

Aug. 2, 1966

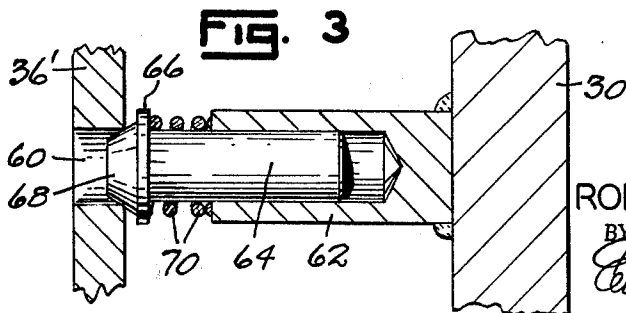
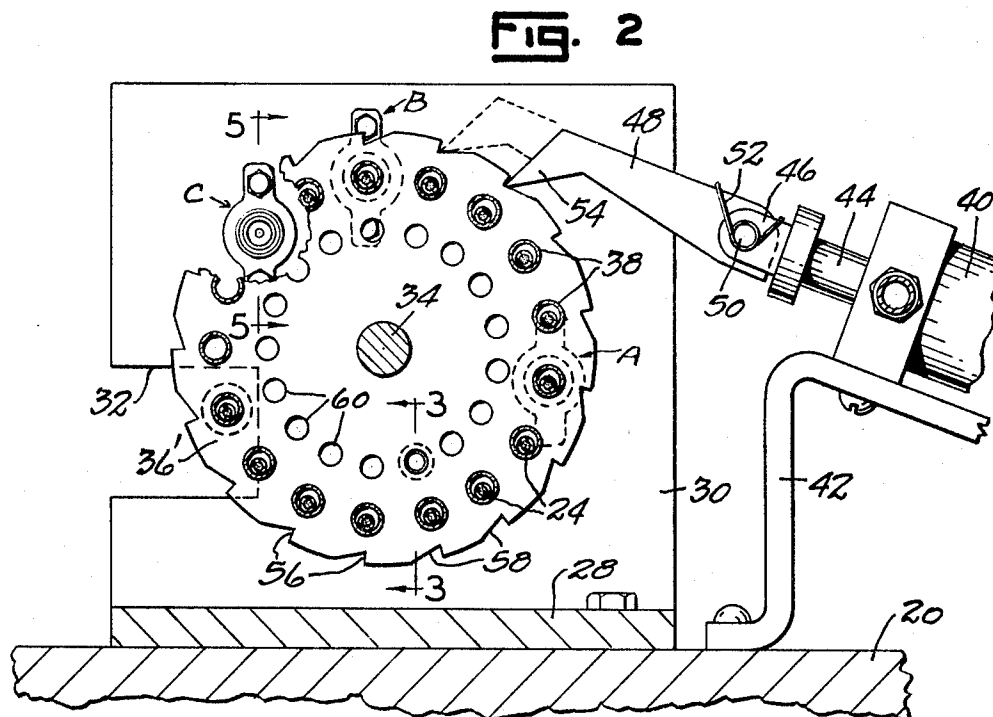
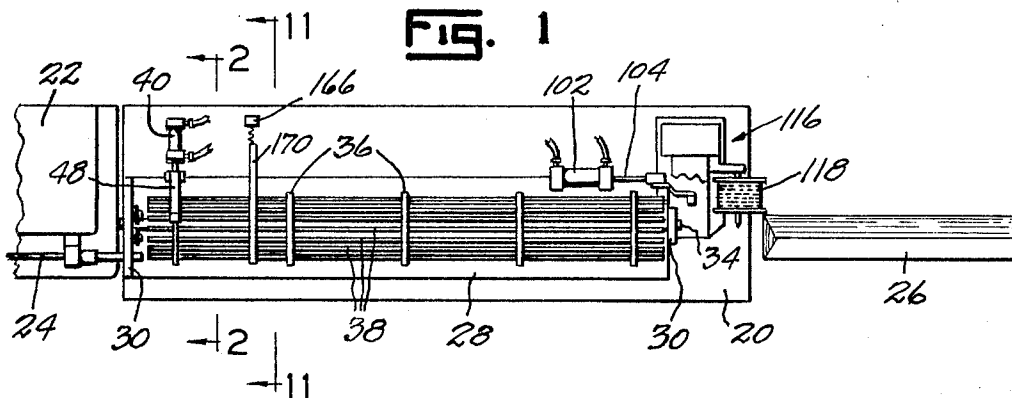
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3,263,316

AUTOMATIC TERMINAL APPLICATOR MECHANISM

Filed Dec. 28, 1964

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AUTOMATIC TERMINAL APPLICATOR MECHANISM

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FIG. 4

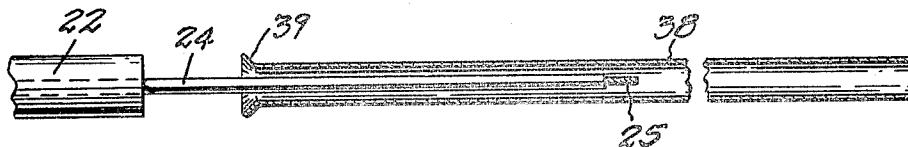


FIG. 5

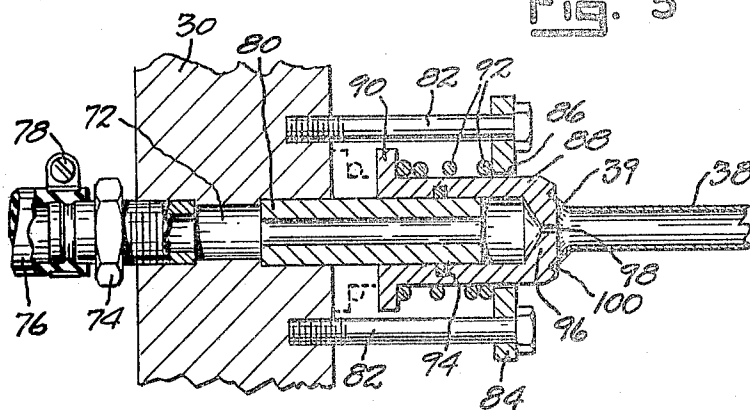
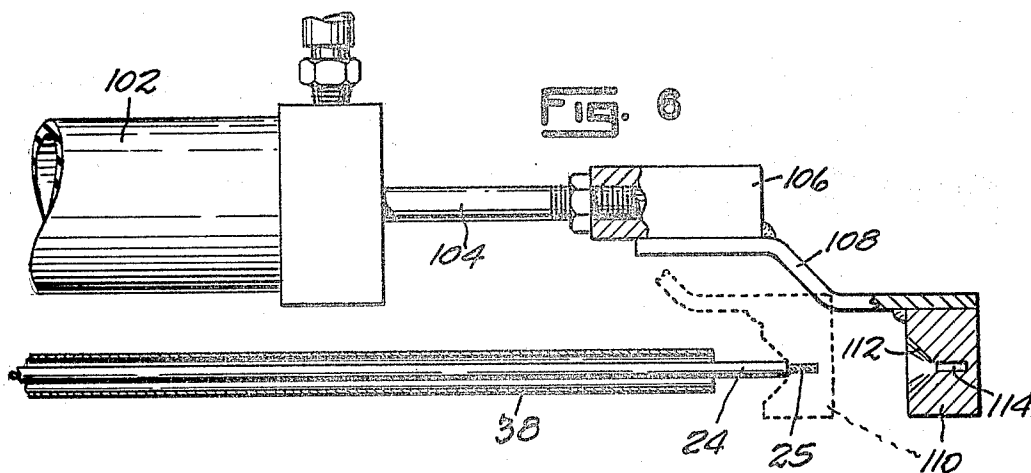


FIG. 6



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AUTOMATIC TERMINAL APPLICATOR MECHANISM

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FIG. 12

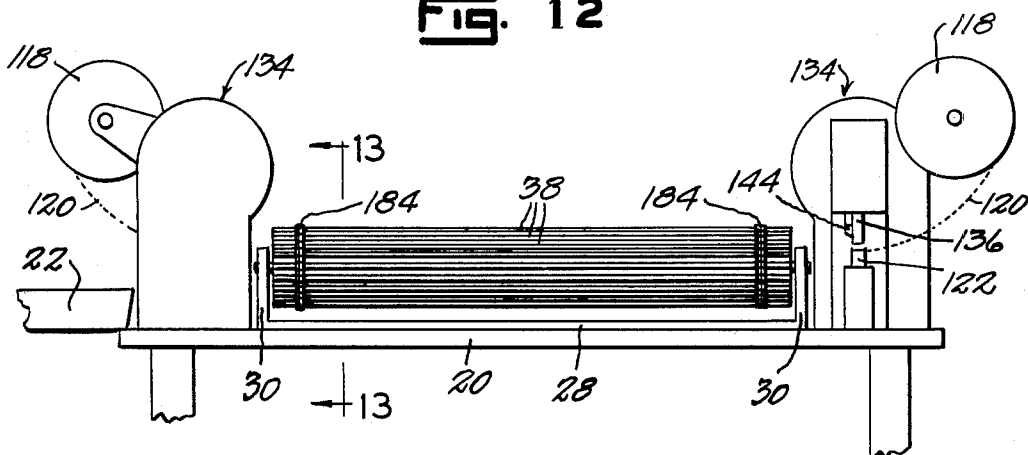
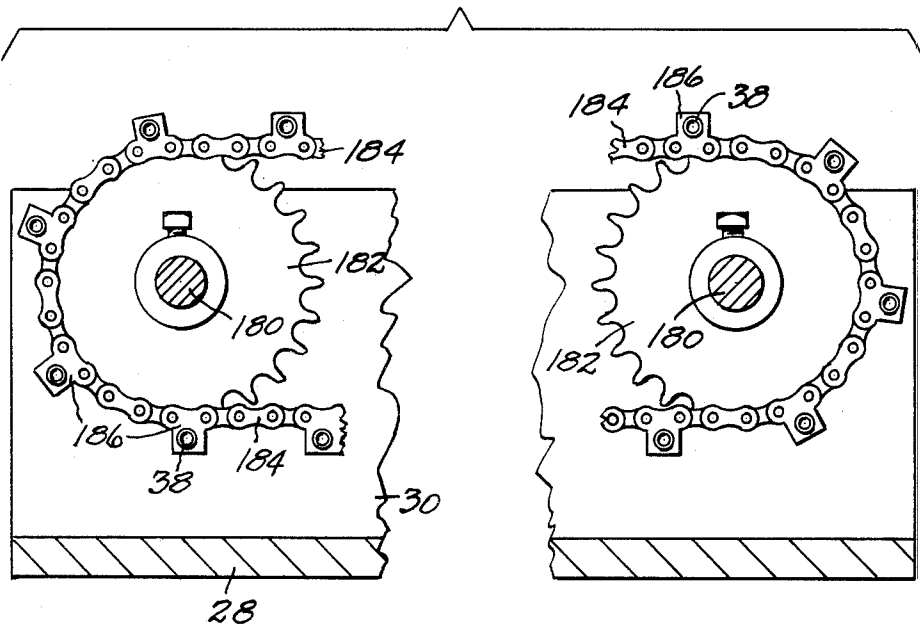


FIG. 13



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3,263,316 AUTOMATIC TERMINAL APPLICATOR MECHANISM

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16 Claims. (Cl. 29-203)

This invention relates to improvements in automatic terminal applicator mechanisms of the type in which electrical terminals are mounted on one or both ends of insulated electrical conductors or wires rapidly and accurately for the production of such terminal bearing electrical conductors at high production rates.

The electrical conductors are cut to length and the insulation may be stripped from one or both ends thereof prior to the application of the terminals. The present mechanism is designed particularly to deliver the conductor pieces successively to terminal applying means in an accurate manner for accurate application of a terminal to the end of the conductor, and thence to deliver the terminal bearing conductor to a delivery or collection station.

The primary object of this invention is to provide a novel device which successively receives individual insulated conductors from a device which has cut the same to length and which may have stripped insulation from one end thereof, and which device is operable to deliver the cut lengths of wire successively and accurately to a terminal applying station and thence to a discharge or delivery station.

A further object is to provide a novel feed mechanism wherein a plurality of substantially parallel open ended tubular members are advanced sidewise thereof step by step in a predetermined path successively past a receiving station, a terminal applying station and a discharge station, and wherein said members stop at each station to accommodate functioning of associated mechanisms at said station to act upon conductors received, carried by, or to be discharged from said tubular members.

A further object is to provide a novel wire feeding device having open ended wire-carrying tubes advanced laterally step by step to different stations, wherein novel means position the wires in the respective tubes with their end portions projecting from the tubes to predetermined extent so as to present them in operative relation to cooperating mechanism adapted to act upon said wires.

A further object is to provide a novel carrier mechanism having open ended wire-carrying tubes which are advanced laterally step by step and which pause at a selected station at which cooperating mechanism for acting on wire is juxtaposed to one end of the tube and at which pneumatic means is juxtaposed to the opposite end of the tube and is operative to advance the wire lengthwise in the tube by air pressure into operative relation to said cooperating mechanism.

Other objects will be apparent from the following specification.

In the drawings:

FIG. 1 is a top plan view illustrating one embodiment of the invention;

FIG. 2 is an enlarged fragmentary vertical transverse sectional view taken on line 2-2 of FIG. 1;

FIG. 3 is an enlarged detail sectional view taken on line 3-3 of FIG. 2;

FIG. 4 is a fragmentary view illustrating the delivery of a length of wire into one tube portion of the device;

FIG. 5 is an enlarged fragmentary detail sectional view of a part of the device located at one end thereof, as seen on line 5-5 of FIG. 2;

FIG. 6 is an enlarged fragmentary detail view with

parts shown in section and illustrating parts of the mechanism at the end of the device opposite that shown in FIG. 5;

FIG. 7 is a fragmentary detail sectional view of a part of the device and cooperating terminal applying means;

FIG. 8 is a view illustrating a wire having a terminal crimped thereon;

FIG. 9 is a view taken on line 9-9 of FIG. 7;

FIG. 10 is a sectional view taken on line 10-10 of FIG. 9;

FIG. 11 is a detail view taken on line 11-11 of FIG. 1;

FIG. 12 is a front elevational view of a modified embodiment of the invention;

FIG. 13 is an enlarged fragmentary vertical sectional view taken on line 13-13 of FIG. 12.

Referring to the drawings, and particularly to FIGS. 1 to 11 which illustrate one embodiment of the invention, the numeral 20 designates a table or other support which is juxtaposed to and positioned between a device 22 for cutting insulated wire 24 to lengths and for stripping insulation therefrom to a predetermined length at one or both ends of the severed lengths, and a collection receptacle 26. The wire cutting and stripping device may be of any suitable character and forms no part of this invention. It will be understood that means are included therein for advancing a wire length endwise as hereinafter described.

The support 20 mounts a frame having a base 28 and a pair of end members 30, which frame is suitably secured upon the support and is elongated and extends between the cutting device 22 and the collection receptacle 26. At least one frame end member has a notch 32 formed therein, as at the lefthand end as seen in FIG. 1, adapted to receive a wire length or member 24 from the cutting device, and a similar notch may be provided at the opposite or righthand end to permit discharge of a terminal-carrying conductor or wire into the receptacle 26. The frame end members 30 support and journal the opposite ends of an elongated shaft 34. At spaced intervals along the length thereof, the shaft 34 carries disks 36. Each disk has a circular series of apertures therein, said apertures being spaced equally from each other and from rod 34. An elongated tube 38 is mounted in each aperture of each disk, whereby said tubes extend parallel to each other and to the shaft 34. The tubes 38 are of equal length, with the ends thereof lying in a common plane transverse of the axis or rod 34. One end of each tube 38 adjacent to the wirecutting device 22 is preferably flared at 39, as best illustrated in FIG. 4. Each tube 38 has a bore or passage therethrough of uniform inner diameter substantially larger than the cross-sectional size of the insulated wire 24. The tubes 38 are of a length greater than the longest piece of wire to be handled by or passed through the device. The disks 36 and tubes 38 define a wire carrier.

Means are provided for rotating the carrier step by step, thereby advancing the tubes 38 laterally thereof. One such means is illustrated in FIGS. 1 and 2 and constitutes a double acting fluid pressure cylinder 40 which is mounted adjacent one of the disks 36 in selected relation thereto as by means of a supporting bracket 42. The fluid pressure cylinder has a piston therein (not shown) with which is connected a plunger 44 projecting therefrom at one end and mounting a yoke or clevis 46. A pawl 48 is pivoted at one end at 50 to the yoke 46, and a spring 52 preferably encircles the pivot 50 and bears at its opposite ends upon the yoke 46 and the pawl 48 to urge the pawl in one direction, for example, counterclockwise as viewed in FIG. 2. The pawl preferably has a pawl finger 54 at the end thereof which is engageable

with the peripheral edge of a disk 36'. The disk 36' has a plurality of circumferentially equally spaced notches 56 formed therein to define teeth. Each of the notches 56 preferably has a substantially V shape with one surface thereof extending substantially radially of the disk, and the other surface thereof 58 being beveled to define a cam surface in counter-rotational direction.

The pawl actuating member has a stroke of predetermined length whereby it is operative to advance the disk 36' through an arc or angle equal to the angular displacement of the adjacent tubes 38. Thus a complete revolution of the device requires a number of successive operations equal to the number of tubes 38 in the device.

Any suitable means may be provided to maintain the carrier in selected rotative position after each actuation of the advancing means 40. One such means is illustrated in FIGS. 2 and 3 wherein a second circular series of apertures 60 is formed in one of the disks 36, such as the disk 36'. The apertures 60 are equal in number to the number of tubes 38 and are spaced apart from each other equally and are also equally spaced from the shaft 34. One frame end member 30 carries a guide tube 62 extending in the direction of the disk with the apertures 60. A pin 64 is slidable in the guide tube 62 and has a circumferential enlargement 66 adjacent its outer end from which projects a frusto conical tip 68 adapted to seat in an aperture 60 registering therewith and normally urged to seated position by a coil spring 70 encircling the pin 64 and bearing at its opposite ends against the end of the guide tube and against the circumferential enlargement 66. The taper of conical pin tip 68 is such as to provide a cam action releasing or withdrawing the pin from the aperture 60 upon advance of the pawl 48 from full line position toward dotted line position as seen in FIG. 2, for the purpose of rotating the carrier. The spring pressure 70 is sufficient to retard rotation of the carrier beyond that angular displacement or movement desired upon each actuation of the advancing means 40. In other words, free spinning rotation of the of the carrier is prevented and the spring 70 presses the conical tip 68 into an aperture 60 whenever the end of the stroke of the actuator 40 is approached, thereby positively registering the carrier at each step thereof and holding the carrier in that registered position as the pawl 48 is shifted from the dotted line to the full line position in FIG. 2 preparatory to the successive actuation thereof by the actuator 40.

At a plurality of positions thereof, such as positions A, B and C illustrated in FIG. 2, one of the frame end members 30 carries pneumatic means for advancing a length of the insulated wire 24 within a tube. Each of the positions A, B and C registers with one of the rest positions of the tubes 38. One form of the pneumatic wire-positioning means is illustrated in FIG. 5. An aperture 72 is formed in member 30 in axial alignment with one of the rest positions of the tubes 38. A fitting 74 is mounted in the aperture 72 and the end of an air hose or air line 76 is connected to the outer end of the fitting 74 by means of a clamp 78. A tubular member 80 is carried by the frame end member 30 to project therefrom in the direction of the carrier but terminates spaced from tubes 38 and in axial alignment with a rest position thereof. Two or more bolts 82 are anchored to the member 30 spaced from the tube 80. Bolts 82 mount a plate 84 spaced from the frame end member 30 and adjacent to but spaced from the flared end portions 39 of the tubes 38. Plate 84 has a central aperture 86 within which is slidable the tubular portion 88 of a nozzle on jet member which has a bore providing a snug sliding fit on the tubular member 80. At one end the jet member has a flange 90, and a coil spring 92 encircles the tubular nozzle part 88 with one end thereof bearing against the flange 90 and the opposite end bearing against the plate 84. The spring 92 normally tends to urge the nozzle to the dotted line position shown in FIG. 5 at which the flange 90 abuts the frame end member 30. If desired, an annular resilient sealing member 94, such as an O-ring, may provide a seal

between the tube members 80 and 88. The nozzle member has an outer end wall 96 which is provided with a substantially central reduced jet orifice 98 whose cross-sectional dimension is smaller than the cross-sectional dimension of the bore of the tube 80. At its outer face the outer nozzle end wall 96 has an annular groove 100 of V-shape in cross-section defined in part by a frusto conical wall adapted to mate with the flared end 39 of a tube 38, as seen in FIG. 5.

The arrangement of the parts is such that the outer wall 96 of the nozzle is normally retracted to a position clear of the flared tube ends 39 by the coil spring 92, so as to avoid interference by the nozzle with the lateral advancing movement of the tube ends 39 by the advancing means 40. When the advancing means has completed one step of its operation and a valve (not shown) is open to permit flow of compressed air in air hose 76, a blast of air passes through the fitting 74, bore 72 and tube 80, into the tubular part 88 of the nozzle to act against the nozzle end wall 96. The force of the air pressure acting on the wall 96, coupled with the restriction of the orifice 98 of the nozzle, applies sufficient force upon the nozzle to overcome the action of the spring 92 and to advance the nozzle into engagement with the flared end 39 of the tube at the groove 100 thereof. This provides a substantially sealed joint between the nozzle and the abutted tube 38 whereby air under pressure is discharged into that tube. The air blast in the tube will be of sufficient force to move or displace endwise in the tube a piece of insulated wire 24 contained therein, so as to move the wire toward the opposite end of the tube.

In axial alignment with one of the stations at which nozzles are mounted, as at the station A, there is located positioning means for positioning a length of wire 24 within the tube 38 at that station so as to project beyond the end of the tube to a predetermined extent. This wire-positioning means preferably includes a double-acting fluid pressure member 102 consisting of a cylinder having a piston (not shown) therein, from which projects a piston rod 104. The fluid pressure member 102 is preferably positioned parallel to and alongside the carrier, as illustrated in FIG. 1. At its outer end the piston rod 104 mounts a part 106 including a laterally offset bracket 108 which, in turn, carries a stop member 110 confronting and spaced from the end of the tube 38 while the latter is at its rest position cooperating with the air supply means, as illustrated in FIG. 5, at station A. The stop member has a tapered recess 112 and a central deep recess 114 which is of a diameter to freely receive and position the bared end part 25 of a piece of insulated wire 24. The fluid pressure member 102 has a stroke greater than the combined depths of the recesses 112 and 114 and is so positioned that it shifts between an inner stop position, as illustrated in dotted lines in FIG. 6, and an outer release position as shown in full lines in FIG. 6. The operation of the fluid pressure member 102 and of the valve which controls the supply of compressed air through the air hose 76, will be correlated by suitable means (not shown) so that the member 102 will position the stop 110 in the dotted line position shown in FIG. 6, while air is being supplied through the hose 76 and nozzle 88 into the tube 38 for the purpose of shifting endwise the piece of insulated wire 24 which is in that tube. Thus the leading end of the wire will pass out of the tube 38 and into the recesses 112, 114 to assume the position shown in FIG. 6, as determined by the dotted line position of the stop member 110. When the supply of air to the air hose 76 is cut off, the fluid pressure member 102 will be actuated to shift it to the full line position shown in FIG. 6 at which it will be clear of the wire member so that subsequent advance of the carrier will carry the wire laterally with a predetermined part thereof projecting from one end of the tube, as seen in FIG. 6. It will be understood that the use of the wire-positioning means

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at station A, including the mechanism just described, is optional and may be eliminated if desired.

At another station displaced from station A in rotational direction, as at station B, there is located terminal applying means at the end of the carrier opposite that at which the air supply and nozzle means at station B is located. The terminal applying means may take any form found suitable and may include the usual reel 118 upon which is wound an elongated strip of terminal members 120 which are connected end to end and which have associated with them means (not shown) for advancing the strip step by step to an anvil 122. One form of terminal is illustrated in FIG. 8 wherein a metal plate portion 124 has a pair of marginal intumed flanges 26 at its opposite sides extending for a portion of the length thereof. At its opposite end the terminal has insulation anchoring flanges 128 adapted to be clinched upon the insulation of a wire 24 adjacent to bared part 25. Intermediate the flanges 126 and 128 the terminal has flanges 130 which are clinched upon the bared end 25 of the wire to effect good electrical contact therewith. Each individual terminal is formed by severing from the strip of terminal members one section thereof consisting of the parts 124, 126, 128 and 130, as by the use of knife blade 132 co-operating with the anvil 122 to produce a shearing action, in the manner well understood in the art.

Spaced from the anvil 122 in its inoperative position is terminal clinching means 134 which may be of any suitable character. The terminal clinching means may constitute a press having a movable head member 136 which shifts toward and from the anvil 122. Head member 136 has a slot 138 at its bottom which may be of the configuration illustrated in FIG. 9, having a restricted portion and tapered mouth portion 140. The head 136 is normally positioned opposite the tube 38 at the terminal applying station B, so that a wire ejected endwise from that tube toward the right as viewed in FIG. 7, as from the initial partly projected position which has previously been determined by the stop 110, will cause the bared end of the wire to enter the slot 138. In order to facilitate entry to the wire into the slot in the event there is any disalignment of the tube 38 relative to the slot 138, the movable head 136 may carry a guide 142 having a wire deflecting surface 144, which converges toward the slot 138. The slot 138 of the movable head 136 preferably has a narrow portion 146 adapted to register with and to receive the bared end 25 of the wire and a wider slot portion 148 adapted to receive a part of the insulation of the wire 24 as illustrated in FIGS. 7 and 10. When the head 136 moves toward anvil 122, the slot portion 146 is adapted to contact, deflect and clinch the intermediate flanges 130 of the terminal and the slot portion 148 is adapted to contact, deflect and clinch the insulation anchoring flanges 128 of the terminal. It will be understood that this clinching mechanism and the shape of the clinching parts is conventional and that any type of clinching head desired may be utilized.

A control for actuating the terminal clinching means may be provided having a part juxtaposed to the terminal clinching means at the movable head 136 thereof in its inoperative position. As here shown a plate 150 may be secured to a frame member 152 to extend alongside and outwardly of the movable head 136. Plate 150 has an aperture 154 therein which registers with the tube 38 and the notch 138 of the clinching device in the rest or inoperative position of the latter. A trip member or lever 156 is pivoted to plate 150 at 158 and has an end portion 160 thereof which normally projects into the opening 154. A micro switch 162 is carried by the frame member 152 and has an actuator portion 164 engaged by the lever 156.

The operation of the device to effect the terminal clinching operation at station B is substantially as follows: When a tube 38 reaches station B while containing a conductor 24 projecting slightly therefrom, any suitable means (not shown) for controlling the cycling of the device and

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timing the operation of the parts will act to eject a blast of air through the tube 38, as previously described, to cause endwise movement of the conductor 24 in said tube toward the right as viewed in FIG. 7. Prior to this operation it will be understood that the terminal applying means 116 will have been actuated to cause a terminal 120 to be advanced onto a position on the anvil 122. As the conductor 24 is projected or moved or advanced in the tube 38 by the air blast, the bared end portion 25 thereof enters the slot 138 of the clinching machine and contacts the end 160 of the lever 156 and pivots the same to operate the actuator 164 of the microswitch 162. Operation of the microswitch 162 actuates control means (not shown) for operating the press to advance the movable head 136 and carry the free or exposed end of the conductor 24 to the dotted line position shown in FIG. 7. The advancing movement of the movable head 136 serves to clinch the flanges 128 of the terminal upon the insulation of the wire 24 and to clinch the flanges 130 of the terminal in electrical contact with the bared wire portion 25 of the conductor, as illustrated in FIG. 8. The operation of the severing blade 132 may also be controlled in predetermined timed relation by actuating means therefor controlled by or in predetermined correlation to the actuation of the microswitch 162. Upon the next rotative step advance of the carrier, the lateral movement of the tube 38 carrying the conductor to which a terminal has just been applied, will move the terminal and its mounting conductor to a position clear of the anvil 122 after the clinching press has been restored to its inoperative position with its head 136 clear of the anvil.

The nozzle 88 at station C, which is located in selected position between the station B and the wire feeding notch 32, is operative to eject the terminal-mounting wire member from the tube and into the collection receptacle 26. Thus the tube will be empty and ready to receive another conductor by the time it reaches the feeding station, as at the notch 32 in FIG. 2.

It will be understood that while the indexing means for the carrier, as illustrated in FIG. 3, is preferred, other means may be provided to prevent overtravel or excessive rotative advance of the carrier, either alone or in conjunction with the registering means illustrated in FIG. 3. One such means is illustrated in FIG. 11, wherein a part 166 of the frame of the device has anchored thereto at 168 an elongated flexible band or strap 170 which passes around and engages a number of the tubes 38 and has connection at its free end with a coil spring 172 connected to the frame part 166. It will be apparent that the strap 170 serves to prevent free rotation of the carrier, so that it serves as a brake to prevent overtravel or free spinning of the carrier.

It will be apparent that one of the important advantages of this construction is that the device automatically adjusts itself to the work pieces and will function properly without change or adjustment thereof for work pieces of different types and of different lengths. Thus the only setting which is required occurs at the device 22 for cutting the wire. Once a length of wire, regardless of its dimension, has been delivered into a tube 38, positioning of the end of the wire relative to the clinching means and its subsequent discharge into the collection receptacle 26 occurs automatically.

It will also be understood that while the device has been illustrated and described as serving to apply a terminal to one end only of a length of wire, the device is readily adapted for automatic application of a terminal to both ends of the wire. This is accomplished by providing positioning means and clinching means at both ends of the carrier at such positions that the mounting of terminal on one end of the wire will be accomplished during a predetermined partial rotation of the carrier, and the application of the terminal to the opposite end of the wire will be accomplished before the carrier completes its rotation. In this connection it is interesting to observe that the air blast advance of the work pieces within the

tubes is effectively accomplished in cases where the wire member carries a terminal as well as in those cases in which a plain end of a wire is exposed to the blast. The only requirement of the device are that the tubes 38 be of a diameter to receive terminals 120 freely and slidably, and that means be provided to push a terminal-mounting end of a wire back into its tube after the first terminal is applied. The last named means may be similar to that illustrated in FIG. 6, but operating reversely for the purpose of moving a terminal bearing conductor end portion into a tube. In this connection it will be apparent that this function requires travel of a member similar to member 102 between a position clear of the end of a terminal bearing wire and a position adjacent to the end of the tube into which the terminal bearing conductor is to be reinserted.

A modified embodiment of the invention adapted to apply terminals to opposite ends of an insulated conductor is illustrated in FIGS. 12 and 13, wherein parts similar to parts previously described have the same reference numerals and wherein the compressed air nozzles have been omitted, for purposes of clarity. In this construction the elongated frame has its base 28 mounted upon the table or support 20 and has elongated frame end members 30 in which are journaled a pair of spaced shafts 180. Each shaft 180 carries a pair of sprockets 182, each of which is substantially coplanar with or aligned with a sprocket upon the other shaft. A chain 184 is trained around each aligned pair of sprockets 182 and each chain mounts at predetermined spaced intervals thereon clip or bracket means 186. Each clip or bracket 186 mounts one end of an open ended tube 38, as previously described. Any suitable means for advancing the chain and sprocket tube carrier step by step may be provided, in the manner well understood in the art, and such means (not shown) may have associated therewith means for effecting accurate control of the stop positions of the tubes. Thus means for advancing the tubes by successive rotation of the sprockets 182 through a selected angle which are similar to the means 40-50 illustrated in FIG. 2, may be employed, together with means, such as illustrated in FIG. 3, for effecting register of the movable parts. It will be understood that the cooperating means, such as the means 22 for cutting and stripping a wire and delivering it to the mechanism, the compressed air nozzle means 88, the wire-positioning means illustrated in FIG. 6, and the terminal feeding and clinching means as illustrated in FIGS. 7, 9 and 10, will all be positioned in selected relation and location relative to the frame 28 so that each will register with a stop position of each of the tubes 38 carried by the chains 184.

It will be apparent from the foregoing description that this device is particularly well suited for pneumatically positioning and then discharging lengths of wire of different types and dimensions relative to terminal feeding and clinching means, and for discharging the wire after terminals have been applied thereto. Thus no adjustment is required for use with different types and sizes of work pieces. Also the device is compact, is readily installed and located relative to other devices, such as wire-cutting and stripping devices, terminal feeding and clinching devices, and collection receptacles. Also, the control of the sequence of operations of the device is readily effected through the operation of control means serving to cycle the device and the associated wire-cutting and stripping devices, the wire positioning devices and the terminal feeding and crimping devices so that fully automatic operation may be achieved. Thus it will be apparent that a control circuit for the successive operation of switches, solenoids and solenoid-operated valves, under the control of suitable timing means (not shown) will accomplish automatic operation of the device. Such automatic control and cycling means are well understood in the art and in and of themselves constitute no part of this invention and hence are not disclosed.

While the preferred embodiments of the invention have been illustrated and described, it will be understood that changes in construction may be made within the scope of the appended claims without departing from the spirit of the invention.

I claim:

1. A device for applying an electrical terminal member to an electrical conductor, comprising a carrier having a plurality of spaced elongated open ended conductor receiving tubes, means for advancing said carrier step by step to move said tubes laterally in a predetermined endless path to and from a plurality of stations, each tube stopping at each station, terminal clinching means located at one station adjacent one end of a tube stopped at said station, and pneumatic means located at said station adjacent the opposite end of a tube stopped at said station and operative to direct a charge of compressed air into said tube to advance a conductor endwise in said tube to feed said conductor to said terminal clinching means.

2. A device for applying an electrical terminal member to the bared end of an insulated wire, comprising a carrier having a plurality of spaced elongated open ended tubes each adapted to carry a conductor, means for advancing said carrier step by step to move said tubes in a predetermined endless path to and from a plurality of stations, means at one station for discharging a blast of air into a tube stopped at said station and containing a conductor to move said conductor endwise in said tube, and terminal clinching means at said station adjacent the air discharge end of the tube stopped at said station and positioned to receive the bared end of said conductor in operative relation for clinching of a terminal thereon.

3. A device for applying an electrical terminal to the end portion of an electrical conductor, comprising a carrier having a plurality of spaced open ended tubes each adapted to receive a conductor loosely therein, means for advancing said carrier step by step in a predetermined endless path to and from a plurality of stations, said stations including a conductor receiving station, a terminal applying station and a discharge station, means at said terminal applying station and at said discharge station for directing a blast of air into a tube to shift endwise the conductors in the respective tubes at said stations, and a terminal applying means at said terminal applying station receiving a blast-advanced conductor in operative position thereon.

4. In a device applying an electrical terminal to the end portion of an electrical conductor, a carrier having an open ended tube adapted to receive a conductor loosely therein, means for advancing said tube in a predetermined path to and from a terminal applying station, a nozzle at said station and normally spring urged to a position clear of the ends of said tubes and shiftable by air pressure into end engagement with a tube at said station to discharge a blast of air into said tube, and a terminal applying device at said station spaced from and substantially aligned with the opposite end of said tube to receive the leading end portion of said conductor as it is moved in said tube by said air blast.

5. In a device for applying an electrical terminal to the end portion of an electrical conductor, a carrier having an open ended tube adapted to receive a conductor loosely therein, means for advancing said tube in a predetermined path to and from a station, and an air blast discharge means at said station having a stationary air outlet part spaced from and substantially aligned with a tube at said station and a nozzle part slidable on said stationary outlet part between a spring urged retracted position clear of said tube and an air pressure advanced position engaging and discharging air into the end of said tube for moving a conductor endwise in said tube.

6. In a device applying an electrical terminal to the end portion of an electrical conductor, a carrier having an open ended tube adapted to receive a conductor loosely therein, means for advancing said tube in a predetermined

path to and from a station, and an air blast discharge means at said station having stationary and movable telescopically interfitted parts and spring means normally positioning said movable part clear of the path of said tube, said movable part having a restricted discharge orifice whereby air under pressure therein advances said movable part into end engagement with a tube located at said station.

7. A device as defined in claim 6, wherein said movable part has an annular groove receiving the tube.

8. A device as defined in claim 6, wherein the end of said tube confronting said air blast discharge means is flared and said movable part has an annular groove with a conical surface complementary to said flared tube end.

9. A device for applying an electrical terminal to the end portion of an electrical conductor, comprising a carrier having a plurality of spaced open ended tubes each adapted to receive a conductor loosely therein, means for advancing said carrier step by step in a predetermined endless path to and from a conductor positioning station, means at said station for discharging a blast of air into a tube at said station to move a conductor in said tube endwise, and stop means located at said conductor positioning station adjacent to the air discharge end of said tube for limiting endwise movement of said conductor in predetermined relation partially projecting from said tube, said stop means being shiftable parallel to said tube between operative and retracted positions.

10. A device for applying an electrical terminal member to the bared end of an insulated wire, comprising a carrier having a plurality of spaced elongated open ended tubes each adapted to carry a conductor, means for advancing said carrier step by step to move said tubes in a predetermined endless path to and from a conductor positioning station, stop means at said station shiftable parallel to said tubes between a stop position and a retracted position, said stop means including a member confronting one end of a tube stopped at said station and having a recess with a tapered mouth to receive said bared conductor end, and means for discharging a blast of air into the other end of said tube at said station to advance a conductor endwise therein and against said stop means.

11. A carrier for delivering an electrical conductor of selected length from a cutting device to a terminal applying device comprising a plurality of open ended conductor receiving tubes, rotatable means mounting said tubes in predetermined spaced relation in a circular set substantially concentric with said mounting means, said mounting means including a peripherally notched rotor, and carrier advancing means including a reciprocating pawl having a selected stroke and engaging successive rotor notches on successive strokes.

12. A carrier for delivering an electrical conductor of selected length from a cutting device to a terminal applying device comprising a plurality of open ended conductor receiving tubes, rotatable means mounting said tubes in predetermined spaced relation in a circular set substantially concentric with said mounting means, said mounting means including a peripherally notched rotor, and carrier advancing means including a reciprocating pawl having a selected stroke and engaging successive rotor notches on successive strokes, said rotor having a circular series of recesses, and spring urged means yieldingly seated in one of said recesses at the end of each stroke of said carrier advancing means.

13. A carrier for delivering an electrical conductor of selected length from a cutting device to a terminal applying device comprising a plurality of open ended conductor

receiving tubes, rotatable means mounting said tubes in predetermined spaced relation in a circular set substantially concentric with said mounting means, said mounting means including a peripherally notched rotor, and carrier advancing means including a reciprocating pawl having a selected stroke and engaging successive rotor notches on successive strokes, and means for resisting free rotation of said carrier and including a flexible band frictionally engaging said carrier and spring urged thereagainst.

14. A carrier for delivering an electrical conductor of selected length from a cutting device to a terminal applying device comprising a plurality of open ended conductor receiving tubes, rotatable means mounting said tubes in predetermined spaced relation in a circular set substantially concentric with said mounting means, said mounting means including a peripherally notched rotor, and carrier advancing means including a reciprocating pawl having a selected stroke and engaging successive rotor notches on successive strokes, one of said tubes registering with said terminal applying device between successive strokes of said advancing means, and means for directing an air blast through said last named tube to advance a conductor therein into operative relation to said terminal applying device.

15. A carrier for delivering an electrical conductor of selected length from a cutting device to a terminal applying device, comprising a plurality of open ended conductor carrying tubes, means mounting said tubes in spaced parallel relation, means for advancing said tube mounting means step by step in a predetermined path to and from a plurality of stations including stations registering with said cutting device and with said terminal applying device respectively, and means at said terminal applying station for directing a blast of air through a tube to advance a conductor therein and feed its end portion to said terminal applying device.

16. A carrier for delivering an electrical conductor of selected length from a cutting device to a terminal applying device, comprising a plurality of open ended conductor carrying tubes, means mounting said tubes in spaced parallel relation, means for advancing said tube mounting means step by step in a predetermined path to and from a plurality of stations including stations registering with said cutting device and with said terminal applying device respectively, and means at said terminal applying station for directing a blast of air through a tube to advance a conductor therein and feed its end portion to said terminal device, said terminal applying device including a guide portion to receive the leading end of said conductor, and a control switch for said terminal applying means having an actuator activated by entry of the conductor into said guide portion and serving to stop advance of said conductor by said air blast.

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