

Nov. 6, 1923.

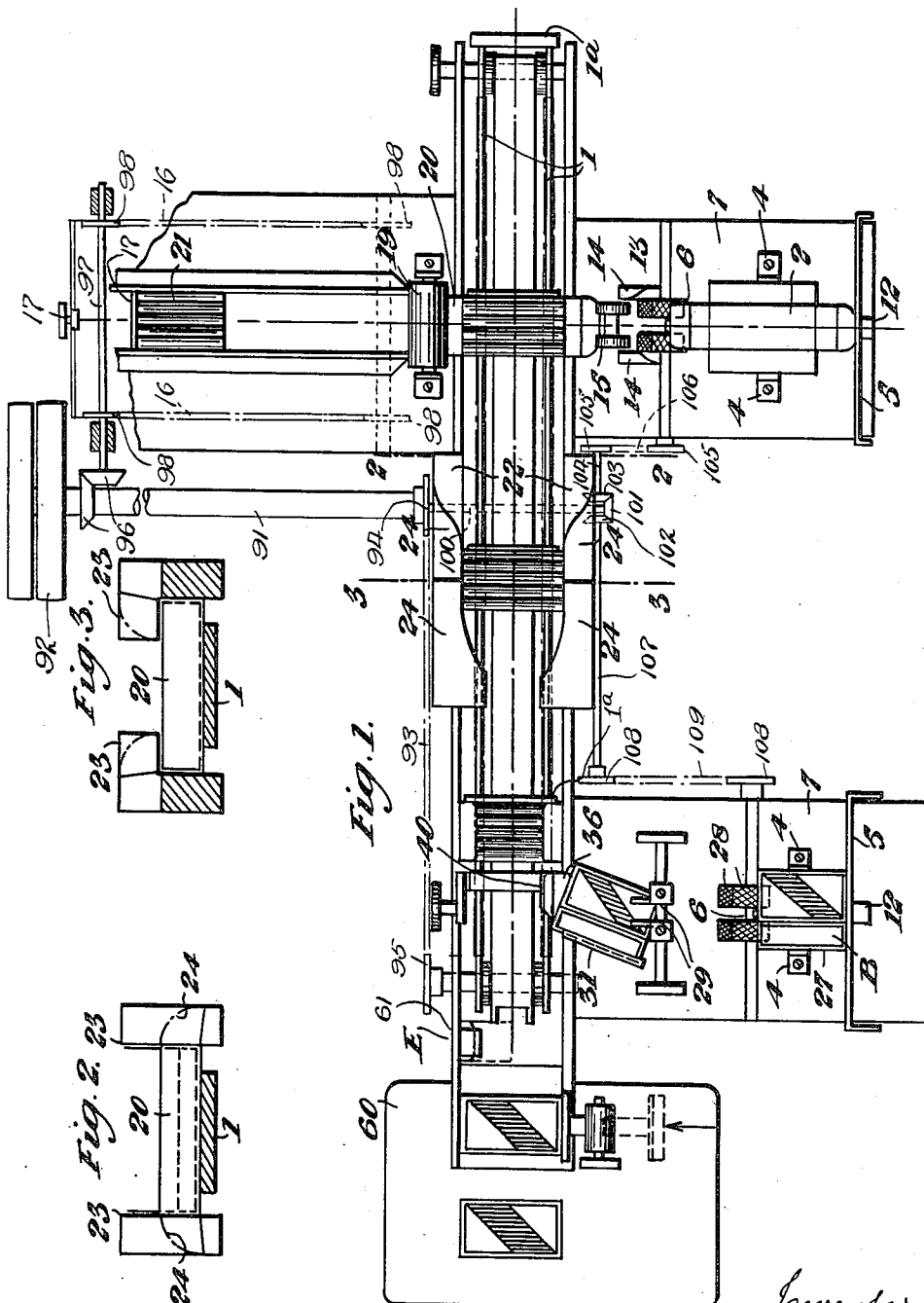
W. E. MOLINS

1,473,496

MACHINE FOR USE IN FITTING TOGETHER BOXES OF THE SLIDE AND SHELL TYPE

Filed June 23, 1921

4 Sheets-Sheet 1



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4 Sheets-Sheet 2

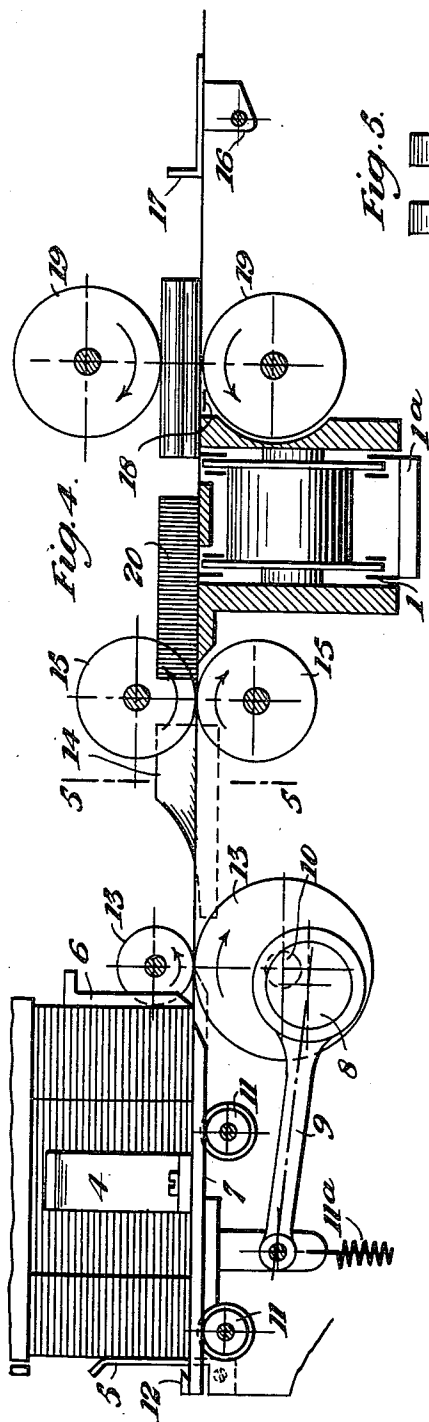


Fig. 5.

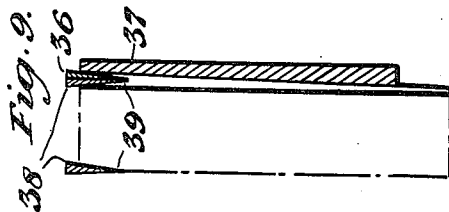
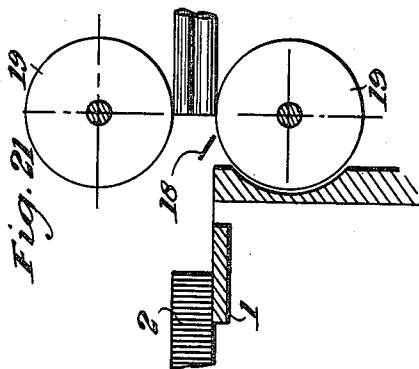
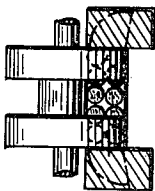
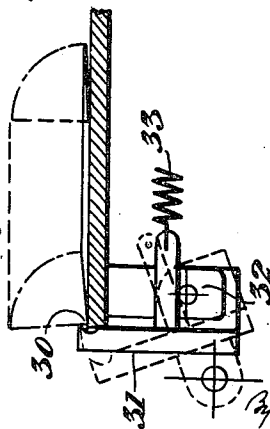


Fig. 8.



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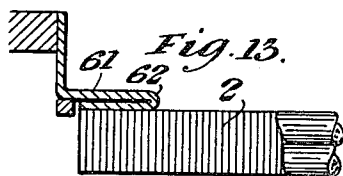
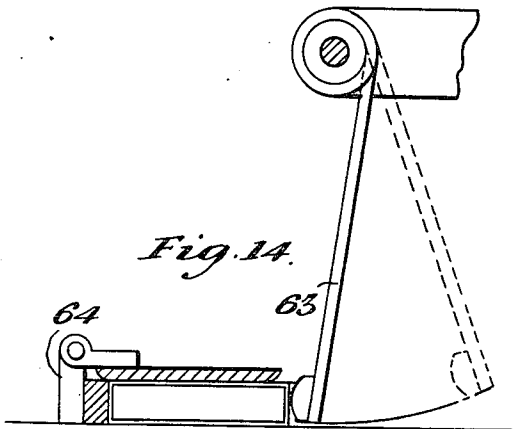
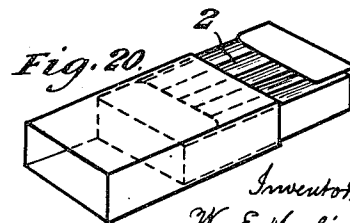
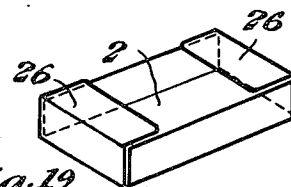
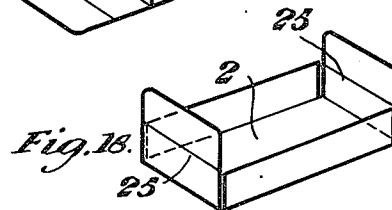
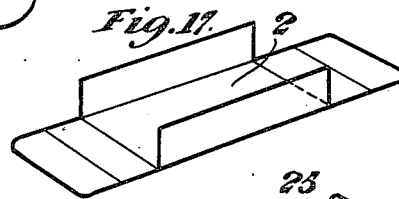
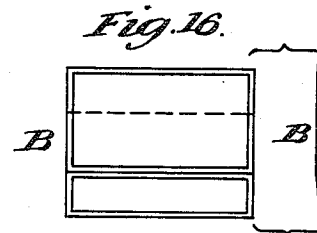
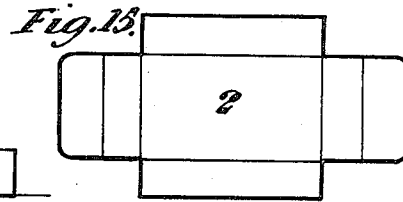
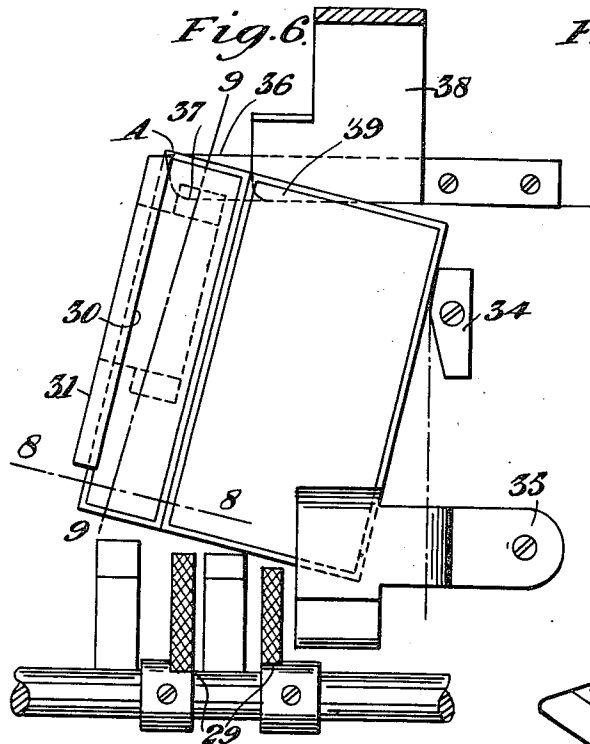
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4 Sheets-Sheet 3



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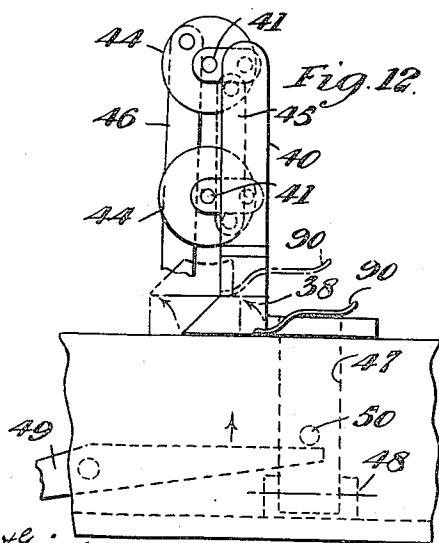
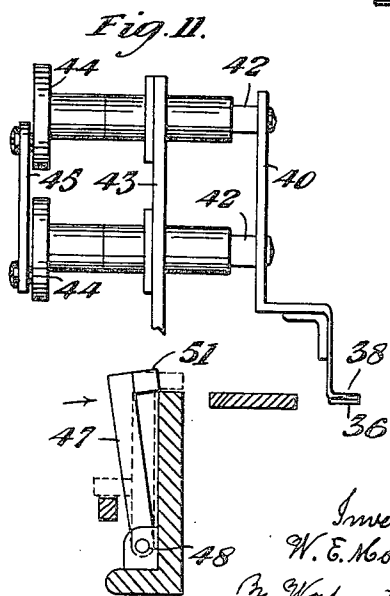
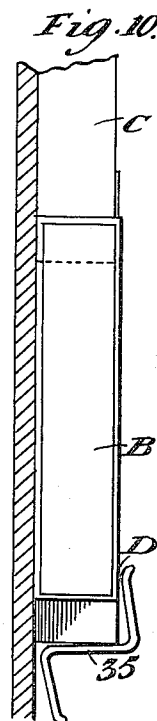
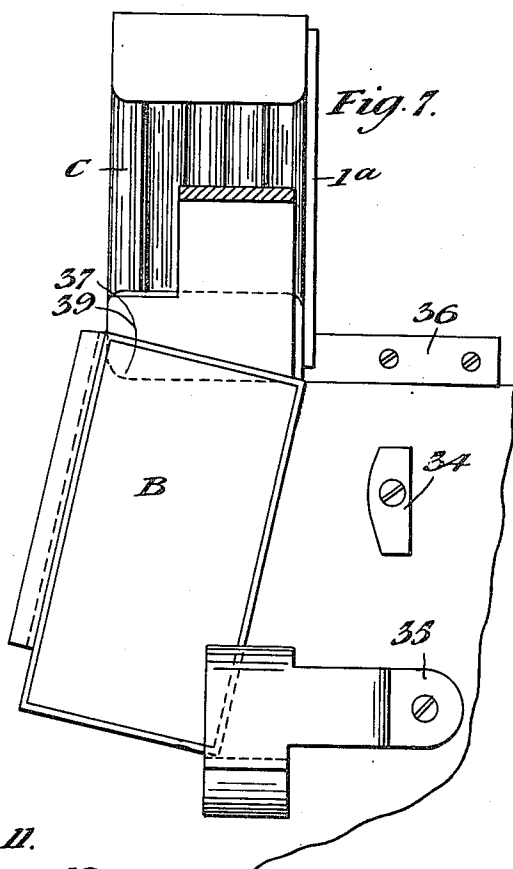
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MACHINE FOR USE IN FITTING TOGETHER BOXES OF THE SLIDE AND SHELL TYPE

Filed June 23, 1921

4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE.

WALTER EVERETT MOLINS, OF LONDON, ENGLAND.

MACHINE FOR USE IN FITTING TOGETHER BOXES OF THE SLIDE AND SHELL TYPE.

Application filed June 23, 1921. Serial No. 479,912.

To all whom it may concern:

Be it known that I, WALTER EVERETT MOLINS, a citizen of the United States of America, residing in London, England, have invented a certain new and useful Machine for Use in Fitting Together Boxes of the Slide and Shell Type, of which the following is a specification.

This invention relates to a machine for use in fitting together the two parts of a two-piece cardboard or similar box of the kind generally known as the "slide and shell" type. Such boxes consist of an interior slide or drawer enclosed in an outer shell, so that the slide or drawer can be pushed out of the shell at either end, such boxes being largely used for packing cigarettes and other small articles.

The boxes are usually supplied from the printers or makers with the slide in the form of a flat scored blank and the shell folded and gummed, but in a flat collapsed state.

The machine, according to the present invention, is arranged to fold the slide, open the shell and insert the slide into the shell, automatically and continuously, as long as the requisite blank slides and collapsed shells are supplied thereto. The machine may conveniently be combined with an automatic filling machine of known kind which fills the slides before they are inserted in the shell.

With the above objects in view, the machine comprises means for feeding the slides one by one from a stack, means for partially folding the slide, and, if desired, filling same, means for further folding the slide and inserting the same into the shell, the latter having been previously opened by the machine from the flat ready to receive the slide.

To enable the invention to be fully understood it will now be described by reference to the accompanying drawings, in which:—

Fig. 1 is a plan view of a machine constructed according to one form of the invention.

Figs. 2 and 3 are sections on the lines 2 2, 3 3, respectively in Fig. 1, shewing the folding of the slide.

Fig. 4 is a view of the slide magazine and feeding apparatus shewing also the means for partially folding the slide.

Fig. 5 is a section on the line 5 5, Fig. 4,

shewing the mechanism for partially folding the slide.

Fig. 6 is a plan view of a portion of the machine shewing the unopened shell in position for opening.

Fig. 7 is a view similar to Fig. 6 shewing the shell opened and the filled and folded slide entered therein at one corner.

Fig. 8 is a sectional view on line 8—8, Fig. 6, of a portion of the shell opening mechanism.

Fig. 9 is a sectional view on line 9—9, Fig. 6, of a further portion of the shell opening mechanism.

Fig. 10 is a side view of Fig. 7, shewing the opened shell and slide engaged, the shell being held in a stop member.

Fig. 11 is a view of a further detail of the mechanism for opening the shell and

Fig. 12 is a view thereof at right angles to Fig. 11.

Fig. 13 is a view of a detail shewing the method of supporting the shell and slide during their passage over a gap between the end of a conveyor and the delivery table as hereinafter described.

Fig. 14 is a view shewing the mechanism for completely closing the shell and slide.

Fig. 15 is a plan view of the flat open slide as inserted in the magazine of the machine.

Fig. 16 is a similar view of a collapsed shell and also includes an end view of same.

Figs. 17, 18 and 19 are views shewing the successive stages of the folding of the slide as performed by the machine.

Fig. 20 is a view of a filled and folded slide partially inserted in the opened shell in the manner performed by the machine.

Fig. 21 is a view shewing means which may be employed for feeding the cigarettes on to the slide.

As shewn in Fig. 1 the machine comprises a travelling conveyor 1 having cross pieces 1^a carried on suitable sprocket wheels on a frame (not shewn) such for example, as the lower conveyor described in the specification of British Letters Patent No. 113124. The conveyor travels from right to left in Figure 1.

In Fig. 15 one of the slides 2 is shewn in the open flat condition in which it is inserted in the machine.

The slides such as 2 are placed in a stack in a magazine shewn in Figs. 1 and 4. This magazine is arranged on one side of the con-

veyor 1 and comprises side guide members 4 back and front members 5 6 and a bottom in the form of a reciprocating table 7. The table 7 is reciprocated by means of the eccentric 8 and connecting rod 9 driven from a spindle 10 suitably actuated, the table being supported on rollers 11, journalled in the supporting frame of the machine. A spring 11^a is provided for holding the table pressed on the rollers. The rear edge of the table has a pusher tooth 12 which passes through an opening in the back member 5 and on movement of the table moves one slide at a time from the bottom of the stack so that said slide is caught between continuously rotating rollers 13, driven from spindle 10 as shewn and fed between suitably curved plates 14 which bend up the longitudinal edges of the slide (Fig. 17) and it is passed to a further set of rotating rollers 15 which deliver it on to the conveyor 1 approximately at right angles to the direction of travel of said conveyor.

At this stage if desired the partially folded slide may be filled by automatic machinery such as described in the specification of British Letters Patent No. 13956 of 1915. A portion of such automatic machinery is here indicated in Figs. 1 and 21. In said Figs. 1 and 21 the bunches of cigarettes travelling on a conveyor 16 at right angles to the conveyor 1 and in line with the partially folded slide issuing from the rollers 15, are passed over a spring tongue 18 by rotating rollers 19 which feed the bunch of cigarettes into the partially folded slide 2.

The tongue 18 prevents the moving cigarettes from fouling the adjacent flat edges of the slide.

In Fig. 1 the apparatus is shewn with a bunch of cigarettes delivered into the slide 20 the succeeding bunch 21 on conveyor 16 being also shewn.

With the filled slide 20 in the position shewn in Fig. 1 the next operation is that the cross piece 1^a on conveyor 1 in contact with the upturned edge of the slide carries said slide along through a channel 22 of L shaped angles 23 and suitably curved plates 24 (Figs. 1, 2 and 3) which first fold up the two end pieces 25 of the slide approximately into a vertical position (Fig. 18) and then bend said ends round said angles forming approximately horizontal flaps 26 on said ends, (Fig. 19), the angles 23 serving as supports during the bending process.

The slide so folded is then carried by the conveyor into position for insertion into the shell. The collapsed shells B (Fig. 16) are stacked in a magazine 27 on the same side of the machine as the slide magazine, the magazine 27 being similar in construction to said magazine and having a similar reciprocating bottom with a pusher tooth for feeding the lowermost collapsed shell between continu-

ously rotating rollers 28. These rollers 28 pass the slide between a set of continuously rotating sectors or discs 29 (Fig. 6) and one longitudinal edge of the shell engages a V shaped groove 30 in a side plate 31 which as shewn in Fig. 8 is pivoted at 32 and normally held at an angle to the path of the feed of the shell by a spring 33. The shell is further guided by stop members 34, 35 arranged to cause the shell to move forward at the desired angle.

Across the path of the shell is arranged a metal blade 36, secured to the machine frame and having a free knife edge 37 which is located exactly in the centre of the V shaped groove 30 in the side plate 31.

As the edge of the collapsed shell is fed along the groove 30, the knife edge 37 engages between the collapsed sides of the shell and in the corner A thereof (Fig. 6). To ensure this action taking place accurately the front or foremost edge of the blade 36 which first meets the shell may be slightly rounded as shewn.

Superposed upon the blade 36 is a second blade 38, having a leading edge 39 shaped to lie flat upon the blade 36 as best seen in Figs. 9 and 11, said edge being rounded and shaped to merge with the edge of the blade 36 so that the shell may be pushed over both blades and opened by swinging or lifting up the blade 38.

The blade 38 (Figs. 11 and 12) is carried on a bar 40 pivotally connected to links 41 secured to the ends of spindles 42 rotatably mounted in a suitable frame 43. For rotating the spindles their other ends are provided with discs 44, linked together by a link 45 the upper disc 44 being turned by a link 46 operated by a cam on a suitably driven spindle of the machine. The motion of the link 46 is such that on operation by the cam the discs 44 will turn through an angle sufficient to raise the blade 38 into the dotted line position, Fig. 12. Thus when the end of the collapsed shell has been pushed over both blades 36, 38, that is, when the blades have been inserted into the shell, operation of the link 46 causes the blade 38 to be raised lifting the side of the shell, and permitting the advancing slide to pass between the two blades to engage the shell. During this operation of the blade 38 the shell is engaged by the stop 35 and side plate 31.

With the above described arrangement as shewn in Fig. 7 the opened shell B meets the advancing slide C on the conveyor at an angle and the foremost corner of the slide enters the foremost inside edge of the shell, the latter being held against displacement by the side plate 31 and stop 35. The stop 35 as shewn in Fig. 10 allows the collapsed shell to pass underneath it but prevents the return of a fully opened shell once it has left

the stop by reason of the edge D which when the shell has passed is adapted to make contact with the back edge of said opened shell.

When one corner of the slide has thus
 5 been inserted in the shell the opposite end of the slide is engaged by a pusher plate 47 (Figs. 11 and 12) which is pivotally mounted at 48 on the machine frame and is normally in the full line position, Fig. 11, that
 10 is to say tilted away from the conveyor. As the folded slide C meets the shell B the plate 47 is swung inwards about the pivot 48 by means of a rocking bar 49 operated by a suitably driven cam and acting on a pin 50
 15 secured on the back of the plate. This movement of the plate 47 causes its top edge 51 to make contact with the free end of the slide and forces the end of the slide already engaged cornerwise in the opened shell to
 20 enter said shell along its whole length, the free end of the shell resting on the edge D of stop 35. As soon as the plate 47 has accomplished its object it moves back automatically into the full line position, Fig. 11.
 25 Simultaneously with the insertion of the slide in the shell by the plate 47 the grooved side plate 31 is moved away from the shell by suitably driven cam mechanism preferably against the action of a spring so that
 30 the shell can pass over said plate 31. The motion of the conveyor then carries the shell with the slide partially inserted therein onwards, and the plate 31 returns to engage the succeeding collapsed shell. The plate 31
 35 may be positively returned by the cam mechanism if desired.

The conveyor then carries the slide C with the shell now partially therein, and delivers it upon a table 60 and in order that the
 40 conveyors may deliver the boxes at rest suitable arrangements are made for bridging the gap E (Fig. 1) between the table 60 and the point where the conveyor passes down round its sprocket wheel. Such means
 45 as here shewn in Fig. 13 consists of a channel 61 arranged above the path of the conveyor into which one of the end flaps 62 of the slide passes, thus supporting the slide over the gap E. The other end of the slide
 50 may be supported by any suitable fixed means since the breadth of the conveyor need not exceed the length of the slide, and as one end of the slide is already inserted in the shell it may be supported by supporting
 55 the shell.

In cases, as in the present example, where the slide has already been filled, on reaching the delivery table 60 a pivoted arm 63 (Fig. 14) actuated by a cam driven from a suitable
 60 spindle on the machine may be provided for pushing the shell home in the slide, a suitable stop 64 being provided for holding the shell during this operation.

Instead of positively lifting the blade 38
 65 by the mechanism hereinbefore described,

said blade may be suitably pivotally mounted and fitted with a curved plate 90 as shewn in Fig. 12, the slide in its passage on the conveyor moving beneath the plate 90 and so raising the blade 38 as indicated in dotted
 70 lines Fig. 12. Immediately the slide has passed, the blade 38 falls into position for the next operation as will be readily understood.

Further the grooved side plate 31 instead
 75 of being mechanically operated as hereinbefore described may be held in operative position by a spring, the strength of the latter being such that it is overcome when the slide inserted in the shell causes the
 80 latter to move sideways, the plate 31 being thus pushed out of the way and returning to its operative position under the action of the spring after the shell has passed.

The machine may be driven in any suitable
 85 manner, one form of drive being illustrated diagrammatically in Figure 1. As shown therein, the main shaft 91 is driven from any desired source of power through
 90 pulleys 92 and drives the conveyor 1 through a chain 93, engaging sprocket wheels 94, 95, and conveyor 16 through bevel gear 96, counter shaft 97 and sprockets 98. An extension 100 of the main shaft carries a bevel
 95 wheel 101 which engages bevel wheels 102, 103 and drives the slide feeding mechanism through shaft 104, sprocket wheels 105 and chain 106, and the shell feeding mechanism through shaft 107, sprocket wheels 108 and
 100 chain 109.

It will be understood that the above described machine may be used to operate on filled or unfilled slides and that when the machine is used for filling cigarettes, machines such as are described in the specification of British Letters Patent No. 13956 of
 105 1915 and in the specification of application for British Letters Patent No. 21803 of 1920, dated 20th July, 1920, may be arranged to deliver cigarettes in the desired groups or
 110 bundles to the slides carried on the conveyor of the present machine.

Other types of filling machines and mechanism however may be employed. Further
 115 any suitable known type of automatic feeding device may be employed for feeding the slides and shells to the conveyor, the constructions herein described for this purpose being given as examples only.

Having thus described the nature of the
 120 said invention and the best means I know of carrying the same into practical effect, I claim:—

1. In an apparatus of the class described in combination, a conveyor, means for feeding
 125 a slide upon the conveyor, means for feeding a shell toward the conveyor, means for holding the shell at an angle to the conveyor whereby the movement of the conveyor is adapted to insert a corner of the slide in-
 130

to the shell, means for inserting the end of the slide fully into the shell and means for releasing said holding means.

2. In an apparatus of the class described in combination, a conveyor, means for feeding a slide upon the conveyor, means for feeding a shell toward the conveyor, means for holding the shell at an angle to the conveyor whereby movement of the conveyor is adapted to insert a corner of the slide into the shell, means for releasing the holding means, means for inserting the end of the slide fully into the shell and for squaring the shell with respect to the conveyor and means for inserting the slide fully into the shell.

3. In an apparatus of the class described in combination, a conveyor adapted to be continuously operated, means for feeding a slide upon the conveyor, means for feeding a flat shell transversely to the conveyor, a guide for the shell and means for opening the shell, the guide being adapted to prevent backward movement of the open shell.

4. In an apparatus of the class described in combination, a conveyor, means for feeding a flat shell, a guide plate having a groove adapted to engage the edge of the shell to guide it toward the conveyor and means opposite the center of the groove adapted to enter the shell to open the latter.

5. In an apparatus of the class described in combination, a conveyor, means for feeding a slide upon the conveyor, means for feeding a flat shell toward the conveyor, a guide plate having a groove adapted to engage the edge of the shell to guide it into the path of the slide, a pair of blades opposite the groove and adapted to enter the shell and means for separating the blades to open the shell.

6. In an apparatus of the class described, in combination, a conveyor adapted to be continuously operated, means for feeding a slide upon the conveyor, means for feeding a flat shell into the path of the slide, a plate having a groove adapted to engage the edge of the shell to guide it at an angle to the conveyor, a pair of blades opposite the center of the groove and adapted to enter the shell, means for separating the blades to open the shell, a guide cooperating with said plate and adapted to hold the opened shell in the path of the slide whereby the motion of the conveyor is adapted to insert one corner of the slide into the shell, means for pushing the end of the slide fully into the shell, and means for removing the plate to permit the shell and slide to be carried on by the conveyor.

7. In an apparatus of the class described, in combination, a conveyor, means for feeding a slide upon the conveyor, means for feeding a shell transversely to the conveyor,

means for holding the shell at an angle to the conveyor, means for opening the shell, means for preventing backward movement of the opened shell, the motion of the conveyor being adapted to insert the corner of the slide into the shell, means for inserting the end of the slide fully into the shell, and means for releasing said holding means.

8. In an apparatus of the class described, in combination, a conveyor adapted to be continuously operated, means for feeding a partially folded slide transversely upon the conveyor, means for feeding a bunch of cigarettes endwise into the slide and means for raising the ends of the cigarettes being fed to prevent fouling of the slide.

9. In an apparatus of the class described, in combination, a conveyor adapted to be continuously operated, means for feeding a partially folded slide upon the conveyor, a second conveyor transverse to the first and adapted to feed a bunch of cigarettes endwise into the slide and a spring member adapted to engage the bunch to lift it clear of the end of the slide.

10. In an apparatus of the class described, in combination, a continuously moving conveyor, means for feeding a slide blank and a bunch of cigarettes in opposite directions upon the conveyor, fixed means for folding the sides of the blank, means for elevating the end of the bunch of cigarettes to clear the end of the blank, fixed folders cooperating with the conveyor to fold the ends of the blank, means for feeding a shell transversely to the conveyor and means for automatically inserting the filled and folded slide into the shell.

11. In an apparatus of the class described, in combination, means for feeding a flat shell, a pair of blades adapted to enter the shell, means for separating the blades to open the shell and means for feeding a slide between the blades and into the shell.

12. In an apparatus of the class described, in combination, a feeding table, a pair of superposed blades, means for feeding a flat shell across the table, the blades being adapted to enter the shell and means for raising one of the blades to open the shell, the other blade being fixed to hold the shell in position.

13. In a device of the class described in combination, means for opening flat shells comprising means adapted positively to hold one side of the shell in fixed position and means adapted positively to lift the other side of the shell, and means for feeding flat shells onto the opening means.

In testimony whereof I have signed my name to this specification.

WALTER EVERETT MOLINS.