

Aug. 29, 1933.

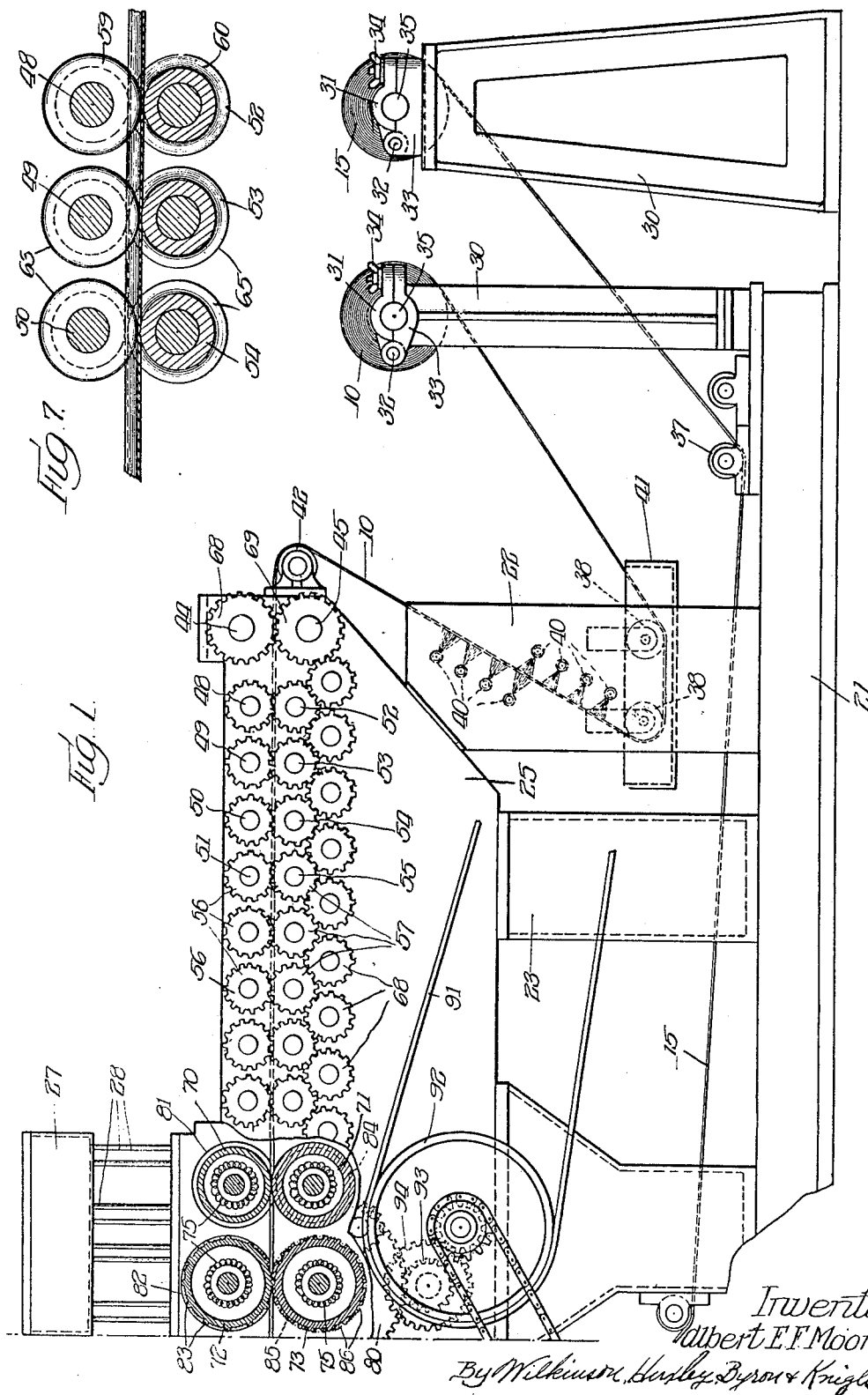
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1,924,873

MACHINE FOR MAKING PACKING MATERIAL

Filed Nov. 1, 1930

6 Sheets-Sheet 1



Aug. 29, 1933.

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MACHINE FOR MAKING PACKING MATERIAL

Filed Nov. 1, 1930

6 Sheets-Sheet 2

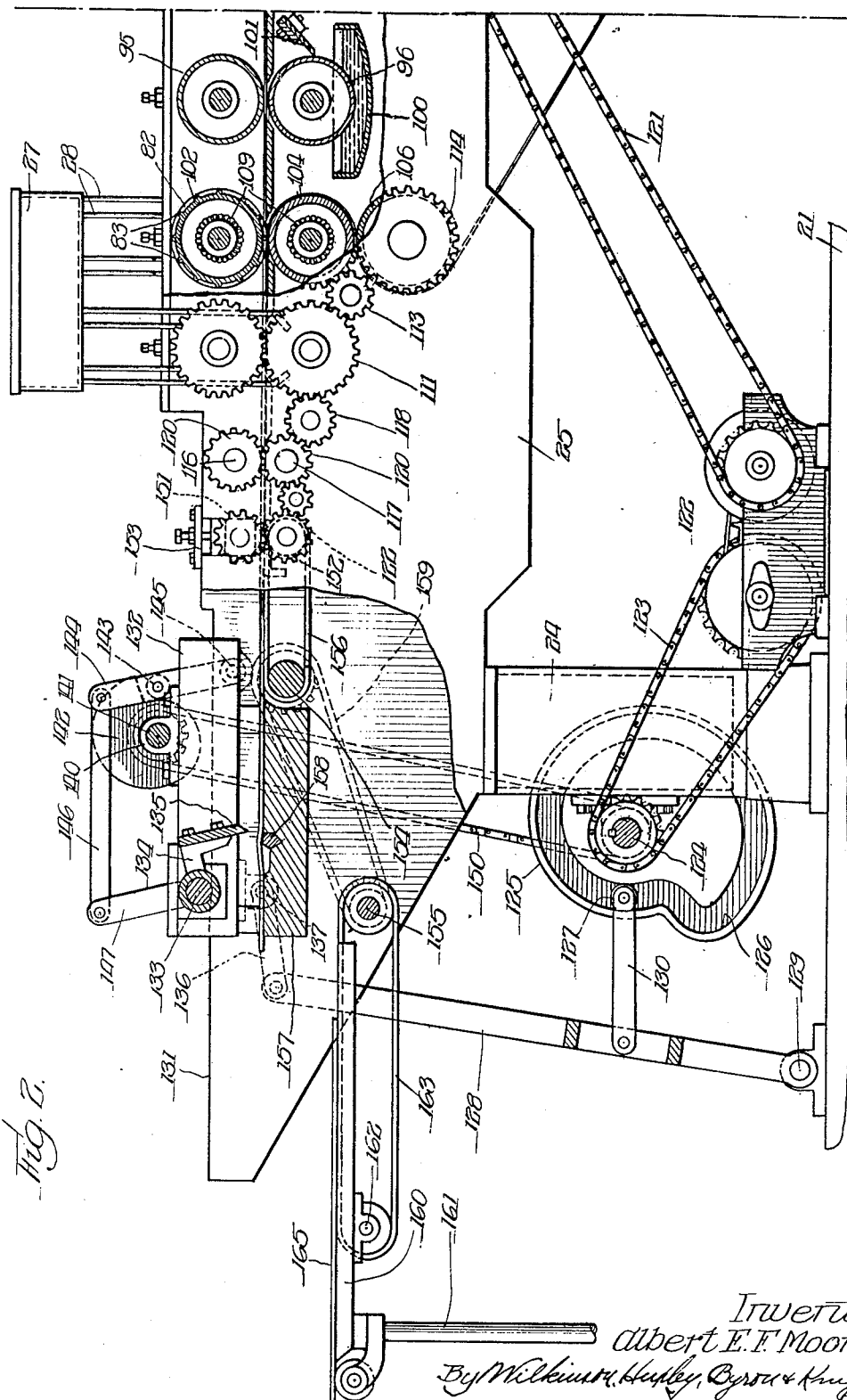


Fig. 2.

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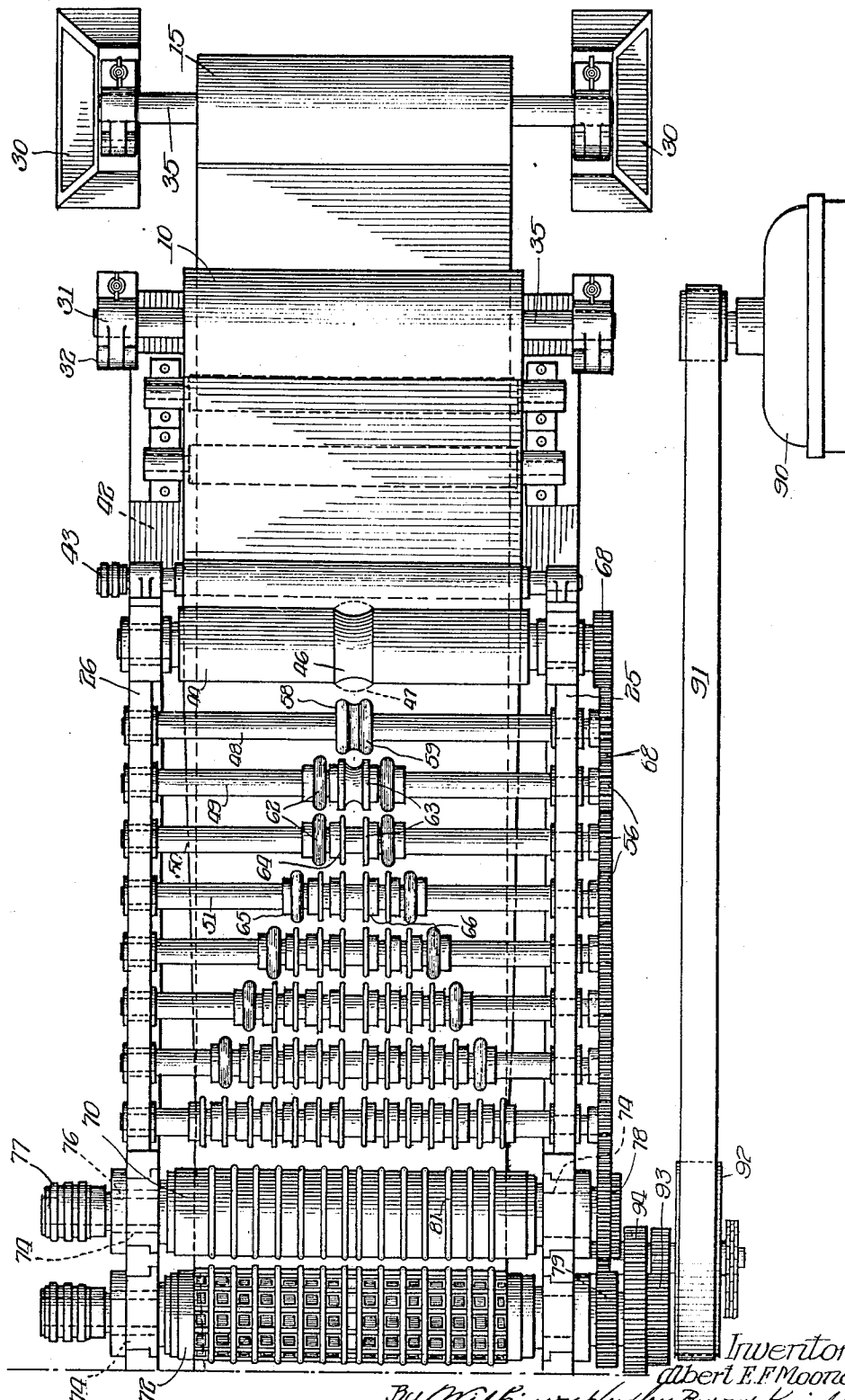
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6 Sheets-Sheet 3

Fig. 3.



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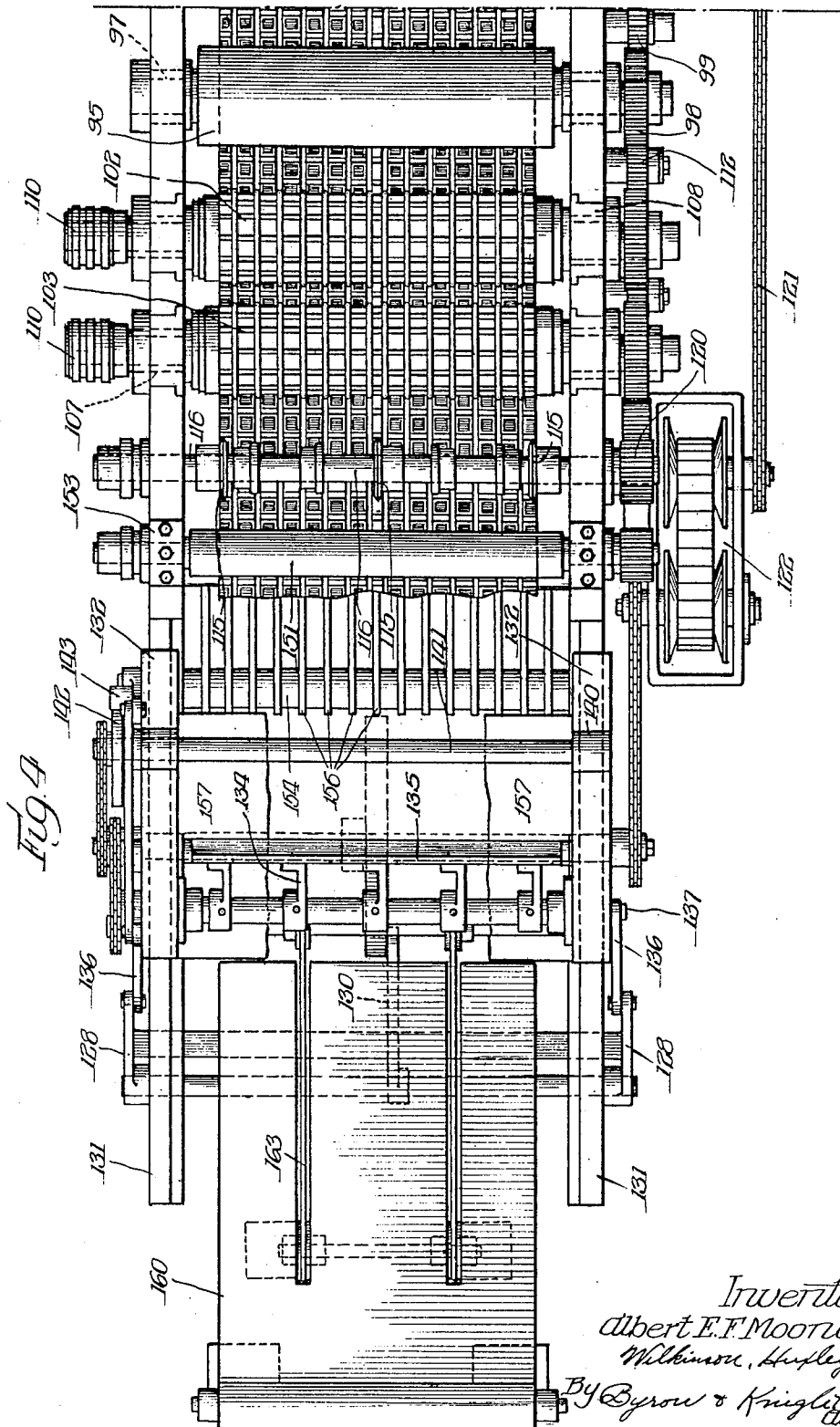
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MACHINE FOR MAKING PACKING MATERIAL

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6 Sheets-Sheet 4



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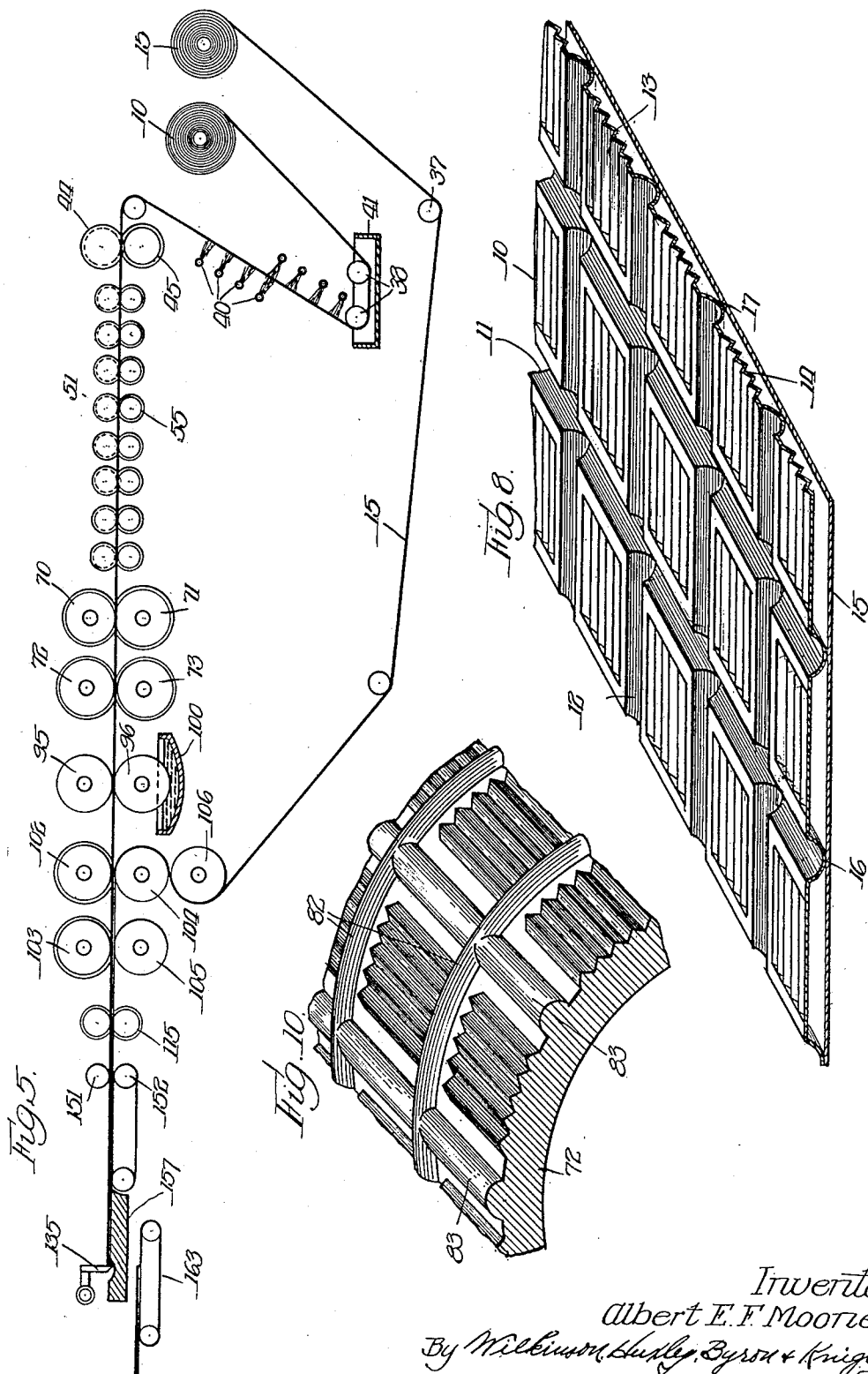
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MACHINE FOR MAKING PACKING MATERIAL

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6 Sheets-Sheet 5



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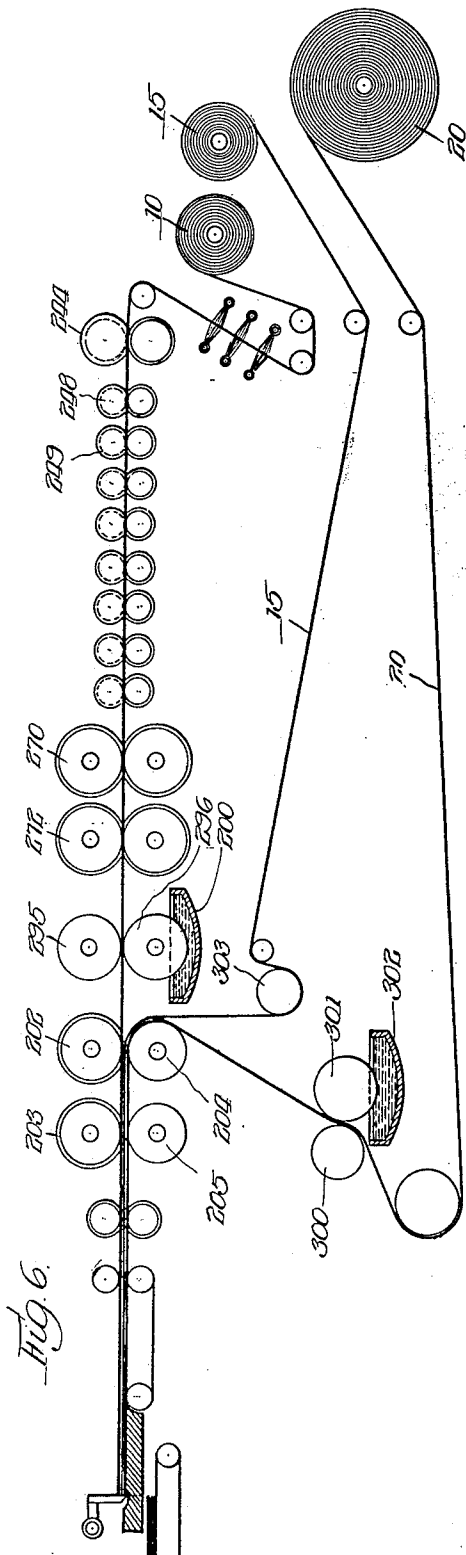
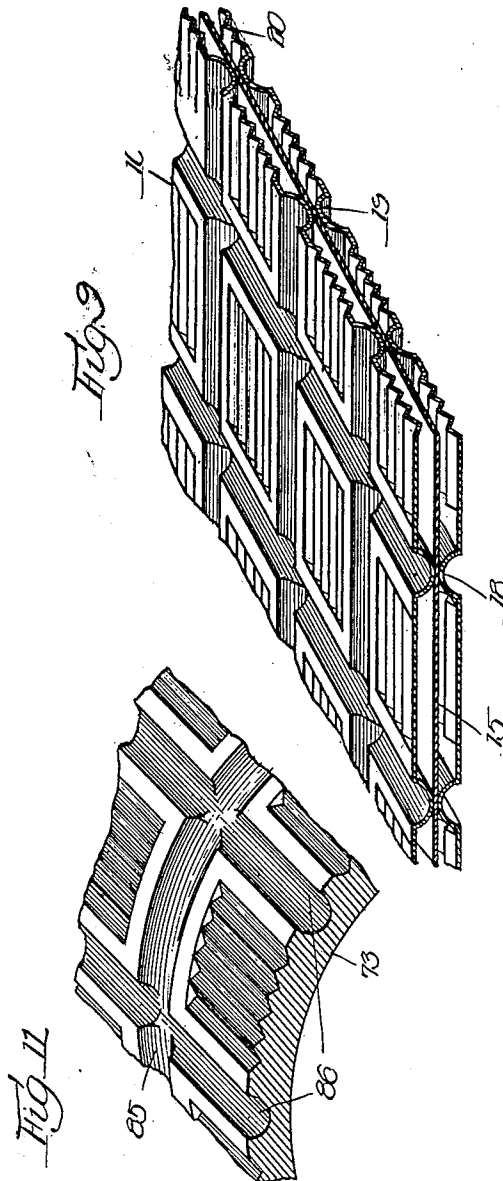
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MACHINE FOR MAKING PACKING MATERIAL

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6 Sheets-Sheet 6



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UNITED STATES PATENT OFFICE

1,924,873

MACHINE FOR MAKING PACKING MATERIAL

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Application November 1, 1930. Serial No. 492,740

10 Claims. (Cl. 154—31)

The invention relates to apparatus for making packing material and has reference in particular to a method and means for forming packing material having super-cushioning properties.

5 An object of the invention is to provide a machine having improved means for efficiently forming a plurality of grooves in a continuously moving sheet of paper longitudinally thereof, by initially gathering said sheet centrally of the
10 same by forming offsets in the plane of the sheet and subsequently utilizing the offsets to form the grooves; to provide improved means including a series of drums to successively form embossed areas on the sheet as it is received from the
15 gathering rolls and to apply to the side of the sheet opposite the embossed areas a thin coating of an adhesive; to provide means including a second series of drums to press together the embossed sheet and a backing sheet whereby the
20 two sheets are secured together by means of the adhesive to form the packing material. Another important feature of the invention comprises the provision of novel means for receiving the material as it leaves the finishing drums and
25 successively stripping the same to the desired width and cutting the same transversely into desired lengths.

Another object of the invention is to provide a machine which will perform all of the above
30 stated objects and in addition will include novel mechanism for successively applying a coating of adhesive to a second sheet provided with embossed areas and pressing said coated sheet into contact with the backing sheet of previously
35 formed material to thus form packing material having increased thickness with resulting increased resiliency.

Another object of the invention resides in providing a method of forming a sheet in which
40 the longitudinal grooves are formed progressively; in which the grooves are set in the sheet by heating the same prior to forming embossed areas in the sheet by simultaneously heating the sheet and forming transverse grooves therein; in
45 which the embossed sheet is joined to a backing sheet and simultaneously heated again to set the adhesive, resulting in the finished packing material.

A further object resides in providing a pair
50 of drums having groove forming members thereon for forming embossed areas in the sheet, and succeeding pairs of drums with only one drum of each pair having the groove forming members thereon, the cooperative drum of each pair being plain.

A further object of the invention is to provide a machine having pairs of drums, certain of which have groove forming members thereon for successively forming embossed areas in a sheet of paper and setting the embossed areas
60 while simultaneously applying the embossed sheet to a backing sheet.

With these and various other objects in view, the invention may consist of certain novel features of construction and operation as will be
65 more fully described and particularly pointed out in the specification, drawings and claims appended hereto.

In the drawings, which illustrate an embodiment of the device and wherein like reference
70 characters are used to designate like parts—

Figure 1 is an elevational view, parts being shown in section of the feeding end of the complete machine constructed in accordance with
75 the present invention;

Figure 2 is an elevational view, parts being shown in section of the delivery end of the complete machine constructed in accordance with
80 the present invention;

Figure 3 is a plan view of the feeding end
85 shown in Figure 1;

Figure 4 is a plan view of the delivery end shown in Figure 2;

Figure 5 is a sectional diagrammatic view of the complete machine;

Figure 6 is a sectional diagrammatic view of a modified form of machine;

Figure 7 is a sectional view taken through certain of the gathering rolls;

Figure 8 is a perspective view of the packing
90 material made by the machine constructed in accordance with the present invention;

Figure 9 is a perspective view showing a modified form of packing material formed by the machine, diagrammatically shown in Figure 6;

Figure 10 is a fragmentary perspective view of the forming surface of the male forming drum; and

Figure 11 is a fragmentary perspective view showing the surface of the female forming drum.

The machine of the present invention is particularly useful in construction of packing material such as shown in detail in Figure 8, for packing fruit, radio tubes and other fragile articles, and also eggs for shipment, it being
105 desirable in packing the latter to employ sectional dividers in connection with grooved sheets or flats, each egg when packed being located in contact with a flat or embossed area and being separated from adjacent eggs by the sectional di-
110

viders which have location in the grooves. The present invention contemplates a method and apparatus for continuously forming packing material of the kind described from rolled paper stock of a relatively inexpensive grade and further contemplates forming packing material of a modified form, more particularly illustrated in Figure 9, which consists in the flats or embossed areas extending from both sides of a backing sheet, the product having a substantial increase in resiliency and cushioning effect due to the additional embossed area.

In Figure 8 the material is shown as comprising a sheet 10 having longitudinal grooves 11 and transverse grooves 12. The material of sheet 10 defined by the longitudinal and transverse grooves comprises an embossed area 13 which in turn is suitably corrugated by means of transverse grooves 14. Secured to the sheet 10 by means of suitable adhesive is a backing sheet 15, the sheet having contact with the longitudinal grooves 11 and transverse grooves 12 as at 16 and 17 respectively. In Figure 9 a slightly modified form of material is shown in which the sheet 10, in combination with the backing sheet 15, has secured thereto an embossed sheet 20, the embossed sheet 20 having contact with the backing sheet 15 at points 18 and 19 corresponding respectively to the longitudinal and transverse grooves of the embossed sheet 20. Packing material constructed as above has the advantage of increased resiliency and resulting cushioning effect by reason of the additional embossed areas on sheet 20. Such material finds many uses, especially is the same useful in packing eggs, since it can be used as a dividing partition, eggs having contact with the raised areas of sheet 10 and other eggs in contact with the corresponding areas of sheet 20.

Referring more particularly to Figures 1 and 2, the machine is located upon any suitable base 21 having uprights 22, 23 and 24 secured thereto. Side frames 25 and 26 are in turn supported from the uprights and held in spaced position by means of any suitable transversely extending tie bars. Located upon the frames 25 and 26 centrally thereof are water tanks 27, the tanks being supported a suitable distance above the frames and serving as a reservoir for supplying water to a number of pipes 28. The tanks are provided for the purpose of cooling the bearings and journal boxes of the various drums and rolls to be later described, since certain of these drums are electrically heated and in order to provide for efficient operation of the same, it is necessary to provide a continuous flow of cooling water to maintain the trunnions at a moderate temperature.

At the feeding end of the machine, Figure 1, is located a plurality of stands 30 for supporting a roll of forming paper 10 and a roll of backing paper 15. Each stand is provided with a suitable journal bearing 33, divided centrally thereof forming a member 31 pivoted at 32, the parts being held in operative position by means of winged nuts 34. The rolls of paper stock are supported on shafts 35, the shafts in turn having engagement in bearings 33 and by reason of the construction of the bearings the shafts can be removed and similar shafts having a new roll of paper thereon can be substituted therefore. Upon the base 21 is supported an idler roller 37 under which is passed the paper from roll 15, while secured to stand 22 is a plurality of idler rollers 38 under which passes the paper from roll 10 and from which it is run in a substantially

vertical direction between a number of steam pipes 40 from small openings in which issues live steam, so that the same is directed against the surface of the paper. Located below the idler rollers 38 is a drip pan 41 which collects the moisture of condensate resulting from the condensation of the steam due to its contact with the paper. The paper sheet secured from roll 15 comprises the backing sheet of the material, while the paper from roll 10 comprises the embossed sheet and this latter, prior to forming the same with embossed portions, is passed through a plurality of gathering rolls, which will be described.

The paper 10, after passing between the steam pipes 40 to suitably moisten the same, is directed over a heating roll 42 journaled at the extreme right hand end of the frames 25 and 26. As shown in Figure 3, the roll is suitably heated by means of a length of resistance coil located within the roll, the current being conducted to the resistance coil by means of connector rings 43. For receiving the paper from the roll 42 and for functioning as pressure rolls for squeezing the excess moisture from the paper, are a plurality of cooperating rolls 44 and 45, the upper roll 44 being provided with a groove 46, while the lower roll is provided with a bulge 47 cooperating with the groove. Located in advance of rolls 44 and 45 are a plurality of forming rolls 48, 49, 50, 51, etc., which have cooperative relationship with companion rolls 52, 53, 54 and 55. The rolls 48, 49, 50 and 51 are driven in a clockwise direction and for the purpose are provided with suitable trunnions to which are secured gears 56. The rolls 52, 53, 54 and 55 are driven in a counter-clockwise direction by means of gears 57 secured to the trunnion of the same, as shown in Figure 1. Shaft 48 is provided with shoulders 58 and 59, which cooperate with similar shoulders 60 provided on shaft 52. These shoulders are disposed in an offset relation as shown in Figure 7, so that as a sheet passes between the rolls 48 and 52, a gathering of the stock occurs at the center thereof in the formation in the sheet of offset portions which are subsequently finally formed into grooves.

The preceding rolls 49 and 50 are also formed with shoulders 62, while their companion rolls 53 and 54 are provided with similar shoulders which cooperate with 62 in the same manner as described in connection with roll 48 and 52. Also provided on rolls 49 and 50 are beads 63 and 64 which have engagement with grooves 65 formed in the companion rolls 53 and 54. These beads are arranged substantially in alignment with shoulders 58 and 59 of the preceding roll and finally form the ultimate inside grooves of the sheet in a manner to utilize the stock offset by the shoulders 52 and 53 as previously brought out. Upon the succeeding roll 51 are formed similar beads 66 and shoulders 65, the beads being aligned with beads 63 and 64 so that they function to retain the shape of the grooves finally formed by the latter beads. The shoulders 65 function to form additional offsets in the plane of the paper, which are subsequently finally formed into grooves by means of the beads on succeeding rolls. The gathering of the sheet of paper therefore occurs with the forming therein of a groove by means of the bulge 47 and groove 46, which initially gathers the stock without giving thereto any definite formation. By reason of the shoulders 58 and 59 offsets are formed in the stock which are subsequently finally formed into

grooves. It is thus seen that, as the paper passes through the gathering rolls, the same is formed with grooves progressively beginning from the center of the sheet and continuing to either side thereof when it is subsequently submitted to further forming mechanism, to be presently described.

The rotation of the gathering rolls is accomplished by means of gears 56 provided on the upper rolls, which have meshing engagement with gears 57 provided on the lower rolls. Located between gears 57 are idler gears 68, which have meshing engagement with adjacent gears 57 so that all of the upper rolls, namely, 48, 49, 50 and 51 are driven in a clockwise direction and at the same speed, while the lower rolls 52 to 55 inclusive are driven in a counter-clockwise direction at the same speed. By means of meshing gears 68 and 69 secured to roller 44 and 45 respectively, the same are driven in the desired rotation and in accordance with the rotation of the forming rolls.

The sheet upon leaving the forming rolls next passes between two heated drums 70 and 71, by means of which the formed sheet is partially set and preheated in advance of its entry between two heated forming drums 72 and 73, which form the transverse grooves resulting in the formation of the embossed areas. The mounting of the drums in the frames 25 and 26 is accomplished by means of suitable trunnions 74 provided on each end of the drums, the trunnions having mounting in suitable bearing blocks, which in turn are adjustably located in openings in the side frames provided therefore. All four of the drums 70, 71, 72 and 73 are provided with a heating device comprising a resistance coil 75 which is located and rigidly supported within the drum. Connector rings 76 are provided for furnishing the resistance coil with a continuous supply of electric current, the rings being suitably secured to the trunnions 74 and having connection to the coil through openings 76. The drums 70 and 71 are provided with meshing gears 78, which by means of a suitable idler pinion, is driven in accordance with the rotation of the gathering rolls. Drums 72 and 73 are also provided with suitable driving gears 79 having meshing engagement to each other and adapted to receive rotation from a main driving gear 80.

Drum 70 is formed with a plurality of beads 81 which cooperate with corresponding grooves 84 formed in the drum 71. It is to be noted that these beads and their corresponding groove allow the drums to receive the paper as it leaves the gathering rolls and permanently set the plurality of grooves previously formed therein. Referring to Figure 10 the surface of drum 72 is shown as provided with a number of annular beads 82, which are in substantial alignment with the annular beads 81 on roller 70. Intersecting beads 82 are a plurality of transversely extending beads 83, the annular and transverse beads forming indentations in the surface of the drum. The drum 73 has a formation for cooperating with drum 72 and is formed with annular grooves 85, Figure 11, which are intercepted by a plurality of transversely extending grooves 86, these grooves resulting in a series of raised portions upon the surface of the drum. As previously stated drums 72 and 73 are heated so that, as the paper is passed between the rolls the longitudinal grooves formed therein are still further set by means of the beads 82 and groove 85, while the paper in addition is formed with transversely extending grooves by

means of beads 83 and grooves 86. By first constructing the longitudinal grooves and then the transverse grooves in a manner as disclosed, the paper at no time is under tension and the danger of fracturing or tearing is entirely eliminated.

The driving mechanism for the drums and rolls above described is secured from any suitable motor 90 by means of a belt 91 functioning to transmit the power from the motor to a pulley 92, suitably mounted for rotation upon the side frame 25. Intermediate pinions 93 and 94 serve to transmit the rotation from pulley 92 to the main driving gear 80 secured to the trunnion on drum 73. By reference to Figure 1 it is seen that both the forming rolls and the gathering rolls are driven in accordance with the rotation of the main driving gear by means of the idler pinions described so that a sheet of paper inserted between drums 44 and 45 will be continuously fed to the gathering rolls and from the gathering rolls will be fed to the grooving and embossing drums with a uniform speed, so that no tearing of the paper nor undue strain is placed upon the same.

The next step in the operation of the machine is to apply to the surface of the embossed sheet a coating of adhesive which is accomplished by suitably journaling in the side frames a plain surface roll 95, Figure 2, having cooperative engagement with a plain surface roll 96. The drums are suitably mounted in the side frame by means of trunnions 97 and are adapted to be driven by gears 98 having meshing engagement with each other, which in turn are driven from roll 73 by means of pinion 99. Located under roll 96 and extending the entire width of the roll is a pan 100 for containing a supply of adhesive such as sodium or potassium silicate, the pan being so located in relation to roll 96 that a portion of the roll will be immersed in the adhesive. Located adjacent the roll 96 is a scraper 101, which is spaced a slight distance from the periphery of the roll so that the surplus adhesive carried by the roll will be removed and allowed to drop back into the pan. The paper as it leaves the embossing roll 72 and 73 is fed between rolls 95 and 96, which results in coating the bottom surface of the sheet with an adhesive, the bottom surface however, comprises merely the grooves 11 and 12, since the sheet is provided with the embossed areas and the grooves are the only part of the sheet designed to engage the backing sheet. The next operation is therefore to bring in contact with the embossed sheet a backing sheet, and this operation will be now described.

As shown in Figures 2 and 4 a second embossing roll is provided including drums 102 and 103, each having a cooperating plain surface roll 104 and 105 respectively. Also associated with the embossing roll 102 and its plain surface roll 104 is a second plain surface roll 106, the latter rolls functioning to present to the embossed sheet the backing sheet 15. The drums 102, 103, 104 and 105 are provided with suitable trunnions 107 and by means of adjustable journal boxes 108 are journaled within the side frames 25 and 26. These rolls are also heated in a manner as described in relation to rolls 72 and 73 by means of a length of resistance coil 109 located within the drum and supplied with current by means of collector rings 110, secured to the trunnions described. By means of gears 111 secured to the drums the same are driven in unison by reason of the idler pinion 112 having meshing engagement with gear 98 and pinion 113, which has meshing engagement with adjacent gears 111. The drum 106

is also driven by the desired speed as gear 114 has meshing engagement with the corresponding gear 111 on the drum 104. By referring to Figure 5 it will be seen that the backing paper 15 is run over rollers until the same is presented to roller 106 which provides a smooth surface for taking out any creases in the paper and for subsequently presenting the same to drum 104 where the same is brought into contact with the embossed paper 10 to which has been applied the coating of adhesive as described. By means of the heat in the drums 102, 103, 104 and 105 respectively, the formation of the embossed areas of the paper is finally set, and in addition the adhesive is dried so that its adhering qualities are materially increased, whereby, when the material leaves rolls 103 and 105, the sheets will be securely united, the packing material having a form as shown in Figure 8. For stripping the material into desired widths cutters 115 are employed and mounted upon transverse shafts 116 and 117 suitably journaled in the side frames. Pinion 118 meshing with gear 111 serves to drive shaft 117 which in turn drives shaft 116 by means of meshing pinions 120 secured to the shafts respectively.

The delivery end of the machine of the present invention contemplates novel mechanism for cutting the packing material into desired lengths without causing buckling or damage to the preceding portion of the material. The structure clearly shown in Figure 2 is driven by means of a belt 121 which transmits power from the pulley 92 to a speed reducing mechanism designated in its entirety by 122. Belt 123 connects the speed reducing mechanism to a transverse shaft 124 to which is suitably secured a cam 125 formed to provide a cam race 125, in which operates a roller 127. Located upon base 21 are vertical arms 128 pivoted at 129 and having connection to a link 130 which in turn has roller 127 rotatably secured thereto. The left end of frames 25 and 26 are formed with an upper bearing surface 131 upon which is mounted for slidable movement thereon members 132. Members 132 are joined by transverse shaft 133 which suitably spaces the members and which forms a mounting for arms 134 to which are secured a cutting blade 135. Referring again to arms 128 it is seen that the same are connected at their upper end to links 136 which are pivotally connected at 137 to the slidable members 132, resulting in an actuation of the members 132 in accordance with movement of arm 128. This arm is in turn actuated by cam 125 and the movement is such that the members 132 are reciprocated upon the bearing surfaces 131 formed in the frames 125 and 126.

Bearings 140 formed integrally with members 132 provide a mounting for a transverse shaft 141 to which is secured a cam 142. The cam is adapted to engage a pin 143 provided on arm 144, the arm being in turn pivoted to one of the respective members 132 at 145. Suitable links 146 and 147 serve to operatively connect the arm 144 to the shaft 133 journaled upon the slidable members. Rotation of shaft 141 is accomplished by providing the shaft with a suitable gear and connecting the same to shaft 124 by means of a belt 150.

As the finished material leaves the cutters 115 it is presented to retarding rolls 151 and 152 suitably journaled within the side frames and driven by means of gearing from the cutter shaft 117. For adjusting the spacing of the retarding rolls a member 153 is provided mounted in the side frames and functioning to adjust the vertical height of the upper retarding roll by means of suitable adjusting screws. Also mounted within the side frames is a rotatably mounted shaft 154 and a second shaft 155, the former providing in connection with the retarding roll 152, means upon which endless tapes 156 are mounted, the tapes functioning as a supporting means for the material. Depending from the members 132 and positioned level with the endless tapes 156 is a block 157 provided in its upper surface with a second cutting blade 158 for cooperating with cutting blade 135 to cut the packing material transversely. The packing material in cut form drops to a table 160 supported by means of a leg 161, the table providing a bearing for the shaft 162. Endless tapes 163 are mounted on shafts 162 and 155, the latter being driven by belt 159 from a suitable pulley located on shaft 154. The table 160 therefore forms a delivery mechanism for presenting to the operator individual sheets of the material 165 cut to the desired lengths.

The members 132 have reciprocating movement and in one direction, travel against the direction of travel of the packing material, but in their return movement the members travel at a rate of speed substantially equal to that of the packing material. The pivotal movement of shaft 133 to cause the cutting movements of blade 135 is so timed that with the members 132 traveling towards the right, Figure 2, the blade 135 will be disengaged from blade 158, but as the members 132 begin their travel towards the left blade 135 travels downwardly as the high part of cam 142 engages pin 143 and the movement of blade 135 continues until the travel towards the left of members 132 is substantially completed. It is thus seen that engagement of blade 135 with blade 158 will cut the material transversely without causing buckling of the material, since the cutting is accomplished with the mechanism traveling in synchronism with the travel of the packing material.

Referring to Figure 6 a modified form of mechanism for making packing material is disclosed, comprising a series of forming rolls 244, 248, 249, etc., which operate as described and which present the sheet to a series of forming drums and embossing drums 270 and 272, respectively. In advance of the drums are a plurality of plain surface drums 295 and 296, which cooperate with a pan 200 for the purpose of applying to the under surface of the embossed sheet a coating of adhesive.

In this particular modification a roll of previously formed packing material 20 is employed and is fed over rollers to a plurality of drums 300 and 301, the latter drum operating in conjunction with a pan 302 containing suitable adhesive such as sodium or potassium silicate for applying to the undersurface of the embossed sheet 20 a thin coating of adhesive. As previously explained, with the preferred modification a backing sheet 15 is employed which is run over suitable rollers located in position for presenting the sheet to suitable mechanism for bringing the same into contact with the previously embossed sheet to unite the same together into the finished packing material. With the apparatus as shown in Figure 6 the backing sheet 15 is run over roller 303 and presented to a plurality of cooperating embossing drums 202, 203, 204 and 205. These embossing drums are of the same form and character as drum 72 previously described, having annular beads provided on the periphery thereof with transverse intersecting beads forming the surface

of the drum into a plurality of depressed portions. These depressed portions cooperate with the embossed areas on the sheet 10 and the sheet 20 and press the same into contact with the backing sheet 15. As the embossed sheets have previously been coated on the proper surface with adhesive uniting of the three sheets takes place, thus forming the completed packing material, as particularly disclosed in Figure 9.

The usual form of mechanism for cutting and stripping the material is embodied in cutting rolls 220 which cooperate with retarding rolls 251 and 252 to present the material to the transverse cutting mechanism including the cutting blade 235.

It is to be understood that I do not wish to be limited by the exact embodiment of the device shown, which is merely by way of illustration and not limitation, as various and other forms of the device will of course be apparent to those skilled in the art without departing from the spirit of the invention or the scope of the claims.

I claim:

1. In a machine for making packing material, in combination with means for forming embossed areas in a moving sheet of paper, of a pair of plain surfaced drums receiving the embossed sheet and applying to one side thereof a coating of an adhesive, and means uniting the embossed sheet to a backing sheet, comprising a pair of drums including an embossing drum and a plain surfaced drum cooperating therewith.

2. In a machine for making packing material in combination with means for forming embossed areas in a moving sheet of paper, of a pair of plain surfaced drums receiving the embossed sheet and applying to one side thereof a coating of an adhesive, and means uniting the embossed sheet to a backing sheet, comprising a pair of embossing drums each drum having a plain surfaced drum cooperating therewith, and heating means within the drums.

3. In a machine for making packing material in combination with means for forming embossed areas in a moving sheet of paper, of a pair of plain surfaced drums receiving the embossed sheet, a plan for containing a quantity of silicate in contact with one of said drums for applying a coating thereof to said sheet, means for adhering to said sheet a backing sheet comprising a pair of plain surfaced drums for presenting to the embossing sheet the backing sheet, and an embossing drum associated with one of said plain surfaced drums for pressing the coated areas of the sheet into contact with the backing sheet.

4. In a machine for making packing material in combination with means for forming embossed areas in a moving sheet of paper, of a pair of drums for applying to said sheet a coating of an adhesive, a second sheet of paper having embossed areas previously formed therein, means for applying a coating of an adhesive to said second embossed sheet, and means including a pair of embossing drums for uniting said embossing sheets to a common backing sheet.

5. In a machine for making packing material

in combination with means for forming embossed areas in a moving sheet of paper, of a pair of plain surfaced drums receiving the embossed sheet and applying thereto a coating of an adhesive, a second moving sheet of paper having embossed areas previously formed therein, means for applying a coating of an adhesive to said second embossed sheet, and a pair of embossing drums receiving the sheets from said plain surfaced drums and pressing the coated surfaces of the embossed sheets into contact with a common backing sheet.

6. In a machine for making packing material, in combination with means for forming embossed area in a moving sheet of paper, of a pair of drums receiving the embossed sheet, one of said drums applying to the contacting side of said sheet an adhesive, and means uniting the embossed sheet to a backing sheet comprising an embossing drum, said drum having a plain surfaced drum cooperating therewith, and heating means within the drums for finally setting the embossed areas and simultaneously drying the adhesive.

7. In a machine for making packing material, in combination, means for forming embossed areas in a moving sheet of paper, means for coating one side of said embossed sheet with adhesive, and means for uniting a backing sheet thereto comprising a pair of drums, one being an embossing drum and the other smooth surfaced, and heating means in the drums whereby the sheets are given a final set.

8. In a machine for making packing material, in combination, gathering rolls for forming grooves in a moving sheet of paper longitudinally of the same, a plurality of sets of drums between which the formed sheet is passed, the first set forming embossed areas in the sheet, the second set presenting to the embossed sheet a backing sheet, and means between the sets of drums for applying adhesive to the embossed sheet.

9. In a machine for making packing material, in combination, gathering rolls for forming grooves in a moving sheet of paper longitudinally of the same, a plurality of sets of drums between which the formed sheet is passed, the first set forming embossed areas in the sheet, the second set presenting to the embossed sheet a backing sheet, and spaced retarding rolls receiving the material from the second set of drums and applying a slight pressure on the surfaces of the material.

10. In a machine for making packing material, in combination, gathering rolls for forming grooves in a moving sheet of paper longitudinally of the same, a plurality of sets of drums between which the formed sheet is passed, the first set forming embossed areas in the sheet, the second set presenting to the embossed sheet a backing sheet, means between the sets of drums for applying adhesive to the embossed sheet, and retarding rolls receiving the material from the second set of drums and delivering the same for further operation.

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