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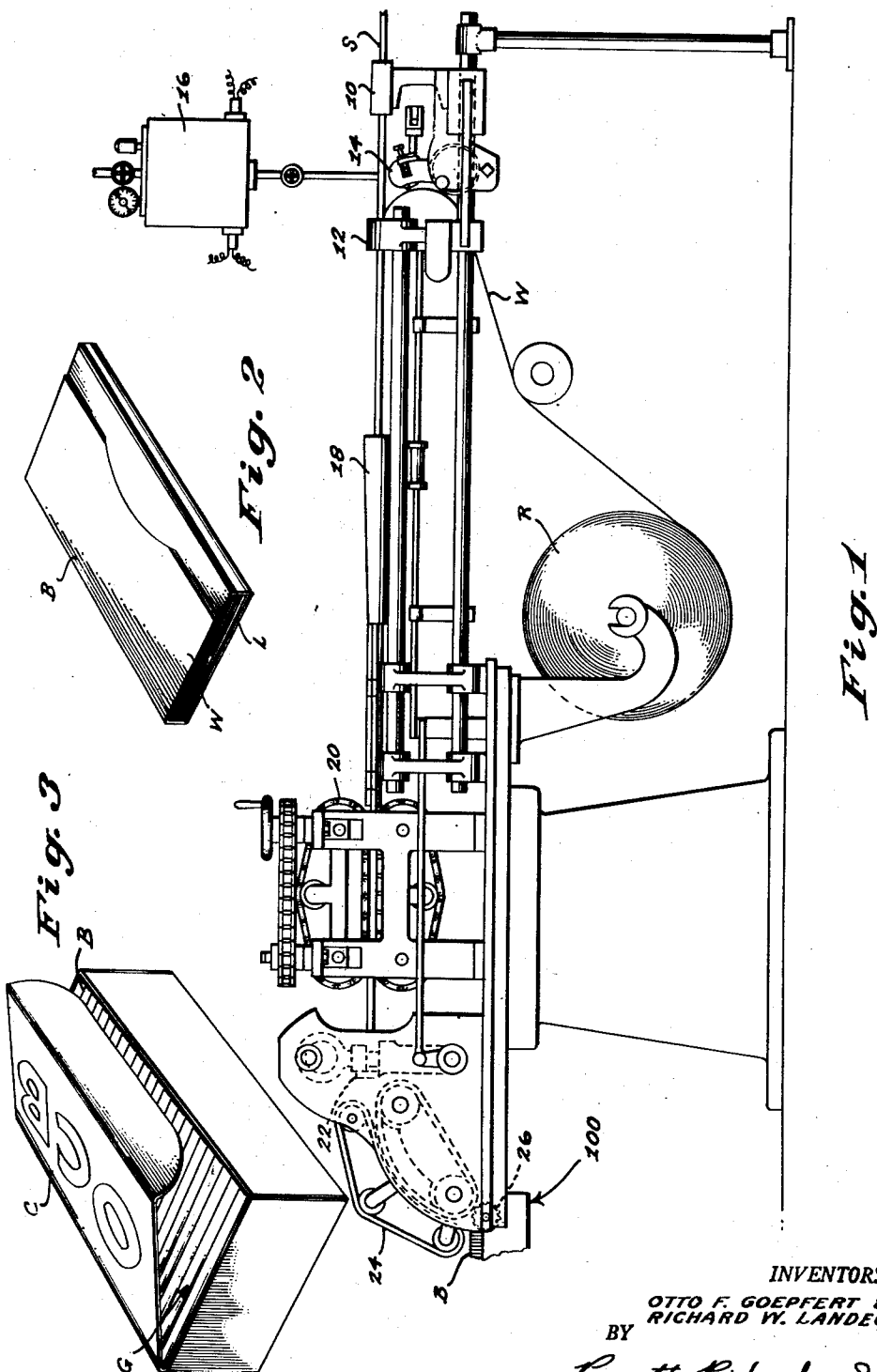
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CIGARETTE PAPER BOOKLET PACKING DEVICE

Filed Sept. 13, 1951

8 Sheets-Sheet 1



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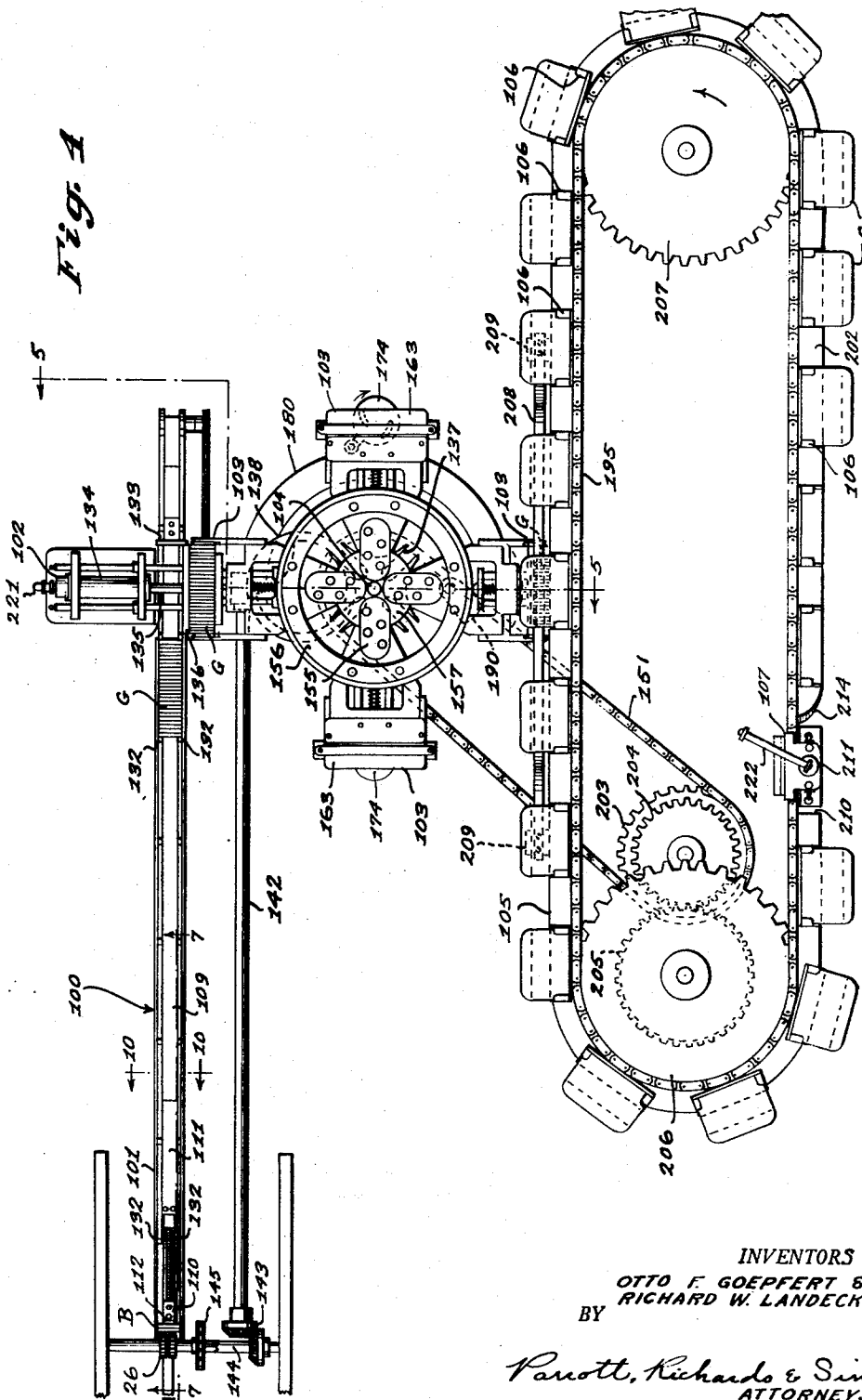
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3 Sheets-Sheet 2



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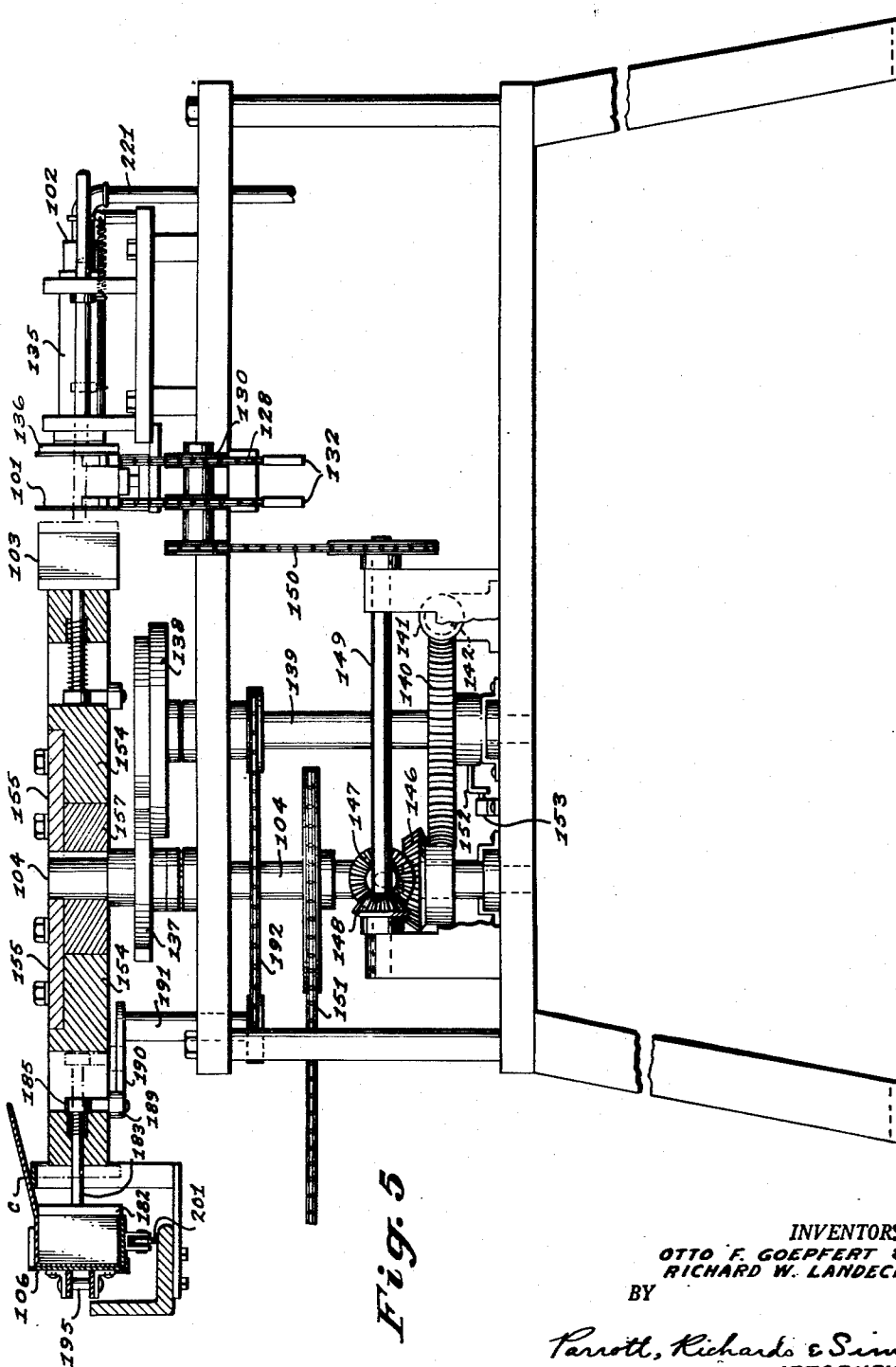


Fig. 5

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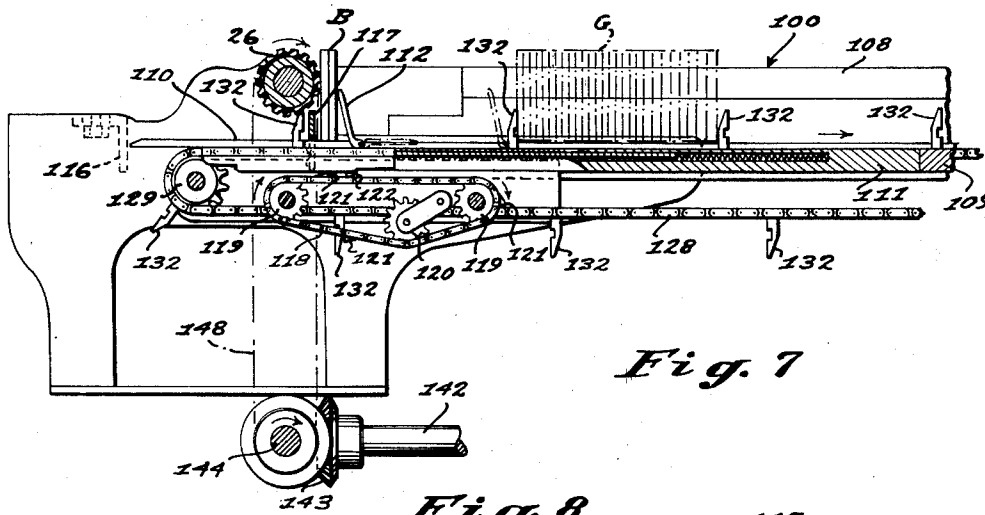


Fig. 7

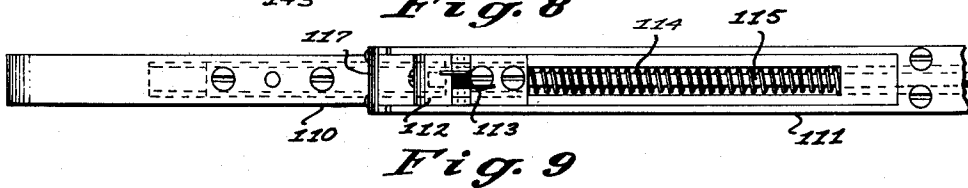


Fig. 8

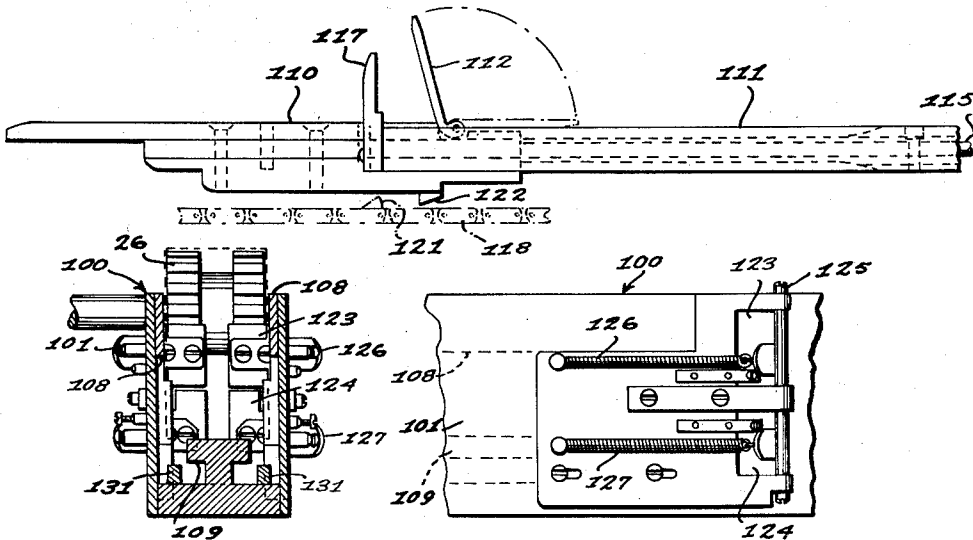


Fig. 9

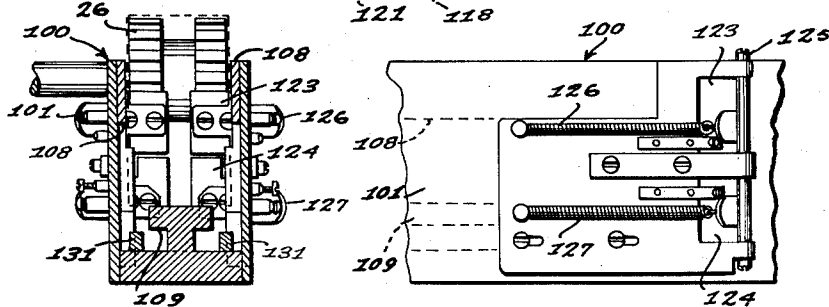


Fig. 10

Fig. 11

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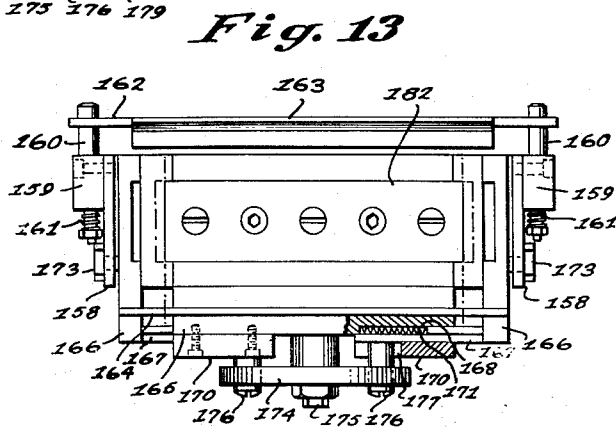
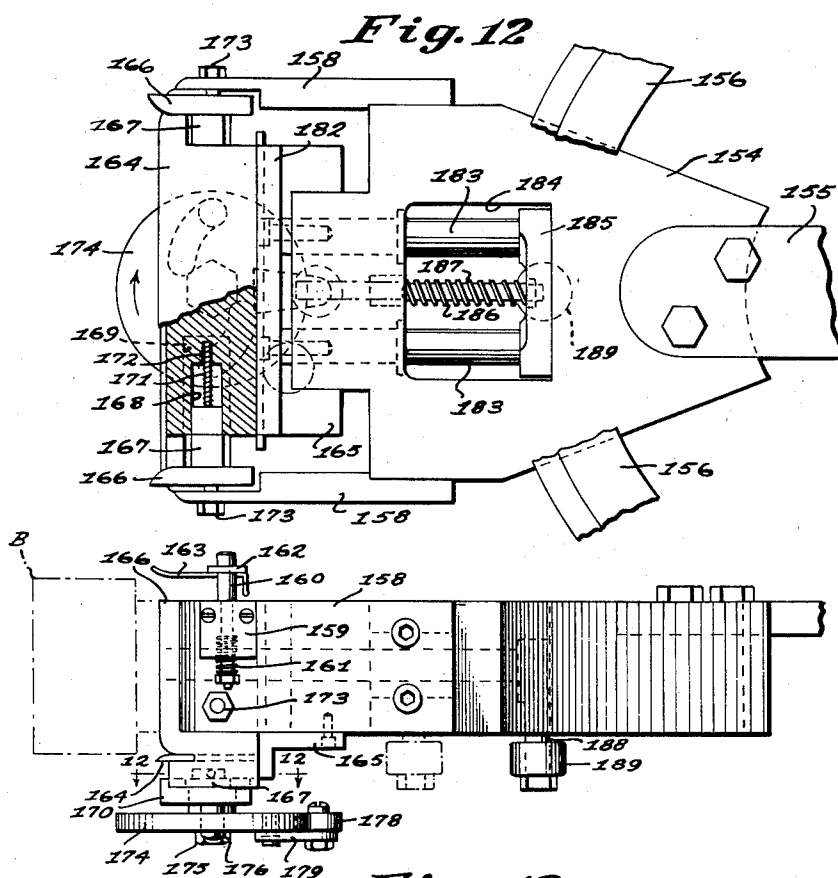
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Fig. 15

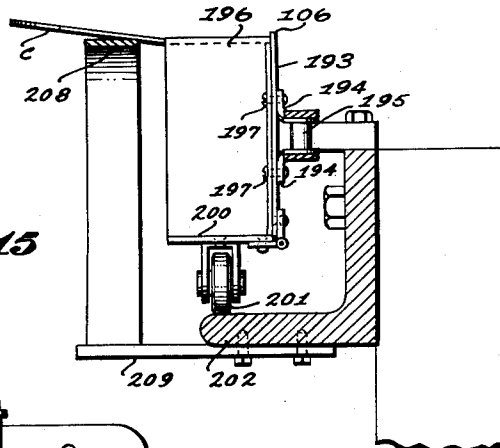
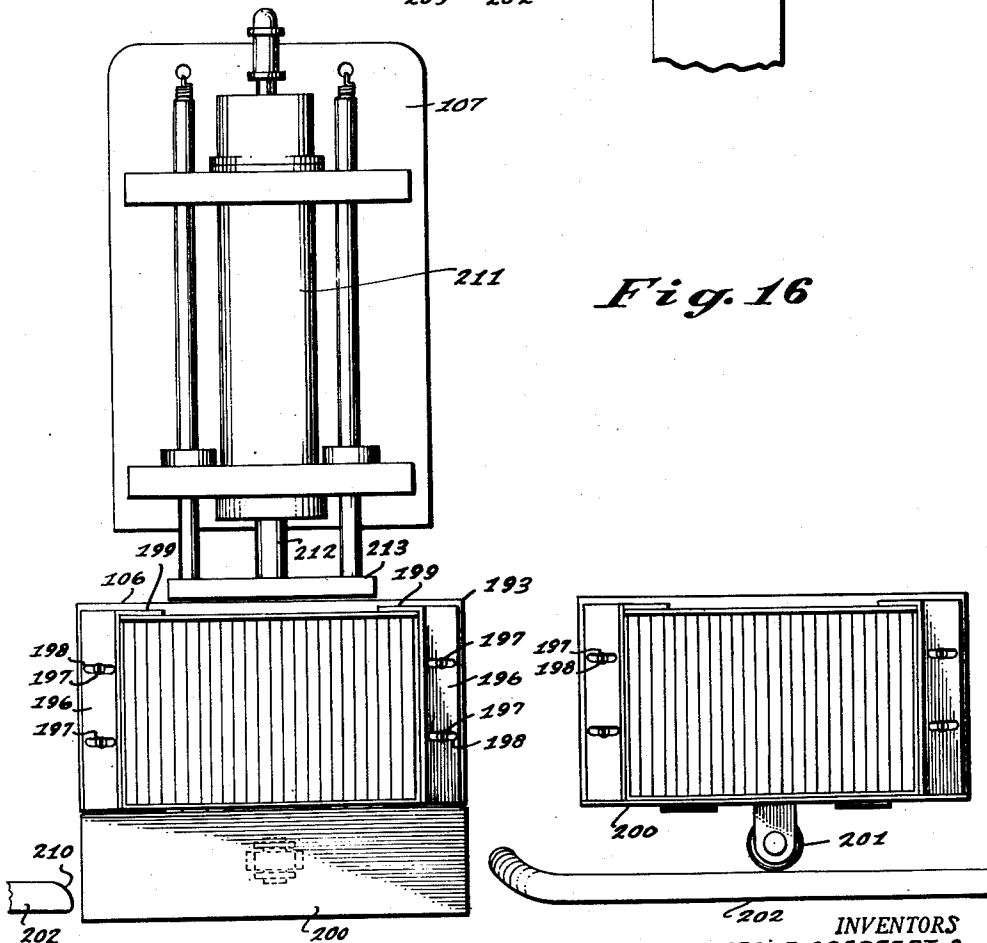


Fig. 16



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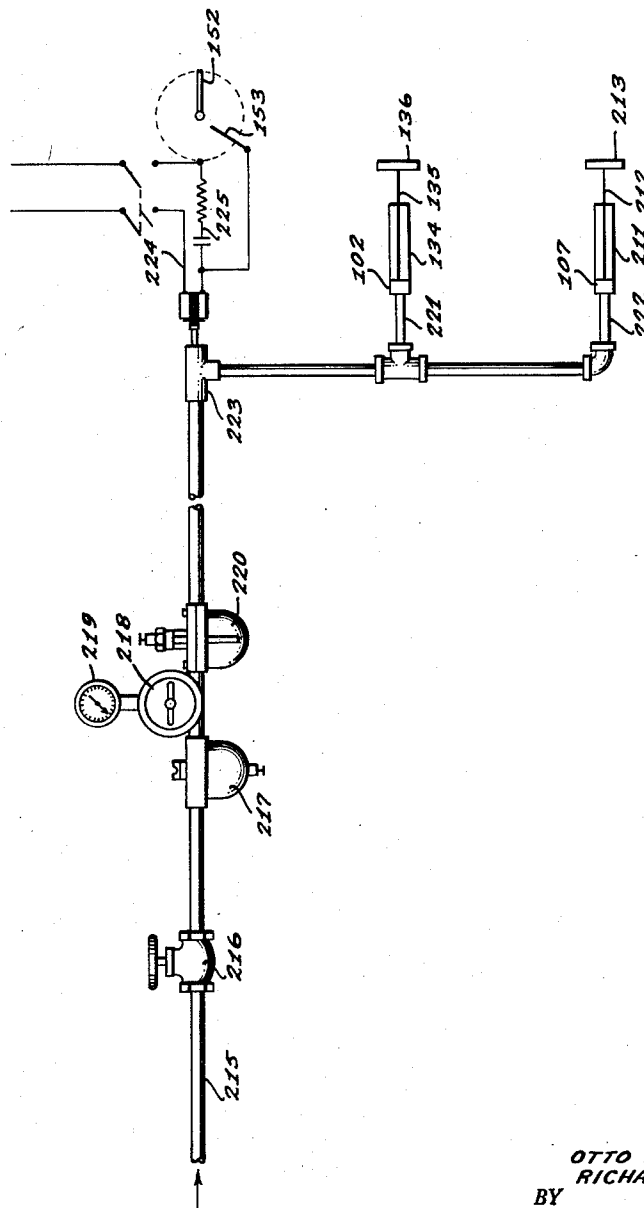
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Fig. 17



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CIGARETTE PAPER BOOKLET PACKING DEVICE

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Application September 13, 1951, Serial No. 246,434

10 Claims. (Cl. 226—14)

This invention relates to article packing devices, and in particular to a device for packing cigarette paper booklets automatically as they are formed on a booklet making machine.

In Patent No. 2,567,201, issued September 11, 1951, a cigarette paper booklet machine is disclosed that is adapted for making the so-called "five cent" or large-size booklet of the type usually containing 100 or more cigarette paper leaves, and it is a machine of this sort with which the packing device of the present invention is especially adapted for use. This packing device might, however, be adapted for handling other sizes of cigarette paper booklets, and it might also be used to advantage for packing other similar types of articles if desired.

A cigarette paper booklet machine of the type disclosed in the above noted Patent No. 2,567,201 operates to draw in a plurality of strips of cigarette paper in superimposed relation and corresponding in number with the number of leaves desired in the finished booklet, to fold an enclosing wrapper web about these cigarette paper strips after placing spaced deposits of adhesive on the wrapper web so as to bond the superimposed cigarette paper strips at one edge to the wrapper and thereby secure the leaves in the resulting booklet, to sever the wrapper enclosed and adhesively secured cigarette paper strips in booklet length as they are fed through the machine, and to deliver continuously the cigarette paper booklets successively formed in this manner.

The packing device of the present invention operates to receive continuously the cigarette paper booklets delivered by a booklet making machine of the above noted type, to arrange the continuously received booklets in regular groups of a desired size for packing, and to convey and handle these groups of booklets so that they are automatically inserted in a packing container without ever being touched by hand. A particular feature of the present invention is the manner in which provision is made for receiving the booklet continuously from the booklet making machine while separating the booklets in groups of the desired size for packing, and for thereafter conveying and handling the groups of booklets with an intermittent movement as they are manipulated for packing. Another feature is the arrangement of a common actuating means for the intermittent motion of the several conveying and handling mechanisms employed for carrying out the packing operation. These and other features of the present invention are described in detail below in connection with the accompanying drawings, in which:

Fig. 1 is a side elevation showing a cigarette paper booklet machine of the type with which the packing device of the present invention is particularly adapted for use;

Fig. 2 is a perspective view illustrating the type of cigarette paper booklet formed on a machine such as is shown in Fig. 1;

Fig. 3 is a further perspective view illustrating the manner in which the cigarette paper booklets shown in Fig. 2 are commonly arranged in packing containers;

Fig. 4 is a plan view illustrating the overall layout of a packing device arranged in accordance with the present invention;

Fig. 5 is an enlarged vertical detail partly in section and taken substantially on the line 5—5 in Fig. 4;

Fig. 6 is an enlarged plan view corresponding generally with Fig. 5;

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Fig. 7 is a further sectional detail taken substantially on the line 7—7 in Fig. 4;

Fig. 8 is a plan view of the slide member employed for accumulating the continuously received booklets in groups of the desired size as shown in Fig. 7;

Fig. 9 is a side elevation corresponding to Fig. 8;

Fig. 10 is a sectional detail taken substantially on the line 10—10 in Fig. 4;

Fig. 11 is a right side elevation corresponding to Fig. 10;

Figs. 12, 13 and 14 are generally corresponding plan, side, and end face views of the booklet handling compartments employed according to the present invention for inserting the groups of booklets directly in the packing containers, Fig. 12 being partly in section as seen on the line 12—12 in Fig. 13 and Fig. 14 also being shown partly in section;

Fig. 15 is an enlarged side detail showing the arrangement of one of the packing container carrying frames;

Fig. 16 is an enlarged front detail of the ejector station on packing container conveyor; and

Fig. 17 is a schematic diagram of the air and electrical circuits employed for actuating the ejector mechanisms on the booklet and packing container conveyors.

Referring now in detail to the drawings, and more particularly at first to Fig. 1, a plurality of superimposed strips of cigarette paper are shown at S in Fig. 1 entering a machine of the type disclosed in the above noted Patent No. 2,567,201 that may be employed as previously mentioned for forming cigarette paper booklets such as may be packed according to the present invention.

As shown, the superimposed strips of cigarette paper S are drawn into the machine through guides 10 and 12 in relation to a wrapper web W withdrawn from a supply roll R and trained beneath the cigarette paper strips S past an adhesive applying station 14 at which spaced deposits of adhesive are applied to the wrapper web W from a suitable adhesive supply source as at 16. The adhesive deposits placed on the wrapper web W are spaced so that there will be one deposit for each booklet ultimately formed, and the adhesive deposits are aligned widthwise of the wrapper web W so as to bond the superimposed cigarette strips S at one edge when the wrapper web W is folded to enclose the strips S.

Folding of the wrapper web W is done at a suitable folding guide 18, and beyond this folding guide 18 a feeding device 20 is arranged for engaging the wrapper enclosed cigarette paper strips so as to act as the means by which the plurality of strips S are drawn into the machine and the wrapper web W is withdrawn from the supply roll R to pass by the adhesive applying station 14 and through the folding guide 18. The feeding device 20 also advances the wrapper enclosed cigarette paper strips to a severing mechanism as indicated at 22 which acts to chop the wrapper enclosed strips 22 into booklet length. The cigarette paper booklets thus formed are received by a delivery mechanism 24 which terminates in a rubber covered pulley as at 26 arranged to discharge the booklets serially in upright position as shown at B in Fig. 1 to be received by the packing device of the present invention which is shown fragmentarily in Fig. 1 as indicated generally by the reference numeral 100.

A cigarette paper booklet B of the type formed in the manner just described above is illustrated further in Fig. 2 of the drawing to show the arrangement of the wrapper W enclosing a block of cigarette paper leaves L that have been cut to length from the superimposed cigarette paper strips S; and the manner in which a group G of these cigarette paper booklets B are commonly arranged in a packing container C is illustrated in Fig. 3 of the drawing. The packing device 100 of the present invention operates to receive these booklets B from the booklet making machine shown in Fig. 1 and pack them by groups G in packing containers as shown in Fig. 3.

The general arrangement of the packing device 100 of the present invention for accomplishing this packing operation is shown in Fig. 4 of the drawing as comprising a booklet conveyor 101 arranged to receive the booklets continuously as at B and advance them intermittently in groups as at G to an ejector mechanism 102 operating transversely of the booklet conveyor 101 to transfer the

groups of booklets G successively to booklet handling compartments 103, a plurality of which compartments 103 are supported in regularly spaced relation for circular movement about a common vertical axis as at 104 so that these compartments 103 travel successively between a loading station adjacent the booklet conveyor 101 and opposite the ejector mechanism 102 for receiving the transferred groups of booklets G, and a succeeding station adjacent a packing container conveyor 105 adapted for presenting empty packing containers C opposite the compartments 103 to receive a group of booklets G displaced therefrom in a manner to be described more in detail presently. The packing container conveyor 105 is arranged with carrying frames 106 in which the packing containers C are placed by hand ahead of the point at which the groups of cigarette booklets G are received from the handling compartments 103, but otherwise the packing operation is carried out entirely automatically, the loaded packing cartons C being advanced past a further ejector mechanism 107 by which they are removed from the carry frames 106 to be collected suitably for storage or shipment.

The manner in which the booklet conveyor 101 is arranged for continuously receiving the booklets B and advancing them intermittently in groups G is shown best in Figs. 7 to 11 of the drawings. In Fig. 7, the receiving end portion of the booklet conveyor 101 in longitudinal section with the booklets B being delivered uprightly by the terminal pulley 26 of the previously mentioned booklet machine delivery mechanism 24, which operates to direct the booklets B continuously from the booklet machine to the conveyor 101.

In order to receive the booklets B and allow them to be advanced uprightly as shown, the booklet conveyor 101 is constructed with a trough-like directing channel fitted with side guide elements 108 and a bottom guide element 109 (see Fig. 10). Provision for accumulating the continuously delivered booklets B in the upright position shown is made by means of a slide member 110 carried in a mounting block 111 for reciprocation in aligned relation with the bottom guide element 109. This slide member 110 has a booklet supporting finger 112 pivoted thereon so as to be foldable flush with the top surface of the slide member 110 in the direction of advance of the accumulating booklets B (compare Figs. 7 and 9). Normally, however, the supporting finger 112 is maintained in an erect position by a torsion spring 113 arranged at its pivot mounting on the slide member 110 and is thereby disposed for supporting the incoming booklets B uprightly as illustrated in Fig. 7.

The slide member 110 is further biased by a compression spring 114 that is disposed over a guide rod 115 extending from the slide member 110 into the mounting block 111 so as to urge movement of the slide member 110 on the mounting block 111 reversely to the direction of advance of the accumulating booklets B and thereby maintain the finger 112 positioned for supporting contact with the incoming booklets B. This compression spring 114 also serves as a return means for the slide member 110 after each group G of the booklets B is accumulated, as will appear more fully presently.

With the slide member 110 at its starting position, as determined by a suitable stop member such as is indicated by dotted lines at 116 in Fig. 7, and the supporting finger 112 erectly disposed, the first several incoming booklets B of a group G to be accumulated are held uprightly by the finger 112 as it shifts from a somewhat forwardly inclined to a vertical position against the pressure of its associated torsion spring 113, a back plate 117 being arranged on the mounting block 111 below the delivery pulley 26 as an opposed positioning stop. Also, when the supporting finger 112 reaches a vertical position, the slide member 110 as a whole will back off against the initial compression of the spring 114 as the incoming booklets B of the group being accumulated build up.

After the first several booklets B of the group have been delivered, however, it is necessary to provide a positive means for shifting the slide member 110 against the increasing pressure of the compression spring 114, and this is done through a timing chain 118 arranged below the slide member 110 on sprockets 119 with an idler tensioning sprocket 120 for maintaining the upper reach of the chain 118 properly taut. This timing chain 118 may be driven in any suitable manner (not shown) from any

convenient operating element of the booklet machine so as to provide it with a linear rate of travel timed in accordance with the delivery rate of the booklets B and thereby cause it to move linearly at the same rate that the booklets B being accumulated advance in the booklet conveyor 101. Accordingly, by providing properly spaced lugs 121 on the timing chain 118 for engaging a complementary lug 122 arranged on the bottom of the slide member 110, it may be adapted readily for actuating a positive advance of the slide member 110 after the first severed booklets B of a group G to be accumulated have been delivered as noted above.

Also, the top reach of the timing chain 118 may be arranged over the sprockets 119 in a length such that this positive advance continues until the booklets B have been delivered in the number desired for the group G (which will be the number desired for ultimate packing as a group), at which time the slide member lug 122 will be released by the working lug 121 on chain 118 as it turns downwardly over the adjacent sprocket 119 to begin its return flight. As this happens, the released slide member 110 will be returned at once to its starting position by the compression spring 114, the supporting finger 112 folding flush to pass beneath the accumulated group of booklets G and recover to an erect position for supporting the incoming booklets B of the next succeeding group to be accumulated, it being understood that the group of booklets just accumulated will be advanced as a group to the position indicated at G in Fig. 7 (by means to be described further below) as this recovery action of the slide member 110 and supporting finger 112 occurs.

To provide supplementary support for the first several incoming booklets B of each group, and thereby further insure orderly handling of these first several booklets B as the slide member 110 and supporting finger 112 are recovering to starting position, the booklet conveyor 101 may be further fitted with yieldably biased gate members at its receiving end adjacent the delivery pulley 26 as illustrated in Figs. 10 and 11. As shown, these gate members suitably comprise upper and lower gate elements 123 and 124 hinged as at 125 in relation to the side guide elements 108 and biased by tension springs 126 and 127 so that they normally extend laterally inward of the conveyor 101 to provide the above noted supplementary support for the first several booklets B. The advance of the booklets B as they accumulate in the conveyor 101 results in folding the gate elements 123 and 124 outwardly against the tension of their associated springs 126 and 127, and the gate elements 123 and 124 arranged to fold flush ultimately with the side guide elements 108 so that the advancing booklets B are then unobstructed as they accumulated under the control of the slide member 110 and supporting finger 112. The upper and lower gate elements 123 and 124 are preferably provided to form these gate members so that the upper gate element 123 may remain unaffected while the lower gate element 124 is folded outwardly to allow passage when necessary for the advancing means provided for the fully accumulated booklet groups G, as described just below.

The fully accumulated booklet groups G are advanced in the booklet conveyor 101 by means of sprocket chains 128 carried on sprocket wheels 129 and 130 adjacent the receiving and delivery ends, respectively, of the conveyor 101, and arranged with its top reach riding on support rails 131 arranged at each side of the bottom guide element 109 (see Fig. 10). The sprocket chains 128 fitted at spaced intervals with booklet advancing lugs 132, the spacing of these lugs 132 being such as to accommodate a fully accumulated group G of the booklets B, and the chains 128 being mounted so that the lugs 132 are disposed at rest to allow successive groups G of the booklets B to accumulate between them under the control of the previously described slide member 110 and supporting finger 112, and are advanced intermittently to take over control of each booklet group G as it is fully accumulated and move it a step forward in the conveyor 101 so that accumulation of the next booklet group G may continue immediately in the next succeeding spacing between the lugs 132. A succession of the booklet groups G is accordingly advanced by the lugs 132 in a step-by-step fashion to the delivery end of the conveyor 101, this intermittent advance being actuated and timed in relation to the other operating elements of

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the packing device 100 by a common-actuating means which is described further below.

At the delivery end of the conveyor 101, an upstanding stop element 133 is fixed on the bottom guide element 109 to position the booklet groups G properly as they are advanced opposite the previously mentioned ejector mechanism 102, and to compress the fully advanced group of booklets G against the lugs 132 that trail it and thereby confine this booklet group G within the reach of the ejector mechanism 102. As already explained, this ejector mechanism operates transversely of the booklet conveyor 101 for transferring the booklet groups G successively to the booklet handling compartments 103, and it comprises for this purpose an air cylinder 134 disposed with an associated piston rod 135 carrying a pusher plate 136 to move transversely between the stop element 133 and the adjacent trailing lugs 132 and sweep the booklet group G confined therebetween into the oppositely disposed booklet handling compartment 103. This action takes place while the intermittently advancing chains 128 of the booklet conveyor 101 and again is timed from the previously mentioned common-actuating means which is still to be described below.

The booklet handling compartments 103 which receive the booklet groups G transferred from the booklet conveyor 101 in the manner noted above are arranged in a circular series for movement about the previously mentioned common axis 104, and four of these compartments 103 are provided in the illustrated embodiment (see Figs. 4 and 6), although a greater or lesser plurality might be employed if desired. The circular movement of the compartments 103 about the common axis 104 is also actuated intermittently so that they come to rest successively at a loading station opposite the booklet conveyor ejector mechanism 102 to receive the transferred booklet groups G. This intermittent motion is obtained through a Geneva motion formed by a four-station Geneva stop 137 mounted on the common compartment axis shaft 104 and a Geneva driver plate 138 mounted on an adjacent countershaft 139 (compare Figs. 5 and 6). This countershaft 139 is driven directly from the booklet machine through a worm wheel 140 that engages a worm 141 carried on a main drive shaft 142 for the packing device 100 which extends from a bevel gear pair 143 at which it is driven from a later shaft 144 that is connected through a sprocket chain or the like as indicated in Figs. 4 and 7 at 145 to the shaft carrying the delivery pulley 26. The countershaft 139 is accordingly driven in timed relation with the operation of the booklet machine, and by suitable speed reduction at the worm 141 and worm wheel 140 may be made to actuate the intermittent motion of the booklet handling compartments 103 with the timing required by the number of booklets B contained in each group G.

It is the Geneva motion just described that also serves as the previously mentioned common actuating means for the intermittent motion of all of the other operating elements of the packing device 100. Thus the booklet conveyor advancing chains 128 are driven intermittently through a bevel gear 146 carried at the lower end of the Geneva stop shaft 104 (i. e. the common compartment axis shaft) to engage one bevel gear of an oppositely disposed pair arranged on an intermediate stub shaft as at 147 (see Fig. 5) to drive a further bevel gear 148 on a lateral shaft 149 that runs to a sprocket and chain connection at 150 with the shaft carrying the sprockets 130 over which the advancing chains 128 are mounted at the delivery end of the conveyor 101. A sprocket and chain connection 151 is also arranged from the shaft 104 for actuating the intermittent motion of packing container conveyor 105, and a trip finger 152 is arranged on the countershaft 139 below the worm wheel 140 for timed actuation of a micro switch 153 through which the ejector mechanisms 102 and 107 are operated on the booklet and packing container conveyors 101 and 105, as is explained more fully below.

The booklet handling compartments 103 are illustrated in detail in Figs. 12, 13 and 14, and as shown they comprise body blocks 154 that are adapted through assembly plates 155 and a bracing ring 156 for mounting in spaced relation around a circular mounting plate 157 which is fixed directly on the common axis shaft 104 for intermittent movement as controlled by the above noted Geneva motion. Each body block 154 is fitted with outwardly-extending side framing arms 158 on which mount-

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ing blocks 159 are carried to receive slidable studs 160 that are biased downwardly by springs 161 and extend upwardly to carry a cross member 162 on which a top guide 163 for the booklet group G is fixed so as to form in effect the top wall of the compartments 103, although it is made adjustable by the springs 161 to ease the entrance of a booklet group G.

The bottom wall for the compartments 103 is formed by a plate member 164 which is fixed in place on a bracket element 165 that is in turn secured to the bottom face of the body block 154. This bracket element 165 also serves to carry slidable end wall members 166 which are fitted with grooved slide arms 167 having an upper portion shaped in a narrower width to fit closed-end slots 168 in the bottom face of bracket element 165, and a wider lower portion fitting open-ended slots as at 169 in bottom cover plates 170 fixed to the bracket element 165. The upper narrower portions of the slide arms 167 terminate short of the full length of the bracket element slots 168 so as to allow sliding movement for the end wall members 166 and compression springs 171 are disposed to bear against the ends of these upper portions from a seat as at 172 in the closed ends of the bracket slots 168 so as normally to bias the end wall members 166 openly against adjustable stops 173 carried by the side framing arms 158.

The purpose of incorporating these slidable end wall members 166 in the booklet compartments 103 is to allow compression of the booklet groups G as they are moved to the succeeding station at which they are displaced for packing in the containers C. This compression serves two purposes. In the first place, it acts to grip the booklet group G more tightly in the compartments 103 against the centrifugal force tending to throw the booklets B outwardly during the circular movement of the compartments 103; and, even more importantly, the compression results in arranging the booklet groups G with adequate compactness for packing nicely in the containers C.

To actuate the slidable end wall members 166 for obtaining this compression, a slotted cam plate 174 is mounted on a central pivot stud 175 extending downwardly at the middle of the bracket element 165, and the curved slots of this cam plate 174 engage following pins 176 extending downwardly from the end wall slide arms 167 through clearance slots 177 in the bottom cover plates 170, so that rotation of the cam plate 174 on its pivot stud 175 in the direction indicated by arrows in Figs. 4, 6 and 12 results in drawing the end wall members 166 and thereby compressing endwise a booklet group G contained in the compartment 103. Rotation of the cam plate 174 for this purpose is effected through a roller 178 carried by a radially disposed extending arm 179 to ride a cam rail 180 shaped to obtain the rate and degree of compression desired, a hump 181 (see Fig. 6), for example, being preferably formed in the cam rail 180 to give a final relatively heavy degree of compression as the compartments 103 reach the station at which the booklet groups G are displaced into the packing containers C.

Displacement of the booklet groups G from the compartments 103 is effected through a movable back wall plate 182 arranged to sweep outwardly between the end wall members 166. This movement of the back wall plate 182 is provided for through slide rods 183 extending backwardly in the body block 154 to a recess 184 therein of sufficient size to accommodate a crosshead 185 fixed on the rear ends of the slide rods 183. This crosshead 185 is fitted with a forwardly extending guide stud 186 on which a spring 187 is carried to bear against the front side of the body block recess 184 and thereby maintain the back wall plate 182 normally in its retracted position. The above mentioned crosshead 185, however, is also fitted with a downwardly extending mounting stud 188 that carries a cam follower 189 in relation to a quick return cam element 190 mounted on a jack shaft 191 that is driven through a chain and sprocket connection 192 from the Geneva drive shaft 139. Through this driving connection 192, the cam element 190 is made to rotate once during each rotation of the Geneva drive plate 138, and by angularly disposing the cam element 190 properly it can accordingly be made to actuate the cam follower 189 during the idling periods of the Geneva motion and thereby shift the crosshead 185 forwardly in the body block recess 184 to move the back wall plate 182 outwardly in the compartment 103 for displacement of a

booklet group G therefrom while a rest occurs in its intermittent circular movement.

The booklet groups G displaced from the compartments 103 in this manner are inserted in the course of the displacement in packing containers C presented by the container conveyor 105. The packing containers C are carried on the conveyor 105, as already mentioned, in carrying frames 106. These carrying frames 106 (see Figs. 15 and 16) consist of a back mounting plate 193 fixed to lugs 194 of a sprocket chain carrier 195 and having side retaining flanges 196 fixed thereon by screws 197, these flanges 196 being provided with elongated mounting apertures 198 so that they may be adjusted for different sizes of packing containers C. The top of the carrying frames 106 are open except for relatively short tip portions 199 provided on the side flanges 196 to position the containers C from above, while the bottom is formed by a hinged plate 200 carried on the back mounting plate 193 and normally supported in a level bottom closing position by a depending roller 201 arranged to ride a supporting rail or flange 202 that extends beneath the carrying frames 106 from the frame structure of the container conveyor 105.

The containers C are placed by hand in the carrying frames 106 to be advanced intermittently past the booklet handling compartments 103 at the adjacent station for receiving the booklet groups G as they are displaced therefrom in the manner already described above. The intermittent advance of the carrying frames 106 is actuated, as previously noted, through the chain and sprocket connection 151 running from the Geneva motion. This chain and sprocket connection runs to a sprocket wheel 203 at the container conveyor 105 which is mounted for rotation with a gear wheel 204 arranged to engage a mating gear wheel 205 that is carried on a common mounting shaft with a drive sprocket 206 for the carrying frame carrier chains 195, a similar idler sprocket being provided at 207 for these chains 195.

As the packing containers C approach the adjacent compartment station in the carrying frames 106 to receive the booklet groups G, the projecting lids of the containers C come in contact with a guide bar 208 mounted on brackets 209 extending from beneath the carrying frame roller supporting rail 202 (compare Figs. 4 and 15). This guide bar 208 runs from the brackets 209 to an elevated position over the adjacent compartment station so as to displace the container lids and thereby avoid any interference from the lid as the booklet groups G are inserted in the containers C.

After loading with a booklet group G displaced from an adjacent compartment 103, the intermittent advance of the loaded containers C is continued in the carrying frames 106 until the ejector station 107 is reached. At this point a break in the supporting rail 202 is provided as at 210 so that the hinged bottom plate 200 is allowed to drop downwardly as the carrying frame comes to rest below the ejector 107, which is a substantial duplicate of the previously described ejector mechanism 102 provided on the booklet conveyor 101, except that on the container conveyor 105 the ejector mechanism 107 is disposed vertically instead of horizontally (compare Figs. 4 and 16). Otherwise, the ejector mechanism 107 comprises, as before, an air cylinder 211 and an associated piston rod 212 carrying a pusher plate 213 adapted to move between the side flanges 196 for stripping the loaded containers C from the carrying frames 106. Beyond the ejector 107, the supporting rail 202 is formed with a developed lifting face as at 214 adapted to guide the bottom plate roller 201 back to a position riding on the supporting rail 202 and thereby close the hinged bottom plate 200 so that the carrying frames 106 are again ready to have empty containers C placed therein for loading with the booklet groups G as they are advanced to the adjacent compartment station.

The manner in which the ejector mechanisms 102 and 107 for the booklet and container conveyors 101 and 105 are actuated is illustrated schematically in Fig. 17. The air supply is delivered through a main line 215 which may be fitted in the usual manner with a gate valve as at 216, a filter 217, a pressure regulator 218 and indicating gage 219, and a lubricator 220. This main supply line 215 thus runs to branch lines 221 and 222 under the control of a solenoid valve 223, which is arranged for actuation from the previously mentioned micro switch 153 that is operated by the trip finger 152 carried on the

Geneva drive shaft 139. The electrical connection between the micro switch 153 and the solenoid valve 223 may suitably consist of a standard D. C. line circuit 224, which should include a loading bridge as indicated at 225 across the micro switch to prevent any sustained arc. With this arrangement it will be understood that the solenoid valve 223 remains normally closed until actuated by the micro switch 153. Upon rotation of the tripping finger 152, however, as timed by the Geneva motion, the normally open micro switch 153 is closed to close the line circuit 224 and thereby energize the solenoid valve 223 to release air through the branch lines 221 and 222 for operating the ejector mechanisms 102 and 107 at the proper time.

The present invention has been described above for purposes of illustration only and is not intended to be limited by this description or otherwise except as defined in the appended claims.

We claim:

1. In combination with an intermittently travelling conveyor constructed to receive continuously and advance in regular groups of a desired size a succession of articles, a collecting mechanism for accumulating a group of said continuously received articles to advance intermittently on said conveyor, said collecting mechanism comprising a slide member mounted for sliding movement longitudinally of said conveyor adjacent the receiving end thereof, an article supporting finger pivoted on said slide member for folding flush therewith, yieldable means normally maintaining said finger in an upright position for supporting said continuously received articles uprightly on said conveyor during accumulation of a group, a second yieldable means urging sliding movement of said slide member reversely to the direction of accumulation of said articles on said conveyor, and means for advancing said slide member against said second mentioned yieldable means at a rate corresponding to the rate of advance of said accumulating articles until a group has been accumulated.

2. In combination with an intermittently travelling conveyor constructed to receive continuously and advance uprightly in regular groups of a desired size a succession of articles, said conveyor being fitted with bottom and side guide elements for directing the upright advance of said articles, a collecting mechanism for accumulating said continuously received articles into groups on said conveyor, said collecting mechanism comprising a slide member mounted for reciprocation in aligned relation with the bottom guide element of said conveyor adjacent the receiving end thereof, an article supporting finger pivoted on said slide member for folding flush therewith in the direction of advance of said accumulating articles on said conveyor, yieldable means normally maintaining said finger in an upright position for supporting said continuously received articles uprightly on said conveyor during accumulation of a group, a second yieldable means urging movement of said slide member reversely to the direction of advance of said accumulating articles, and means for engaging and advancing said slide member against said second mentioned yieldable means at a rate corresponding to the rate of advance of said accumulating articles and for releasing said slide member upon accumulation of each group.

3. The combination defined in claim 2 and further characterized in that yieldably biased gate members are hinged on said side guide elements closely adjacent the receiving end of said conveyor, said gate members being yieldably biased for extending laterally inward of said conveyor and thereby affording supplementary support for the first several articles received in each group, and said gate members being hinged for folding flush with said side guide elements upon further accumulation of articles in each group.

4. An article packing device comprising a plurality of article handling compartments mounted in spaced circular relation for movement about a common axis and having laterally shiftable end walls, a Geneva motion actuating the movement of said compartments intermittently about said axis, means for inserting a group of articles to be packed in each of said compartments while they are at rest at a given point in their intermittent movement, means for displacing said group of articles from each of said compartments while at rest at a succeeding point in said movement, and means for shifting said end walls inwardly of each compartment and thereby compressing

said group of articles endwise during movement between said first and second mentioned points of rest for insertion compactly in a packing container.

5. An article packing device comprising a support member mounted for rotation about a vertical axis, a plurality of article handling compartments disposed at regular intervals in circularly spaced relation on said support member, said compartments opening radially outward in relation to the axis of said support member, said compartments having laterally shiftable end walls, and said compartments having a back side wall movable radially in relation to the axis of said support member, a Geneva motion actuating intermittent rotation of said support member for circular movement of said compartments between successive regularly spaced stations, means for successively inserting a group of articles to be packed in each of said compartments at one of said stations, cam means for shifting said end walls laterally inward during movement of each compartment to a succeeding station and thereby compressing said group of articles endwise in said compartments, and a second cam means at said succeeding station for moving said back side wall radially outward and thereby displacing said endwise compressed group of articles for insertion compactly in a packing container.

6. An article packing device comprising conveying means for continuously receiving and intermittently advancing uprightly in regular groups of a desired size a succession of articles, ejector means operating transversely of said conveying means for successively transferring said groups of articles from said conveying means during a rest in the intermittent advance thereon, a plurality of article handling compartments mounted in regularly spaced relation for movement in a circular path adjacent said conveying means and opposite said ejector means, said article handling compartments having laterally shiftable end walls, means for shifting said end walls of each compartment, said shifting means disposing said shiftable end walls openly to the fullest extent opposite said ejector means for receiving therebetween a group of articles transferred from said conveying means by said ejector means, and said shifting means operating during movement of said compartment beyond said ejector means to shift said end walls inwardly and thereby compress each transferred group of articles endwise, and a Geneva motion actuating: the intermittent advance of said groups of articles by said conveying means; the operation of said ejector means in timed relation for transferring said groups of articles from said conveying means; and an intermittent circular movement of said compartments for successively receiving and compressing said groups of articles transferred from said conveying means by said ejector means.

7. An article packing device comprising conveying means for continuously receiving and intermittently advancing uprightly in regular groups of a desired size a succession of articles, ejector means operating transversely of said conveying means for successively transferring said groups of articles from said conveying means during a rest in the intermittent advance thereon, a plurality of article handling compartments mounted in regularly spaced relation for movement in a circular path between a station adjacent said conveying means and opposite said ejector means and at least one succeeding station spaced therefrom, said compartments being adapted for receiving said transferred groups of articles at said adjacent station and having means associated therewith for displacing said groups of articles therefrom at said succeeding station, a second conveying means arranged for engaging packing containers for said groups of articles and carrying said containers past said succeeding station for receiving said displaced groups of articles from said compartments, a second ejector means for removing said packing containers from said second mentioned conveying means after receiving said groups of articles, and a Geneva motion actuating: the intermittent advance of said groups of articles by said first mentioned conveying means; the operation of said first mentioned ejector means in timed relation for transferring said groups of articles from said first mentioned conveying means; an intermittent circular movement of said compartments for successively receiving at said adjacent station said groups of articles transferred from said first mentioned conveying means; an intermittent movement of said second mentioned conveying means for presenting packing containers serially at said succeeding compartment station to receive said groups of articles

as they are displaced from said compartments; and the operation of said second mentioned ejector means in timed relation for removing said packing containers from said second mentioned conveyor after insertion of said groups of articles.

8. The combination with a machine for forming cigarette paper booklets, of a device for packing said booklets comprising: conveying means for continuously receiving and intermittently advancing uprightly in regular groups of a desired size a succession of said booklets; ejector means operating transversely of said conveying means for successively transferring said groups of booklets from said conveying means during a rest in the intermittent advance thereon, a plurality of booklet handling compartments mounted in regularly spaced relation for movement in a circular path between a station adjacent said conveying means and opposite said ejector means and at least one succeeding station spaced therefrom, said compartments being adapted for receiving said transferred groups of booklets at said adjacent station and having means associated therewith for displacing said groups of booklets therefrom at said succeeding station, a second conveying means arranged for engaging packing containers for said groups of booklets and carrying said containers past said succeeding station for receiving said displaced groups of booklets from said compartments, a second ejector means for removing said packing containers from said second mentioned conveying means after receiving said groups of booklets, and a Geneva motion actuating: the intermittent advance of said groups of booklets by said first mentioned conveying means; the operation of said first mentioned ejector means in timed relation for transferring said groups of booklets from said first mentioned conveying means; an intermittent circular movement of said compartments for successively receiving at said adjacent station said groups of booklets transferred from said first mentioned conveying means; an intermittent movement of said second mentioned conveying means for presenting packing containers serially at said succeeding compartment station to receive said groups of booklets as they are displaced from said compartments; and the operation of said second mentioned ejector means in timed relation for removing said packing containers from said second mentioned conveyor after insertion of said groups of booklets.

9. An article conveying means for continuously receiving and intermittently advancing uprightly a succession of articles in regular groups of a desired size, said conveying means comprising bottom and side guide elements for directing the upright advance of said articles, intermittently operating feed means including a continuous series of upstanding advancing lugs spaced at regular intervals to accommodate an accumulated group of said articles therebetween for engaging and advancing successively accumulated groups of said articles in said guide elements, and collecting means for accumulating said continuously received articles successively in groups between said advancing lugs for engagement and advance by said intermittently operating feed means, said collecting means including a pivoted article supporting finger yieldably biased in upright position, a reciprocable member carrying said finger and yieldably biased in a direction opposite to the direction of advance of said accumulating articles, and means for engaging and moving said reciprocable member against the yieldable bias thereof, and thereby positioning said supporting finger to maintain said articles upright in said guide elements until a group is accumulated between said advancing lugs, and for releasing said reciprocable member upon accumulation of a group of said articles, whereby said member is returned by the yieldable bias thereof to position said supporting finger for accumulating a succeeding group of said articles, the return of said member being allowed by the pivoting of said yieldably biased supporting finger to clear said accumulated group of articles.

10. An article conveying means for continuously receiving and intermittently advancing uprightly a succession of articles in regular groups of a desired size, said conveying means comprising bottom and side guide elements for directing the upright advance of said articles, intermittently operating feed means including a continuous series of upstanding advancing lugs spaced at regular intervals to accommodate an accumulated group of said articles therebetween for engaging and advancing successively accumulated groups of said articles in said guide

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elements, an upstanding stop element disposed at the delivery end of said conveying means in the path of said advancing groups of articles and spaced in relation to said advancing lugs for compressing each of said article groups successively against the trailing advancing lugs at the position of rest for said intermittently operating feed means, and ejector means operating transversely of said feed means in timed relation for successively transferring said accumulated and compressed groups of articles from said feed means.

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