Oct. 30, 1956 N. ZWICK 2,768,378

MACHINES FOR ATTACHING TERMINALS TO CORDS OR THE LIKE

Filed April 14, 1951 4 Sheets-Sheet 1

FIG. 10

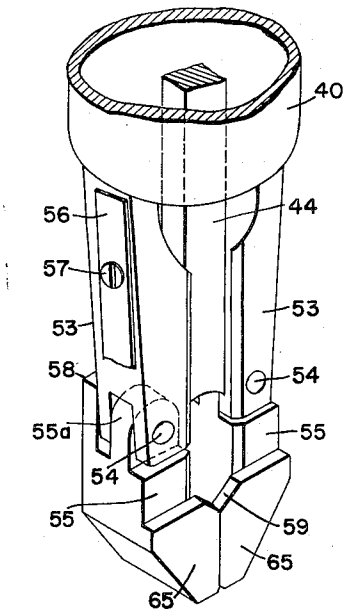


FIG. 1

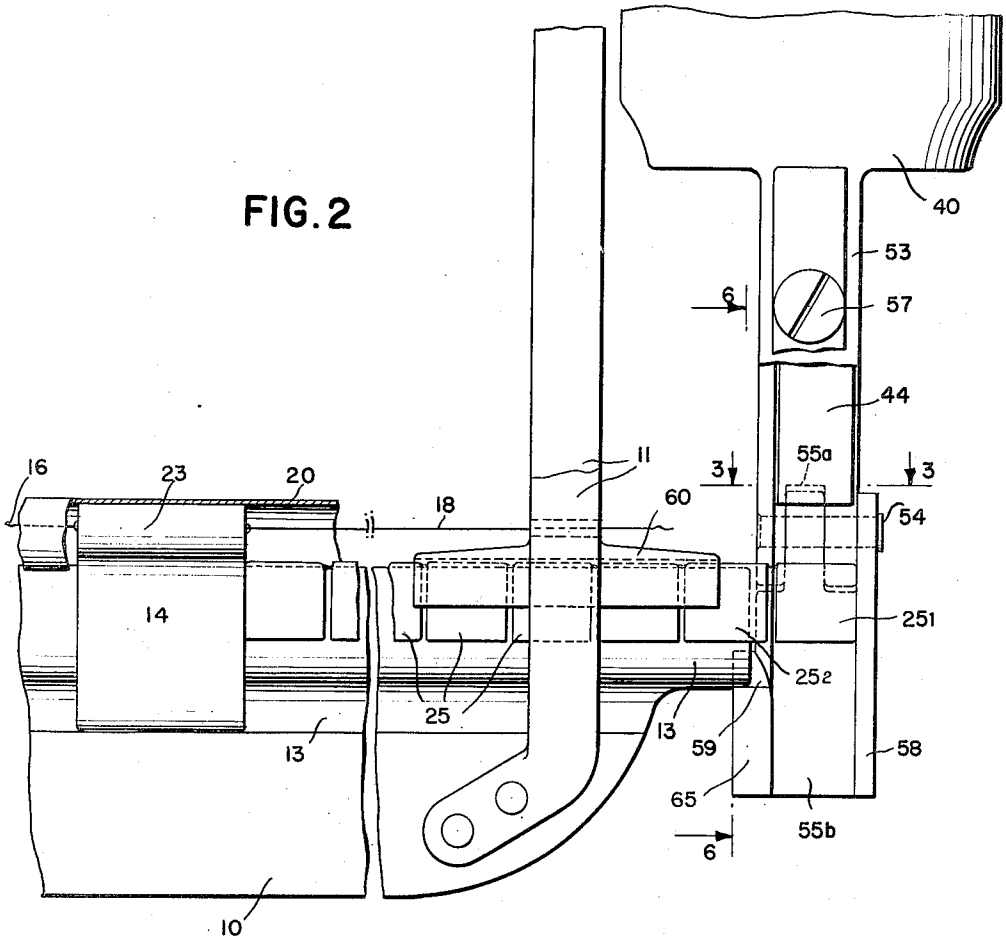
INVENTOR.
NICHOLAS ZWICK

BY Frank W. Lomnitzer

ATTORNEY

Oct. 30, 1956 N. ZWICK 2,768,378
MACHINES FOR ATTACHING TERMINALS TO CORDS OR THE LIKE
Filed April 14, 1951 4 Sheets-Sheet 2

FIG. 2



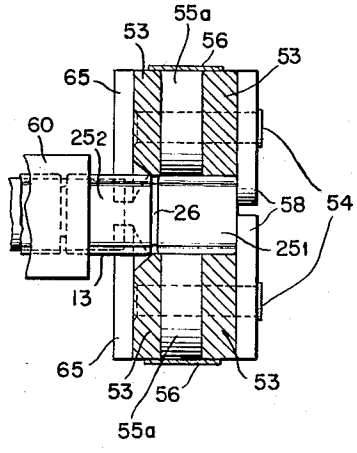


FIG. 3

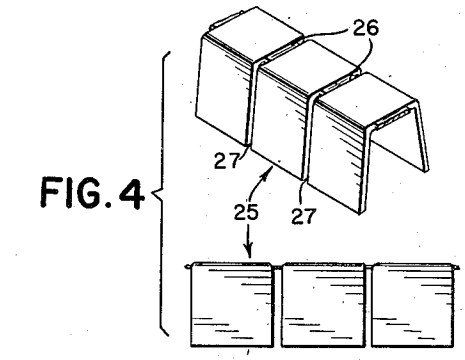
INVENTOR
NICHOLAS ZWICK
BY
Frank W. Lowmiller
ATTORNEY

Oct. 30, 1956 N. ZWICK 2,768,378

MACHINES FOR ATTACHING TERMINALS TO CORDS OR THE LIKE

Filed April 14, 1951 4 Sheets-Sheet 3

FIG. 4



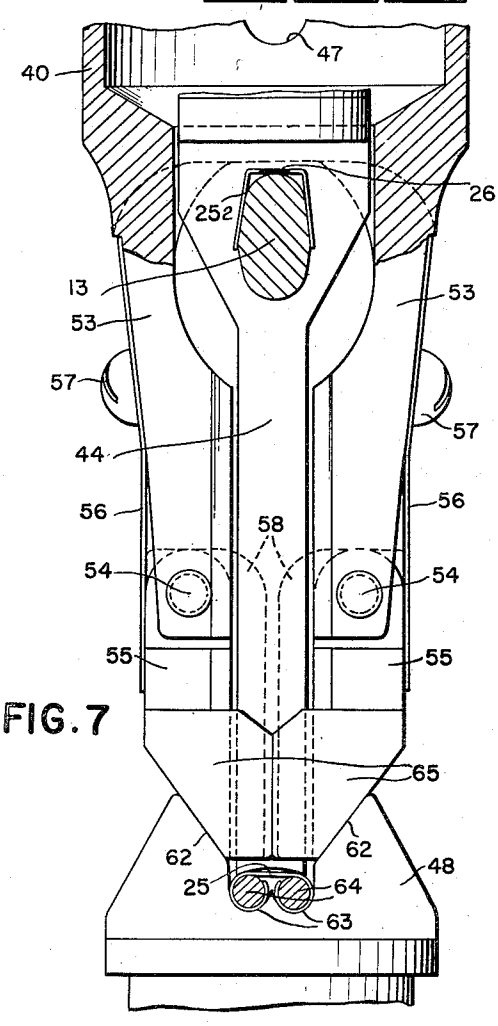


FIG. 7

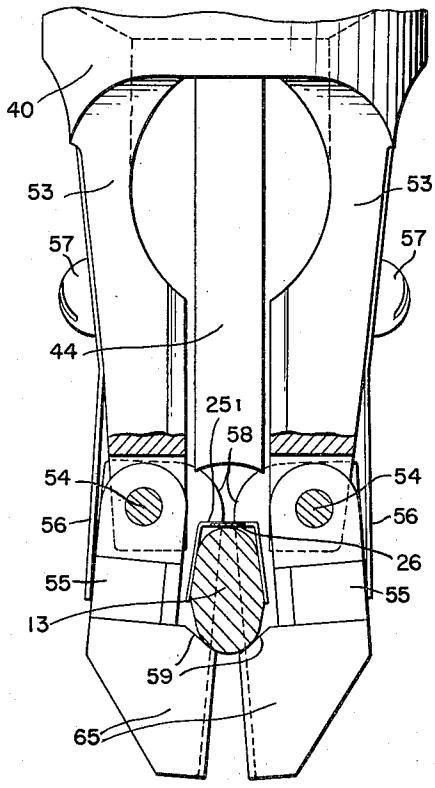


FIG. 6

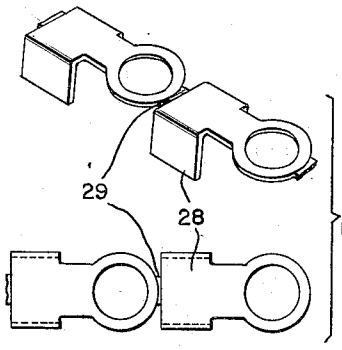


FIG. 5

INVENTOR
NICHOLAS ZWICK

BY Frank W. Lowenfeld

ATTORNEY

Oct. 30, 1956 N. ZWICK 2,768,378

MACHINES FOR ATTACHING TERMINALS TO CORDS OR THE LIKE

Filed April 14, 1951 4 Sheets-Sheet 4

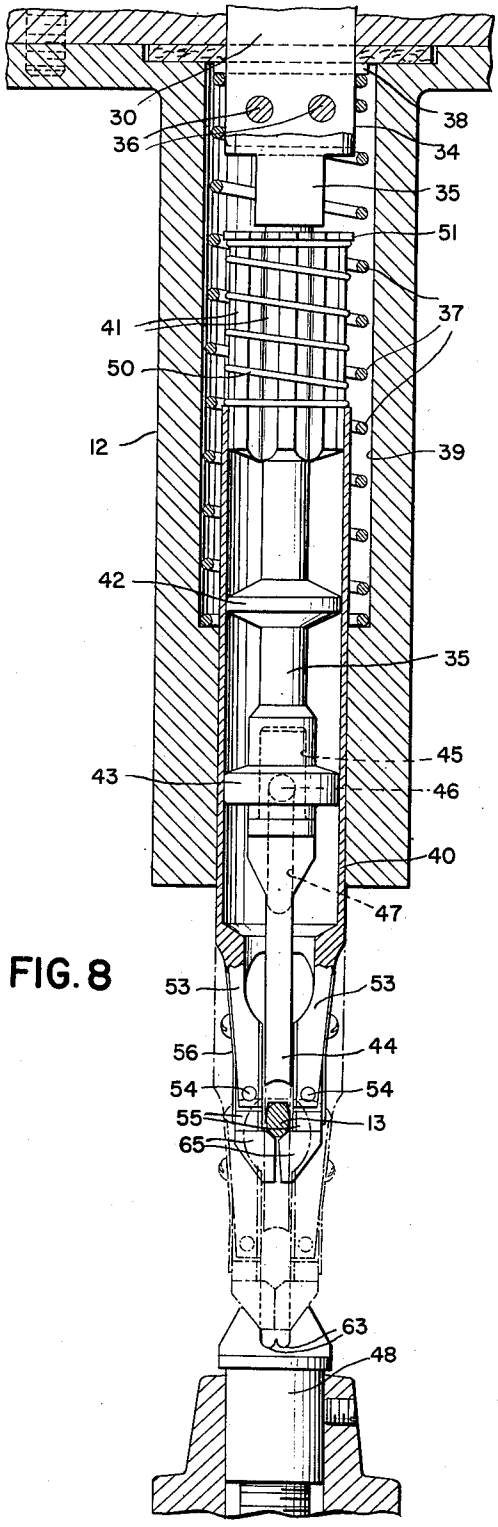


FIG. 8

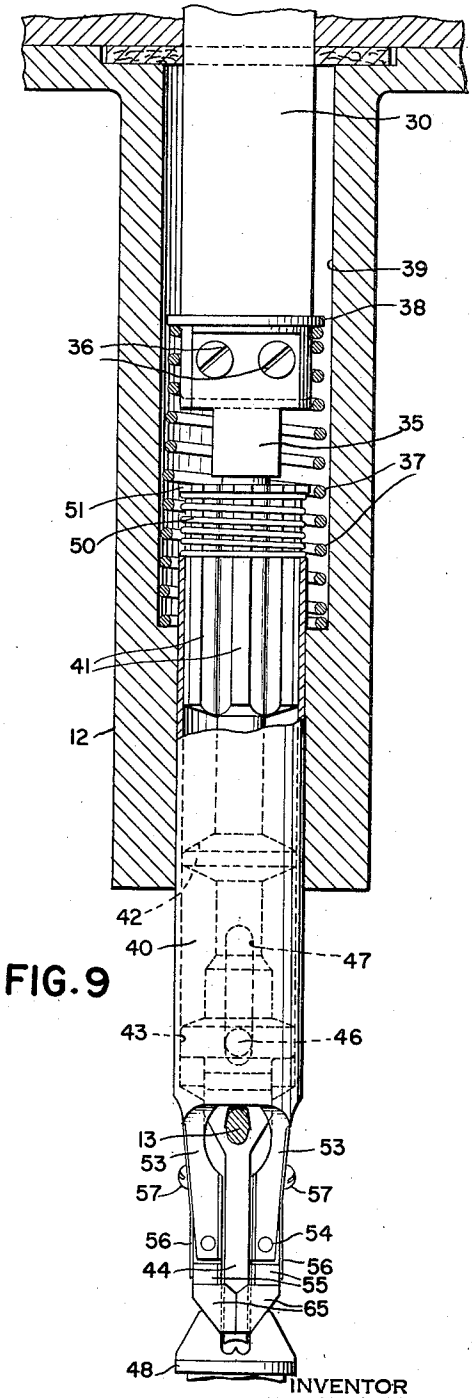


FIG. 9

INVENTOR
NICHOLAS ZWICK

BY Frank W. Lowitzer

ATTORNEY

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2,768,378

MACHINES FOR ATTACHING TERMINALS TO CORDS OR THE LIKE

Nicholas Zwick, New York, N. Y.

Application April 14, 1951, Serial No. 221,069

6 Claims. (Cl. 1—177)

This invention relates to a machine of the type for attaching parts, and more particularly to an apparatus or machine for clamping or binding an article to a cord, or the like. In one use of the improved machine said articles may comprise clamping devices to be attached to a pair of cords to bind them together, and in an alternative use the article may be in the form of an electric terminal which is attached to a wire.

It is a main object of the invention to provide means in the above described type of machine for feeding said articles to the applying means automatically in succession without requiring the operator to manually insert each article in said applying or attaching means, which has been found to be an inefficient manner of operation.

In accordance with the general features of the invention there is provided on the machine a support for a cartridge of interconnected clamping devices or articles with suitable feeding means for feeding said articles to be clamped to the applying or attaching means in succession. Said applying means consists of a unit having a reciprocable punch and correlated grippers which are so formed as to normally receive the foremost article preparatory to a clamping operation. Said punch provides in its initial descent for the separation of the foremost article from the remainder of the cartridge, this being facilitated by having weakened interconnecting webs between adjacent articles.

Further descent of the punch and said grippers carries the severed article towards the stationary anvil or die, whereupon said grippers strike the die, and further descent of said punch projects the article through the grippers to the die, which forms or presses the article around the wire or cord, and attaches or clamps it thereto.

The return of the applying unit elevates said punch and grippers, and when the grippers are in normal elevated position the following article is fed by the automatic feeding means into said grippers, this feeding operation having previously been prevented from doing so by a face of the punch cooperating with the leading end of the following article.

A further feature of the invention consists in a construction of feeding means which facilitates the insertion of a cartridge, and a detent to hold the foremost articles adjacent the grippers to prevent raising or buckling of the cartridge unit when an article is severed.

Other objects and advantages of this invention will more fully appear from the following detailed description taken in connection with the accompanying drawings, illustrating a preferred embodiment thereof, in which:

Fig. 1 is a perspective view of the assembled machine and also showing the electrical switch for initiating its operations.

Fig. 2 is a view in side elevation with the foremost gripper removed to show how a foremost article of a cartridge is fed into the grippers, and the detent for the cartridge.

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2 showing how the grippers are pivoted.

Figs. 4 and 5 are detail views of examples of articles adapted to be attached by the present machine to inserted wires, cords, or the like.

Fig. 6 is a sectional view on an enlarged scale taken on the line 6—6 of Fig. 2 showing the normal open position of the grippers.

Fig. 7 is a view similar to Fig. 6 but showing the same parts in the position they take after completion of a clamping operation.

Figs. 8 and 9 are partially fragmentary views to show the detailed construction of the attaching unit. The dotted line position in Fig. 8 shows the position of the punch prior to a clamping stroke; and Fig. 9 the position after a clamping stroke.

Fig. 10 is a perspective view showing the manner of pivoting a pair of grippers and their relation to the punch.

The storage magazine includes a support plate **9** (Fig. 1) supported from the machine framework **12** by brackets **10** and **11**, said support plate **9** having a rail or shear bar **13** on which a pusher member **14** slides. A cartridge **15** which consists of a series of clamping devices successively used in the clamping or attaching operation is manually placed upon the rail **13** after the operator has drawn the pusher member **14** to the left-hand position shown by means of a cord **16**. The pusher member is held in such left-hand position, as will be described by a bead **17** attached to cord **16** in order to facilitate the insertion of a cartridge. Attached to the pusher member **14** is a cord **18** to which a weight **19** is secured to successively feed the clamping articles. A semi-circular tube **20** pivoted at **21** on bracket **10** and having its free end resting in a bifurcated bracket **22** receives a circular guide head **23** of pusher member **14** to guide the latter. At its extreme left-hand position pusher member **14** registers with a complementary slotted portion of the tube to enable the free end of tube **20** to be rocked about its pivot **21**. Said tube **20** is also slotted longitudinally to rest upon the cartridge and to confine it on the rail **13**. The left end of tube **20** has a slot through which the wire **16** passes to hold bead **17** against the tube **20**, as shown in Fig. 1. During the normal feeding operation of the clamping articles bead **17** is detached in order to freely pass through the tube **20**. As will be seen in Fig. 1 cord **18** passes through the tube **20** and into a guide tube **66** which is bent to position cord **18** so that it will not be struck by the operating parts of the machine.

Various forms of clamping or binding devices may be used in connection with the present machine, two forms being shown in Figs. 4 and 5. The form shown in Fig. 4 consists of a series of U-shaped metal clamping devices **25** integrally interconnected by weakened link portions **26** formed by the intermediate slits **27**. A series of clamping devices **25** constitute a cartridge. The form shown in Fig. 5 consists of a series of electrical terminals **28**, likewise interconnected by weakened link portions **29** to form a similar cartridge.

The ram **30** (Fig. 1) for effecting the clamping operation may be operated by any suitable power means and preferably comprises a solenoid **31** (Fig. 1) attracting an armature **32** integral with said ram. Solenoid **31** is energized upon depression of a foot operated switch **33** which connects said solenoid to an electrical current supply.

The ram **30** is rectangular in section with its lower end **34** fitting in a slot of a plunger **35** and secured thereto by fastening screws **36**. A compression spring **37** extends between a flange **38** of said plunger **35** and the

bottom of a bore 39 in the framework 12 and upon the deenergization of said solenoid 31 returns said ram 30 and plunger 35.

The bore 39 terminates at its lower end in a smaller hole in which freely slides a tube or sleeve 40. The plunger 35 has a series of guide teeth or ribs 41 and circular flanges 42 and 43 by means of which said plunger 35 is centrally mounted in said tube 40 for an independent reciprocation therein.

A punch 44 which is substantially square in its cross section at its lower end has a circular pin end 45 fitting in a hole in the lowermost end of plunger 35. The punch 44 is secured to plunger 35 by a pin 46, one end of said pin sliding in an elongated slot 47 (Fig. 9) in tube 40 to prevent rotation of the tube 40. The function of the punch 44 is to first detach a clamping article and subsequently to force its slide portions to bend according to the formation of a die or anvil 48 around a cord to effect the attachment. A compression spring 50 extends between the top of tube 40 and a flange 51 of the plunger 35 to normally cause pin 46 to engage the upper end of slot 47. By means of spring 50 both the plunger 35 and tube 40 first move downwardly by ram 30 as a unit until the lower end of tube 40 is stopped when grippers 55 carried by extensions 53 strike the anvil 48, and thereafter enable an independent movement of the plunger 35 and punch 44 to effect the clamping operation.

The lower end of tube 40 has a pair of extensions 53 spaced apart so as to permit punch 44 to pass through and to carry pivot pins 54 for grippers 55. In more detail the lower end of each extension 53 has a slot in which fits a tongue 55*a* (Figs. 2, 3, and 10) of the related gripper. A pin 54 passes through a hole in the extension 53, and through a hole in said tongue 55*a* and a side or stop portion 58 of a gripper to pivot said gripper on the associated extension 53. The free ends of grippers 55 are urged towards each other by flat springs 56 attached to extensions 53 by screws 57.

It will be recalled that the clamping devices 25 are fed over the rail 13 and are urged by the weight 19 so that the foremost device 25_1 (Figs. 3 and 6) passes off the left end of rail 13 and in between the grippers 55 until its end strikes the stop portions 58 of the grippers. Stop portions 58 are side plates of grippers 55 and are integral therewith. This is the normal position prior to a clamping operation and to facilitate the entry of a clamping device therein the rail 13 engages bevel cam edges 59 of side portions 65 of grippers 55 to normally separate them, as best shown in Fig. 6. As the grippers 55 and punch 44 are initially lowered by ram 30 cam edges 59 leave rail 13 and springs 56 close the grippers upon the foremost clamping device 25_1, and shortly thereafter the punch 44 strikes the horizontal top of clamping device 25_1 to shear or detach clamping device 25_1 from its successor 25_2. The descent of the punch 44 causes weakened portion 26 to be broken and clamping device 25_1, is severed from the rest of the cartridge. The ram 30 causes the plunger 35 and punch 44 to descend further, and through spring 50 the tube 40 and grippers 55 which carry clamping device 25_1 are moved further down.

The following clamping device 25_2 is urged by the weight 19 along rail 13 when clamping device 25_1 is detached until it abuts a side face of the now lowered punch 44. When the latter returns to its upper normal position clamping device 25_2 will enter the grippers 55. In this way a clamping device is always in a position for use in the next machine operation.

The detached clamping device 25_1 is lowered by grippers 55 until the lower ends thereof strike complementary sides 62 of the die 48, as shown in dotted line position in Fig. 8.

After the grippers 55 strike the die the ram 30 continues its downward movement compressing spring 50 and moving punch 44 further downwardly, as shown in Fig. 9. Said punch will now project the clamping device 25_1 through the grippers 55, causing the side portions of the clamping device 25_1 to be guided by forming edges 63 of die 48 around two cords 64 which it is desired to bind together. Said cords 64 have previously been placed in the die 48 prior to the close of switch 33, either manually or automatically.

It will be seen that punch 44 projects the clamping device 25_1 downwardly into the die guided by a channel 55*b* (Fig. 2) formed by stop portions 58 and side portions 65 of the grippers (Fig. 3) and it is also to be understood that grippers 55 are suitably opened at their lower ends for passage of punch 44 and a clamping device 25. The side portions 65 are also integral side plates of grippers 55 but are not as high as the stop portions 58, as is evident in Figs. 2, 6 and 10.

Opening of the solenoid circuit by release of foot pressure on switch 33 deenergizes the solenoid 31 and enables the ram 30, plunger 35 and punch 44, and tube 40 with its grippers 55 to return to normal under action of springs 37 and 50.

In order to prevent the following clamping devices 25 from buckling on the rail 13 during detachment of a foremost clamping device 25_1 there is interposed over three or four of the left-hand clamping devices 25 a holding member in the form of a U-shaped bracket 60 (Fig. 2) carried between the two brackets 11.

If an electrical terminal 28 is to be attached to the exposed wire or end of a cord, anvil 48 is suitably formed to cause their side portions to be clamped or pressed around the single wire or cord.

While there have been shown and described and pointed out the fundamental novel features of the invention, as applied to a preferred embodiment, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. In a machine for setting a clamp around an article, a stationary shear bar fixed to the machine framework, means for feeding a strip of integrally joined preformed clamps over said shear bar, a die having forming portions for setting a clamp around said article, a punch cooperating with said shear bar, grippers movable towards said die for receiving an unsevered clamp at the front end of the strip, compressible resilient means between said grippers and punch for causing said grippers and punch to be moved concurrently, operating means to first effect movement of said punch and grippers relative to said shear bar to sever said unsevered clamp and to then move said grippers and punch downwardly until further movement of the grippers is arrested by said die, and to then effect a further movement of said punch to project said severed clamp against the forming portions of the die to set said clamp around the article, said resilient means being compressed after said grippers have been arrested by said die to enable said further movement of said punch, and means for holding the unsevered clamps of the strip to prevent said clamps from buckling on said shear bar when a clamp is being severed.

2. In a machine for setting a clamp around an article, means for feeding a strip of integrally joined preformed clamps, a die having forming portions for setting a severed clamp around said article, a stationary shear bar fixed to the machine framework, conveying means movable towards said die and normally receiving an unsevered clamp at the front end of the strip, a punch cooperating with said shear bar, and operating means to first effect movement of said punch and conveying means

relative to said shear bar to sever said unsevered clamp and to then move the conveying means and the punch downwardly until further movement of the conveying means is arrested by said die, and to then effect a further movement of said punch to project said severed clamp against the forming portions of said die to set said clamp around the article.

3. A machine according to claim 2 wherein said operating means includes compressible yielding means for causing said conveying means and said punch to be moved concurrently downwardly and compressible after said conveying means has been arrested by said die to enable said further movement of said punch.

4. In a machine for binding a pair of cords by a clamp, means for feeding a strip of integrally joined preformed clamps, a die having forming portions for setting a severed clamp around said pair of cords, a stationary shear bar fixed to the machine framework, a punch cooperating with said shear bar, conveying means movable towards said die and normally receiving an unsevered clamp at the front end of the strip, and operating means including compressible resilient means intermediate said punch and conveying means for moving said punch and conveying means concurrently downwardly relative to said shear bar to sever said unsevered clamp and then moving the punch and conveying means further downwardly until further movement of the conveying means is arrested by said die, and then effecting a further movement of said punch to project said severed clamp against the forming portions of said die to set said clamp around the pair of cords, said resilient means being compressed to enable said further movement of said punch after said conveying means has been arrested by said die.

5. In a machine for forming an article, means for feeding a strip of articles integrally joined by weakened interconnecting webs, a stationary shear bar fixed to the machine framework, a punch cooperating with said shear bar, a die having forming portions for forming an article, grippers movable towards said die and normally receiving an unsevered article at the front end of the strip of articles, and operating means to first effect movement of said punch and grippers relative to said shear bar to

break the interconnecting web to sever an article from the strip and to then move the grippers and punch downwardly until further movement of the grippers is arrested by said die, and to then effect a further movement of said punch to project said severed article against the forming portions of said die to form the article.

6. In a machine for setting a clamp around an article, means for feeding a strip of integrally joined preformed clamps, a die having portions for setting a clamp around said article, a stationary shear bar fixed to the machine framework, a punch cooperating with said shear bar, grippers movable towards said die opened at their home position for receiving an unsevered clamp at the front end of the strip, operating means to first effect movement of said punch and grippers relative to said shear bar to sever said unsevered clamp and to then move said grippers and punch concurrently downwardly until further movement of the grippers is arrested by said die, and to then effect a further movement of said punch to project said severed clamp against the forming portions of the die to set said clamp around the article, means engaging the grippers when they are at their home positions for opening them to receive said unsevered clamp, and spring means acting upon said grippers for causing said grippers to automatically close upon the severed clamp as said grippers are moved out of engagement with the preceding named means towards the die.

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