward end of the hopper; and the platform may have forward stop means as indicated at **31**. The hopper may be fed by hand or by conveyor as desired.

Some suitable means for feeding the carton blanks one by one from the hopper is provided. This may take various forms as known in the art, including a feeding wheel and the like. At **32** there is indicated in dotted lines a feeding means in the nature of a suction cup mechanism, movable to withdraw an individual blank from the hopper.

The result of feeding a blank will be to position it as shown at **33** in Figure 2. It now lies adjacent the cigarette hopper; and it may be supported at its lower end by a hook-like ledge **34** attached to the table **18**. The position of the blank will now be such that its bottom wall lies directly opposite the article assembly indicated at **34***a* in Figure 2.

A pushing device **35** is arranged to be slidable over the table **18** in ways **36** and **37**. The pusher is moved mechanically in timed sequence with other operations hereinafter described. One way of doing this is illustrated in Figure 2. Here the machine is driven by a belt **38** from a prime mover (not shown), the belt engaging a sheave **39** on the drive shaft of a gear reduction mechanism **40**. A relatively large sheave **41** is affixed to the driven shaft of the gear reduction mechanism. A pitman **41** is pivoted eccentrically to the sheave **41** as at **43**, its other end being pivoted as at **44** to a lever arm **45**. The lever arm is fulcrumed as at **46** to a bracket **47** on the machine frame. The upper end of the lever arm is connected to the pusher **35** by a link **48**. The pusher **35** is provided with a series of thin metallic fingers **49**, extending rearwardly of the pusher and underlying the packs of cigarettes forming the assembly **34***a*.

Figure 3 illustrates that as the pusher **35** is driven rearwardly it will cause the article assembly **34***a* to engage the bottom wall **11** of the carton blank and cause the blank and assembly to enter a throat formed between lower supporting members **50** (of which there may be several as shown in Figure 5) and upper rib members **51**. The blank is thus wrapped around the assembly as indicated, the front carton wall **10** lying beneath the assembly, and the rear carton wall **12** overlying the assembly. The operation of the drive will be such that the pusher is now withdrawn (moving to the right in Figure 3), and the combination of assembly and blank remaining in the throat or in the entrance thereto.

The combination aforesaid is next moved rearwardly through the throat by any suitable means. One such means comprising a series of chains **52** forms a conveyor. The upper flight of this conveyor moves in a path coplanar with the supports **50** passing over sprockets **53** and **54**. Below, there is a sprocket **55** on a shaft **56** by means of which the chains are driven. The shaft **56** also carries a sprocket **57** connected by a chain **58** to the sheave **41**. The chains **52** carry at suitable intervals pushing fingers **59** which, turning in behind the combination of the blank and the assembly in the throat, engage this combination and serve to carry it through the throat.

As the combination enters and passes through the throat the various flaps on the ends of the blank walls are folded. First the flaps **16** on the bottom wall are folded forwardly of the direction of motion of the combination, the combination then appearing as shown in Figure 8. This is accomplished by stationary sweeps indicated most clearly at **60** in Figure 5.

During a continuation of the motion of the combination the flaps **17** on the back wall of the carton are folded down. This is accomplished by stationary sweeps **61** along the path of the combination. At the same time a suitable adhesive is applied to the then upper surfaces of the flaps **15** on the front wall **10**. This can be accomplished in any suitable way, as by glue wheels or the like, and any suitable adhesive may be employed. Water-vehicle adhesives may be used if desired, providing a sufficient setting time is allowed. For this purpose the throat may be elongated as desired and hold means may be used as will be readily understood by the skilled worker in the art. It is preferred, however, to use a heat sensitive or thermoplastic adhesive which can obviate or greatly shorten the setting time. Again the adhesive may be applied in various ways including printing, roller application, spraying and the like. It may also be flowed on from a suitable spout or nozzle **62** as shown in the drawings, the spout being equipped with suitable control valves (not shown).

After the adhesive has been applied to them the flaps **15** on the front wall are folded upwardly against the already folded flaps **17**. This is accomplished by stationary sweeps **63**. The flaps with the adhesive between them are, of course pressed together. In the event of the use of a thermoplastic adhesive, electrical heaters **64** may be employed to activate them. The combination is now in the form illustrated in Figure 9, i. e. in the form of an open topped but otherwise completely formed carton filled with the article assembly.

When this stage has been attained the combination is delivered from the rear end of the throat in such fashion as to come to rest with its open side uppermost on a transversely moving conveyor **65**. This conveyor has side guides **66** and **67**; and at suitable intervals it is provided with pushing abutments **68** to cause the desired endwise movement of the combination. Curved fingers **69** may be provided at the ends of the supporting members **50** to assist in the delivery of the combination onto the transversely moving conveyor.

While the combination is moving in the transverse direction under the influence of the conveyor **65**, any desired preliminary operations may be effected on it, including such things as the imprinting or affixing of State stamps to the cigarette pack ends, the insertion of coupons, etc.

The final operations are concerned with the closing of the tops of the cartons. As the cartons move in the direction of the arrows in Figure 10 the tuck flap **14** is engaged between stationary rod-like sweeps **69** and **70** which are so shaped as to bend the tuck flap over and downwardly and ultimately to insert it between the cigarette packs and the front wall **10** of the carton. The final operation involves smoothing down of the top structure of the carton as by stationary sweep **71** after the sweeps **69** and **70** have released the tuck flap. The position of the front wall **10** may be maintained by a side guide **72**.

The conveyor **65** may be as long as desired and may be employed to deliver the filled and closed cartons to a wrapping machine, where additional moisture protection is secured, or to a point at which the cartons may be introduced into containers for storage or shipment.

By the apparatus disclosed the cartoning of cigarette packs can be accomplished at speeds consonant with the speeds at which the packs themselves are manufactured by automatic equipment. Modification may be made in the invention without departing from the spirit of it. The invention has been described in an exemplary embodiment, but what is claimed as new and desired to be secured by Letters Patent is:

1. In mechanism of the class described, a support, means for forming an assembly of articles on said support, means adjacent said support defining a constricted throat of a size to receive said assembly of articles, means for delivering a carton blank between said support and said throat, said carton blank consisting of a plurality of body walls having end closure flaps, abutment means for positioning said blank with an interme-

diate body wall thereof opposite said assembly of articles, a pusher for moving said assembly of articles and said blank into said throat, whereby said throat acts to fold the body walls of said blank about three sides of said assembly of articles, said pusher including a plurality of thin spaced apart fingers extending outwardly therefrom and underlying the articles in said assembly, conveyor means for continuously moving said blank and assembly of articles through said throat, said conveyor including abutments movable between the fingers of said pusher to engage and carry said blank and assembly of articles through said throat, drive means for moving said pusher and said conveyor in timed relation, and stationary sweep means in said throat effective against the movement of said blank and assembly of articles through said throat to fold and secure the end flaps of said carton blank.

2. In mechanism of the class described, a support, means for feeding articles to said support and for forming said articles into an assembly of articles extending across said support, means beyond said support defining a constricted throat of a size to receive said assembly of articles, means for delivering a carton blank between said support and said throat, said carton blank consisting of a plurality of body walls in articulation, some of said body walls having end closure flaps, abutment means for positioning said blank with an intermediate body wall thereof opposite said assembly of articles, a pusher for moving said assembly of articles and said blank into said throat, whereby said throat acts to fold the body walls of said blank about three sides of said assembly, said pusher having a vertically disposed surface for contact with the rear surfaces of the articles in said assembly and including a plurality of thin spaced apart fingers extending outwardly thereof and underlying and supporting the articles in said assembly, conveyor means for continuously moving said blank and assembly of articles through said throat, said conveyor including driving fingers movable between the fingers of said pusher as the latter is retracted to engage and carry said blank and assembly of articles forwardly through said throat, drive means for moving said pusher and said conveyor in timed relation, and stationary sweep means in said throat effective against the movement of said blank and assembly through said throat to fold and secure the end flaps of said carton blank in erected condition.

3. The structure claimed in claim 2 wherein said constricted throat has upper and lower smooth wall members, outwardly flared at their forward end to effect initial folding of said carton blank, and in which the lower wall member is interrupted to provide space for said conveyor.

4. The structure claimed in claim 3 including a transverse conveyor at the rear end of said throat for receiving said erected carton blank and the assembly of articles contained therein, and transfer means for receiving the said erected carton from said first named conveyor, turning it through 90° and depositing it on said transverse conveyor in a position at right angles with respect to its original position.

5. In mechanism for forming and filling cigarette cartons, a support, means for forming superposed rows of cigarette packs on said support, means beyond said support defining a constricted throat of a size to receive two rows of said packs in superposed relation, means for delivering a cigarette carton blank between said support and said throat, said carton blank consisting of a plurality of body walls in articulation, some of said body walls having end closure flaps, abutment means for positioning said blank with an intermediate body wall thereof in alignment with said throat, a pusher movable across said support for pushing two superposed rows of packs and said blank into said throat, whereby said throat acts to fold the body walls of said carton blank about three sides of said packs, said pusher including a plurality of thin spaced apart fingers extending outwardly therefrom and underlying and supporting said packs, conveyor means for continuously moving said blank and packs through said throat, said conveyor including travelling abutments movable between the fingers of said pusher to engage and carry said blanks and packs through said throat, drive means for moving said pusher and said conveyor in timed relation, and stationary sweep means in said throat effective against the movements of said blank and packs therethrough to fold and secure the end flaps of said blank.

6. The structure claimed in claim 5 in which the said intermediate wall of said blank is the bottom wall thereof, said blank having a top with a tuck flap, the rows of cigarette packs advanced by said pusher being brought endwise against said bottom wall, a transverse conveyor at the rear end of said throat for receiving said cigarette carton and the packs contained therein, and means for transferring the said carton to said transverse conveyor with the bottom wall thereof lowermost, whereby end portions of said packs are disposed upwardly in the completed carton, and means effective during the transverse movement of the carton on said transverse conveyor for folding said top wall and said tuck flap and inserting the latter, whereby to close the filled carton.

**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 846,658 | Giroud | Mar. 12, 1907 |
| 1,218,786 | Lev | Mar. 13, 1917 |
| 1,639,282 | Bergstein | Aug. 16, 1927 |
| 2,281,005 | Nicodemus et al. | Apr. 28, 1942 |
| 2,336,795 | Malhiot | Dec. 14, 1943 |
| 2,609,646 | Total | Sept. 9, 1952 |
| 2,696,702 | Martin | Dec. 14, 1954 |