

(No Model.)

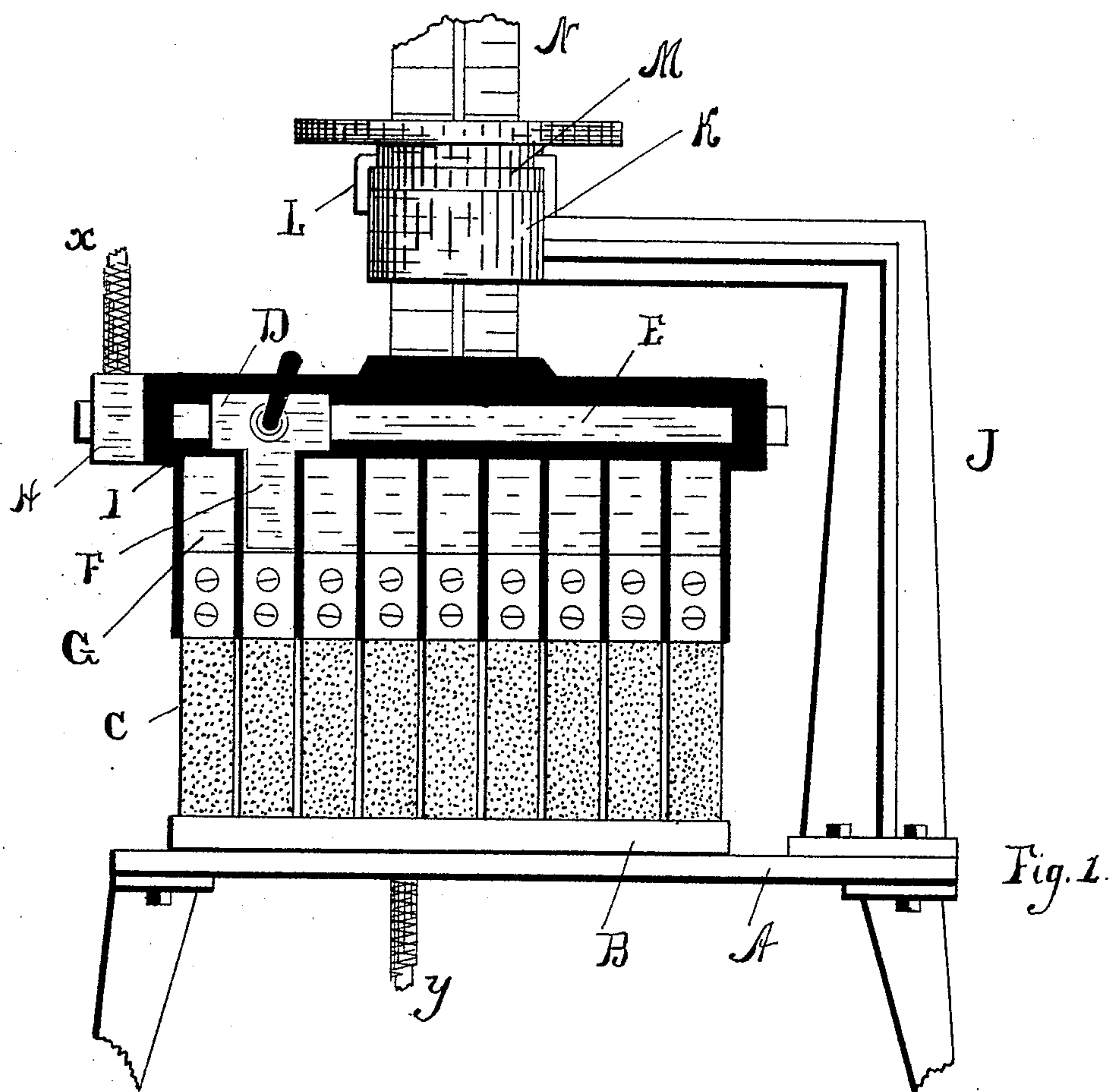
2 Sheets—Sheet 1.

C. L. COFFIN.

APPARATUS FOR HEATING METALS ELECTRICALLY.

No. 520,299.

Patented May 22, 1894.



WITNESSES

Amelia Williams
Geo. H. Lothrop

INVENTOR

Charles L. Coffin

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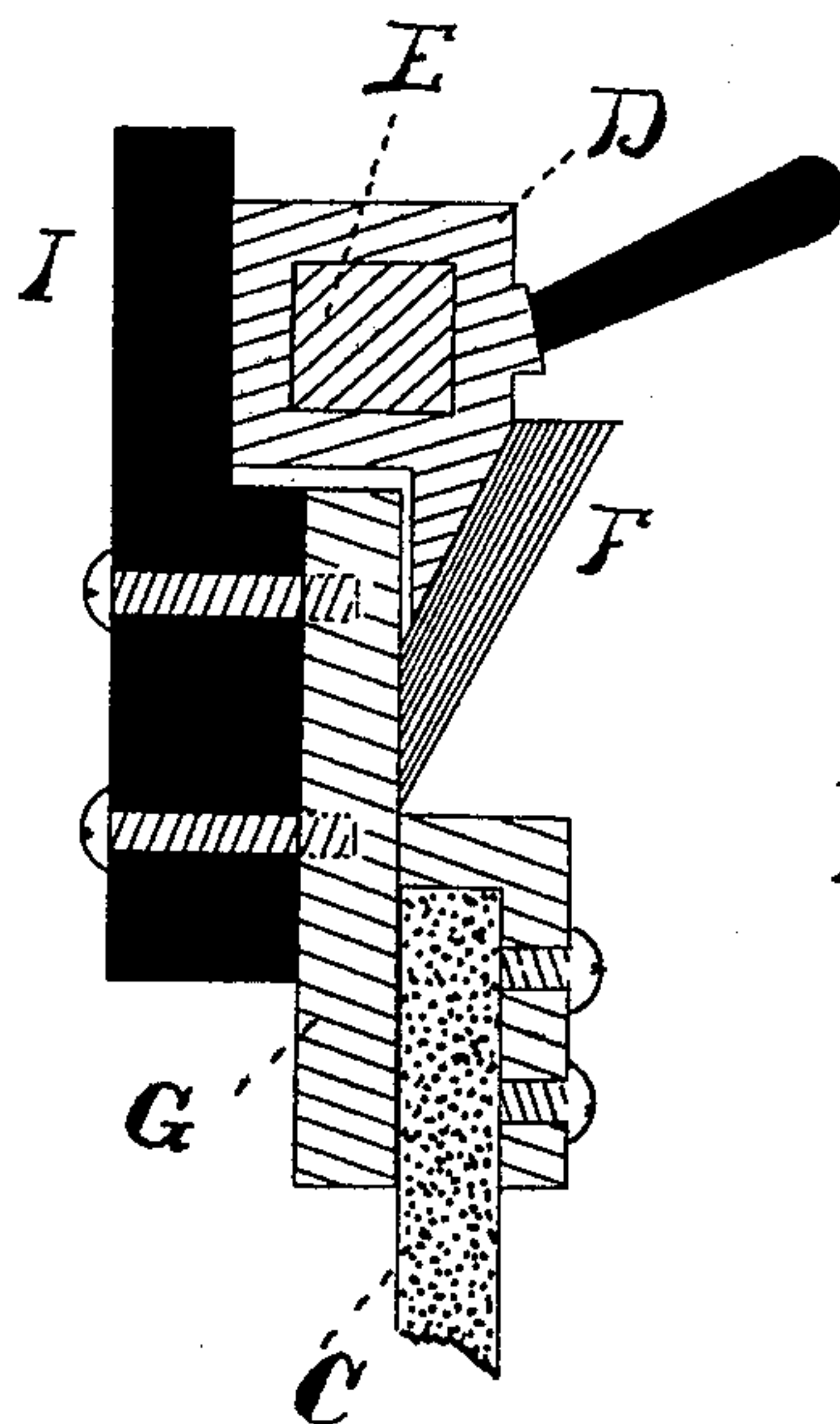
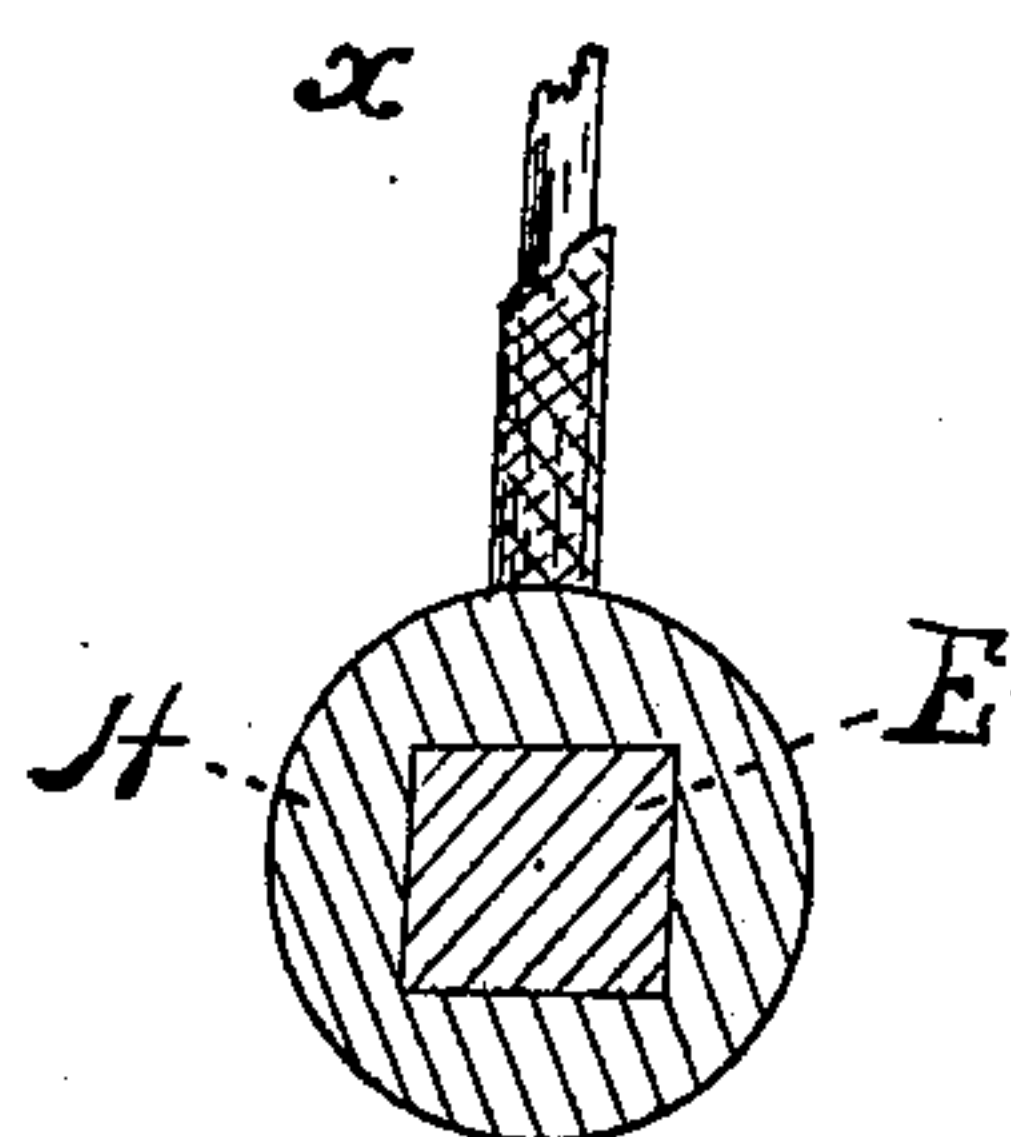
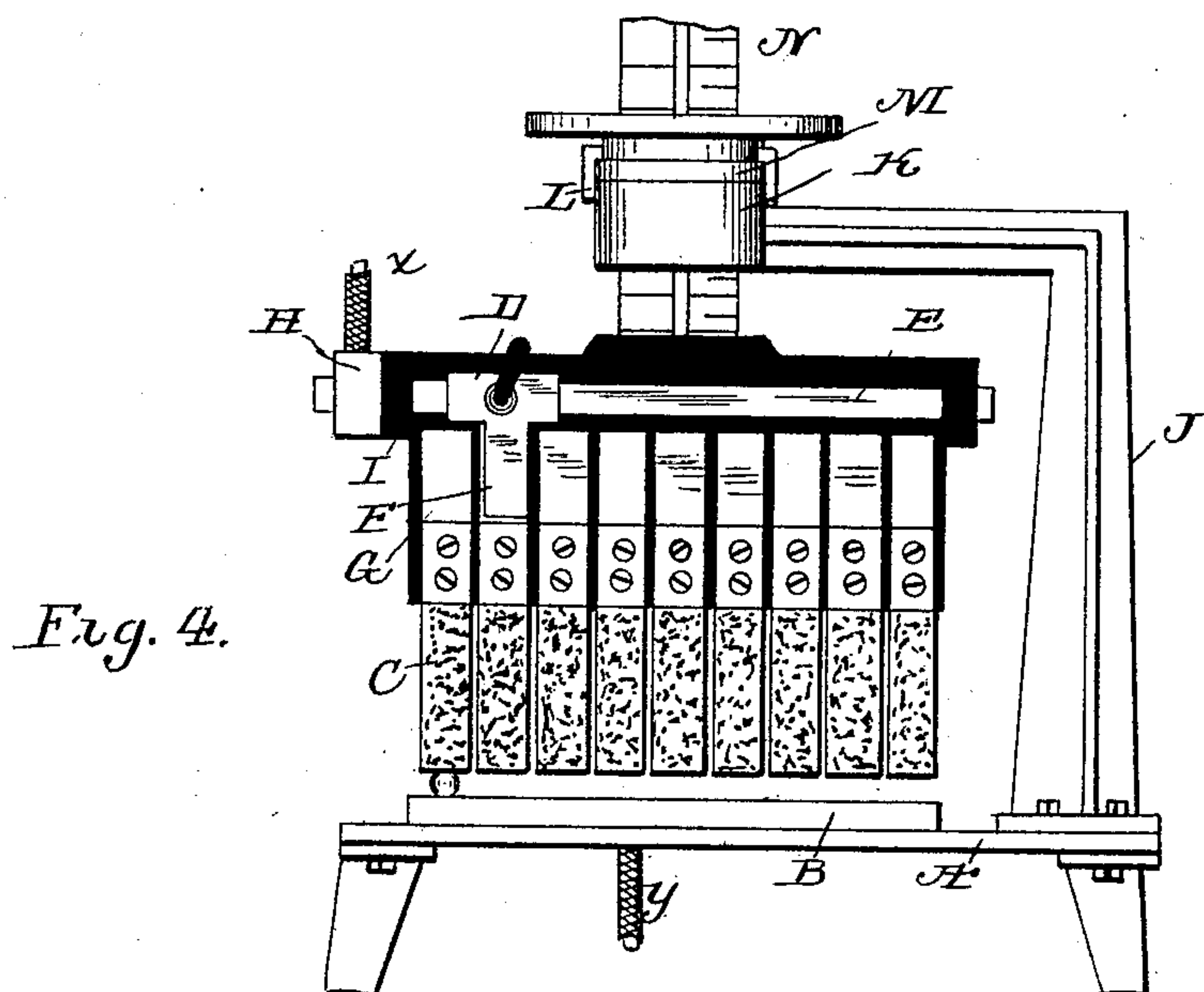
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UNITED STATES PATENT OFFICE.

CHARLES L. COFFIN, OF DETROIT, MICHIGAN.

APPARATUS FOR HEATING METAL ELECTRICALLY.

SPECIFICATION forming part of Letters Patent No. 520,299, dated May 22, 1894.

Application filed October 5, 1893. Serial No. 487,242. (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 Improvement in Apparatus for Heating Metals Electrically, of which the following is a specification.

My invention consists in an improvement in method of and apparatus for heating metal electrically, hereinafter fully described and claimed.

In the accompanying drawings—Figure 1 is a sectional elevation of my improved apparatus. Fig. 2 is a detail sectional view, showing one end portion of the conductor α . Fig. 3 is a detail vertical sectional view through the conductor D and one of the electrodes; and Fig. 4 is an elevation of the apparatus adjusted to produce the voltaic arc.

A represents a table suitably supported and insulated.

J represents a goose neck or standard secured on and rising from table A, and carrying on its end a collar K.

N represents a rod which passes through collar K. For raising and lowering rod N, it may be screw threaded and engage with a nut M which rides on collar K and is kept in place by lugs L.

I represents a block of insulating material carried on rod N in which is secured a metal rod E, and a series of insulated electrodes C, preferably of carbon, each electrode C being provided with a contact plate of metal G.

D represents a conductor adapted to move in electrical contact with rod E, and carries a brush F making contact with plate G on electrode C.

α represents a conductor preferably terminating in a collar H, by which rod E is connected with one terminal of a generator of electricity. B represents the material to be heated, connected by conductor γ with the other terminal of the generator.

The operation of my invention is as follows: Material B being placed in position and connected with the generator, electrodes C are brought in contact with B, thus establishing a circuit through conductor α , rod E, conductor D, brush F, contact plate G, one electrode C, material B and conductor γ . When this electrode C becomes hot, brush F is shifted to

the contact plate G of the next electrode C, and when this second electrode becomes hot, brush F is shifted to the next electrode C. As electrodes C heat very readily and retain their heat a considerable time, quite a number of them can be heated, and then by shifting brush F more rapidly they are all maintained at a high heat, and heat material B by incandescence. In this manner quite a long seam or joint can be brought to welding heat with but little expenditure of power, since the current need be only sufficient to heat one electrode C to the desired temperature. This process is especially useful in heating sheet metal for welding, in cases where the arc process develops too much heat and where it is very difficult to bring the edges to be welded into contact and pass a heating current across the joint.

I have illustrated the electrodes C as arranged in a straight line, for heating a straight seam, but it is evident that they may be arranged in any curve, or in a circle.

The apparatus in Fig. 1 is intended for use by direct contact with the material, but by first bringing the electrode in contact with the material, and then raising it slowly from the material, to the position shown in Fig. 4, the current being passing, a voltaic arc will be produced, which arc may be moved backward and forward by moving the contact piece.

I do not herein claim the method of heating metal by subjecting the same to the influence of a moving voltaic arc while simultaneously heated by radiation from incandescent electrodes in proximity to, but not in contact with the metal, as such constitutes the subject-matter of my application for Letters Patent filed October 7, 1893, Serial No. 487,453.

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

1. In an apparatus for heating metal electrically, the combination of a plurality of high resistance electrodes, metallic conducting clamps sustaining said electrodes, and means for insulating said electrodes and clamps from each other, a movable contact device connected to one terminal of a source of electric energy, and adapted to make contact with said conducting clamps, severally and successively

bringing said high resistance electrodes into circuit with the metal, and means for connecting the same to the other terminal of the source of electric energy.

5 2. In an apparatus for heating metal electrically, the combination with a plurality of high resistance electrodes insulated from the metal, means for connecting said metal to the terminal of a source of electric energy, support for the electrodes, means for raising and lowering said electrodes, a movable contact device, and means for connecting said contact device to the other terminal of the source of energy.

15 3. In an apparatus for electrically heating metal, the combination with the metal and means for connecting said metal to one terminal of a source of electric energy, of a plurality of high resistance electrodes insulated from each other, a movable adjustable support for said electrodes, a movable contact device connected to the other terminal of the source of energy, and means for bringing said electrodes severally and successively into the electric circuit.

25 4. In an apparatus for heating metal electrically, the combination with a support for the metal to be heated and means for connecting said metal with one terminal of a generator, of a series of high resistance electrodes insulated from each other, means for bringing said electrodes in contact with the metal, and means for connecting said electrodes severally and successively with the other terminal of the generator, substantially as shown and described.

35 5. In an apparatus for electrically heating metal by means of an electric arc, the combination of a plurality of electrodes, a contact device by means of which said electrodes may be successively thrown in circuit, means for moving said contact device, and means for maintaining an electric arc between the metal and the electrodes successively thrown in circuit.

45 6. In an apparatus for electrically heating by means of the electric arc, the combination

of a plurality of electrodes insulated from each other, a contact device by means of which said electrodes may be successively thrown in circuit, means for moving said contact device with means for maintaining an electric arc between said electrodes successively thrown in circuit.

7. In an apparatus for electrically heating by means of the electric arc, the combination of a plurality of electrodes insulated from each other, a contact device by means of which said electrodes may be successively thrown in circuit, means for moving said contact device, and means for maintaining an electric arc between another electrode and the first named electrodes as successively thrown in circuit.

8. In an apparatus for electrically heating by means of the electric arc, the combination of an electrode connected to one terminal of a source of electric energy, with a plurality of electrodes insulated from each other, a contact device connected to the other terminal of the source of electric energy, by means of which said electrodes may be successively thrown in circuit, means for moving said contact device, and means for maintaining an electric arc between said first named electrode and the said insulated electrodes as successively thrown in circuit.

9. In an apparatus for electrically heating by means of the electric arc, the combination of an electrode connected to one terminal of a source of electric energy, a movable conductor connected to the other terminal of said source of electric energy, a series of insulated conductors adapted to be successively placed in circuit by said movable conductor, and means for maintaining an electric arc between said first named electrode and the insulated electrodes, as successively thrown in circuit.

CHARLES L. COFFIN.

Witnesses:

AMELIA WILLIAMS,
DENTON GUINNESS.