

July 17, 1934.

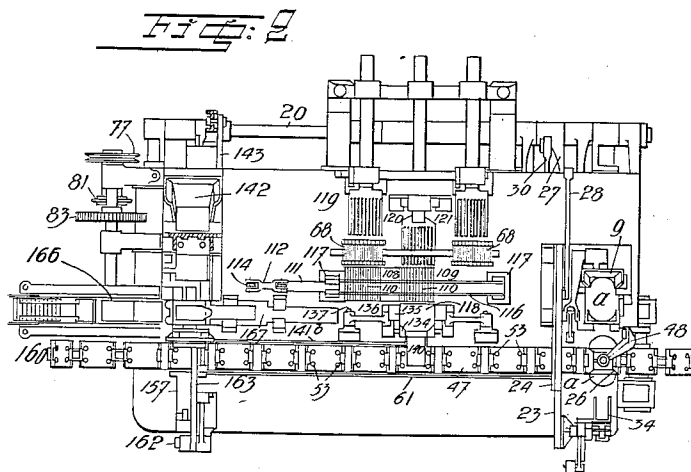
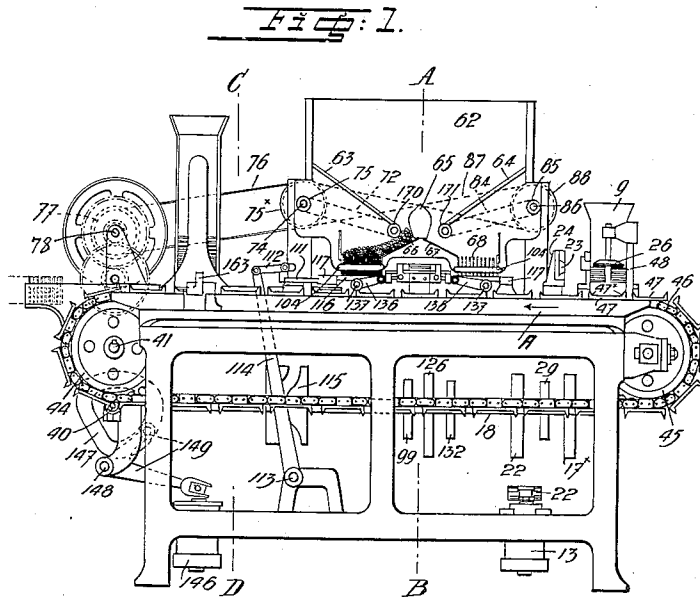
G. ÖRSTRÖM

1,966,995

MACHINE FOR PACKAGING CIGARETTES AND OTHER STAFF SHAPED ARTICLES

Filed April 23, 1931

6 Sheets-Sheet 1



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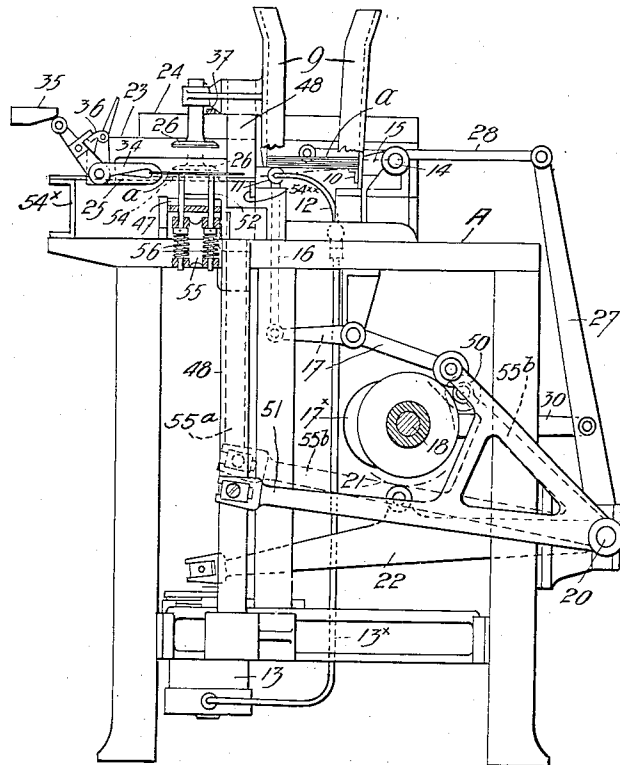
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FIG. 3.



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6 Sheets-Sheet 3

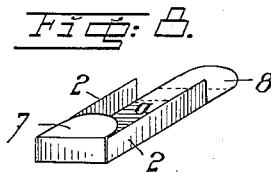
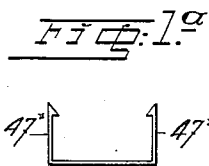
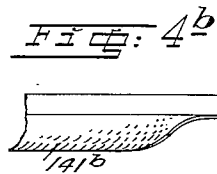
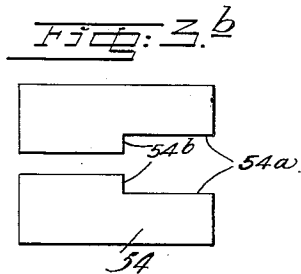
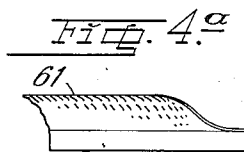
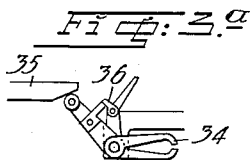


Fig. 9

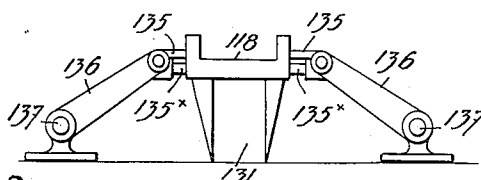
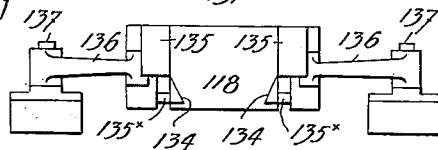


Fig. 10



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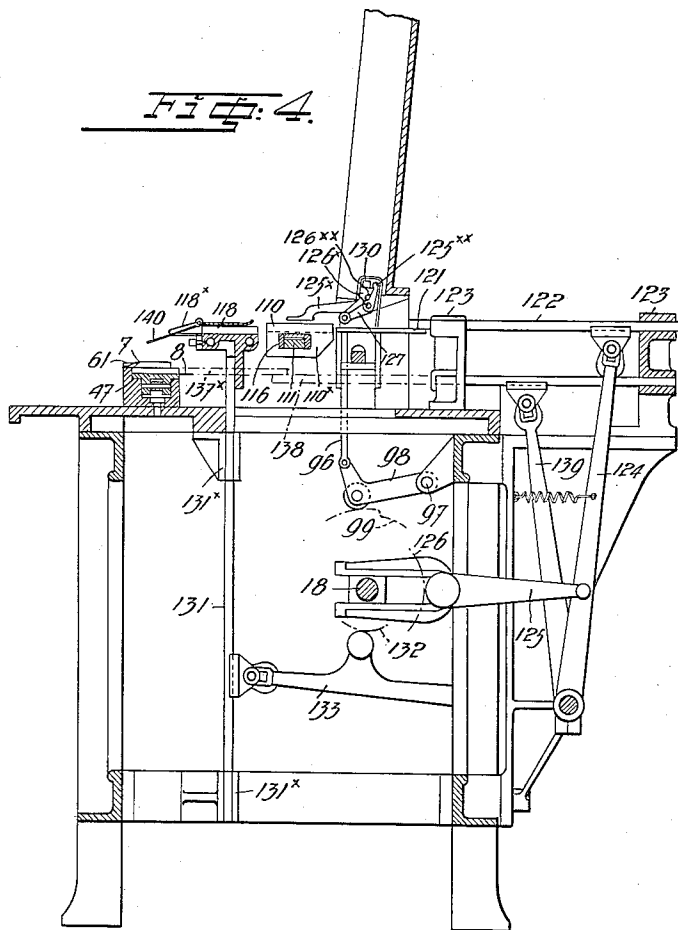
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MACHINE FOR PACKAGING CIGARETTES AND OTHER STAFF SHAPED ARTICLES

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6 Sheets-Sheet 4



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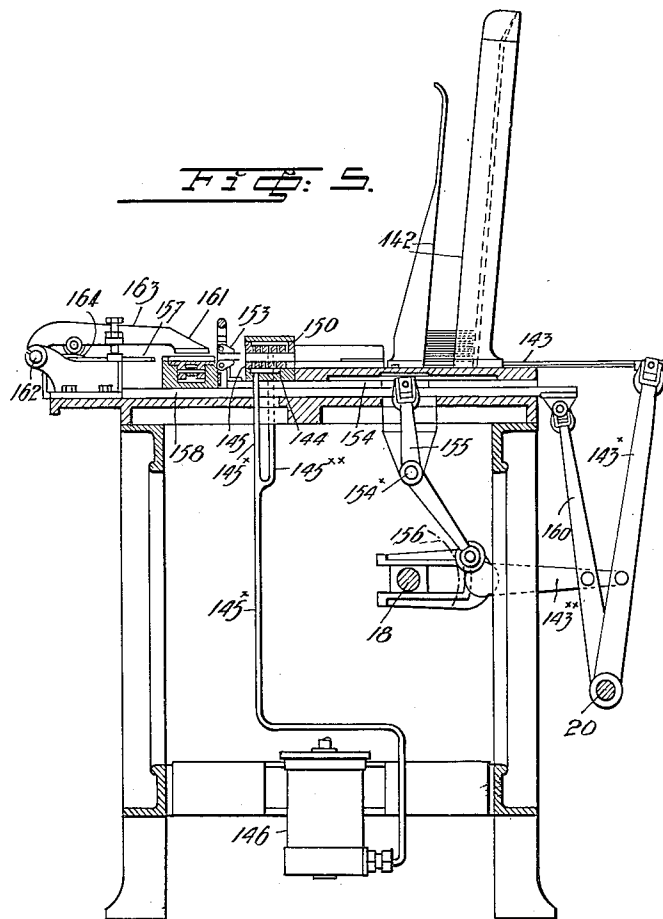
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MACHINE FOR PACKAGING CIGARETTES AND OTHER STAFF SHAPED ARTICLES

Filed April 23, 1931

6 Sheets-Sheet 5



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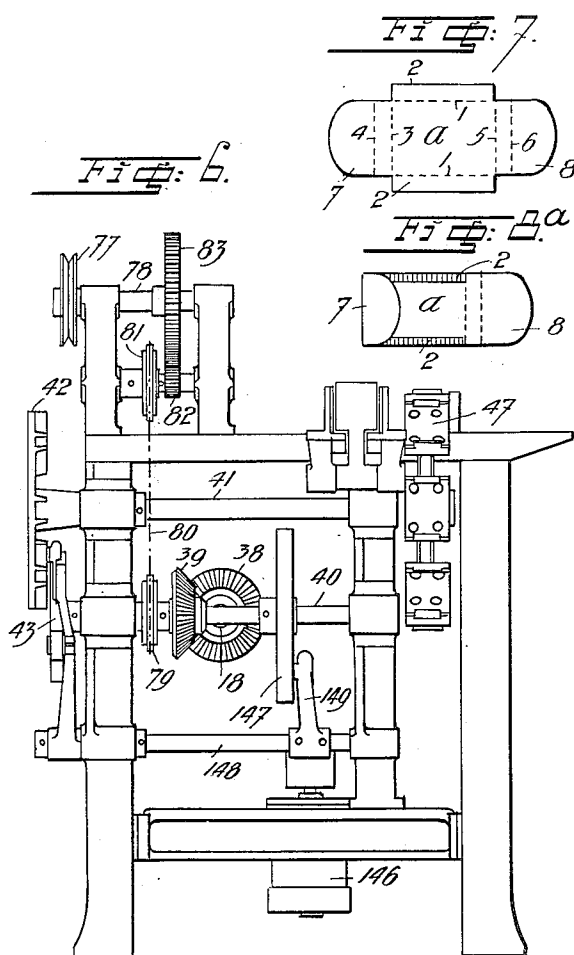
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MACHINE FOR PACKAGING CIGARETTES AND OTHER STAFF SHAPED ARTICLES

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6 Sheets-Sheet 6



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UNITED STATES PATENT OFFICE

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MACHINE FOR PACKAGING CIGARETTES
AND OTHER STAFF-SHAPED ARTICLES

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Application April 23, 1931, Serial No. 532,314
In Germany April 30, 1930

5 Claims. (Cl. 93—4)

This invention relates to a machine for pack-
aging cigarettes and other staff-shaped articles.
In one form of execution of the machine for
packaging for instance cigarettes in push boxes
the inner box is shaped from a blank of paste-
board or stiff paper by a piston, which moves
the blank through a device and together with
the piston folds the blank and then inserts the
box into a compartment, which together with
other compartments is moved in an endless path.
A section of the said path is straight or sub-
stantially straight and at the said section the
said folding and inserting device is located and
also stations for finishing the packages. Thus,
during the movement of the compartments the
inner boxes are moved to a station, at which the
cigarettes are introduced into the same and then
to a station, at which the inner boxes are pushed
into the outer boxes. Owing to the fact that the
said stations thus are located at a straight part
of the path of the compartments the operations
at all stations may easily be controlled by the
person in charge of the machine, which consti-
tutes a guarantee of the machine delivering only
correct packages.

Annexed drawings show a cigarette packaging
machine arranged in accordance with this in-
vention. Fig. 1 is a side elevational view looking
towards the front of the machine Fig. 1a is an
enlarged elevational detail. Fig. 2 is a plan view
of the arrangement shown in Fig. 1. Fig. 3 shows
the machine viewed toward the right end in
Fig. 1. Fig. 3a shows a blank transferring tongs
in open position. Fig. 3b shows in a plan view a
folding table. Fig. 4 is a section on the line A—B
of Fig. 1. Figs. 4a and 4b show in plan views two
plough-shaped folding bars. Fig. 5 is a section
on the line C—D of Fig. 1. Fig. 6 shows the
machine viewed toward the left end in Fig. 1.
Fig. 7 shows the blank of a box unfolded. Fig.
8 shows in a perspective view the said blank,
the side portions being turned upward and one
of the end flaps turned over, so that an open
inner box is gained ready for receiving a set of
cigarettes. Fig. 8a is a plan view of the arrange-
ment shown in Fig. 7 when folded. Figs. 9 and
10 are a front view and a top view of a compressor
chamber.

The blank *a* of an inner box is provided with
scores 1 along which the side flaps 2 are bent up-
wards, and two scores 3, 4 and 5, 6 respectively
along which the end flaps 7 and 8 are turned
over the box thus formed. Blanks *a* are piled
up in a magazine 9 fixed to the frame A of the
machine. The pile of blanks is carried by shelves

10, pins or similar projections. A pipe or hollow
head 11 provided with openings in its top side and
closed at its one end is connected by a hose 12
to a pipe 13 communicating with a suction pump
13. The said pipe 11 is carried by an arm 15, which
is swingably mounted on a pin 14 and by a link 16
is connected to a two-armed lever 17, swingably
mounted on a pin and acted upon by a cam disc 17*
on the main shaft 18 of the machine. The piston of
the said pump 13 is caused to effect its working stroke
by a lever arm 22, which is swingably mounted on a
shaft 20 and acted upon by a cam disc 21 on the
shaft 18, said arm 22 being moved upwards by a
spring not shown.

After the pipe 11 has been moved upwards by
the said cam disc and lever arm mechanism, the
pump 13 effects a vacuum in the pipe 11, so that
the pipe seizes the front end of the lowermost
blank in the magazine 9 and moves the same down-
wards during the subsequent downward movement
of the pipe, as shown by the dotted line in Fig. 3.

23 is a slide movable in a guide 24. The said
slide carries a pair of tongs 25, Fig. 3, which,
when moved to the magazine 9 seizes the blank
lowered by the section pipe 11, and during its
return stroke places the same under a piston 26,
which is movable upwards and downwards. The
said tongs 25 may be of the known construction
in which the swingable, spring actuated jaw 34
at the end of the working stroke of the tongs is
brought by a stationary slanting abutment 35 into
open position and is locked in this position Fig.
3a by a catch 36, which, as the tongs has been
advanced to the box blank is disengaged by an
abutment 37, Fig. 3, so that the jaw 34 is caused
by its spring to seize the next box blank.

The said slide 23 is reciprocated by an arm 27,
which is swingably mounted on the shaft 20 and
connected to the slide by a link 28, said arm
being acted upon by an eccentric 29 on the shaft
18, the rod 30 of which is connected to the arm 27.

The main or cam shaft 18 of the machine is
driven for instance by an electric motor (not
shown). Shaft 18 rotates by means of a mitre
gear 38, 39, Fig. 6, a transverse shaft 40, jour-
naled in the frame of the machine. Said shaft
40 in its turn imparts to a second transverse
shaft 41 an intermittent movement. Any suitable
mechanism may be used for this purpose. Ac-
cording to the drawings the intermittent move-
ment of the shaft 41 is effected by means of the
known arrangement of a maltese wheel 42, fixed

to the shaft 41, and an arm 43 co-operating with the same and fixed on the shaft 40.

Said shaft 41 carries a sprocket wheel 44. At the opposite end of the machine a corresponding sprocket wheel 54 is journaled. A chain 46 passes round the sprocket wheels 44 and 54 and is provided with compartments 47 which during the intermittent movement of the chain in the direction indicated by the arrow in Fig. 1 by turns are placed straight below the piston 26. Piston 26 is fixed to a rod 48, Fig. 3, which is movable in guides provided in the frame of the machine and acted upon by a cam disc on the shaft 18 by means of a lever arm 50, 51, swingably mounted on the shaft 20. Openings 53, for instance four are provided in the bottom of each compartment 47, through which, while the compartment is located under the piston 26, four pins 52 are moved upwards. Said pins 52 are carried by a vertically movable slide 55a, more closely described below. As a blank α has been placed under the piston 26, the latter is lowered and the head 55 together with the pins 52 is raised, so that the blank α will be held by the piston 26 (see the dotted position shown in Fig. 3) and the pins 52. The piston 26 and the head 55 now descend, so that the blank sustained by the pins 52 is placed into the compartment. During this movement the side flaps 2, 2 and the end flap 7 are bent upwards by the edges 54^a and 54^b of a slotted folding table 54 or the like Figs. 3 and 3^b. The said table 54 is carried by supports 54^x and brackets 54^{xx}, Fig. 3. The right end flap 8 of the box on the other hand remains in its flat position, until the box has been charged with cigarettes. The compartments are adapted to the shape and size of the boxes, introduced into the same by the piston 26 so that the boxes will remain in a reliable manner in the compartments while moved to the different stations and maintain their shape until the packaging operation has been finished. As the piston 26, after the folding of the blank and the introducing of the same into the compartment, is moved upward, the box is held in the compartment by its hook-shaped walls as shown more closely and on a greater scale in Fig. 1a 47^x. The pins 52 are carried by a head 55 and, preferably, are slidably mounted in the same and sustained by springs 56, so that the pins force the blank toward the piston 26 in a yieldable manner. The head 55 is fixed to a slide 55^a, which is movable in guides provided in the frame of the machine. The said slide is acted upon by a cam disc on the shaft 18 by means of a lever arm 55^b, which is swingably mounted on the shaft 20.

During the movement of the compartments the end flaps 7 of the boxes strike a plough-shaped bar 61, Figs. 2, 4 and 4a, extending longitudinally of the path of the compartments and located at its outer side. The right end of the bar 61 is bent inwards along a screw shaped surface, so that the bar turns the flap 7 inwards over the box, as shown. The flap 7 is held in the said position during the continued movement of the compartment to the station, at which the inner box is pushed into the outer box.

The compartments thus provided with inner boxes are moved by the chain to a station at which they are charged with cigarettes. Cigarettes are located in a magazine 62, which in the form of execution shown in the drawings has a funnel like bottom 63, 64. A partition wall 65 is located in the opening between the bottom walls 63, 64 and below the said wall two slanting plates 66 and 67 are located which extend

in opposite directions and conduct the cigarettes to two distributing chambers. Upright, parallel plates 68 are provided in the bottom of each chamber which in the present case constitute ten partitions. Only one of the distributing chambers is shown charged with cigarettes, Fig. 1, but, evidently, both distributing chambers operate simultaneously. In order to cause the cigarettes to move from the magazine 62 downwards into the distributing chambers a roller 170 and 171 respectively is journaled at each bottom opening. Roller 170 is rotated by means of a belt 72 or the like passing round a pulley 75 on a shaft 74, which is rotated by a motion transmitting device comprising for instance a rope pulley 75^x, a rope 76 and a rope pulley 77 on a shaft 78, which is driven by the shaft 40 by means of a chain gearing 79, 80, 81 and a toothed gearing 82, 83, Fig. 6. Roller 171 is rotated by means of a belt 84 passing round a pulley 85 on a shaft 86, which is driven by a crossed belt 87, passing round a pulley 88 on the shaft 85 and a pulley on the shaft 84. Preferably, the plates 68 are moved forward and backward in a lateral sense by a suitable driving mechanism (not shown), so that the cigarettes pass from the distributing chambers downwards into the partitions in a reliable manner.

The cigarettes are transmitted from the partitions, effected by the plates 68, in sets of ten cigarettes, into two sets of transferring compartments 108 and 109 (not shown in Fig. 1), which compartments are effected for instance by strips 110 of sheet metal and fixed in heads 110^x, which are carried by a slide 111 movable on a bar 116. The said slide 111 is connected by means of a link 112 to a lever arm 114, which is swingable on a pin 113, Fig. 1, and acted upon by a grooved cam disc 115 on the shaft 18. The bar 116 is fixed in supports 117.

During the operation of the machine the slide 111 places the set 108 of compartments alternately in front of the left distributing partitions formed by the plates 68 and in front of a compressor chamber 118. The right set of compartments 109 is shifted in an analogous manner and thus placed alternately in front of the right distributing partitions of the magazine and the compressor chamber 118. Cigarettes are transmitted from the distributing partitions to the compartments 108 and 109 and from the latter into the compressor chamber 118 by pistons 119, 120 and 121, which may consist of plates divided into fingers, as shown. The construction of the pistons and the mechanisms operating the same are substantially equal and for that reason only one of the same viz. the piston 121 is described. The piston 121 is fixed to a slide 122, which is movable in guides 123 and reciprocated by means of a lever arm 124, which is swingably mounted on the shaft 20, and a link 125, acted upon by a cam disc 126 on the shaft 18. A bar 104 is located at the lower part of each set of partitions, which permits the lowermost row of cigarettes to be ejected but retains the next superposed rows of cigarettes.

While cigarettes are pushed from one set of transferring compartments into the compressor chamber, cigarettes are pushed into the other set of transferring compartments from the corresponding distributing partitions, and while the emptied set of transferring compartments is moved to its distributing partitions, the second set of transferring compartments, charged with cigarettes, is moved to the compressor chamber.

In this manner every period is used for the packaging operation, for which reason the packaging capacity of the machine is the greatest possible. Besides through the provision of two sets of distributing partitions and two sets of transmitting compartments ample time is gained for the feeding of the cigarettes downwards into the partitions and the settling of the same. While the cigarettes are thus moved by the transferring compartments they may be inspected or, if necessary, subjected to some treatment.

For the controlling of the number of cigarettes in each set of compartments 108 and 109 placed in front of the piston 121, a set of finger like feelers 125^x, in the present case ten feelers, is located above the piston, which are swingably mounted on a pin 126^x and are each provided with an arm 125^x extending upwards. The said feelers 125^x are normally held in the position shown in Fig. 4 by an arm 127 which is swingable on the pin 126^x and by means of a rod 126^{xx} extending longitudinally of the machine may act upon all arms 125^x. Arm 127 is connected by a link 96 with an arm 98 swingable on a pin 97 and acted upon by a cam disc 99 on the shaft 18. As a set of compartments has been placed in front of the piston 121, the cam disc 99 permits the rod 126^{xx} to move toward the left, so that the feelers 125^x move downwards, if necessary acted upon by springs, not shown. If there is no cigarette in one or more compartments, the corresponding feeler will then move downwards through such a distance, that the corresponding arm 125^x enters into contact with a stationary, insulated plate 130, thus closing an electric circuit of a signalling device or breaking the circuit of the electric motor, which drives the machine, so that the machine is stopped.

The compressor chamber 118 is carried by a vertical slide 131 which is movable in guides 131^x and is moved by an arm 133, swingable on the shaft 20 and acted upon by a cam disc 132 on the shaft 18 and a spring (not shown). Two opposite walls of the compressor chamber consist of a fixed section 134, having an oblique inner surface, and a section 135 movable transversely of the chamber on pins 135^x. A link 136 is connected at its one end to the movable section and is swingable at its other end on a stationary pin 137 and has such a slanting position, that, as the compressor chamber is lowered, the link 136 moves the section 135 inwards. After a set of cigarettes has been moved from the set of compartments 108 and 109 respectively into the compressor chamber by the piston 121 and the compressor chamber then is lowered, the cigarettes located in the compressor chamber are forced toward each other to a compact row partly by the fixed, oblique sections, operating already during the introducing of the cigarettes, partly by the sections 135 operating during the lowering of the compressor chamber.

As the compressor chamber has been located on a level with an inner box placed before the chamber by the chain 46, the cigarettes are pushed by a piston 137^x from the compressor chamber into the said box and pass through a mouth piece 118^x. The piston 137^x, which is shown in Fig. 4 by dotted lines in its advanced position, is mounted on a slide 138, which is moved by an arm 139, swingable on the shaft 20, and a link acted upon by a cam disc on the shaft 18 (the said cam disc and link are not shown). While the cigarettes are transferred from the compressor chamber into the inner box they are guided by a hinged plate 140, bearing against the upper side of the cig-

arettes. After the inner box has been charged with cigarettes in the described manner, the chain 46 is moved further toward the station, at which the inner box is pushed into the outer box. While the charged box is thus moved the end flap 8 is turned inwards over the box by a plough-shaped bar 141^b, Figs. 2 and 4^b.

A magazine 142 containing outer boxes is located at the station last mentioned. The boxes are placed in the magazine in a flat condition. The lowermost box in the magazine is engaged by a slide 143 and pushed through an opening provided in the front wall of the magazine at the bottom of the same, the height of the said opening being so adapted that only one box may pass through the same at a time. The slide 143 is moved by an arm 143^x swingable on the shaft 20 and acted upon by a cam disc on the shaft 18 by means of a link 143^{xx}. Owing to the fact that the distance between the magazine 142 and the place at which the inner box is pushed into the outer box is comparatively great for constructive reasons the feeding of the outer box to the said place is effected in two periods for which purpose the slide 143, as before known, is provided with two offsets which successively engage the outer box and move the same.

A plate 145 provided with holes 144 is located at the introducing station. The chamber below the plate 145 communicates through a pipe 145^x with a suction pump 146, the piston of which is moved by a grooved cam disc 147 on the shaft 40 and an elbow arm 149 swingable on a pin 148, Fig. 1. Above the plate 145 there is a second plate 150 which communicates with the pump 146 through a hose and a branch 145^{xx} of the pipe 145^x. The suction plate 150 may be raised and lowered by means of a mechanism for instance of the construction stated in the U. S. Patent 1,590,567. The outer box is placed by the slide 143 into the space between the two plates 145 and 150 whereupon the pump 146 is caused to operate, so that the top and bottom walls of the box adhere to the plates. The upper plate 150 is then raised and simultaneously moved toward the left in Fig. 1 and brings thereby the outer box into open condition. One end opening of the outer box is directed toward the chain 47. A mouth piece 153 is located between the chain and the suction plates and is carried by a slide 154 which is moved by an arm 155 swingable on a pin 154^x and acted upon by a cam disc 156 on the shaft 18. The said mouth piece 153 is put by the slide 154 into the opening of the outer box and facilitates in this manner the introducing of the inner box into the outer box. The said introducing is effected by a piston 157 carried by a slide 158. The said slide is reciprocated by a cam disc on the shaft 18, a link and an arm 160 swingably mounted on the shaft 20 (the link and cam disc are not shown). During the introducing of the inner box into the outer box the inner box is guided by a plate 161, which is carried by an arm 163 swingably mounted on a pin 162. The said plate 161 keeps the flap 7 of the inner box in a lowered position while the box is introduced into the mouth piece 153. While the chain 46 moves the inner box to the introducing station, plate 161 is held in the raised position shown in Fig. 5 by a projection 164 on the slide 158, which projection permits the plate 161 to descend and press against the inner box as soon as the piston 157 begins to introduce the inner box. As the inner box has been introduced the suction in the plates 145 and 150 ceases and the finished box is moved to a delivery channel 166 by

a piston 167 or the like acted upon by a cam disc on the shaft 18.

The machine described above may, evidently, be provided with only one delivery device for
5 cigarettes. The mechanism transferring the cigarettes from the magazine to the compressor chamber then is considerably simplified, owing to the fact that the cigarettes may be moved directly from the magazine into the compressor chamber
10 and from the latter into the box.

The invention may, evidently, be modified in many respects, without exceeding the limits of the same.

I claim:

15 1. In a machine for manufacturing boxes and other packings for instance inner boxes of push boxes and charging the same with cigarettes or other staff-shaped articles the combination of compartments of the shape and size of the boxes
20 and movable in an endless path, a movable shaping implement, means for moving the implement, a folding device located at the said path in such position that the said implement forces a blank through the said folding device and the box thus
25 folded into a compartment placed in the path of the implement, means for forcing the blank against the said implement and sustaining the same while forced through the folding device, means located at the said path and adapted to
30 introduce cigarettes into the boxes transported by the compartments, and means located at the said path and adapted to introduce the inner boxes charged with cigarettes into the outer boxes.

2. A machine as claimed in claim 1, wherein
35 bars extend longitudinally of the path of the compartments, one of the said bars bending the one end flap of the inner box over the box and the other bar turning the other end flap over the box after the box has been charged with cigarettes, and a plate provided at the means for the
40 introducing of the inner box into the outer box, and means for raising and lowering the plate for forcing the flaps of the inner box downwards during the said introducing operation.

3. In a machine for manufacturing boxes and other packings for instance inner boxes of push boxes and charging the same with cigarettes or other staff-shaped articles the combination of
50 compartments of the shape and size of the boxes and movable in an endless path, a movable shaping implement, means for moving the implement, a folding device located at the said path in such position that the said implement forces a blank through the said folding device and the box thus
55 folded into a compartment placed in the path of the implement, the bottoms of the said compartments being provided with openings, a slide operating beneath the compartments, pins carried by the slide and extending through the openings provided in the bottom of the compartment
60 for forcing the blank against the shaping implement and sustaining the same during the operation of the implement, sustaining springs for the said pins, means located at the said path and adapted to introduce cigarettes into the boxes transported by the compartments, and means lo-

cated at the said path and adapted to introduce the inner boxes charged with cigarettes into the outer boxes.

4. In a machine for manufacturing boxes and other packings for instance inner boxes of push
80 boxes and charging the same with cigarettes or other staff-shaped articles the combination of compartments of the shape and size of the boxes and movable in an endless path, a movable shaping implement, means for moving the implement,
85 a folding device located at the said path in such position, that the said implement forces a blank through the said folding device and the box thus folded into a compartment placed in the path of the implement, means for forcing the blank
90 against the said implement and sustaining the same while forced through the folding device, means located at the said path and adapted to introduce cigarettes into the boxes transported by the compartments, through a compacting chamber, comprising two oppositely disposed side walls consisting each of a fixed part with an oblique inner surface and a movable part which
95 is moved inwards after the introduction of the cigarettes into the compacting chamber, a vertically movable slide which carries the said chamber and moves the same into a position in front of a device for displacing the cigarettes from the chamber and into the boxes, inclined links, connected to the said movable parts of the compacting chamber and to fixed points and imparting movement to the said parts in the movement of the chamber, and means located at the said path
100 and adapted to introduce the inner boxes charged with cigarettes into the outer boxes.

5. In a machine for manufacturing boxes and other packings for instance inner boxes of push boxes and charging the same with cigarettes or other staff-shaped articles the combination of
110 compartments of the shape and size of the boxes and movable in an endless path, a movable shaping implement, means for moving the implement, a folding device located at the said path in such position that the said implement forces a blank through the said folding device and the box thus
120 folded into a compartment placed in the path of the implement, means for forcing the blank against the said implement and sustaining the same while forced through the folding device, means located at the said path and adapted to transfer cigarettes to the boxes transported by the compartment said means comprising two groups of upright partitions, each containing a row of cigarettes, pistons for pushing a set of cigarettes from the said groups of partitions alternately, two uniformly moved carriers, which are placed alternately in front of the said groups of partitions respectively and receive the cigarettes pushed from the same, and a joint delivery place located between the two groups of
135 partitions and provided with a piston for the transferring of the cigarettes from the said carriers, and finally means located at the said path and adapted to introduce the inner boxes charged with cigarettes into the outer boxes.

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