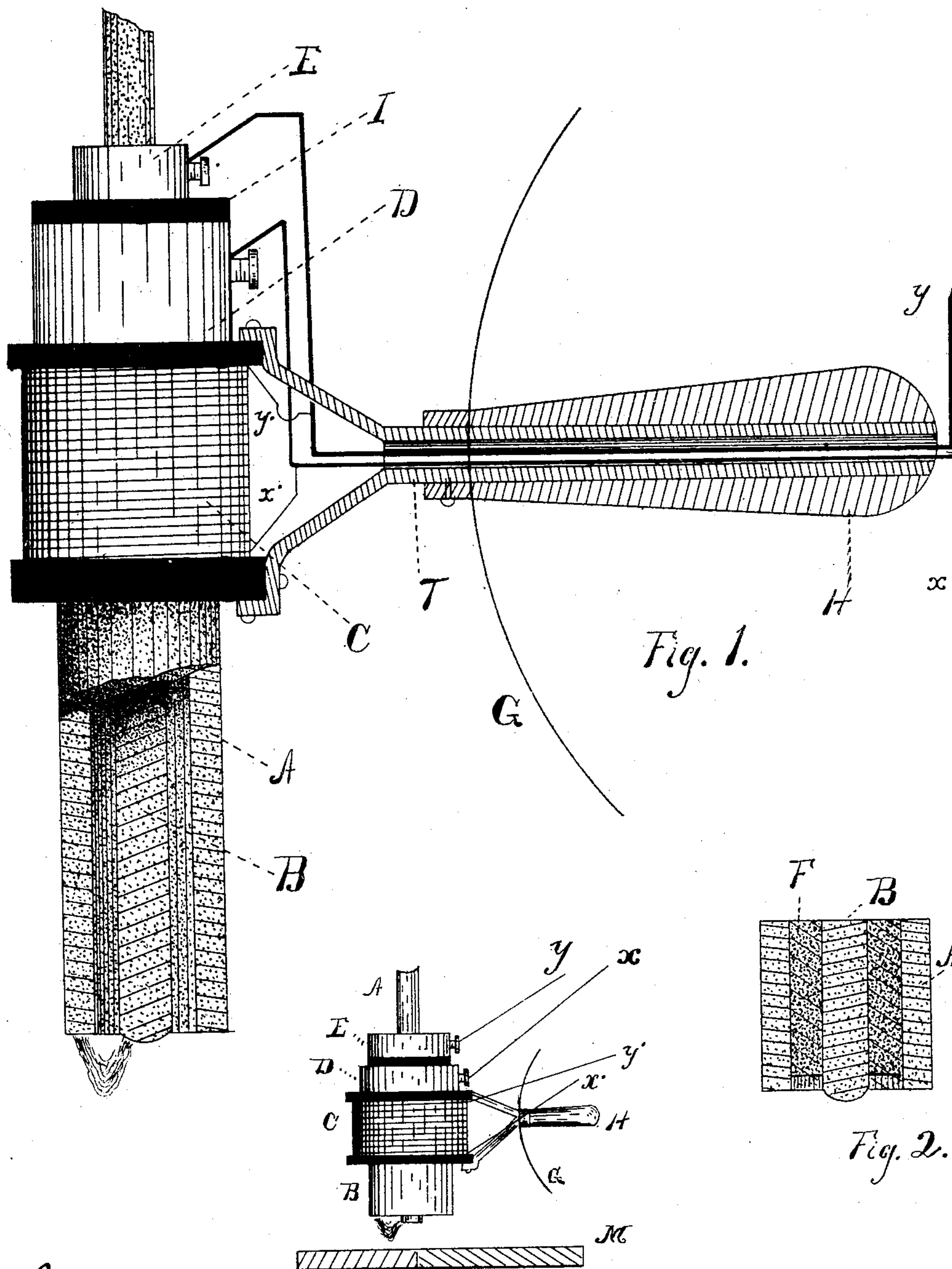


(No Model.)

C. L. COFFIN.
METHOD OF AND APPARATUS FOR HEATING, WELDING, OR WORKING
METALS ELECTRICALLY.

No. 501,825.

Patented July 18, 1893.



WITNESSES
Alfred L. Thompson
Frederick H. Anderson

Fig. 3.

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METHOD OF AND APPARATUS FOR HEATING, WELDING, OR WORKING METALS ELECTRICALLY.

SPECIFICATION forming part of Letters Patent No. 501,825, dated July 18, 1893.

Application filed February 9, 1893. Serial No. 461,622. (No model.)

To all whom it may concern:

Be it known that I, CHARLES L. COFFIN, of Detroit, in the county of Wayne and State of Michigan, have invented a new and useful
5 Improvement in Methods of and Apparatus for Heating, Welding, or Working Metals Electrically, of which the following is a specification.

My invention consists in an improved method of and apparatus for heating, welding or
10 working metals electrically, hereinafter fully described and claimed.

Figure 1 is an elevation, partly in section, of a heating tool. Fig. 2 is a vertical section
15 of the lower end of the tool, and Fig. 3 is a diagram, showing the tool in position with two articles to be heated and welded together.

For certain purposes it is desirable in applying to metal an arc sprung between two
20 extraneous conductors to cause said arc to traverse a portion of the material, and this can be done by causing the arc either to travel on the conductor between which it is sprung magnetically or mechanically, the first being
25 the subject of this application.

In carrying out my invention, I take a hollow carbon A and a carbon rod B, and secure the solid carbon B within the hollow carbon A by fastening to the hollow metallic
30 holder D, and to the solid carbon a metallic holder E of such size as to slip within, or rest on, or otherwise engage with holder D, the two being insulated by insulation shown at I. The space between the two carbons may
35 be filled up with a refractory material F if desired. To the holder D, I attach an electro-magnet C which encircles the hollow carbon A, and to the insulated ends of said electro-magnet C I attach a handle T, provided with
40 an insulation H. I connect the holders E and D and thereby the carbons B and A with the terminals of a source of electric energy, by means of the conductors y and x , which may for convenience pass through handle T as
45 shown in the drawings. The terminals of the bobbin of electro-magnet C are connected with the conductors y and x by small conductors y' and x' , as shown in Fig. 1.

G represents a shield for the handle. If the carbons A and B are connected by a conductor more fusible than the electrodes A
50 and B and a current is passed through the conductors y and x , an arc will be formed between carbons A and B at their extremities, as indicated in Figs. 1 and 3, and at the same
55 time the electro-magnet C will be energized and the effect of said electro-magnet on the arc is to cause it to rotate around the end of the carbon A, its motion being more rapid as
60 the magnetic intensity increases, so that instead of affecting only a single point on the metal M, as it would do if stationary, it covers a field equal to the circumferential area
65 of carbon A, thus rendering its action very efficient and rapid.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The herein described mode of electrically heating metal consisting in springing a voltaic arc between two electrodes one within the
70 other, rotating said arc magnetically, and applying said arc to the article to be heated.

2. In an apparatus for electrically heating and welding by means of an electric arc, the combination with two concentric electrodes,
75 of a magnet for directing and steadying the arc, substantially as shown and described.

3. In an apparatus for heating and welding by means of the electric arc, the combination of two electrodes one within the other, a support for said electrodes and a magnet upon
80 said support, and means for connecting said electrodes and magnet with the terminals of a generator of electricity, substantially as shown and described.

4. In an apparatus for heating and welding by means of the electric arc, the combination of two electrodes, one within the other, an electro-magnet surrounding said electrode and a support carrying said magnet and electrodes,
85 substantially as shown and described.

CHARLES L. COFFIN.

Witnesses:

CYRUS E. LOTHROP,
GERTRUDE H. ANDERSON.