Jan. 23, 1945. B. H. BUNN 2,367,658

TYING MACHINE

Filed April 14, 1943 3 Sheets-Sheet 1

Fig. 1

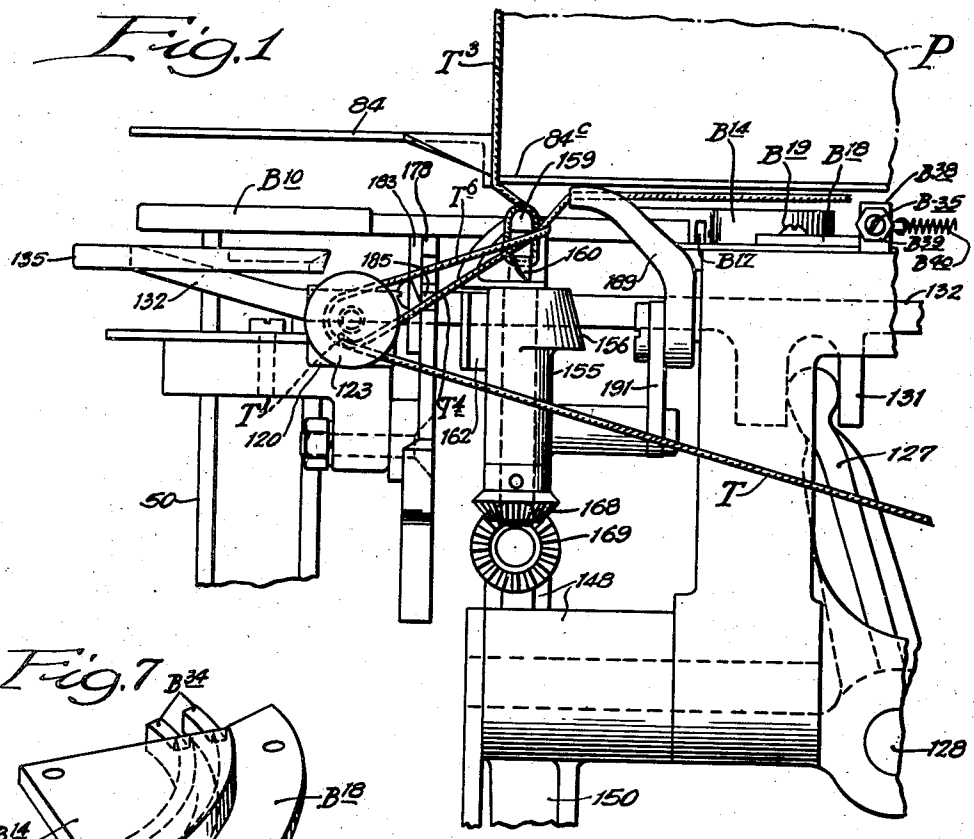


Fig. 7

Fig. 8

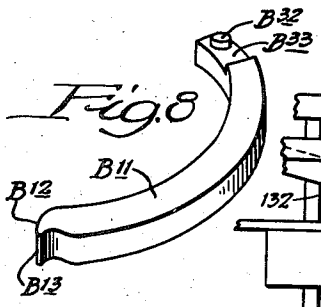
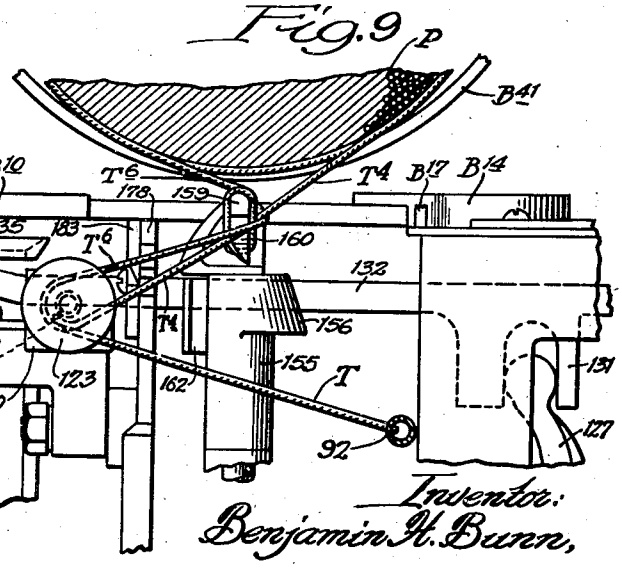


Fig. 9



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Fig. 2

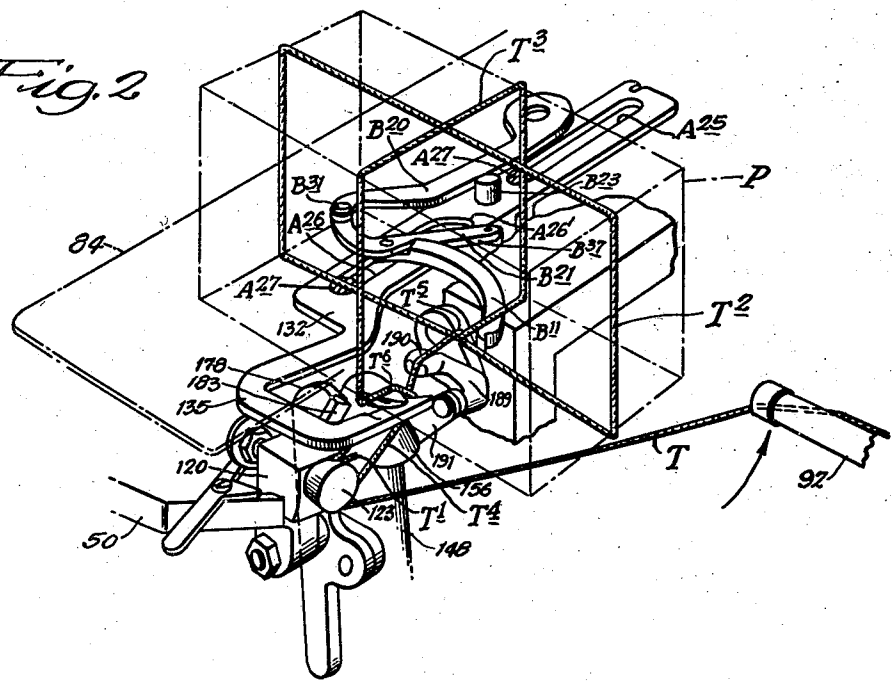
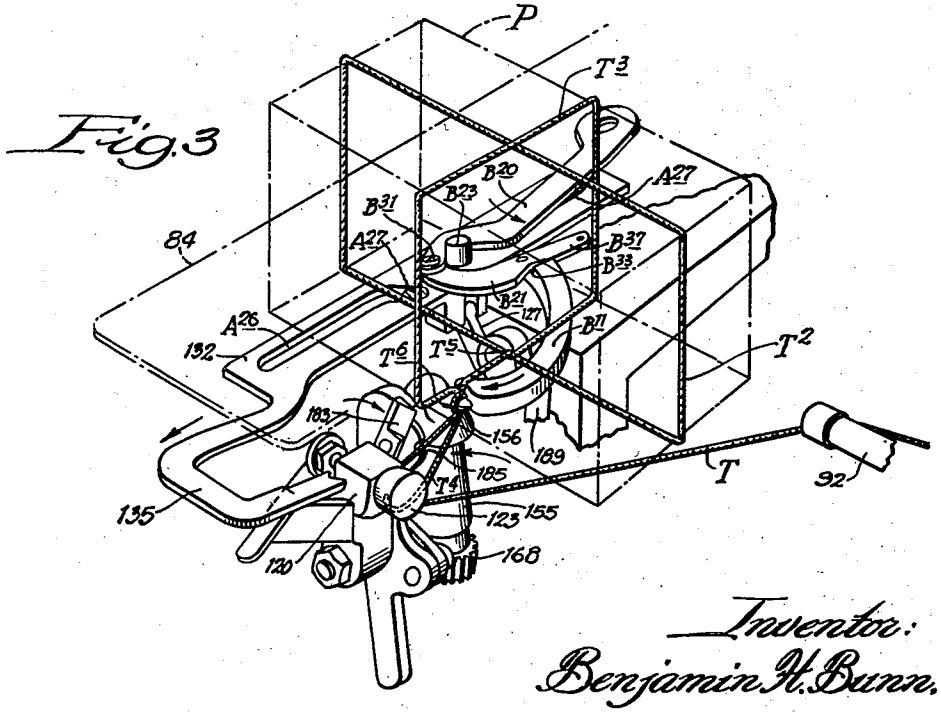


Fig. 3



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Fig. 4

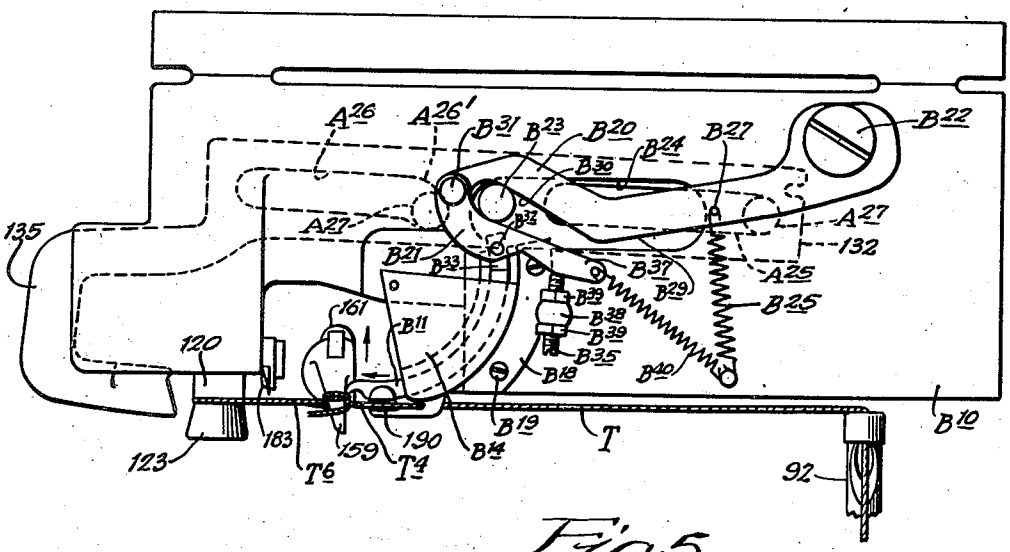


Fig. 5

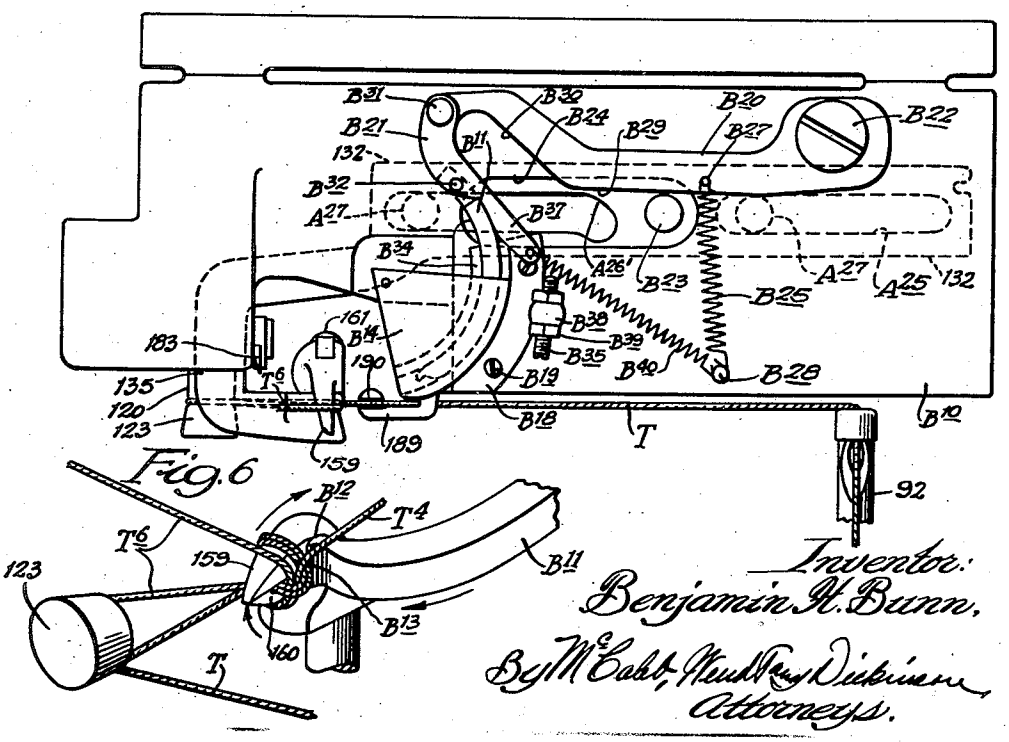


Fig. 6

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UNITED STATES PATENT OFFICE

2,367,658

TYING MACHINE

Benjamin H. Bunn, Chicago, Ill., assignor to B. H. Bunn Company, Chicago, Ill., a corporation of Illinois

Application April 14, 1943, Serial No. 482,958

20 Claims. (Cl. 100—31)

My invention relates to tying machines of the type adapted for putting one or more wraps of twine about a package or bundle and then tying a knot in the ends of the twine, and more especially concerns improvements and modifications in a tying machine such as shown and described in my prior Patent No. 2,182,959 issued December 12, 1939.

In my said prior patent, stripping of the encircling twine from the knotter beak during the knotting operation is effected by a horizontally pivoted stripper which contactually underlies and is moved into stripping position in conjunction with the downward movement of an overlying flexible portion of the package-supporting table plate. Such arrangement presupposes the tying of a compressible package, the flexible portion of the plate when flexed upwardly effecting compression of the package by causing the twine laid thereabout and held by the tying mechanism to be drawn more tightly against the top and sides of the package. Upward movement of the flexible plate is accomplished by the stripper as the latter is pushed up clear of the horizontal sweep executed by the knotter beak for looping the twine about itself. Then the stripper is released and spring returned to stripping position where it engages the twine loop and holds it while the beak is withdrawn and pulls the ends of the twine on through the loop to complete the knot.

A stripper operating as described is impractical where the packages to be tied are substantially incompressible due either to the particular nature of the package contents or of the container in which they are packed. Upward flexing of the supporting plate would in such case overstretch and probably snap the twine ties. It therefore becomes important when tying incompressible packages to maintain the supporting plate stationary and, in order to avoid slackness in the twine wraps, relatively close to the knotter so that the normal elasticity of the twine will react against the slight stretching produced in wrapping and tying and thus absorb the slight overreach of twine necessary to accommodate the operating clearance between the knotter and the package.

Accordingly, a principal object of the present invention is to provide a tying machine of the type indicated which is particularly suitable for tying incompressible packages and bundles and in which stripping of the encircling twine from the knotter beak in the formation of the knot is effectively accomplished without movement of the package support.

A further object is to provide stripping means for a tying machine of the foregoing character which is adapted to derive its motion through being coupled in a novel manner with driven mechanism which is cooperative with but independent of the knotter.

A further object of the invention is to provide an improved stripper which is adapted to be incorporated in a tying machine of existing design with but a minimum of alteration or redesign of any of the parts of such machine.

The foregoing, together with further objects, features and advantages of my invention, are set forth in the following description of certain specific embodiments thereof and illustrated in the accompanying drawings, wherein:

Fig. 1 is an elevation of the knotting mechanism and associated parts of a tying machine, generally corresponding to Fig. 1 of my Patent Number 2,182,959 and similarly showing the knotter beak an instant before snapping closed upon the twine ends, but omitting certain of the parts which have been discarded in the present instance in view of the incorporation of my new stripper in the machine.

Fig. 2 is a schematic phantom perspective view, looking partly from above and from the left of Fig. 1 and showing the parts of the knotter mechanism and the stripper in the relative positions they occupy at an earlier stage in the knotting cycle than shown in Fig. 1;

Fig. 3 is a schematic phantom perspective view similar to Fig. 2 but showing the parts of the knotter and stripper mechanisms in the relative positions occupied at a stage in the knotting cycle following that shown in Fig. 1 and just before the encircling twine is stripped from the knotter beak in the tying of the knot;

Fig. 4 is a top plan view of the knotting and stripper mechanisms taken in a plane directly above the stripper and showing the parts in the same relative positions as in Fig. 3;

Fig. 5 is a top plan view similar to Fig. 4 but showing the parts in the relative positions as in Fig. 2;

Fig. 6 is a fragmentary perspective view on an enlarged scale showing the cooperative relationship of the knotter beak and the stripper finger as they appear, similarly as in Figs. 3 and 4, a moment before the stripping action;

Fig. 7 is an enlarged perspective view of the stripper guide;

Fig. 8 is an enlarged perspective view of the stripper finger;

Fig. 9 is an elevation of the knotting mecha-

nism and associated parts taken in substantially the same plane as Fig. 1 but showing certain modifications adapted for better accommodating elongated or roll type bundles.

Since the drawings and the following description are intended primarily to disclose my present improvements in a machine of the type disclosed in my previously mentioned prior patent, the reader is referred to such patent for a more complete description of the nature and operation of the parts shown which are common to this and the prior disclosure and for the mechanism by which such parts are mounted and operated in properly timed sequence. To assist the reader in this respect, the same reference characters are employed herein as are used in the prior patent to identify the same or corresponding parts. All new reference characters added herein include the prefix "B" and such new reference characters do not necessarily correspond with parts that perchance are identified by the same number, but without the prefix B, in my prior patent.

While for the purpose of illustration a package P of substantial size to be wrapped is shown in the drawings as of rectangular box-like form, it may of course be of other form or in the nature of a bundle, whether sheet wrapped or not. While the package P may, of course, be of such character as to be somewhat compressible in response to tightening of the tying string thereabout, fully consistent with operation of the present machine, the package will be considered in the following description as being substantially incompressible. This incompressibility may be, and usually is due to the character of the material in the package whether composed of a single item or an aggregation of separate items.

In tying the package P, it is set upon a table 84 (Fig. 1) carried by the general frame 50 of the machine, with one side of the package located against the shoulder formed by the downward offsetting of a portion 84c of the table. Twine T has its end T^1 (Fig. 2) caught between the block 120 and the twine catcher head or button 123 and is guided by the orbitally rotatable wrapping arm 92 to wrap around the package. Where the package is to have only one wrap, a knot will be formed after the wrapping arm has traveled once around its orbit in the direction indicated by arrow. Where the package is to be wrapped both longitudinally and transversely, a first wrap T^2 is laid about the package in a first rotation of the wrapping arm 92 and the package is then turned thru 90° relative to the plane of such wrap and the wrapping arm is again caused to rotate to lay the second wrap T^3 about the package. At completion of the wrapping, a starting reach of twine T^4 extends to the concatenation T^5 whence it continues as the wrap T^2 which in turn, continues as the wrap T^3 from the point where the twine interlinks at the concatenation T^5. The final wrap T^3 terminates in a short reach T^6 which is caught between the rear face of the catcher head 123 and the front face of the block 120, being up to this point integral with the succeeding lead-off reach of the twine T.

During the first wrap, a draw plate 132 is so positioned that a U-shaped projection 135 thereon acts as a buffer to guide the twine past the twine catcher 123, but on the second wrap the buffer projection 135 is shifted by movement of the plate 132 into a position to clear the twine catcher so that the terminating reach T^6 will be engaged by the latter.

The draw plate 132 is mounted for horizontally sliding reciprocation on the main frame of the machine below a top plate B10 of the frame and is guided in a generally rectilinear path by pins A27 extending thru tandem slots A25 and A26 in the plate. An offset A26' at the rear of the forward slot A26 causes the forward projection carrying end of the plate to shift away from the reader into the catcher-clearing position when the plate is moved to its forward limit.

Reciprocal motion is imparted to the draw plate 132 in timed coordination with operation of the rest of the machine by an upstanding arm of a bell crank 127 which is pivoted at 128 to a bracket carried by the machine frame. The free end of the bell crank arm engages in a downwardly opening bifurcation or slotted boss 131 which depends from the plate 132. After the twine reach T^6 has been caught by the twine catcher, the draw plate 132 is slid to the extreme right as viewed in Figs. 2 and 5, and the notched end of the extension 135 passes over the twine catcher 123 and engages the terminating reach T^6 which is thereby deflected under the adjacent lower side edge of the package into proximity to the lower starting reach T^4. Thereupon the closed jaws 159 and 160 which form the knotter beak are projected into the angle of the deflection bend in the twine reach T^6 by forward rocking of the knotter carriage 148 upon its horizontal pivot pin as effected by the rocker arm 150. Simultaneously the twine reach T^4 is engaged within the groove 190 of a vertically swinging tip-up arm lever 189 and lifted against the lower jaw 160 of the beak and tipped up at a sharp angle alongside the beak into juxtaposition with the twine reach T^6. The use of this arm is especially desirable where, because of the width of the package P and its eccentric relation to the knotter as determined by the locating shoulder of the supporting table, the angle of inclination of the reach T^4 is too obtuse for the knotter beak to engage this reach readily. The arm 189 is actuated by a link 191 connected to the rocking knotter carriage 148.

The knotter beak is then caused to rotate counterclockwise, as viewed in Fig. 5, by action of the bevel gears 168 and 169, to engage and loop about itself the two twine end reaches T^4 and T^6. After the beak has progressed about half way in its looping rotation, the lower jaw 160 is opened by engagement of a roller 161 with a cam 156 carried by the knotter shaft journal boss 155, so that as the beak approaches completion of the rotation, the jaws will engage the end portions of the twine reaches T^4 and T^6 between them as shown in Fig. 1. As the knotter beak takes the twine reach T^6 away from the draw slide extension 135, the latter is moved to the left out of the path of the rotating beak. An instant after attainment of the position shown in Fig. 1, the knotter head completes its rotational cycle and carries the roller 161, which has by then left the cam 156, under the free end of a leaf spring 162 which yieldingly closes the lower jaw 160 against the upper jaw 159 to grasp the twine ends ready to pull them through the loop of twine encircling the beak and thus complete the knot.

Both the deflection of the twine reach T^6 and the looping of the twine reaches T^4 and T^6 about the knotter beak results in drawing the twine wraps T^2 and T^3 tight against the package P, and due to the incompressibility of the package, places the twine under some tension. This tension is relied upon to function after tying of the

knot to absorb the necessary overreach of twine in the final wrap which is required to accommodate the working clearance between the top of the knotter head and the bottom of the package. Such clearance is preferably maintained at a minimum by locating the overlying table portion 84c as close as practicable to the crown of the knotter head.

Tying of the knot is effected by rearward withdrawal of the knotter beak by rocking the carriage 148. At the same time, a cutter carrier 178 is rocked to drive a cutter blade 183 into severing relation to the end portion of the twine reach T^6 while a groove or notch 185 in the cutter carrier engages the initial reach T^4 and strips it from the twine catcher.

As the knotter beak retreats rearwardly in the direction indicated by arrow in Figs. 3, 4 and 6, the encircling loop of twine is stripped from the beak and the beak pulls the twine ends through the loop which promptly tightens thereon due to the tension which has been developed in the twine wraps. According to the present invention, this stripping is effected by means of a stripper B11 which is engageable with the twine loop about the beak immediately back of the twist in the twine on the flat-face left side of the beak. In this instance the stripper B11 comprises a finger formed with a rounded beak-opposing heel B12 and a forwardly projecting narrow, vertically extending stripping edge or tip B13 (Fig. 8). During the stripping operation, the stripping tip B13 tends to wedge itself into the angle between the flat face of the knotter beak and the encircling twine to preclude slipping and riding of the stripper over the twine and failure to strip it.

Although for stripping purposes the stripper B11 must coact intimately with the knotter beak, the stripper must be cleared from the path of the knotter beak to permit unobstructed rotation of the latter to loop the twine about itself. Means are therefore provided for reciprocably shifting the stripper between the stripping position and an out-of-the-way position. Due to the limited clearance between the overlying stationary table plate portion 84c and the top of the knotter beak, movement of the stripper relative to the beak in a vertical plane, such as is effected with the stripper of my aforesaid prior patent, is prohibited. However, it is practicable to have the stripper move in a horizontal plane in the narrow space between the frame top B10 and the plate portion 84c. Although the stripper might be pivoted for timed oscillation or arranged for straight line reciprocation toward and from the knotter beak with movement imparted thereto by such means as a radius arm functioning in timed sequence to the operation of the machine, I prefer for certain practical reasons to fashion the stripper B11 as an arcuate finger of rectangular cross section movable on an arc toward and from the knotter beak in response to reciprocations of plate 132.

To this end, the stripper finger B11 is slidably mounted upon the upper face of the frame top plate B10 in a horizontal plane at the level of the knotter beak when in the knot-forming position. An arcuate guide for the stripper finger comprises a sector plate B14 which is formed with a pair of spaced concentric arcuate flanges B15 forming a downwardly opening track channel B17 complementary to the stripper finger and within which the stripper is reciprocably slidable in a generally front to rear direction. An integral attachment flange B18 on the sector plate is apertured to receive screws B19 by which the sector plate is fixedly secured to the top of the frame plate B10 adjacent to the forward edge of the latter and clear of the plane of wrapping movement of the twine T. The forward end of the slide track B17 opens toward the normal plane of the flat face of the knotter beak, with the adjacent edge of the sector plate spaced a sufficient distance from the knotter beak to clear the rotational path of the beak point. Through this arrangement, the stripper finger B11 can be slid forwardly in the track channel B17 into extended or stripping position as indicated by the directional arrow in Figs. 3 and 4, and reversely into the retracted or out of the way position within the track, shown in Figs. 2 and 5.

Both the stripper finger B11 and the sector guide plate B14 can be made easily and inexpensively by simple manufacturing processes. Thus, the stripper finger is adapted to be formed from a one-third segment of a metal ring of suitable radius, with the stripping tip end ground down and finished to proper contour. The guide plate B14 is adapted to be formed from a quarter sector of a turned disc having an annular channel to provide the track B17 milled or turned therein and a continuous flange turned down around its periphery and trimmed to provide the attachment flange B18 as shown.

Actuation of the stripper finger B11 in timed relation to the knotter is effected by the sliding draw plate 132 through the intermediary of an oscillating cam lever B20 and a transmission link B21. The cam lever B20 is of a length on the order of twice the extent of the reciprocal movement of the draw plate 132. Adjacent to one end the lever is pivotally secured as by means of a screw B22 to the top of the frame plate B10 near the straight end of the draw plate 132 to extend longitudinally in overlying relation to the rear margin of the draw plate. The forward edge of the lever B20 provides a cam edge which engages an upwardly extending follower or actuating pin B23 which is preferably centrally rigid with the draw plate 132 and projects up through a clearance slot B24 in the horizontal frame plate B10. This slot is of ample dimension to permit entire freedom of movement of the pin B23 throughout its reciprocal path as determined by reciprocations of the slide plate 132.

The cam lever B20 is constantly urged into edgewise engagement with the actuating pin B23 by preferably resilient means such as a coiled tension spring B25 which is secured at one end to the lever as at B27 and at its other end to an anchoring stud B28 projecting up from the frame plate B10 at such a distance spaced forwardly from the lever with respect to the length of the spring as to maintain the spring under constant tension.

For about one half of the extent of reciprocal movement of the slide plate 132 considered from the extreme right-hand position as shown in Fig. 5, a substantially straight, longitudinal cam portion B29 of the forward edge of the cam lever B20 rides against the pin B23. In the remainder of the range of reciprocal movement of the slide plate, a rearwardly diagonal cam portion B30 forming a continuation of the forward straight cam edge portion B29 rides in engagement with the actuating pin B23 as shown in Fig. 4, and under the influence of the tension spring B25 allows the cam lever B20 to be swung forwardly. The angle and length of the diagonal cam edge portion B30 is predetermined to

enable full extension and retraction of the stripper finger B11 as the actuating pin B23 is shifted in opposite directions from end to end of this diagonal edge portion and the lever B20 is oscillated.

In translating the oscillating motion of the lever B20 into reciprocal arcuate motion of the stripper finger B11, the link B21 affords a coupling and lost motion mechanism, being connected by a pivot pin B31 to the oscillating end of the lever B20 and by a pivot stud B32 to the rear end of the stripper finger. As shown, the pivot stud B32 projects up rigidly from a reduced thickness rear portion B33 of the stripper finger B11 (Fig. 8) which provides an offset deep enough to accommodate substantially the thickness of the link B21 which, as also the lever B20, is preferably made from a stock that is substantially thinner than the stripper finger so that the link and lever can both be readily manufactured by die stamping. As best seen in Fig. 7, the rear end portions of the stripper guiding channel flanges B15 are also preferably cut down as indicated at B34, corresponding to the reduced rear portion B33 of the stripper, and the rear edge of the sector plate B14 is cut away forwardly to clear the link B21.

Efficiency in the transmission of motion from the lever B20 to the stripper finger B11 is promoted by having the distance between the oscillating end of the lever and the rear end of the stripper finger, and thus the distance between the pivots B31 and B32, as short as practicable. Since this causes the link to swing rather closely to the diagonal cam edge portion B30 of the lever in the extreme forward swing of the lever, the inner or rear edge of the link B21 is preferably formed on a radius to clear the actuating pin B23 which in that condition of the lever and link is jackknifed therebetween.

Nice adjustment of the stripper actuating mechanism to attain as desirably close as practicable approach of the shoulder B12 of the stripper finger to the flat side face of the knotter beak, without actual frictional engagement with the beak, is effected through the medium of a set screw B35 which is engageable with a forward extension B37 on the transmission link B21. The adjusting set screw B35 is threaded through a rigid post B38 extending up from the frame table B10 closely adjacent to the edge of the sector plate attachment flange B18 and forwardly spaced from the path of movement of the extension B37 to afford an adjustment clearance through which the tip of the adjusting screw extends for engagement with the forward edge of the extension B37. Lock nuts B39 fix the set screw B35 in adjusted position. Through this arrangement, the adjustment set screw B35 provides an adjustable limit stop determinative of the extent to which the cam lever B20 and the transmission link B21 can drive the stripper finger B11 toward the knotter beak.

Resilient means, such as a coiled tension spring B40, is connected to the free end of the link extension B37 and exerts a constant forward pull on the transmission link, supplementing the action of the lever biasing spring B25, and positively draws the extension B37 against the limit tip of the adjusting screw B35. The forward end of the tension spring B40 may be attached to the anchoring stud B28.

In the operation of the machine, the stripper finger B11 is fully retracted by engagement of the lever straight edge B29 with the actuating pin B23 when the draw slide 132 is in the extreme twine drawing position as shown in Figs. 2 and 5. While the draw slide 132 is returned to clear the extension 135 from the rotational path of the knotter beak, this retracted condition of the stripper finger B11 persists by reason of the length of the lever straight edge B29 and until the knotter beak has completed its twine looping rotation. Then the draw slide 132 is shifted to its extreme limit of separation from the knotter beak whereby to effect forward swinging of the lever B20 by reason of the diagonal cam edge portion B30 following the actuating pin B23 as the latter travels with the draw slide. This drives the stripper B11 forwardly as indicated by the arrows in Figs. 3, 4 and 6 into stripping position.

By utilizing the draw plate 132 for actuating the stripper B11 in the manner described, it will be apparent that all movements of the stripper mechanism can be effected within very limited vertical clearance, and the need is eliminated for special means to actuate the stripper from the driving mechanism of the machine (as is the case in my aforementioned prior patent).

Where narrow or small girth bundles are to be tied so that the twine reach T^4 will extend at such a sharp angle upwardly alongside the knotter beak, that the beak in its looping rotation will readily engage such twine reach, the tilt-up arm 189 may be eliminated. For example, as shown in the modified form of Fig. 9, the machine may be equipped with a trough-shaped bundle support B41 centered over the knotter beak to support an elongated bundle of relatively incompressible small rods or strands such as synthetic bristles or the like, to be tied together. In a typical installation, such an arrangement has been found particularly suitable for tying bundles of synthetic bristles of the plastic material known as Nylon. It will be noted that the twine reach T^4 extends up so sharply and closely under and alongside the knotter beak as to render it easily engageable by the beak for knot-looping. In view of the small size of the bundle, operating efficiency is promoted in this modified arrangement of the machine by reducing the radius of rotation of the twine arm 82 so that its orbit will be substantially reduced from that necessary in a machine which is adapted for tying larger bundles or packages such as in Fig. 1.

While I have illustrated a preferred embodiment of my invention, many modifications may be made without departing from the spirit of the invention, and I do not wish to be limited to the precise details of construction set forth, but desire to avail myself of all changes within the scope of the appended claims.

I claim:

1. In combination in a machine adapted for tying relatively incompressible packages or bundles; a fixed support; means for wrapping twine about a package or bundle carried by said support; a twine catcher for engaging both the starting end reach and the terminating end reach of the twine; a knotter beak having a position closely adjacent to the starting end reach; means for drawing the terminating end reach of twine into position to be engaged by the knotter beak; means for rotating the knotter beak for engaging and looping both of the twine end reaches about itself; means for actuating said twine drawing means; a stripper movable between a stripping position closely adjacent to the knotter beak for stripping the encircling loop of twine from the beak to form the knot, and an out

of the way position enabling free rotation of the knotter beak in looping the twine end reaches about itself; and means for actuating said stripper in response to movement of said twine drawing means.

2. A tying machine as defined in claim 1 in which the twine drawing means comprises a slide member longitudinally reciprocable in a given plane, and the stripper comprises an element reciprocable in a path which crosses the path of reciprocation of the slide member but in a different plane.

3. In combination in a tying machine including means for laying a wrap of twine about a package, a knotter having a beak for engaging a loop of twine thereabout and grasping a twine end portion between its jaws for pulling the end portion through the beak-encircling twine loop to complete the knot, a member movable relative to the beak and cooperating therewith to assist in the engagement of the twine by the beak, and a stripper cooperative with the beak to strip the encircling twine from the beak by relative motion of the stripper and the beak, said member being connected with said stripper for shifting the stripper into and out of stripping position relative to the beak in response to movements of the member.

4. A tying machine as set forth in claim 3 in which the beak-assisting member is constructed and arranged to operate from one side of the beak and the stripper to operate from the opposite side of the beak.

5. In combination in a tying machine including a support for packages or bundles to be tied, means for laying wraps of twine about the packages or bundles, a knotter comprising a beak constructed and arranged to engage a loop of twine about itself and then withdraw from the loop to pull an end portion of the twine through the loop to form a knot, and a slidable draw plate for assisting the beak to engage the loop of twine; a stripper mounted below said support and above said draw plate movable toward and away from the beak cooperative to strip the loop of twine therefrom upon withdrawal from the loop, and means connecting the stripper for actuation by said draw plate.

6. A tying machine as defined in claim 5 in which a machine frame plate lies between the draw plate and the stripper, said frame plate having an opening therethrough over said draw plate, and the connecting means includes a member carried by said draw plate projecting up therefrom through said opening.

7. A tying machine as defined in claim 5 in which the connecting means comprises a fixed member projecting from the draw plate, and lever mechanism actuated by said projecting member.

8. In combination in a tying machine including a knotter having a beak, twine engaging means movable relative to the beak for assisting in placing a reach of twine adjacent to the beak to be in part looped thereabout and in part grasped between the jaws of the beak to be pulled through the loop in tying the knot, and a stripper actuated by said twine-engaging means for stripping the twine loop from the beak.

9. In combination in a machine for tying bundles or packages, a knotter including an intermittently rotatable twine looping and knotting beak, a stripper finger arranged to cooperate with the beak for stripping a twine loop therefrom, guide means for slidably supporting said stripper finger for reciprocation to carry it into and out of stripping relation to the beak, and means for reciprocating the finger in timed relation to the intermittent rotations of the beak.

10. A tying machine as defined in claim 9 in which a fixed base stationarily supports the guide means and slidably supports the stripper finger, and the guide means comprises a member having a downwardly opening channel within which the stripper finger is reciprocably slidable.

11. In combination in a tying machine, an intermittently operable knotter beak, an arcuate stripper finger, means including an arcuate track for guiding said stripper finger for endwise stripping coaction with the beak, and means for reciprocating the stripper finger in said track into and out of stripping position relative to the beak in timed relation to operation of said beak.

12. In combination in a tying machine including a knotter beak adapted to engage a loop of twine about itself and pull an end portion of the twine through the loop to tie a knot, guide means for slidably supporting a stripper finger, a reciprocable stripper finger slidably supported by said guide means and having one end formed to coact with the beak in stripping the twine loop from the latter to effect said drawing through of the twine end, and finger-reciprocating means engaging said stripper finger at the end opposite the stripping end.

13. A tying machine comprising in combination, a knotter beak, a reciprocable draw plate, a stripper finger adapted to cooperate at one end with said beak to strip a twine loop therefrom in tying of a knot, means for guiding said stripper finger for reciprocation, mechanism for reciprocating said stripper finger including an oscillating cam lever, and means on said draw plate providing a follower engaged by said cam lever for effecting oscillation of the lever in response to reciprocations of the plate.

14. A tying machine as defined in claim 13 in which the draw plate and the cam lever are separated by an intervening supporting frame structure having an opening therethrough affording clearance for the follower which is in the form of a pin projecting from the draw plate through the opening, and resilient means anchored to the frame structure constantly urging the lever against the follower pin.

15. In combination in a tying machine, a rotatable knotter beak, an elongated stripper finger having one end fashioned to cooperate with the beak for stripping a loop of twine therefrom in the tying of a knot, means providing a track for slidably guiding the stripper finger in a reciprocal path directed toward the beak, an oscillatable actuating lever mounted with its oscillating end adjacent to but spaced from the end of the stripper finger opposite the stripping end, a link connecting the operating end of the lever with the adjacent end, of the stripper finger for translating oscillating motion of the lever into linear reciprocal motion of the stripper finger and means for oscillating the actuating lever in timed relation to rotation of said beak.

16. A tying machine as defined in claim 15 including resilient means acting upon the lever and the transmission link to urge them constantly in one direction.

17. A tying machine as defined in claim 15 including means for adjusting the extent to which the actuating lever and transmission link will drive the stripper finger toward the beak.

18. In combination in a tying machine including a knotter beak, a reciprocable stripper coop-

erative with the beak, an oscillating actuating lever for the stripper, a link connecting the lever and the stripper and having an extension projecting beyond the stripper, and an adjustable limit stop engageable by said extension for controlling the nearness of approach of the stripper to the beak.

19. In combination in a tying machine including a knotter having a knot tying beak, a stripper guided for linear reciprocation into and out of stripping position relative to said beak, and means for reciprocating said stripper including an oscillating lever having a lost motion connection with the stripper.

20. In combination in a machine for tying relatively incompressible packages or bundles, twine wrapping means, a knotter including a twine looping and knot tying beak, a fixed support closely overlying said beak, horizontally extending guide means, and an elongated stripper slidably engaging said guide means below said support and movable into side proximity with said beak.

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