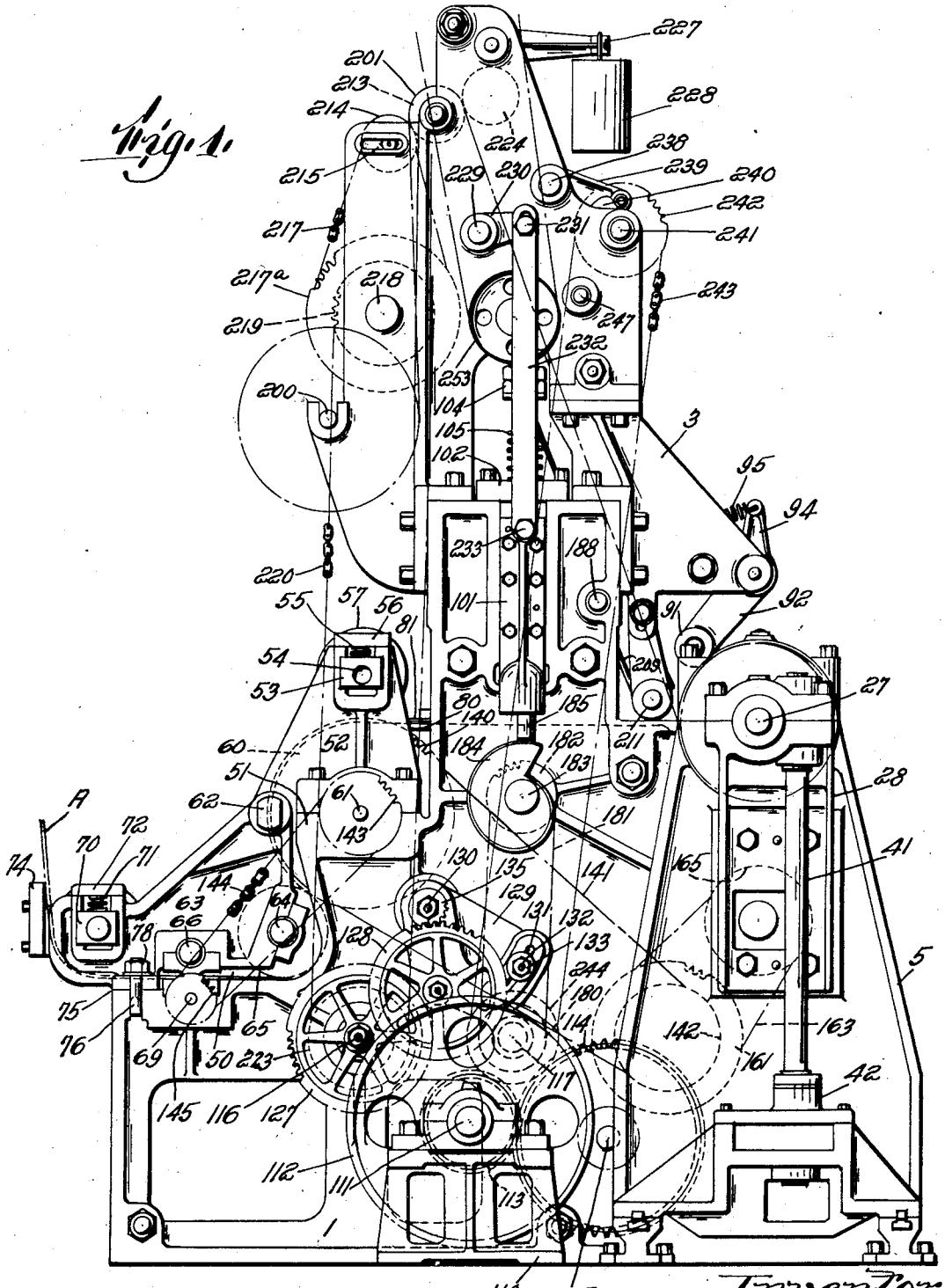
Oct. 5, 1926. 1,601,784

H. H. WANDERS

SHEET WINDING AND WRAPPING MACHINE

Filed May 9, 1921 8 Sheets-Sheet 1

Fig. 1.



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Oct. 5, 1926. 1,601,784

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SHEET WINDING AND WRAPPING MACHINE

Filed May 9, 1921 8 Sheets-Sheet 2

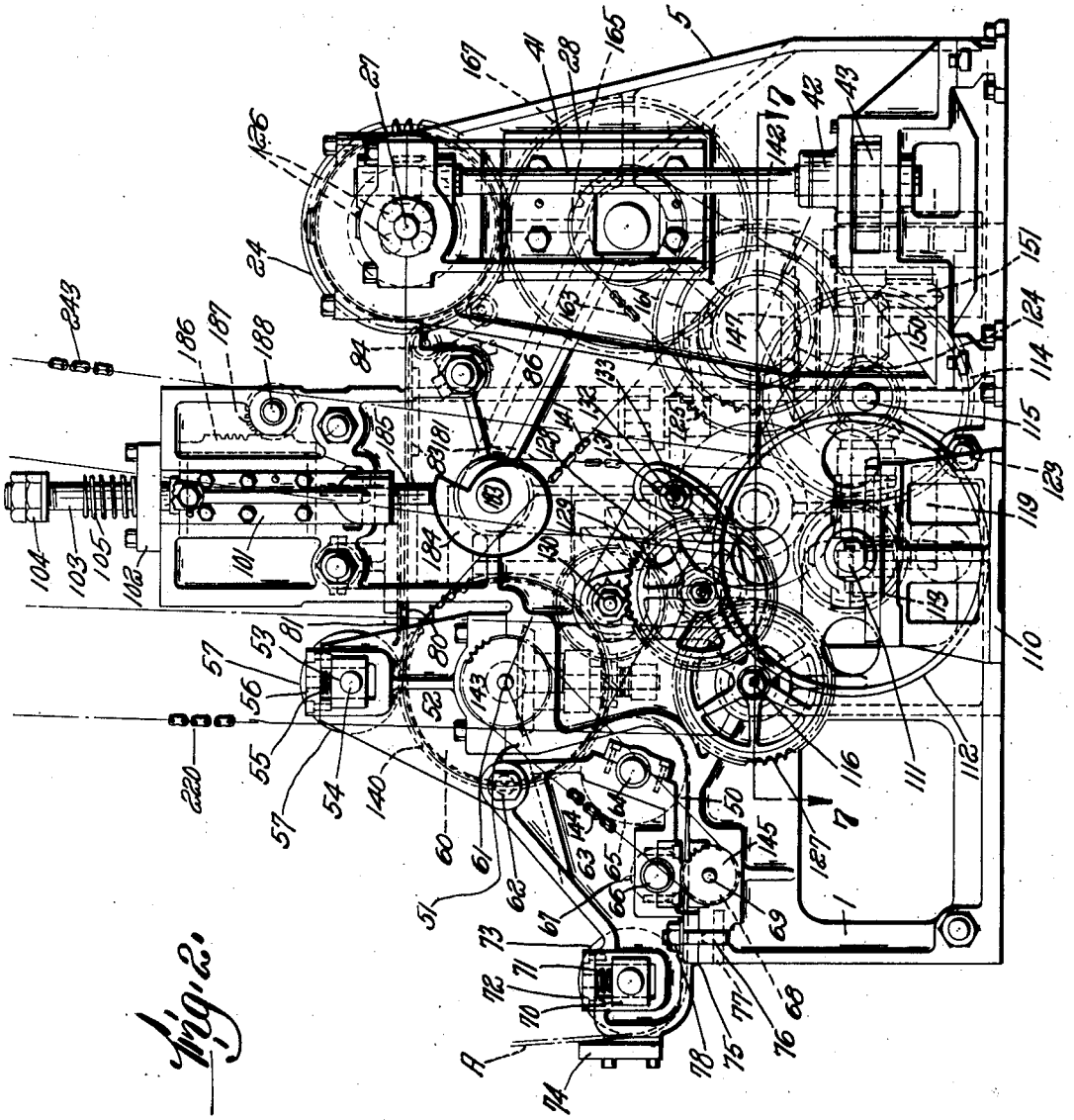


Fig. 2.

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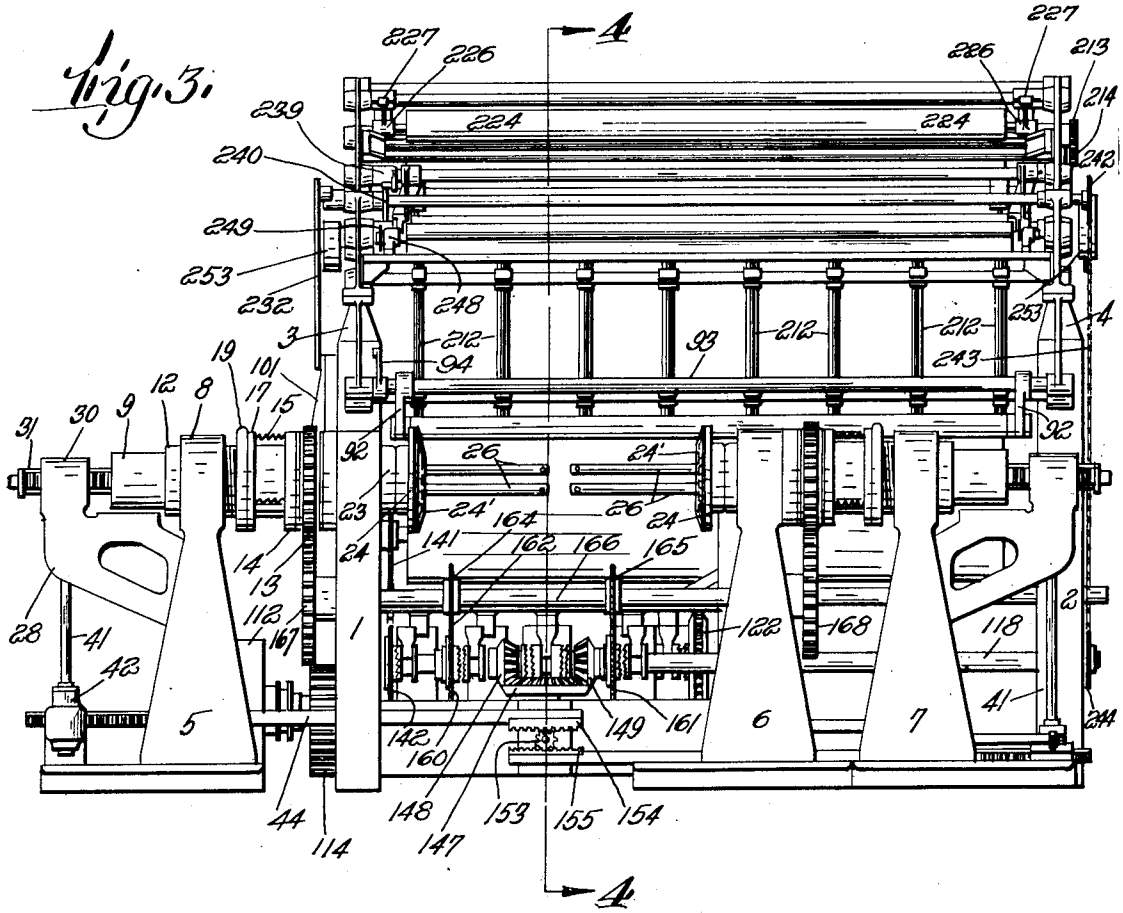
Oct. 5, 1926. 1,601,784

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SHEET WINDING AND WRAPPING MACHINE

Filed May 9, 1921 8 Sheets-Sheet 5

Fig. 3.



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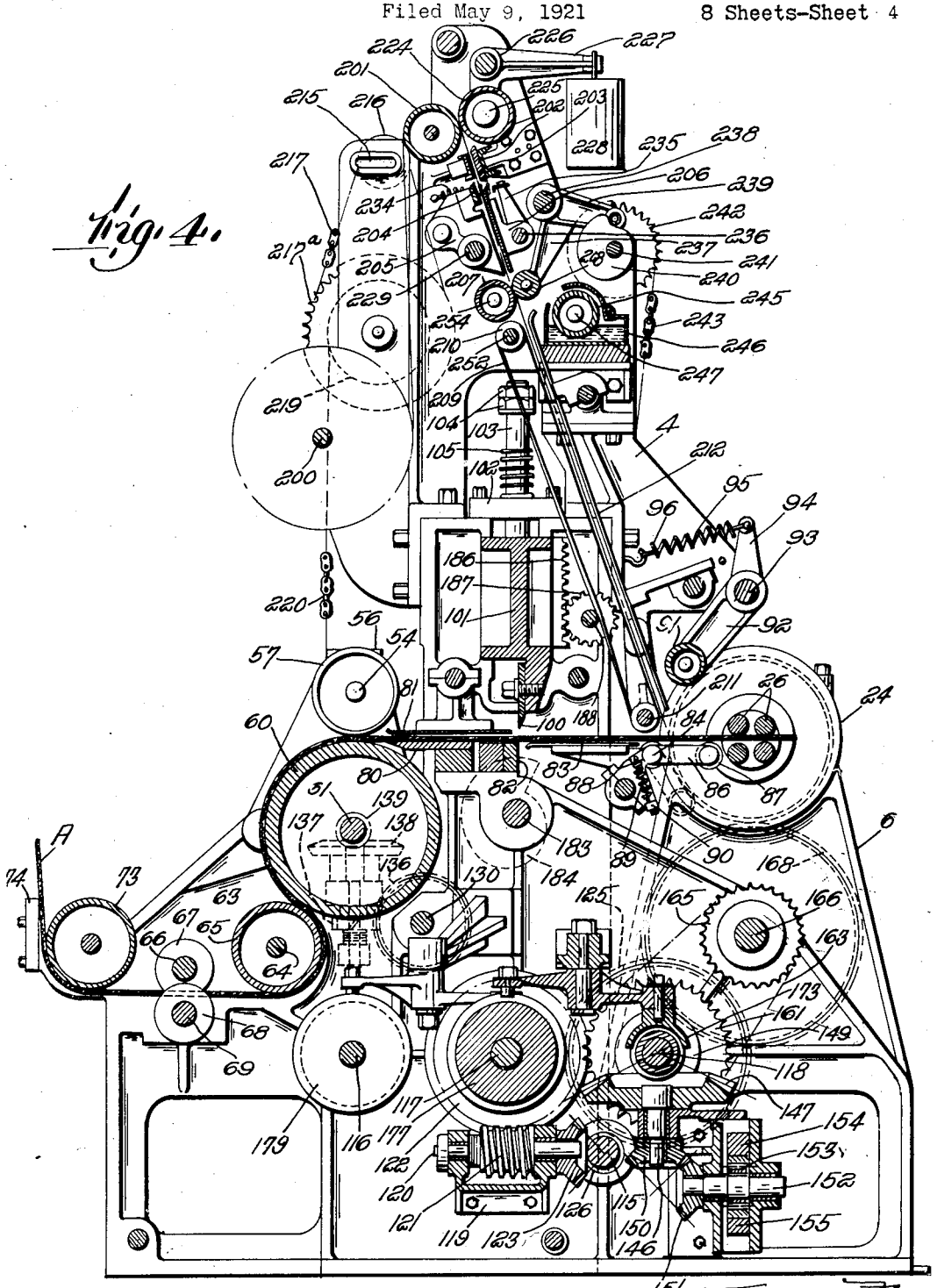
Oct. 5, 1926. 1,601,784

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SHEET WINDING AND WRAPPING MACHINE

Filed May 9, 1921 8 Sheets-Sheet 4

Fig. 4.



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SHEET WINDING AND WRAPPING MACHINE

Filed May 9, 1921 8 Sheets-Sheet 5

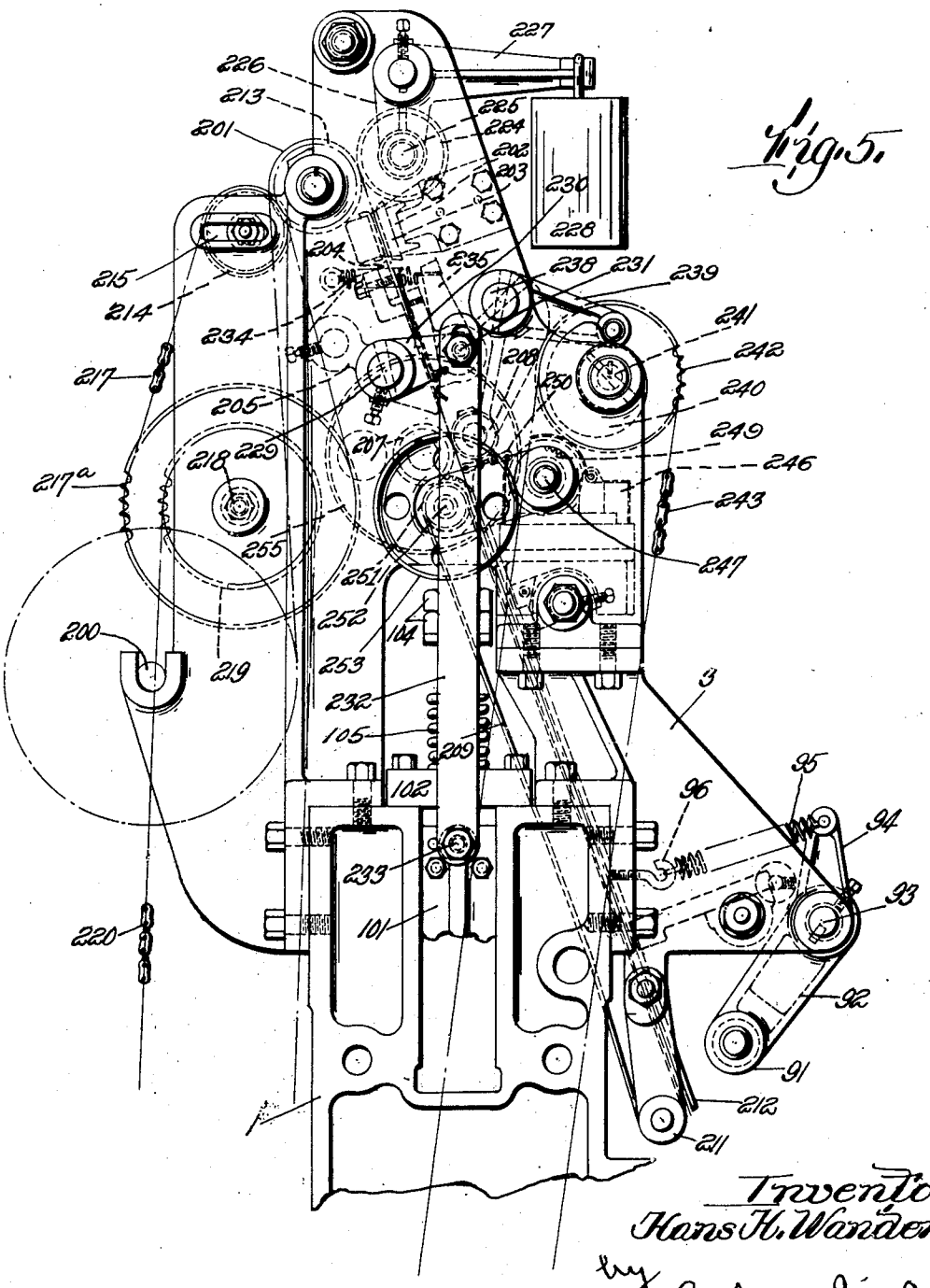


Fig. 5.

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Oct. 5, 1926. 1,601,784

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SHEET WINDING AND WRAPPING MACHINE

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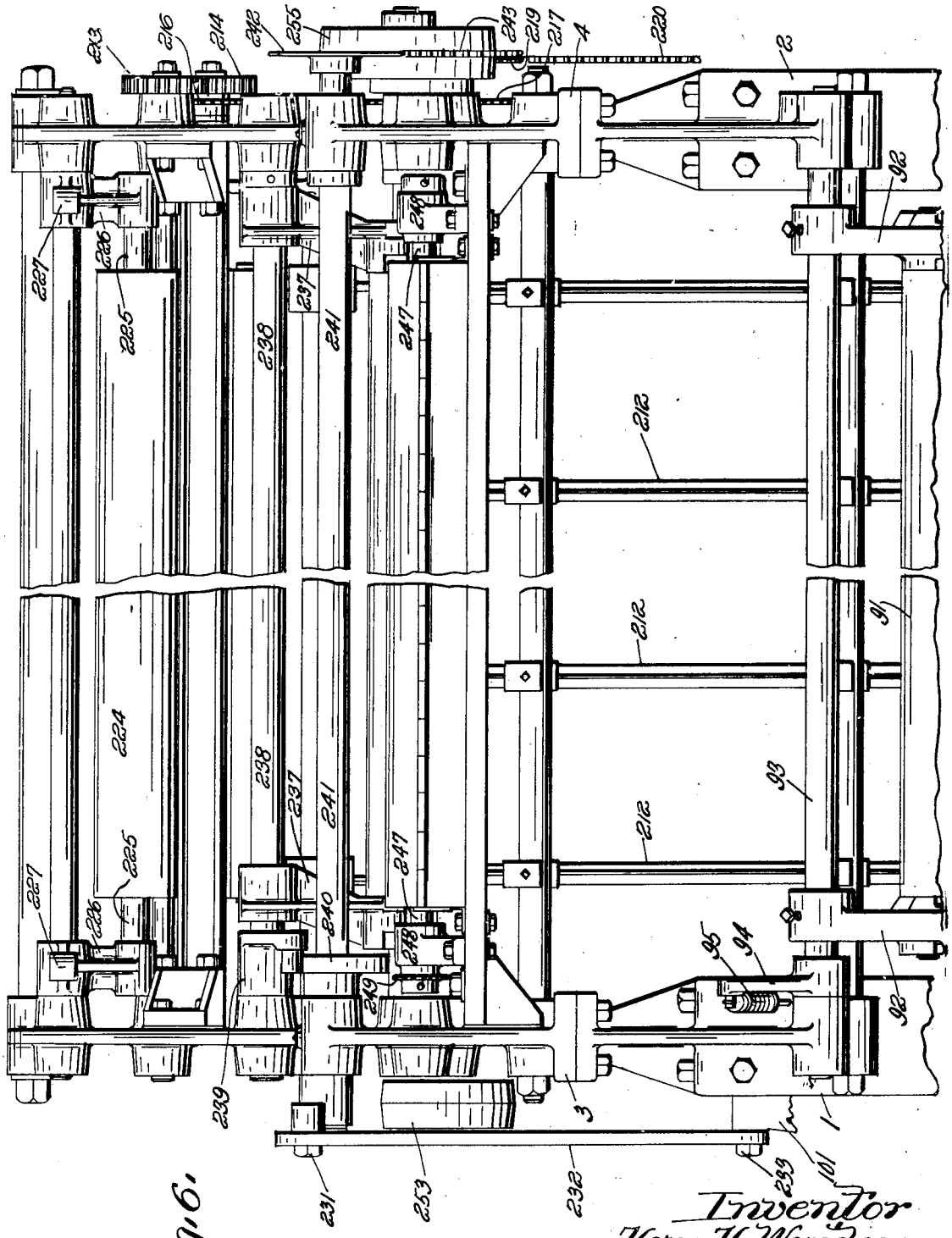


Fig. 6.

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Oct. 5, 1926. 1,601,784

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SHEET WINDING AND WRAPPING MACHINE

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Fig. 7.

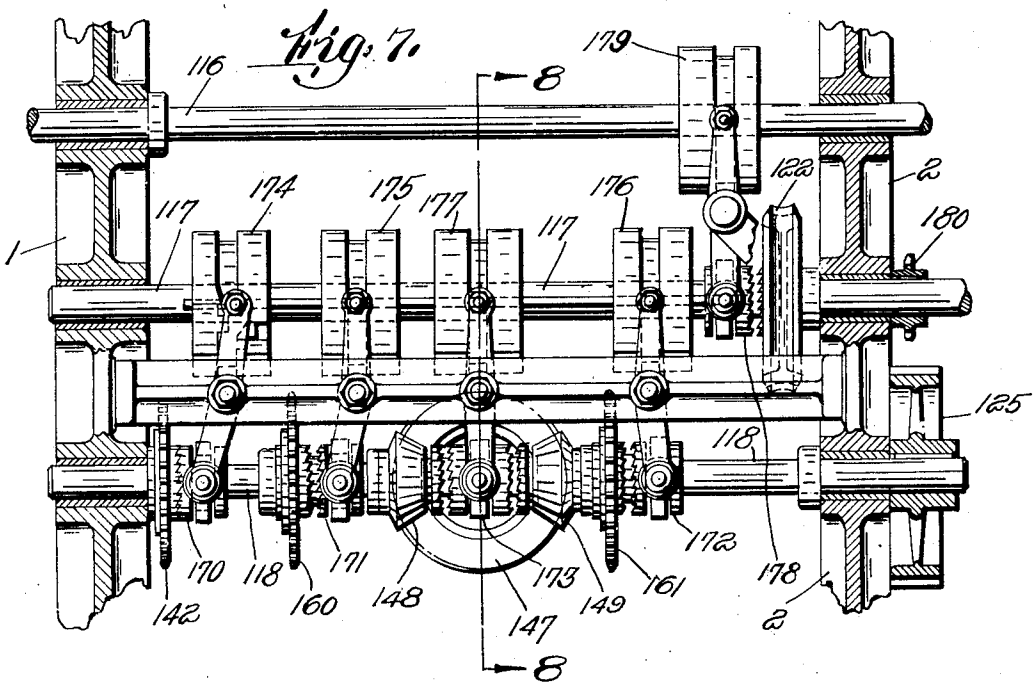
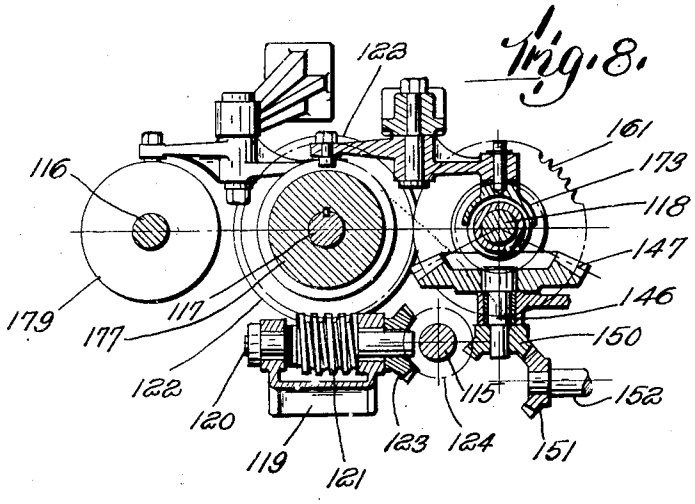


Fig. 8.



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SHEET WINDING AND WRAPPING MACHINE

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Fig. 9.

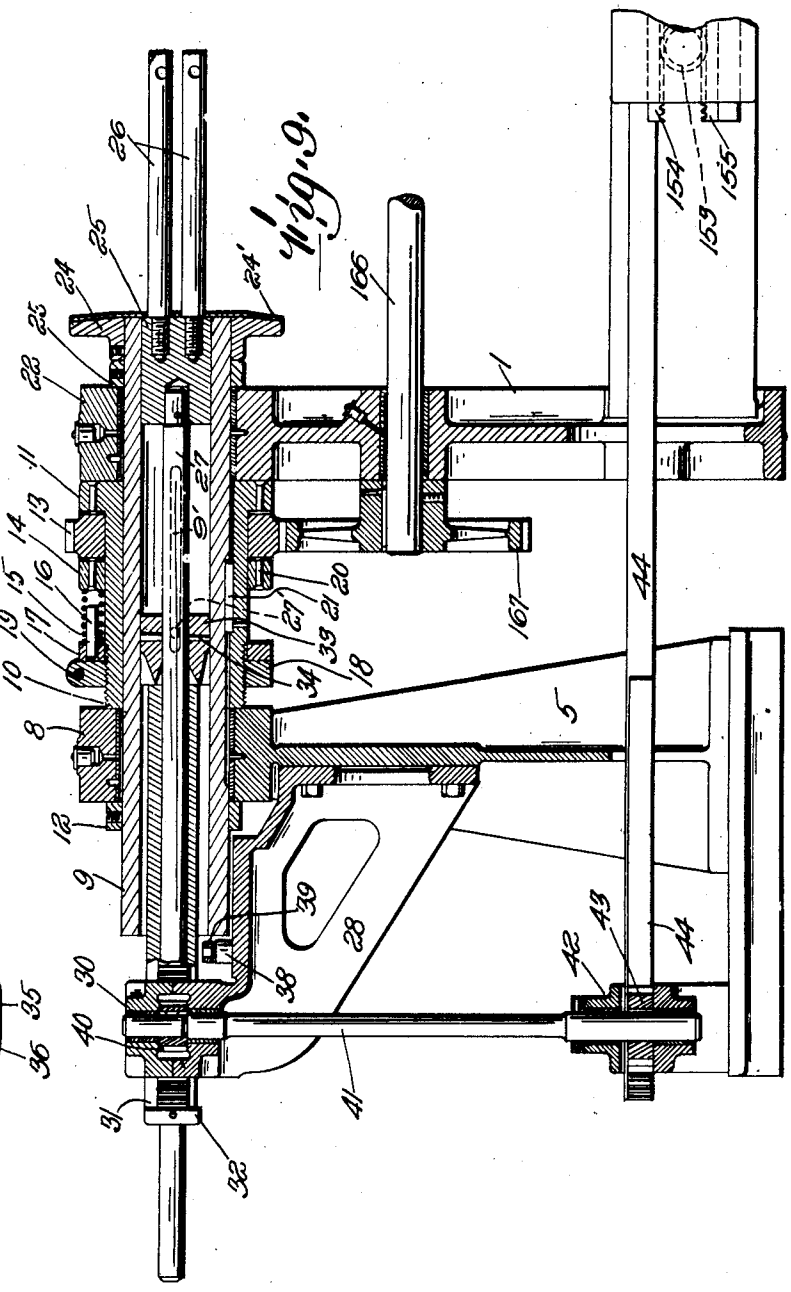
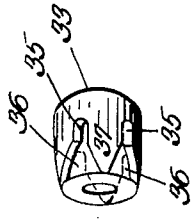


Fig. 10.



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UNITED STATES PATENT OFFICE.

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SHEET WINDING AND WRAPPING MACHINE.

Application filed May 9, 1921. Serial No. 467,799.

This invention relates to machines for winding lengths of sheet material into rolls and wrapping them with paper and then sealing, and has been more particularly designed for handling roofing material such as is formed of felt impregnated with asphalt or similar material, although it is not restricted to such use.

Roofing material of this nature is made in various thicknesses and widths, and, as it is desirable to roll in each package material sufficient to cover definite areas of a roof, this invention provides means by which the roofing is automatically measured off in such various lengths as may be desired. Means is also provided for slitting the roofing into strips of the widths desired. It is also desirable to measure off the wrapping paper to conform to the various sizes of completed roll, and mechanism for accomplishing this function has also been provided. The material should be wound under the proper tension, it being evident that, as the roll increases in size, the rate of rotation thereof for a given linear speed of the material decreases. Winding mechanism, conforming to these requirements, has been provided by this invention.

The invention further provides fingers between which the roofing sheet passes and which are rotated to wind the same, together with means for removing these fingers when the roll is completed so that it may pass from the machine. These fingers are so constructed and actuated that, before a new roll is to be made, they are presented in correct position to receive the roofing sheet. Sheet-guiding devices, which direct the sheet between the fingers but which do not interfere with the subsequent winding, are also a part of this invention.

In order to ensure proper wrapping of the roll, one end of a sheet of wrapping paper is wound into the roll just prior to its completion, the other end of the paper having glue applied thereto so that, by continuing the winding operation after the completion of the roll of roofing, the wrapping thereof and fastening of the wrapping paper is effected.

For a more complete understanding of this invention, together with other objects and advantageous details and combinations of parts, reference may be had to the accompanying drawings illustrating an embodiment thereof, in which

Figure 1 is a side elevation of the machine, shown somewhat diagrammatically.

Figure 2 is a somewhat similar view but on a larger scale of the lower portion of the machine.

Figure 3 is a rear elevation of the machine.

Figure 4 is a vertical section but on a larger scale on the line 4—4 of Figure 3.

Figure 5 is a side elevation on a larger scale than Figure 1 of the upper portion of the machine.

Figure 6 is a rear elevation of the same portion.

Figure 7 is a horizontal section on the line 7—7 of Figure 2.

Figure 8 is a section on the line 8—8 of Figure 7.

Figure 9 is a partial vertical section through one of the finger-actuating mechanisms and related parts.

Figure 10 is a perspective of the finger-centering device.

Referring to these drawings,—1 and 2 indicate a pair of side frame portions carrying the mechanism for handling the roofing material, and 3 and 4 indicate side frame portions superposed on the portions 1 and 2 and carrying the wrapping paper holding and feeding mechanisms.

Roll winding mechanism.—As shown more particularly in Figures 1, 2 and 3, positioned adjacent the frame portions 1 and 2 are a series of pedestal blocks 5, 6 and 7. The pedestal 5 is preferably in fixed relation to the frame portion 1, but the pedestals 6 and 7 are preferably adjustably mounted relative to the machine toward and from the frame portion 2 to adjust for different widths of rolls. As the exact method of mounting these pedestals for such adjustments is immaterial to this invention, no detail showing thereof has been made.

Referring to Figure 9, pedestal 5 carries at its upper end a bearing 8 within which is journaled a hollow sleeve 9. Fixed to the sleeve 9 at one side of the bearing 8 is a second sleeve 10 terminating at its end opposite to the bearing 8 is a flange 11. A collar 12, fixed to the sleeve 9 adjacent the opposite face of the bearing 8, holds the sleeve 9 from

axial movement in this bearing. Journaled on the sleeve 10 adjacent the flange 11 is a gear 13 which is pressed against the flange 11 by means of a collar 14 surrounding the sleeve 10 and urged axially of this sleeve by means of a series of springs shown at 15 surrounding guide pins 16 made fast in a ring 17. Ring 17 is held in position by a split collar 18 internally threaded to engage the threaded extremity of the sleeve 10. A tightening bolt 19 may be used to draw together the split ends of the ring 18 to hold the same in adjusted position. If desired, fiber washers may be interposed between the collar 14 and the gear 13, and the gear 13 and the flange 11, rivets as 20 being shown by which these washers are made fast to the ring and flange. By this construction, the gear 13 is in frictional driving relation to the sleeve 10, which in turn is keyed by the key 21 to the sleeve 9. The frame portion 1 has a bearing 22 in alinement with the bearing 8 to receive the sleeve 9 adjacent the flange 11. Inwardly of the bearing 22, a collar 23 is made fast to the sleeve 9 and adjacent thereto is made fast a spool flange 24 having a cover plate 24'. Within the sleeve 9 is carried a block 25 into the end of which are screwed a plurality of winding fingers 26, preferably four being employed, which project through perforations in cover plate 24'. The inner end of the block 25 has fast thereto the end of a shaft 27, this shaft being concentric with the sleeve 9 and projecting outwardly therethrough. The pedestal 5 has fixed on its outer end a bracket 28 having at its outer end a vertical journal bearing 30, and adjacent thereto a horizontal guideway for the reception of a hollow rack bar 31. This rack bar projects within the sleeve 9 and the shaft 27 passes therethrough and is free to rotate therein. This shaft is prevented from axial movement relative to the rack bar 31 by means of a collar 32 fixed thereto outwardly of the rack bar and a cam block 33 made fast by a pin 34 to shaft 27 at the other end of the rack bar. The block 25, shaft 27 and cam block 33 may slide axially of the sleeve 9, but are prevented from rotation relative thereto by means of a slot 9' in the sleeve within which rides a pin 27'. The rack bar 31, however, is held from rotation within its guideway.

Referring to Figure 10, it may be seen that the cam block 33 has formed therein a series of notches 35 terminating at the end adjacent the rack bar in outwardly flaring portions 36, thus forming a series of pointed teeth 37 projecting toward the end of the rack bar. Fixed to the bracket 28 adjacent the end of the sleeve 9 is an upstanding pin 38 having journaled thereon at its upper end a roller 39, this roller being of a diameter to pass within the slots 35 of the cam block. By this construction, on movement of the rack bar in a direction to retract the fingers 26, the cam block 33 impinges against the roller 39, which enters between the teeth 37 and guides the shaft 27 in order to position the fingers 26 angularly so that the spaces therebetween may be properly presented to receive the sheet of roofing material, as will later be described.

In order to move the rack bar, a pinion 40, meshing with the teeth thereof, is carried by a vertically extending shaft 41 journaled at its upper end in the bearing 30 and journaled at its lower end in a bearing 42 supported adjacent the foot of the pedestal 5. Within the bearing 42, shaft 41 carries a pinion 43 which meshes with a rack bar 44 projecting toward the center of the machine. The actuating mechanism for this rack bar will be described later.

Pedestals 6 and 7 carry a mechanism in all respects similar to that just described supported by frame member 1 and the pedestal 5 except that it is reversed end for end so that the fingers 26 for supporting the roll extend in the opposite direction. This construction is shown in elevation in Figure 3.

Roofing feeding and cutting mechanism.— Referring now to Figures 1, 2 and 4, the frame member 1 at its forward end has an angular depression shown at 50, and adjacent the upper end thereof the lower half of a shaft bearing as at 51. The upper half 52 of this bearing is formed as a bracket member having at its upper end a vertical slot in which is slidably mounted a bearing block 53. This block has journaled therein a shaft 54 and a spring 55 bears against the upper face of the block 53 and against the under face of a retaining member 56. The shaft 54 is journaled in a similar manner in a bracket carried by the frame member 2 and has fixed thereon a pressure roll 57. This pressure roll is urged by the springs 55 into contact with the periphery of a measuring roll 60 carried by a shaft 61 journaled in the bearing blocks 51 and 52. The bearing block 52 has pivoted thereto at 62 a bracket 63. Near the apex of the angular recess 50, this bearing bracket 63 has journaled a shaft 64 which carries an idle tension roller 65, it being understood that a similar bracket 63 is carried by the frame portion 2 and carries similar bearing portions for the various parts. On the horizontal lower face of the bracket 63 is journaled a shaft 66 which may have fixed thereon one or more circular slitting knives, as shown at 67. Cooperating with these knives in shearing relation thereto are similar knives 68 carried by a shaft 69 journaled in the frame portions 1 and 2. The outer end of the bracket 63 has a pair of pedestal jaws for the slidable reception of a bearing block 70 urged downwardly therein by a spring 71 bearing between its upper face and a

pedestal closing block 72. This shaft 70 carries an idler roll 73. Fixed outwardly of this idler roll is a guide plate 74. The outer face of the bracket 63 bears against the upper face of the frame portion 1 at 75 and an eye-bolt 76 pivotally mounted on the portion 1 on a pin 77, (see Figure 2), carries a nut 78 on its upper end which may be moved into engaging relation to the bracket 63. A similar construction is employed in connection with the frame 2 and allows the brackets 63 to be swung upwardly so that access may be had to the various rolls and the slitting knives for ease in threading the material in the machine.

The strip of roofing, shown at A, passes downwardly between the guide plate 74 and the idler 73, and from thence past the slitting knives 67 and 68 around the idler roll 65, around the measuring roll 60, beneath the pressure roll 57, across the upper surface of a table 80 and beneath a guide plate 81, and across the upper face of a shear block 82 to a supporting table 83 toward the winding mechanism. Pivoted at 84, between the frame portions 1 and 2, is a sheet guide 86, which may, if desired, be formed of a series of spaced links carrying at their outer ends a roller 87. The table 86 has a rearwardly projecting lug 88 to which is attached the end of a coiled spring 89 made fast at 90, (see Figure 4,) to the machine frame. This spring normally holds the sheet guide 86 in the position shown in full lines in Figure 4 where it furnishes a continuation for the table 83 and over which the sheet A is guided between the fingers 26. As the material is wound, however, the roller 87 bears thereon and is moved downwardly, as shown in dotted lines, carrying the outer end of the table, to avoid interference with the winding of the roll, this action being effected against the tension of the spring 89. This construction not only serves to present the sheet A in position to pass between the fingers 26, but exerts pressure on the outside of the roll as it is formed, aiding in the close winding thereof. This action is further aided by means of a pressure roll 91 carried by a pair of arms 92 (see Figures 3 and 4) which are fixed to a shaft 93 journaled above the fingers 26 and to which is fixed an arm 94 normally drawn inwardly by a spring 95 engaging over a hook 96 fixed to the frame 1.

Cooperating with the shear block 82 is a cutting blade 100 fixed to a slide 101 guided in vertical slideways in the frame portions 1 and 2. The upper end of these slideways are closed by retaining plates 102 through which project vertically-extending posts 103 fixed at their lower ends in the slide 101 and having a pair of check nuts 104 threaded on their upper ends. A cushioning spring 105 surrounds each post 103 and cushions the blow as the slide 101 descends, this descent being accomplished by gravity, as will later be explained.

For the purpose of actuating the mechanism so far described, the following driving connections have been provided. Referring to Figures 1 and 2, at 110 is positioned a bearing bracket which carries journaled therein a shaft 111, having affixed thereto a driving belt pulley 112. Also fixed to the shaft 111 is a gear indicated at 113, meshing with a gear 114 fixed to the main drive shaft 115. Above shaft 115 are three shafts arranged in a horizontal plane at 116, 117, 118, which will be referred to hereafter as the main cam shaft, the secondary cam shaft, and the clutch shaft respectively.

Referring more particularly to Figures 4 and 8, the frame portion 2 carries a bracket 119 having journal bearings for a shaft 120 which has fixed thereon between the bearings a worm 121. This worm meshes with a worm gear 122 journaled on the secondary cam shaft 117. At one end, shaft 120 has a bevel gear 123 which meshes with a bevel gear 124 fixed to the drive shaft 115. Outwardly of the frame 2, a gear 125 is fixed to the clutch shaft 118, and meshing therewith is a pinion 126 (see Figure 4) carried by the drive shaft 115. It will thus be apparent that shaft 118 will be driven continuously by the drive shaft 115, and that shaft 117 may be driven through the worm 121 and the worm gear thereon when the worm gear is in driving relation thereto, as will later be explained.

The shaft 116 is driven from the clutch shaft through change gears as follows. Shaft 116 projects outwardly of the frame portion 1 and carries on its end a gear 127 (Figures 1 and 2) which meshes with a gear 128 carried by an arm 129 pivoted on a shaft 130 journaled in the frame portion 1. The arm 129 has an arcuate slot 131 concentric with the pivotal connection 130. A stud 132 passes through this slot and is fixed to the frame 1, and threaded on its outer end is a nut 133 which may be screwed down against the arm 129 to hold it in position. This construction permits the use of various sizes of gears 127 by which the speed of the shaft 116 may be varied, the arm 129 being adjusted to bring the gear 128 in mesh with the gear 127 whatever size of gear may be used. The shaft 130 carries a gear 135 meshing with the gear 128. As shown in dotted lines in Figures 2 and 4, the shaft 130 also carries a spiral gear 136 meshing with a spiral gear 137 which is carried by a vertical shaft having at its upper end a bevel gear 138. This gear meshes with a bevel pinion 139 on the shaft 61 which carries the measuring roll 60. A large sprocket wheel 140 is also carried by the shaft 61 and over this sprocket is passed a drive chain

141 which engages a sprocket wheel 142 journaled on the shaft 118. The shaft 61 also carries a sprocket wheel 143 over which passes a sprocket chain 144 engaging a sprocket wheel 145 fixed to the shaft 69 for rotating the splitting knives 68. The winding mechanisms are actuated from the clutch shaft 118 as follows: Arranged beneath the shaft 118 is a vertically-extending shaft 146 (see Figures 4 and 8) which carries at its upper end a bevel gear 147 meshing with a pair of bevel gears 148 and 149 (see Figure 7) journaled on the shaft 118. The lower end of the shaft 146 carries a bevel gear 150 meshing with a similar gear 151 fixed to a shaft 152. This shaft carries a pinion 153 in engagement with rack bars 154 and 155 (Figures 3, 4 and 9) positioned above and below it, the upper bar 154 being fixed to the bar 44 above mentioned, by which mechanism winding fingers 26 are moved axially at certain times, as will be explained. The rack bar 155 is connected to a similar bar positioned in like manner in the pedestal 7 and actuating the corresponding mechanism carried thereby.

For rotating the winding mechanism, at 160 a sprocket wheel is journaled on the shaft 118 and at 161 a similar wheel is also journaled thereon, sprocket chains 162 and 163, as shown in Figure 3, connecting these wheels with sprocket wheels 164 and 165 made fast to a shaft 166. This shaft extends through the frame 1 and the pedestal 6, and has fixed at its outer ends gears 167 and 168. As shown in Figure 9, gear 167 meshes with gear 13 to rotate the winding fingers 26. Gear 168 is adjustable along the shaft 166 and meshes with a similar gear driving the winding fingers carried by the pedestals 6 and 7.

Positioned adjacent the sprocket wheels 142, 160 and 161 are clutch mechanisms 170, 171 and 172, by which these sprocket wheels may be clutched to rotate with the shaft 118. A double clutch mechanism, shown at 173, may be thrown in opposite directions to clutch the beveled gears 148 and 149 to rotate with the shaft 118. These clutch mechanisms are controlled by cams 174, 175, 176 and 177 respectively, fixed to the secondary cam shaft 117. A clutch mechanism 178, carried by the shaft 117, may be thrown into and out of clutching relation with the worm wheel 122 by means of a cam 179 fixed to the main cam shaft 116.

Knife 100 is actuated from the secondary cam shaft 117 as follows. On the end of shaft 117 adjacent the frame part 2 is a sprocket wheel 180 over which passes a chain indicated at 181, in Figures 1 and 2, which passes over a similar sprocket wheel 182 on a shaft 183 extending across the machine and journaled in frames 1 and 2 vertically above the shaft 117. At opposite ends of this shaft are carried the snail cams 184 which are adapted to impinge against posts as 185 fixed to the knife slide 101. In order to ensure a free movement of the slide 101, opposite ends thereof are provided with series of rack teeth 186 which mesh with a pair of spur gears 187 carried at opposite ends of an equalizing shaft 188 journaled at its opposite ends in the frame portions 1 and 2.

The mechanism thus described is timed to obtain the following sequence of operations, as will be more fully described later. The feed roll 60 is turned to feed a length of roofing over the tables 80 and 83 and between the fingers 26 as shown in Figure 4. When the strip is in proper position between these fingers, rotation thereof is started, thus winding the roofing in a roll, preferably one roll being formed on each of the opposed series of fingers, the roofing having been split by the knives 67 and 68 on its passage thereto. When sufficient roofing has been wound on these fingers, in accordance with the setting of the change gears above mentioned, the rotation of the measuring roll 60 and the winding fingers 26 is stopped, and further action of the machine causes the snail cams to allow the knife 100 to drop, thus severing the strips. This having been accomplished, rotation of the fingers is again started to complete the winding of the roll. When this has been completed, the rotation of the fingers is stopped and they are then retracted axially from the rolls by the action of the clutch mechanism 173 through which motion is imparted to the rack bars supporting the finger mechanism. This allows the roll to drop from the machine into a suitable conveyor provided for the purpose. Further actuation of the machine causes the roll fingers to return to their former position and stop, while the measuring roll 60 is again actuated to feed the material in position between these fingers for a repetition of the same cycle of operations.

Wrapping paper mechanism.—Just prior to the completion of the winding operation, a strip of wrapping paper is fed to the roll by mechanism which will now be described. Referring more particularly to Figures 1, 3, 4, 5 and 6, the frame portions 3 and 4 carry, above the measuring roll, in sockets, a shaft 200 for supporting the wrapping paper roll or rolls. The paper is led up from the inner side of these rolls, over a feed roll 201 positioned near the upper part of the machine, and as shown more particularly in Figure 4 down through a guideway 202 having a shear blade 203 at its lower edge, past a cooperating shear blade 204 carried by the upper end of a rocking bracket 205, a clamping plate 206 being positioned opposite the bracket 205 and cooperating

therewith to hold the paper at certain times. The paper then passes over an abutment roll 207 arranged to take the pressure from a glue-applying roll 208, thence down in contact with a feeding belt 209 passing over an upper pulley 210 and a lower pulley 211, a series of guide fingers 212 (see Figures 3, 4 and 6), being positioned in parallel relation to the feed belt to hold the paper in contact with the latter. The feed belt and the fingers 212 act as a chute to guide the lower edge of the paper closely toward the roll of roofing. In order to impart a positive feed for the paper, the feed roll 201 is driven through a pair of meshing gears 213, 214 (see Figures 1 and 6) carried adjacent the frame-member 2, gear 214 being carried on a shaft adjustably mounted in slots 215 in the frame portions 3 and 4. This allows gears 214 of different sizes to be substituted as desired in order to determine the amount of paper to be fed. This gear 214 is driven from a sprocket wheel 216 carried by the same shaft by a chain 217 which passes about a sprocket wheel 217^a journaled on a shaft 218. A second sprocket 219 fixed to this same shaft carries a chain 220 which passes downwardly around a sprocket wheel 223 carried by the main cam shaft 116. As this shaft, as before described, is driven through a system of change gears, it is evident that the paper feed will be subjected not only to the adjustment derived therefrom in conformity to the feed of the roofing, but is also subject to further modification by the change gear 214.

In order to properly feed the paper as is passes over the feed roll 201, it is held pressed thereagainst by means of a pressure roll 224 carried on a shaft 225 journaled in a pair of bell-crank arms 226 (see Figure 6), these bell-crank arms having outwardly extending portions 227 to which may be attached weights as 228 (see Figures 1, 4 and 5).

The wrapping paper is cut into proper lengths by the knife 204 which is carried by the rocking bracket 205 fixed to a shaft 229 projecting outwardly of the frame 3 and having fixed at its outer end an arm 230. To the end of this arm is attached by a bolt and slot connection at 231 the upper end of a link 232 which is pivoted at 233 to the knife slide 101, it being thus evident that with each descent of the knife slide to cut the roofing, knife 204 will also be actuated to cut off a section of the wrapping paper. The pressure plate 206 cooperating with the knife bracket 205 is normally held in contact with the paper by means of a spring 234 fixed at one end to the frame and engaging over an arm 235 fixed to a rock shaft 236 which carries this plate.

The glue-applying roll 208 is carried by a pair of arms 237 fixed to a rock shaft 238 which carries at one end an arm 239 having a cam roll at its outer end in cooperative relation to a cam 240. This cam is carried by a shaft 241 extending across the machine, and outwardly of the frame portion 4 this shaft carries a sprocket 242 over which passes a chain 243 which leads downwardly to a similar sprocket wheel 244 carried on the secondary cam shaft 117. The cam 240 is so formed that the rotation thereof causes the glue-applying roll 208 to be moved at times away from the paper and into contact with a glue-applying roll 245 dipping down below the surface of glue contained in a receptacle 246. The roll 245 is carried by a shaft 247 extending outwardly from the receptacle and through a pair of bearings 248 (see Figure 6) at either end thereof. Outwardly of the bearing 248 adjacent the frame portion 3, the shaft 247 carries a sprocket wheel 249 over which passes a chain 250 which connects with a similar sprocket wheel 251 carried by a shaft 252. Outwardly of the frame 3, shaft 252 carries a belt wheel 253 which may be driven by a belt from any suitable source as a counter-shaft mounted above the machine. This shaft 252 also carries the feed belt roll 210. The abutment roll 207 for the feed belt is similarly carried on a shaft 254 which projects outwardly from the frame 4 and has fixed at its outer end a belt pulley 255 which may also be driven from the overhead counter-shaft.

This mechanism is so timed as to feed a length of paper from the roll carried by shaft 200 in the path, as above described, during the feed of the roofing material. As the roofing material is cut, the length of paper is cut also and the upper end thereof is held between the cam plate 238 and the rocking bracket 205. Thereupon the glue-applying roll 208 is moved into contact with the paper near its upper end and the paper released thereabove. The paper then passes down upon the feed belt 209 so that its lower end is guided onto the layer of roofing adjacent its point of winding.

Drive mechanism timing.—Assuming that the machine is in position for the start of a cycle of operations, the roofing sheet A is threaded through the machine over the measuring roll 60 as far as the knife 100, while the wrapping paper is passed over the feed rolls as far as the knife 204. The winding fingers 26 are in their extreme inward position ready to receive the roofing on the subsequent feeding thereto. Referring to Figure 7, the main cam shaft 116 carrying the cam 179 is in position to hold the clutch 178 in engagement with the worm 122, so that the secondary cam shaft 117 is connected for driving. The cam 174 on this shaft is in such a position that the clutch

170 is in engagement with the sprocket wheel 142 so that the measuring roll is connected in driving relation with the clutch shaft 118, as above described. The clutches 171 and 172 are out of engagement with the sprockets 160 and 161 and the clutch mechanism 173 is in mid position out of engagement with both bevel gears 148 and 149, so that the winding mechanism is idle. On actuation of the machine, the measuring roll is then driven from the clutch shaft 118 and the paper feed is driven therefrom toward the fingers 26. The roofing material then feeds in between the pairs of fingers 26 into the position shown in Figure 4, whereupon the cam 175 on the secondary cam shaft actuates the clutch 171 to rotate the fingers 26, as above described, in a counter clockwise direction as seen in Figure 4, thus starting to wind up the roofing. Just after the clutch 171 is thrown in, cam 179 on the main cam shaft acts to throw the clutch 178 out of engagement with the worm 122, thus stopping the rotation of the secondary cam shaft, whereupon the cams 174, 175, 176 and 177 are idle. This condition of the mechanism continues until the main cam shaft 116 has made nearly a complete revolution, the time thereof depending on the size of the change gears used. Toward the completion of this rotation of the main cam shaft 116, the cam 179 thereon acts to again throw clutch 178 into engagement with the worm 122, thus again starting the rotation of the secondary cam shaft 117. The cam 174 then acts to throw clutch 170 out of engagement with the sprocket 142, which discontinues the rotation of the measuring roll, it having rotated sufficiently to feed out the required length of roofing for the roll and paper for wrapping it. At the same time that clutch 170 is thrown out, clutch 171 is also disconnected from the sprocket 160 to discontinue the rotation of the winding fingers 26. At this point in the cycle of operations, the snail cams driven from the secondary cam shaft 117 allow the knife 100 to descend by gravity to sever the roofing material against the edge 82, and at the same time the wrapping paper knife 204 is actuated to sever the strip of wrapping paper. The rotation of the secondary cam shaft 117 also actuates the glue roll, as before described, to apply glue to the upper portion of the wrapping paper. As soon as this cutting of the strips and gluing of the wrapping paper has been effected, the clutch 172 is thrown into engagement with the sprocket 161, by the action of the cam 176 on the secondary cam shaft, to start the rotation of the winding fingers 26. The lower end of the wrapping paper, passed downwardly through the machine by means of the belt 209, is presented to the roll by the time the second rotation of the winding fingers begins, so that subsequent rotation thereof acts to wind the paper within and around the roll of roofing, the rotation of these fingers continuing for a sufficient time after the length of roofing has been entirely wound. The roll of roofing is completed and wrapped and the outer end of the wrapping paper is made fast in position by the glue applied thereto. Further rotation of the secondary cam shaft then disengages the clutch 172 by the action of the cam 176, and rotation of the winding fingers ceases. The cam 177 on the secondary cam shaft now acts to throw the clutch mechanism 173 into driving engagement with the gear 148, which acts through the horizontal bevel gear 147 to actuate the mechanism for retracting the winding fingers 26. The outer end of the roll being held by the spool flange 24, this motion of the fingers pulls them from within the roll, which thereupon falls from its position and may be received by any suitable conveyor, by which it may be removed from the machine. In case the roofing is split in two by the knives 67 and 68, it is evident that a pair of rolls are wound and wrapped simultaneously by the oppositely directed sets of winding fingers. As soon as the rolls have been released, the clutch 173 is disengaged from the gear 148 and brought into engagement with the gear 149, which serves, through the mechanism before described, to return the winding fingers 26 to their original position. About the time this action takes place, the cam 174 again acts to throw the clutch 170 into engagement with the sprocket 142 to start the measuring roll for a subsequent cycle of operations.

Having thus described an embodiment of this invention, it should be evident to those skilled in the art that many modifications and changes might be made therein without departing from its spirit or scope as defined by the appended claims.

What I claim is:—

1. A machine of the class described comprising, in combination, means for winding sheet material into a roll, means for measuring the length of said material, means for severing the material at the end of said length, means for measuring a length of wrapping material, and means for wrapping said roll therein.

2. A machine of the class described comprising, in combination, means for winding sheet material into a roll, means for measuring the length of said material, means for severing the material at the end of said length, means for measuring a length of wrapping material, means for wrapping said roll therein, and means for fastening said wrapping in position.

3. A machine of the class described comprising, in combination, means for winding

sheet material into a roll, means for severing the sheet at the end of a measured length, means for severing a length of wrapping material in accordance with the length of the sheet, and means for wrapping said roll in said length of wrapping material.

4. A machine of the class described comprising, in combination, means for winding sheet material into a roll, means for severing the sheet at the end of a measured length, means for severing a length of wrapping material in accordance with the length of the sheet, means for wrapping said roll in said length of wrapping material, and means for releasing said wrapped roll from the machine.

5. A machine of the class described comprising, in combination, means for winding sheet material into a roll, means for severing the sheet at the end of a measured length, means for severing a measured length of wrapping material, means for winding said wrapping material into and around said roll, and means for fastening said wrapping material.

6. In a machine of the class described, a rotatable and axially movable member, spaced fingers carried at the end of said member, means for inserting the end of a length of sheet material between said fingers, means to rotate said member in one direction only to wind said material into a roll, means to move said member axially to withdraw said fingers from said roll to release the same, and means for ensuring the proper positioning of said fingers to receive a sheet for a subsequent winding.

7. In a machine of the class described, a winding mechanism comprising a pair of spaced fingers between which sheet material may be passed, means to rotate said fingers to wind the sheet material into a roll, means to move said fingers axially to remove them from the roll, and means acting as said fingers are removed for ensuring their correct angular position to receive a sheet for a subsequent winding operation.

8. A winding mechanism comprising a sleeve, a shaft rotatable with and movable axially within said sleeve, a pair of winding fingers carried by said shaft and between which sheet material may be passed, means for rotating said sleeve to wind the material about said fingers, means to move said shaft axially to withdraw said fingers from a completed roll and to present them in position for a subsequent winding operation, and means for ensuring the correct angular positioning of said fingers to receive the sheet prior to each winding operation.

9. In a machine of the class described, a winding mechanism comprising a sleeve, a shaft rotatable with and movable axially within said sleeve, a pair of winding fingers carried by said shaft and between which sheet material may be passed, means for rotating said sleeve to cause said fingers to wind said material, means to move said shaft axially to withdraw said fingers from a completed roll and to present them in position for a subsequent winding operation, and cam means acting during such axial movement to ensure the proper angular positioning of said fingers to receive the material prior to each winding operation.

10. In a machine of the class described, a rotatable member, means on said member for engaging the end of a length of sheet material to wind the same into a roll by the rotation of said member, and means for presenting the end of the material to said engaging means yieldable therefrom in accordance with the increasing size of said roll as it is wound.

11. In a machine of the class described, a main cam shaft, a secondary cam shaft, a clutch shaft, a drive for said main cam shaft, a drive for said clutch shaft, an intermittent drive controlled from said main cam shaft for said secondary cam shaft, a measuring roll, a sheet winding mechanism, and means controlled by said secondary cam shaft and actuated by said clutch shaft for actuating said measuring roll and winding mechanism to wind a measured length of sheet material into a roll.

12. In a machine of the class described, a main cam shaft, a secondary cam shaft, a clutch shaft, a drive for said main cam shaft, a drive for said clutch shaft, an intermittent drive controlled from said main cam shaft for said secondary cam shaft, a measuring roll, a sheet winding mechanism, and means controlled by said secondary cam shaft and actuated by said clutch shaft for actuating said measuring roll and winding mechanism to wind a measured length of sheet material into a roll and then to disengage said winding mechanism therefrom.

13. In a machine of the class described, a main cam shaft, a secondary cam shaft, a clutch shaft, means controlled by said main cam shaft for actuating said secondary cam shaft, means for driving said clutch shaft, means driven by said clutch shaft for driving said main cam shaft, a measuring roll for sheet material driven from said clutch shaft and controlled by said secondary cam shaft, a periodically acting knife for severing the sheet in lengths determined by said measuring roll, a sheet winding mechanism for winding the cut length into a roll, and means for feeding wrapping paper to said roll as the roll is completed to be wrapped therearound by subsequent actuation of said winding mechanism.

14. In a machine of the class described, a downwardly inclined chute, means for feeding sheet material into the upper end of said chute, a winding mechanism positioned at

the base of said chute, means for periodically severing the sheet adjacent the upper end of said chute, means for applying glue to the sheet below the severing line, and means allowing said glued length to fall into engagement with said winding mechanism to be wound thereby.

15. In a machine of the class described, a roll for measuring a length of sheet material, a wrapping paper feed, means adjustable for different lengths desired for driving said roll and said paper feed, means for cutting off said sheet material and said paper into such lengths, and means for winding said lengths of sheet material into a roll and for wrapping the length of wrapping paper therearound.

16. In a machine of the class described, a roll for measuring a length of sheet material, feeding means for wrapping material, a winding mechanism, means to actuate said mechanism, means to present said sheet material to said mechanism, and means acting subsequent to said sheet presenting means to present said wrapping material to said mechanism.

17. In a machine of the class described, a roll for measuring a length of sheet material, a wrapping paper feed, means adjustable for different lengths desired for driving said roll, means responsive to such adjustment and additionally adjustable for driving said feed, means for cutting off said sheet material into lengths, means actuated thereby for cutting said wrapping paper into lengths, and means for winding said lengths of sheet material in rolls and for wrapping said rolls with the lengths of wrapping paper.

In testimony whereof I have affixed my signature.

HANS H. WANDERS.