

Jan. 21, 1941.

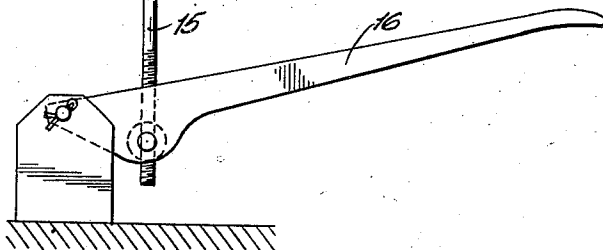
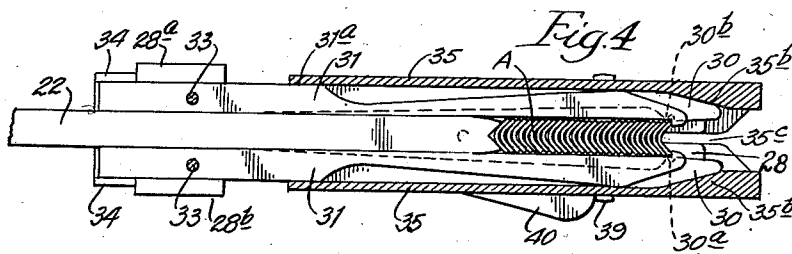
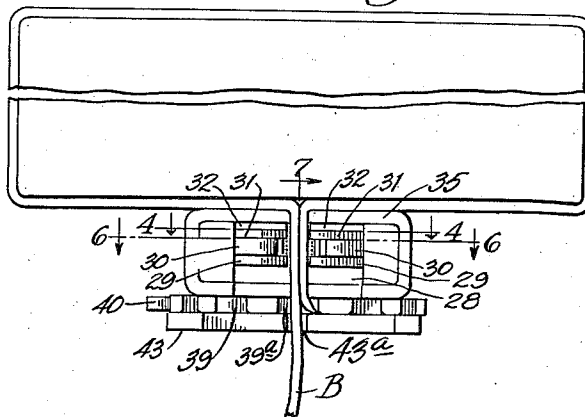
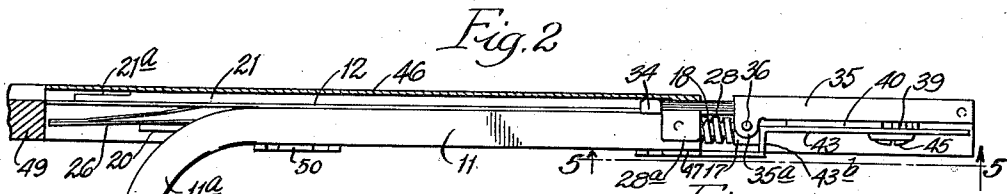
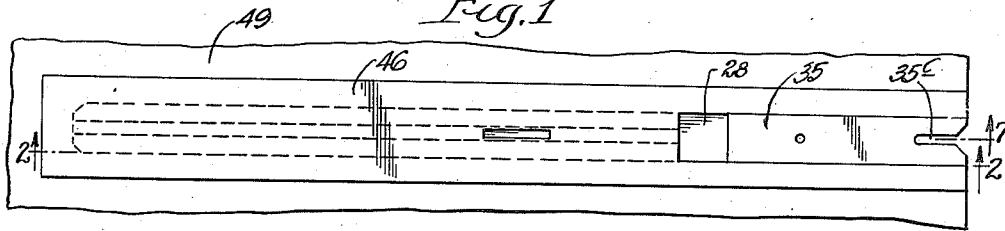
E. R. WORKMAN

2,229,484

MACHINE FOR APPLYING A CLIP

Filed Jan. 28, 1937

2 Sheets-Sheet 1



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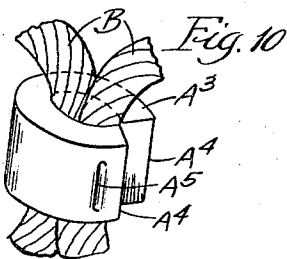
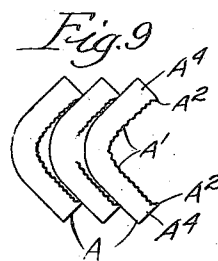
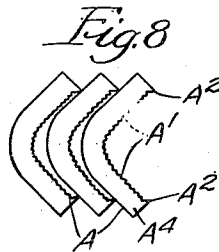
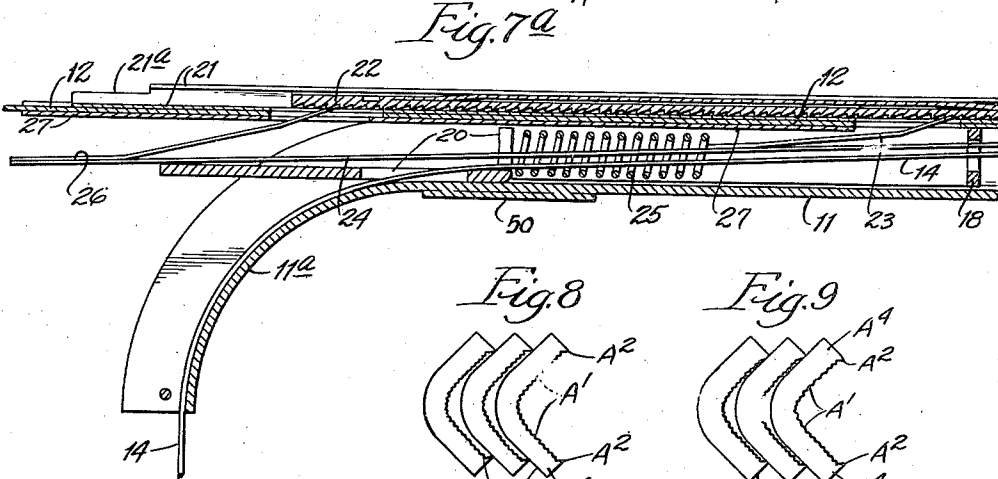
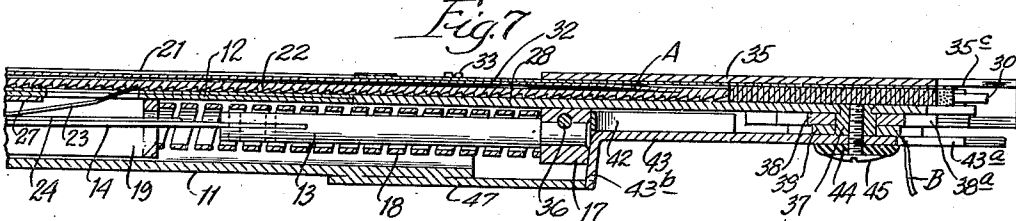
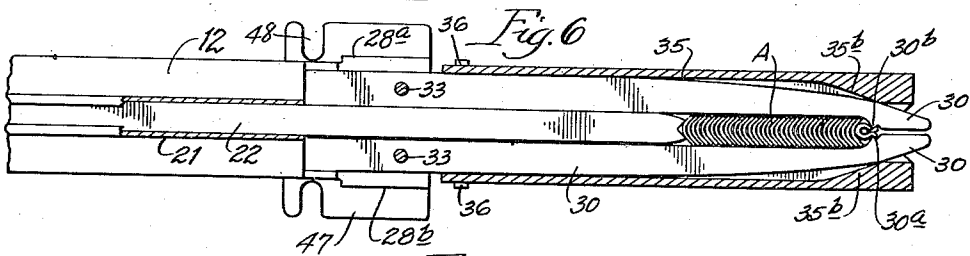
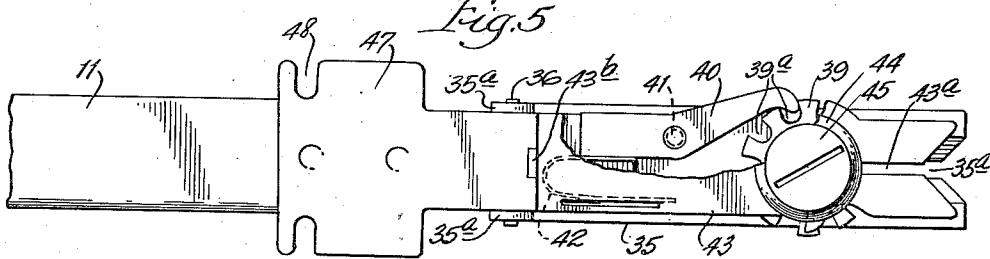
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2,229,484

MACHINE FOR APPLYING A CLIP

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,229,484

MACHINE FOR APPLYING A CLIP

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Application January 28, 1937, Serial No. 122,889

22 Claims. (Cl. 153—1)

This invention relates particularly to machines for tying string, twine or wire about packages, boxes, and the like. The present application is a continuation-in-part of my prior application, Serial No. 705,164, filed January 3, 1934.

An object of the invention is to provide a simple, efficient and inexpensive means for securing the ends of a cord about a package.

Another object is to provide a simple and efficient form of clip for securing the meeting ends of string, twine or wire, and to provide a stack of these clips.

Another object is to provide a machine for removing these clips one at a time from the stack and applying them to the string, twine or wire.

Still another object is to provide such a cord tying device as will permit a box or package to lie flat on a table or counter while being tied, thereby permitting the counter space to be utilized for other purposes, and enabling the cord to be tied tightly about a package.

These and other objects, as will hereinafter appear, are accomplished by this invention which is fully described in the following specification and shown in the accompanying drawings, in which:

Figure 1 is a partial top plan view of a table or counter with my tying device applied thereto;

Fig. 2 is a partial section on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged end elevation of the tying machine showing a cord placed about a package prior to securing a clip thereon;

Fig. 4 is a partial reduced horizontal section on the line 4—4 of Fig. 3 showing the position of the clip and of the machine in the inoperative position ready to receive the cord to be tied;

Fig. 5 is a partial enlarged bottom view on the line 5—5 of Fig. 2;

Fig. 6 is a partial reduced horizontal section on the line 6—6 of Fig. 3 showing the position of the clips and of the clamping jaws at the instant of applying the clip to the cord;

Fig. 7 is a sectional view on the vertical line 7 of Figs. 1 and 3;

Fig. 7^a is a continuation of the same;

Fig. 8 is a greatly enlarged top plan view of a number of clips prior to their formation of a stack;

Fig. 9 is a similar view of the clips formed into a stack; and

Fig. 10 is a greatly enlarged view of the meeting ends of the cord secured by means of a clip.

In reducing this invention to practice, I have

used a clip A which is preferably made of steel bent into a substantially V-shape, as shown in Fig. 8, each clip preferably being roughened at A' to better hold a cord or wire with which it comes in contact, and each having an inwardly projecting ridge or burr A² so that when a number of these clips are assembled, as shown in Fig. 8, this burr will come sharply into contact with the back of the next adjacent clip. By passing a suitable electric current from one clip to the next, this burr will be sufficiently heated to permit it to be welded to the contiguous clip, with the result that the whole then forms a solid stack of clips containing say fifty or one hundred clips depending upon the size of the clips and the machine in which they are to be used. In Fig. 9 such a stack is shown containing, however, only three clips. In the machine which will now be described for applying these clips, the foremost clip is removed by the machine which breaks it loose from the stack and bends it into the position A³ of Fig. 10 about the meeting ends of the cord B. While this clip will be described as being used for tying the meeting ends of cord about a package, it will be understood that it is intended also to cover a similar use for twine of any size or of wire. It is also useful for making electrical connection between two wires.

The embodiment of the machine for applying the clips comprises a frame 11 of U-shaped cross section which is partially closed at the top by means of a metal strip 12, the two being secured together preferably by spot-welding at a number of points. Within the rectangular tube thus formed is enclosed a plunger 13 secured to the end of a flexible wire tape 14 which passes around the curved rear end 11^a of the frame (Fig. 2) and thence down to an adjusting screw 15 which is adjustably connected to a foot pedal 16.

The plunger 13 (Fig. 7) is connected to a block 17 as by riveting over the outer end of the plunger. A stiff spring 18 surrounds the plunger 13 and bears at one end against the block 17, while the other end bears against a U-shaped member 19, the opposite end of the U-shaped member (Fig. 7^a) bearing against a hollow member 20 which is welded or otherwise secured to the inside of the frame 11. Thus when the operator steps on the pedal 16, the plunger 13 is drawn back compressing the spring 18. The forward action of the plunger is limited by means of a stop which will later be

described against which the block 17 normally bears, as shown in Fig. 7.

On the top of the metal strip 12 is located a C-shaped magazine 21 spot-welded to the metal strip 12 adapted to receive stacks of clips which are inserted from the rear end 21^a, the clips then being pushed forward by means of a follower 22 (Fig. 7) which slides within the magazine. The bottom of the follower is provided with teeth and is urged forward by a spring pawl 23 spot-welded to a metal strip 24 which rests upon the flat wire 14 within the frame 11, and passes through the hole in the U-shaped member 19 which acts as a guide for it. A relatively soft spring 25 surrounds the metal strip 24 and the wire tape 14 and bears at one end against the hollow member 20, and at the other against the rear end of the pawl 23. A second spring pawl 26 is similarly carried by the rear end of the metal strip 24 and likewise engages the teeth on the bottom of the follower. The forward end of the metal strip 24 (Fig. 7) lies behind the plunger 13 so that as it is retracted it is drawn back, thereby retracting the pawls 23, 26. As the foot pedal is released and the plunger returned to its normal inoperative position by the spring 18, the pawls 23, 26 are likewise released and are pressed forward by means of the relatively soft spring 25, thereby tending to force the stack of clips toward the front end of the machine.

In order to readily remove the follower from the magazine I have provided a metal release 27 which lies just under the metal strip 12 and has openings corresponding with the openings within the metal strip through both of which the pawls 23 and 26 pass. By forcing this release to the right the device as viewed in Fig. 7^a, it withdraws both these pawls from engagement with the teeth and the follower with the result that the follower can then be readily pulled back out of the magazine. A sheet metal support 28 (Fig. 7) has laterally extending ears 28^a, 28^b (Fig. 6) which overlap the sides of the frame 11 and are spot-welded thereto. The top of this support is on a level with the inner surface of the magazine, and that, together with its associated parts, forms a continuation of the magazine for the clips and the follower.

Referring now to Figs. 3 and 4, a spring finger 29 lies on each side of the follower and over each of these lies a gripping jaw 30, and above that lies another spring finger 31. All these spring fingers are alike and the spring fingers 31 are covered by means of a plate 32 and all are held in place by means of screws 33. The rear ends of the gripping jaws 30 bear against upwardly struck ears 34 (Fig. 4) which prevent outward movement of the left ends of these jaws so that the jaws tend normally to remain open. The spring fingers turn inwardly at right angles at their forward ends so that the forward clip of the stack will encounter them and be stopped thereby, as shown in Fig. 4. Each gripping jaw is provided with a notch 39^a so placed as to engage the corners A⁴ (Fig. 8) of the foremost clip, so that when these gripping jaws approach each other, as will later be explained, the foremost clip is broken loose from the next adjacent clip of the stack and is simultaneously bent inwardly to grip the cord, as shown in Fig. 10. At the same time a tooth 30^b just to the rear of the notch 39^a engages the clip and produces a tooth mark A⁵ (Fig. 10).

The apparatus by which the gripping jaws are

caused to approach each other will now be explained. This consists of a sleeve-like member 35 of C-shaped cross section which partially surrounds the support 28 and the plate 32, and is slidably mounted thereon. It has two ears 35^a which lie one on each side of the block 17, and is pivotally secured thereto by means of a pin 36. Cam surfaces 35^b are located within the forward end of this sleeve and are adapted to engage the front inclined ends of the gripping jaws 30. Thus when the sleeve is retracted by means of the foot pedal, the normally open gripping jaws, as shown in Fig. 4, are forced to the closed position of Fig. 6, thereby closing a clip gripped therebetween. Each spring finger is provided with a shoulder 31^a (Fig. 4) so that it bears against the inner surface of the sleeve, thereby yieldably holding the spring finger in contact with the front end of the stack of clips. The sleeve is provided with a notch 35^c to assist the notches 38^a, 39^a and 43^a in guiding the cord into the concavity of the foremost clip in the magazine.

A mechanism for holding the cord to be tied and for cutting it off after the clip is applied will now be described. The sheet metal support 28 is provided with a cylindrical lug 37 over which is placed a hardened and ground stationary shearing plate 38 which is held from rotating by the side walls of the sleeve 35, and which has two notches 38^a, either of which can be turned to a point beneath the foremost clip. Thus by turning this plate over four shearing surfaces can be presented. Beneath this stationary shearing plate is a rotatable shearing plate 39 having a series of openings 39^a (Fig. 5). The plate 39 is rotated by means of a pawl 40 which is hingedly mounted upon a pin 41 on the sleeve 35 and held in contact with the notches of the rotatable shearing plate by means of a spring 42. Thus as the sleeve 35 is retracted to the position shown in Fig. 6, the pawl 40 is drawn back and engages the next notch in the shearing plate 39 so that when the sleeve 35 is again forced back to the position of Figs. 4 and 5 the rotatable shearing plate is advanced one notch. This notch corresponds to the notch 35^c of the sleeve so that the cord is passed through both these notches.

The means for holding the end of the cord B will now be described. A bracket 43 lies beneath the rotatable shearing plate 39 and is yieldably pressed toward that plate by means of a yieldable member 44 of rubber or the like which is held by means of a screw 45 which passes through the member 44 and the bracket 43, and is screwed into a threaded hole in the cylindrical lug 37. The bracket 43 is also provided with a notch 43^a corresponding to the notch 35^c. Thus the lower end of the cord B (Fig. 3) which is being unwound from a ball or spool (not shown) beneath the counter or table is severed upon a partial rotation of the rotatable shearing plate and at the same time the end of this cord is caught between the lower surface of the rotatable shearing plate 39 which is preferably roughened, as shown in Fig. 5, and the bracket 43. Thus the cord is held for the operator to begin the next tying operation.

To do this he pulls the lower end of the cord B which is depending from the bracket up through the several notches, as shown in Fig. 3, around the package, and then pulls it firmly down again through that same series of notches and holds it from a point beneath the counter while stepping firmly on the pedal 16 when the clip is ap-

plied, and on release of the pedal the ends of the cord are cut and the free end of the cord is again gripped ready for the next operation, the cord B again depending as shown in Fig. 7. A cover plate 46 (Fig. 1) is yieldably held in the counter on the level thereof, and is easily removable to give quick access to the parts of the tying machine.

The bracket 43 has an offset portion 43^b adapted to serve as a stop for the plunger 13. This end is also notched to engage and bear on an anchor plate 47 which is spot-welded to the frame 11, notches 48 being provided in a widened portion thereof to receive screws for securing the machine to a portion of the table or counter 49. A similar anchor plate 50 is spot-welded to the rear end of the frame.

I claim:

1. A device of the character described comprising a magazine to hold a stack of separate V-shaped clips secured together in nested relation wherein the ends of each clip overlap the next succeeding clip, and means for gripping the extending ends of the foremost clip for breaking it loose from the next adjacent clip and for concurrently closing it about the meeting ends of a cord to be gripped.

2. A device of the character described comprising a magazine to hold a stack of separate V-shaped clips secured together in nested relation wherein the ends of each clip overlap the next succeeding clip, means for gripping the extending ends of the foremost clip for breaking it loose from the next adjacent clip and for concurrently closing it about the meeting ends of a cord to be gripped, and means for cutting the cord.

3. A device of the character described comprising a magazine to hold a stack of separate V-shaped clips secured together in nested relation wherein the ends of each clip overlap the next succeeding clip, means for gripping the extending ends of the foremost clip for breaking it loose from the next adjacent clip and for concurrently closing it about the meeting ends of a cord to be gripped, means for cutting the cord, and means for holding the end of the cord from the ball preparatory to tying the next package.

4. A device of the character described comprising a magazine to hold a stack of separate V-shaped clips secured together in nested relation wherein the ends of each clip overlap the next succeeding clip, means for gripping the extending ends of the foremost clip for breaking it loose from the succeeding clip and for concurrently closing it about the meeting ends of a cord to be gripped, a stationary shearing element, and a notched wheel movable thereover to cut the cord.

5. A device of the character described comprising a magazine to hold a stack of separate V-shaped clips secured together in nested relation wherein the ends of each clip overlap the next succeeding clip, means for gripping the extending ends of the foremost clip for breaking it loose from the succeeding clip and for concurrently closing it about the meeting ends of a cord to be gripped, a stationary shearing element, a notched wheel movable thereover to cut the cord, and an abutment adjacent the side of the notched wheel opposite the stationary element to hold the end of the cord from the ball preparatory to tying the next package.

6. A device of the character described comprising a magazine to hold a stack of separate

V-shaped clips secured together in nested relation wherein the ends of each clip overlap the next succeeding clip, means for gripping the extending ends of the foremost clip for breaking it loose from the succeeding clip and for concurrently closing it about the meeting ends of a cord to be gripped, and means for advancing the stack to a predetermined point after each clip has been broken loose from the stack, the means for advancing including a plunger having a series of teeth, a plurality of pawls engaging said teeth as the plunger advances.

7. A device of the character described comprising a magazine to hold a stack of separate V-shaped clips secured together in nested relation wherein the ends of each clip overlap the next succeeding clip, means for gripping the extending ends of the foremost clip for breaking it loose from the succeeding clip and for closing it about the meeting ends of a cord to be gripped, and means for advancing the stack to a predetermined point after each clip has been broken loose from the stack, the means for advancing including a plunger having a series of teeth, a plurality of pawls engaging said teeth as the plunger advances, at least one of said pawls being spring-pressed.

8. A device of the character described comprising a magazine for holding a stack of separate arcuate clips secured together in nested relation, means for concurrently detaching the foremost clip and for closing it about the meeting ends of a cord to be gripped, means for cutting the cord, and means for holding the end of the cord from a ball preparatory to tying the next package.

9. A device of the character described comprising a magazine for holding a stack of separate arcuate clips secured together in nested relation, means for concurrently detaching the foremost clip and for closing it about the meeting ends of a cord to be gripped, a stationary shearing element, and a notched wheel movable thereover to receive and cut the cord.

10. A device of the character described comprising a magazine for holding a stack of separate arcuate clips secured together in nested relation, means for concurrently detaching the foremost clip and for closing it about the meeting ends of a cord to be gripped, and means for advancing the remaining clips to predetermined points after each foremost clip has been detached.

11. A device of the character described comprising a magazine for holding a stack of separate arcuate clips secured together in nested relation, means for concurrently detaching the foremost clip and for closing it about the meeting ends of a cord to be gripped, means for advancing the remaining clips to predetermined points after each foremost clip has been detached, and a foot pedal for operating all said means.

12. A device of the character described comprising a magazine for holding a stack of arcuate clips secured together in nested relation, means for detaching the foremost clip and concurrently closing it about the meeting ends of a cord to be gripped, means for cutting the cord, and means for advancing the remaining clips to predetermined points after the foremost clip has been detached.

13. A device of the character described comprising a magazine for carrying a stack of arcuate clips secured together in nested relation,

jaws adapted to engage the foremost clip to break it loose from the stack and to close it about the meeting ends of a cord, and notched means for concurrently securing and cutting the

5 cord to be gripped, each of said notches in turn aligning with and forming a channel through the concave side of the foremost curved clip providing an entrance for admission of the cord.

10 14. A device of the character described comprising a magazine to hold a stack of V-shaped clips nested and connected in aligned formation with the ends of each clip overlapping its preceding clip, means for gripping the extending

15 ends of the foremost clip for breaking it loose from the remaining clips and for closing it about the meeting ends of a cord to be gripped, and means for advancing the stack to a predetermined point after each clip has been broken

20 loose from the stack.
15. A device of the character described comprising a magazine to hold a stack of V-shaped clips nested and connected in aligned formation with the ends of each clip overlapping its preceding clip, means for gripping the extending

25 ends of the foremost clip for breaking it loose from the remaining clips and for closing it about the meeting ends of a cord to be gripped, and means for advancing the stack to a predetermined point after each clip has been broken loose from the stack, the means for advancing including a

30 plunger having a series of teeth, and a plurality of pawls engaging said teeth as the plunger advances.

35 16. A device of the character described comprising a magazine to hold a stack of V-shaped clips nested and connected in aligned formation with the ends of each clip overlapping its preceding clip, means for gripping the extending

40 ends of the foremost clip for breaking it loose from the remaining clips and for closing it about the meeting ends of a cord to be gripped, and means for advancing the stack to a predetermined point after each clip has been broken loose from the stack, the means for advancing includ-

45 ing a plunger having a series of teeth, and a plurality of pawls engaging said teeth as the plunger advances.

18. In a device of the character described, a plurality of pawls engaging said teeth as the plunger advances, at least one of said pawls being spring-pressed.

5 18. In a device of the character described, a means to simultaneously cut a cord and secure the free end thereof comprising a stationary shear member, a movable shear member and a yieldable holding member, wherein these members have notches adapted for alignment to receive the cord and having projections to cut the cord while simultaneously securing an end thereof against the holding member.

10 19. A device of the character described comprising a magazine for the accommodation of a plurality of clips, spring fingers acting to hold the clips in line within the magazine, means for engaging the foremost clip while in its aligned position and for closing it about paralleled cords prior to its removal from the magazine, and means to simultaneously cut the cord and secure the free end thereof.

15 20. A device of the character described comprising a magazine for the accommodation of a plurality of connected clips, spring means for holding the clips in line within the magazine, a stationary shearing element, a notched wheel movable thereover to receive and cut a cord, and an abutment adjacent the notched wheel opposite the stationary element and cooperating with the stationary element to grip the end of the cord unwound from a ball preparatory to tying the next package.

20 21. In combination, a relatively stationary cutter having a shearing edge, a relatively movable cutter having a cooperating shearing edge and a pinching surface, a relatively stationary pinching member adjacent the movable cutter, said member being resiliently urged against the pinching surface, the movable cutter being adapted to shear at the shearing edge a strand disposed across the first shearing edge and the edge of the pinching member and to pinch and hold the severed end of the strand.

25 22. In combination, a relatively stationary cutter having a shearing edge, a relatively movable cutter having cutting bars with cooperating shearing edges and a pinching surface, a relatively stationary pinching member adjacent the movable cutter, said member being resiliently urged against the pinching surface, each of said cutting bars being adapted to successively shear at the shearing edge successive portions of a strand disposed across the first shearing edge and the edge of the pinching member, and successively pinch and hold each severed end of the strand.

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