ABSTRACT OF THE DISCLOSURE

Apparatus for cutting selective lengths of insulated wire, bending the adjacent severed ends and stripping the insulation therefrom, in which gripping members periodically advance the wire to a cutting position where one set of cutting blades severs the insulation and wire core, and sets of blades respectively on the opposite sides of said one set cut the insulation only, and while other members hold the severed ends, a die member at the cutting position is moved in right angled relation between the sets of insulation cutting blades to bend the severed ends at right angles, the die member having shoulders for engaging and stripping the insulation from the severed ends as they are being bent, after which the severed part with its bent ends is ejected in an axial direction by a blast of air. Electrically energized cyclically operable components automatically control the successive operations of advancing, cutting, bending and stripping.

The present invention relates generally to the art of severing filamentary materials, and is more particularly concerned with improvements in high-speed apparatus for the cutting of a wire conductor or the like into predetermined lengths and shaping the end portions of said lengths.

It is one object of the herein described invention to provide improved apparatus for cutting wire materials into predetermined lengths having bent or otherwise shaped end portions.

A further object of the invention is to provide apparatus of the foregoing type, wherein in the case of insulated wire the insulation will be removed from the bent end portions.

A further object is to provide improved pneumatically operable linearly movable gripping means for feeding the wire, and wherein the movement of the gripping means determines the length of wire to be cut.

A still further object is to provide novel bending die means operable at right angles to the cutting blades of the apparatus for bending the severed wire ends and removing the insulation from such ends, where the wire has an insulation covering.

Another object is to provide improved pneumatic means for ejecting the cut lengths with bent ends, which are controlled in timed relation to the operation of the end bending means.

Still another object resides in the provision of means for centering the wire adjacent the cutting elements, and holding the wire against horizontal lateral displacement during bending of the severed ends of the wire.

It is also an object to provide in apparatus of the character described herein, improved control means embodying a simplified arrangement of switches for selectively energizing an electro-magnetically operated air valve from capacitor means in a manner to minimize switch contact sparking.

Further objects of the invention will be brought out in the following part of the specification, wherein detailed description is for the purpose of fully disclosing the invention without placing limitations thereon.
vide means whereby the speed of actuation of the power means may be regulated with respect to the movement of an associated piston 19 within the tubular cylinder between its ends. The piston 19 is centrally supported for axial movement upon a tubular member 20 which is turnable axially of the cylinder and has its ends extending through the end closures 15 and 16 to provide a tubular guide for the movement of the filamentary material thereafter as it is fed to the cutting and bending mechanism. The postion 19 is sealed with respect to the tubular member 20 by means of an O-ring 21, and the tubular member is in turn sealed within the end closure 16 by an O-ring 22. The piston 19 is connected with a power delivery element 23 which comprises a tubular member having telescopic relation with the tubular member 20, the power delivery element being connected at one end to the piston, and having its other end connected with feed clamping means 24 which is utilized for advancing the filamentary material in a feeding direction as it is carried through the power delivery element 23 and tubular element 20 in an egress to the cutting and bending mechanism. The power delivery element 23 is sealed by an O-ring 25 in its passage through the end closure 15.

The feed clamping means 24 includes an upright cylindrical member 26 through which the other end of the power delivery element 23 extends and to which the cylinder is secured for movement therewith in response to reciprocatory action of the power delivery element as the piston 19 is moved within its associated cylinder. The cylinder 26 is supported for sliding movement by an appropriate bearing upon a guide rod 27, one end of this guide rod being supported in the end closure 15 while the other end is supported in a mounting block 28 secured to the mounting plate 13 near the end of the mounting panel and actuating arm and adjacent to the upper edge 12. The length of the guide rod 27 is sufficient to permit movement of the feed clamping means therealong for a distance corresponding to the full travel of the piston 19 from one end to the other of cylinder 14.

The cylinder 26 is closed by a top cap 29 which is held in position by means of an upper retaining ring 30, while the lowermost end of the cylinder is closed by means of a bottom cap 31 having a peripheral sealing ring 32, this cap being held in position by a retainer ring 33 and having a central flow connection with an inlet conductor 34 for the air for operating the feed clamping means. Mounted within the lowermost end of the cylinder 26 is a piston 35 which is normally urged in a downward direction by one or more spring members 36, but under the air pressure admitted below the piston to an upper position in which a clamping head 37 of the piston will be projected through registered openings 38 in the under side of the adjacent wall of the power delivery element 23 and an inner guide sleeve 39 for the filamentary material. The filamentary material will be thus gripped into the clamping head 37 and the opposite wall of the inner guide sleeve in such a manner that translatory movement of the feed clamping means towards the cutting and bending mechanism will feed a predetermined length of the filamentary material to the cutting and bending mechanism. This length will depend upon the extent of translatory movement of the feed clamping means. Provision is made for adjustably varying the extent of this movement in a manner which will now be explained.

As shown in FIG. 2, the feed clamping means 24 is arranged to always move to the full limit of its translatory movement to the right, the extent of this movement being determined by the movement of the piston 19 to the right of the cylinder 14 as determined by the end closures 15 and 16. To regulate the lengths into which the filamentary material is to be formed, the extent of retractive movement of the feed clamping means 24 to the left is variable limited by means of a stop member 40 in the form of a mounting lock which is slidable and supported up the guide rod 27 and which can be adjustably secured in any desired position therealong by means of a set screw 41. Adjacent position to the stop member 40 is a similar mounting block 42 which is likewise located along the guide rod 27 and can be secured in adjusted position by means of a set screw 43. The mounting block 42 serves as a support for a micrometer 44 having a spindle 45 against which the stop member 40 is adapted to abut. Thus, with the mounting block 42 secured against movement, and the stop member 40 releasing its set screw 41 loosened, so that it can be moved along the guide rod, the micrometer may be utilized to provide a fine adjustment of the position of the stop member 40 on the guide rod. The cut lengths of filamentary material are thus controllable to a very fine degree. Once the desired position of the stop member 40 is obtained, it is secured in this position by means of its set screw 41. Movement of the feed clamping means is cushioned at its retraction limit by means of shock washers 46, and at the end of its feeding movement by shock washers 47.

Limit switches 48 and 49, which form a part of the control to be subsequently described, are arranged to be actuated in response to movement of the feed clamping means 24 to its retracted position and to the limit of its feed position respectively. The limit switch 48 is mounted on the stop member 40 and contains an actuating pin 50 which functions upon being depressed to closed normally open contacts therein. The limit switch 49 is mounted for tilting adjustment about a pivot 51 by means of an adjusting screw 52 having threaded support in a post 53, one end of the adjusting screw being connected with the switch mount in spaced relation to the pivot 51. The adjusting screw permits control of the extent of the timed relation at which the normally open contacts of the limit switch will be moved to closed position by means of its actuating pin 54 which is in the line of travel of a switch actuating arm 55 adjustably secured to the power delivery element 23 adjacent the cylinder 26. The limit switch 48 is used as a feed control, while the switch 49 is utilized to control the cutting and bending mechanism as will hereafter be explained.

The cutting and bending mechanism B comprises a unitary assembly upon a mounting panel 56, as best shown in FIG. 3. At the left side of the mounting panel, there is positioned a retractable clamping means 57 which is of the same general construction as the feed clamping means 24, and wherein similar parts have been indicated by corresponding primed numbers. In this gripping means, a single tube 58 is utilized to guide the filamentary material from the tubular member 20 of the feeding mechanism A to the cutting and bending tooling of mechanism B. The retraction clamping means is supplied with actuating air through an opening 59 in the back side of the cylinder 26, rather than through the bottom cap 31.

From the right end of the tube 58, as shown in FIG. 3, the filamentary material is fed into the cutting and bending mechanism B, the filamentary material leaving the tube 58 and entering a stripping block assembly 60 which is composed of a left strip block 60a and a right strip block 60b.

The left strip block 60a is provided with a tubular guide bushing 61 which receives and conducts the filamentary material to a second axially aligned bushing 62 having a circumferentially extending groove 63, which connects with an air supply conduit 64, and an air discharge opening 65 (FIG. 6) through which a jet of air is forced at the proper time to eject the severed length of filamentary material after stripping the insulation from its bent ends through the right strip block 60b. The right strip block is provided with a longitudinally extending central bore 66 which is in longitudinal communication along one side with a radially extending slot 67 for ac-
commodating the bend ends of the severed wire portion during its ejection. The open side of the slot 67, as shown in FIG. 3, is normally covered by a closure plate 68, as shown in FIG. 3.

At the adjacent ends of the strip blocks 60a and 60b, the strip block 60a is formed with a plurality of upper and lower spaced apart guide fingers 65a and 65b which cooperate to completely sever it as well as insulation covering thereon. On each side of the cutting blades there is provided a set of die blades which are provided with notched cutting edges so as to sever the insulation only without severing the wire core. There is also mounted in the slot for the right hand die blades (FIG. 6) a set of cooperatively associated guide blades 73a and 73b together with associated spacer blanks 74a and 74b.

The guide blades are provided so as to center the filamentary material horizontally within the right strip block 60b and hold the filamentary material against lateral movement during the end bending operation, as will hereinafter be explained more fully. Each of these guide blades is formed from a flat metallic blank of substantially uniform thickness so as to provide at one end parallel side edges 75 and 76 which are connected by a right angled end edge 77. The other end is formed with an end edge which includes a Y-portion 78 which is bent parallel to said side edges. Projecting longitudinally of the guide blade at this end, there is also provided an integrally formed projecting finger 80 at one side of the plate, this finger extending beyond the adjacent end edge. When assembled in operating position, the projecting fingers of the upper and lower guide blades are in overlapping relation.

Referring once again to FIG. 3, the upper set of blade members is supported in a head member 81a by means of a pin 82a which passes through an aperture in each of the blades. In a similar manner, the lower set of blade members 70b is supported in a head member 81b by a pin 82b.

The head member 81a has an operative connection with a stem 83a adapted to be reciprocated by movement of a piston 84a in a double acting air cylinder 85a. In a similar manner, the head member 81b is connected with a stem 83b, a piston 84b and double acting air cylinder 85b. The air cylinders are mounted upon the mounting panel 56 to provide a unified assembly, with appropriate connections (not shown) for supplying air to the opposite ends of the cylinders as diagrammatically illustrated in the control diagram. As thus arranged, it will be apparent that when air is supplied to the outer ends of the cylinders 85a and 85b, the blades will be actuated to a closed position, whereas when air is supplied to the adjacent ends of the cylinders, the blades will be actuated to an open position. Moreover, it will be understood that in the closed position, the cutting blades 71a and 71b will function to sever the wire and its insulation completely, whereas the die blades 72a and 72b on each side of the cutting blades will operate to sever the insulation only at points spaced from the cutter blades a distance depending upon the length of bent end which is required. This distance will be determined by the thickness and spacing of the fingers 69a and 69b as provided in selectively changeable strip blocks 60b.

The end bending mechanism as best shown in FIG. 4 comprises a bending die, as generally indicated at 86 which is supported for horizontal reciprocating movement in right angled relation to the axis of the filamentary material. This die as shown in FIG. 5 comprises an elongate bifurcate member having spaced apart parallel leg portions 87 and 88 which are connected at one set of adjacent ends by a bridging portion 89. This die is arranged to straddle the cutting blades 71a and 71b in such a manner that the outer side surfaces of the legs 87 and 88 will be cooperatively associated with the die blades 72a and 72b on each side of the cutting blades. These ends of the legs 87 and 88 have right angled faces which form a first shoulder 90 which function to bend the adjacent severed ends of the filamentary material, as will hereinafter be explained more fully. Adjacent each of the first shoulders is a second projecting shoulder 91 which functions to engage the innermost end of the severed insulation strip and strip it from the bent end. The extreme outer side surfaces 92—92 of the legs 87 and 88 contain a longitudinally extending slot 93 in each case to accommodate the bent end portion of the wire during removal of the insulation therefrom. Since the portions of the shoulders 90 and 91 are brought into engagement with the filamentary material during bending and insulation removal, the engageable portions of the shoulders are subject to a high degree of wear, and for this reason it is desirable to provide inserts as indicated at 94 of harder material that may be used for the body of the die. At the bridging end portion 99, a transversely extending slot 95 is provided to receive a coupling part of a connector 96 which is secured to the bending die by means of a pin 97.

The connector 96 is carried by a power delivery piston rod 98 which is supported for reciprocative movement by means of a piston 99 contained within and cooperatively associated with a double acting cylinder 100 arranged with fluid connections 101 and 102 at its opposite ends. Reciprocative movement of the bending die is limited by means of a spacer member 103 supported around the piston rod 98 so as to form an abutment engageable by the connector 96 during its retracted movement.

Referring to FIG. 7, the operation of the bending die will be explained. The filamentary material 11 is illustrated as comprising in this case a metal conductor or a wire 104 which is encased in a surrounding cover of insulation 105.

FIG. 7(a) illustrates the position of the bending die at the conclusion of the cutting operation, wherein the cutting blades 71a and 71b have completely severed the filamentary material, having cut through the wire and insulation. The die blades 72a and 72b have severed the insulation 105 at points spaced on opposite sides of the cutting blades so as to leave insulation end slug portions 106.

In FIG. 7(b), the bending die has been moved forward. During initial movement from the position shown in FIG. 7(a), the first shoulders 90 will engage each end portion on opposite sides of the cutting blades and bend these end portions into right angled relation to the main axis of the filamentary material. Upon continued movement of the bending die, the adjacent second shoulder 91 will in each case engage the inner end edge of the insulation slug 106 and act to remove it by stripping it from the bent end of the wire.

As shown in FIG. 7(c), as the bending die continues to move to its forward limit, the bent end portions slide along the associated slots 93 until the insulation slug is entirely removed. Upon retraction of the bending die 88 and movement of the cutting and die blades to opened position, the severed portion of the filamentary material with stripped bent ends is ejected by means of the air jet issuing from the opening 65.

Referring now to FIG. 8, the electrical control and the sequence of operation of the various components of the apparatus will now be explained. Electrical power is supplied from an A.C. potential source 107 which is connected to the primary winding 108 of a transformer 109 which has its secondary winding 110 connected into the charging circuit of capacitor means. One side of the secondary winding of the transformer is grounded at 111, while the other side of the winding is connected through a rectifier 112, this rectifier having its outlet connected to branching circuits which are respectively connected through re-
sistor 113a and 113b to corresponding terminals of capacitors 114a and 114b which have their charging circuits completed through ground connections 115a and 115b. As thus arranged, these capacitors will be continuously connected to their respective charging circuits.

In general, pressurized operating air for the apparatus is fed through a conduit 116 from a suitable source to an air valve 117 which is selectively operable through the electric control system, as will subsequently be described, to directly energize the cutting mechanism so as to actuate it to a closed cutting position or an opened non-cutting position. The pilot valve 117 has a slide valve 118 which is selectively operable by means of energizable solenoid actuating coils 119 and 120. When the coil 119 is energized, the slide valve is moved to a position in which pressurized air will be connected with a port 121, and a port 122 will be connected with an exhaust port 123. When the coil 120 is energized, the slide valve will be moved to a position in which pressurized air will be connected with the port 122, and the port 121 will be connected with an exhaust port 124.

Let it now be assumed that the feed mechanism is on its retraction stroke following a cutting operation, the movement of the feed clamping means 24 towards the left, as shown in Fig. 8, will carry it to a position of engagement with the actuating pin 50 of limit switch 48 so that its normally open contacts 125 will now be closed. Closure of these contacts will energize the actuating coil 119 of the pilot valve 117 by completing a circuit from one side of capacitor 114b, through a conductor 126, the coil 119 and hence through ground to the other side of the capacitor. The pilot valve will then be operated to the position shown. This will apply pressurized air to the cylinders 85a and 85b to open the cutting blades. Exhaust air from these cylinders will be expelled through the port 123 of the pilot valve. Simultaneously, the cylinder 100 will be energized and move the bending die 86 to its retracted open position.

Exhaust air from the cylinder 100 is carried through a conduit 127 to a three way normally closed pilot valve 128 which opens and connects the air ejection opening 65 through a conduit 129 directly with the pressurized air source. This ejects the severed wire with the bends ends.

At the same time that the bending die is opened, pressurized air is supplied through a pilot valve 128a which opens to supply operating air to the cylinder 26 of the feed clamping means 24. The filamentary material is now gripped so that it will be advanced in a feeding direction as soon as the cylinder 14 is energized.

After a slight delay time with respect to the energization of the feed clamping means, control valve 18a actuates pilot valve 128b and fluid actuating pressure is applied to the left end of cylinder 14 from the pressurized air source through a conduit 131.

The filamentary material is now advanced until the switch actuating arm 55 engages the actuating pin 54 of limit switch 49 to move its normally open contacts 132 into closed position. Closure of these contacts completes an energizing circuit through a conductor 133 for the operating coil 120 of the pilot valve 117 so that this coil will be directly connected across the capacitor 114a.

The pilot valve will now be operated so as to move the slide valve 118 to a position connecting the cutter actuating cylinders to fluid pressure from the port 122, and the cutting blades will now be operated to closed position. Simultaneously, fluid pressure will be applied through a conduit 134 to the cylinder 26 of the retraction clamping means which will now close into gripped relation to the filamentary material. At the same time, the cylinder 26 of the feed clamping means 24 is connected to exhaust through port 124 so that it will release its grip on the filamentary material.

After a predetermined time delay, a control valve 18b operates valve 128c to connect the cylinder 100 to pressurized air through a conduit 135. The bending die now operates to bend the ends of the filamentary material. At the same time that the retraction clamping means are closed, air pressure is applied to the right end of the cylinder 14 through a conduit 136 to energize the feeding cylinder for retraction movement at the end of which the contacts of limit switch 48 are again closed and the cycle repeated.

Various modifications may suggest themselves to those skilled in the art without departing from the spirit of my invention, and hence, I do not wish to be restricted to the specific form shown or the uses mentioned, except to the extent indicated in the appended claims.

I claim:

1. Apparatus for cutting and shaping filamentary materials, comprising:
   (a) cutters operable from an opened to a closed position on a linear axis to sever a filamentary material moved to a cutting position in said cutters; and
   (b) means movable on a linear axis at right angles to the linear axis of said cutters for bending at least one of the adjacent severed ends of the material while in said cutting position.

2. Apparatus for cutting and shaping an insulated filamentary material, comprising:
   (a) cutters operable from an opened to a closed position on a linear axis to sever a filamentary material moved to a cutting position in said cutters; and
   (b) means movable on a linear axis at right angles to the linear axis of said cutters for bending the adjacent severed ends of the material and removing the severed end portions of the insulation therefrom.

3. Apparatus for cutting and shaping the ends of an insulated filamentary material, comprising:
   (a) cutters operable in a closed position to sever a filamentary material therein and the adjacent end portions of the insulation;
   (b) means for feeding a predetermined length of the material to a cutting position by said cutters;
   (c) means for actuating said cutters;
   (d) means operable independently of said cutters at right angles to the axis of said filamentary material for bending the severed ends and removing the severed end portions of the insulation therefrom prior to movement from said cutting position.

4. Apparatus for cutting and shaping the ends of an insulated filamentary material, comprising:
   (a) cutters selectively operable to opened and closed positions, and in closed position acting to sever a filamentary material at a cutting position therein and the adjacent end portions of the insulation;
   (b) gripping means including a jaw member mounted for movement into engaged and disengaged relation to said material;
   (c) means for bodily moving said gripping means towards said cutters, during jaw engagement, the extent of said movement determining the length of material to be cut; and
   (d) means operable independently of said cutters at right angles to the axis of movement of said filamentary material for simultaneously bending the adjacent severed ends and removing the severed end portions of the insulation therefrom while in said cutting position.

5. Apparatus for cutting and shaping the ends of an insulated filamentary material, comprising:
   (a) cutters respectively operable on a linear axis to opened and closed positions including one set of cutters in closed position acting to sever a filamentary material therein and sets of cutters on opposite sides of said one set of cutters acting to sever the adjacent end portions of the insulation on opposite sides of the point of severance by said one set of cutters;
(b) first gripping means including a jaw member mounted for movement into engaged and disengaged relation to said material;

(c) actuator means for bodily moving said first gripping means in a feeding direction towards said cutters during its jaw engagement, the extent of said movement determining the length of material to be cut;

(d) second gripping means including a jaw member mounted for movement into engaged position with respect to said material at the conclusion of the feeding movement of said actuator means;

(e) bending die means positioned between the sets of insulation severing cutters operable on a linear axis at right angles to the axis of said cutters, while gripped by said second gripping means, for bending the severed ends and removing the severed end portions of the insulation therefrom.

6. Apparatus for cutting and shaping the ends of an insulated filamentary material, comprising:
(a) cutters operable to opened and closed positions including one set of cutters in closed position actuating to sever filamentary material therein and spaced apart sets of cutters on opposite sides of said one set of cutters actuating to sever adjacent end portions of the insulation;
(b) means for axially centering the material in the cutters and holding the material against lateral movement;
(c) bending die means operable between said one set of cutters and each set of insulation severing cutters for bending the adjacent severed ends of the material and stripping the severed end portions of the insulation therefrom, said bending die means being operably movable independently of said cutters.

7. Apparatus according to claim 6, wherein the centering means includes elements positioned axially of the filamentary material on opposite sides of said cutters, the elements on one side of the cutters being mounted for movement with the cutters.

8. Apparatus for cutting and shaping the ends of an insulated filamentary material, comprising:
(a) cutters operable in a closed position to sever a filamentary material therein and the adjacent end portions of the insulation;
(b) means for feeding a predetermined length of the material to said cutters;
(c) means for actuating said cutters; and
(d) means movable independently of said cutters and operable at right angles to the axis of said filamentary material and on an axis of movement angularly displaced relative to the movement of said cutters for bending the severed ends and removing the severed end portions of the insulation therefrom, said means including a die member having a first shoul-der for engaging and bending each of the severed end portions, and a second shoulder for engaging and stripping the severed end portion of insulation from each of the bent end portions.

9. Apparatus according to claim 8, wherein the die member is bifurcate and straddles one of said cutters and has shoulder carrying portions operable on opposite sides of the cutter.

10. Apparatus for cutting and shaping the ends of an insulated wire material, comprising:
(a) cutters operable in a closed position to sever an insulated wire material therein and the adjacent end portions of the insulation, including a central cutter for severing the insulation and wire, and die cutters spaced axially of the wire on opposite sides of the central cutter for cutting the insulation only;
(b) means for feeding a predetermined length of the material to said cutters;
(c) means for actuating said cutters; and
(d) means alternately positioned with respect to said cutters and operable independently of the cutters at right angles to the axis of said wire material for bending the severed ends proximate to said die cutters and removing the severed end portions of the insulation therefrom.

11. Apparatus for cutting and shaping the ends of an insulated wire material, comprising:
(a) cutters operable in a closed position to sever an insulated wire material therein and the adjacent end portions of the insulation including a central cutter for completely severing the material, and die cutters respectively positioned on opposite sides of the central cutter for cutting the insulation only;
(b) means for feeding a predetermined length of the material to said cutters;
(c) means for actuating said cutters;
(d) elements positioned outwardly of the die cutters and being movable therewith to center the material and hold it against lateral movements; and
(e) means operable at right angles to the axis of said wire material including a die member straddling said central cutter and having parts proximate to each of said die cutters for bending the adjacent severed ends and removing the severed end portions of the insulation therefrom.

12. Apparatus for cutting and shaping the ends of an insulated filamentary material, comprising:
(a) pneumatically actuated cutters operable in a closed position to sever a filamentary material therein and the adjacent end portions of the insulation;
(b) means for feeding a predetermined length of the material to said cutters;
(c) electro-magnetically actuated control means for said cutters having a first circuit energizable to cause movement of the cutters to a closed position, and a second circuit energizable to cause movement of the cutters to an open position;
(d) an A.C. electric source;
(e) capacitor means;
(f) a charging circuit for said capacitor means containing a rectifier connected with said source and resistor means connected with said capacitor means;
(g) switching means operable by said feeding means including contacts operable at the termination of a feeding operation to connect the charged capacitor means to said first circuit, and other contacts operable prior to the beginning of a feeding operation to connect the charged capacitor means to said second circuit.

13. Apparatus according to claim 12, wherein the capacitor means comprises separate capacitors each energized through a resistor from said rectifier, and wherein the capacitors are respectively connected by the switch contacts to the energizing circuit.

14. As an article of manufacture, a bending die for wire working apparatus, comprising:
(a) an elongate bifurcate member having spaced apart parallel leg portions connected at one set of adjacent ends by a bridging portion;
(b) a first shoulder at the free end of each leg portion;
(c) a second shoulder inwardly spaced from the free end of each leg; and
(d) an elongate groove in the outer side surface of each leg portion having one end opening in said second shoulder and extending axially of the leg portion towards said bridging portion.

15. As an article of manufacture, a bending die and cutter blade guide means for wire working apparatus, comprising:
(a) an elongate block of substantially rectangular configuration having an axial bore in lateral communication along one side with a radially projecting slot; and
(b) a plurality of spaced apart transversely extending slots at one end of the block for receiving therein reciprocable bending die means and cooperable reciprocable cutter blades.

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