Aug. 10, 1926. 1,595,799

H. R. MASSINGHAM

HEATED ELEMENT

Filed August 16, 1924 2 Sheets-Sheet 1

Fig. 1

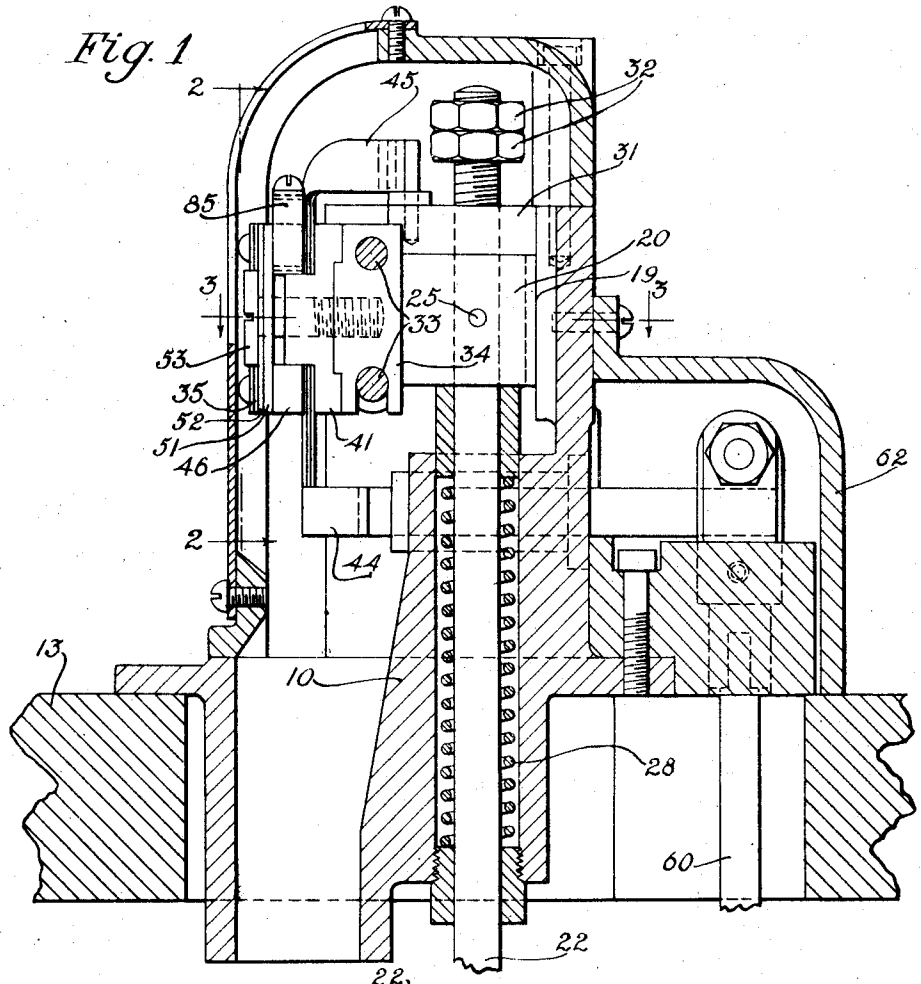
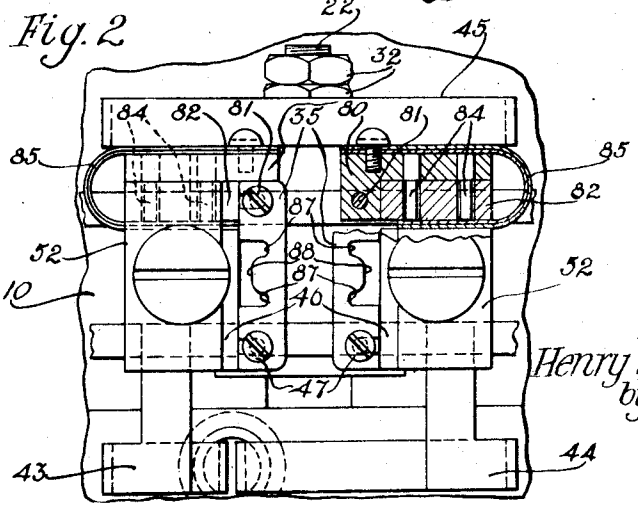


Fig. 2



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Filed August 16, 1924 2 Sheets-Sheet 2

Fig. 3

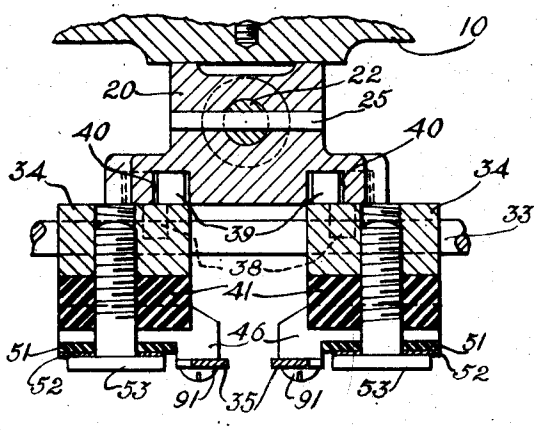


Fig. 4

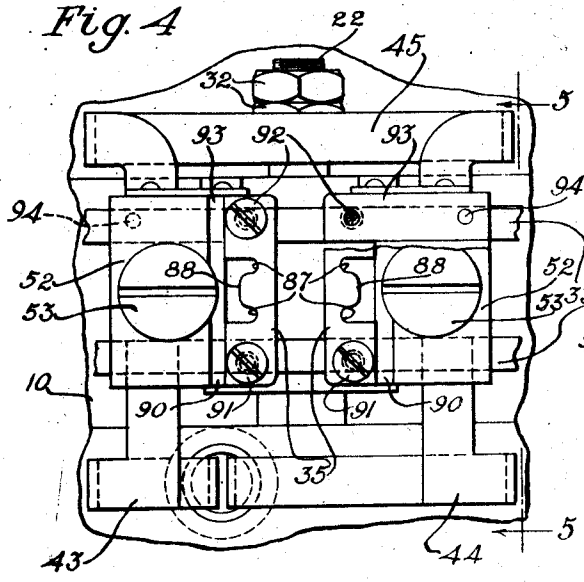
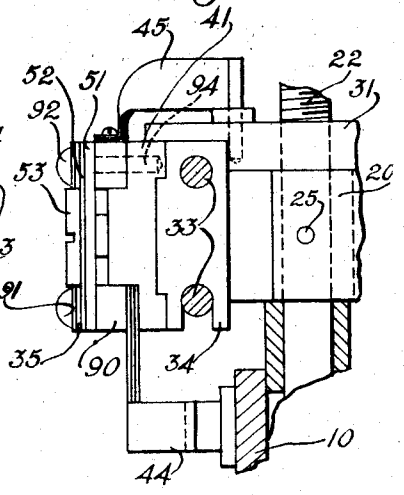


Fig. 5



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UNITED STATES PATENT OFFICE.

HENRY ROGERS MASSINGHAM, OF LA GRANGE, ILLINOIS, ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

HEATED ELEMENT.

Application filed August 16, 1924. Serial No. 732,368.

This invention relates to heated elements and to means for mounting them, and more particularly to electrically heated elements employed in a mechanism for severing and removing insulation from a conductor.

An object of the invention is to provide an improved heated element having a portion adapted to be heated to a substantially uniform temperature throughout, and means for mounting the element in such manner that it will not buckle or become deformed when it expands and contracts in response to variations in the temperature thereof.

One form of the invention is embodied in apparatus of the type shown and described in the copending application, Serial No. 513,328, filed November 7, 1921, by Levinger and Balduf for removing the insulating coverings from the ends of insulated conductors. The improved apparatus comprises electrically heated elements of improved form supported upon means which permit the elements to expand and contract without injury thereto.

Other objects and features of the invention will become apparent as the detailed description progresses, reference being had to the accompanying drawings, wherein—

Fig. 1 is a vertical section taken through apparatus embodying the invention;

Fig. 2 is a section taken on line 2—2 of Fig. 1;

Fig. 3 is a section taken on line 3—3 of Fig. 1;

Fig. 4 illustrates another form which the invention may take, and

Fig. 5 is a section taken on line 5—5 of Fig. 4.

In the drawings, 10 is a frame or support mounted upon a bench or other suitable supporting means 13. One portion of the frame 10 is enlarged to provide a flat guide surface 19 upon which rides a block 20. The block 20 is secured to a vertically disposed operating rod 22 by a pin 25. The operating rod 22 may be connected by any suitable means (not shown) to a suitable foot pedal or other operating means (not shown). A helical compression spring 28 disposed around the operating rod 22 tends to urge the rod 22 into a position wherein it holds the block 20 against a member 31 projecting forward from the guide surface 19. The rod 22 projects through the member 31. A plurality of adjusting nuts 32 threaded onto the upper end of the rod 22 are adapted to limit downward movement of the block 20. Mounted in the frame 10 are supports or rails 33 upon which ride a plurality of carriages 34, a carriage 34 being provided for each of a pair of heated elements 35. Each carriage 34 is equipped with a pin 38 having a rectangular portion 39 adapted to ride in one of a plurality of cam slots 40 formed in the block 20 (Fig. 3). The cam slots 40 are so designed that upon a slight movement downward of the block 20 the rectangular shaped portions 39 of the pins 38 will be moved toward each other thereby moving the carriages 34 in the same direction.

Mounted in front of each carriage 34 is an insulating block 41 having shoulders upon which rest a plurality of conductors for connecting the elements 35 with any suitable source of electrical energy (not shown) whereby the elements may be heated to a suitable temperature, the elements being wired in series. The supply leads are indicated at 43 and 44 and the connecting lead at 45. The supply leads 43 and 44 are connected to the heated elements 35 by copper terminal blocks 46 upon which the lower ends of the elements are supported and to which they are secured by screws 47. The upper ends of the elements are supported upon a plurality of L-shaped terminal blocks 80 to which they are secured by screws 81. Mounted upon the upper end of each insulating block 41 is a terminal block 82 against which one surface of the terminal blocks 80 normally rests. Each terminal block 80 is provided with a plurality of guide pins 84 which are slidably journaled in the associated terminal block 82. It is obvious that this construction permits the terminal blocks 80 to move upwardly when the elements 35 expand and permits them to return to their normal positions when the elements contract. This makes it unnecessary for the elements to buckle when they expand and is exceedingly advantageous in that the elements will become permanently deformed if they buckle when expanding.

Each terminal block 80 is electrically connected to its associated terminal block 82 by means of a laminated conductor 85 which has one of its ends secured to the terminal block 80 and the other of its ends secured to the associated terminal block 82. The

ends of the connecting lead 45 contact with the rear surfaces of the terminal blocks 82. The supply leads 43 and 44 are connected to a plurality of main supply leads housed into an auxiliary casing 62, one of the main supply leads being indicated at 60. The main supply leads are preferably connected to the source of electrical energy by a circuit (not shown) which includes a rheostat (not shown) adapted to control the temperature of the elements 35.

Engaging the front surface of each terminal block 46 and the front surface of its associated terminal block 82 is an insulating cap 51 made of mica and mounted thereon is a steel cap 52. Passing through the steel cap 52, the mica cap 51, and the insulating block 41, and screw threaded into the block 20 is a screw 53 for clamping the terminal blocks 46 and 82 in place on the insulating block 41 with the ends of the leads 43, 44, and 45 interposed therebetween.

As indicated in Figs. 1 and 2, the elements 35 are blades which may be composed of any suitable metal or alloy and are slotted where they are secured to the terminal blocks 46 and 80 by the screws 47 and 81, respectively, to facilitate the renewal of the elements in the event that they are burned out. Each heated element 35 comprises two portions 87 of reduced area and a portion 88 intermediate the reduced portions 87 and of a cross-sectional area larger than that of either of the reduced portions. The purpose of this construction is to prevent a narrow portion of the element substantially midway between its ends from rising to an excessively high temperature as compared with immediately adjacent portions of the element. In practice it has been found advantageous to have a comparatively long portion of the element rise to the desired temperature as this permits the insulating covering to be severed quickly and easily. The narrow portions 87 tend to become heated to a high temperature, but the heat is dissipated into the intermediate portion 88 in such manner that it assumes throughout its length the same temperature as the reduced portions 87.

The operation of the apparatus for moving the carriages 34 toward and away from each other is substantially like that of the apparatus disclosed in the aforementioned copending application for moving substantially identical carriages toward and away from each other. Briefly, in the operation of the mechanism the adjusting nuts 32 and the aforementioned rheostat (not shown) are first adjusted. The rheostat is adjusted for the desired amount of heat, the correct temperature being reached when the elements are heated to a cherry red. The operator then places one end of an insulated conductor between the elements 35, the insulated conductor so introduced between the elements being the one from which a portion of the insulating covering is to be removed. The operating rod 22 is moved downward by means of the foot pedal (not shown) and this downward movement of the rod 22 causes the rectangular portions 39 to move toward each other. This movement of the rectangular portions 39 is accompanied by a like movement of the carriages 34 which bring the heated elements 35 into engagement with the insulating covering on the conductor inserted between them. The operator then gives the conductor a slight twist and withdraws it from between the elements. The twist burns a groove in the insulation upon the conductor and the withdrawing movement severs and strips the insulation from the end of the conductor. The means for supporting the elements 35 are adapted to hold the elements 35 rigidly in their operative positions during the withdrawing movement so that the elements will not tend to follow the conductor as it is withdrawn. When the operating rod 22 is released, the spring 28 returns the apparatus to its normal position.

Figs. 4 and 5 illustrate another form of the invention which is embodied in apparatus also comprising a plurality of carriages 34, adapted to ride upon a plurality of rails 33 and which may be moved toward or away from each other by mechanism (not shown) substantially identical with the mechanism employed for actuating the carriages 34 in the apparatus shown in Figs. 1 to 3, inclusive. Each carriage 34 is provided with an insulating block 41 having shoulders adapted to accommodate the conductors for connecting the elements 35 with a suitable source of electrical current. The elements 35 are substantially identical with the elements 35 as shown in Figs. 1 to 3, inclusive, and are included in a circuit adapted to bring them to a suitable temperature. The lower end of each element 35 is supported upon a copper terminal block 90 and is secured thereto by means of a screw 91. The upper end of each element 35 is pivotally secured by a screw 92 to the free end of a copper terminal block 93 pivotally secured by means of a screw 94 to the associated insulating block 41. The copper terminals 93 are electrically interconnected by the laminated connecting lead 45 which is sufficiently flexible to permit the terminals to be displaced with respect to each other. The supply leads 43 and 44 have their ends clamped between the terminal blocks 90 and the insulating blocks 41. The means for so clamping the ends of the terminals 43 and 44 between the terminal blocks 90 and the insulating blocks 41 is substantially identical with the corresponding means shown and described in Figs. 1 to 3, inclusive.

In that form of the invention which is disclosed in Figs. 4 and 5, the heated elements 35 may expand and contract without permanent injury thereto, it being understood that as the elements expand the copper terminal blocks 93 will be angularly displaced to compensate for the increase in length of the elements. In a like manner, the terminal blocks 93 will permit the elements 35 to contract to their normal lengths when the apparatus is not in use.

What is claimed is:

1. In a mechanism for removing the insulating covering from a conductor, a plurality of heated elements disposed in opposed relation, a plurality of means for independently supporting the elements and permitting their free expansion and contraction due to changes in temperature thereof, and means for moving the supported elements into engagement with and thereby severing the insulating covering of a conductor.

2. In a mechanism for removing the insulating covering from a conductor, irrotationally movable carriages, burning elements, means for supporting said burning elements upon said carriages comprising terminal blocks having portions freely movable in response to expansion and contraction of the burning elements due to temperature changes therein, current leads for said blocks, insulating means between said terminal blocks and carriages, and means for clamping said leads to said blocks and the whole to said carriages.

3. In a mechanism for removing the insulating covering from a conductor, a pair of oppositely disposed burning elements, carriages therefor, means for mounting the elements on the carriages designed to permit the free expansion and contraction of the elements in response to temperature changes, means for moving said carriages in opposite directions to clamp an insulated conductor between the burning elements, and electrical terminals for conducting electrical current to the elements through the mounting means therefor to heat the elements and thereby sever the insulating covering on the conductor.

4. In a mechanism for removing the insulating covering from a conductor, a pair of carriages, a burning element for each carriage, means for attaching each element to the carriage therefor designed so that one end of the element moves freely in response to expansion and contraction of the element due to temperature changes, rails upon which said carriages are adapted to move, means for moving the carriages along the rails to clamp an insulated conductor between the burning elements carried by the carriages, and means for connecting the elements with a source of electrical current to heat the elements and thereby sever the insulation of the conductor.

5. In a mechanism for severing an article, an element comprising a plurality of spaced portions and a portion integral with and interconnecting the spaced portions, the connecting portion having a greater cross-sectional area than one of the spaced portions, and means for including the portions in series in an electric circuit whereby the portions are heated to substantially uniform temperature.

6. In a mechanism for severing an article, an element comprising a plurality of spaced portions and an intermediate portion of greater cross-sectional area than either of the spaced portions and connecting the spaced portions, and means for subjecting the element to an electric current to heat the spaced and intermediate portions to a predetermined temperature.

7. In a mechanism for removing insulating covering from a conductor, an electrically heated element comprising a plurality of portions of reduced cross-sectional area so designed and spaced apart as to insure uniform heating through the portion intermediate said reduced portions, and means for causing a relative movement between the element and an insulated conductor to bring the insulation of the conductor and the element into engagement thereby severing the insulation.

8. In a mechanism for removing the insulating covering from a conductor, a burning element comprising a plurality of spaced portions and a portion integral with and interconnecting these spaced portions, the interconnecting portion having a greater cross-sectional area than one of the spaced portions, a support for the element, means for mounting the element thereon, said means designed to permit the free expansion and contraction of the element in response to temperature changes therein, means for connecting the element with a source of electrical current to heat the interconnecting portion thereof to a predetermined temperature throughout, and means for causing a relative movement between the element and an insulated conductor to bring the insulation thereof and the element into engagement to sever the insulation.

In witness whereof, I hereunto subscribe my name this 2nd day of August A. D., 1924.

HENRY ROGERS MASSINGHAM.