April 11, 1939. J. A. STOCK 2,153,652

RIP-CORD CARTON-MAKING MACHINE

Filed March 7, 1938 6 Sheets-Sheet 1

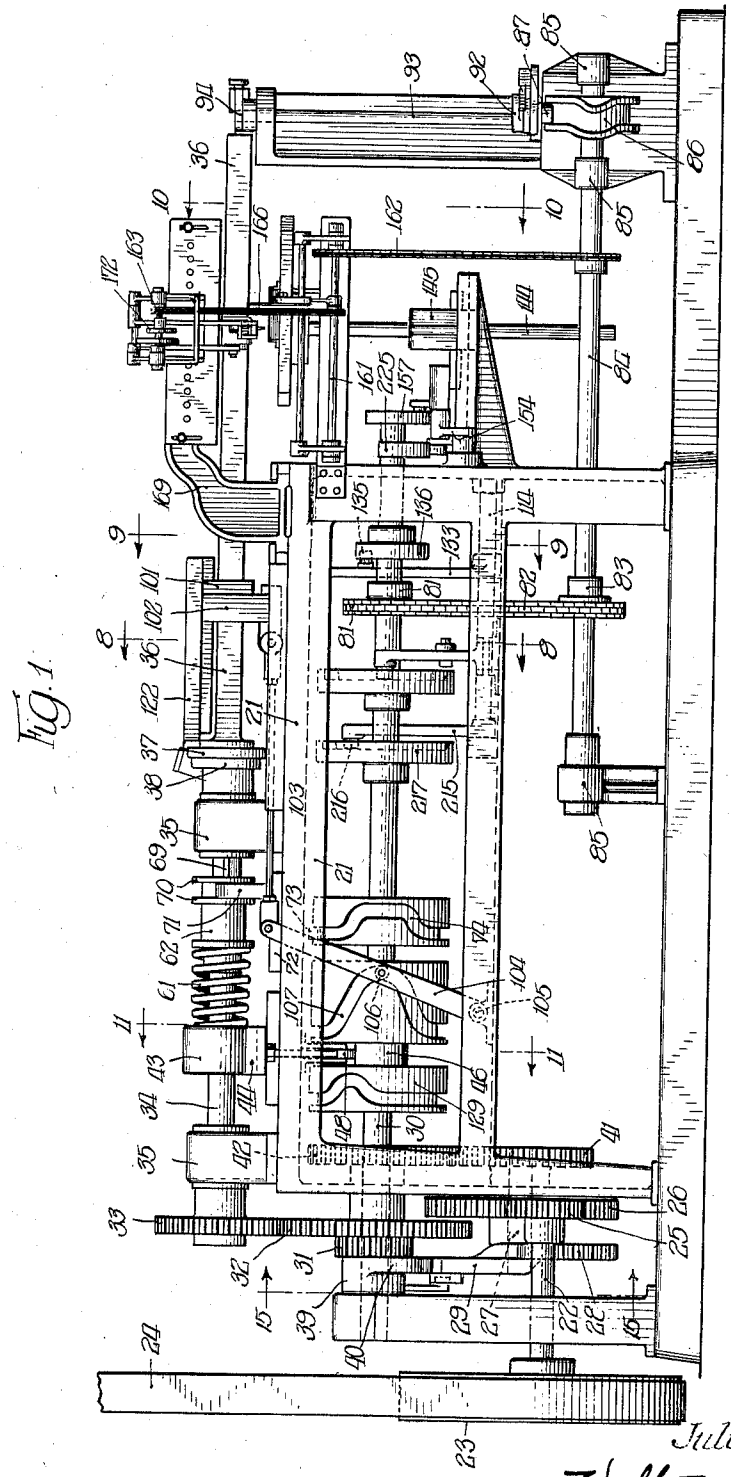


Fig. 1.

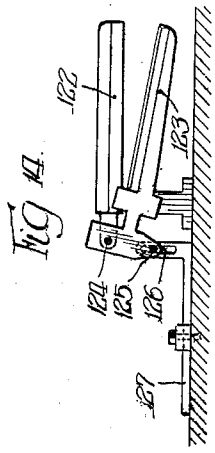


Fig. 14.

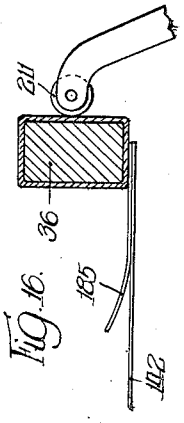


Fig. 16.

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RIP-CORD CARTON-MAKING MACHINE

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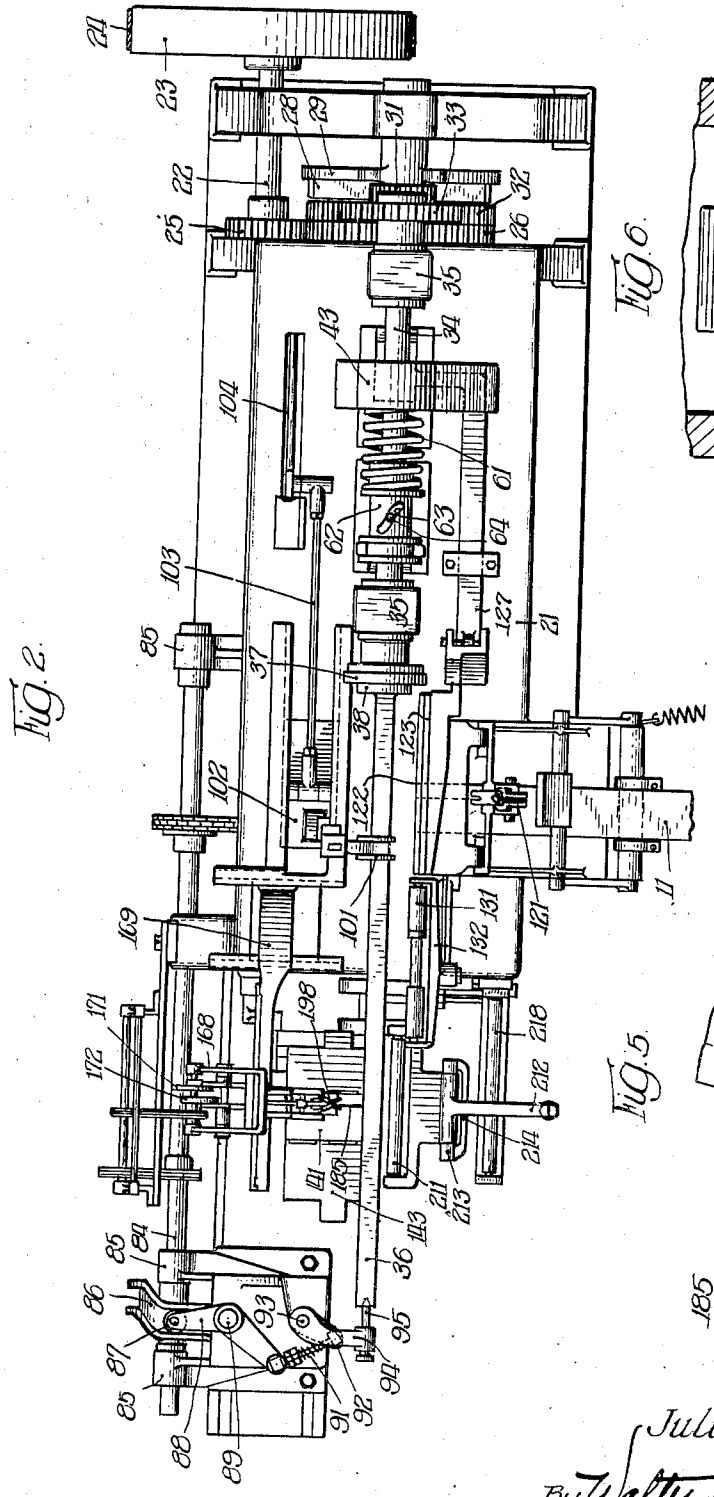


Fig. 2.

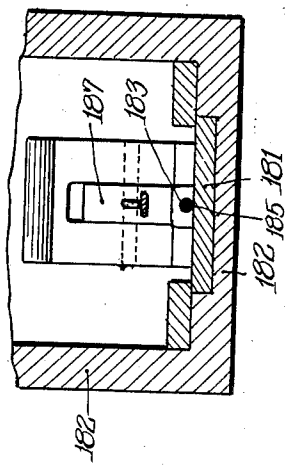


Fig. 6.

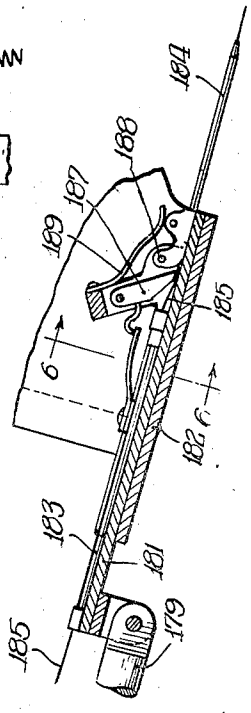


Fig. 5.

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RIP-CORD CARTON-MAKING MACHINE

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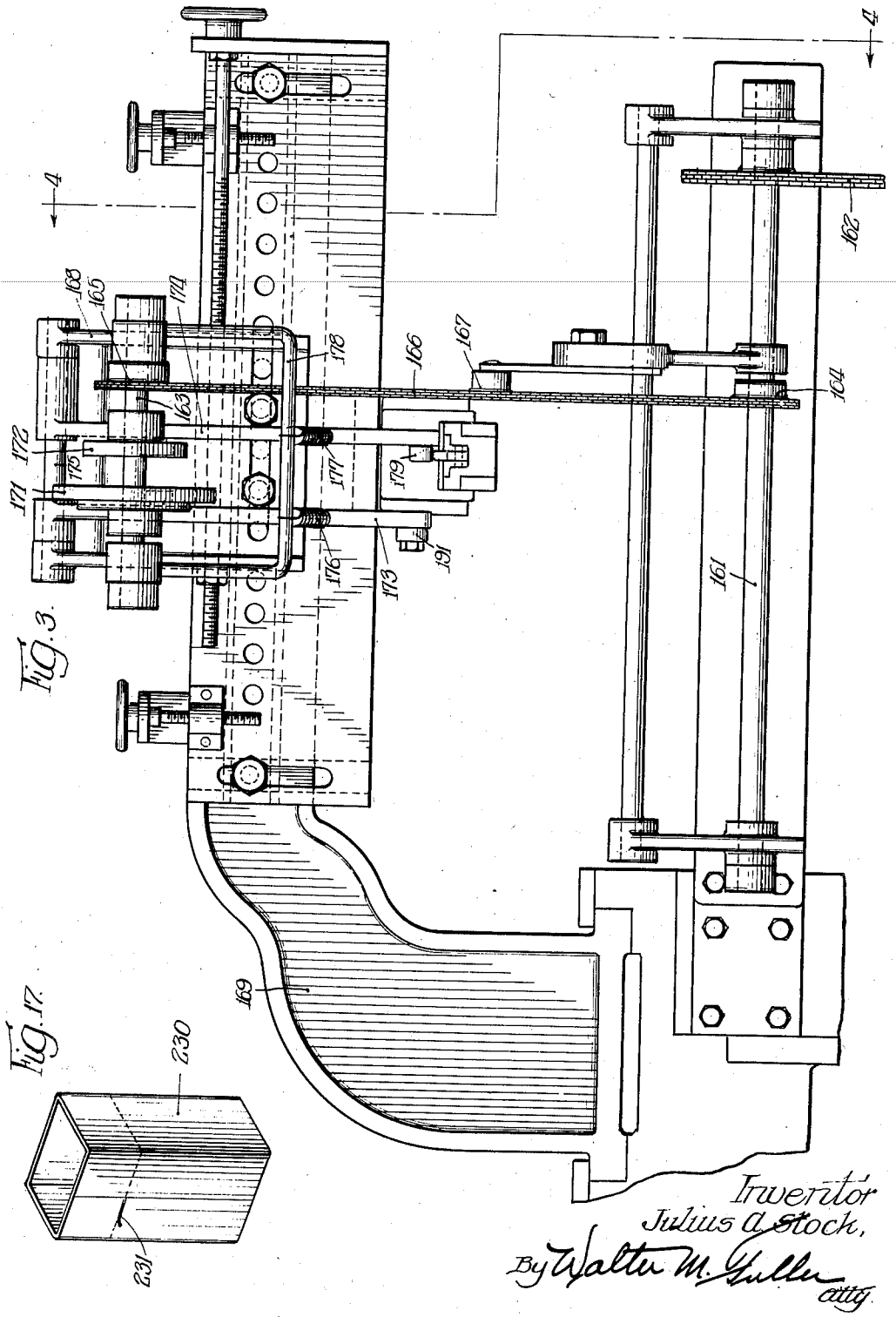


Fig. 3.

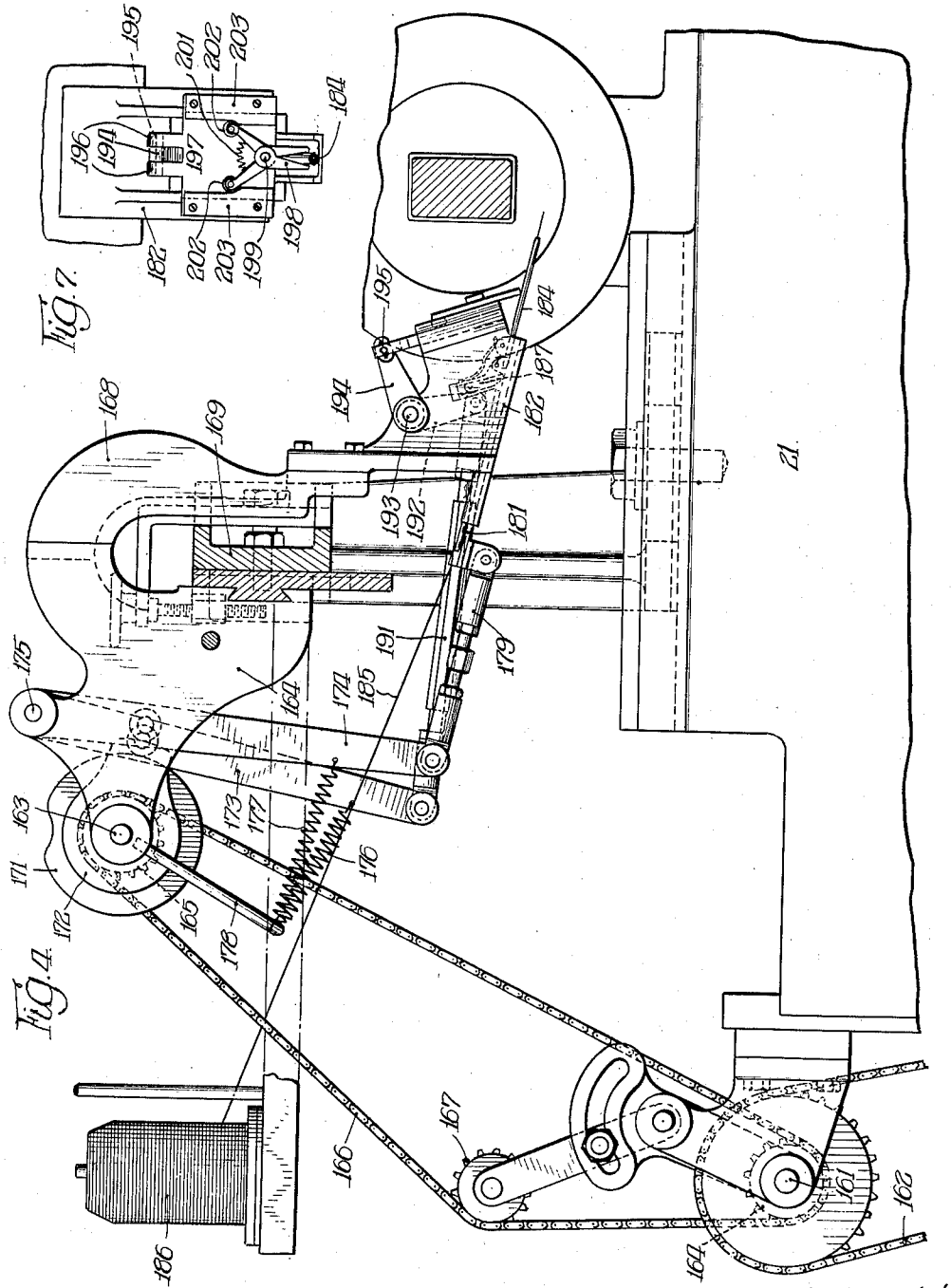
Fig. 17.

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April 11, 1939. J. A. STOCK 2,153,652

RIP-CORD CARTON-MAKING MACHINE

Filed March 7, 1938 6 Sheets-Sheet 4

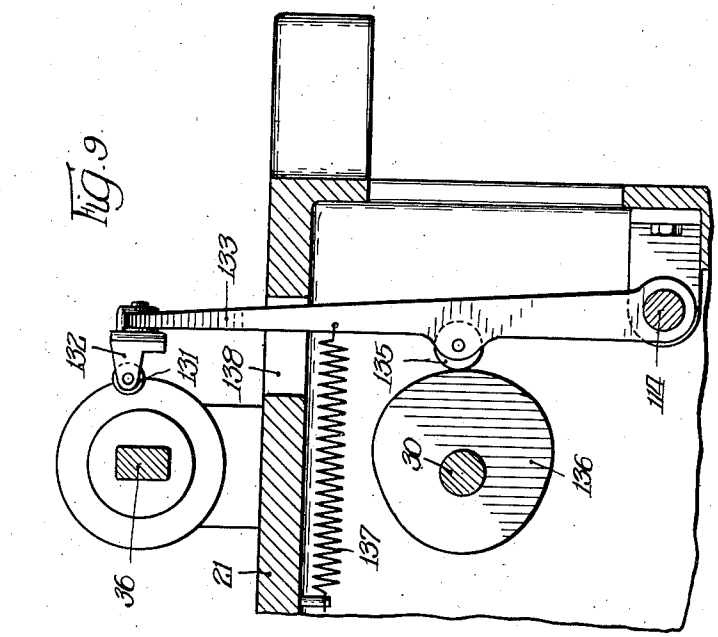


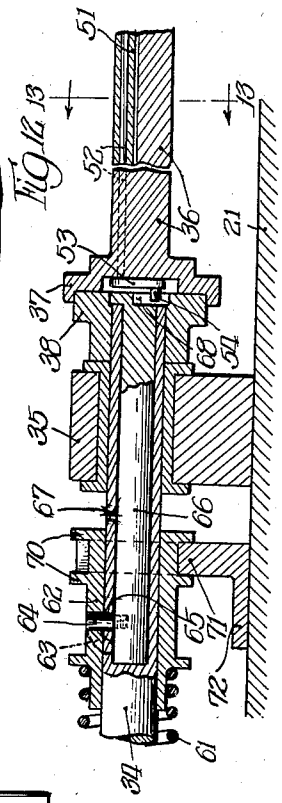
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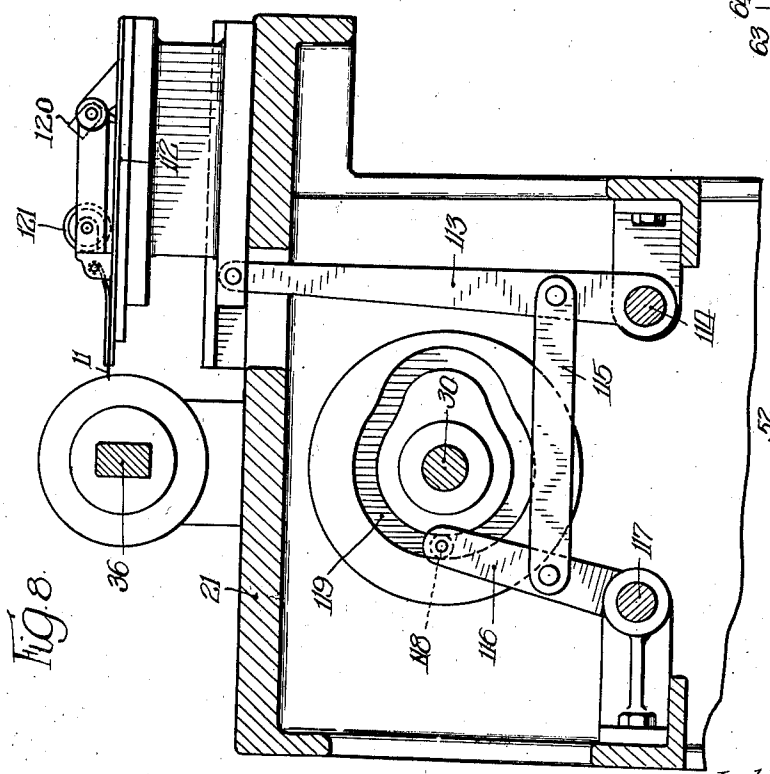
April 11, 1939. J. A. STOCK 2,153,652

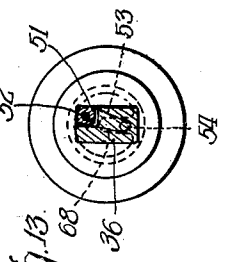
RIP-CORD CARTON-MAKING MACHINE

Filed March 7, 1938 6 Sheets-Sheet 5









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April 11, 1939. J. A. STOCK 2,153,652

RIP-CORD CARTON-MAKING MACHINE

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Fig. 11.

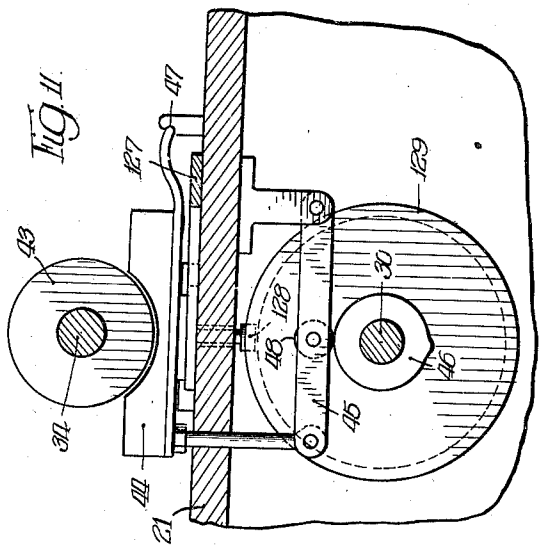


Fig. 15.

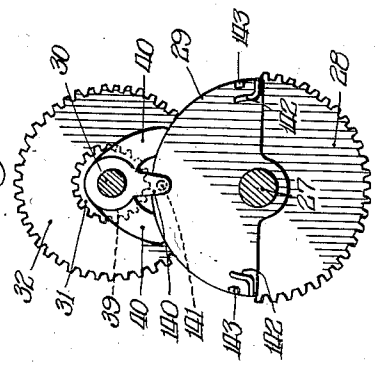
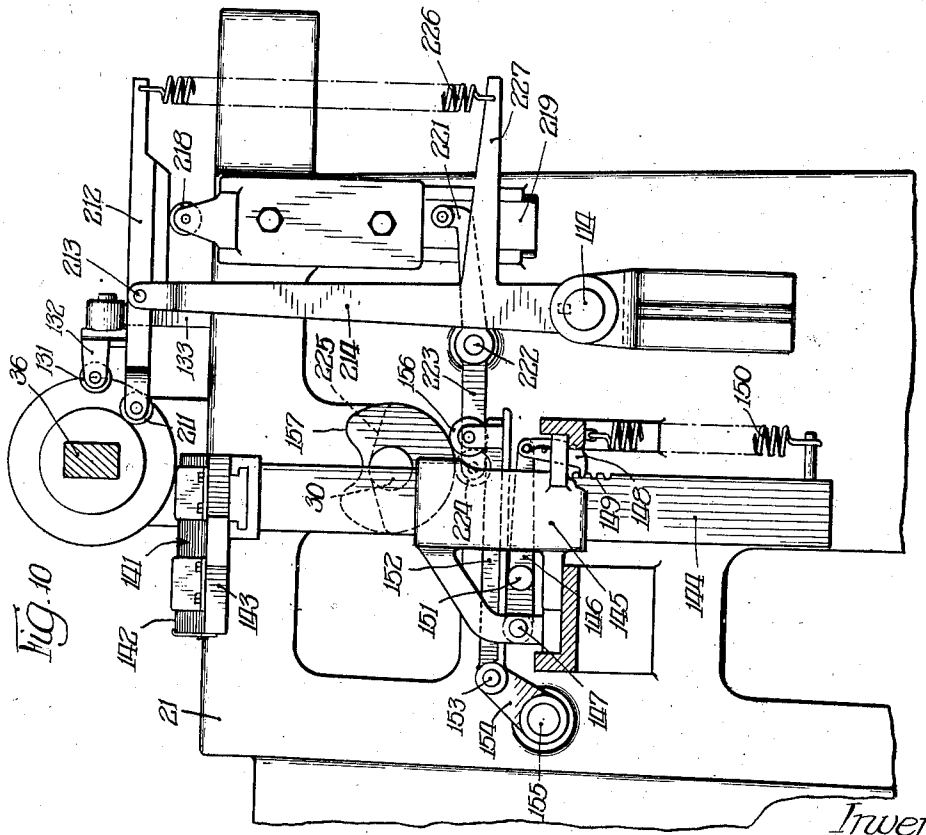


Fig. 10



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Patented Apr. 11, 1939

2,153,652

UNITED STATES PATENT OFFICE

2,153,652

RIP-CORD CARTON-MAKING MACHINE

Julius A. Stock, Chicago, Ill., assignor to W. C. Ritchie and Company, Chicago, Ill., a corporation of Illinois

Application March 7, 1938, Serial No. 194,285

10 Claims. (Cl. 93—81)

The current invention pertains to certain features of advantage and benefit in appliances or machines for making cartons, containers, receptacles, etc., and it relates more particularly, but not necessarily restrictedly, to machines for providing convolutely wound carton bodies equipped with rip cords and cover sheets or labels.

A leading object or prime purpose of the invention is to supply a machine which will make such carton bodies rapidly, efficiently, and at relatively small cost and which machine will afford effective service over a long period of time and be unlikely to become damaged or injured in ordinary service.

Although the novel and improved machine may have many of its parts adjustable or replaceable in order to enable it to make cartons or containers of a variety of sizes and shapes, the underlying valuable features of the invention are not necessarily coupled with such capacities for adjustments and replacements.

The new machine makes the convolutely wound carton body and supplies it with both the rip cord and label or cover sheet and while the elements of one or more of such carton bodies are being produced, the rip cords and labels are at the same time being supplied to one or more carton bodies previously made by and while still in the machine.

To enable those acquainted with this art to understand the invention fully, both from structural and functional standpoints, a present preferred embodiment of the invention has been illustrated in the accompanying drawings to which reference should be had in connection with the following detailed description, and for simplicity, like reference numerals have been employed throughout the several views of the drawings to represent or designate the same parts.

In these drawings:

Figure 1 is a side view of the new machine;

Figure 2 is a plan view of the machine;

Figure 3 is an elevation on an enlarged scale of the label and cord applying portion of the machine;

Figure 4 is a vertical section on line 4—4 of Figure 3;

Figure 5 is a section through the cord-feeding mechanism;

Figure 6 is a cross section on line 6—6 of Figure 5;

Figure 7 is a face view of the cord applying and cutting means;

Figure 8 is a vertical cross section on line 8—8 of Figure 1 showing the stock-feeding device;

Figure 9 is a vertical cross section on line 9—9 of Figure 1 illustrating the stock-rolling appliance;

Figure 10 is a vertical cross section on line 10—10 of Figure 1 and presents the label or cover sheet roller mechanism;

Figure 11 is a vertical cross section on line 11—11 of Figure 1 and shows the brake and its operating means;

Figure 12 is a longitudinal section through a portion of the mandrel and its rotating means and illustrates the clamp for the stock strips;

Figure 13 is a vertical cross section on line 13—13 of Figure 12;

Figure 14 shows the knife or shears for cutting off the stock strips from the supply;

Figure 15 is a vertical cross section on line 15—15 of Figure 1 presenting the locking means for the operating mechanism for the mandrel when the latter is stationary;

Figure 16 illustrates the manner of winding the label and cord around the wound stock strips; and

Figure 17 shows the finished carton element in perspective.

Referring to these drawings, it will be perceived that the novel and improved machine includes a main frame 21 of appropriate shape for properly supporting the various machine elements entering into the construction.

A short, properly journalled, drive shaft 22 is power driven by means of a pulley 23 and associated belt 24, the shaft having a small gear 25 thereon in mesh with the teeth of a larger gear 26 on an appropriately journaled shaft 27, the hub of gear 26 carrying a gear sector 28 of 180° coupled with a semicircular ring 29 at the side of the gear sector 27 and occupying the other 180°.

A long, suitably journaled shaft 30 (Figures 1 and 15) has two gears 31 and 32 secured together and free to turn on the shaft, gear sector 28 intermittently cooperating or meshing with the smaller gear 31 of the two gears to rotate the pair at spaced intervals of time, gear 32 being constantly in mesh with and adapted to revolve a gear 33 fixed on the end portion of a main, upper shaft 34 revoluble in bearings 35, 35.

An elongated mandrel or form 36 (Figures 1 and 12) on which the winding of the stock is to occur has at one end a flange 37 demountably bolted or otherwise removably secured to a flange 38 rotated by shaft 34.

From an understanding of the drive means described, it will be obvious that the mandrel 36 is interruptedly rotated a plurality of revolutions

(say three or four) at each actuation with intervening short periods of non-rotation.

In order that the associated or companion shaft 34 and mandrel 36 may be positively locked during their stationary periods, gear 31 has fixed thereto a hub 39 having two arms 40, 40 adapted to ride on the edge of the constantly rotating, semicircular member 29, while the continuously revolving sector 28 is temporarily out of mesh with its correlated gear 31, to lock gear 31 from turning.

Hub 39 has another depending arm 140 equipped with a roller 141 adapted to cooperate with the two cams 142, 142 and associated lugs 143, 143 adjacent to the ends of the gear sector 28 to shift the arms 40, 40 into and out of locking position, but of course it will be understood that any other appropriate locking means could be satisfactorily used as a substitute.

Shaft 30 is ceaselessly rotated by a gear 41 (Figure 1) on shaft 27 in mesh with another gear 42 fixed on shaft 30, and, in order to stop the rotation of shaft 34 quickly, it has a brake drum 43 (Figures 2 and 11) beneath which is a brake shoe 44 adapted to be raised against the drum by a rock arm 45 actuated by a cam 46 on shaft 30, the brake shoe being hinged at 47 and the arm 45 having a roller 48 riding on the cam.

Mandrel 36 (Figures 12 and 13) is fitted for a portion of its length with an elongated, stock strip clamp 51 rockingly mounted in the mandrel, and, when in locking position, it is substantially flush with the surface of the mandrel, the shaft 52 on which such clasp is mounted having on its exposed end a short arm 53 with a roller 54, the following cooperating instrumentalities being employed to open and close such clasp or clamp 51.

A coiled spring 61 (Figures 1, 2 and 12) bears at one end against the brake member 43 and presses at its other end against a sleeve 62 slidable lengthwise on shaft 34 and having an oblique slot 63 therethrough, accommodating a pin 64 extended through a slot 65 in, and at a right angle to the axis of, the shaft 34 and into a short shaft 66 oscillatory in a cylindrical cavity 67 in the end of shaft 34 and having a slot 68 in its end accommodating the roller 54.

Thus, when sleeve 62, which is keyed at 69 (Figure 1) to shaft 34, is slid to the left as viewed in Figure 1 against the pressing action of spring 61, its oblique slot will turn pin 64 partway around the axis of the shaft in slot 65 causing the shaft 66 and its slot 68 to turn correspondingly with equal and like swinging of the clasp or clamp 51, the latter being open when the mandrel is not rotating to receive the front edge of the strips of stock to be wound convolutely around the mandrel, the clamp automatically closing as soon as shaft 34 begins to turn again.

Sleeve 62 has spaced circular ribs 70, 70 (Figure 12) which have between them an operating yoke 71 on a slide 72 fitted with a roller 73 (Figure 1) in the groove of a cam 74 mounted on, and revolving with, shaft 30, whereby this cam controls the opening and closing of the clasp or clamp in the mandrel.

By means of a sprocket wheel 81 on shaft 30 (Figure 1), a sprocket chain 82, and a second sprocket wheel 83 on a lower shaft 84, mounted to turn in bearings 85, 85, 85, such shaft is revolved uninterruptedly, the shaft near one end carrying a cam 86 (Figures 1 and 2) which, by means of a roller 87 in its groove, rocks bell-crank lever 8 fulcrumed at 89, such lever through a yielding connection 91, rocking arm 92 on the lower end of a suitably journalled, upright shaft 93, which at its top end has an arm 94 carrying a rotary, tapered or conical bearing 95 fitting in a complementary recess in the otherwise free end of the mandrel 36. When the finished carton bodies are delivered or discharged one by one from such end of the mandrel, the bearing referred to moves automatically away temporarily to permit such action.

To feed the partially completed and the finished carton bodies along the mandrel, the latter is supplied with a pusher 101 (Figures 1 and 2) mounted on a slide 102 connected by a link 103 to an arm 104 fulcrumed or hinged on the frame at 105 and having a roller 106 occupying the groove of cam 107 on shaft 30.

The supply strip of paper or other stock 11, coated with an adhesive on its top surface, (Figure 2) is fed by and also over a slide 112 (Figure 8) having a feeding pawl 120 engaging the top surface of the stock, the slide being actuated by a rock arm 113 rockingly mounted on a shaft 114 accommodated in bearings on the frame, said arm being swung forwardly and rearwardly by a link 115 connecting arm 113 to another rock arm 116 hinged on the frame at 117 and having at its upper end a roller 118 in the groove of a cam 119 on shaft 30.

The slide 112 in moving toward the mandrel feeds the stock to the clamp 51 on the mandrel 36 by means of its usual and well-known feeding pawl 120, and, after the advance end of the stock has been clamped to the mandrel, the subsequent rotation of the mandrel draws the stock forwardly over the slide during the rearward travel of the slide and pawl.

Such supply strip in thus passing over the slide is cut into two parallel parts side by side by a cutting disc 121 (Figures 2 and 8) mounted on the slide 112 for rotation in any approved manner, and, after the proper lengths of the two strips have been fed to the mandrel, they are cut off by shears (Figures 2 and 14) comprising an upper stationary blade 122 and a companion, movable blade 123 hinged at 124 and having a pin 125 in a slot 126 of a suitably guided slide 127 actuated by a roller 128 (Figure 11) in the groove of a cam 129 on shaft 30, whereby at the proper moment the pair of stock strips feeding between the knife blades 122, 123 are cut off from their supply, and the slide retracts for the next feeding operation.

Of course, it is to be understood that the stock strip feeding means is in register with that part of the mandrel equipped with the clamp or clasp 51 referred to above.

At the side of the stock feeding mechanism described above, there is a roller 131 adapted to act on the convolutely wound, adhesively coated strips on the mandrel to cause them to become adequately cemented together.

Such roller 131 (Figures 2 and 9) is mounted to revolve freely in a support 132 on the upper end of a rock arm 133 hinged on the shaft 114 and fitted with a roller 135 acted upon by the edge of a cam 136 on shaft 30, the arm being pulled toward the cam by a coiled, contractile spring 137, and, as is shown, arm 133 extends up through a slot 138 in the table portion of the frame and the mounting of the roller is such that it can follow the cross sectional contour of the mandrel 36 regardless of the shape of the latter.

Turning now to the means provided for applying the labels or cover sheets to the convo-

lutely wound body parts of the cartons, it will be observed, as shown in Figure 10, that a pile 141 of such labels 142 is located on a small table 143 at a lower level than the underside of the mandrel 36, and adjustably mounted on the upper end of an upright bar 144 slidable through a vertical opening in a bracket or casting 145 mounted on the machine frame, such casting having an arm 146 hinged thereon at 147 and carrying at its end a spring-pressed latch or catch 148 adapted through the open side wall of the casting to enter any one of a series of recesses or notches 149 in the adjacent edge of the bar.

A spring 150 is fastened at its upper end to the frame and at its other end to a pin on the lower part of the bar, and such spring tends at all times to raise the latter and its pile of labels, but it is restrained from so doing, except at the proper moments, by a cross pin 151 extended through the arm 146 and engaging the under side of another arm 152 hinged at 153 to a rock arm 154 oscillatory on a stub shaft 155, element 152 at its free end having a roller 156 riding on the edge of a cam 157 fixed on and rotatable with shaft 30, the cam having a notch or recess, which, when it registers with the roller 156, permits the latter to ascend under the contractile action of spring 150 and allows the label table 143 and the labels 142 to be raised so that the topmost label will engage the adhesively coated, companion carton elements on the mandrel 36 and become adhered thereto preliminary to being completely wrapped around such elements during the rotation of the mandrel by a roller 211, described hereinafter.

The rip cord applying mechanism comprises the following coacting parts: Shaft 84 rotates a smaller, intermediate shaft 161 (Figures 1 and 3) by means of a sprocket wheel and chain connection, characterized as a whole 162, and such shaft 161 in turn revolves a shorter, higher shaft 163 (Figures 3 and 4) through sprocket wheels 164 and 165 and sprocket chain 166, a tightening idler wheel 167 also being employed in association with the chain.

Shaft 163 is mounted to rotate in arms of a bracket 168 adjustable along a supporting arm 169 carried by the frame of the machine.

Shaft 163 has two cams 171 and 172 mounted thereon to turn therewith and these cams act respectively on rock arms 173 and 174 hinged on a top shaft or rod 175 and pulled outwardly by coiled, contractile springs 176 and 177 connected to a wire frame 178.

Arm 174 by means of a link 179 is operatively joined to a slide 181 (see Figures 4, 5 and 6) mounted to reciprocate in the lower portion of a bracket 182 on member 168, the slide at its top having two, small, aligned tubes 183, 184 adapted and designed to have the cord 185 from a supply spool 186 extend therethrough, a spring-pressed, inclined, hinged finger or catch 187 engaging the cord between the spaced ends of the guide tubes and acting to permit forward feed of the cord therebeneath the catch, but precluding rearward travel of the cord, all as will be readily understood.

Tube 184 is desirably hinged at 188 for vertical rocking capacity and it is normally held down on the bracket by a leaf spring 189.

The other rock arm 173 is connected by a link 191 to an arm 192 on a short shaft 193 journalled in the spaced sidewalls of bracket or member 182, such shaft between the sidewalls having an arm 194 slotted at its free end to accommodate a pin 195 in the separated extensions 196, 196 of an inclined slide 197 guided in the bracket, the slide having a pair of scissors or shears 198 mounted thereon at 199, the cutting edges of the scissors or shears being slightly above the path of travel of the cord 185.

The parts of the shears or scissors corresponding to the handles are pressed apart by an intervening expansive spring 201 and they are also supplied with rollers 202, 202 riding on the cam edges of a pair of plates 203, 203 adjacent to and overlying the marginal portions of the slide.

Obviously, when the slide descends, the scissors cut the cord, and when the slide ascends the scissors open again.

In addition to the foregoing coacting parts of the mechanism, the machine includes a roller for rolling down the applied labels on the box bodies and the intervening cord which has a trailing end designed to extend freely outside of the applied label.

Such roller 211 (Figures 2 and 10) is mounted in the bifurcated end of a rock arm or lever 212 fulcrumed at 213 on the upper end of an arm 214 keyed to shaft 114 which is oscillated by means of an arm 215 keyed thereon (Figure 1) having a roller 216 in the side cam groove of a cam 217 on shaft 30, and, by this means, roller 211 is moved substantially horizontally toward and from the mandrel 36.

Such roller 211, however, requires a yielding up-and-down action and this is brought about by the fact that the lever 212 rests on an elongated roller 218 on the top end of a suitably guided vertical slide 219 reciprocated by an arm 221 on a shaft 222 having another arm 223 carrying a roller 224 coacting with cam 225 on shaft 30.

A spring 226 connects the end of arm 212 with a side extension 227 on arm 214, thus tending to raise the roller 211 up to the mandrel, this action, however, being controlled by roller 218 and its operating cam 225.

The operation of the machine occurs practically as follows:

While the mandrel is stationary and its clamp 51 is open, the slide 212 advances the slit stock causing the front ends of the two paper or other thin strips to become clamped to the mandrel as the latter soon thereafter starts its period of rotation.

The turning of the mandrel winds these two adhesive-coated strips therearound convolutely the required number of times to secure the needed thickness of layers which thereby become more or less cemented together, and, of course, at the proper moment, the shears 122, 123 sever the parallel strips from the supply strip.

All this occurs while the slide or feeder 101 is to the right of the winding strips as the parts are viewed in Figure 2.

The winding having been accomplished, the clamp 51 having opened, and the mandrel having stopped temporarily, the feeder 101 advances the wound strips along the mandrel to a position in register with the pressing roller 131 and it also feeds the other previously wound strips along the mandrel and delivers one completed article from the end of the mandrel.

During the next period of rotation, while another pair of strips are being wound on the mandrel, the roller 131 yieldingly rolls the pair of strips under consideration so that they are securely cemented together, the roller following the cross sectional contour of the mandrel even though it is rectangular rather than circular.

The next forward feed along the mandrel, during its period of non-rotation, brings these particular convolutely wound pair of strips into register with the cord and label applying means, and, while the mandrel is stationary, the cord **185** having been advanced by its sliding feeder to a position above the topmost label with the end of the cord in substantial register with the remote edge of the label, and with the cord in register with the division between the two wound strips, the label table rises carrying the overlying cord with it and applies the advance portion of the upper label and the cord to the undersides of the wound strips and then recedes.

The mandrel then performs its next set of revolutions and the cord and label are wound around the companion body strips with the cord at the division between such strips.

As the cord is thus being wound around such carton body, it pulls the cord from the supply spool through the cord feeder while the latter is retracting preliminary to its next cord-feeding operation.

At the proper moment, the scissors **198** cut off the cord from the supply so as to leave a portion of the cord trailing behind the corresponding edge of the label, thus in the finished carton element **230** there is an exposed, accessible end **231** (Figure 17) to enable the rip cord to be easily grasped and pulled to sever the covering label in register with the division between the two parts of the labeled body, thus separating these two parts.

This cord-tearing operation, of course, is not carried out until the labeled elements have been supplied with an internal collar or neck, two ends, and the contents of the receptacle, none of which are shown, nor directly involved with this invention.

While the label and cord are being wound around the associated body elements, and thereafter, or merely thereafter, the spring-pressed roller **211** advances to the labeled body and rolls it securely in place with, of course, the major portion of the cord between the label and body, and, as in the previous instance, such roller yields to conform to the shape of the elements on which it rolls.

Subsequently, the labeled body is delivered from the machine from the then free end of the mandrel by the advance of the following uncompleted products.

Those acquainted with this art will understand that the invention, as defined by the appended claims, which should be interpreted as broadly as permissible by the state of the prior art, is not limited and restricted to the precise and exact details of structure and modes of operation stated and that modifications can be resorted to without departure from the heart and essence of the invention and without the loss or sacrifice of any of its material benefits and advantages.

I claim:

1. The combination of a table adapted to support a pile of cover sheets, means to feed the advance section of a rip-cord supply over the topmost cover sheet on said table with the end of the cord in substantial register with one edge of said topmost cover sheet, means to raise said table, cover sheets and rip-cord section to the carton element around which such cover sheet and rip cord are to be wound, means to so wind such cover sheet and rip cord around the carton element during rotation of the latter, and means to sever such rip-cord section from said supply with an end trailing beyond the opposite edge of said cover sheet, whereby when the cover sheet and cord have been wrapped around the carton element such trailing portion of the cord will be exposed outside of the cover sheet and be readily accessible for ripping said cover sheet asunder.

2. In a carton element making machine, the combination of a rotatably mounted mandrel, means to rotate said mandrel intermittently about its axis, means to feed successively to said mandrel pairs of stock strips with the adjacent edges of each pair practically in contact with one another, means to clamp the advance ends of said pairs of strips successively temporarily to said mandrel, whereby during rotation of the mandrel said pairs of strips are wound successively convolutely therearound side-by-side, means to feed rip-cord sections successively and by rotation of said mandrel to wind one such rip-cord section around each said pair of wound strips on the mandrel in substantial registration with the joint between said wound strips, means to feed cover sheets successively and by rotation of said mandrel to wind one such cover sheet around each said pair of wound strips and their rip-cord section leaving an exposed accessible end of the latter, and means to discharge the carton elements thus formed from the machine.

3. In a carton element making machine the combination of a rotatably mounted mandrel, means to rotate said mandrel intermittently about its axis, means to feed a supply strip to said mandrel, means to sever said supply strip longitudinally into two stock strips side-by-side, means to clamp the advance ends of said stock strips temporarily to said mandrel, means to sever said stock strips from said supply strip, whereby during each period of rotation of said mandrel a pair of said stock strips are wound convolutely side by side around the mandrel with their adjacent edges practically in contact with one another, means to feed rip-cord sections successively and by each period of rotation of said mandrel to wind one such rip-cord section around each pair of previously wound strips on the mandrel in substantial register with the joint between them, means to feed cover sheets successively and by each period of rotation of said mandrel to wind one such cover sheet around each pair of previously wound strips on the mandrel and their rip-cord section leaving an exposed accessible end of the latter, and means to discharge the carton elements thus formed from the machine.

4. In a carton element making machine, the combination of a rotatably mounted mandrel, means to rotate said mandrel intermittently about its axis, means to feed successively to said mandrel pairs of stock strips with the adjacent edges of each pair practically in contact with one another, means to clamp the advance ends of said pairs of strips temporarily to said mandrel, whereby during rotation of the mandrel said pairs of strips are wound successively convolutely therearound side-by-side, means to slide said pairs of strips along said mandrel when their winding thereon has been completed thereby sliding the previously wound strips therealong in advance thereof, means to feed rip-cord sections successively and by a later period of rotation of the mandrel to wind one such rip-cord section around and in register with the joint between each pair of said advanced wound strips while another pair of stock strips is being wound around the mandrel at the original winding position, means to feed cover sheets successively and by a period of

rotation of the mandrel to wind one such cover sheet around each pair of said advanced wound strips and their rip-cord section while a pair of stock strips are being wound around the mandrel at the original position, and means to deliver the finished carton elements from the machine.

5. The carton element making machine presented in claim 4 in which said cover sheets are wound around said advanced wound stock strips at the same later period of rotation of said mandrel that said rip-cord section is wound around the same pair of wound strips.

6. The carton element making machine presented in claim 4 in which said cover sheet and rip-cord section for each pair of wound strips are wound around said wound strips substantially simultaneously during the same later period of rotation of the mandrel.

7. The carton element making machine presented in claim 2 in combination with a rip-cord supply and means to sever therefrom a section for winding around each pair of wound stock strips.

8. The carton element making machine presented in claim 3 in combination with a rip-cord supply and means to sever therefrom a section for winding around each pair of wound stock strips.

9. The carton element making machine presented in claim 4 in combination with a rip-cord supply and means to sever therefrom a section for winding around each pair of wound stock strips.

10. In a carton element making machine, the combination of a rotatably mounted mandrel, means to rotate said mandrel intermittently about its axis, means to feed successively to said mandrel pairs of stock strips with the adjacent edges of each pair practically in contact with one another, means to clamp the advance ends of said pairs of strips temporarily to said mandrel, whereby during the periods of rotation of the mandrel said pairs of strips are wound successively convolutely therearound side-by-side, a table adapted to support a pile of cover sheets, means to feed successively the current advance section of a rip-cord supply over the current topmost cover sheet on said table with the end of the cord in substantial registration with one edge of the topmost cover sheet, means to raise and lower said table, cover sheets and rip-cord section intermittently to apply a portion of the current topmost cover sheet and of its corresponding rip-cord section to each pair of said successive wound stock strips with the rip-cord section in substantial registration with the joint between the wound strips, for winding of such cover sheet and rip-cord section around their pair of wound stock strips during a period of rotation of the mandrel, means to sever the current rip-cord section from said supply with an end trailing beyond the opposite edge of said topmost cover sheet, whereby when the cover sheet and cord have been wound around the wound stock strips such trailing portion of the cord will be exposed outside of the cover sheet and be readily accessible for ripping said cover sheet asunder, and means to discharge the finished carton elements thus formed from the machine.

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