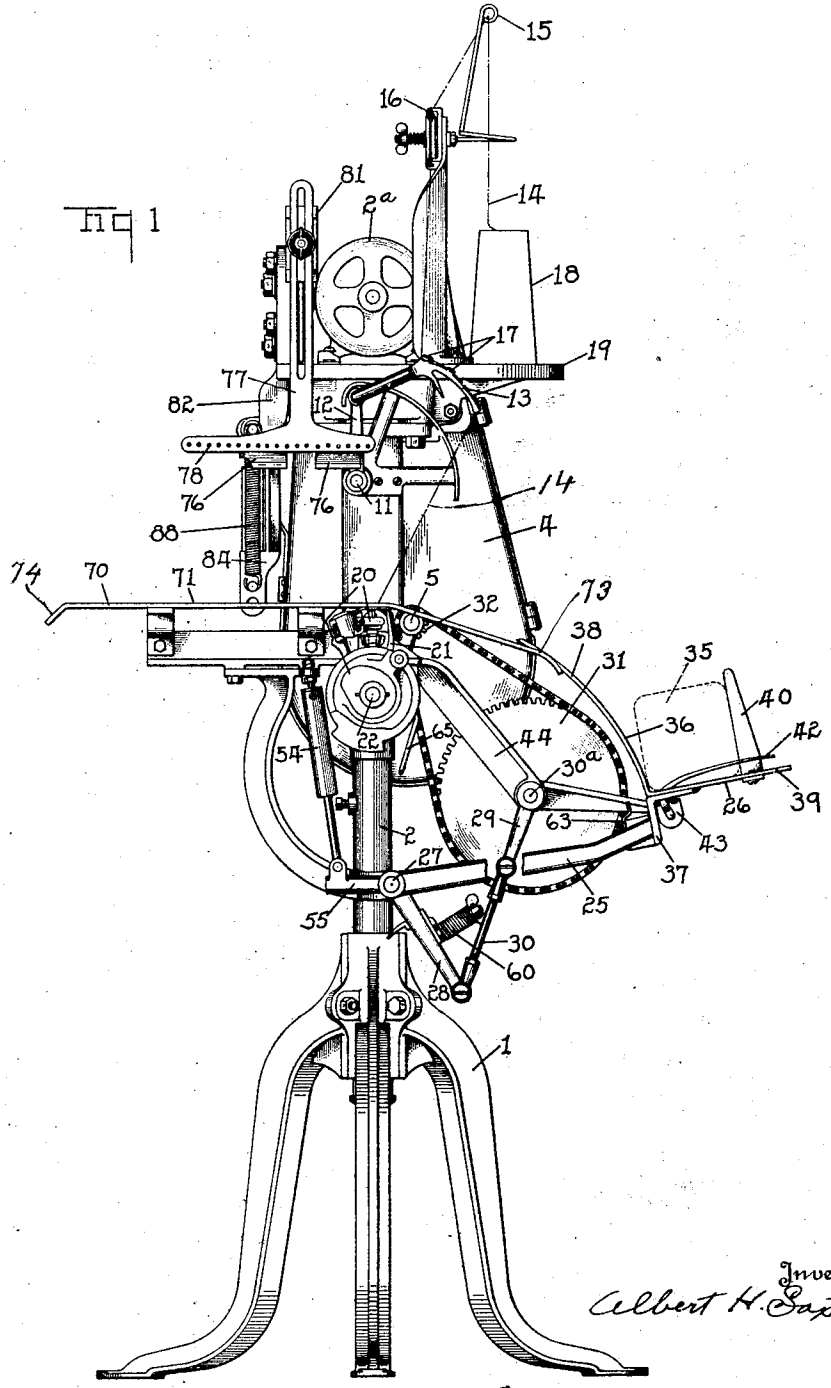
May 24, 1927. 1,629,841

A. H. SAXTON

AUTOMATIC BUNDLE TIER

Filed July 18, 1924 4 Sheets-Sheet 1

Fig 1



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May 24, 1927. 1,629,841

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AUTOMATIC BUNDLE TIER

Filed July 18, 1924 4 Sheets-Sheet 2

Fig 3

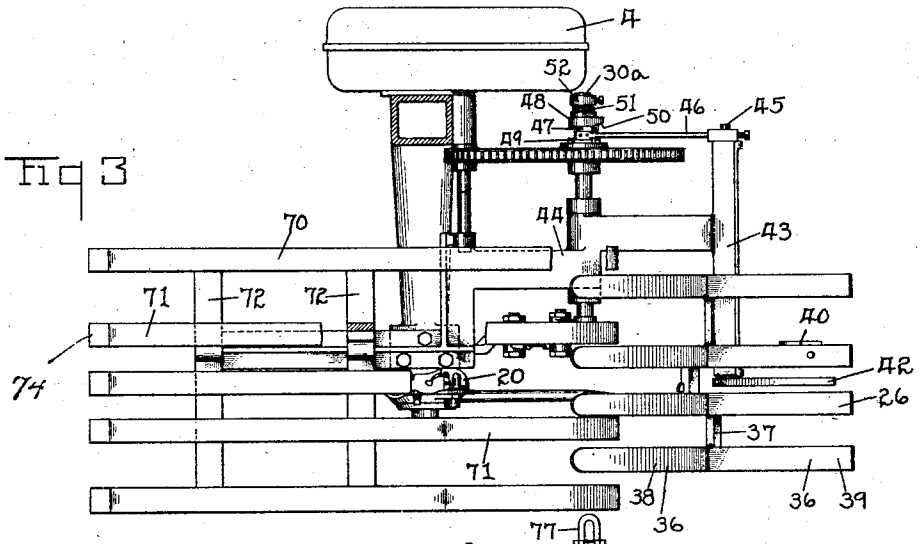
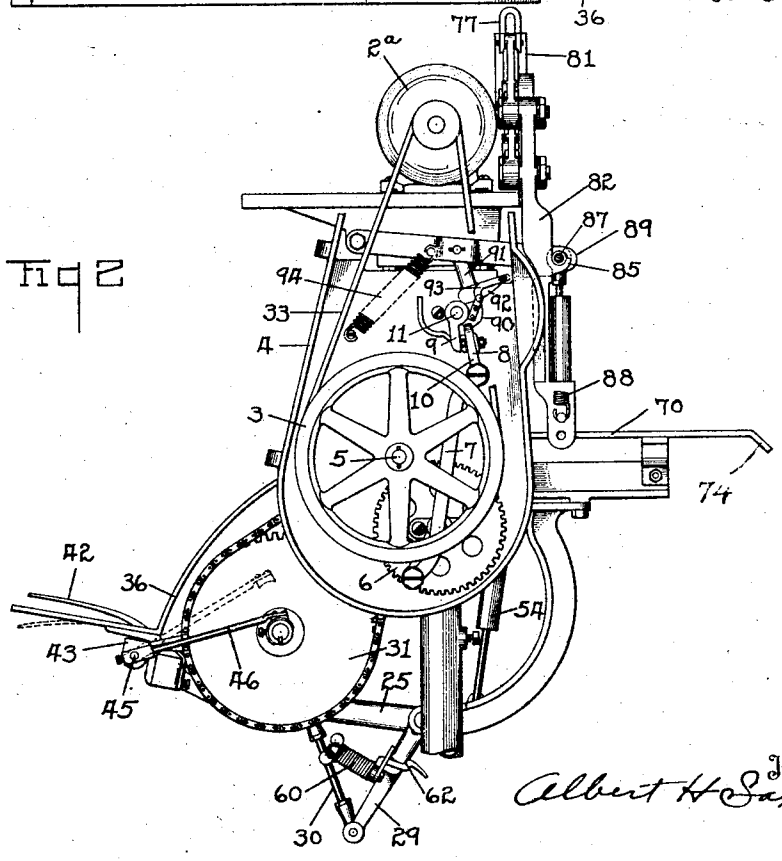


Fig 2



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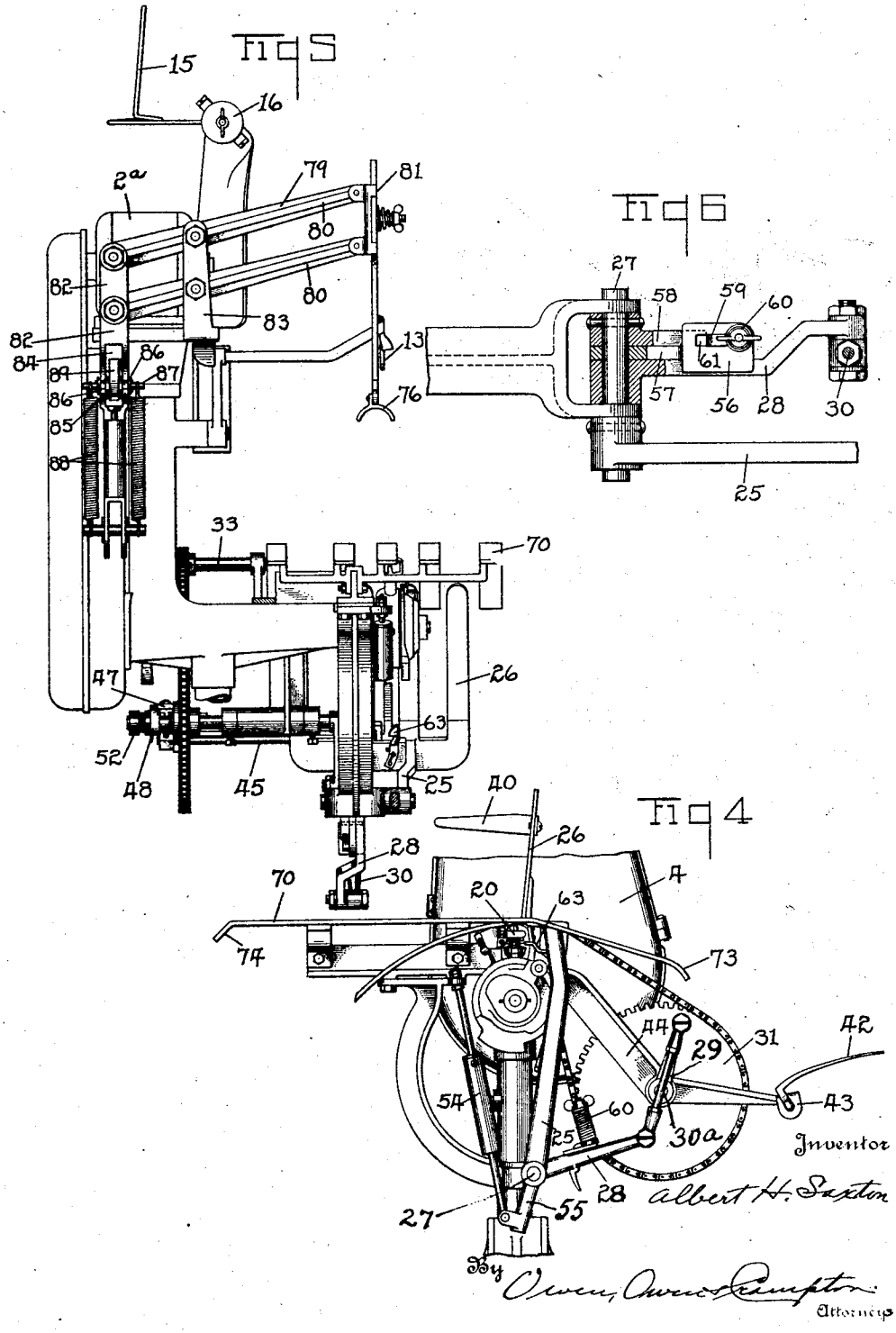
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AUTOMATIC BUNDLE TIER

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Fig 7

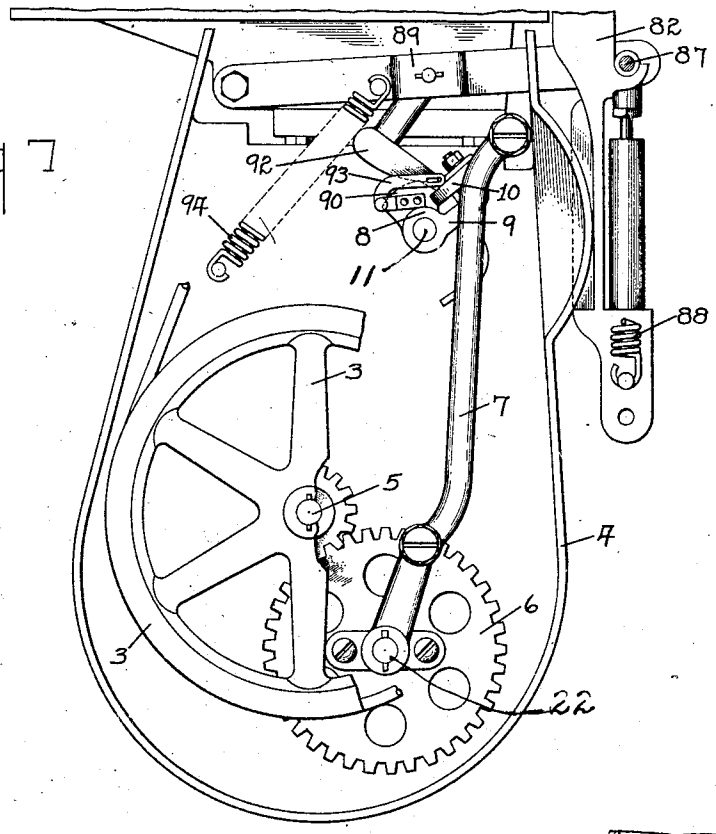
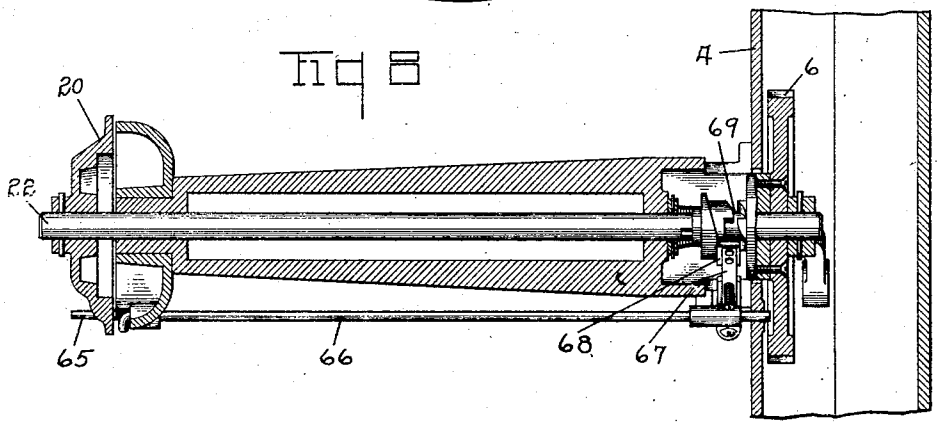


Fig 8



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Patented May 24, 1927. 1,629,841

UNITED STATES PATENT OFFICE.

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AUTOMATIC BUNDLE TIER.

Application filed July 18, 1924. Serial No. 726,708.

My invention has for its object to provide an efficient tying machine wherein the bundle wrapping and tying operations will be automatically started upon placing the bundle or object to be wrapped and tied in position in the tying machine. The invention also provides a means for yieldingly pressing the bundle while the cord is being drawn to increase the tightness of the cord when the bundle has been wrapped and tied. The invention also has for its object to provide coordinating parts whereby the improvements that contain the invention may be applied to wrapping and tying machines. The invention also has for its object the accomplishment of other advantages and features which will appear upon examination of the drawings and from the following description.

The invention may be contained in structures of different forms and to be used for tying cord or twine or the like for connecting parts or wrapping bundles of different kinds, and thus the structure may be varied to be used for a great variety of purposes and still be within the purview of the novelty of my invention. For the purpose of describing and showing a practical application of my invention, I have selected a bundle tier containing the invention as an example of structures that embody the invention and shall describe it hereinafter. The structure selected for purposes of illustration is shown in the accompanying drawings.

Figure 1 of the drawings illustrates a side view of the tying machine selected as an example of structures containing my invention. Figure 2 illustrates a side view opposite to the side shown in Fig. 1 of some of the operative parts of the mechanism. Figure 3 illustrates a top view of the bundle supporting rack and of a part of the mechanism for operating the rack. Figure 4 shows the supporting rack shown in Fig. 3 in a raised position to place the bundle in position to be tied. Figure 5 is a rear view of the mechanism shown in Fig. 2. Figure 6 is a view showing a detail of a means for disconnecting the rack operating mechanism from the driving mechanism. Figure 7 is a detail view of a part used for operating the bundle presser foot for producing a tightly drawn cord when the bundle has been wrapped and tied. Fig. 8 illustrates an automatic clutch for connecting the tying mechanism with the driving means of the machine.

The structure shown in the drawings is of that type of bundle tier machines described and shown in the Patent Number 1,597,696 granted August 31, 1926, to myself and Joseph J. Bachmayer, and contains many of the features described in the said application. The said application described a machine for forming loops of cord in tags and tying the ends of the loops that are thus formed, while the machine selected for purposes of illustration and shown in the drawings of this application is for wrapping bundles with cord and tying the ends of the portions of the cord that are used in wrapping the bundles, and particularly relates to a means for automatically setting the mechanism or parts thereof in operation and for depressing each bundle along the line in which the cord is placed to aid in producing a tightly wrapped bundle, together with other features more particularly described hereinafter and shown in the drawings, and the coordinating parts whereby the improvements may be properly operated in conjunction with a machine of the type referred to.

The machine is supported on a tripod 1 having an adjustable pedestal 2 for adjusting the height of the machine. It is driven by means of a suitable motor such as the electric motor 2^a that drives the wheel 3 located in the casing 4 that is suitably supported on the pedestal 2. The wheel 3 is located on a shaft 5 and by means of a pinion drives the gear wheel 6. The wheel 6 is freely rotatable on its shaft except as it is positively connected thereto by means of a clutch as hereinafter described. A link 7 is connected to the gear wheel 6 and to an arm 8 formed of two yieldingly connected parts 9 and 10, and so as to cause oscillatory movements of the arm 8 to produce oscillatory movements in a shaft 11 and, if need be, to break the joint between the parts 9 and 10 if the shaft 11 should be stopped by a positive force and to prevent breaking or injury of any parts of the machine or injury to the person operating the machine. The shaft 11 is connected to the needle arm 12 having the needle 13, and consequently the link 7 produces oscillatory movements in the needle 13 to raise the needle well

above any package and to draw the cord about the bundle to be wrapped. The cord 14 passes through a suitable guide 15 and a tension device 16 and is threaded through openings formed in bosses 17 on the top of the needle and in the end of the needle. The cord may be drawn from a suitable bobbin or ball 18 that is supported on a shelf 19 forming a part of the frame of the machine. When the needle is moved down, it places the twine in position to be engaged by the knotting mechanism 20 that ties the portions of the cord placed about the package and severs it from that portion of the cord that extends through the openings in the needle and is connected to the bobbin 18, while at the same time the knotting mechanism 20 grips the end of the last named portion of the cord to hold it preparatory to being tied with the portion of the cord that surrounds the succeeding bundle. The cord is severed by means of the combined knife and guide that is operated by the arm 21 that is manipulated by the knotting mechanism 20. The knotting mechanism 20 is driven by the shaft 22. These features are described in detail in the said patent referred to above.

The controlling elements for starting the mechanism described and referred to are actuated by the movement of an arm 25 on which is supported a rack 26. The arm 25 is pivotally connected to the frame of the machine by means of the shaft 27 and is operated by an arm 28 that is also connected to the shaft 27. Thus the arms 25 and 28 form a bell crank lever for lifting the rack 26. The bell crank lever is connected to an arm 29 by means of an adjustable link 30. The arm 29 is connected to a shaft 30^a to which a sprocket or chain gear wheel 31 may be releasably connected, as hereinafter described. Rotation of the gear wheel 31 causes rotation of the arm 29 which in turn causes oscillatory movements in the bell crank lever formed by the arms 25 and 28 which operates to raise and lower the rack 26. The gear wheel 31 is driven by means of the pinion 32 which is connected to the shaft 5 which is driven by the wheel 3 that is directly connected to the motor 2^a by means of the belt 33. Thus the chain gear wheel 31 is being rotated while the motor 2^a is in operation, but it is connected to the shaft 30^a only during those periods that the rack 26 is being raised and lowered.

The movement of the rack 26 is controlled by the weight of the bundle 35, that is, the rack 26 is caused to be raised when the bundle 35 is placed on the rack. The rack 26 is formed of strips of metal 36 that extend at substantially obtuse angles to each other and are secured to an angle bar 37 which is connected to the arm 25. The parts 38 of the strips 36 are preferably slightly curved to lie substantially within the path of movement of the cross bar 37, while the other portions 39 of the strip 36 extend rearwardly from the machine and form a shelf on which the bundle 35 may be conveniently placed. If desired, a finger 40 may be secured to one of the strips 36 to confine the bundle to the corner of the rack and indicate roughly the position at which the cord will be placed when the bundle has been wrapped and tied. It also operates to hold the bundle loosely on the table until it is tied.

The connection of the chain gear wheel 31 with the shaft 30^a is produced by the operation of the lever 42, which is pivotally connected to a frame 43 that forms a part of the frame of the machine, it being part of an arm 44 that extends from the machine. The arm 44 also supports the shaft 30^a that is located in suitable bearings formed in the arm 44. The lever 42 is connected to a shaft 45 to which is keyed an arm 46. When, therefore, the bundle 35 is placed on the rack 26, the arm 46 is raised, the weight of the arm 46 and the parts connected thereto being such as to normally maintain the lever 42 raised, and consequently the arm 46 lowered, that is, before a bundle is placed in position on the rack 26. The end of the arm 46 is provided with a spreading block 47 for spreading the jaws of a clutch that is formed of the two clutch members 48 and 49. The member 49 is connected to the chain gear wheel 31, while the member 48 is slip-keyed to the shaft 30^a. One of the clutch members 48 and 49 has a lateral cam face such as that shown at 50, while the block 47 also has a coacting cam surface whereby the block 47 will separate the clutch members 48 and 49 so as to disconnect the chain gear wheel 31 from the shaft 30^a when the arm 46 is lowered so as to place the block 47 into engaging relation with respect to the cam surface 50, that is, the block 47 resting on the edges of the clutch members 48 and 49 will at one point during the rotation of the shaft 30^a engage the cam surface 50 and will wedge or separate the clutch members 48 and 49 as the shaft 30^a continues to rotate the clutch members until the connecting teeth of the clutch members are disengaged. To yieldingly resist this separation of the clutch members and to cause the clutch members to reengage when the block 47 is pulled from beneath the clutch members, a spring 51 may be located on the shaft 30^a and between the clutch member 48 and a ring 52 that is secured to the end of the shaft 30^a. Thus when the lever 42 is lowered by the weight of the bundle, the block 47 is lifted from between the clutch members 48 and 49 and the spring will establish connection between the continuously rotating chain gear wheel

31 and the shaft 30a. This will cause the shaft 30a to rotate and cause the arm 25 to oscillate, which will raise the rack 26. The lever 42 being supported on the part 43 of the frame of the machine will not move with the rack 26 and consequently, as the bundle is raised by the rack 26, it will be lifted from the lever 42. This will lower the block 47 in position to engage the cam surface 50 of the clutch member 48, but owing to the fact that the shaft 30a must necessarily rotate a considerable distance before the block 47 will sufficiently separate the clutch members 48 and 49 to cause disconnection between the chain gear wheel 31 and the shaft 30a, the rack 26 will raise to its uppermost position. The machine however may be started by actuating manually or pedally the same elements that are actuated by the lever 42.

In order to cushion the return of the rack to the portion 43 of the frame, a suitable spring, pneumatic or oil buffer 54 may be connected to the frame of the machine and to an arm 55 that protrudes from the arm 25. Also, in order to yieldingly disconnect the rack 26 from the driving chain of mechanical elements that causes the rack to be raised, the arm 28 may be releasably connected to the shaft 27, as shown in Fig. 6. A plate 56 is connected to an arm 57 that is supported on the shaft 27, and an arm 58 is keyed to the shaft 27 but is connected to the arm 57 by means of a latch 59 that is spring-pressed by the spring 60. One end of the latch 59 is located beneath the spring 60 and extends through an opening 61 formed in the plate 56 and is provided with a suitable notch 62 that engages the end of the arm 58. The arm 25 is also keyed to the shaft 27 and so that if the arm 25 is stopped in its movement by some substantial positive force, the arm 28 being moved upward by the link 30 and the chain gear wheel 31 may continue to move, but the arm 58 will be disconnected therefrom since it will push the latch member 59 to one side against the action of the spring 60 and thus become released from the connection with the arm 28. Thus the arm 28 may continue in its upward movement while the rack 26 will discontinue its movement and will be held by the object or force that is sufficiently great to cause the latch 59 to be tripped and permit the disconnection of the end of the arm 58 from the latch. In order that the connection may be easily established, the latch 59 protrudes below the plate 56 as best shown in Fig. 2, and the end portion is bent or cammed away from the shaft 27 so that the arm 58 may be easily snapped into engaging relation with respect to the latch.

In order that the rack 26 may be held more positively in its uppermost position than it could be held through the jointed connections existing between the arm 29, the link 30, the arms 28, 58 and 25, the upper end of the arm 25 is provided with a latch 63 that engages with the knife and guide supporting arm 21 that forms a part of the knotting mechanism 20. The final operation of the knotting mechanism, as described in my said prior joint application, is the lateral movement of the knife and guide to sever the cord after it has been wrapped and knotted by the machine. This lateral movement of the arm 21 is taken advantage of to disconnect the latch 63 since such lateral movement will cause the arm 21 to slip from the notch, that is, from the nose of the latch 63, and thus disconnect the positive engagement of the outer end of the arm 25 at the completion of the wrapping and tying operations of the machine. It will then fall of its own weight to the frame 43 except as it is resiliently caught by the buffer 54.

The knotting mechanism is started when the bundle has been placed in position on the table or rack. The lever 25, when it is raised to its uppermost position to so place the bundle, moves a lever 65 that connects the gear wheel 6 with the shaft 22 to which the knotting mechanism 20 is connected. The lever 65 is connected to a shaft 66 and an arm 67 is connected to the shaft 66. A cam block 68 is raised by the arm 67 so as to permit the parts of the clutch 69 to engage and cause rotation of the shaft 22. The clutch and its operation are the same as that described in the said patent referred to above except that the shaft 66 is actuated by the arm 25 striking the arm 65 which is connected to the shaft 66.

The table 70 is formed of a plurality of strips 71 that are connected to cross bars 72 that are suitably supported on the frame of the machine. The ends of the strips 71 bend downward for receiving the bundle, which is carried upward by the rack 26, as at 73. The rear ends of the strips 71 may also be bent downward, as at 74, for the purpose of delivering the bundles from the table into any suitable receptacle, such as a basket or a suitable conveyor. Thus the bundles may be placed in succession on the table and the portions of the cord between the knotting mechanism 20 and the raised needle in succession will be wrapped around the bundles, knotted and severed, the succeeding bundles being pushed from the bundle wrapping position by the bundles that are raised by the rack 26 as they are placed successively in position to be wrapped. Thus the machine may be operated continuously to wrap the bundles as fast as they are placed in position on the rack 26.

As a further aid in producing a compact and tightly drawn cord about the finally wrapped bundle, I have provided means for pressing the top of the bundle substantially

along the line that the cord is drawn by the machine, and while the knot is being tied. A presser foot 76 is provided which will be lowered when the bundle has been placed in tying position on the table 70. The presser foot 76 is preferably channeled or U-shaped and so as to spread that portion of the cord that extends over the top of the bundle. The presser foot 76 has a considerable length so as to extend across the top of the bundle. The presser means may be formed of two or more presser feet that may be connected to a T-shaped bar 77. The T-bar is provided with a plurality of holes 78 in its head that may be tapped, and where a plurality of presser feet 76 are used the presser feet may be adjustably located at any point along the head of the T-bar 77. The T-bar 77 and consequently the presser feet 76 are located substantially in the same plane that the needle 13 moves in its operations on the cord to draw portions of the cord about the bundle. Thus the cord will be drawn over the bundle beneath the presser feet 76 while the presser feet are operated so as to press the top of the bundle while the cord is being drawn by the needle and being tied by the knotting mechanism.

The T-bar 77 is adjustably connected to a parallelogram of elements 79 consisting of two levers 80 and a slotted frame 81 that forms a supporting head and connects the levers 80 at two of their ends and the member 82 that connects the levers 80 at their remaining ends. The levers 80 are pivotally supported on the part 83 of the frame of the machine and thus substantially vertical movements are produced in the presser foot 76, while the T-bar 77 is maintained in a vertical position. The member 82 is provided with a centrally located slot 84 and hooked portions 85 located on each side of the slot 84. Rollers 86 ride upon the surface of the member 82 above the hooked portions 85. The rollers 86 are supported on a shaft 87 that is connected to a pair of springs 88, the lower ends of the springs being positively connected to the lower end of the member 82. The shaft 87 also extends through the end of an arm 89 that is pivotally connected to the end of the frame. The arm 89 extends through the slot 84 formed in the member 82 and so as to receive the shaft 87. Means is provided for raising the arm 89 which will operate through the springs 88 to raise the member 82. This lowers the presser feet 76 and presses the presser feet against the top of the bundle, which occurs during the drawing of the cord and the tying thereof. As the bundle may have different heights, the presser feet 76 will strike the top of the bundle at different times according to their different heights, but the arm 89 will continue to be raised by the mechanism although the presser feet will be held substantially stationary when the bundle has reached the limit of its compressibility, then the presser feet 76 will be subjected to the tension of the springs induced by the movement of the arm 89.

The movement of the arm 89 is produced by the jointed arm 8 that is connected to the shaft 11. The jointed arm 8 is provided with a cam surface 90, while the arm 89 is provided with a pivoted block 91 that is provided with a cam surface 92 that coacts with the cam surface 90 to raise the lever 89 when the jointed arm 8 is raised by the operation of the link 7, that is, the cam surface 90 rolls on the cam surface 92, the two being held in substantially definite relation with respect to each other by means of a link 93 that is connected to the jointed arm 8 and to a nose formed at the end of the cam surface 92 of the block 91. As the arm 8 is raised, the lever 89 is raised and when the presser feet 76 strike the bundle, the continued movement of the arm 89 subjects the presser feet 76 to the tension of the springs 88, which causes more or less compressing of the bundle while the cord is being drawn and tied. To cause the return of the arm 89 when the arm 8 is returned in its oscillatory movements produced by the link 7, a spring 94 is connected to the arm 89 and to the frame of the machine and so as to draw the arm 89 downward, and thus the presser feet 76 will be raised well above the tops of the bundles and so that succeeding bundles may be placed in the tying position on the table 70.

I claim:—

1. In a bundle tier machine, an actuating means, a wrapping and tying mechanism, a bundle moving mechanism, for moving a bundle to bundle tying and wrapping position, an arm operated by the weight of a bundle for connecting the actuating mechanism with the bundle moving mechanism and means operated by the bundle moving mechanism for connecting the wrapping and tying mechanism with the actuating means when the bundle has substantially reached the bundle tying and wrapping position.

2. In a bundle tier machine, an actuating means, a wrapping and tying mechanism, a bundle moving mechanism for moving a bundle to bundle tying and wrapping position, an arm operated by the weight of a bundle for connecting the actuating mechanism with the bundle moving mechanism, a bundle pressing means and means operated by the bundle moving means for connecting the bundle pressing means with the actuating mechanism and means operated by the bundle moving mechanism for connecting the wrapping and tying mechanism with the actuating means.

3. In a bundle cord wrapping machine, an

actuating means, a wrapping mechanism, a vertically guided presser foot, means for operating the presser foot, means for shifting the bundle into wrapping position and means actuated by the weight of the bundle for connecting the bundle shifting means with the actuating mechanism, and means operated by the bundle shifting means for connecting the presser foot operating means with the actuating mechanism for pressing the bundle when it has reached the bundle wrapping position.

4. In a bundle tier machine, an actuating means, a wrapping and tying mechanism, a bundle moving mechanism for moving a bundle to bundle tying and wrapping position, a lever operated by the weight of a bundle for connecting the actuating mechanism with the bundle moving mechanism and a lever operated by the bundle moving mechanism for connecting the wrapping and tying mechanism with the actuating means.

5. In a bundle tying machine, an actuating means, a bundle wrapping and tying mechanism, a bundle rack carrying means, a table for receiving a bundle from the rack, a lever operated by the bundle on the rack for connecting the actuating mechanism with the rack carrying means.

6. In a bundle tying machine, an actuating means, a bundle wrapping and tying mechanism, a bundle rack carrying means, a table for receiving a bundle from the rack, a frame located in the vicinity of the rack, a lever pivotally connected to the frame for connecting the rack carrying means with the actuating means and normally protruding through the rack and operated by the weight of the bundle.

7. In a bundle tying machine, an actuating means, a bundle wrapping and tying mechanism, a bundle rack carrying means, a table for receiving a bundle from the rack, a frame located in the vicinity of the rack, a lever pivotally connected to the frame for connecting the rack carrying means with the actuating means and normally protruding through the rack and operated by the weight of the bundle, and a lever operated by the rack carrying means for connecting the wrapping and tying mechanism with the actuating means.

8. In a bundle cord wrapping and tying machine, an actuating means, a wrapping and tying mechanism, means for pressing the bundle substantially along the line of the cord for being wrapped and tied, means for shifting the bundle into wrapping position, means operated by the weight of the bundle for connecting the means for shifting the bundle with the actuating means, and means operated by the bundle shifting means for connecting the wrapping and tying mechanism and the bundle pressing means with the actuating means.

In testimony whereof I have hereunto signed my name to this specification.

ALBERT H. SAXTON.