

[54] ARCH WIRE ANNEALER

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[22] Filed: Feb. 1, 1971

[21] Appl. No.: 111,194

[52] U.S. Cl. 219/156, 219/162

[51] Int. Cl. C21d 9/62

[58] Field of Search.....219/156, 162, 58, 107, 117

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[57] ABSTRACT

A device for annealing end portions of wire, including first and second contact members between which the wire is placed and to which electrical power is provided, wherein the wire completes the circuit, and wherein the contact members are such that varying lengths of wire can be annealed, and wherein one contact member is movable to present another portion thereof in association with the other contact member.

1 Claim, 4 Drawing Figures

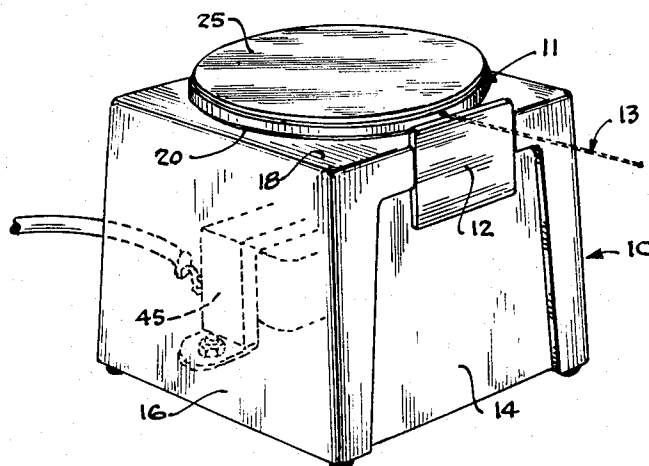


Fig. 1

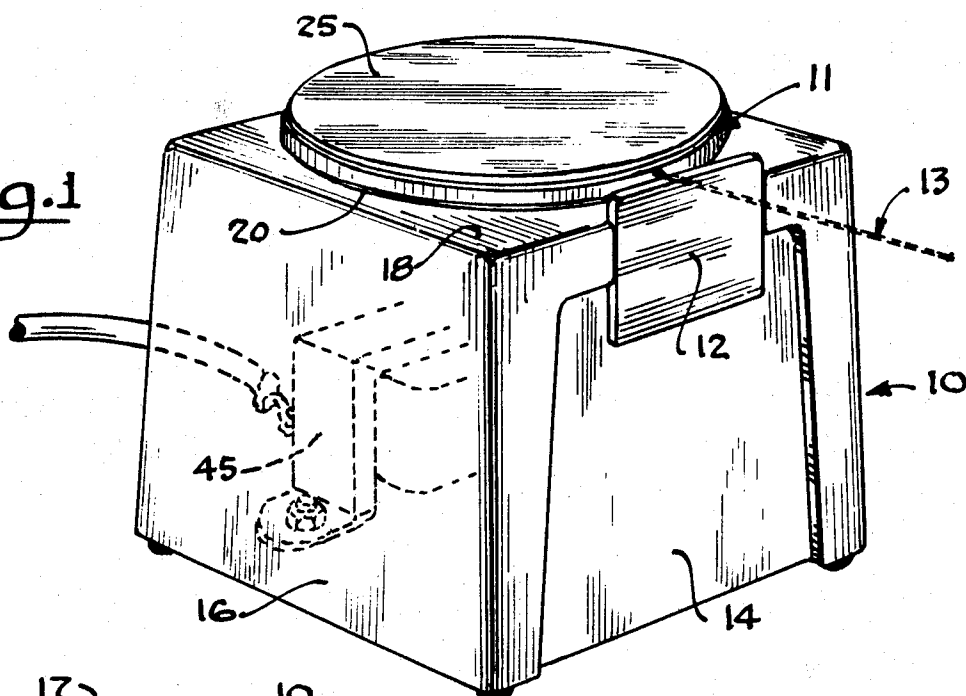


Fig. 2

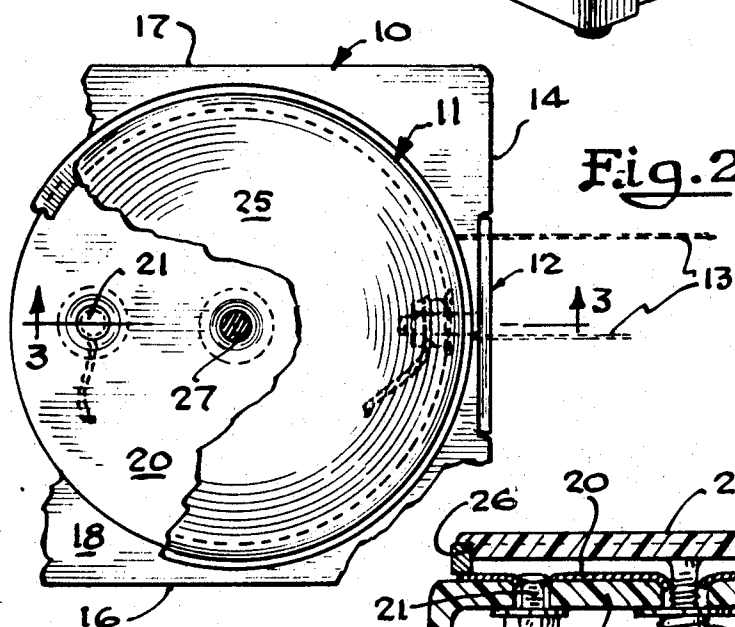


Fig. 3

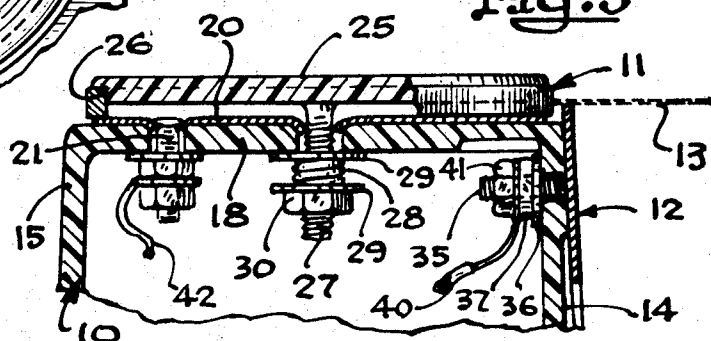
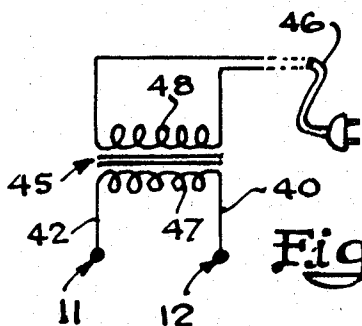


Fig. 4



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ARCH WIRE ANNEALER

This invention relates in general to a device for annealing the ends of wire, and more particularly to a device useful to those practicing orthodontia, for annealing the end portions of arch wire, small auxiliaries, uprighting springs, and the like.

Heretofore, it has been common for orthodontists to anneal the end portions of arch wires, small auxiliaries, uprighting springs and the like by applying heat through the use of matches, which is not only inconvenient and discomforting to patients, but likewise inconvenient and cumbersome to orthodontists.

The present invention overcomes the above difficulties in providing an electrically powered device for annealing the ends of orthodontic arch wires and the like, doing away with the use of matches, and further making it more convenient and efficient on the part of the orthodontist. The device includes a base of electrically insulating material upon which spaced electrical contacts are mounted and which contacts are connected to a source of electrical power. One of the contacts may be in the form of an annular bar, and the other contact may be in the form of a straight bar, although it is appreciated they may take some other form. The contacts are spaced from each other and aligned so that a wire may be extended into contacting relation with both contacts, thereby completing the electrical circuit and by virtue of the resistance in the wire causing it to be heated and annealed so that it may be easily and quickly bent as needed. The annealing relieves all spring qualities from the wire, it being appreciated that the wire used by orthodontists, usually stainless steel, must have spring qualities. One contact member is rotatable or movable to present different portions in association with the other contact member. This permits a renewed surface to be brought into position after pitting thereof is such as to require same. The pitting is caused by arcing between the end of the arch wire and a contact member as the arch wire is brought into contact therewith. While the device is operable on standard line voltage, in order to make it perfectly safe so that the human body can tolerate the potential across the contact members, a step down transformer is employed within the unit to step down the voltage at the contact members.

It is therefore an object of the present invention to provide an electrically powered wire annealer especially useful in the practice of orthodontia.

Another object of the present invention is to provide a wire annealer having spaced contact members across which a length of wire can be placed for annealing same by completing an electrical circuit, wherein one of the contact members may be in the form of an annular bar, and the other may be in the form of a straight bar so that varying lengths of wire can be annealed.

Still another object of this invention resides in the provision of a wire annealer including a pair of contacts across which a length of wire can be placed for annealing, wherein one of the contacts is in the form of a straight bar and the other of the contacts is in the form of an annular bar, and wherein the annular bar is rotatable to bring a different portion into association with the straight bar as the need presents itself when excessive pitting is encountered on the annular bar.

Other objects, features and advantages of the invention will be apparent from the following detailed disclosure, taken in conjunction with the accompanying sheet of drawing, wherein like reference numerals refer to like parts, in which:

FIG. 1 is a perspective view of the wire annealer according to the present invention, illustrating a length of arch wire in place to be annealed;

FIG. 2 is a top plan view of the annealer of FIG. 1, with some parts broken away to show underlying parts, and illustrating in phantom two different lengths of wire in position on the contacts for being annealed;

FIG. 3 is a vertical sectional view taken through the device substantially along line 3—3 of FIG. 2, with some parts shown in elevation, and illustrating again a length of arch wire in association with the contacts; and

FIG. 4 is an electrical schematic of the electrical circuit for the annealer.

Referring now to the drawings, the wire annealer of the invention includes generally a body or base 10 of insulating material such as a suitable plastic, and upon which is mounted first and second electrical contact members 11 and 12. The wire annealer is especially useful for annealing the ends of arch wires, small auxiliaries, uprighting springs, and the like to facilitate bending, and the end of an arch wire 13 is illustrated in FIG. 1, placed across the contacts 11 and 12 in the annealing position.

The base 10 is generally box-shaped and includes front and back walls 14 and 15, and opposed side walls 16 and 17. A top wall 18 connects to the front, back and side walls.

The contact member 11 as shown is in the form of an annulus, having a substantially rectangular cross section, and is pressed downwardly against a metal disk or plate 20 which is secured to the top wall 18 of the base 10 by a terminal bolt assembly 21. The metal plate 20 is circular in form and arranged to be in contact with at least some part of the metal annular contact 11.

The contact 11 is held onto the base 10 by a circular retainer 25 of electrically insulating material, such as plastic.

An annular shoulder 26 is formed at the periphery of retainer 25 for receiving the annular contact member 11 and maintaining it in proper alignment on the body. One end of a stud 27 is anchored in the plastic retainer 25, and extends through an opening in the plate 20 at the upper wall 18 of the base 10.

The retainer 25 and the contact member 11 are maintained in biased relationship against the plate 20 by means of a coil spring 28 surrounding the stud 27 and arranged between a pair of washers 29. A lock nut 30 is threaded on the stud 27 to hold the washer and spring in place and to hold the retainer 25 and contact 11 in place on the base. The contact member 11 may be in the form of a metal disk instead of an annulus and plastic retainer, but such would add weight and cost to the unit.

The contact member 12, in the form of a bar or plate is fastened to the front wall 14 of the base 10 by means of a stud 35 extending from the plate and through an opening in the front wall.

A washer 36 is applied to the stud on the inside of the wall 14 and against which a lock nut 37 is tightened to securely fasten the contact member to the body. As noted particularly in FIG. 2, a recess is provided on the outer face of the front wall 14 into which the contact member 12 fits to properly orient it relative to the annular contact member 11.

The stud 35 of the straight bar contact 12 also serves as an electrical terminal to which a conductor 40 may be attached by a nut 41, while the terminal bolt assembly 21 serves as a terminal to which a conductor 42 is connected. In order to provide an electrical potential across the contacts 11 and 12, that the human body can tolerate, a step-down transformer 45 is provided between the contacts 11 and 12 and the line cord 46, wherein the conductors 40 and 42 are connected to the secondary 47, and the line cord 46 is connected to the primary 48.

As seen in FIG. 1, the transformer 45 is mounted within the body 10. While not illustrated, it can be appreciated that the transformer may be mounted on an access panel closing the bottom of the body.

In operation, as seen in the drawings, and particularly in FIG. 2, the center part of the contact bar 12 is spaced closer to the center of the annular contact bar 11 than the opposite ends thereof, wherein it can be appreciated that the length of wire to be annealed may be varied by changing the position of the wire across the straight contact bar 12. Annealing of the end of an arch wire is accomplished with the power connected to the annealer, by first placing the wire onto and in contact with the straight bar 12 and then sliding it into contact with the annular contact bar 11. This will produce arcing between the end of the arch wire and the annular contact bar 11, which will cause pitting of the surface of the contact bar 11. Excessive pitting will decrease the ease of establishing contact and

reduce the usefulness. Accordingly, the annular bar 11 may then be rotated to bring a new portion into association with the straight contact bar 12. It can, therefore, be appreciated that the life of the contact bar 11 is substantially lengthened since it is rotatable.

As above suggested, the annular bar 11 may be in the form of a circular disk as long as an edge for sufficient contact is provided. Thus, a solid disk may be utilized as the contact member mounted on top of the base. Moreover, the contact member 12 on the front of the base may take the form of a flat circular plate, which would also provide varying distance therebetween to anneal various lengths of wire. Such a circular front plate may also be rotatable.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention, but it is understood that this application is to be limited only by the scope of the appended claims.

The invention is hereby claimed as follows:

1. An arch wire annealer for annealing wire to facilitate

bending thereof comprising, a hollow base of electrically insulating material including side walls and a top wall, a first electrical contact member in the form of a straight bar secured to the side of the base and having a horizontally extending edge projecting slightly above the top wall thereof, a terminal for the first contact member defined by a stud connected thereto and extending through a side wall to the hollow of base, a second electrical contact member in the form of an annular bar mounted on the top wall of the base spaced from the first contact member to define a gap therebetween of varying width, means rotatably mounting said second contact member on said top wall, an electrical conductive plate secured to said top wall below said annular bar and in electrical contact therewith a stud connected to said plate and extending through the top wall to the hollow of the base and defining a terminal, and means connecting said terminals to a source of electrical potential, whereby placing a wire in engagement with said contact members causes completion of the electrical circuit and heating of the wire.

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