M. C. FRANCE.

INSULATED WIRE STRIPPING MACHINE.

APPLICATION FILED JAN. 11, 1918.

1,306,588.

Patented June 10, 1919.

2 SHEETS—SHEET 1.

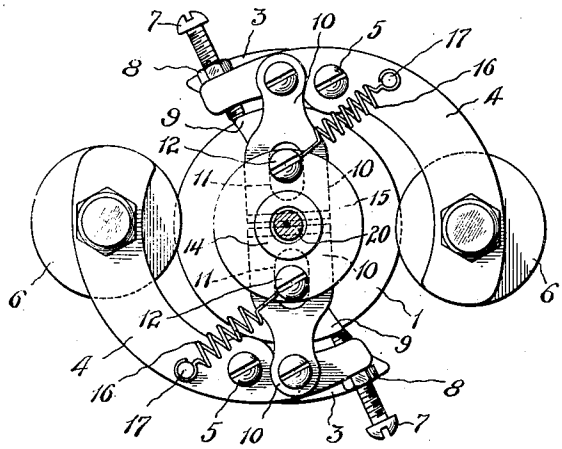


Fig. 1

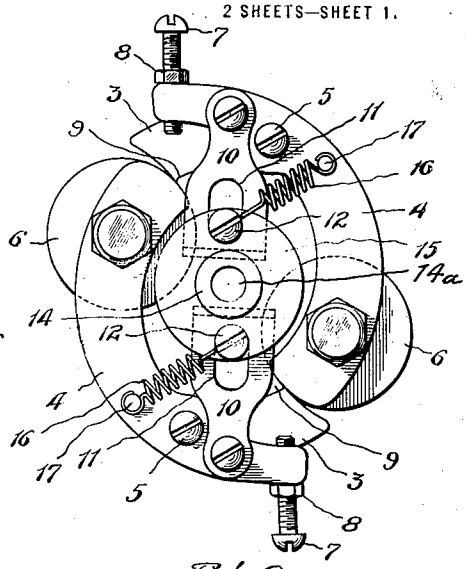


Fig. 2

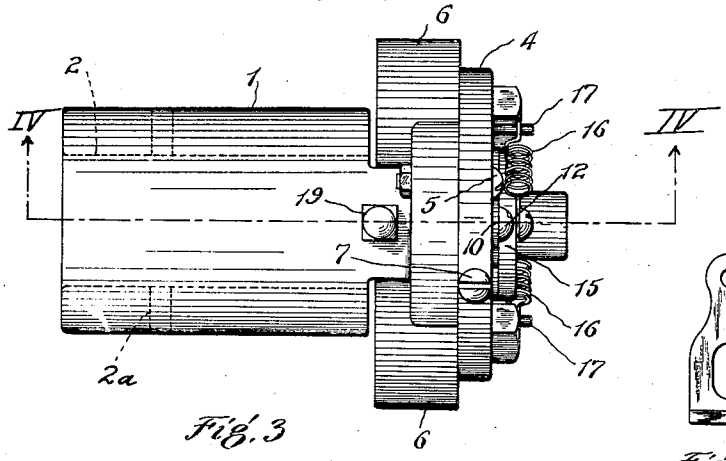


Fig. 3

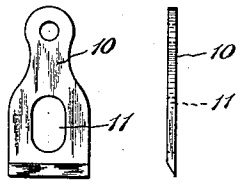


Fig. 5

Fig. 6

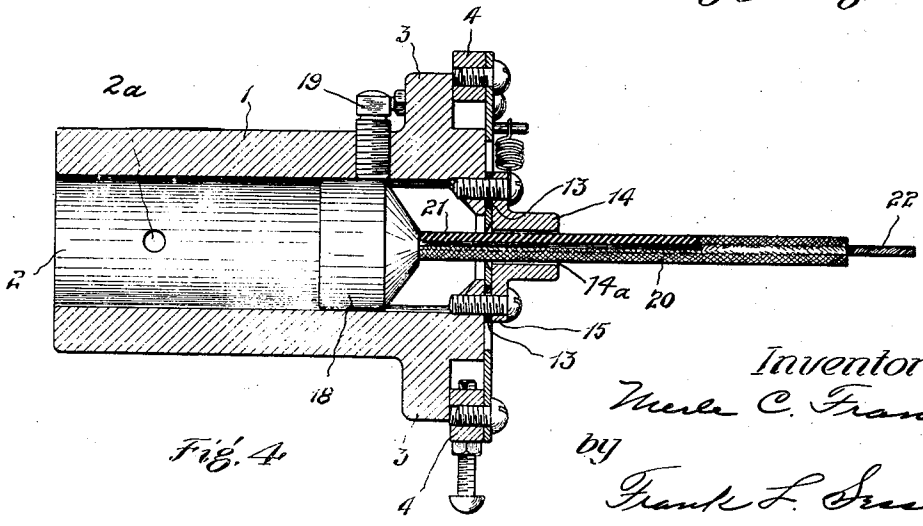


Fig. 4

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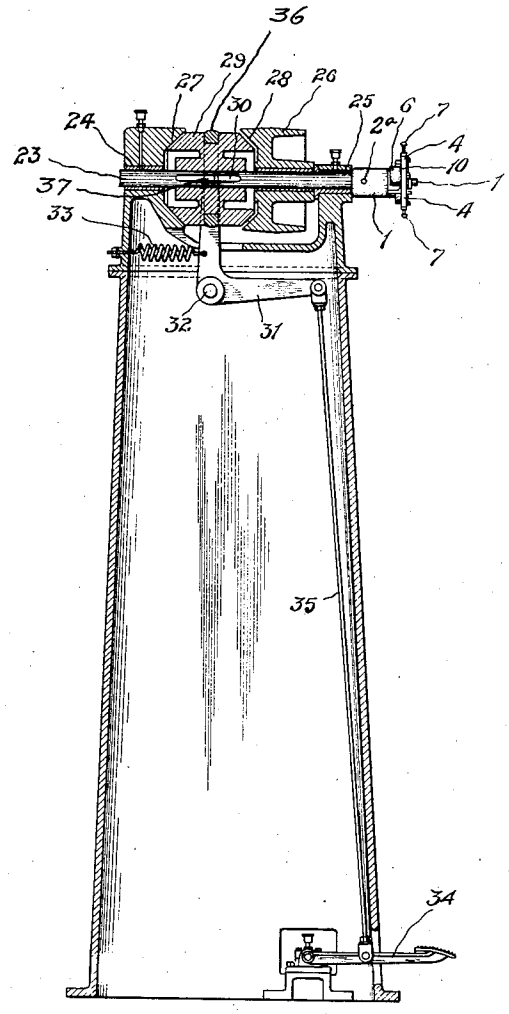


Fig. 7

Inventor
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UNITED STATES PATENT OFFICE.

MERLE C. FRANCE, OF CLEVELAND, OHIO.

INSULATED-WIRE-STRIPPING MACHINE.

1,306,588. Specification of Letters Patent. Patented June 10, 1919.

Application filed January 11, 1918. Serial No. 211,357.

To all whom it may concern:

Be it known that I, MERLE C. FRANCE, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Insulated-Wire-Stripping Machines, of which the following is a specification.

My invention relates to machines for stripping insulation from the ends of either solid or stranded, insulated, electrical conductors for the purpose of preparing the ends of the conductors to be connected to the terminals of electric circuits. Heretofore this work has been largely if not entirely performed by hand with the aid of an ordinary jack knife or other crude tool.

The object of my invention is to provide means for stripping the insulation from the ends of electrical conductors by machinery in a better, cheaper, and more expeditious manner than it has heretofore been accomplished.

To accomplish the object of my invention, I provide a cutting device mounted upon a rotatable spindle. The device may be constructed something on the order of a lathe chuck which may be mounted upon the spindle of an ordinary lathe, or, preferably, it may be incorporated in a specially designed machine which will be hereinafter described. The cutting device consists of one or more knife blades mounted on the spindle in a plane transverse to the axis of rotation, and held normally away from the center of the spindle to permit the end of the insulated wire which is to be stripped, to be put into position for stripping. The insulated wire being presented longitudinally and centrally to one end of the spindle past the cutting edge of the blade, the spindle is revolved, and, by the action of a centrifugal weight, the knife blade is forced toward the axis thus cutting the insulation transversely. The mechanism is provided with suitable adjustable stops so that the knife blade cannot cut deeper than the depth of the insulating covering of the conductor which is being stripped. As soon as the knife blades have cut their way through the insulation, the wire is pulled longitudinally away from them and the insulation is stripped from the end of the wire by the flat sides of the blades while they are still revolving with the spindle. As the wire is held against rotation by the hand of the operator, the revolution of the knife blades and of that portion of the insulation which is being stripped off, twists the strands of a stranded conductor into a straight, compact end, ready to be tinned and soldered into a terminal or to be inserted into the socket of a binding post.

My invention is clearly illustrated in the accompanying drawings in which Figure 1 is an end view of the insulation stripping device showing the cutters in their innermost position for stripping the insulation from a wire.

Fig. 2 is an end view of the insulation stripping device with the cutters in the open or idle position.

Fig. 3 is a plan of the device with the cutters in the position seen in Fig. 2.

Fig. 4 is a longitudinal section of the device on line IV—IV of Fig. 3 with the addition of a wire in place to be stripped of its insulation.

Figs. 5 and 6 are respectively side and end views of one of the knife blades used in my device; and

Fig. 7 is a longitudinal section through a machine embodying my invention.

Referring to the drawings, 1 represents the spindle head upon which are mounted the knives and knife moving parts of my insulation stripping device. As here shown, it consists of a cylindrical shell, the central aperture, 2, of which is bored to fit upon the spindle of a suitable lathe or other machine and is provided with a transverse hole, 2^a, for the reception of a suitable driving pin by which it is secured to and driven by the spindle of the machine. It will be understood that the spindle head may be secured in any other suitable manner to the spindle, or may be made an integral part of it. Near the outer end of the spindle head, 1, there are provided flange like transverse projections, 3, 3, to which are pivoted levers, 4, 4, by means of screws or other pivots, 5, 5. Each of the levers, 4, carries at one end a centrifugal weight, 6, and at the other end an adjustable stop screw, 7, which is threaded through the lever and is provided with a jam nut, 8. The end of the stop screw, 7, is adapted to engage the surface of the projection, 9, formed upon the spindle head 1.

To the levers, 4, 4, are pivoted the cutter blades, 10, 10. Each of the blades, 10, is provided with a guiding slot, 11, in which

stands a screw, 12, which carries a wearing bushing, 13, in the slot, 11. It will be noted that the blades are beveled on one side only to form their cutting edges and that the edge of each blade is therefore in the plane of one of its sides. This side of the blade is preferably placed toward the end of the wire from which the insulation is to be stripped as shown in Fig. 4. 14 is a cylindrical guide which has a central aperture, 14ª, through it, and a transverse flange, 15, through holes in which pass the screws, 12, 12, which are screwed into the end of the spindle head, 1, and thus support the guide 14. Springs, 16, 16, having their inner ends attached to the screws, 12, 12, and their outer ends pivotally secured to levers, 4, 4, by means of the pins, 17, 17, act to normally hold the levers, 4, 4, and centrifugal weights, 6, 6, in their innermost position and the knife blades, 10, 10, in their outermost position and to return these parts to the positions in which they are seen in Fig. 2 of the drawings whenever the spindle stops rotating. 18 is a stop gage member adjustably held in the bore, 2, of the body, 1, by means of a set screw, 19.

In Fig. 4, an insulated wire, 20, is shown in position in the stripping device ready for the machine to be started to strip the end of the wire, 21, which is seen within the device abutting against the end of stop gage, 18. The outer end, 22, of the wire, 20, is shown to be stranded and as having been already stripped, the strands being shown as having been twisted together by the operation of the machine.

In Fig. 7 there are shown the essential parts of such a machine as I prefer to employ for driving my insulation stripping device. The machine is provided with a spindle, 23, mounted to run in bearings, 24, 25. A driving pulley, 26, is shown loosely mounted for rotation upon spindle, 23. The housing of bearing, 24, is provided with a stationary, internal cone surface, 27, and one end of the pulley, 26, is provided with a similar cone surface, 28. Upon the spindle, 23, between the cone surfaces 27 and 28, there is slidably mounted the double ended friction cone, 29. A sliding, driving connection, between shaft, 23, and friction cone, 29, is made by the feather key, 30. A bell crank shifting lever, 31, pivoted to the frame of the machine at 32, is provided for the purpose of shifting the friction cone, 29, into engagement with cone surface, 28, of pulley, 26, or with the stationary, braking, cone surface, 27, of the housing of bearing, 24. A spring, 33, is provided which acts between lever, 31, and the frame of the machine to normally hold friction member, 29, in engagement with the stationary cone surface, 27. A foot treadle, 34, connected by the rod, 35, to lever, 31, is provided to enable the operator to cause the engagement of the cone, 29, with pulley, 26. A loose ring, 36, encompasses friction cone, 29, and is provided with pins, 37, which are engaged by the end of lever, 31, for shifting the friction clutch and braking cone, 29, in a well known manner.

While I have shown my insulation stripping device mounted upon a special machine, it will be understood that I do not limit my invention to its use upon the particular type of machine shown. It will be evident to those skilled in the art that the device may be mounted upon the spindle of an ordinary lathe and operated by starting and stopping the lathe in any well known manner, or, the device may be operated upon any other suitably driven spindle differing in details of construction or driving means, from that herein shown and described.

The operation of my machine is as follows:

The spindle, 23, being stationary, the knives will be in the open position shown in Fig. 2. To strip the insulation from a wire, the end of the wire is inserted through the guide bushing, 14, as shown in Fig. 4. The belt pulley, 26, being driven from any suitable source of power, the foot treadle, 34, is depressed to cause the engagement of friction clutch, 29, with pulley, 28, and the consequent rotation of spindle, 23, together with the stripping knives. As soon as the stripping device starts to rotate, the knives are forced toward the axis of the spindle as previously described and the insulation is cut through to the surface of the conductor, the stop screws, 7, having been previously set to stop the inward travel of the knives at the surface of the conductor. With the foot treadle still depressed and the spindle rotating, the insulated wire is now pulled away from the machine, and the insulation is stripped from the end of the wire by the flat sides of the knife blades. Upon releasing the foot treadle so that spring, 33, may act, friction brake, 29, is drawn against the stationary friction surface, 27, of the bearing, 24, and the rotation of the spindle is quickly stopped, thus permitting the knives to again open, ready to receive the next wire to be stripped.

It will be observed that the flange-like projections, 3, do not extend clear around the spindle, but are cut away to give room for the weights, 6, as well as to form stops therefor to limit the inward travel of the weights, and, further, to form openings in the sides of the wire stripper to permit the insulation which is removed from the wire to fall or be thrown out of the space behind the knives, thus making the device self-clearing.

I have found that my invention effects a great saving of time and labor and performs the work of stripping wires uniformly and

neatly, and in a highly satisfactory manner. These advantages and numerous others will be apparent to those connected with electrical industries in which the ends of large numbers of insulated wires have to be stripped in order that they may be properly electrically connected.

Having thus described my invention what I claim and desire to secure by Letters Patent is:

1. In a machine of the class described, a rotatable spindle; a knife blade mounted on said spindle in a plane transverse to the axis thereof and having its cutting edge presented toward said axis; a centrifugal weight; and operative connections between said knife blade, said spindle and said weight, whereby, when said spindle is rotated about its axis, the centrifugal force of said weight acts through the said connections to move the knife blade toward said axis.

2. In a machine of the class described, a rotatable spindle; a knife blade mounted on said spindle in a plane transverse to the axis thereof and having its cutting edge presented toward said axis; a centrifugal weight; operative connections between said knife blade, said spindle and said weight, whereby, when said spindle is rotated about its axis, the centrifugal force of said weight acts through the said connections to move the knife blade toward said axis; and elastic means acting between said spindle and said knife blade to oppose the movement of said knife blade toward said spindle.

3. In a machine of the class described, a rotatable spindle; a knife blade mounted on the end of said spindle in a plane transverse to the axis thereof and having its cutting edge presented toward said axis; and a lever pivoted to the end of said spindle at a distance from said axis, said lever being connected at one end to said knife blade and having its other end weighted, whereby, when said spindle is rotated about its exis, the centrifugal force of the weighted end of said lever tends to rotate the lever about its pivot on said spindle to force the knife blade toward said axis.

4. In a machine of the class described, a rotatable spindle; a knife blade mounted on said spindle in a plane transverse to the axis thereof and having its cutting edge presented toward said axis; a lever pivoted to the end of said spindle at a distance from said axis, said lever being pivotally connected at one end to said knife blade and having its other end weighted, whereby, when said spindle is rotated about its axis, the centrifugal force of the weighted end of said lever tends to rotate the lever about its pivot on said spindle to force the knife blade toward said axis; and means for moving said blade away from said axis as said spindle comes to rest.

5. In an insulated wire stripping machine, a rotatable spindle; a knife blade mounted on said spindle in a plane transverse to the axis thereof and having its cutting edge presented toward said axis; means actuated by the rotation of said spindle for moving said blade toward said axis; said spindle having an opening in its side adjacent to said blade to permit the insulation stripped from the wire to be thrown out of the space behind said blade by the rotation of said spindle.

6. In a machine of the class described, a rotatable spindle, a pair of knife blades mounted on said spindle at opposite sides thereof, and means for causing said knives to simultaneously advance radially inwardly upon rotation of the spindle and to normally return on the spindle coming to rest.

7. In a machine of the class described, a rotatable spindle; a knife blade mounted on said spindle in a plane transverse to the axis thereof and having its cutting edge presented toward said axis; means actuated by the rotation of said spindle for moving said blade toward said axis; means for rotating said spindle; and frictional means embodying a stationary frictional member for stopping the rotation of said spindle.

8. In a machine of the class described, a plurality of knives thereon and means for automatically by the rotation of the spindle causing said knives to advance toward the axis of rotation of the spindle, said means embodying devices whereby upon the spindle coming to rest the knife edges will move away from said axis.

9. In a machine for stripping wire, a spindle and means for rotating it, a central guide, a knife-blade mounted on said spindle and means for positively advancing said knife inwardly toward the axis of the spindle, said means embodying devices whereby the knife is normally withdrawn away from said axis so that when said means is at rest the knife will be normally held out of the path of the guide.

10. In a machine for stripping wire, a spindle and means for rotating it, a plurality of radially-disposed knives on the spindle, a central guide, an adjustable stop carried by the spindle in line with the guide and at the opposite side of the knives, and means for positively advancing the knives radially inwardly, said means embodying devices whereby the knives are normally drawn outwardly away from the path of the guide, so that while the said means is at rest the path between the guide and the stop will be clear.

11. In a machine for stripping wire, a spindle and means for rotating it, a central guide, a knife-blade mounted for radial movements on said spindle; means for hold-

ing said knife-blade normally away from the center of said spindle; adjustable means for limiting the movement of the knife-blade toward said spindle; and means for positively advancing said knife-blade inwardly toward the center of the spindle and holding it at the limit of its inward travel during the rotation of said spindle.

12. In a machine for stripping wire, a spindle and means for rotating it, a plurality of radially-disposed knives, a central guide, an adjustable stop carried by the spindle in line with the guide and at the opposite side of the knives; and means for positively advancing the knives radially inwardly and holding them at the limit of their inward movement during the rotation of said spindle.

13. In a machine of the class described, a rotatable spindle; a knife-blade mounted on said spindle in a plane transverse to the axis thereof and having its cutting edge presented toward said axis, said knife-blade having movement radially of said axis; a stop for limiting the movement of said knife-blade toward said axis; and means for moving said knife-blade toward said axis and for holding it at the limit of its movement while said spindle is rotating.

14. In an insulated wire stripping machine, a revoluble spindle; a guide mounted upon said spindle and having an aperture concentric therewith for receiving the wire from which the insulation is to be stripped; a knife blade mounted on said spindle behind said guide for radial movements in a plane transverse to the axis of said spindle; means for moving said blade toward said axis; means actuated by centrifugal force for moving said blade away from said axis; means for rotating said spindle; and an adjustable stop behind said knife blade for limiting the distance the wire may be inserted into said guide.

15. In an insulated wire-stripping machine, a revoluble spindle, a guide mounted upon said spindle and having an aperture concentric therewith for receiving the wire from which the insulation is to be stripped; a knife-blade mounted on said spindle behind said guide for radial movements in a plane transverse to the axis of said spindle, means actuated by centrifugal force for moving said blade toward said axis; means for moving said blade away from said axis; and means for rotating said spindle.

16. In a machine of the class described, a rotatable spindle; a knife blade mounted on said spindle in a plane transverse to the axis thereof and having its cutting edge presented toward said axis, said knife blade having limited movement radially of said axis; and means actuated by centrifugal force for moving said knife blade toward said axis.

17. In a machine of the class described, a rotary support, a plurality of knives mounted on said support; means actuated by centrifugal force for advancing the cutting edges of said knives toward a common axis; and a guiding means to receive the wire to be stripped.

18. In a machine of the class described, a spindle and means for rotating the same, a central guide and a central stop, a pair of knives arranged between said guide and said stop, these knives being arranged at opposite sides of the center of the spindle, and automatic means for holding said knives out of the path of said guide while the spindle is at rest, said means embodying devices whereby when the spindle is rotated the knives advance simultaneously radially inwardly across the throat of the guide.

In testimony whereof I affix my signature in the presence of two witnesses.

MERLE C. FRANCE.

Witnesses:

LOUIS A. CORLETT,

T. F. MAWER.