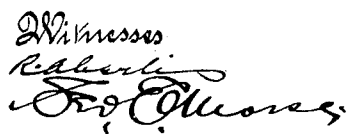


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APPARATUS FOR WELDING, BRAZING, AND SOLDERING BY ELECTRICITY.
No. 606,342. Patented June 28, 1898.

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UNITED STATES PATENT OFFICE.

ALBERT HIRSCH, OF BERLIN, GERMANY.

APPARATUS FOR WELDING, BRAZING, AND SOLDERING BY ELECTRICITY.

SPECIFICATION forming part of Letters Patent No. 606,342, dated June 28, 1898.

Application filed December 21, 1897. Serial No. 662,786. (No model.) Patented in England October 16, 1895, No. 19,442.

To all whom it may concern:

Be it known that I, ALBERT HIRSCH, engineer, of 23 Lüneburgerstrasse, Berlin, Germany, have invented new and useful Apparatus for Welding, Brazing, and Soldering by Electricity, (for which I have obtained Letters Patent in Great Britain, dated October 16, 1895, No. 19,442,) of which the following is a full, clear, and exact description.

My invention relates to electric welding, brazing, and soldering by the heat of an electric arc, not by the passage of the current through the work, but by causing the arc to assume the form and to act in the manner of a flame whose temperature is graduated in the direction of the length of the flame inversely as the distance from the electrodes and capable of being projected on the work like a blowpipe-flame. Heretofore in the production of such a flame-like arc it has been customary to employ a magnetic field to deflect the arc; but the use of a magnetic field results in such a concentration of the incandescent gases surrounding the arc as to prevent the formation of zones of sensibly-differing temperatures, any desired variation of temperature involving a corresponding variation of the intensity of the magnetic field. Moreover, an electromagnet located in immediate proximity to and in circuit with the arc is liable to be so injured by the heat that the flame would cease, besides which the use of the electromagnet involves a waste of electric energy and an increase in the weight and cost of the apparatus. Now if the carbons or other electrodes be placed in an obliquely-convergent position relatively to each other the use of a magnetic field may be advantageously dispensed with.

My invention therefore consists in the means for producing a flame of the character described without the employment of a magnetic field—that is, so mounting and operating the electrodes in a tool that they may be adjusted at the required angle and converged, separated, and otherwise manipulated by one hand as to produce, vary, or extinguish the flame, as required by the exigencies of the work.

The tool or apparatus is susceptible of various modifications of form and construction, of which that illustrated in the accompany-

ing drawings may be taken as an example, Figure 1 being a side view, and Fig. 2 a top plan view, of the preferred form of tool.

A A' are the two convergent electrodes, preferably carbons, mounted in clamps or electrode-holders *a a'*, pivoted on the ends of electrode carriers or levers B B', pivoted at *b b'*, so as to be capable of motion in their common plane, the joints *b b'* being carried by the two parts C C' of a metal bar or stem connected by an intervening insulating-block C² and provided with a handle H². The joint *b'* is stiff and is carried by a slide *b*², adjustable along the part C' by means of a manually-operable micrometer-screw *d*, mounted in bearings *d'*, screwing through a nut in the slide *b*² and provided with a milled head of insulating material, so that the electrode or carbon A' may be adjusted at any required distance from the carbon A, roughly by flexure of the joints or finely by means of the screw. The joint *b* is loose and directly on the part C, and the lever B and carbon A are capable of motion limited in the outward direction by an adjustable screw-stop *e*, mounted in a lug *e*² on the part C and against which a lug *e'* abuts, the motion being produced in one direction by a spring F and in the other direction by a thumb-lever G, faced with insulating material, pivoted on the part C', and connected by a link *g* with a button *g'*, of insulating material, on the lever B, so that by a thrust of the lever G the carbons will be quickly brought together and separated again the proper distance for striking the arc.

In order to produce a flame-like arc of the character described, the carbons should be inclined to each other at an angle which may vary between, say, forty and seventy degrees, according to the form of the flame required, the nature and dimensions of the work, and other circumstances of the case, provisions for this variation of angle being made by the various pivotal and other adjustments above described. The insulated leads H H' from the source of alternating current are connected to the binding-screws of the carbon-holding clamps.

I claim—

1. A tool or instrument for use in welding brazing and soldering by the heat of the elec-

tric arc, consisting in the combination of a pair of carbon-holding clamps, such as *a a'*, pivotally attached to a pair of lever-arms *B B'* mounted on insulated portions of the same bar or stem, the one being pivoted to the end of the bar or stem and the other to a slide working on said stem, a micrometer-screw mounted on the stem and adapted to traverse the slide thereon, said screw having a milled head in proximity to the handle of the tool, an adjustable stop for limiting the outward angular movement of the carbon-carrying lever which is pivoted to the end of the stem, a spring connected to the said lever and to the bar or stem so as to produce angular motion of the carbon in the outward direction, a thumb-lever pivoted at the opposite side of the bar to the micrometer-screw and in proximity to the handle of the tool and coupled by a link to the outer carbon-carrying lever so as to act in opposition to the spring for bringing the carbons momentarily together for striking the arc, all substantially as specified.

2. In a hand-tool for electric welding and analogous operations, the combination of a handle, a stem supported thereby, a plurality of electrode-carriers pivoted to the stem, electrodes carried by the carriers and inclined toward each other at an angle and manually-operated means for swinging an electrode-carrier so as to bring the electrodes into such position as to strike the arc.

3. In a tool for electric welding or analogous operations, the combination of a stem or support, a plurality of electrode-carriers one at least of which is pivotally carried thereby, electrodes carried by the electrode-carriers and inclined toward each other, manually-operated means for adjusting one of the electrode-carriers with respect to the other, and

manually-operated arc-striking means, substantially as described and for the purposes set forth.

4. In a tool for electric welding and analogous operations, the combination of a plurality of electrode-carriers carried by a common support and provided with electrodes inclined toward each other, one at least of the said electrode-carriers being pivoted to its support and provided with manually-operated means for moving it toward the other electrode-carriers to bring the electrodes into such a position as to form the arc, and a spring acting upon the said electrode-carrier to separate the electrodes to strike the arc, substantially as described and for the purposes set forth.

5. In a portable electric welding apparatus, the combination of the following instrumentalities in operative relation, to wit, a handle provided with an electrode-support, a plurality of electrode-carriers carried by the said support and movable with respect thereto, one at least of the said electrode-carriers being pivotally carried by the said support, manual means for manually adjusting one of the electrodes and manually-operated arc-striking apparatus, the entire structure being supported from the handle in order to constitute a portable and transportable tool wherein the electrodes are capable of a fine manual adjustment with respect to each other and wherein the arc may be manually struck, substantially as described.

Signed by the said ALBERT HIRSCH this 22d day of November, 1897.

ALBERT HIRSCH.

In presence of—

WOLDEMAR HAUPT,
HENRY HASPER.