April 12, 1932. W. E. MOLINS 1,853,447

PACKING MACHINERY

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Fig. 3.

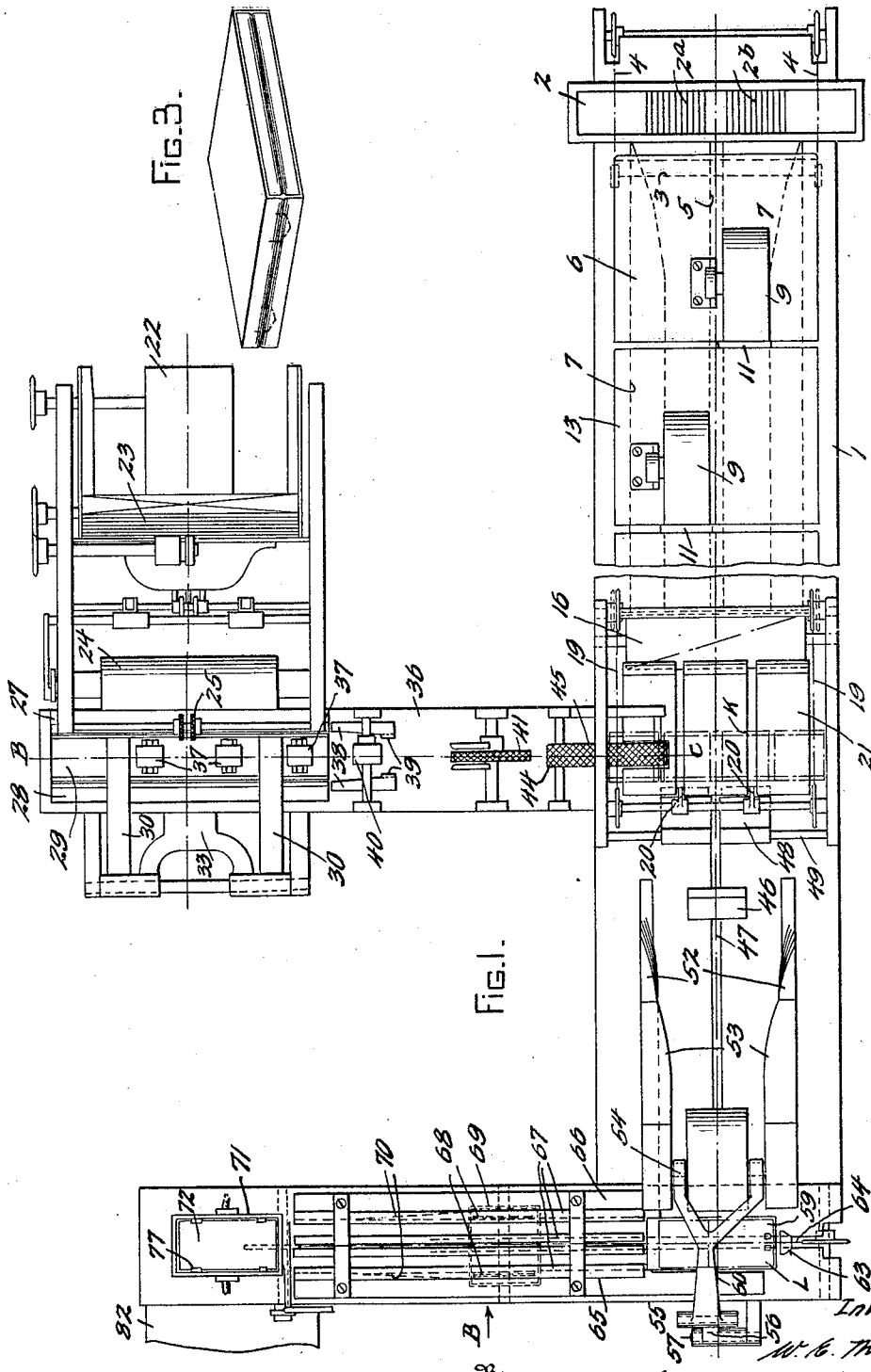


Fig. 1.

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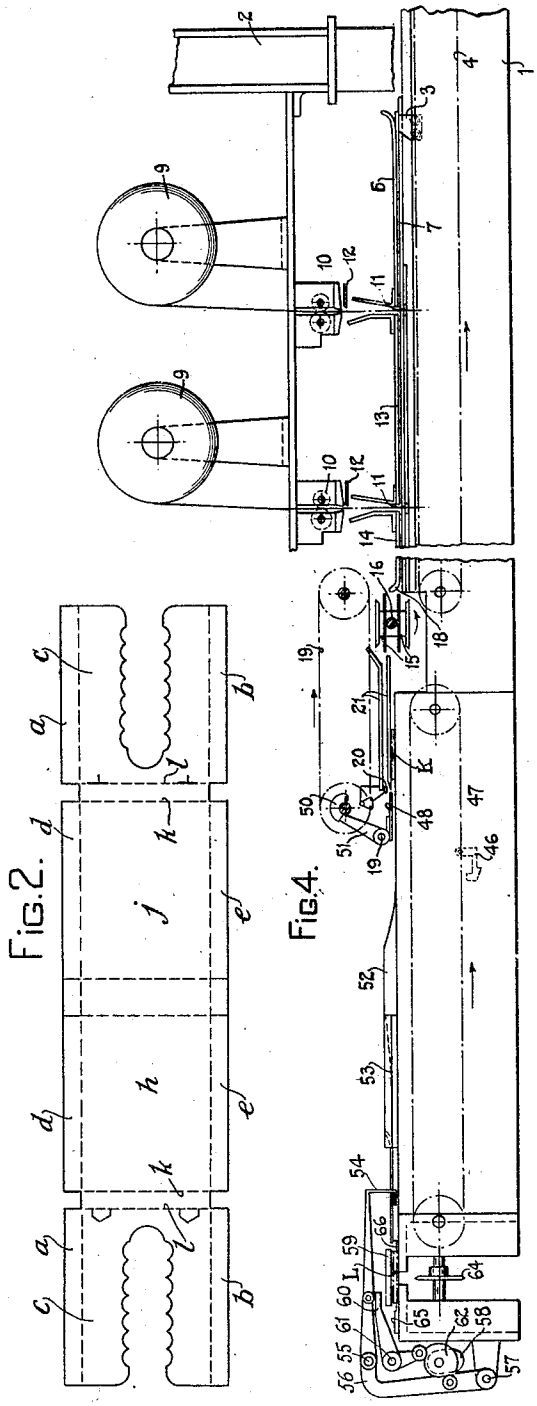


Fig. 2.

Fig. 4.

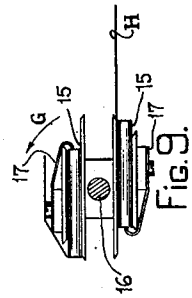


Fig. 9.

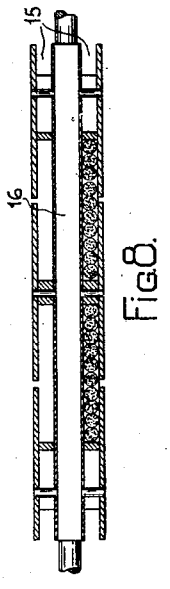


Fig. 8.

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PACKING MACHINERY

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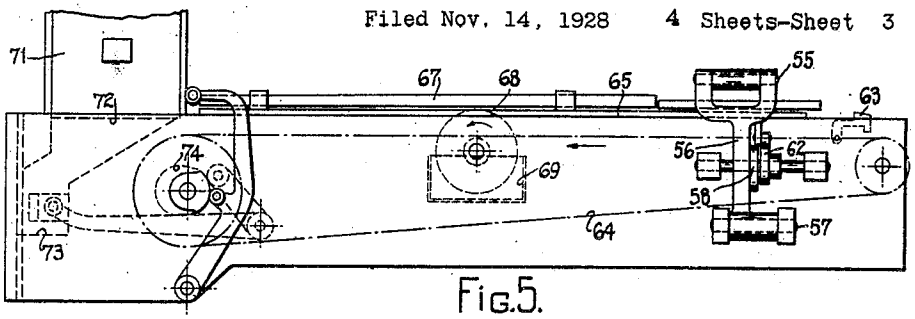


Fig.5.

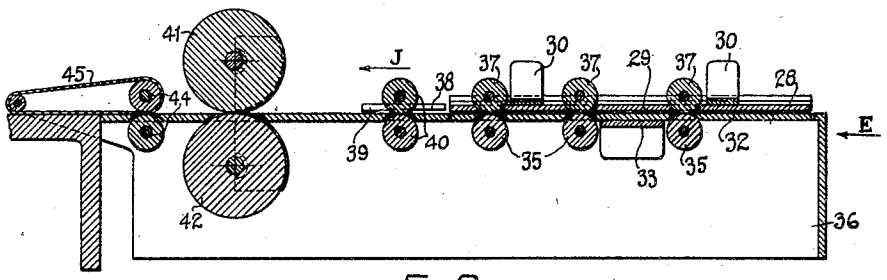


Fig.6.

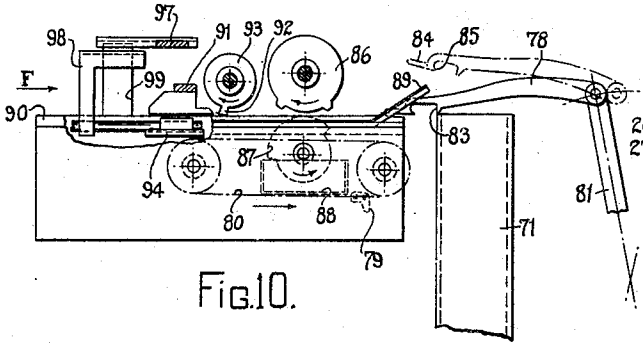


Fig.10.

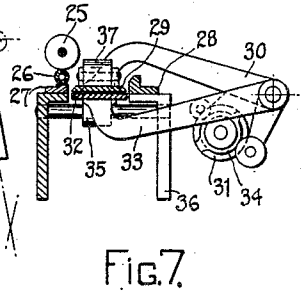


Fig.7.

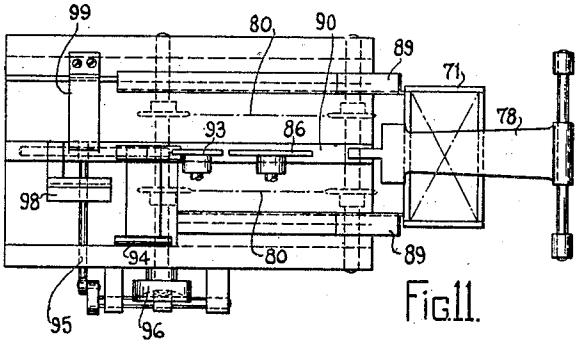


Fig.11.

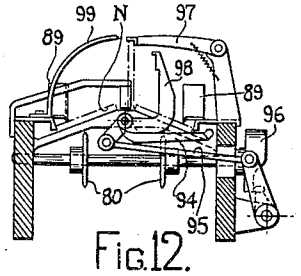


Fig.12.

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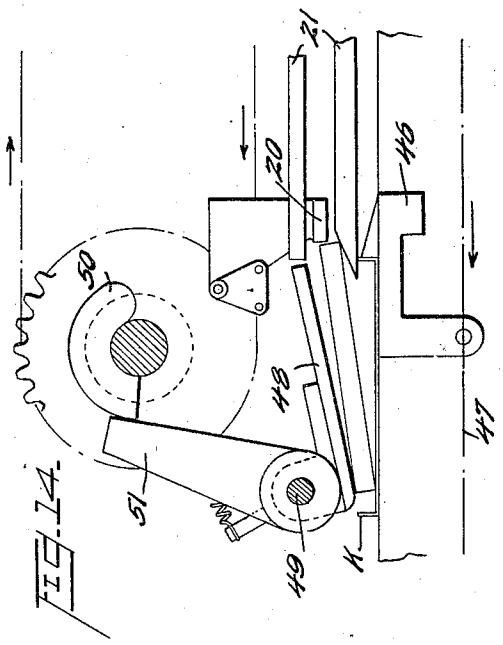


FIG. 14.

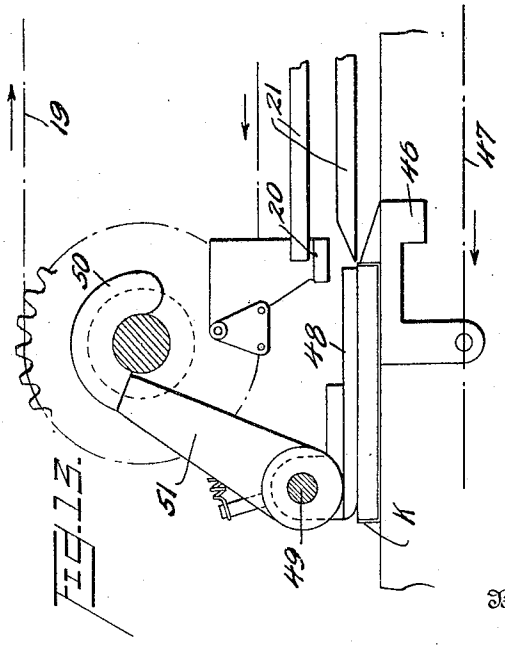


FIG. 13.

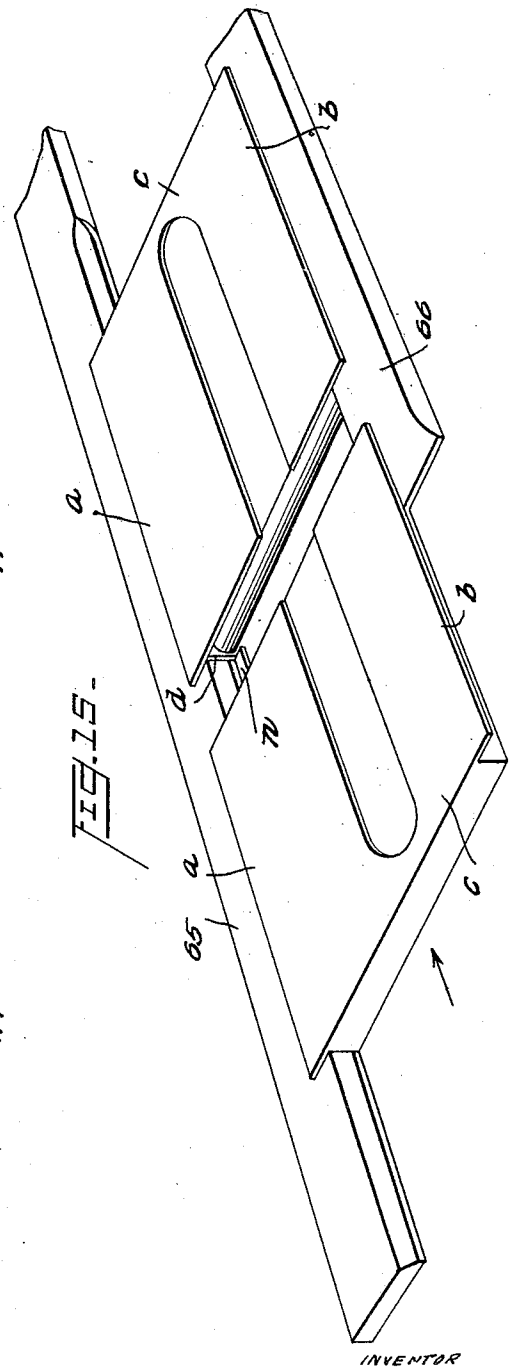


FIG. 15.

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Patented Apr. 12, 1932 1,853,447

UNITED STATES PATENT OFFICE

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PACKING MACHINERY

Application filed November 14, 1928, Serial No. 319,269, and in Great Britain December 5, 1927.

This invention is for improvements in or relating to cigarette packing machinery, and more particularly to a machine designed to pack cigarettes or like articles in a carton of the kind comprising either one or two pockets formed, or each formed, so as to hold a single row of cigarettes with the axes thereof disposed parallel to the mouth of the pocket, and wherein the one pocket and a cover, or the two pockets, are hinged together by a flap which extends across the open end or the open ends of the pocket or pockets when the cover of the pocket is closed or when one pocket is folded upon the other.

The present invention consists of a packing machine operable to pack automatically cigarettes or like articles in a carton of the kind referred to which comprises means (for example an endless conveyor) operable to move a batch or two batches of cigarettes into engagement with a blank composed of two sections united by a flap so that the axes of the cigarettes are disposed at right angles to the longer dimension of the blank, and means operable to move the batch or batches of cigarettes, together with the blank, through folding mechanism arranged either to fold one section of the blank into a U shaped block ended pocket about the batch of cigarettes and the other section into a cover, or to fold the two sections each into a U shaped block ended pocket about a batch of cigarettes in such a manner that the open ends of the pockets are directed towards one another.

Further, the present invention comprises means for feeding a web or webs of wrapping material across the path of the batch or batches of cigarettes, means for severing a strip or strips of material from the webs, and means for wrapping the strip or strips of material around the cigarettes, prior to the same engaging with the blank from which the carton is formed.

The invention also comprises a device for automatically closing cartons or the like of the type referred to wherein means are arranged to receive the said cartons in an extended condition and move the same through mechanism operable automatically to fold either the pocket and the cover or the two pockets one upon the other, and if desired, means are provided for strengthening the said flap by folding and securing the side extensions of the same downwardly upon the flap.

The invention is more particularly described with reference to the accompanying drawings, in which:—

Fig. 1 is a plan of a machine constructed according to the present invention with the carton closing mechanism indicated diagrammatically,

Fig. 2 shows the blank from which a carton is produced,

Fig. 3 shows a completed carton as discharged from the machine,

Fig. 4 is a side elevation of Fig. 1 looking in the direction of the arrow "A",

Fig. 5 is a side elevation of Fig. 1 looking in the direction of the arrow "B",

Fig. 6 is a section on line C—D of Fig. 1,

Fig. 7 is and end elevation of Fig. 6 looking in the direction of the arrow "E",

Fig. 8 is a sectional elevation of the foil folding frame shown in Fig. 4,

Fig. 9 is an end view of Fig. 8,

Fig. 10 is a diagrammatic elevation partly in section, of the closing gear,

Fig. 11 is a plan of Fig. 10,

Fig. 12 is an end view, partly in section, of Fig. 10 looking in the direction of the arrow "F",

Figures 13 and 14 are enlarged fragmentary views of a portion of Figure 4 illustrating two positions which the parts of the apparatus assume during operation, and

Figure 15 is an enlarged perspective view of a portion of the mechanism shown in Figure 1.

Referring to the drawings which illustrate the method of making a double pocket carton of the kind referred to, the machine comprises a main bed 1 on which is mounted a cigarette hopper 2. The cigarette hopper 2 comprises two distinct sets of vane openings 2^a and 2^b and a pusher piece 3 of a conveyor 4 is arranged to pass beneath the vane openings so as to remove two distinct batches of cigarettes simultaneously.

The two batches of cigarettes are separated

from one another by a spacing member 5 and are so disposed as to pass beneath a cover plate 6 mounted above the bed of the machine.

There is provided at each side of the bed 1 of the machine, guides 7 which taper towards the centre line of the machine as shown in Fig. 1 for the purpose of bunching each batch of cigarettes together into a compact batch after the cigarettes have been removed from the vanes in loose formation.

Each compact batch of cigarettes is thereafter moved into engagement with a strip of foil fed through a slot 11 in the bed of the machine as shown in Fig. 4. Each foil wrapping unit comprises a reel of foil 9 from which a web is drawn by a pair of rollers 10. The free end of the foil is fed through the slot 11 and a strip of foil is severed from the web by a rotating cutting mechanism 12 as each batch of cigarettes meets the foil.

It will be observed that the foiling units are spaced apart lengthwise of the bed of the machine so that the right-hand batch of cigarettes meets the corresponding web of foil as the left-hand batch of the next succeeding batch of cigarettes meets the other web of foil.

The foil wrapping is arranged to extend lengthwise around the cigarettes of each batch of cigarettes so that the ends of each strip overlap to a small extent. Each web of foil is fed downwardly through the bed of the machine and when the length thereof which extends below the surface of the bed of the machine is sufficient to form a strip of the required length, a moving batch of cigarettes meets the web of foil and a strip is automaticallly severed therefrom and the cigarettes are thereafter moved between plates 13 and 14 which are mounted a short distance above the bed of the machine. The plates 13 and 14, together with the bed surface, form folding boxes and the foil strip is folded around the leading end of a batch of cigarettes in such a manner that a short length of the same is disposed beneath the cigarettes and the remaining length extends over the upper surface of the cigarettes with an extension extending beyond the rear end of the cigarettes. The piece of foil which trails behind the cigarettes is folded around the rear end of the same and beneath the cigarettes until the same overlaps the short length of the first fold hereinbefore referred to.

The folding operations of the foil are carried out as follows:—

The pusher piece 3 of the conveyor 4 moves the partly wrapped batch of cigarettes into one of the compartments 15 of a rotatable frame or carrier 16 (Figs. 8 and 9). The carrier 16 comprises a series of flat plates spaced apart from one another so as to form two compartments 15. Each compartment is formed wide enough to permit a partly wrapped batch of cigarettes to be moved therein. The carrier 16 is arranged so that the compartment thereof which is disposed at the lower level forms a continuation of the folding boxes formed by the surfaces of the bed 1 of the machine, and the folder plate 14 hereinbefore referred to.

When a batch is disposed within the lower compartment 15 of the carrier, the same ceases to be under the control of the pusher piece 3 which is automatically moved beneath the bed of the machine.

The compartment 15 is furnished with spring plate 17 which forms a stop for locating a batch of cigarettes within the same, and also forms means for retaining the cigarettes in position when the carrier is rotated. The carrier 16 is then rotated through 180° in the direction of the arrow "G", Fig. 9, by a Geneva movement (not shown), and this motion brings the loaded compartment to a higher level and also brings the second compartment of the carrier into position to receive the next partly wrapped batch of cigarettes.

The rotation of the carrier causes the trailing end H of the foil wrapper, Fig. 9, to move into contact with the curved end 18 of the plate 14 which folds the same about the rear end of the batch of cigarettes so that when the batch occupies the upper position the foil is wrapped around the cigarettes as indicated in Fig. 9.

A conveyor 19 mounted above the bed of the machine is operable so that a pusher piece 20 thereof periodically moves through the upper compartments 15 of the rotatable carrier 16 and removes the wrapped batch of cigarettes therefrom.

The batch of cigarettes is carried from the carrier 16 between guides 21 which fold the flaps H of the foil around what was the rear end of the cigarettes until their position was reversed. The batch of cigarettes is then placed in position upon a blank, automatically fed into position.

The blank feed illustrated is of the type described in my copending application Serial No. 229,475 and comprises an inclined plate 22 (Fig. 1) on which the blanks 23 are stacked. The blanks are fed downwardly, one at a time, by a reciprocating needle pad and pass through a scoring or embossing roller 24.

The details of the blank feed are set out in detail in specification No. 285,540, and the rollers 24 are arranged to score the blanks in the manner indicated in dotted lines in Fig. 2, and a pair of rollers 25 and 26 are arranged to receive the score blank and feed the same to mechanism shown in detail in Figs. 6 and 7.

Referring to Figs. 1, 6 and 7; the scored blank is moved by the rollers 25 and 26 above a pair of guides 27 and 28 so that the same lies centrally above the said guides.

A former or plunger 29, carried on arms 30

and oscillated by a cam 31, is operable to move between the guides 27 and 28, and a second former 32 carried on an arm 33 and oscillated by a cam 34 is operable so as to rise to the level of the top of the guides. The blank is gripped between the formers 29 and 32 and carried downwardly between the cheeks of the guides so that the narrow side folds of the blank are bent upwardly at right angles to the surface of the blank.

A series of rotating feed rollers 35 are mounted so that the upper surfaces thereof lie flush with the bottom of the guides 27 and 28, and a series of co-operating friction rollers 37 are mounted on the former 29 so that when the former 29 has moved between the guides 27 and 28 and the former 32 has moved downwards sufficiently to release the blank from the grip of the two formers, the rollers 35 and 37 come into contact with the blank and feed the same in the direction of the arrow J, Fig. 6.

The blank is moved by the rollers 35 and 37 between a pair of folders 38 which bend over the vertical narrow side folds of the packet until they lie flat in contact with the surface of the blank, and guides 39 are fitted to the ends of the folders to keep the blank straight during this operation. The blank is carried beneath the folders 38 by means of a pair of feed rollers 40. The blank then passes between a pair of rollers 41 and 42, the upper one being furnished with convex portions 43 on its rim, the lower one being furnished with co-operating concave portions on its rim.

As the blank passes between these rollers, the scalloped edges formed in the slotted ends *c* of the blanks are bent upwardly so that they will grip the cigarettes and retain them in position when the carton is completed.

The blank is next fed onwardly by a pair of feed rollers 44 and 45*a*, the latter being driven from the former by means of a belt 45, when it will be found that the narrow side folds of the blank are almost flat again owing to the natural resiliency of the material from which the blank is formed, but if necessary, folders may be provided at this stage to press the flaps flat so that when the end panels *c* are folded over, their side folds *a* and *b* will extend beyond the corresponding folds *d* and *e* of the central portion of the blank.

The blank is now lying across the main bed 1 in the position indicated by chain lines at K in Figs. 1 and 4.

The blank is carried along the bed of the machine by one of the pusher pieces 46 of the chain conveyor 47, and at the same time the wrapped batches of cigarettes are brought along the guides 21 by the pusher piece of the conveyor 19.

When the two batches of cigarettes reach the end of the lower guide 21 they fall from the sloping end of the guide on to the blank, and a cam operated presser plate or dabber 48 moves downwardly and presses the batches squarely on to the blanks.

The presser plate is pivoted at 49 and the plate cam 50 rotated in the direction indicated in Fig. 4, lifts the arm 51 and causes the presser plate to oscillate about the pivot 49 as shown in Figures 13 and 14 of the drawings.

The loaded blank is now carried by the pusher piece 46 through folders 52 which turn up the end flaps *c* of the blank about the scored lines *k*.

The blank then passes through another pair of folders 53 which turn down the end flaps *c* of the blank about the scored lines 1.

The partly folded carton is transferred from the main bed 1 of the machine into the path of a conveyor which carries the same through gumming gear by means of a reciprocating claw 54 (see Figs. 1 and 4). The claw 54 is pivoted at 55 to a cam lever 56 pivoted at 57 and oscillated by a cam 58. The claw 54 draws the carton from between the folders 53 and deposits the carton beneath a plate 59, mounted above the conveyor channel. A guide plate 60 is pivoted at 61 and is raised periodically by a cam 62.

When the claw 54 moves to the left in Fig. 4, the guide plate 60 is in the position shown in that figure, but as the claw moves back during the return stroke of the same, the plate 60 is raised upwardly about the pivot 61 by a cam 62 so that the claw is also raised to clear the next succeeding carton. The partly formed carton now lies in the position indicated by chain lines at L on Figs. 1 and 4 in the path of one of a series of pusher pieces 63 on a chain conveyor 64.

The leading edge of the carton lies against a plate 65 which constitutes a folder or opener and the rear edge of the carton lies against a similar plate 66 so that when the carton moves past the opener, the upstanding side folds of the panels *h* and *j* are supported in a vertical position, but the side folds of the panel *c* are bent into a horizontal position. It will be noted from Figure 15 of the drawings that the guides 65 and 66 are provided with bevelled edges so shaped as to effect proper manipulation of the several folds of the carton.

The carton thereafter moves between guides 67 and over a pair of gum wheels 68, rotating in a bath of gum 69, and gun is applied to the flaps *a* and *b* of the panels *c*.

After the carton has been gummed the same moves between a pair of folders 70 which fold down the flaps *a* and *b* on to the corresponding flaps of the panels *h* and *j* and the folded and gummed carton is discharged by the conveyor 64 into the magazine or stacker 71. The sides of the stacker are heated by electric or other heaters and at the base of the stacker is a plate 72 carried on a

guide 73 and reciprocated vertically by a cam 74. When the packet has been raised upwardly into the magazine over a distance of approximately its own thickness, it is moved in the direction of the arrow M, Fig. 5, by means of a pusher bar 75 by the cam 76.

The purpose of this movement is to stagger the packets so that the vertical tabs *m* which form the locking catches of the finished packet are not distorted by being thrust into contact with the preceding packet.

Spring retainers 77 are provided in the magazine to support the pile of packets as the plate 72 moves downwards.

Referring to Figs. 10, 11 and 12, the flat open packets rise to the top of the magazine 71 and a reciprocating pusher 78 thrusts the packet from the top of the magazine into the path of conveyor pieces 79 carried on a chain conveyor 80. The pusher 78 is operated by an arm 81 in the manner indicated in Fig. 10.

The packet is moved from the top of the magazine 71 by the lip 83 on the pusher 78, and during this movement the projection 84 on the pusher bends out the forward tab, or extension of the central hinge *n* of the blank to a horizontal position, and on the return stroke the projection 85 on the pusher bends out the rear tab *n* into the horizontal position. The purpose of this movement is to open these tabs so that gum may be applied thereto. The pusher 78 is raised upwards on the return stroke of the same as indicated by chain lines in Fig. 10.

The packet is conveyed by the pusher pieces 79 so that the central flap of the packet passes beneath a gum wheel 86 which receives gum from a disc 87 which runs in a gum bath 88. The wheel 86 is arranged to receive gum from the disc 87 during the interval between successive packets.

The two pockets of the carton are bent downwardly by guides 89 so that the central flap of the packet is raised up on the central bar 90, thus rendering it easy to apply gum and fold over the tab *n*. The leading tab *n* is folded down by a fixed guide 91 and the rear tab *n* is folded down by a projection 92 on a rotary member 93.

The packet next passes into the closing gear as indicated by chain lines N in Fig. 12, and an oscillating arm 94 operated by a link 95 and cam 96 raises one pocket into a vertical position where it is retained by a spring catch 97.

The carton moves onwards and another oscillating arm 98 operated by the same mechanism as the arm 94 swings the vertical pocket downwardly on to the other pocket. The vertical pocket is guided during this movement by a guide 99 which ensures that the tabs are in their respective slots *p* and the completed pocket shown in Fig. 3 is discharged from the machine.

Although the invention hereinbefore described has been particularly concerned with batches of cigarettes which are automatically wrapped in foil prior to the same being deposited upon a blank of the type illustrated in Fig. 2 of the accompanying drawings, nevertheless it will be appreciated that instead of the cigarettes being enveloped in foil prior to the same being deposited upon the blank, the foil may be deposited upon the blank prior to the same being fed into position to receive the cigarettes, whereupon the cigarettes are deposited upon the foil resting upon the blank, and the blank and foil are thereafter automatically folded about the cigarettes, in which case it will be observed that the foil will be wrapped in an opposite direction to the manner set forth with reference to the accompanying drawings.

Therefore with a packet of the above character the foil may be used for raising the cigarettes to the mouth of the pocket, and if necessary, the slot formed in the pocket may be dispensed with and the foil used as the sole means for raising the cigarettes.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In a machine for automatically wrapping cigarettes, the combination with means for feeding a wrapper, of means for feeding a batch of cigarettes transversely of the path of feed of the wrapper to cause the batch to engage and fold the wrapper around one end of the cigarettes, means for reversing the batch and wrapper with respect to the direction of movement thereof, a continuous conveyor for delivering the batch and partially folded wrapper to said last named means, and means engaged by the wrapper subsequent to the reversal thereof for folding the wrapper about the opposite end of the batch.

2. In a machine for automatically wrapping cigarettes, the combination with means for feeding a wrapper, of means for feeding a batch of cigarettes transversely of the path of feed of the wrapper to cause the batch to engage and fold the wrapper around one end of the cigarettes, means for rotating said batch and wrapper to reverse the same with respect to the direction of movement thereof, a continuous conveyor for delivering the batch and partially folded wrapper to said last named means, and stationary means engaged by the wrapper subsequent to the reversal thereof for folding the wrapper about the opposite end of the batch.

3. In a machine for automatically packing cigarettes in a carton, the combination with means for depositing a batch of cigarettes on a portion of a carton blank, of means for moving the blank and batch in such direction that the free portion of the blank extends laterally of the path of movement of the blank, means for folding the free portion of the blank over the cigarettes during such movement, means for securing the side ex-

tensions of the carton together, and mechanism for moving the blank through said last named means in a direction substantially at right angles to the first direction of movement.

4. In apparatus of the class described, means for depositing separate batches of cigarettes on aligned separate sections of a carton blank with the axes of the cigarettes disposed perpendicularly to the direction of alignment of the blank sections, means for folding the separate sections about the batches to form two cigarette containing pockets having the open ends thereof directed toward one another with the cigarettes parallel to the open ends, and means for folding the two pockets together so that the connecting portion of the blank forms a closure for the open pocket ends.

5. In apparatus of the class described, the combination with a stacker, of means for feeding double pocket cartons upwardly through said stacker with the pockets thereof opened out and in alignment, and means located at the upper end of the stacker for folding the cartons to superimpose one pocket on the other as the cartons emerge from the stacker.

6. In apparatus of the class described, the combination with a stacker, of means for feeding cartons having a projection at one end extending outwardly from one face of the carton npwardly through the stacker, and means for shifting each carton laterally within the stacker after the carton has been introduced and elevated within the stacker to afford clearance for the projection on the succeeding carton.

7. In a machine for packing cigarettes in cartons, the combination with a pivoted element biased to engage and compress a batch of cigarettes within a carton, of a rotatable cam, a follower movable with said element and engaging said cam to retain said element out of engaging position, said cam being formed to suddenly release the said follower whereby the force of compression exerted by the element on the cigarettes will be increased by impact.

8. Apparatus for folding and delivering blanks comprising stationary folding means, formers adapted to grip a blank therebetween and move the latter downwardly through said means to fold the blank, rotatable means disposed beneath said blank when the latter is in folded position, and means for separating said formers to permit the blank to fall on said rotatable means whereby the blank is conveyed away.

9. In apparatus of the class described, means for depositing separate batches of cigarettes on separate sections of a carton blank, means for folding the separate sections about the batches to form two cigarette containing pockets having the open ends thereof directed toward one another, means for folding the two pockets together so that the connecting portion of the blank forms a closure for the open pocket ends, the two pockets having cooperating interlocking portions thereon adapted to engage to interlock the pockets when the latter are folded together.

10. In a machine for automatically wrapping cigarettes, the combination with means for feeding a wrapper, of means for feeding a batch of cigarettes transversely of the path of feed of the wrapper to cause the batch to engage and fold the wrapper around one end of the cigarettes, means for reversing the batch and wrapper with respect to the direction of movement thereof, a continuous conveyor for delivering the batch and partially folded wrapper to said last named means, means engaged by the wrapper subsequent to the reversal thereof for folding the wrapper about the opposite end of the batch, and a second continuous conveyor for removing the batch and wrapper from said reversing means and carrying the same through said last named means.

11. In a machine for automatically wrapping cigarettes, the combination with means for feeding a wrapper, of means for feeding a batch of cigarettes transversely of the path of feed of the wrapper to cause the batch to engage and fold the wrapper around one end of the cigarettes, means for reversing the batch and wrapper with respect to the direction of movement thereof, a continuous conveyor for delivering the batch and partially folded wrapper to said last named means, means engaged by the wrapper subsequent to the reversal thereof for folding the wrapper about the opposite end of the batch, and a second continuous conveyor for removing the batch and wrapper from said reversing means and carrying the same through said last named means, said conveyors being disposed on opposite sides of the moving batches and having means projecting therefrom and intercepting the path of movement of the batches.

12. In a machine for wrapping cigarettes, the combination with a continuous conveyor for feeding a batch of cigarettes in a predetermined path of movement against a strip of wrapping material to cause the latter to fold about one end of the batch, means for swinging the cigarettes through an arc having its center spaced from the path of movement of the batch in a direction initially opposed to the direction of movement of the batch in the said path for folding the wrapper about the opposite end of the batch, and a second continuous conveyor for removing the batch and wrapper from said means, said conveyors being disposed on opposite sides of the center of the arc through which the means is swung.

13. In a machine for wrapping cigarettes,

the combination with means for feeding a batch of cigarettes in a predetermined path of movement against a strip of wrapping material to cause the latter to fold about one end of the batch, means for receiving the batch and wrapper from said last named means and reversing the position thereof with respect to the direction of movement, a continuous conveyor for withdrawing the batch and wrapper from said last named means, a second continuous conveyor disposed beneath the first conveyor and arranged to receive the batch and wrapper from the end of the first conveyor, and a presser plate for engaging and pressing the wrapped batch as the latter falls on the second conveyor.

14. In apparatus of the class described, means for depositing separate batches of cigarettes on separate sections of a carton blank, means for folding the separate sections about the batches to form two cigarette containing pockets having the open ends thereof directed toward one another, means for folding the two pockets together so that the connecting portion of the blank forms a closure for the open pocket ends, the two pockets having cooperating interlocking portions thereon, and means for guiding one of said pockets toward the other pocket to ensure engagement of said cooperating interlocking portions when the pockets are folded together.

15. In apparatus of the class described, means for depositing separate batches of cigarettes on separate sections of a carton blank, means for folding the separate sections about the batches to form two cigarette containing pockets having the open ends thereof directed toward one another, means for folding the two pockets together so that the connecting portion of the blank forms a closure for the open pocket ends, one of said pockets having a tongue projecting therefrom and the other of said pockets having a slit therein to receive the said tongue, and means for guiding one of the pockets toward the other pocket to direct the tongue into the slit when the pockets are folded together.

In testimony whereof I hereunto affix my signature.

WALTER EVERETT MOLINS.