Jan. 26, 1954 C. HERZOG 2,667,557

WIRE SEVERING APPARATUS

Filed April 12, 1950 3 Sheets-Sheet 1

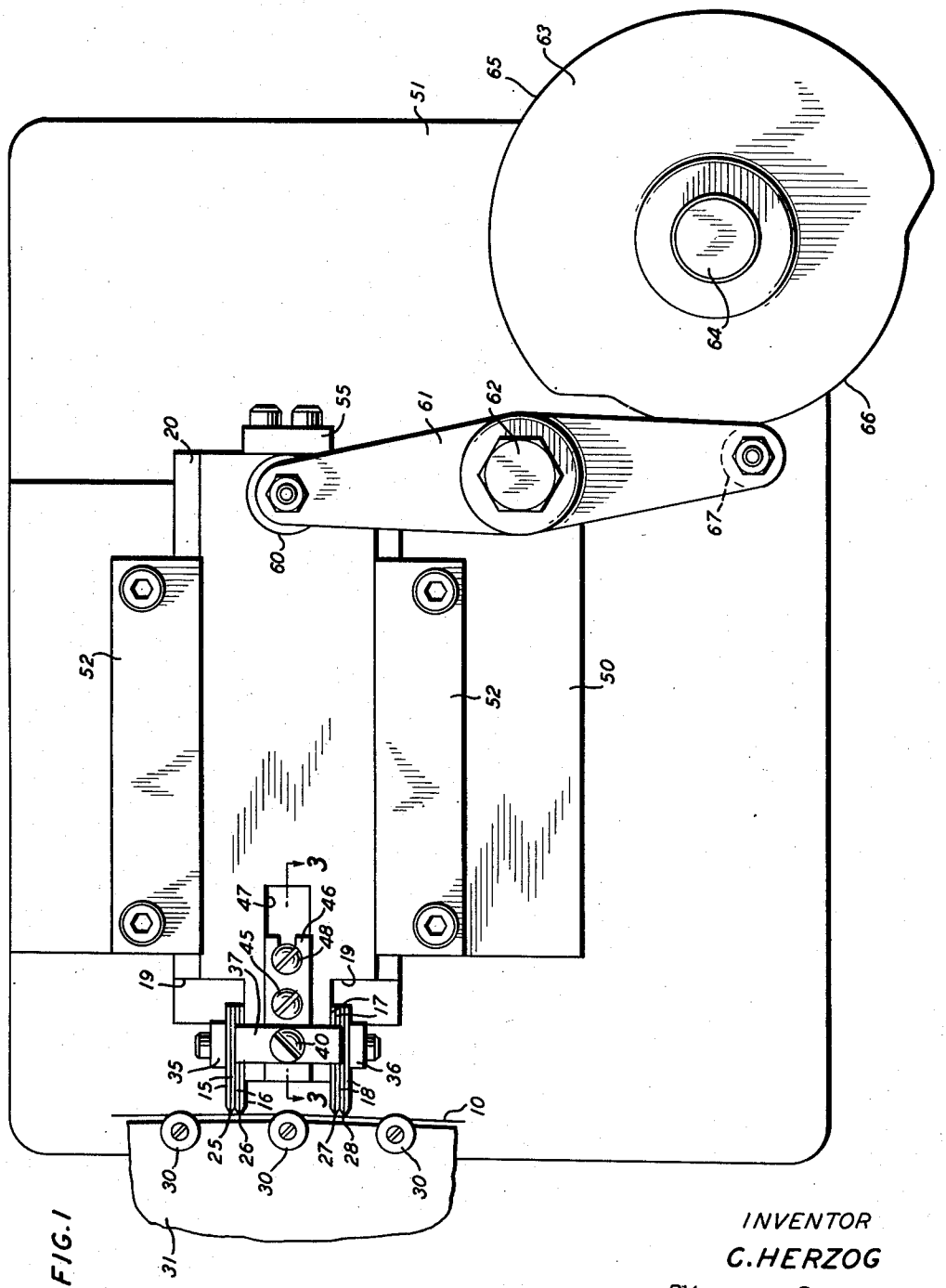


FIG. 1

INVENTOR
C. HERZOG
BY W. C. Parmele
ATTORNEY

Jan. 26, 1954 C. HERZOG 2,667,557

WIRE SEVERING APPARATUS

Filed April 12, 1950 3 Sheets-Sheet 2

FIG. 2

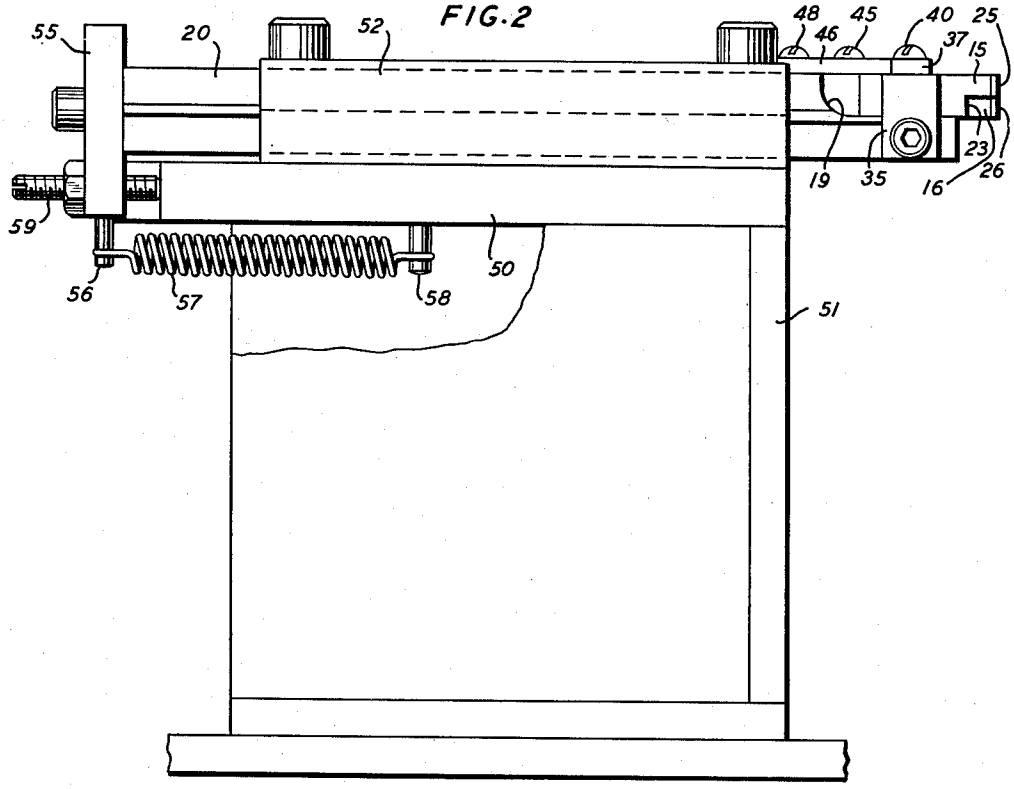


FIG. 3

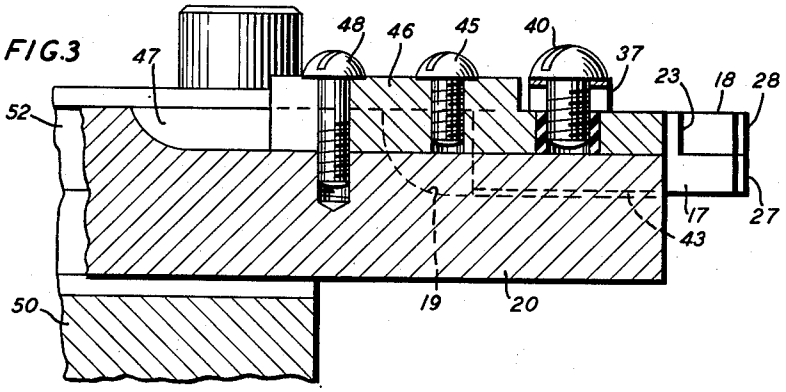
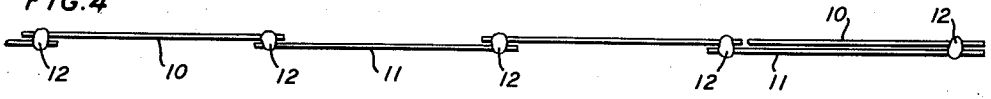


FIG. 4



INVENTOR
C. HERZOG
BY W. C. Parnell.
ATTORNEY

Jan. 26, 1954 C. HERZOG 2,667,557

WIRE SEVERING APPARATUS

Filed April 12, 1950 3 Sheets-Sheet 3

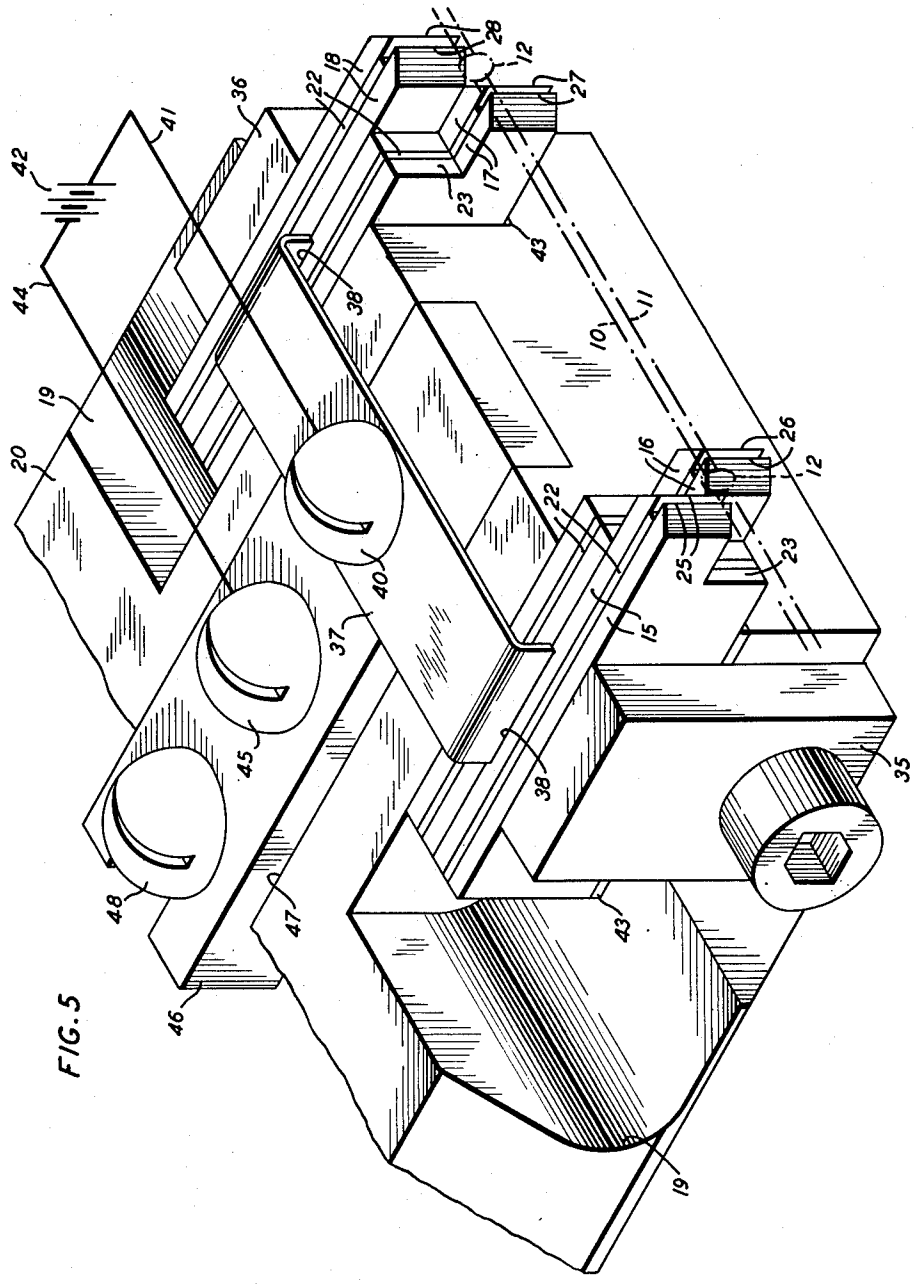


FIG. 5

INVENTOR
C. HERZOG
BY W. C. Parnell
ATTORNEY

Patented Jan. 26, 1954 2,667,557

UNITED STATES PATENT OFFICE

2,667,557

WIRE SEVERING APPARATUS

Carl Herzog, Belleville, N. J., assignor to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York

Application April 12, 1950, Serial No. 155,520

3 Claims. (Cl. 219—1)

1

This invention relates to wire severing apparatus and more particularly to apparatus for electrically severing or burning given lengths from longitudinally advanced wires.

In the manufacture on a continuous basis of a thermistor unit each comprising a bead of thermistor material with parallel lead wires extending in opposite directions from the bead, the beads are applied at suitable intervals to two spaced parallel wires. As a further step, it is necessary to remove a section of one of the wires between each adjacent pair of beads and, since the wires are of fine gauge and very closely spaced, it is difficult to perform this operation without damaging the remaining structure of the units.

An object of the invention is to provide an apparatus which is exceedingly simple in structure and highly efficient in operation to sever portions accurately from a longitudinally advanced wire.

With this and other objects in view, the invention comprises an apparatus for severing wire having spaced contacts included in a circuit to be completed by a portion of the wire to be severed, the contacts being moved intermittently relative to the path of the wire.

More specifically the invention includes four pairs of electrical contacts having knife-like edges disposed at suitable given positions to engage given portions of parallel wires advanced longitudinally intermittently in a given path. The contacts of each pair are insulated from each other and included in an electrical circuit which is closed when the contacts engage their respective portions of the wires whereby the electrical energy passing through the wires between the contacts will burn the wires in two at these portions thus electrically severing the wires. The contacts are supported on a carriage for movement therewith relative to the path of the wires so that two pairs of contacts may engage only one of the wires and the other pair of contacts may engage only the other wire. The carriage is normally urged toward the wires by a spring, but constantly under the control of a cam which permits the spring to function to move the contact into engagement with the wires and positively moves the contacts with the carriage away from the wires.

Other objects and advantages will be apparent from the following detailed description when considered in conjunction with the accompanying drawings, wherein

Fig. 1 is a top plan view of the apparatus;

Fig. 2 is a side elevational view of the apparatus, a portion thereof being broken away;

Fig. 3 is an enlarged fragmentary sectional view taken substantially along the line 3—3 of Fig. 1;

Fig. 4 illustrates the result of using the apparatus to remove portions from the wires at given positions; and

2

Fig. 5 is an enlarged isometric view of the forward portion of the carriage including the pairs of contacts or severing elements.

Referring now to the drawings, attention is first directed to Fig. 4 which illustrates parallel wires 10 and 11 spaced given distances apart and joined at spaced positions by beads 12 of thermistor material. Fig. 4 illustrates the result of the apparatus in severing alternate portions from the wires.

The apparatus disclosing the present embodiment of the invention includes four pairs of contacts or severing elements 15, 16, 17 and 18 mounted at cutaway portions 19 of a carriage 20. The contacts of each pair are separated from each other by insulating members 22 and are provided with cutaway portions 23 to position their knife-like leading edges 25, 26, 27 and 28, respectively at given positions as shown in Fig. 5. The wires 10 and 11 are supported by suitable units 39 holding them in their spaced positions, these units being mounted on a support 31 movable intermittently to advance the wires longitudinally in timed relation with the actuation of the carriage 20 so that the beads 12 will be disposed between the pairs of cutting elements as shown in Fig. 5.

The pairs of contacts are so positioned and supported by the carriage that the knife-like edges 25 and 28 of the upper contacts 15 and 18 will engage only the wire 10 and the knife-like edges 26 and 27 of the lower contacts 16 and 17 will engage only the wire 11.

The pairs of contacts 15 and 16 are held in their cutaway portion 19 of the carriage by a clamp 35, a similar clamp 36 securing the pairs of contacts 17 and 18 in their cutaway portion 19 of the carriage. The inner contacts of the two pairs at each side of the carriage electrically engage each other and are connected electrically by a terminal strip 37 as shown in Fig. 5. This connection is made by recesses 38 in the inner contacts of the two pairs at each side of the carriage to receive the ends of the terminal strip so that when the pairs of contacts with their intermediate insulating members 22 are secured in position by the clamps 35 and 36, the contacts are not only rigidly held against displacement, but the inner contacts are included through a terminal 40 in one side 41 of an electrical circuit having a source of electrical energy 42. Suitable members 43 insulate the central pairs of contacts electrically from the carriage 20. In the present embodiment of the invention, the outer contacts are electrically connected to the other side 44 of the circuit through a terminal 45 and a contact strip 46, the carriage 20 and the clamps 35 and 36. The contact strip 46 is mounted in a groove 47 of the carriage (Fig. 3) and is secured in place by a screw 48.

The carriage 20 is mounted on a support 50 of a unit 51 for longitudinal movement between

guides 52. A plate-like member 55 mounted on the back of the carriage supports a pin 56 to which one end of a spring 57 is connected, the other end of a spring being connected to a pin 58 supported by the under surface of the support 50. The spring 57 provides the force for normally urging the carriage forwardly to move the contacts into engagement with the wires, a distance controlled by an adjustable stop 59 carried by the member 55 in position to engage the support 50. The member 55 extends upwardly above the carriage to be engaged by a roller 60 supported by one end to a cam lever 61 which is pivotally supported at 62. A cam 63 continuously driven by a shaft 64 from a power means (not shown) has high and low portions 65 and 66 to alternately cause movement of the carriage with the contacts into and out of severing position. A cam roller 67 supported by the adjacent end of the cam lever 61 rides continuously upon the periphery of the cam.

Considering now the operation of the apparatus, let it be assumed that the wire advancing means, namely the support 31 and the units 30, travels intermittently in timed relation with the cycles of operation of the cam 63 whereby during each cycle of operaion of the apparatus, the wires will be advanced to position two new beads 12 between the pairs of cutting elements as shown in Fig. 1. While the wires are at rest in this position, the low portion 66 of the cam 63 will allow the spring 57 to function to force the carriage 20 forwardly toward the wires 10 and 11 a distance limited by the stop 59 at which time the knife-like edges 25 to 28, inclusive, of their respective pairs of contacts will have moved into electrical engagement with their particular portions of the wires 10 and 11 including these portions of the wires in the electrical circuits. The electrical energies travelling through the various circuits including the portions of the wires 10 and 11 between the knife-like edges of their contacts will be sufficient to burn these portions of the wires effectively severing the wires electrically without causing any lateral disturbance of the wires or the thermistor beads. With this arrangement of the contacts, the inner peripheries of contacts 16 and 17 will sever a complete portion from the wire 11, while the outer pairs of contacts will sever portions from the wire 10 on the opposite sides of the beads 12 at the severing position. Therefore in the next operation, as may be observed by viewing Fig. 4, the inner pairs of contacts 16 and 17 will again sever the complete portion from between the beads 12 while the contacts 15 complete the severing of the portion from the wire 10 uniformly severed at one point by the previous operation performed thereon by the contacts 18. Furthermore, the contacts 18 will perform another severing operation as before.

It is to be understood that the above described arrangements are simply illustrative of the application of the principles of the invention. Numerous other arrangements may be readily devised by those skilled in the art which will embody the principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

1. An apparatus for severing closely positioned wires bonded together by beads at regularly spaced intervals to produce a continuous string of beads each having lead wires extending in opposite directions from the bead comprising movable means to support the wires and advance them longitudinally in closely disposed parallel paths, means supported for movement through operating cycles in a given path toward and away from the paths of the wires, a pair of contacts for each wire having wire engaging edges and mounted on said means supported for movement and spaced from each other longitudinally of the paths of the wires and each pair opposite its respective wire, and circuits for the contacts supplied with electrical currents of sufficient amplitude to burn the portions of the wire engaged by the edges of the contacts in each pair and completing the circuits therebetween.

2. An apparatus for severing closely positioned wires bonded together by beads at regularly spaced intervals to produce a continuous string of beads each having lead wires extending in opposite directions from the bead comprising movable means to support the wires and advance them longitudinally in closely disposed parallel paths, means supported for movement through operating cycles in a given path toward and away from the paths of the wires, a pair of contacts for each wire having wire engaging edges and mounted on said means supported for movement and spaced from each other longitudinally of the paths of the wires and each pair opposite its respective wire, circuits for the contacts supplied with electrical currents of sufficient amplitude to burn the portions of the wire engaged by the edges of the contacts in each pair and completing the circuits therebetween, and means operable in timed relation with the wire supporting and moving means to move the said means supported for movement at predetermined intervals to move the engaging edges of the contacts into engagement with their respective wires intermittently.

3. An apparatus for removing alternate sections from closely spaced parallel wires bonded together by beads at regularly spaced intervals to produce a continuous string of beads each having parallel lead wires extending in opposite directions from the bead, the apparatus comprising means to support and advance the wires intermittently in a given path by a distance equal to twice the spacing between the beads, a carriage supported for movement through operating cycles toward and away from the path, four pairs of contacts having wire engaging edges mounted on the carriage in two groups spaced apart by at least one unit spacing of the beads on the wires with one pair of edges of each group disposed to engage one of the wires adjacent one side of a bead and the other pair of edges disposed to engage the other wire adjacent one other side of the bead, means for insulating the contacts of each pair from each other, a source of power connected to each pair of contacts, and means for reciprocating the carriage in timed relation to the advancement of the wires to move the wire engaging edges into contact with the wires to burn out the section of wire between each pair of contacts.

CARL HERZOG.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,339,417	Pierce	May 11, 1920
2,298,528	De Causse	Oct. 13, 1942
2,427,588	Burnett	Sept. 16, 1947
2,513,431	Sell	July 4, 1950