

Jan. 6, 1931.

K. H. ANDRÉN ET AL

1,787,658

CUTTING AND STRIPPING MACHINE

Filed Dec. 27, 1927

6 Sheets-Sheet 1

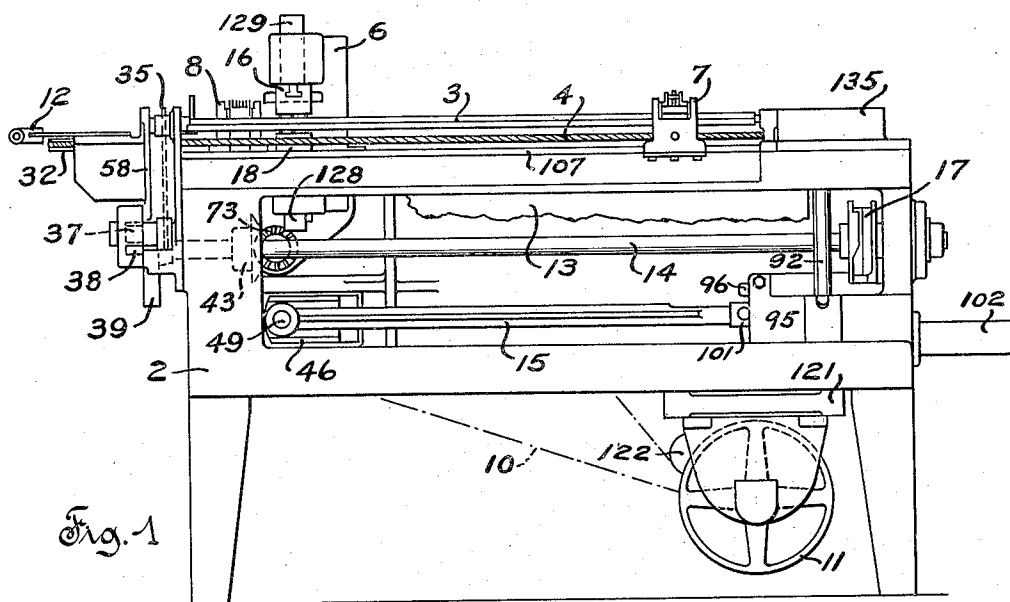


Fig. 1

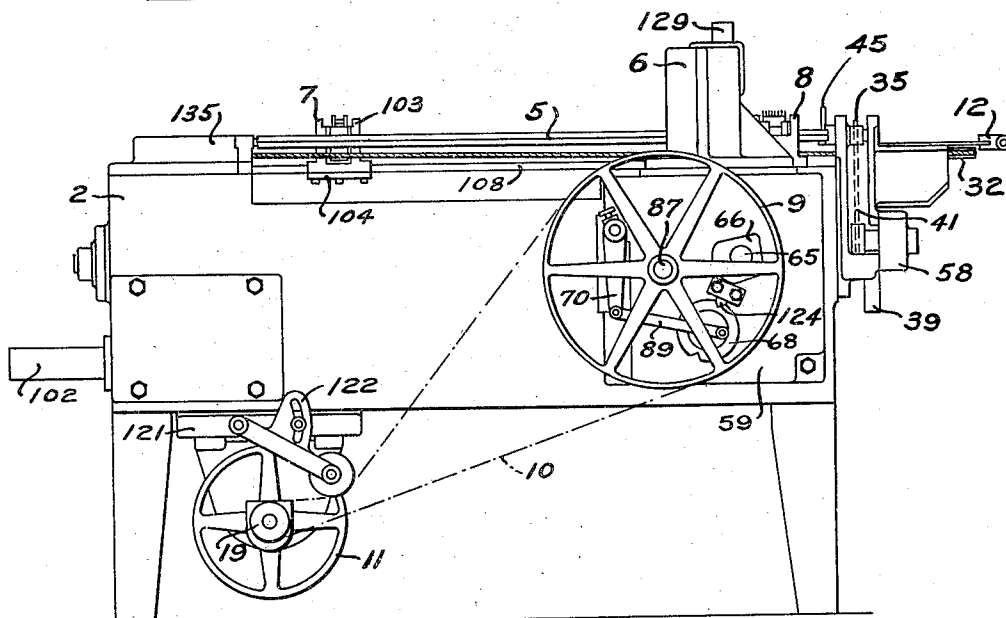


Fig. 2

Inventors
H. J. Olsen
K. H. Andrén

by W. H. Lieber
Attorney

Jan. 6, 1931.

K. H. ANDREN ET AL

1,787,658

CUTTING AND STRIPPING MACHINE

Filed Dec. 27, 1927

6 Sheets-Sheet 2

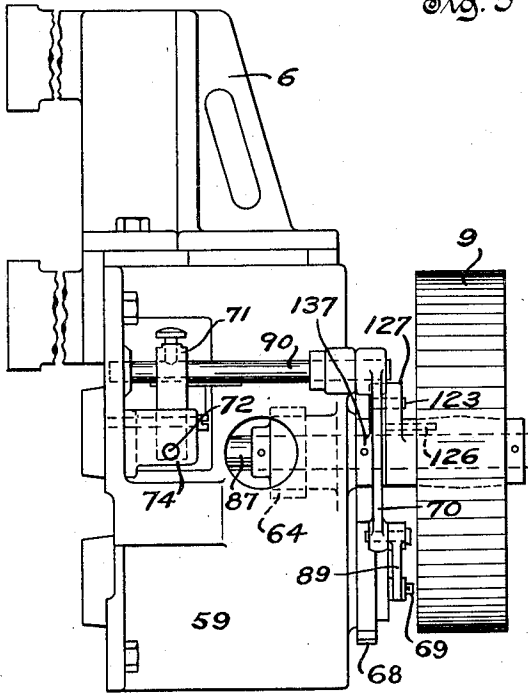
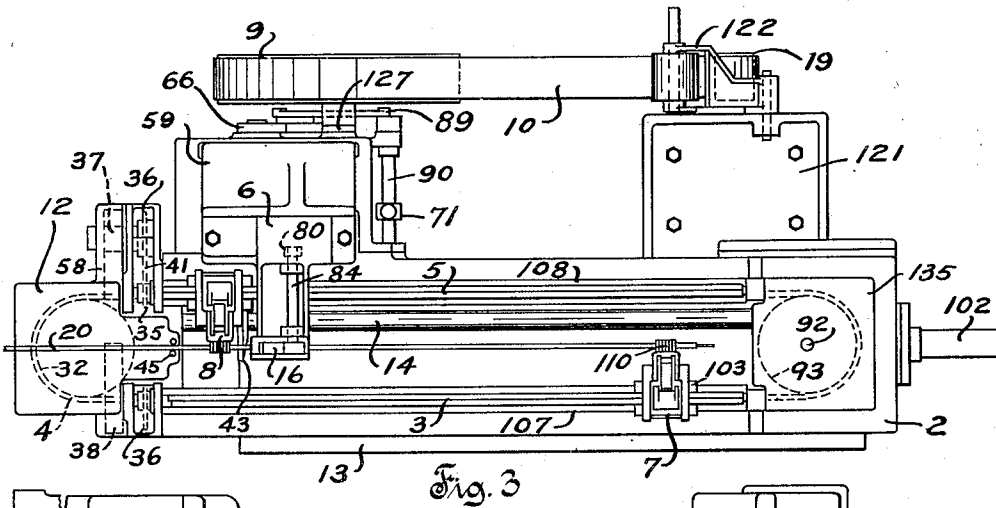
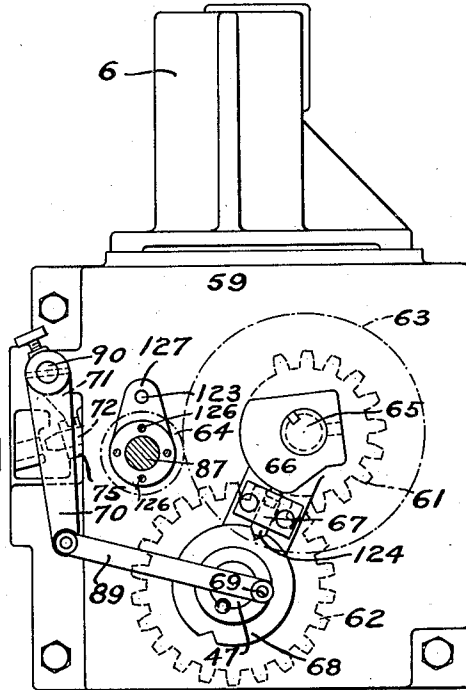


Fig. 4



Jan. 6, 1931.

K. H. ANDRÉN ET AL

1,787,658

CUTTING AND STRIPPING MACHINE

Filed Dec. 27, 1927

6 Sheets-Sheet 3

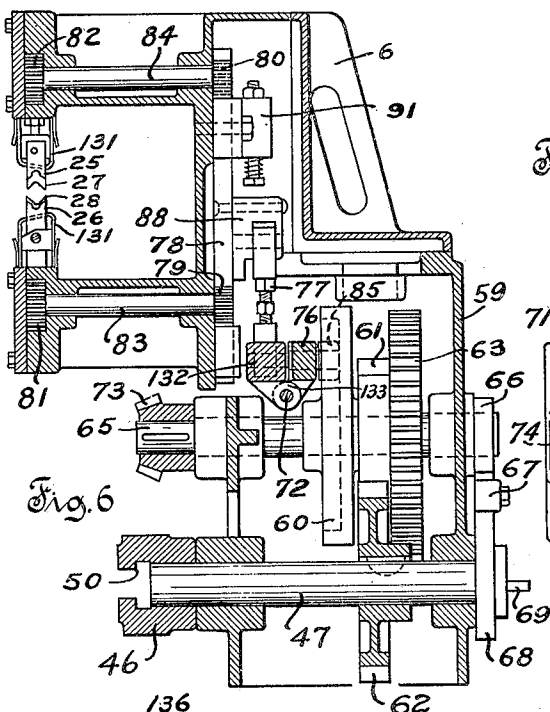


Fig. 6

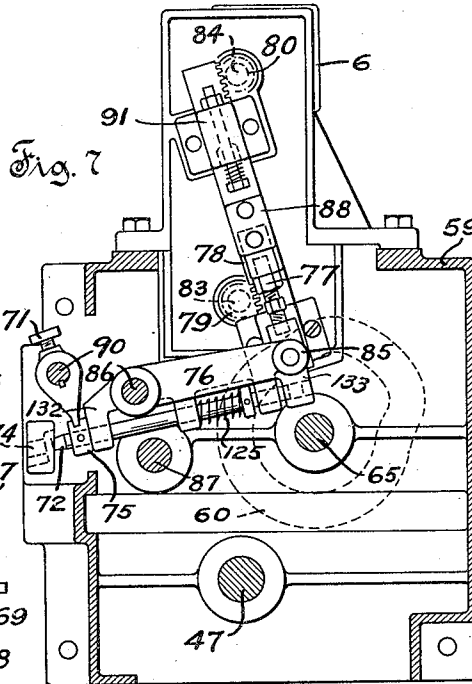


Fig. 7

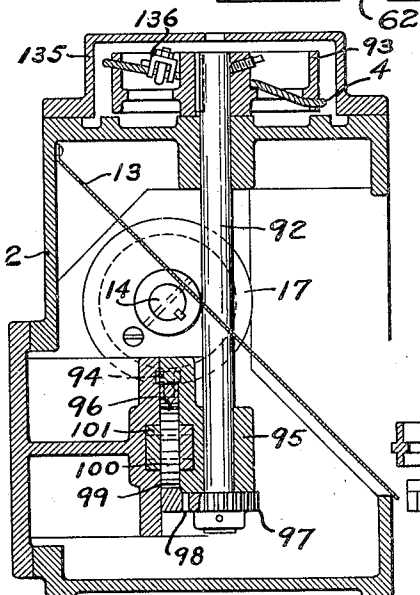


Fig. 8

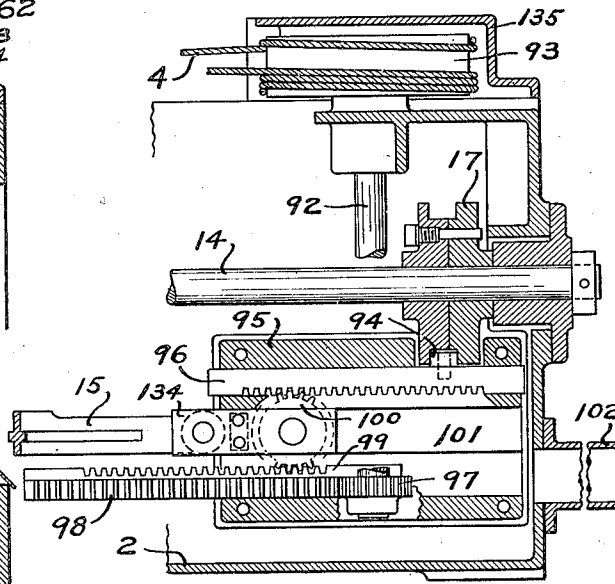


Fig. 9

Inventors
H. T. Olsen
K. H. Andrén
by W. H. Lieber
Attorneys

Jan. 6, 1931.

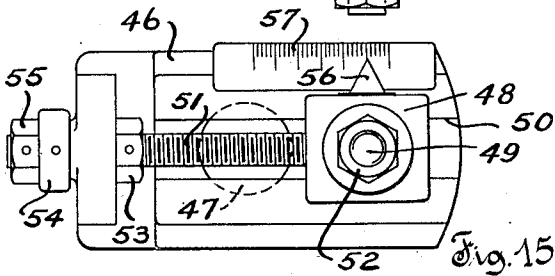
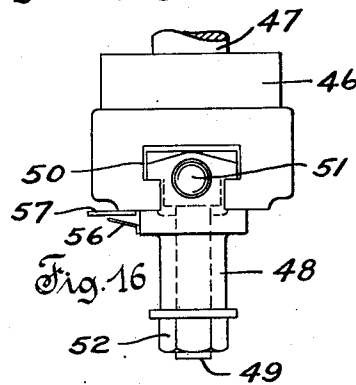
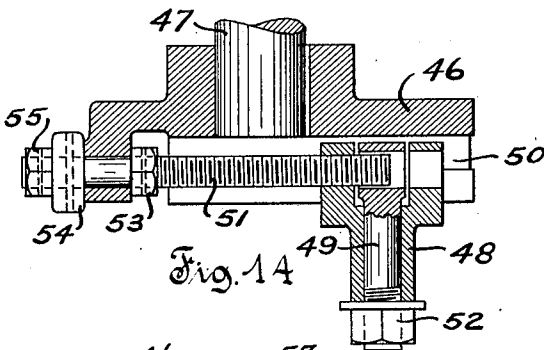
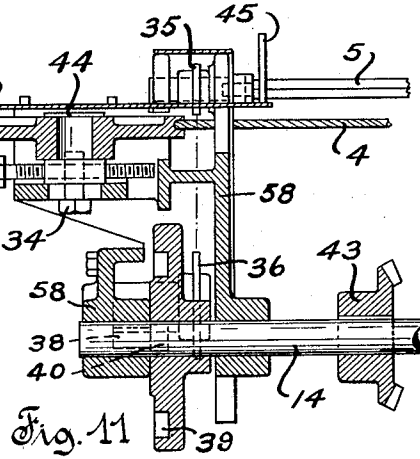
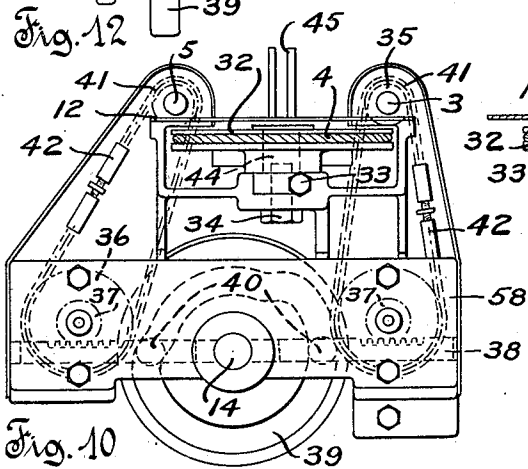
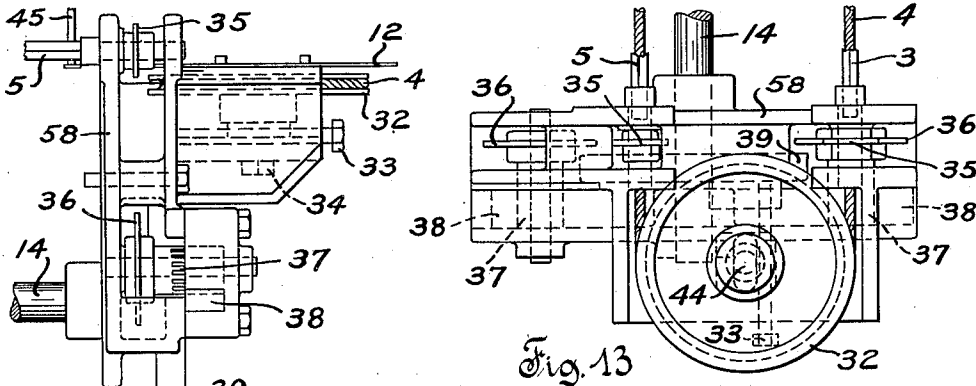
K. H. ANDREN ET AL

1,787,658

CUTTING AND STRIPPING MACHINE

Filed Dec. 27, 1927

6 Sheets-Sheet 4



Inventors
H. J. Olsen
K. H. Andren
by W. H. Lieber
Attorney

Jan. 6, 1931.

K. H. ANDREN ET AL

1,787,658

CUTTING AND STRIPPING MACHINE

Filed Dec. 27, 1927

6 Sheets-Sheet 5

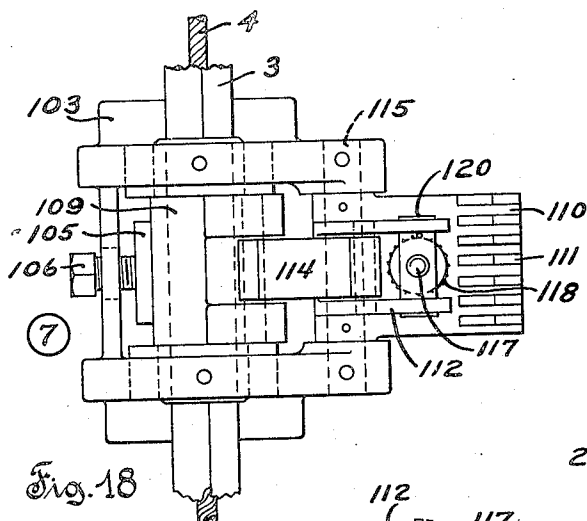


Fig. 18

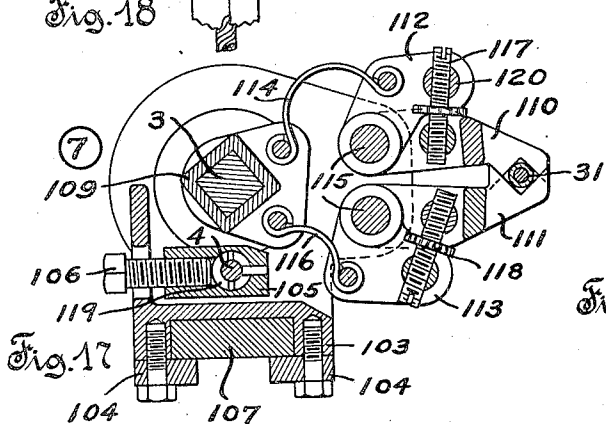


Fig. 17

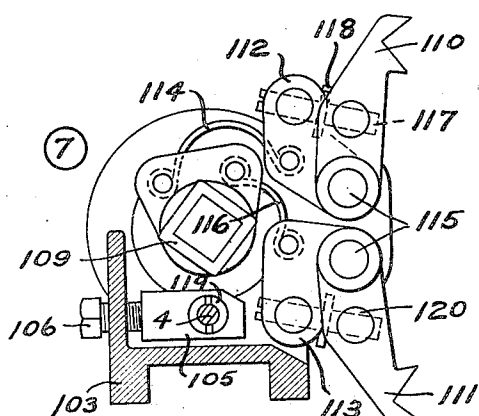


Fig. 19

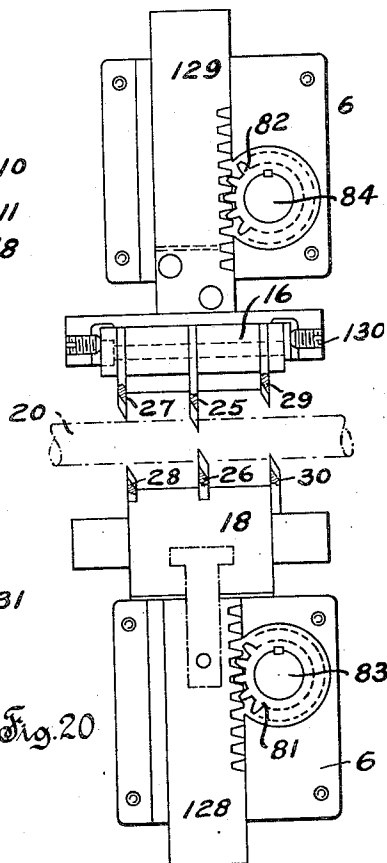


Fig. 20

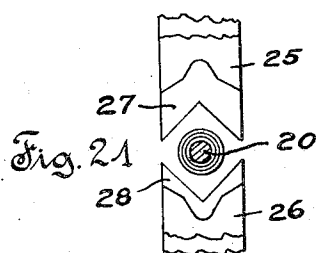


Fig. 21

Inventors
H. J. Olsen
K. H. Andren
by W. H. Lieber
Attorney

Jan. 6, 1931.

K. H. ANDREN ET AL

1,787,658

CUTTING AND STRIPPING MACHINE

Filed Dec. 27, 1927

6 Sheets-Sheet 6

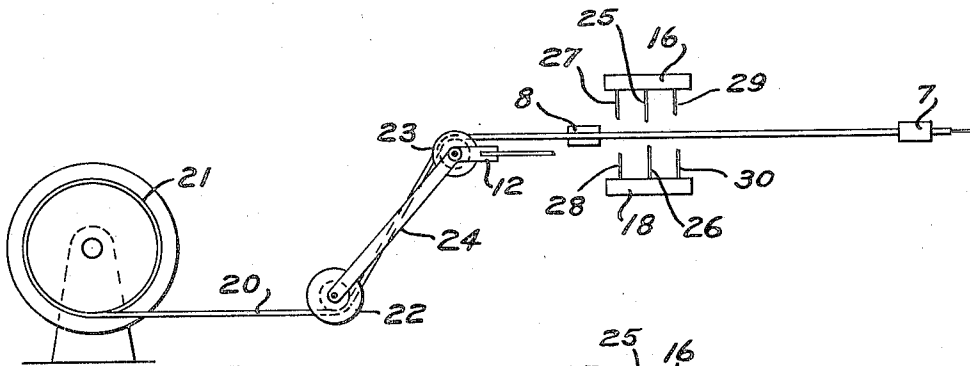


Fig. 22

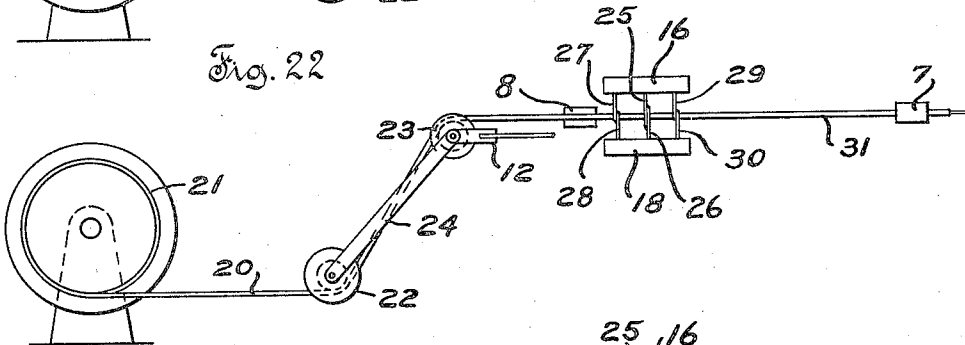


Fig. 23

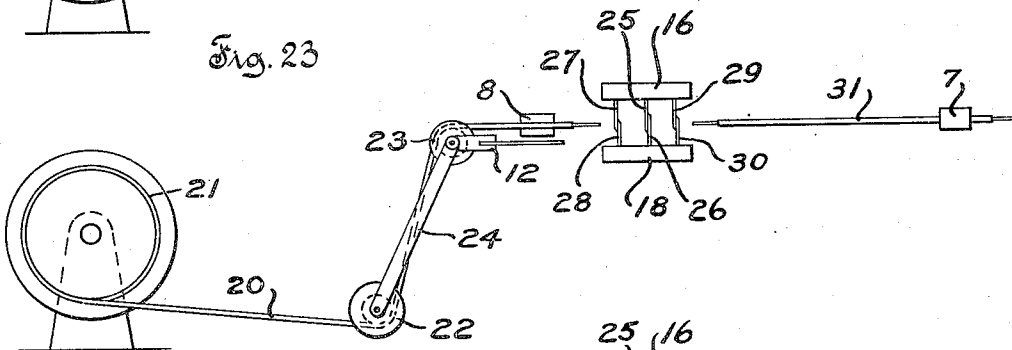


Fig. 24

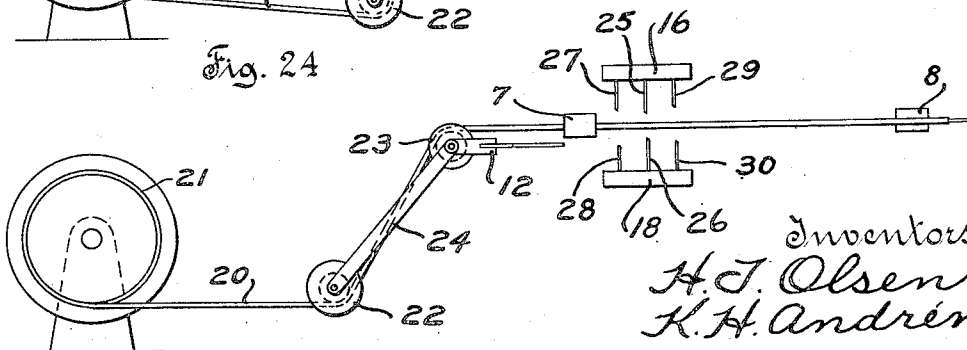


Fig. 25

Inventors
H. J. Olsen
K. H. Andren

by W. H. Lieber
Attorney

UNITED STATES PATENT OFFICE

KARL H. ANDRÉN AND HAAKON T. OLSEN, OF MILWAUKEE, WISCONSIN, ASSIGNORS
TO ARTOS ENGINEERING COMPANY, OF MILWAUKEE, WISCONSIN, A CORPORATION
OF WISCONSIN

CUTTING AND STRIPPING MACHINE

Application filed December 27, 1927. Serial No. 242,864.

The present invention relates in general to improvements in the art of severing material into pieces of predetermined length and of treating the ends of the severed pieces, and relates more specifically to an improved process of and apparatus for cutting and stripping insulated or otherwise covered wire or the like in rapid succession, for the automobile, radio and other industries.

10 An object of the invention is to provide a new and useful method of rapidly and automatically cutting and stripping covered wire. Another object of the invention is to provide simple and efficient apparatus for automatically severing wire stock into successive pieces of predetermined and accurate length. A further object of the invention is to provide improved apparatus for effectively stripping covering material such as insulation from one or both ends of successive pieces of wire or the like. Still another object of the invention is to provide a single machine which is capable of quickly cutting wire stock into successive pieces of predetermined length, and of subsequently stripping undesirable insulation or the like from both ends of the wire adjoining the point of severance. A further object of the invention is to provide various improvements in the details of construction and in the mode of operating machines for cutting and stripping wire or the like, whereby the cost of manufacture and operation thereof is reduced to a minimum, and the efficiency of performance is enhanced to a maximum. These and other objects and advantages resulting from use of the present invention, will be apparent in the course of the following description.

40 The term "wire" as employed herein, is intended to define and to include any material having characteristics similar to those of wire, whether or not the transverse cross-section thereof be circular. The term "insulation" is intended to define any covering or coating, including substances ordinarily used for electrical insulation purposes. It is intended that these and other specific terms employed herein, should be given the broadest possible interpretation consistent with the nature of the present improvement.

A clear conception of an embodiment of the several novel features of the invention and of the details of construction and mode of operation of mechanism built in accordance therewith, may be had by referring to the drawings accompanying and forming a part of this specification in which like reference characters designate the same or similar parts in the various views.

Fig. 1 is a side elevation of the improved wire cutting and stripping machine, looking toward the discharge side thereof.

Fig. 2 is a side elevation of the improved wire cutting and stripping machine, looking toward the driving side thereof.

Fig. 3 is a top view of the improved wire cutting and stripping machine.

Fig. 4 is an enlarged fragmentary end view of the knife frame and a portion of the actuating mechanism.

Fig. 5 is a part sectional side view of the frame and mechanism shown in Fig. 4.

Fig. 6 is a transverse sectional view through the cutter frame showing the details of construction of the knife actuating mechanism.

Fig. 7 is a longitudinal sectional view through the cutter frame likewise showing details of construction of the knife actuating mechanism.

Fig. 8 is a transverse sectional view through one end of the cutting and stripping machine showing details of construction of the wire stripping and feeding mechanism.

Fig. 9 is a fragmentary longitudinal sectional view through the portion of the machine shown in Fig. 8, likewise showing details of construction of the stripping and feeding mechanism.

Fig. 10 is a front end view of a portion of the improved wire cutting and stripping machine showing details of construction of the wire clamping, stripping and feeding mechanisms.

Fig. 11 is a fragmentary longitudinal sectional view through the portion of the machine shown in elevation in Fig. 10, showing further details of construction of the mechanism.

Fig. 12 is a reversed elevation of the mechanism shown in section in Fig. 11.

Fig. 13 is a top view of the portion of the cutting and stripping machine illustrated in elevation and section in Figs. 10, 11 and 12.

Fig. 14 is an enlarged central sectional view through an adjustable motion transmitting crank constituting a part of the wire clamping, stripping and feeding mechanism of the improved machine.

Fig. 15 is a side elevation of the motion transmitting crank shown in Fig. 14.

Fig. 16 is an end elevation of the motion transmitting crank shown in Figs. 14 and 15.

Fig. 17 is an enlarged end elevation of one of the wire gripping clamps showing the same in closed position.

Fig. 18 is a top view of the clamp showing the same in closed position as in Fig. 17.

Fig. 19 is an end elevation of the clamp illustrated in Figs. 17 and 18, showing the same in open position.

Fig. 20 is an enlarged side view of the cutting and stripping knives of the improved machine, showing the same in separated position.

Fig. 21 is a fragmentary end elevation of the cutting and stripping knives, showing the same relatively separated to permit advancement of the wire therebetween.

Fig. 22 is a somewhat diagrammatic side view of the wire supply, feeding and cutting elements of the improved machine, showing the knives separated.

Fig. 23 is a similar view of the elements shown in Fig. 22, showing the knives in cutting position.

Fig. 24 is a similar view of the elements shown in Figs. 22 and 23, showing the same adjusted as during the stripping operation.

Fig. 25 is a similar view of the elements shown in Figs. 22, 23 and 24, showing the knives again separated and also showing the wire advanced a length from the position illustrated in Fig. 22.

Referring to the drawings, the improved machine comprises in general a main frame 2 having wire supply means, discharge means, cutting mechanism and stripping mechanism associated therewith.

The wire supply means consists of a rotary wire bearing reel 21 from which the wire 20 is delivered over grooved guide rollers 22, 23 to the space between guide pins 45 mounted at the top of the frame 2, see Figs. 3 and 22. The upper guide roller 23 is rotatably associated with the bracket 12 secured to the front of the frame 2, and the lower guide roller 22 is likewise associated with the lower swinging end of a tension arm 24 the upper end of which is pivotally associated with the bracket 12. The tension arm 24 and the roller 22 carried thereby, serve to retain the wire 20 under a slight degree of tension and to prevent undesirable slack therein, during the

stripping operation, as shown in Figs. 22 to 25 inclusive. The wire discharge means consists of a laterally directed chute 13 formed to receive the finished pieces 31 from the cutting and stripping devices, and to deliver the same in rapid succession toward the side of the frame 2, see Fig. 1.

The improved cutting and stripping mechanisms are automatically operable by power applied to a common driving pulley 19 rotatably supported upon a bracket 121 located beneath the frame 2. The pulley 19 may be driven either by a direct connected motor, or by means of power applied to a pulley 11, and is adapted to transmit rotary motion to a pulley 9 through a belt 10 having tensioning mechanism 122 cooperating therewith as disclosed in Fig. 2. The pulley 9 is loosely supported upon an end of a transverse shaft 87 which is journaled in the side frame 59, the shaft 87 and pulley 9 being drivingly interconnected by means of a pair of cranks 127, 137, and a shear pin 123 connecting these cranks. The crank 127 is rigidly secured to the hub of the pulley 9 by means of bolts or screws 126, and the crank 137 is rigidly attached directly to the shaft 87 in any suitable manner. The shear pin 123 serves to prevent breakage of parts of the machine due to any abnormal condition of operation, and the outer crank 127 may obviously be attached to other driving means than the pulley 9 specifically shown in the drawing.

A pinion 64 secured to the medial portion of the shaft 87, meshes with a gear 63 secured to a second transverse shaft 65 which is also journaled in the frame 59. A mutilated gear 61 carried by the shaft 65, has teeth which are adapted to intermittently engage the teeth of another gear 62 which is secured to a third transverse shaft 47 likewise journaled in the frame 59 as shown in Figs. 5 and 6. A cam 66 secured to the outer end of the shaft 65 is intermittently engageable with a latch pin 124 which is guided upon the frame 59 by means of a guide 67, and which is adapted to cooperate with diametrically opposite peripheral notches of a disk 68 secured to the outer end of the shaft 47. The disk 68 is provided with an eccentric pin 69 which is connected to the lower swinging end of an arm 70 by means of a link 89. The upper end of the arm 70 is secured to a pivot shaft 90 to which a latch 71 is adjustably attached as shown in Figs. 4, 5 and 7. The lower oscillating end of the latch 71 engages a notched collar 75 secured to a locking pin 72 which is slidably supported in a pair of spaced lower lugs formed integral with a lever 132 swingably mounted upon a fixed pivot 86. A spring 125 coacting with one of the lugs of the lever 132 and with a collar on the pin 72, tends to urge the locking pin toward the right as viewed in Fig. 7. Located laterally adjacent to the lever

132 and likewise swingably supported upon the pivot 86, is a second lever 76 having a lug 133 at an end thereof, provided with a hole disposed in alinement with and adapted to receive the upper end of the pin 72 to lock the levers 76, 132 together. A roller 85 carried by the upper end of the lever 76 engages the groove of a cam 60 which is secured to and is rotatable with the shaft 65 as shown in Figs. 6 and 7. The locking pin 72 and the spring 125 cooperate to urge the pin into the hole of the lug 133 and to thereby lock the levers 76, 132 together, but the latch 71 cooperating with the collar 75 is at times operable to withdraw the upper end of the pin 72 from the lug 133 and to force the lower end thereof into the hole of a stationary locking lug 74 secured to the frame 59. When the elements are thus positioned, the lever 132 is positively locked against displacement while the lever 76 is free to be moved.

The swinging upper end of the lever 132 is connected to a block 88 attached to the side of a rack bar 78, by means of an adjustable connection 77, and the rack bar 78 is slidably secured to the knife supporting frame 6, by means of upper and lower guides 91. The upper and lower ends of the rack bar 78 are provided with teeth disposed on opposite sides of the bar and engageable with pinions 80, 79 respectively, as shown in Figs. 6 and 7. The pinions 80, 79 are located on opposite sides of the rack bar 78 and are secured to the knife actuating shafts 84, 83 respectively, which are journaled in the frame 6. Pinions 82, 81 secured to the corresponding ends of the shafts 84, 83 respectively, mesh with the teeth of upper and lower alined knife carrying racks 129, 128, as shown in Figs. 6 and 20. The upper wire severing knife 25 and the stripping knives 27, 29 located at the opposite sides thereof, are all detachably secured to a knife supporting block 16 by means of clamping screws 130, the block 16 being attached directly to the lower end of the upper rack 129. The lower wire severing knife 26 and the stripping knives 28, 30 located at the opposite sides thereof, are likewise detachably secured to a knife supporting block 18 which is attached directly to the upper end of the lower rack 128. The knives 25, 26, 27, 28, 29, 30 are preferably shaped as shown in Figs. 20 and 21, and stripper guards 131 of the form shown in Fig. 6, may be placed on opposite sides of each set of knives for the purpose of preventing the wire or insulation from clinging to the knife blades when the latter are moved out of cutting position.

A bevel pinion 73 secured to the inner end of the transverse shaft 65, meshes with a bevel gear 43 which is keyed to the longitudinal shaft 14 as shown in Figs. 1 and 11. The shaft 14 is journaled directly in the main frame 2, and has its front end additionally

supported in a frame 58. A pair of horizontal racks 38 slidably associated with the frame 58 as shown in Figs. 10, 11, 12 and 13, are movable toward and away from the forward portion of the shaft 14, by means of rollers 40 carried by the racks and coacting with the groove of a cam 39 secured to the shaft 14. The teeth of the sliding racks 38 engage the teeth of pinions 37 which are drivingly secured to lower sprockets 36 by means of short shafts, and the lower sprockets 36 are drivingly connected to the upper sprockets 35 by means of chains 41 having turn-buckles 42 for adjusting the chain tension, see Fig. 10. The upper sprockets 35 are connected to square clamp actuating shafts 3, 5 which extend parallel to each other and longitudinally of the main frame 2, the shafts 3, 5 being disposed directly above the clamp guiding rails 107, 108 respectively as shown in Figs. 1, 2 and 3.

An adjustable crank 46 secured to the inner end of the transverse shaft 47 as shown in Figs. 1, 6, 14, 15 and 16, has a movable crank pin 48 for longitudinally reciprocating a connecting rod 15. The crank pin 48 is slidable along a slot 50 in the crank 46, to vary the throw, by means of a threaded rod 51 which may be locked in adjusted position with the aid of nuts 53, 55 and a collar 54. The crank pin 48 may also be locked to the rod 51, by means of an internal locking pin 49 and a lock nut 52 associated therewith, the nut 52 also serving to retain the connecting rod 15 in place. In order to definitely indicate the degree of adjustment effected, the crank pin 48 may be provided with a pointer 56 cooperating with a gage 57 as shown in Fig. 15. The rear end of the connecting rod 15 is pivotally connected to a bar 134 which is slidable in a slot 101 of a bracket 95. A gear wheel 100 carried by the sliding bar 134, meshes with the teeth of upper and lower racks 96, 99 respectively, which are also slidably associated with the bracket 95, as shown in Figs. 8 and 9. The upper rack 96 carries a roller 94 which engages the peripheral groove of a cam wheel 17 secured to the rear portion of the longitudinal shaft 14, the wheel 17 being adapted to slightly shift the rack 96 during rotation of the shaft 14. The lower rack 99 in addition to having the teeth which mesh with the gear wheel 100, also has side teeth 98 coacting with a pinion 97 secured to the lower end of a rear shaft 92. The coaction between the gear wheel 100 and the racks 96, 99, is such, that when the upper rack 96 is stationary and the wheel 100 is advanced therealong, the lower rack 99 is quickly shifted at a much higher speed of travel than that of the wheel 100. To accommodate this excessive movement of the lower rack 99, the main casing 2 is provided with a rear end casing 102 located in line with the rack 99.

Secured to the upper end of the upright shaft 92, is a cable actuating drum or wheel 93 which is housed within a casing 135. The ends of a clamp shifting cable 4 are secured to the wheel 93 by means of fasteners 136 as shown in Fig. 8, and the parallel oppositely movable stretches of the cable 4 extend longitudinally of the frame 2 between the guide rails 107, 108 and the square shafts 3, 5 as indicated in Figs. 17, 18 and 19. The forward turn of the cable 4 engages a front sheave 32 which is pivotally supported upon an adjustable pivot 44. The sheave pivot 44 is adjustable to vary the tension of the cable 4, by means of a screw 33, and may be locked in adjusted position by virtue of a cap screw 34, see Fig. 11.

The stripping and wire advancing clamps 7, 8 which are illustrated in detail in Figs. 17, 18 and 19, are slidably associated with the rails 107, 108 respectively, located at opposite sides of the top of the frame as shown in Fig. 3. Each of the clamps 7, 8 comprises a frame 103 coacting directly with one of the top rails 107, 108 and retained in position thereon by means of guide plates 104; a swingable member 109 disposed between the opposite side walls of the frame 103 and slidably engaging the adjacent actuating shafts 3, 5; upper and lower jaws 110, 111 respectively swingably supported upon pivots 115 secured to the side walls of the frame 103; upper and lower jaw actuating brackets 112, 113 respectively swingably supported upon the pivots 115 and adjustably connected to the medial portions of the jaws 110, 111, by means of adjusting screws 117 having medial thumb nuts 118 and threaded end portions coacting with pivot pins 120; upper and lower leaf springs 114, 116 connecting the brackets 112, 113 respectively with the swinging portion of the member 109; and means for adjustably attaching the clamp frame 103 to the adjacent stretch of the cable 4. The adjustable attaching means consists of a central block 105 carried by each frame 103 and having a clamping sleeve 119 disposed within a bore thereof and engaging the adjacent portion of the cable 4, and a set screw 106 for locking the sleeve 119 and the block 105 to the cable. When the jaws 110, 111 are in closed position as shown in Figs. 17 and 18, they are adapted to firmly grip an intervening wire 31. When the jaws 110, 111 are open as shown in Fig. 19, the clamp may be shifted longitudinally of the frame 2 in either direction, without interfering with the cutting mechanism. The proper location of the clamps 7, 8 is such that when the clamp 8 is near the front of the machine as illustrated in Fig. 3, the opposite clamp 7 is near the rear of the machine, and vice versa.

During normal operation of the improved cutting and stripping machine, the entering wire 20 is delivered from the supply reel 21

to the clamps 7, 8 over the tensioning and guiding rollers 22, 23 as shown in Fig. 22. After the wire 20 has been positioned as illustrated in Fig. 22, with the clamp 7 near the rear of the machine and with the clamp 8 near the front, both of the clamps 7, 8 are caused to grip the wire and are retained fixed while the knife actuating mechanism is released and operated to bring the cutting and stripping knives 25, 26, 27, 28, 29, 30 into cutting position wherein the central knives 25, 26 sever both the wire and the insulation, while the end knives 27, 28, 29, 30 merely cut through the insulation, as shown in Fig. 23. After the cutting operation has been completed, the clamps 8, 7 are automatically shifted to the position shown in Fig. 24 while the knives are retained in cutting position, thereby causing the knives 27, 28 to strip the severed insulation from the end of the wire 20 and simultaneously causing the knives 29, 30 to strip the severed insulation from the front end of the piece 31 of wire. The cutting knives are subsequently elevated to the position shown in Fig. 25 and the rear clamp 7 is opened fully to release the finished piece 31 and to permit the same to drop by gravity upon the chute 13 for delivery from the machine. When the knives have been separated and the clamp 7 opened as described, the closed clamp 8 is moved rearwardly through the gap between the separated knives, dragging with it a fresh length of wire, and the clamp 7 is simultaneously moved forwardly past the clamp 8 and the knives and is finally closed to grip the wire 20 thereby again placing the elements in condition preparatory to the cutting operation. During the succeeding similar cycles of operation of the machine, the clamps 7, 8 function alternately, to advance the wire 20 as described, to strip the ends of the wire adjacent to the point of severance, and to deliver the finished pieces from the machine.

The entire mechanism is automatically operated by the power applied from the pulley 9 or other source, to the transverse shaft 87 which is rotated continuously. The continuous rotary motion of the shaft 87 is transmitted through the pinion 64 and gear 63 to the second transverse shaft 65 and from thence through the bevel gears 73, 43 to the longitudinal shaft 14. The constantly rotating shaft 65 carries with it the mutilated gear 61, the intermediate cam 60, and the end cam 66, the relative disposition of the former and latter of these elements with respect to the shaft 65, being such that when the gear 61 is imparting motion to the third shaft 47 through the gear 62, the cam 66 has released the locking pin 124, whereas, when the gear 61 is ineffective the cam 66 becomes effective to retain the pin 124 in locking position.

When the machine is operating to cut and strip pieces of wire which are within the nor-

70

75

80

85

90

95

100

105

110

115

120

125

130

mal limits of travel of the clamps 7, 8, the locking latch 71 is released and slid laterally along the pivot shaft 90 so that it cannot become effective to engage the notched collar 75 and to thereby disengage the levers 76, 132. The continuous rotation of the cam 60 will then cause the levers 76, 132 to become effective during each revolution of the shaft 65, to operate the knives through the connection 77, the rack bars 78, 128, 129, the shafts 83, 84, and the pinions 79, 80, 81, 82. Due to the formation of the cam 60, this cam functions to shift the levers 76, 132 during only about one fourth of each revolution of the shaft 65 and cam 60, the period covered by the remaining three fourths of the revolution being occupied by other operations and the knives being positively held in separated position during this latter period, by the cam 60 coacting with the roller 85.

When the machine is operating to cut and strip pieces of wire which are of greater length than the normal limits of travel of the clamps 7, 8, the locking latch 71 is employed to positively lock the knives in separated position during several fore and aft movements of the clamps. During such "long cutting" operation of the machine, and as the shaft 47 and disk 68 are advanced during each revolution, the arm 70 and latch 71 are swung toward the left from the position shown in Figs. 5 and 7, thereby shifting the locking pin 72 to the left and positively locking the knife actuating lever 132 and hence the knives, in fixed and separated position. During continued movement of the shaft 47 throughout the revolution, the arm 70 and latch 71 are returned to the position shown in Figs. 5 and 7, thereby shifting the locking pin 72 to the right and locking the levers 132, 76 together so that normal motion of the lever 76 produced by engagement of the roller 85 with the cam 60, will be transmitted through the lever 132, and intermediate gearing to the knives in order to bring the same together.

The intermittent rotary movement of the third shaft 47 is imparted to the crank 46 and from thence through the crank pin 48 and connecting rod 15 to the bar 134 and gear wheel 100, thus causing the wheel 100 to intermittently revolve and move along the slot 101 in opposite directions. When the pin 124 is effective to lock the shaft 47 against movement, the bar 134 is simultaneously locked in either of its end positions within the slot 101, but during the intermittent movement of the disk 68 and shaft 47 through half revolutions, the bar 134 is moved from end to end of the slot 101. When the bar 134 and the wheel 100 are moving along the slot 101, the upper rack 96 is stationary and the wheel 100 is caused to rotate so as to produce longitudinal motion of the lower rack 99 in the same direction as that of the bar 134 but

at double the speed thereof. This longitudinal motion of the rack 99 is converted into rotary motion of the upright shaft 92 and of the wheel 93, by means of the pinion 97 coacting with the side teeth 98 of the lower rack, thereby producing relatively rapid and simultaneous movement of the opposite side stretches of the cable 4 and hence of the clamps 7, 8 along the guide rails 107, 108, in opposite directions. The arrangement is obviously such that when the rack 99 moves in one direction, the clamp 7 is moved forwardly while the opposite clamp 8 is being moved rearwardly from one predetermined position to the other; and when the rack 99 moves in the opposite direction, the clamp 8 is moved forwardly while the clamp 7 is moving rearwardly from one predetermined position to the other.

The continuous rotary motion of the longitudinal shaft 14, transmitted thereto from the second shaft 65 through the bevel gears 73, 43, is imparted to the rotary cams 39, 17 associated with the front and rear end portions respectively, of the shaft 14. The rear cam wheel 17 utilized during "short cutting", has its peripheral groove which coacts with the roller 94, so formed, that when the gear wheel supporting bar 134 is moving along the slot 101, there is no motion being imparted to the upper rack 96. The formation of the wheel 17 and the rotation thereof, is such that when the bar 134 is locked in either end position, the upper rack 96 is shifted longitudinally a slight distance. Such shifting of the rack 96 is transmitted through the gear wheel 100 to the lower rack 99, thus producing equal longitudinal motion of the rack 99 in the opposite direction, and causing the stripping movement of the clamps 7, 8 after the cutting knives have been brought together, as previously explained. During "long cutting" operation, the cam wheel 17 is replaced by another which produces stripping motion of the clamps 7, 8, only at the end of each complete fore and aft movement of the clamps.

The constantly rotating cam 39 at the forward end of the shaft 14, causes the racks 38 to alternately move in opposite directions, one of the racks being held fixed during inward and outward movement of the other. The reciprocation of the racks 38 is converted into rotary or oscillatory motion by the pinions 37, and is transmitted from these pinions through the chains 41 and sprockets 36, 35 to the clamp actuating shafts 3, 5. Such alternate oscillatory movement of the shafts 3, 5 causes the same to open and close the jaws 110, 111 of the clamps during release of the finished pieces 31 and subsequent re-clamping of the wire 20 by the clamps 7, 8. The slack adjusters 42 serve to maintain proper tension of the chains 41, and are of such length that they will not interfere with

the relatively slight reverse travel thereof. The clamp opening and closing mechanism operates only during release of a finished piece 31, and during closing of a properly positioned clamp, and does not affect the clamps 7, 8 when closed, as when the cutting, stripping and feeding of fresh wire stock is being effected. This mechanism also functions alternately with respect to the two clamps 7, 8.

From the foregoing detailed description of the construction and mode of operation of the various mechanisms, it will be apparent that the several mechanisms when properly adjusted function to effectively perform the several steps of feeding, cutting, stripping, and discharging finished pieces of the insulated wire, in rapid succession. The length of the finished pieces 31 may be readily varied by adjusting the throw of the crank 46, and the amount of insulation removed by stripping may likewise be varied by changing the distance between the stripping knives and the intervening cutting knives by substituting spacing blocks of different width. The knives may also be replaced by other means for removing the insulation in cases where knives are not suitable, and the degree of pressure exerted by the jaws 110, 111 upon the wire, may be conveniently varied by adjustment of the screws 117. The tension of the cable 4 may be adjusted by manipulation of the cap screws 33, 34, and the set screws 106 serve to vary the position of the clamps 7, 8 with respect to the stretches of the cable. All of the adjusting mechanisms are readily accessible for manipulation, and the locking pin 72, functions to positively prevent possible destruction of delicate parts of the machine during "long cutting" operation, that is, when relatively long pieces of wire are being cut. The cam 60 cooperating with the roller 85, further functions to positively lock the knives in separated position during transfer of the wire stock. The shear pin 123 also serves to protect the motion transmitting mechanisms, and the double cranks 127, 137 permit convenient replacement of the pin 123 and substitution of a gear or motor drive for the pulley 9. The machine is operable at relatively high speed and has amply demonstrated its ability to accurately and effectively cut and strip insulated wire, into successive pieces 31 of the desired and uniform length.

It should be understood that it is not desired to limit the invention to the exact details of construction and to the precise mode of operation disclosed herein, for various modifications within the scope of the appended claims may occur to persons skilled in the art.

It is claimed and desired to secure by Letters Patent:—

1. In combination, means for severing suc-

cessive pieces from a wire, a pair of wire clamps movable to opposite sides of said severing means, and means for causing said clamps to alternately feed a portion of the wire having predetermined length past said severing means.

2. In combination, wire cutting means, wire stripping means located on opposite sides of said cutting means, a pair of clamps movable relative to said cutting and stripping means, means for moving said clamps to strip insulation from a wire severed by said cutting means, and means for alternately moving said clamps to feed a predetermined length of wire past said cutting means.

3. In combination, a pair of relatively movable knives, means for moving said knives toward each other to cut a wire, means for subsequently separating said knives and for locking the same in separated position, and a clamp movable between said knives while locked to advance the wire therebetween, said clamp being disposed on opposite sides of the plane of movement of said knives during successive cutting operations.

4. In combination, a pair of relatively movable knives, means for actuating said knives to cut a wire, means for subsequently separating said knives to form a gap, a pair of clamps for gripping the wire on opposite sides of said knives, and means for simultaneously moving one of said clamps through said gap in one direction and the other past said knives laterally of said gap in the opposite direction after completion of a cutting operation.

5. In combination, a pair of knives movable to cut a wire, a pair of clamps for holding the wire on opposite sides of the plane of said knives, and means for simultaneously moving said clamps in opposite directions past said plane after completion of a cutting operation.

6. In combination, a wire cutter comprising a movable knife, a pair of clamps movable to opposite sides of the plane of movement of said knife, and means for causing said clamps to alternately feed wire stock past said plane.

7. In combination, a wire cutter comprising a reciprocable knife, a pair of clamps movable across the plane of reciprocation of said knife, and means for alternately moving said clamps across said plane to feed wire stock past said knife.

8. In combination, a wire cutter comprising a severing knife and a stripping knife located laterally of said severing knife, means for moving said knives in parallel planes, a pair of clamps movable across said planes, and means for alternately moving said clamps across said planes to feed wire stock past both of said knives.

9. In combination, a wire cutter comprising a knife movable in a plane, a movable clamp, and means for moving said clamp across said plane to feed wire past said knife, said clamp being disposed on opposite sides of said plane during successive cutting operations.

10. In combination, a wire cutter comprising a knife reciprocable in a plane, a movable clamp, and means for intermittently moving said clamp a predetermined distance across said plane to feed wire past said knife and for subsequently returning said clamp to feeding position, said clamp being disposed on opposite sides of said plane during successive cutting operations.

11. In combination, a pair of relatively movable knives, means for moving said knives toward each other to cut a wire, means for subsequently separating said knives, and a clamp movable between said knives while separated to advance wire stock therebetween, said clamp being disposed on opposite sides of the plane of movement of said knives during successive cutting operations.

12. In combination, a pair of relatively movable knives, means for moving said knives toward each other to sever a wire, means for subsequently separating said knives, and means movable laterally between said knives while separated to feed wire stock into position preparatory to cutting, said feed means being disposed on opposite sides of said knives during successive cutting operations.

13. In combination, a pair of relatively movable knives, means for moving said knives toward each other to sever a wire into successive lengths, means for separating said knives after each severing operation, and a pair of clamps alternately movable between said knives while separated to feed successive lengths of wire stock into position preparatory to cutting.

14. In combination, a wire cutter comprising a knife, a pair of clamps for holding a wire on opposite sides of said knife, and means for moving said clamps away from and toward said knife after completion of a cut.

15. In combination, a wire cutter comprising a knife movable in a plane, a wire holding clamp on each side of said plane, and means for simultaneously moving said clamps laterally away from said plane after completion of each cut.

16. In combination, a wire cutter comprising a movable knife, a clamp for holding a wire at one side of the plane of movement of said knife, and means for successively moving said clamp first away from and then across said plane after each cutting operation.

17. In combination, a knife movable in

a plane, a pair of wire clamps on opposite sides of said plane, and means for moving each of said clamps first away and then reversely across said plane after each cutting operation.

18. In combination, a movable knife, a movable clamp, and means for bodily moving said clamp away from and subsequently past said knife after each cutting operation.

19. In combination, a movable knife, a movable clamp, and means for positioning said clamp on opposite sides of said knife during successive cutting operations.

20. In combination, a movable knife, a clamp bodily movable past said knife in opposite directions, and means for positioning said clamp on opposite sides of said knife during successive cutting operations.

21. In combination, a pair of supports relatively movable toward and away from an intervening wire, a set of cooperating wire severing knives carried by said supports, a set of cooperating insulation cutters associated with said supports on each of the opposite sides of said knives, and a set of coacting clamping jaws for laterally gripping a wire interposed between said supports at the side of each set of said cutters remote from said knives.

22. In combination, a pair of supports relatively movable toward and away from an intervening wire, a set of cooperating wire severing knives carried by said supports, a set of cooperating insulation cutters associated with said supports on each of the opposite sides of said knives, a set of coacting clamping jaws for laterally gripping a wire interposed between said supports at the side of each set of said cutters remote from said knives, and common means for actuating said jaws and for simultaneously pulling both of the severed ends of the wire away from said knives.

In testimony whereof, the signatures of the inventors are affixed hereto.

KARL H. ANDRÉN.
HAAKON T. OLSEN.