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GB 2044154 A US 5019688 A

(58) Field of Search
UK CL (Edition N) B3R
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(54) SOLDERING IRON

(57) Solder material (18) or desoldering braid is fed to a location in close proximity to the tip (14) along a passage or channel provided in or on the handle (10). A manually depressible member (26) is provided to engage and advance the material (18), which member is depressible against the bias of a first spring (27) and is slidable in the direction of the tip (14) against the bias of a second spring (28).

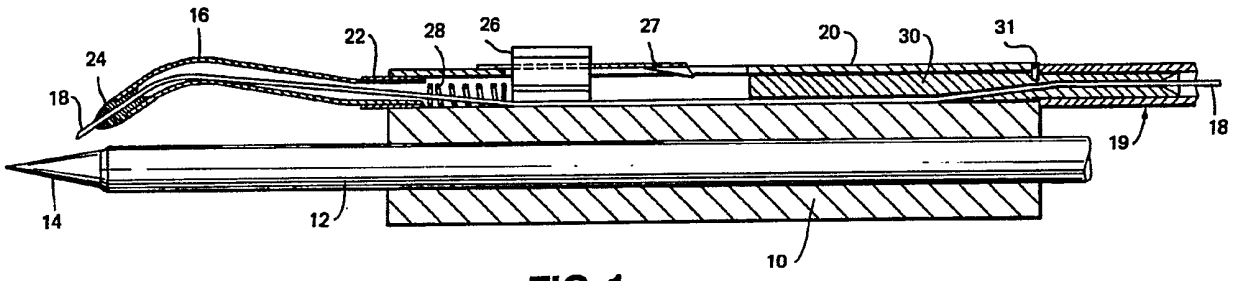

FIG. 1

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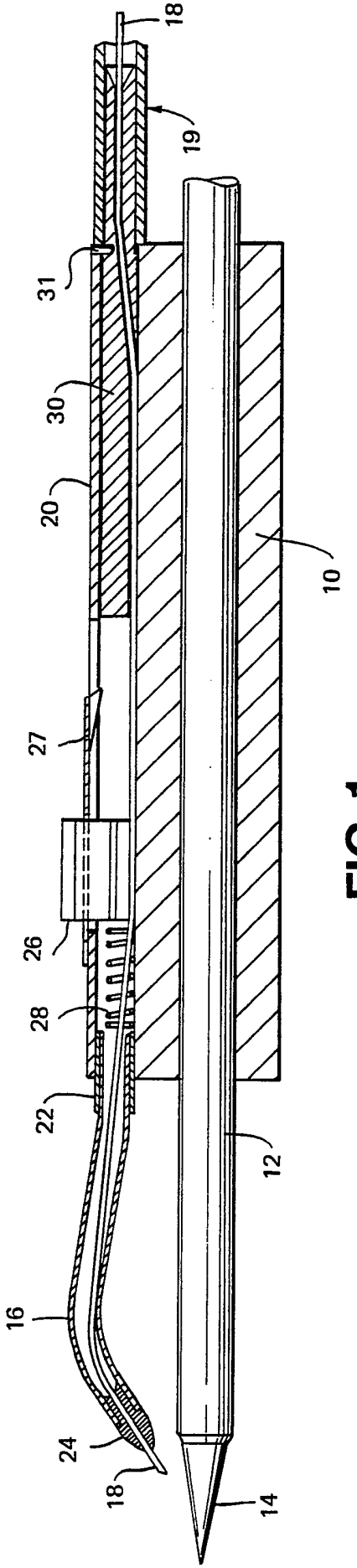

FIG. 1

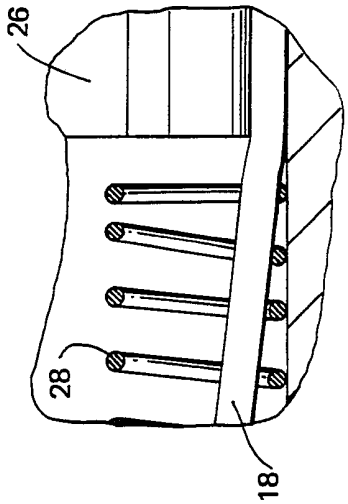

FIG. 1a

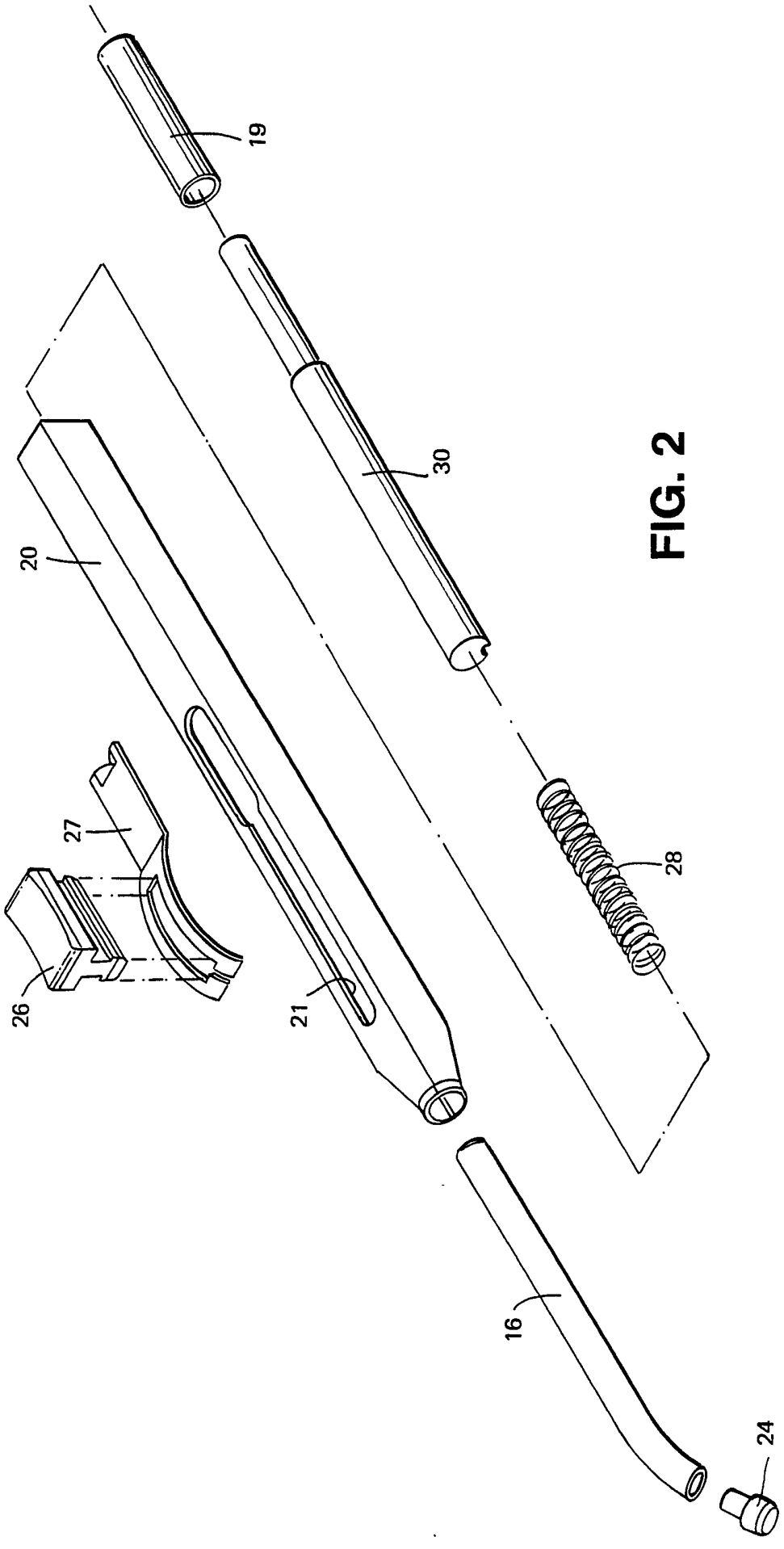

FIG. 2

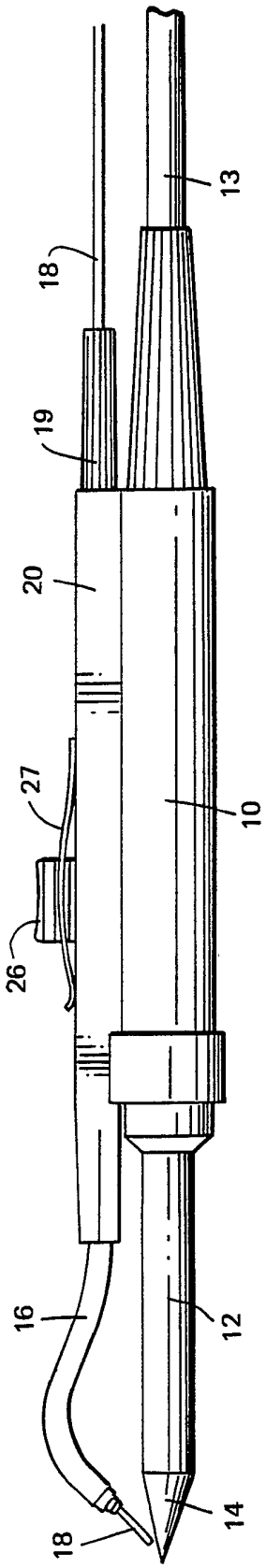

FIG. 3

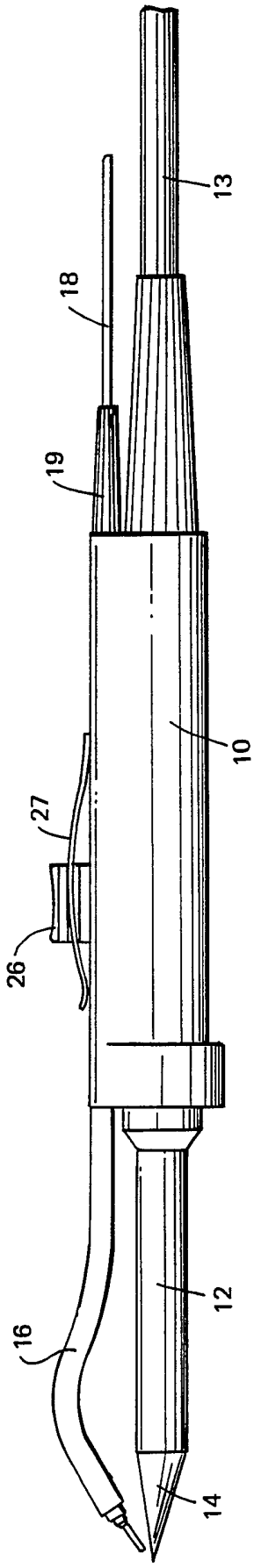

FIG. 4

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Soldering Iron

This invention relates to a soldering iron.

Electric soldering irons usually comprise a handle, a tip heated by an electric element and a lead whereby the element can be connected to a power supply. Usually support and/or suspension means will be provided but these are not of relevance to the present invention. Comparable irons incorporate a gas cylinder and a burner to be portable and eliminate the need for a power lead. Others operate from gas via a flexible conduit.

One of the problems with a soldering iron is that when an item is being soldered three processes need to be carried out simultaneously. Firstly, the article to be soldered needs to be supported, secondly the article needs to be heated and thirdly solder needs to be applied. In electronics and similar soldering the requirements of flux supply has been eliminated by the use of solder having an accompanying flux supply, for example by using wire solder with flux cores.

For larger jobs it is convenient to support the workpiece and for the user to apply the soldering iron with one hand and the solder

with the other. However when a large number of jobs are to be carried out, and where the workpiece is small or light, the repeated mounting and demounting of the workpiece can be time consuming and hence expensive. Consequently, numerous proposals have been made for a soldering iron provided with means whereby solder can be supported and fed towards a workpiece to be soldered.

One known proposal involves the mounting of a spool of solder wire upon the handle of the soldering iron, and a trigger operated mechanism, also mounted on the handle, to bring about advance of the wire along guide means to the tip of the soldering iron. Another proposal, disclosed in GB 2 044 154A, for manual advancement of solder material to the tip of a soldering iron involves provision of a slide, which is permanently in engagement with the solder by means of a feed dog, and is slideable against spring bias to advance the material. The slide is caused to move forward by downward pressure on a pivotal member which has an oblique surface engaging a roller on the slide. Backward movement of the solder, upon return of the slide and the pivotal member under spring bias, is prevented by a suitable latch device.

An object of the present invention is to provide a hand held soldering tool with means for feeding solder material (or indeed, de-soldering braid) to the tip, which means is of particularly simple construction and thereby is economic to produce and

trouble-free in operation.

According to the present invention a hand held soldering tool comprises a handle carrying a soldering iron tip, means for heating said tip, guide means providing a channel or passage along which material, in the form of a strip, wire or braid, may be fed to said tip, and a mechanism for feeding said material along said channel or passage towards said tip, said mechanism comprising a member, arranged on the guide means, which is manually depressible against the bias of first spring means so as to make contact with any material lying in the guide means and which is also slidable against the bias of second spring means so as to advance any contacted material towards said tip.

Preferably the aforesaid guide means provides a substantially closed passageway having a longitudinal slot through which the member of the feed mechanism projects for contact with the said material.

The first spring means is conveniently a leaf spring, while the second spring means is conveniently a helical spring. However a different choice of spring means may serve equally well.

The guide means may be an integral part of the handle, namely a channel or groove provided in the surface thereof, or therethrough, or may be both of these in different regions.

Alternatively it is envisaged that the guide means may be provided as a separate fitment for mounting onto the handle of a conventional solder iron in order to enhance its operability.

The invention will be described further, by example, with reference to the accompanying drawings wherein;

Figure 1 is a partial longitudinal cross-section of a preferred soldering iron of the invention;

Figure 1a is an enlarged detail of the region labelled A in figure 1;

Figure 2 is an exploded view of the solder feed attachment according to the invention which is shown mounted in operative position in figure 1;

Figure 3 is a schematic side elevation of a soldering iron very similar to that shown in figure 1; and

Figure 4 is a similar view of an alternative embodiment.

Referring firstly to figures 1 and 3 a preferred soldering iron has a handle (10) of insulating material with a shaft (12) extending therethrough. The shaft (12) projects from a front end of the handle (10) to provide a soldering iron tip (14), which is

heated by a heating element (not shown) disposed within the shaft (12). At the rear end of the handle (10), the shaft (12) also projects and is there connected to a cable (13) whereby the element is supplied with electrical power.

In order that solder material (18) can be fed to the tip (14) guide means is provided in the form of a feed tube (16), a substantially rigid hollow casing (20) and a delivery tube (19), which are connected together from the front (where the tip is) to the rear of the tool to provide a passageway through which the solder material can be advanced.

The casing (20), which is shown more clearly in figure 2 is mounted onto the handle (10) and in the illustrated embodiment extends substantially the full length of the handle (10). One end of the feed tube (16) fits into the front end of the casing (20), i.e that end nearest the tip (14), by way of a collar (22). The free end of the feed tube (16) is positioned adjacent the tip (14) and is fitted with a nozzle (24) through which solder material (18) emerges during a soldering operation.

The feed tube (16) is adjustable by being rotatable relative to the casing (20) and by being capable of moving further in or further out of the front end of the casing (20), so that, in effect, it is extendible. The feed tube (16) may also itself be formed of flexible material, such as copper, so that its

curvature can also be adjusted. Accordingly, the position of the nozzle (24) can be adjusted so that the solder is appropriately directed at the tip (14) and so as to suit any particular job or operative.

In this respect it is also important that the feed tube (16) is positioned sufficiently far from the tip (14) that there is no possibility, in normal use, of the solder (18) melting in the tube (16) or in the nozzle (24) to such a degree as to cause solidification at the tip and malfunction of the solder feed arrangement.

The aforesaid provisions for adjustment of the tubing (16) are particularly important where the guide (16, 20, 19) is formed, as in Figures 1 to 3, as a separate unit which is an addition to a pre-existing style of soldering iron, since the nozzle position can then easily be suitably positioned adjacent the tip and in an orientation to direct solder material towards said tip without the need for special care in the position of mounting of the casing (20) upon the handle (10).

In the presently described embodiment the solder material (18) is in the form of wire. Such wire is quite soft and is capable of being pushed along the guide (20, 16, 19) and out through the nozzle (24) by the force of a user's thumb, for example.

To enable the feeding of solder wire through the passageway provided by the guide means the casing (20) has a longitudinal slot (21) in its upper wall and a feed mechanism consisting of a pusher member (26) and two springs (27, 28) associated with said slot (21). The pusher member (26) is, as shown, of I-shaped cross section. Its upper portion is enlarged to provide a top surface suitable for engagement by the thumb of a user who is grasping the handle (10). Its central portion extends through the slot (21) and its lower portion is retained within the passage in the casing (20). The first spring (27) is a leaf spring with a flexing portion provided with a slot (29) through which the central portion of the pusher member (26) also engages. The leaf spring (27) lies outside the passage, on top of the casing (20) and is retained solely by engagement of the pusher member (26) through its slot (298). Both the pusher member (26) and the leaf spring (27) are longitudinally slidable along the casing slot (21). The flexing portion of the spring (27) normally holds the pusher member (26) out of contact with any solder wire in the casing passage. On application of downward manual pressure to the pusher (26), the flexing portion deforms from its normally convex curvature to straight or concave to allow the lower surface of the pusher to make contact with the wire. Once in firm contact with the wire, the pusher (26) can be pushed forward along the slot (21) so as to advance the wire (18), with the leaf spring (27) also being carried forward at the same time.

The second spring (28) is a helical spring which is located in the passageway of the casing (20). The solder wire (18) passes through the centre of this spring, as shown in figures 1 and 1a. This spring (28) is appropriately positioned in the vicinity of the front region of the slot (21). It is compressed as the pusher member (26) is moved forward. As shown in figure 1a, the pusher member (26) need not contact the spring (28) upon forward motion of the former in contact with the wire (18) . The compression force may be transmitted by way of the wire which is gripped and held down by the pusher member (26). When the pusher member (26) is released, the helical spring (28) is able to expand again to urge the pusher member (26) along with the leaf spring (27), to their rearward start position.

An insert (30) is provided in the rearward end region of the casing (20) extending into the adjoining delivery tube (19). A pin (31) holds this insert in position. This insert (30) is formed with a central bore in its rear portion communicating with a notch in its front region thereby defining a path through which the solder wire is guided. It may be formed of brass or plastics or any other suitable material. It may be cylindrical, as shown in figure 2, or any other suitable shape. It serves, as just stated, for guidance of the wire, but it also usefully removes any bends or kinks in the wire as well as providing an attachment point for the delivery tube (19).

Use of the above described soldering iron, specifically the solder feed mechanism will readily be understood by reference to figure 1. The tool is loaded with lengths of solder wire (18) which are progressed towards the tip (14) as soldering continues. In this respect the wire (18) is guided through the delivery tube (19), the casing (20) and the feed tube (16), as already explained, with the aid of the insert (30), and is advanced by frictional engagement and forward movement of the pusher member (26), which is depressed manually, against the leaf spring (27) and in that position, in contact with the wire (18), is urged forwards, also by manual pressure, against the bias of the helical spring (28). Upon release of the pusher member (28), it is returned, along with the spring (27) to its original position to the rear of the slot (21) in which it is slidingly engaged, by the action of the spring (28).

The feed mechanism is particularly simple and is therefore inexpensive to manufacture and reliable in use. Moreover, the user should be able to control the distance which the solder wire is moved upon actuation of the pusher (26) so that the amount of solder supplied can, if desired, be varied.

Although the above embodiment of the invention has been descrubed with respect to a feed mechanism for solder wire, said mechanism could easily be modified for feeding solder material in strip form through a passageway or channel to the tip. Also possible is

the feeding of de-soldering braid in cases where the tool is used for the purpose of removing rather than applying solder material.

Figure 4 shows an alternative embodiment where the guide means of the solder feed mechanism is integrally formed in a handle of a soldering tool, rather than being provided as an additional casing (20). In this respect it is simply a matter of a passageway being provided in the handle itself, with a slot therein to allow the pusher member (26) and associated leaf spring (27) to be mounted for sliding therealong. All the other parts are the same and have accordingly been denoted by the same reference numerals without the need for repetition of the description thereof.

Instead of a closed passageway, the guide means can comprise an open channel, throughout its length or in parts, or just a series of guide rings. Many other structural variations are possible within the scope of the invention.

It should be noted that in the feed mechanism according to the invention it is possible to feed solder material (or desoldering braid) in either direction, i.e forwards or backwards, which was not always possible with previously known mechanisms. This feature is advantageous as the user can freely ensure that solder does not rest in contact with the tip and melt prematurely when the iron is being put into use at the start of an operation.

Claims

1. A hand held soldering tool comprising a handle carrying a soldering iron tip, means for heating said tip, guide means providing a channel or passage along which material, in the form of a strip, wire or braid, may be fed to said tip, and a mechanism for feeding said material along said channel or passage towards said tip, said mechanism comprising a member, arranged on the guide means, which is manually depressible against the bias of first spring means so as to make contact with any material lying in the guide means and which is also slidable against the bias of second spring means so as to advance any contacted material towards said tip.

2. A soldering iron as claimed in claim 1 wherein the guide means provides a substantially closed passageway having a longitudinal slot through which the member of the feed mechanism projects for contact with the said material.

3. A soldering tool as claimed in claims 1 or 2 wherein the first spring means is a leaf spring.

4. A soldering tool as claimed in claim 1, 2 or 3 wherein the second spring means is a helical spring.

5. A soldering iron as claimed in any preceding claim wherein the guide means is, at least in part, formed integrally with the handle.

6. A soldering tool as claimed in any preceding claim wherein the guide means has a front end portion, adjacent the soldering iron tip, in the form of a feed tube which is extendible relative to a fixed rear end portion of said guide means.

7. A soldering tool substantially as hereinbefore described with reference to and as illustrated by figure 1 and 3 or figure 4 of the accompanying drawings.

8. An attachment for a soldering iron, for mounting on the handle thereof, comprising guide means providing a channel or passage along which material, in the form of a strip, wire or braid may be fed, and a mechanism for feeding said material along said channel or passage comprising a member arranged on the guide means, which member is manually depressible against the bias of first spring means so as to make contact with any material lying in the guide means and which is also slidable against the bias of second spring means so as to advance any contacted material along the guide means.

9. An attachment for a soldering iron substantially as hereinbefore described with reference to and as illustrated by figure 2 of the accompanying drawings.

Patents Act 1977

Examiner's report to the Comptroller under Section 17 (The Search report)

Application number
GB 9422943.2

Relevant Technical Fields

(i) UK Cl (Ed.N) B3R

(ii) Int Cl (Ed.6) B23K

Search Examiner
D N P BUTTERS

Date of completion of Search
4 JANUARY 1995

Databases (see below)
(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii)

Documents considered relevant following a search in respect of Claims :-
1 TO 9

Categories of documents

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E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
X	GB 2044154	(ROSÉN)	1, 4, 5, 6
X	US 5019688	(CHENG)	1, 2, 3, 8

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