I. H. Sisson.

MACHINE FOR PRODUCING BUNDLES OF YARN OR THREAD.

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11 SHEETS—SHEET 2.

WITNESSES.

- Joyce Morey
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INVENTOR.

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ATTORNEYS.
To all whom it may concern:

Be it known that I, ISAAC H. Sisson, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Machines for Producing Bundles of Yarn or Thread, of which the following is a specification.

My invention relates to a machine for producing bundles of thread or yarn, particularly to a machine for manufacturing such bundles as are used in the manufacture of dolls covered by Patent No. 940,801, issued November 23, 1909.

Among the important objects of the invention are to provide a machine of simple and efficient construction which will automatically receive continuous strands of thread or yarn and which will at intervals tie the strands together and will then cut the strands intermediate the ties, so that the finished bundles can be delivered; to provide clamping carriers for the machine adapted to successively receive the strands; and to provide conveying mechanism for conveying the carriers successively through a clamping field, a binder or tying field, a shearing field, and a releasing field, actuating mechanism closing the carriers into clamping engagement with the strands, wire feed mechanism and die mechanism cooperating in the binder field to apply tie wires to the strands, shears operating in the shearing field to cut the strands intermediate the tie wires, and cam mechanism acting on the carriers to cause release therefrom of the finished bundles; to provide simple cam mechanism controlled and adjusted to effect operation of the various fields at the desired time; and in general to provide a machine which will operate entirely automatically to receive the strands and to deliver the finished bundles.

In the accompanying drawings is illustrated a machine adapted to carry out the various features of my invention.

In these drawings:

Fig. 1 is an elevational view showing the general arrangement of the machine itself and the spool supporting rack for supplying the threads;

Fig. 2 is an elevational view of the machine looking from the right;

Fig. 3 is a plan view;

Fig. 4 is a side elevational view looking 55 from the left;

Fig. 5 is a view looking from plane 5-5,

Fig. 6 is a diagrammatic plan view showing arrangement of the various shafts, gears and cams;

Fig. 7 is a view looking from plane 7-7,

Figs. 2, 3 and 4;

Fig. 8 is a view looking from plane 8-8,

Figs. 2, 3 and 4;

Fig. 9 is a view looking from plane 9-9,

Figs. 2, 3 and 4;

Fig. 9' is a view looking from plane 9',

Fig. 10 is an enlarged view looking from plane 9—9, Fig. 3;

Fig. 10' is a sectional view taken from plane 10' Fig. 10;

Fig. 11 is a front elevational view partly in section of the wire applying mechanism showing the position of the parts before the wire is cut;

Fig. 12 is a similar view showing the position of the parts after the wire is cut and bent;

Fig. 13 is a similar view showing the position of the parts to apply the bent wire about the strands;

Fig. 14 shows the same parts in position after having clamped the wire about the strands;

Fig. 15 is an elevational view of spool supporting mechanism showing a spool in place;

Fig. 16 shows the spool supporting parts in position to receive the spool;

Fig. 17 is a front elevational view of one of the clamping carriers;

Fig. 18 is a vertical transverse sectional view of one of the clamping carriers showing the clamping jaws closed.

Fig. 19 is a view like Fig. 18, showing the clamping jaws open. Fig. 20 is a side elevation of the clamping carrier and a releasing abutment about to cooperate therewith; and Fig. 21 is a similar view showing release being accomplished.

In Fig. 1 the general purpose and layout of the machine is illustrated. The yarns or threads y coming from a plurality of spools x converge through an eye 30, and after passing over a number of guide rollers 31, 31 are carried to the machine M, where
they are clamped to conveyer mechanism to then travel through a clamping field, in which metal bands are clamped about the strands, and then through a cutting field in which the strands are cut intermediate the bands, the products P (Fig. 3), in the form of bundles of strands each secured together at the middle, being then unclamped and delivered from the machine.

10 Referring particularly to Figs. 2, 3 and 4, supporting framework for the machine M comprises a suitable base 32 on which are mounted the standards 33, 34, Fig. 2, and 33', 34', Fig. 4, the respective standards being at the corners of the base, which is rectangular. Mounted on the tops of standards 33 and 34 is a right table section 35, and mounted on the standards 33', 34' is the left table section 35', the table sections being separated by a longitudinal gap 36 (Figs. 3, 7, 8 and 9). Supported on the table section 35 and extending a distance into the gap 36 is a rail plate 37, and on table section 35' is a similar rail plate 37'.

25 On the base 32 and extending longitudinally thereof are L-shaped beams 38 and 38', from whose respective heads horizontal rail plates 39 and 39' extend toward each other and parallel with the upper rail plates 37 and 37' and in vertical alignment therewith. At the rear end of the machine the rail plates 37, 39 and 37', 39' are connected respectively by semi-circular plates 40 and 40', and at the front of the machine these same plates are connected together by semi-circular rail plates 41 and 41', the various semi-circular plates being secured to the machine frame in any suitable manner. The inner edges of the various horizontal and semi-circular rail plates form a continuous track for a plurality of carrier members C all secured to a belt or continuous band 42 supported by idlers 43 and 44, as best shown in Fig. 5. These idlers rotate respectively on transverse shafts 45 and 46, the shaft 45 being journaled in bearing frames 47 and 47', mounted respectively on shelves 48 and 48' extending forwardly from the standards 33 and 33'. The rear shaft 46 is journaled in bearing frames 49, 49' mounted on shelves 50 and 50' extending rearwardly from the standards 34 and 34' respectively. The shaft 46 at its left end carries a crank disk 51 whose crank pin 52 is pivoted to the rear end of connecting rod 53 whose front end terminates in a gear rack 54 (Fig. 4). This gear rack is reciprocable in the sleeve 55 forming part of a housing 56 journaled on the transverse shaft 57 with which the rack 54 meshes, so that upon rotation of shaft 46 the gear rack 54 will be reciprocated back and forth and the shaft 57 rotated alternately in opposite directions. At the inner end of the shaft 57 is secured, a gear 59 which meshes with the rack bar 60 which is slidable on and supported by a longitudinally extending guide frame 61 secured to the under side of the table section 35 adjacent the track for the clutch members (Figs. 5 and 10). Movably with the rack bar is a block 62 to which an L-shaped pawl 63 is pivoted at the end of its horizontal limb. The block 62 carries a spring barrel 64 containing the compression spring 65 which forces a plunger 66 against the elbow 75 of the pawl so that the pawl is normally raised. The upward movement of the pawl is limited by engagement of the abutment lug 67 on the pawl with the spring barrel. Thus, as the shaft 57 and gear 59 are rotated alternately in opposite directions the rack 60 carrying the pawl is reciprocated back and forth. As will later be explained more in detail, the upper end of the pawl extends into the path of the bases of the carrier C and has ratchet engagement therewith, so that as the pawl is bodily reciprocated back and forth, the upper leg of the conveyer belt band 42 is stopped forwardly.

The construction of the carrier frames is clearly shown in Figs. 17 and 19. Each frame comprises side bars 68, 68' connected together by spaced apart transverse walls 69 and 70. The side bars have respectively the grooves 71 and 71' for receiving the opposed edges of the rail plates extending into the gap 36 (Fig. 7). The under side of each carrier frame has a ratchet notch 72 with which the upper end e of the pawl 63 cooperates. Referring to Fig. 5, the pawl end e has just traveled rearwardly across the base of a carrier and into the notch 72, and as the race bar 60 is now moved forwardly the end e will engage against the shoulder 72a of the notch and the conveyer band 42 will be given a counter-clockwise advance. When the rack 60 is now moved rearwardly the pawl end e glides over the rear end of the carrier base against the force of spring 65 and is then ready for cooperation with the ratchet notch of the next carrier. Upon each forward travel of the rack the conveyer belt is advanced a distance equal to the distance between successive carriers.

Each carrier has clamping jaws for receiving the yarn strands and for securely clutching these strands. Referring to Figs. 17, 18 and 19, the walls 69 and 70 of each carrier frame journal horizontal shafts 73 and 74 for supporting clamping arms 75 and 76 respectively having fingers 75' and 76' adapted to interlock. The hubs of the arms have gear teeth 77 and 77' thereon which intermesh so that actuation of one arm 125 will result in movement of the other, a spring 78 tending to keep the arms apart in the position shown in Fig. 19, so that the strands y may enter between the arms and the grooves g and g' in the fingers of the...
arms. When the arms are closed the grooves will overlap, as shown in Figs. 17 and 18, and the strands will be compressed together. Connecting the left ends of the walls 69 and 70 of each carrier is a plate 79 having the opening 80 receiving the outer end of a latch bar 81 pivoted at its inner end to the clamping arm 75. A stem 82 pivots in the plate 79 below and to one side of the slot 80, and from its inner end a latch pin 83 extends and normally engages the latch shoulder 81' on the latch bar 81 to hold this latch bar in and thereby to hold the jaw members or clamping arms in closed position (Fig. 18). The outer end of the pin 82 carries a tripping lever 84, a spring 85 connecting between this lever and the plate tending to hold the lever in normal position with the latch pin in engagement with the latch shoulder. To cause opening of the clamping jaws of each carrier and thereby delivery of the products from the front of the machine a cam block 86 is secured to the front of the semi-circular track plate 41' adjacent the path of the carriers. Looking at Fig. 4, the carrier conveyor band travels in a clockwise direction, and as the trip lever 84 of each carrier wipes over the cam block 86 the latch pin is withdrawn from the latch shoulder and the latch bar released, so that the spring 78 will throw the clamping arms apart to allow the finished product to fall therefrom (see Figs. 19 and 21). The carriers open when they reach the rear of the machine to receive the strands and ready to be locked about the strands.

The mechanism for closing the jaws about the strands is clearly shown in Figs. 8, 4 and 7. At the rear end of table section 35' a guide block 87 is secured, in which a bar 88 is adapted to slide in a direction at right angles to the path of the carriers. The bar secures at its inner end a plate 89 at such a level as to engage with the clamping arms 76 of the carriers C as the carriers come to rest in front of the plate. The bar 88 is moved inwardly when each carrier comes into proper position, and the arm 76 is engaged by the plate and swung inwardly to closed position, the gear teeth on the arm 75, and the strands are clamped. Upon closure of the arms the latch bar 81 is drawn inwardly, so that the latch pin 83 may swing in front of the latch shoulder 81', and the arms are then locked and are not released until the trip levers engage with the cam block 86 at the front of the machine. Reciprocation of the block 88 is controlled by a mechanism which will be described later. As best shown in Fig. 7, an abutment bracket 90 is secured to the table section 35 opposite the block 88 for receiving the carrier and preventing tilting thereof during engagement of the plate 89 therewith.

While the strands are thus securely clamped together binder mechanism becomes effective for tying or binding the strands together at intervals. At an intermediate part of the table section 35 a frame 91 extends transversely from the outer edge of the table section to the inner edge thereof adjacent the traveling conveyer band, and from the inner end of this frame the standard 92 is supported. This standard has dovetail engage ment with a vertically slideable block 98 having mechanism for cooperating with wire to feed from a reel r, the wire passing down wardly alongside the abutment 94 provided on the slide block 98. A bell crank link 95 is pivoted at its elbow to the block 93. Slide able through the downwardly extending arm 98' of this link is an abutment screw 96 whose rear end is adapted to be clamped between ears 97 extending downwardly from a horizontal arm of the link. The inner end of this abutment screw has pivoted thereto a vertically extending abutment plate 98 which is adapted to clamp the wire against the abutment 94 or to release the wire. Extending from the block 98 above the link 95 is a lug 99 carrying an adjustable abutment screw 100, against which the horizontal arm of the link abuts. For actuating the link and the slide block 93 to control the feeding of wire a rock lever 101 is provided and is pivoted at an intermediate point to the standard 102, the inner end having slot and pin pivotal connection with the link 95 and the outer end having adjustable connection with the connecting rod 103 which is connected with suitable actuating cam mechanism which will be described later. In Fig. 10 wire has just been fed downwardly, and the lever 101 has just completed its clockwise movement. As the lever now rotates in counterclockwise direction the link 95 will first be rotated in clockwise direction to cause the wire to be securely clamped between the plate 98 and abutment 94, and then the block 93 is carried downwardly so that the clamped wire is fed into a forming field to be described later. When the lever 101 moves in clockwise direction the link 95 is first rotated to withdraw the abutment plate 98 from the wire, and as soon as the link strikes the abutment screw 100 the block 98 will be carried to its upward position indicated in Fig. 10. In order to lock the wire after feeding thereof a detent pawl 104 is pivoted to the standard 92 and is held by spring 105 against the wire to lock the wire against upward movement but to allow downward movement thereof into the forming field.

Coming now to the mechanism for controlling the binding of tie wires about the strands, the transverse frame 91 has slide able therein a block 106 and within said block a bar 107 is slideable. The rear end of block 130
106 is connected with an actuating arm 108 controlled by cam mechanism to be later described, the connection between the block and arm 108 being through the slot 109 in the side wall of the frame 91. The bar 107 at its outer end has connection with the connecting link 110 connected with actuating lever 111 controlled by suitable cam mechanism, the connection between the bar 107 and link 110 being through a slot 112 provided in the side wall of frame 91 opposite to the slot 109. The block 106 has at its front end a vertical wire receiving groove 113. When the block is in its outermost position, as shown in Fig. 11, this groove will register with the axial bore of the shearing member 114 screwed through the top wall of frame 91. Immediately upon inward movement of the block 106, its upper edge cooperation with the shearing member 114 to cut the wire. As best shown in Figs. 10' and 11, a forming mandrel 115 is slidable transversely across the path of the block 106, this mandrel being an extension on a cylindrical plunger 116 engaging in the pocket 117 formed at the base of the standard 92, a spring 118 tending to throw the plunger forwardly to carry the mandrel end 115 in front of the block 106. After the block 106 begins inwardly after cutting of the wire the small section of wire in front of the block 106 is carried about the mandrel 115, as indicated in Fig. 12, and then upon further inward movement of the block 106 the beveled face 119 of the mandrel end is engaged by the side of block 107 and the mandrel is thus forced out of the path of the block. During all this time the bar 107 has been actuated to travel with the block 106, but after the inner end of the block 106 reaches the vertical plane of the traveling strands it remains at rest for an interval, and during this interval the bar 107 continues its inward movement. However, when the block 106 has reached its innermost position it will have been met by the abutment head 120 carried at the end of a block 121 slidable transversely across the table section 35 on guide frame 122. This abutment head carries a die block 123 which receives the ends of the bent wire section, as shown in Fig. 13. The block 106 and abutment head 120 now rest for a period, and during this interval the bar 107 completes its inward movement to cooperate with the die block 123 to wrap the wire about the strands (Fig. 14). Thereafter the parts return to position indicated in Fig. 11. In order to assure perfect cooperation of the tying mechanism parts the head 120 is provided with guide wings 124 for receiving the inner end of block 106, and block 106 has guide wings 125 for engaging at the outer sides of guide wings 124. Thus at regular intervals a tie wire is secured and wrapped about the strands.

The cutting mechanism for cutting the strands midway between the tie wires is arranged at the front end of the machine. Referring particularly to Figs. 3 and 8, a frame 126 extending transversely across the table section 35 supports the slidable carriage 127 having at its front end the cone 128 journaling a shaft 129 to which are pivoted the shears levers 130 and 131. The front ends of these levers have suitable cutting blades 132, and the rear ends of the levers are pivoted by toggle links 133 and 134 whose inner ends pivot to the toggle head 135 at the inner end of a threaded rod 136. The rod 136 has slidable engagement through the upper end of a cam controlled actuating lever 137, such relative movement being controlled by adjustable abutment nuts 138, 139 on the rod. A connecting rod 140 is pivoted to the plate 127 at its inner end, and at its outer end is pivoted to a cam controlled actuating lever 141. The plate 127 is normally at the outer end of its guide frame 136, so that the cutting ends of the shears are out of engagement with the strands. At the proper time the lever 141 is actuated to cause plate 127 to be moved inwardly to carry the open ends of the shears about the strands, and then when the lever 137 is actuated to cooperate with abutment screw 139 the toggle links are pulled outwardly and the shearing edges brought together and the strands severed. The actual cutting of the strands takes place during the time when the strands are at rest and the tie wires are being applied thereto. In order to lock the conveyor band 42 during the tying and cutting period a detent pawl 142 is pivoted adjacent the path of the carriers C and is controlled by spring 143 to engage the rear ends of the successive carriers to prevent backward movement of the band 42. In order to lock the band against forward movement during the rest period a locking bar 144, slidable in frame 145 of the table section 35', is moved in advance of one of the carriers. Coming now to the cam mechanisms for controlling and timing the operations of the various mechanisms above described, Fig. 6 diagrammatically illustrates the lay-out of these cams. The shaft 46 which carries the conveyor belt idler 44 has at its right end the gear wheel 146 which meshes with a driving pinion 147 on a shaft 148 which carries a belt wheel 149 which may be connected with any driving source and which may have a handle 150 to enable the machine to be operated manually. Journalled in suitable bearings on the standards 33 and 34 is a shaft 150 and journal in bearings on the standards 33' and 34' is a shaft 151. The
rear ends of the shafts 150, 151 carry bevel gears 152 and 153 meshing respectively with the bevel gears 154 and 155 on shaft 46. On shaft 151 is mounted a cam disk 156 having a cam groove 157 in one of its faces for receiving a cam roller 158 at the end of lever 159 pivoted at an intermediate point to a downwardly extending bracket 160. The upper end of the lever 159 has pivotal engagement with the block 88 which carries at its end the plate 89 for controlling the closure of the carrier jaw members. The cam disk 151 on shaft 151 has the cam slot 162 in one of its faces for receiving the cam roller 163 at the lower end of lever 164 pivoted at an intermediate point to the bracket 165, the upper end of this lever having pivotal engagement with the end of block 121 carrying the head 120 which cooperates with the binder mechanism. Another cam disk 166 on shaft 151 has the cam groove 167 for receiving the roller 168 on lever 169 whose upper end has pivotal engagement with the stop plate 144. The cam disk 167' on shaft 151 has the cam groove 168' for receiving the cam roller 169' at the lower end of the lever structure 170 pivoted at an intermediate point to the lower end of bracket 170', the upper end of this lever, as before mentioned, being connected with the bar 107 sliding within block 106. The cam disk 171 has the cam groove 172 for receiving the roller 173 at the inner end of the lever 174 which is pivoted at the upper end of the standard 175, the rod 103 connecting together the outer end of this lever and the lever 101 which controls the wire feeding mechanism. Cam disk 176 has a suitable slot for receiving the cam roller 177 at the lower end of lever structure 108 pivoted at the lower end of bracket 170', the upper end of this lever structure being connected with the block 106 for controlling the forming and application of the tie wires.

Cam disk 178 has a groove 179 for receiving the cam roller 180 at the lower end of lever 181 secured to a shaft 182 which also supports the lever 141 which controls the operation of the shear mechanism supporting slide plate 127. The cam disk 184 has a slot 185 receiving cam roller 186 at the lower end of lever structure 137, the upper end of this lever structure controlling the openness and closing of the shearing jaws.

The various cam disks are all driven at the same speed, and it is of course obvious that the cam grooves therein can be of such shape and so positioned as to cause operation of the various devices in any desired sequence and at the desired times. The adjustment is, however, preferably such that when the carrier belt or band 42 is at rest, the carrier jaws will be closed over the strands, the tie wires applied to the strands and the strands cut into lengths. In Fig. 15, I have shown the arrangement for supporting the yarn or thread spools. Referring to Fig. 1, the supporting rack for the spools has cross bars 200 and on these cross bars sleeves 201 are clamped as illustrated in Figs. 15 and 16. An upstanding lug 202 on each of these sleeves has pivoted thereto a spool supporting spindle 203, and a downward extending lug 204 on the sleeve has pivoted thereto a pivoted clip 205 pressed downwardly by a spring 206. The various sleeves are one above the other and the spindle of one sleeve is of a length to engage at its upper end with the clip 205 of the sleeve above. When a spool is to be removed or applied to a spindle, the clip of the other sleeve is raised and the spindle swinging downwardly, as illustrated in Fig. 6, the spool being applied and the spindle is swung upwardly into engagement with the clip on the upper sleeve. A stop extension 207 on each spindle abuts against its supporting sleeve and thus limits the swinging thereof.

I thus provide a simple and efficient machine for receiving strands or threads of material and which will automatically firmly clamp the strands together and will apply tie wires thereto at regular intervals and will cut the strands intermediate the tie wires so the machine will deliver bundles of strands to be used in any manner, as for example in the manner shown in my Patent No. 940,801 already referred to. I do not of course desire to be limited to the precise construction, arrangement, and operation shown and described, as changes and modifications might be made which will come within the scope of my invention. I therefore claim the following:

1. In a machine of the character described, the combination of clamping carriers traveling bodily and successively receiving and carrying strands of material, means for tying said strands together at intervals, and means for cutting said strands into bundles.

2. In a machine of the character described, the combination of carrier members, conveyor mechanism for said carrier members, clamping jaws on each carrier member for receiving strands of material, connecting mechanism for cooperating with said carrier clamping jaws to close said jaws securely about the strands, mechanism disposed adjacent the path of said carriers and adapted to apply metallic tie bands about the strands, shearing mechanism operable to cut said strands intermediate said bands, and means for cooperating with said carriers to effect release of the strand bundles therefrom.

3. In a machine of the character described, the combination of carrier mem-
bers for receiving strands of material, a conveyor for supporting said carriers, means for causing step by step movement of said conveyor, actuating means adjacent the path of said carriers to cause clamping of said strands by the carriers into intimate parallel relationship, die members disposed adjacent the path of said carriers and strands carried thereby, means for feeding wire to one of said die members, means for actuating said die members to apply tie wires to said strands, shearing mechanism disposed adjacent the path of said strands for cutting said strands intermediate the carrier members whereby the tied strands are cut up into bundles, and means in the path of said carriers adapted to cooperate therewith to effect release of the bundles.

4. In a machine of the character described, the combination of carrier members, clamping jaws for each carrier member, a conveyor to which said carrier members are secured, means for moving said conveyor, said carrier member jaws being normally open to receive parallel strands of material, an actuating bar adapted to cooperate with said carriers to effect clamping of the jaw members thereof about the strands, tying mechanism adapted to apply tie wires to said strands intimately together at intervals, shearing mechanism adapted to cut said strands intermediate the tie wires whereby the strands are separated into bundles, means for releasing the bundles from the carrier member, and cam mechanisms for controlling the operations of said clamping jaw actuating mechanism, said tying mechanism, said shearing mechanism, and said releasing mechanism.

5. In machinery of the described class, means for arranging continuous strands of material in intimate relation, clamping members for successively receiving said strands, conveyor mechanism on which said clamping members are supported, means for intermittently moving said conveyor mechanism, means operable during a period of rest of said conveyor mechanism to apply tie wires about said strands whereby said strands are securely clamped together at intervals, and means operable during periods of rest of said conveyor mechanism for cutting said strands intermediate the tied sections thereof whereby said continuous strands are separated into bundles tied intermediate their ends.

6. In a machine of the character described, the combination of conveyor mechanism, a plurality of carriers mounted on said conveyor mechanism, each carrier member having clamping jaws which are normally open to receive the parallel strands of material, an actuating bar automatically controlled to close the jaws of each carrier member after reception of the strands thereby, a tie mechanism adapted to apply tie wires to the strands intermediate the clamping members, and cutting mechanism operable to cut the strands intermediate the wires whereby the continuous strands are converted into bundles of strands tied intermediate their ends.

7. In a machine of the character described, the combination of two idlers, an endless band on said idlers, carriers on said band, each carrier having clamping jaws for receiving strands of material, means for closing the jaws of each carrier as the strands are received thereby, means disposed in the path of said carriers for applying tie wires thereto to securely clamp the strands together at intervals, shearing mechanism disposed adjacent the path of the carriers for cutting said strands intermediate the carriers, cam mechanisms for controlling said clamping jaw actuating mechanism, said tie wire applying mechanism, and said shearing mechanism, and a common driving means for said conveyor belt and said cam mechanisms.

8. In a machine of the character described, the combination of two table sections separated by a gap, a conveyor band adapted to travel through said gap parallelly therewith, carriers mounted on said conveyor band, each carrier having clamping jaws normally open to receive strands of material, means mounted on said table adjacent the path of said carriers for closing said jaw members after reception thereof of the strands, cooperating die mechanisms at opposite sides of said carrier path adapted to apply tie wires to said strands, and shearing mechanism mounted adjacent said carrier path for cutting said strands intermediate the tie wires.

9. In a machine of the character described, the combination of a table having a longitudinal slot, transverse shafts at the ends of said table each mounting an idler, an endless band mounted on said idlers and having one leg traveling longitudinally through said slot, a plurality of clamping members mounted on said band and adapted to receive and to clamp strands of material, a frame mounted transversely on said table adjacent said slot, a block slideable in said frame and having a forming end, means for feeding wire into said frame in advance of said block, a mandrel in said frame for cooperating with the forming end of said block to bend wire lengths, a die plate slideable within said block, a die head on said table, the strands of material passing between said block and head, and said block and die plate cooperating with said head to securely clamp the wire length about said strands, means for cutting said strands in-
termediate said tie wires thereon, and a common driving means for said shafts and said tie wire applying mechanism.

10. In a machine of the character described, the combination of a table having a longitudinal slot, transverse shafts at the ends of said table each mounting an idler, an endless band mounted on said idlers and having one leg traveling longitudinally through said slot, a plurality of clamping members mounted on said band and adapted to receive and to clamp strands of material, a frame mounted transversely on said table adjacent said slot, a block slidable in said frame and having a forming end, means for feeding wire into said frame in advance of said block, a mandrel in said frame for cooperating with the forming end of said block to bend wire lengths, a die plate slidable within said block, a die head on said table, the strands of material passing between said block and head, and said block and die plate cooperating with said head to securely clamp the wire length about said strands, means for cutting said strands intermediate said tie wires thereon, a counter shaft geared to one of said idler shafts, cam members mounted on said counter shaft, and cam levers connecting between said cam members and said block and cam plate of the wire applying mechanism.

11. In a machine of the character described, the combination of tie wire applying die mechanism, shearing mechanism, carriers for receiving strands of material, and means for bodily moving the carriers successively into the fields of operation of said wire applying mechanism and shearing mechanism, whereby tie wires are applied at intervals about said strands and said strands cut intermediate said carriers to form bundles.

12. In a device of the character described, the combination with a main frame, of an endless traveling conveyor mounted thereon, a series of clamping members carried by the conveyor for receiving and assembling a plurality of strands of material into a cord, mechanism for cutting the cord into predetermined lengths during a dwell in the movement of the conveyor, mechanism for automatically binding the strands of each length together prior to the severing of the same, and mechanism for intermittently driving said conveyor.

13. In a device of the character described, the combination with an endless traveling conveyor mounted thereon, a series of spaced apart clamping members carried by the conveyor and adapted to receive a plurality of strands of material and withdraw them from rolls of stock during the travel of the conveyor, means for supporting a plurality of rolls of stock from which said strands are withdrawn, mechanism for automatically actuating the clamping members, means for applying tying members to the strands while secured within the clamping members and means for severing the strands on either side of the tying members to form bundles of predetermined lengths, and means for actuating said various mechanisms in properly timed relation.

14. In a machine of the character described, the combination with a main frame, of a conveyor traveling thereon, a series of spaced apart clamping members carried by said conveyor and adapted to receive and hold a plurality of strands of flexible material and automatically withdraw the latter from suitable rolls of stock, means for supporting said rolls of stock, means for applying tie-bands to said strands and for severing said strands on either side of said tie-bands, and means for releasing the severed lengths from the clamping members, all of said parts being automatically and synchronously operated.

15. In a device of the character described, the combination with a main frame, of a conveyor traveling thereon, a series of carriers moving with said conveyor and adapted to receive and hold a plurality of strands of material, mechanism for applying the tying members to the strands to form a cord or rope, and mechanism for severing said cord or rope into predetermined lengths on either side of each tying member to form bundles, said parts being operated automatically and synchronously.

16. In a device of the character described, the combination with means for supporting a plurality of rolls of stock containing strands of flexible material, bodily traveling clamping members for successively clamping and withdrawing a plurality of strands from said rolls of stock and cutting the same to form a cord, mechanism for applying a plurality of tying members to said cord, and mechanism for severing said cord on either side of each tying member whereby said cord is cut into bundles to predetermined length.

17. In a device of the character described, the combination with a main frame, of carrier members, conveyor mechanism for said carrier members, clamping jaws on each carrier member for receiving strands of material, mechanism for cooperating with said carrier clamping jaws to close the latter securely about the strands, mechanism disposed adjacent the path of said carriers and adapted to apply tying members about the strands during a dwell in the movement of the conveyor, shearing mechanism for cutting said strands intermediate the tying members, means for cooperating with said carrier members to effect the release of the
strand bundles therefrom, said parts being operated automatically and synchronously.

18. In a machine of the character described, the combination with a main frame, of carriers for receiving a plurality of strands of material, a conveyor for supporting said carriers, means for causing step by step movement of said conveyor, actuating means adjacent the path of said carriers to cause clamping of said strands, die members disposed adjacent the path of said carriers, means for feeding wire to one of said die members, means for actuating said die members to apply tie wires around said strands, shearing mechanism for cutting said strands intermediate the tie wires whereby the tied strands are severed into bundles of predetermined lengths, and means for releasing the bundles from the carrier, said parts being operated synchronously and automatically.

19. In a machine of the character described, the combination with a main frame, of carrier members, clamping jaws for each carrier member, a conveyor to, which said carrier members are secured, means for intermittently actuating said conveyor, said clamping jaws being normally open to receive a plurality of strands of flexible material, means for automatically closing said jaws to clamp the strands, tying mechanism for applying tying bands to said strands, shearing mechanism for cutting said strands whereby the strands are severed into bands, and means for releasing the bundles from the carriers, said parts being automatically and synchronously operated.

20. In a device of the character described, the combination with a main frame, means for supporting a plurality of rolls of stock, said rolls comprising strands of flexible material, a series of traveling clamping members upon said main frame, for automatically withdrawing a plurality of strands from said rolls, means for applying tension to the strands as they are withdrawn from the rolls, said clamping members holding the strands in substantial parallelism, mechanism for severing said strands while so held into predetermined lengths, and means for opening and closing said clamping jaws at predetermined intervals in their travel, said parts being operated in properly timed relation.

21. In a device of the character described, the combination with a main frame, of means for supporting a plurality of rolls of stock, said rolls comprising strands of flexible material, an endless traveling conveyor upon said frame, a series of clamping jaws moving with the conveyor and adapted to withdraw a plurality of strands of material from the rolls of stock and hold them in substantial parallelism, and means for applying a plurality of tie-bands to said strands at predetermined points on the latter, said parts being operated in properly timed relation.

22. In a device of the character described, the combination with a main frame, of a conveyor traveling thereon, carriers adapted to receive and hold a plurality of strands of flexible material, said carriers being supported by and moving with the conveyor, means for applying tying members to said strands at predetermined points in the latter while the strands are held within the carriers, and means for actuating said parts in properly timed relation.

In witness whereof, I hereunto subscribe my name, this second day of April A. D. 1912.

ISAAC H. SISSON.

Witnesses:
Peter C. Cannon,
P. Leo Cannon.