Feb. 25, 1947. C. O. BARSTAD 2,416,370

ELECTRICAL SOLDERING IRON

Filed Aug. 28, 1945

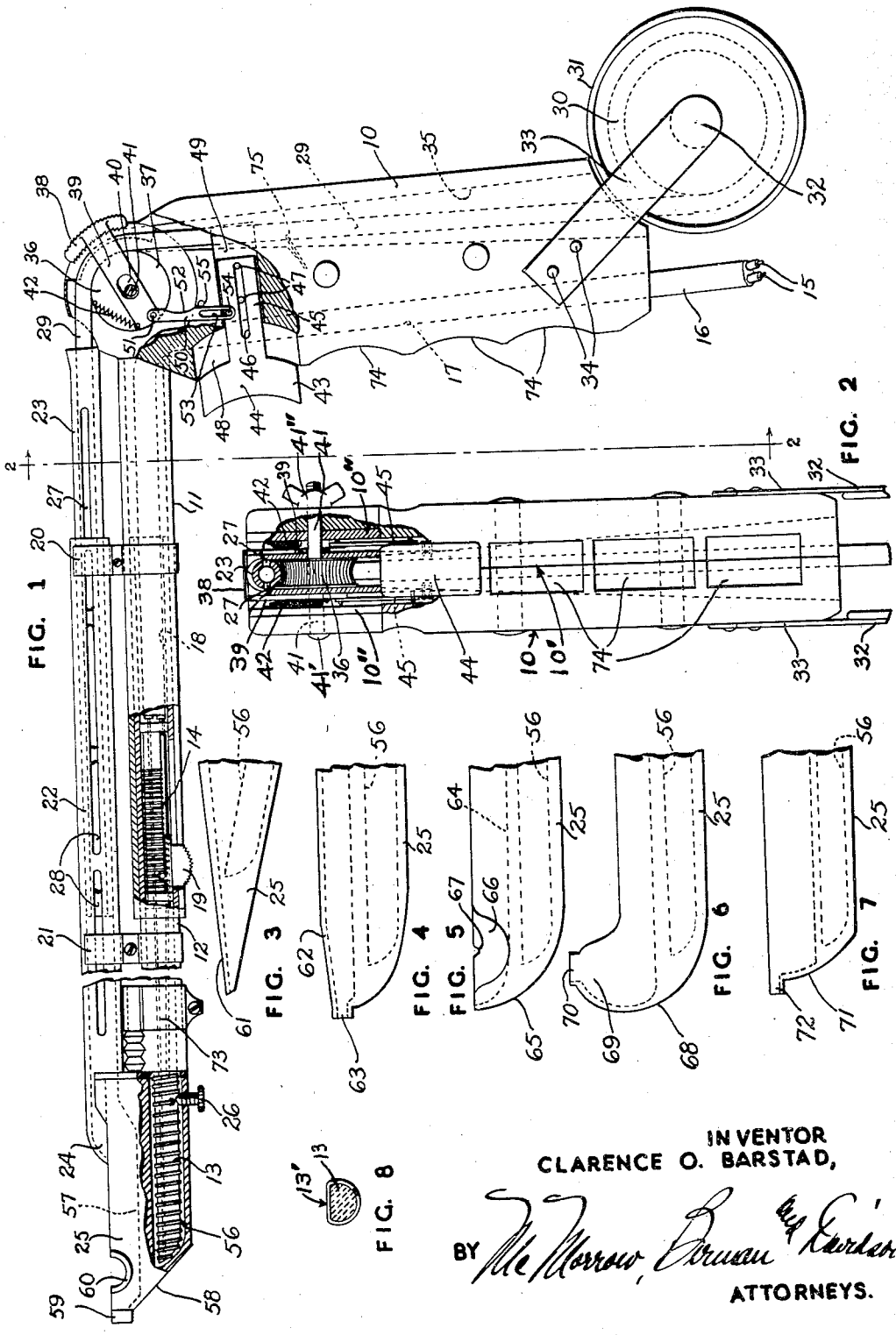


FIG. 1

FIG. 2

FIG. 3

FIG. 4

FIG. 5

FIG. 6

FIG. 7

FIG. 8

INVENTOR
CLARENCE O. BARSTAD,

BY McMorrow, Berman & Davidson

ATTORNEYS.

Patented Feb. 25, 1947 2,416,370

UNITED STATES PATENT OFFICE

2,416,370

ELECTRICAL SOLDERING IRON

Clarence O. Barstad, Minneapolis, Minn.

Application August 28, 1945, Serial No. 613,058

3 Claims. (Cl. 219—27)

1

This invention relates to electrical soldering irons and has for one of its objects to improve generally upon devices of this kind.

An important object of the invention is to produce a simple, compact and practical electrical soldering iron which is easily held and manipulated in one hand of the user and constructed and arranged for facilitating the manufacture of the same and at a minimum cost.

Another object is to provide for working adjustment of the device, including means for the feeding of a wire or strip or solder for a controlled melting of the solder and also having provision for the application and use of interchangeable solder delivering members to the device.

A further object is to provide for longitudinal adjustment of the body portions of the device.

A still further object is to provide an adjustable handle arranged and adapted to be set in different angular relations to the body portion of the device.

Other objects and advantages to be attained will hereinafter more fully appear in the following description.

In the accompanying drawings there is illustrated a practical but non-limiting embodiment of the invention, in which drawings:

Figure 1 is a general side elevation and partial sectional view of a complete device;

Figure 2 is a cross sectional view taken on or about the line 2—2 of Figure 1;

Figures 3 to 7, inclusive, are fragmentary views illustrative of modifications of solder delivering members for use interchangeably on the device; and

Figure 8 is a cross section through a preferred form of heating element.

Referring now to the drawings in detail, the numeral 10 designates a handle member of the pistol-grip type. Extending forwardly from the upper portion of the handle member 10 is a tubular body element which, as shown, is of telescopic type, that is to say, it comprises a tubular base member 11 hingedly attached at its inner end to the upper portion of the handle member 10 and has fitted slidably therein an extensible member 12 which is also tubular. Carried by and projected forwardly from the extensible tubular member 12 is a heating element 13, and inwardly from the heating element 13 there is a variable resistance coil 14. The resistance coil 14 is electrically connected at its outer end to the heating element 13 and at its inner end to the wires 15 of an insulated cord 16. The cord 16 is carried through a suitable passageway provided

2

therefor within the handle member 10, as indicated at 17, and thence, as at 18, to the resistance coil 14. A conventional, longitudinally slidable, switch element 19 is projected through registered longitudinal slideways in the outer tubular member 11 and inner tubular member 12, the switch member 19 being of a conventional character, as is the resistance coil 14, so that by sliding the switch member 19 longitudinally with relation to the coil 14 the resistance of the coil is accordingly varied, and a continued movement of the member 19 in one direction also breaking the electrical circuit. The details of these just described parts of the device being conventional and obvious the same are not illustrated in the drawings.

Supported by releasable clip elements 20, 21, is a telescopic tubular element that is disposed in parallel relation to the aforesaid telescopic element, the clip 20 being carried by the part 11 and the clip 21 by the part 12, said parallel telescopic element including the outer tubular member 22 and the inner tubular member 23 fitted longitudinally slidable therein. The inner tubular member 23 is made to terminate normally adjacent the top of the handle member 10 while the outer end portion of the member 22 is turned downwardly and curvedly to produce a nozzle portion 24 which is projected so as to overhang a solder delivery member 25 which is detachably secured about and to the heating element 13 and is held in place by any suitable securing means such as, for example, a set screw 26, as shown.

Tubular members 22 and 23 may have solid walls throughout the length thereof, but, as shown, said inner tubular member 23 may have longitudinal slots 27 in diametrically opposite portions of its wall while the outer tubular member 22 may have registering longitudinal slots 28 in the diametrical side wall portions thereof. These slotted wall openings in the members 22 and 23 are provided for the purpose of ventilation and also to have a view of the interior of the members 22 and 23 to observe the passage of a wire or strip of solder 29 which is fed through the members 22 and 23 and projected through the nozzle portion 24 of the member 22 in the use of the device. The wire or strip of solder 29 is supplied from a roll thereof contained within a holder 31 which is rotatably mounted on the lower end portions 32 of angularly disposed bracket arms 33 whose inner end portions are fastened, as at 34, to the opposite sides of the lower end portion of the handle member 10. The handle member 10 is provided with a passageway 35 therethrough for the wire or strip of solder

29, the strip or wire 29 being carried over a roller disc 36 which is fitted rotatably in a circular opening 37 provided therefor in the upper portion of the handle member 10.

Suitable means is provided for engaging and feeding the wire or strip of solder 29 in the immediate region where it passes over the roller disc 36. As shown, there is an arcuate thumb piece 38 having a pair of radial legs 39 which straddle within the upper portion of the handle member 10, said leg portions 39 having comparatively short longitudinal slots 40 therein, through which slots 40 the opposite end portions of the pivot shaft 41 of the roller disc 36 are projected and on which shaft portions the leg members 39 of the thumb piece 38 are both longitudinally movable as well as rotatable. A spring element 42 is provided for yieldably holding each of the leg members 39 in outwardly extended position on the pivot shaft 41. By this provision, the user of the device may press his thumb against the thumb piece 38 and thereby cause the inner surface of the thumb piece 38 (which is knurled, corrugated or otherwise roughened) to engage the roundedly bent portion of the wire or strip of solder 29 against the roller disc 36, and with the thumb piece thus engaged with the wire or strip 29 the user may press his thumb to cause a rotary movement of the thumb piece 38 and thus feed the wire or strip 29 in the direction to move its forward portion through the tubular members 23 and 22. By varying the rotative movement of the thumb piece 38 the user may regulate the feed of the wire or strip of solder 29 to the degree desired.

As shown, a trigger element 43 is provided for manipulation by the forefinger of the user to either assist the operation of the thumb piece 38 or to cause the feeding of the wire or strip 29 by the operation of the trigger element 43 only. The trigger element 43 is provided with a head portion 44 to be engaged by the finger of the user, and said head portion 44 has a pair of lateral leg extensions 45 to straddle opposite interior parts of the handle member 10, said leg members being provided with longitudinal slots 46 so that said leg portions may slide longitudinally on a pair of supporting and guide studs 47.

The head portion 44 of the finger piece 43 is depressible into a recess 48 provided therefor in the adjacent portion of the handle member 10 and the leg members 45 slide in slideways 49 provided therefor in the handle member.

The working connection between the finger piece 43 and thumb piece 38 is effected through the intermediary of link members 50 which are pivotally attached, as at 51, to the inner end portions of the respective leg members 39 of the thumb piece 38, said link members 50 having elongated longitudinal slots adjacent their opposite ends, as at 53, said slotted portions 53 engaging studs 54 provided therefor on the respective leg members 45 of the finger piece 43. On adjacent face portions of the handle member 10, interiorly thereof, fulcrum studs 55 are provided for engagement by longitudinal edge portions of said link members 50 and said edge portions of the link members 50 having curved recesses 52 in the region where said link members 50 engage said studs 55. By this link connection between the leg members 39 and the leg members 45, if the finger piece 43 is pressed and moved inwardly, the link members 50 are rocked by their engagement with the studs 55, this movement of the link members being also longitudinally downward

and thereby rocking the leg members 39 of the thumb piece 38 and pulling the same longitudinally inward on the pivot shaft 40 of the roller disc 36, this actuation of the leg members 39 causing the thumb piece 38 to engage the portion of the wire or strip of solder 29 so as to move the wire or strip 29 a step forward in the feeding thereof.

Obviously, while the dual provision for feeding the wire or strip 29 of solder is illustrated, that is to say, means for feeding the wire or strip 29 is provided for either thumb or finger actuation or in both ways at the same time, an electrical soldering device of the character of the present invention may be provided with only one of the said wire or strip feeding provisions, that is to say, with either the thumb piece 38 or the finger piece 43.

The interchangeable solder delivering members 25 may be made in various forms.

In Figure 1, the member 25 comprises an integral body having a longitudinal lower chamber 56 to receive the projected portion of the heating element 13. The upper portion 57 of the member 25 is channeled or dished longitudinally so as to contain the molten solder resulting from the projection of the end portion of the wire or strip 29 from the nozzle portion 24 of the tubular member 22 and into the receptacle portion 57 of the element 25, which element 25 is heated by the heating element 13. In the form shown in Figure 1, the forward end portion of the element 25 is undercut diagonally or beveled, as at 58, and its tip portion is provided with a restricted outlet 59, and, inwardly adjacent said restricted outlet portion 59, the element 25 is provided with lateral spouts 60. In this modification, the molten solder produced in the receptacle portion 57 may be discharged through either the restricted tip opening 59 or the lateral spout portions 60.

In the modification shown in Figure 3, the solder delivery element 25 is of the pointed tip type and in separate parts is provided with a longitudinal groove 61 in which groove the solder is melted and allowed to run out of the tip portion of the groove.

In Figure 4, the element 25 is covered at its forward end portion and provided at its discharge end with a restricted outlet 63, it being understood, of course, that the inner portion of the element 25 is uncovered at least sufficiently to receive the nozzle portion 24 of the tubular member 22.

In Figure 5, there is shown a further modification of the element 25, wherein the upper portion of the element is generally depressed or channeled, as at 64, and its forward end portion is undercut curvedly, as at 65. In this modification there is no provision for direct endwise delivery of the molten solder from the receptacle portion 57 but there is provided a lateral cupped extension adjacent its end, said cupped portion 66 having a slightly notched outlet portion 67 through which the molten solder is delivered sidewise from the element 25.

In Figure 6, there is a still further modification illustrated somewhat along the lines of the modification shown in Figure 5 except that the upwardly curved forward end portion 68 is extended further upwardly, as at 69, and provided with a discharge portion 70. In this last named modification, obviously, the device in use is handled with the tubular portions 11 and 12 and 23 and 22 disposed in a substantially vertical position with the modified element 25 lowermost.

Yet another modification is illustrated in Fig-

ure 7 wherein the element 25 is generally similar to the modification illustrated in Figure 1 except that the beveled forward end portion 71 is rounded slightly instead of being beveled on a straight angular line as shown at 58 in Figure 1 and also instead of having the lateral delivery notch 60 as in Figure 1 there is provided only the end discharge nipple 72 similar to the part 59 in Figure 1.

As a further means of attachment of the molten solder delivery element 25 to the device, in addition to the aforesaid set screw 26, a clip 73 may be provided as indicated in Figure 1 for detachably securing the rear end portion of the element 25 to the forward end portion of the tubular body member 12.

To enable the user of the device to grasp the handle member 10 more firmly the handle member may be provided with a plurality of curved recesses 74 along its inner edge portion just below the finger piece 43 for the reception of the user's fingers below the forefinger which is applied to the finger piece 43 in its manipulation for the feeding of the wire or strip of solder 29.

Also, it is preferable to provide a spring tongue member 75 within the body of the handle member 10 and have said spring tongue extend some distance into the passageway 35 so that the protruded end portion of the member 75 takes into the wire sufficiently to prevent return movement of the wire yet the member 75 is positioned at such an angle that the wire is readily fed through manipulation of the thumb piece 38 and finger piece 43.

From the foregoing it is evident that the device of the present invention is adaptable for many different soldering operations particularly due to the provision of the interchangeable solder distributing elements 25 and the adjustability of the tubular body portions of the device together with the handle provision and arrangements for the convenient handling and manipulation of the device and the means for selectively feeding the wire or strip of solder from the supply source on the handle to the nozzle portion through which the wire or strip of solder is projected in the quantity desired into the melting portion of the element 25.

It is here noted that the heating element 13 (see Figure 8) is preferably formed semi-circular in cross section, that is to say, it may be semi-circular, substantially as shown, and have a flattened top face 13' of substantial width and extending throughout the working length of the element. This flattened top face is to afford an extensive heating area for a maximum effect to quickly and thoroughly melt the solder as it is fed to the delivery member 25. As to the cross sectional form of the heating element, it is not to be limited exactly to that shown, as the same may be of a different body shape but the flattened maximum heating face 13' is to be retained in all forms. Obviously, for the accommodation of the heating element 13 therein, the longitudinal openings or sockets 56 of the solder delivery elements 25 are to be of a complementary cross sectional form.

The hinged attachment of the handle member 10 may be effected in any desirable or approved manner. As indicated in the drawings (see more particularly Figure 2) the pivot shaft 41 is in the form of a bolt extended through the associated parts from side to side of the handle member 10, the bolt having a head 41' at one end and a nut element 41'' at its opposite end. The nut element 41'', preferably in the form of a wing nut for easy manipulation, is provided for the ready loosening and tightening of the handle member 10 for angular adjustment of the latter with relation to the body member of the device, the adjustment of the handle member 10 being through an angle of approximately 90 degrees so that the handle may be swung a slight distance forwardly from that shown in Figure 1, and also rearwardly so as to bring it substantially in longitudinal alinement with the body portion so that the device may be used like an ordinary straight handled soldering iron. Generally stated, the handle member is made in two half sections, divided along the medial vertical line 10' as shown in Figure 2. Placed just inside of each handle section, in opposed relation to the intermediate parts, including those 36, 39 and 50, is a washer element 10'' (see Figure 2). These washer elements 10'' are suitably recessed on their inner faces to afford ample working clearance particularly of the movable parts 39 and 50, but otherwise they are engageable closely against the next adjoining, interposed, inner solid face portions of the body member of the device as well as the adjacent upper portions of the handle member sections, by which provision and arrangement it is obvious that the handle can be adjusted and tightened in its angular positions relative to the body member by merely manipulating the nut element 41'' on the through-bolt 41, whereby the handle member 10 while frictionally held in its adjusted positions it is at the same time readily moved by reasonable force applied thereto, and yet there is no binding upon or interferences with the movable parts of the device.

While the structure illustrated in the drawings is a practical exemplification of the invention it is obvious that the same admits of considerable modification within the purview of the invention as defined in the appended claims. The invention, therefore, is not limited to the specific construction and arrangement shown.

Having thus described the invention, what is claimed is:

1. In an electrical soldering device of the character described, an elongated tubular body portion and a rigid pistol-grip type handle portion through which a strip of solder is passed in the use of the device, feeder means for the strip of solder, a thumb piece constructed and arranged for operation of the feeder means, said thumb piece being located at the rear upper portion of the handle member, and a finger piece constructed and arranged with a linked lever connection with the thumb piece whereby the thumb piece and finger piece may be jointly manipulated in the feeding of the strip of solder or either the thumb piece or the finger piece manipulated individually for the feeding of the strip of solder.

2. An electrical soldering device as set forth in claim 1, wherein the feeder means includes a rotatable roller disc, the finger piece includes a pair of radial arms straddling the roller disc and each having a longitudinal slot through which the shaft of the roller disc extends, a spring element normally urging the slotted arms of the finger piece outwardly so as to hold the finger piece yieldably in disengaged relation to the strip of solder, the finger piece being mounted movably transversely of the handle member and the linked lever connection between the thumb piece and finger piece cooperating with a fulcrum stud whereby a movement of the finger piece inwardly of the handle member causes a combined longi-

tudinally inward and rocking movement of the arms of the thumb piece.

3. An electrical soldering device as set forth in claim 1, wherein the rigid pistol-grip type handle portion is hingedly attached to the body portion with frictional holding provision in connection therewith whereby the handle portion can be adjusted in angularly set working relation to the body portion.

CLARENCE O. BARSTAD.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,893,093	Linville et al.	Nov. 15, 1929
1,906,225	Dupau	Apr. 14, 1932
2,025,509	Hieber	May 10, 1934
1,596,432	Henson	Mar. 18, 1925