April 13, 1943. R. B. ANNIS 2,316,388

METAL ETCHING STYLUS

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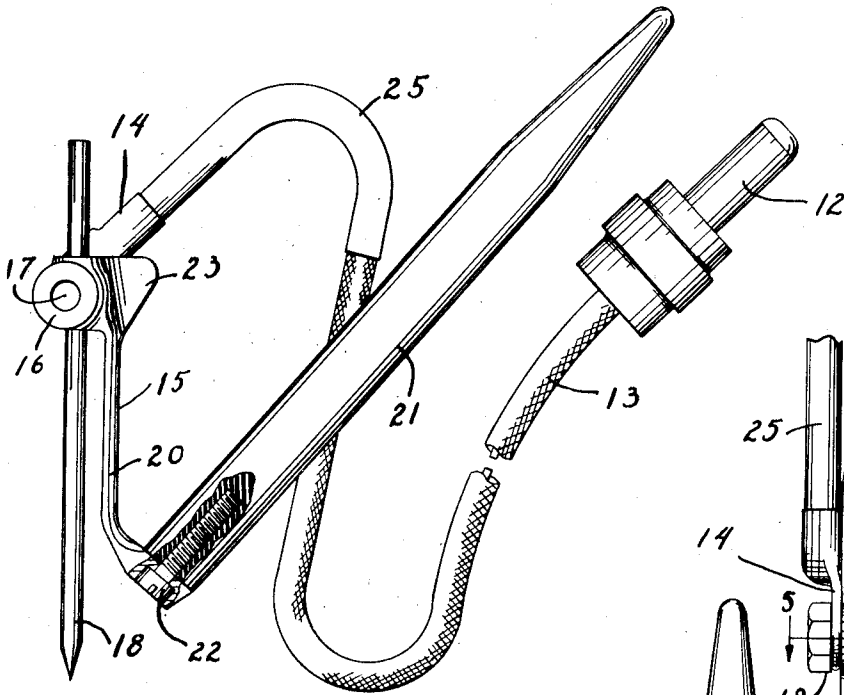


FIG. 2.

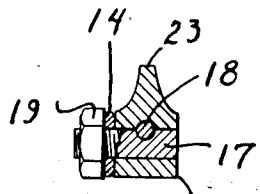


FIG. 5.

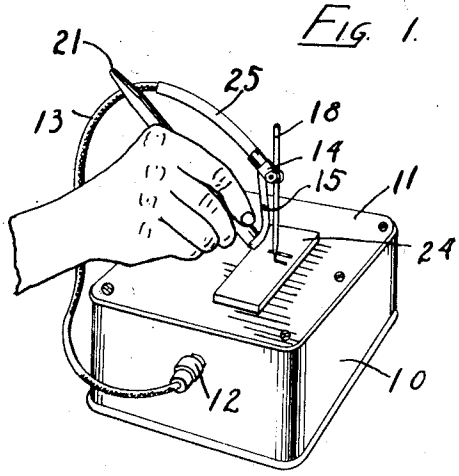


FIG. 1.

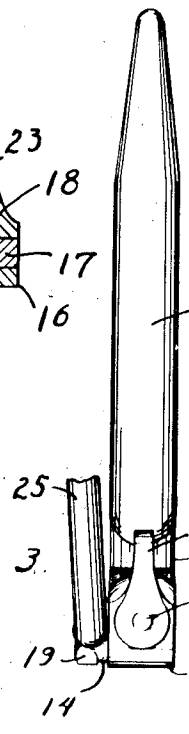


FIG. 3.

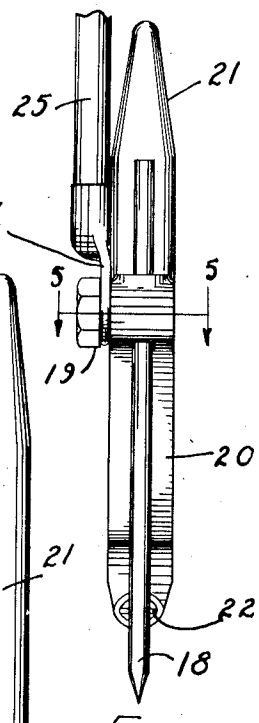


FIG. 4.

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METAL ETCHING STYLUS

Robert B. Annis, Indianapolis, Ind.

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6 Claims. (Cl. 219—29)

This invention relates to means for electrically etching directly upon metal. An application of the invention is found in applying identifying characters or parts numbers to individual tools, such as milling cutters, and to individual parts of machine assemblies. Such marking or numbering of parts by the electric etching device is of particular advantage where the tools or parts are made of hardened steel, a situation wherein it is difficult to employ other means of marking.

The etching process is carried out in general by guiding a metallic electrode to trace the pattern or character to be etched directly on the member, which member is made the terminal of one side of a circuit, the electrode being the terminal of the other.

A primary object of the invention is to provide means for holding and guiding the electrode over the part to be etched in a manner whereby the electrode will be held substantially perpendicular to the etched surface while the electrode guiding means may be held in the operator's hand in much the same manner as a pencil or pen during a writing operation.

A still further important object of the invention is to provide a structure whereby the current carrying conductor does not pass through the member held in the operator's hand. An important advantage of the invention is that the electrode may be guided during the etching operation in substantially the same manner as direct writing upon the surface, all without inconvenience or annoyance to the operator from heat arising in the electrode. During the etching process, particularly if the process is carried on over any considerable period of time, the etching electrode will become heated to that degree whereby contact of the electrode with the operator's hand would cause severe burning, a situation which is eliminated by use of the present invention.

These and many other objects and advantages of the invention will become apparent to those versed in the art in the following description of one particular form of the invention as illustrated in the accompanying drawing, in which

Fig. 1 is a view in a perspective of a device embodying the invention;

Fig. 2, a view in side elevation on an enlarged scale of the stylus of the etcher;

Fig. 3, a view in top plan;

Fig. 4, a view in front elevation; and

Fig. 5, a view in section on the line 5—5 in Fig. 4.

Like characters of reference indicate like parts throughout the several views in the drawing.

Referring first to Fig. 1, the box 10 is employed to contain the usual current regulating transformer (not shown), the details of which do not enter into the present invention. In any event, one terminal of the secondary winding of the transformer is connected directly to the metallic plate 11 which forms the top closure of the box 10. The other terminal leads to an outlet in the side of the box into which the terminal 12 fixed on the cord 13 may be inserted. The voltage between the plate 11 and the conductor in the cord 13 is quite low, in fact so low that the operator may rest his hand directly on the plate 11 to bridge across with the cable conductor without any sensation of current passage through his hand.

The cable 13 carries an attaching terminal 14 on its end removed from the terminal 12.

A bracket 15 is formed to have a head 16 through which is transversely inserted a headless bolt 17, the bolt 17 being free to slide through a bore provided in the head 16. The head 16 is vertically bored off center in relation to the transverse axis of the bolt 17 therethrough, Fig. 5, in such manner that an electrode 18 may be inserted and passed vertically through the head 16, substantially half of the electrode 18, at the horizontal diametrical plane through the head 16, passing through the bolt 17 and the other half therebehind through the head 16. In other words, the bolt 17 is provided with a transverse slot thereacross, through which slot the electrode 18 passes.

This slot across the bolt 17 is located in that position whereby, when the electrode 18 is inserted through the head 16 and the bolt 17, one end of the bolt 17 is flush with the side face of the head 16 and the other end of the bolt 17 extends outwardly beyond the opposite face of the head to present a screw-threaded end over which is placed the terminal 14 and a nut 19 screw-threadedly engaging that end of the bolt 17. By tightening up the nut 19 on the bolt 17, the bolt 17 is tended to be pulled through the bore in the head 16 but such tendency is overcome by reason of the slotted portion of the bolt 17 engaging the electrode 18, whereupon the electrode 18 is firmly seated in the head 16 by tightening that nut 19, at the same time firmly pressing the terminal 14 against the head. The electrode 18 may accordingly be adjusted vertically upwardly and downwardly through the head 16

to have the desired length of electrode extending below the head.

The head 16 is mounted in offset relation to a shank 20 of the bracket 15 so that this shank may extend along in substantial parallel alignment with but be spaced apart from that part of the electrode 18 which extends below the bracket head 16. The lower end of the shank 20 is turned outwardly and downwardly to have attached thereto a pencil-like member 21, means of the attachment being herein shown as a screw 22 passed through the end of the shank 20 and screw-threadedly engaging axially within the lower end of the member 21. The axis of this member 21 is in a common plane with the axis of the electrode 18. This member 21 is made out of any suitable insulating material, preferably for both heat and electrical insulation.

In the present form of the invention a fin 23 is provided to extend rearwardly from the head 16 and continue downwardly to blend into the shank 20. This fin 23 serves to radiate heat from the head 16 which may be transmitted thereto by the electrode 18. In practice, the electrode 18 is pointed sharply and the electrode is adjusted to bring the point on the line of the axis of the member 21. By so locating the point of the electrode 18, the member 21 may be grasped the same as one would a pen holder or pencil, and place the point of the electrode 18 on the object 24, Fig. 1, to be etched, whereupon the operator may direct the electrode point with exactly the same mode of muscular control as he would a pencil or pen. In so doing, it is to be noted that the cable 13 carrying the current to the electrode 18 does not pass through that handle member 21 but is carried directly to the head 16 for connection with the electrode 18. Also it is to be noted that by reason of the angular disposition of the member 21, the electrode 18 may be held in its best operating position, which position is that where the axis of the electrode is perpendicular to the face of the object 24.

By reason of the shank 20 having a greater width, Fig. 4, than that of the electrode 18, this shank 20 serves very efficiently as a heat shield for the operator's forefinger which normally would lie upon the upper side of the member 21, Fig. 1. Even though the shank 20 should become warm, the handle member 21 being of insulating material remains relatively cool even under continued etching. When the point of the electrode 18 becomes dull, the electrode 18 may be removed quickly from the head 16 by loosening the nut 19; re-sharpened; and again fixed in position by insertion through the head and tightening up of the nut 19.

Preferably the bracket 15 is made out of a material that is less heat-conductive than that of the electrode 18. Normally the electrode 18 would be made out of copper or a copper alloy, the point in particular being of copper alloy or even tungsten. The bracket 15 in one particular instance is made out of malleable iron which inherently is a poorer heat conductor than copper. Thus it is to be seen that the combination of the stylus embodies three essential interconnecting members, the electrode 18, the bracket 15, and the handle or holder 21, each having less conductivity than the other in the order named. The cable 13 is preferably reenforced adjacent the terminal 14 by any suitable covering means, such as a length of tubing 25 made out of one of the synthetic rubbers which is oil resistant.

While I have herein shown and described my invention in the one particular form, it is obvious that structural variations may be employed without departing from the spirit of the invention and I therefore do not desire to be limited to that precise form beyond the limitations as may be imposed by the following claims.

I claim:

1. For an electric etching device, a stylus comprising a bracket having a shank and a head at the upper end of and in offset relation to the shank, an electrode, means for adjustably carrying the electrode from said head, a pencil-like member carried by the lower end of said shank at an acute angle to said electrode, the axis of said electrode and said member being in a common plane, said electrode being in spaced, substantially parallel alignment with said shank, and said shank being wider than said electrode to serve as a shield thereacross.

2. For an electric etching device, a stylus comprising a bracket having a shank and a head at the upper end of and in offset relation to the shank, an electrode, means for adjustably carrying the electrode from said head, a pencil-like member carried by the lower end of said shank at an acute angle to said electrode, the axis of said electrode and said member being in a common plane, said bracket being of a heat conductivity relatively less than that of said electrode, and said bracket further having a greater width than said electrode to serve as a shield between the electrode and said member.

3. For an electric etching device, a stylus comprising a bracket having a shank and a head at the upper end of and in offset relation to the shank, an electrode, means for adjustably carrying the electrode from said head, a pencil-like member carried by the lower end of said shank at an acute angle to said electrode, the axis of said electrode and said member being in a common plane, and a heat radiating fin projecting toward said member from said head and around from the upper end of said shank.

4. For an electric etching device, a stylus comprising a bracket having a shank and a head at the upper end of and in offset relation to the shank, an electrode, means for adjustably carrying the electrode from said head, a pencil-like member carried by the lower end of said shank at an acute angle to said electrode, the axis of said electrode and said member being in a common plane, said means consisting of a vertical bore through said head, a transverse bore through the head communicating with the vertical bore, a bolt slidingly carried in the transverse bore and having a transverse notch thereacross, said electrode being positioned in said head vertical bore to be engaged by said notch, and means for pulling the bolt axially to grip the electrode accordingly in the head.

5. For an electric etching device, a stylus comprising a bracket having a shank and a head at the upper end of and in offset relation to the shank, an electrode, means for adjustably carrying the electrode from said head, a pencil-like member carried by the lower end of said shank at an acute angle to said electrode, the axis of said electrode and said member being in a common plane, said means consisting of a vertical bore through said head, a transverse bore through the head communicating with the vertical bore, a bolt slidingly carried in the transverse bore and

having a transverse notch thereacross, said electrode being positioned in said head vertical bore to be engaged by said notch, and means for pulling the bolt axially to grip the electrode accordingly in the head, and a conductor secured to said head by said bolt pulling means.

6. In an electric etching device, a stylus comprising a hand grip in the nature of a pencil made of heat and electrical insulating material; an upturned bracket extending from the lower end of the grip to be in a substantially vertically disposed position when the grip is supported in a normal writing position; a head on the upper end of the bracket; an electrode adjustably retained as to extended length by said head to maintain the electrode in closely spaced relation to said bracket on the side thereof removed from said grip; said bracket being wider than said electrode; and means for securing an electrical conductor to said bracket head; whereby said grip is removed from immediate heat transfer from both said conductor and said electrode and the lower point of the electrode guided as though it were the point of said grip.

ROBERT B. ANNIS.