(No Model.) 2 Sheets—Sheet 1.

W. MITCHELL.

APPARATUS FOR ELECTRICALLY HEATING CRUCIBLES.

No. 494,586. Patented Apr. 4, 1893.

Fig. 1.

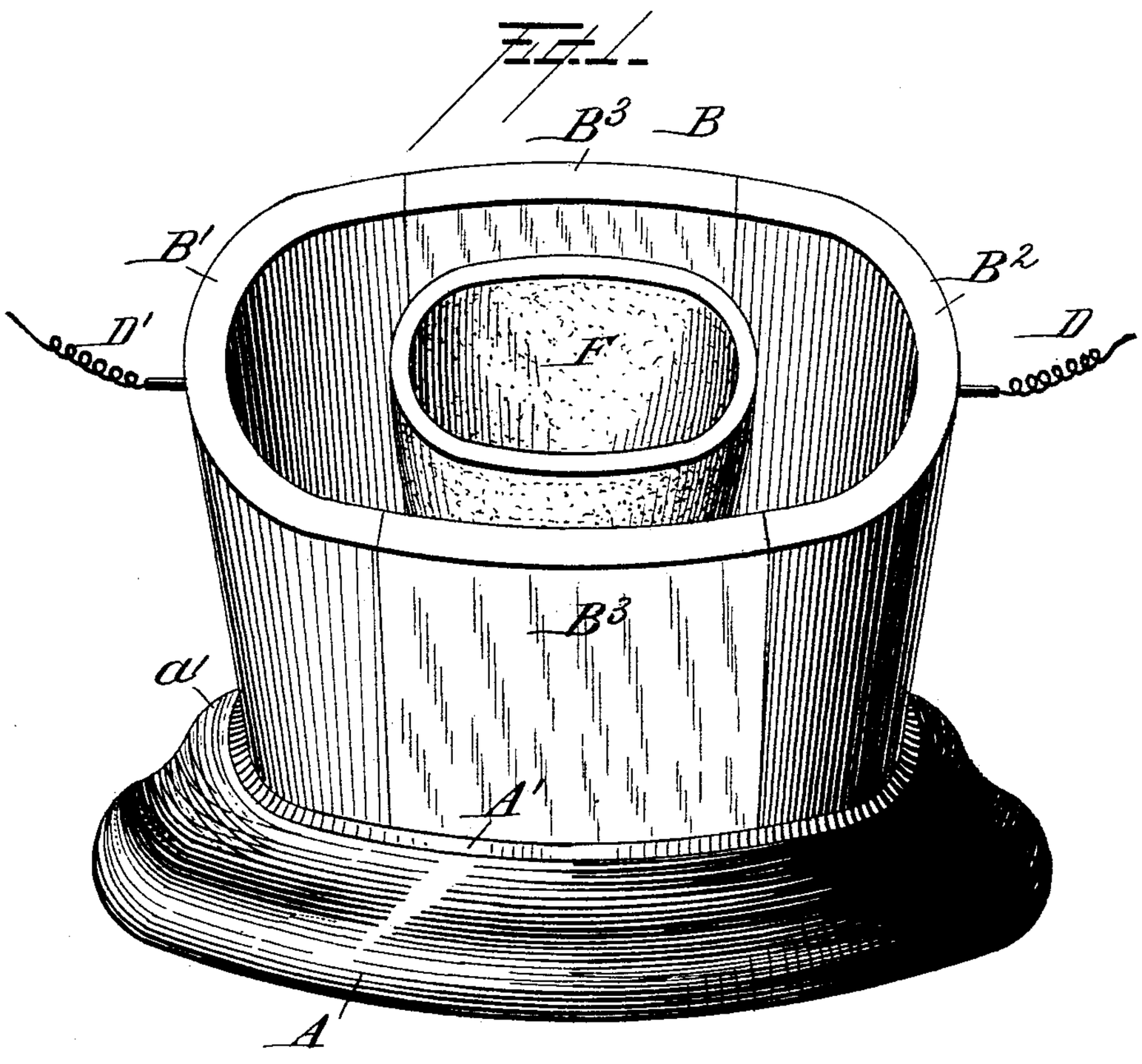
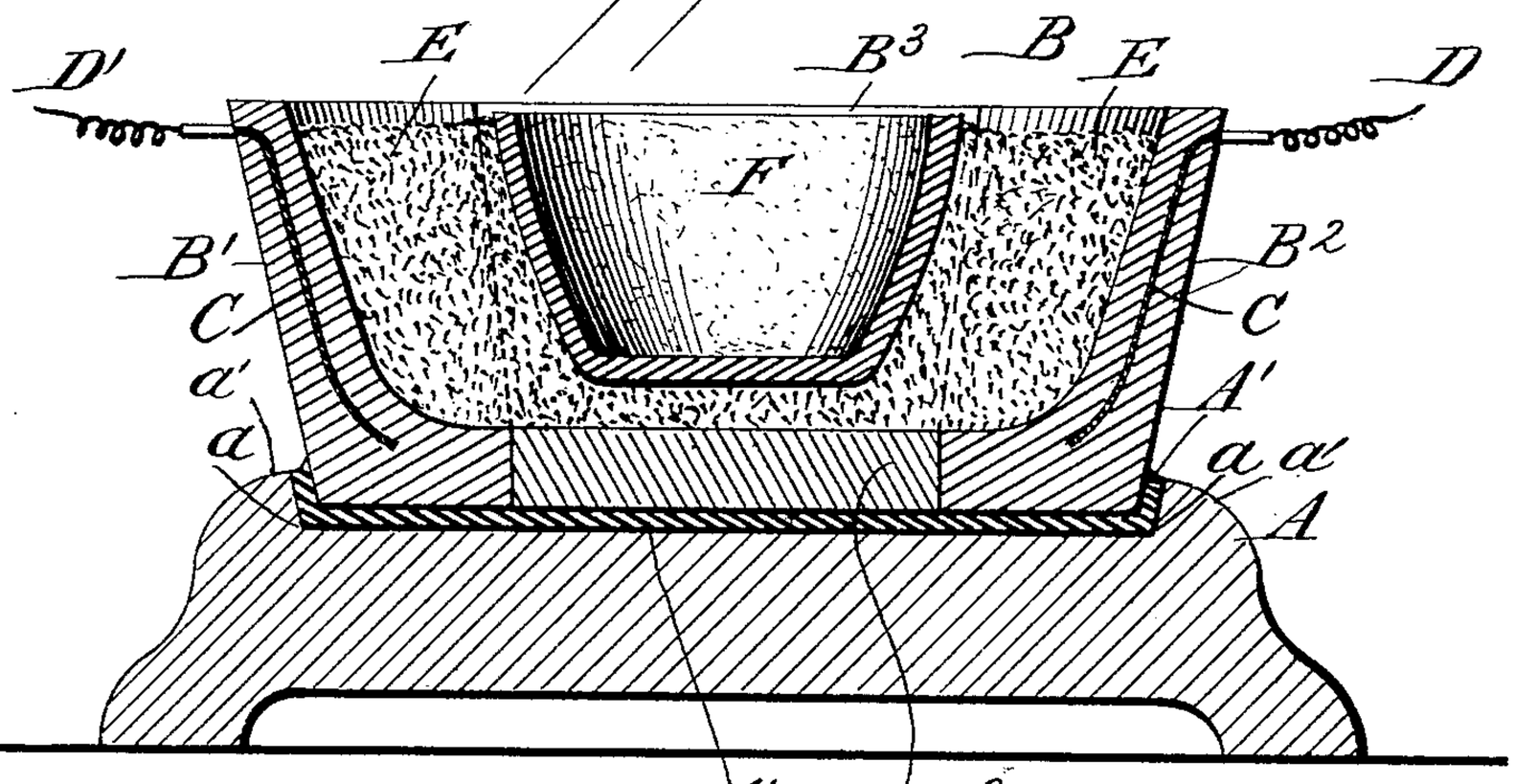


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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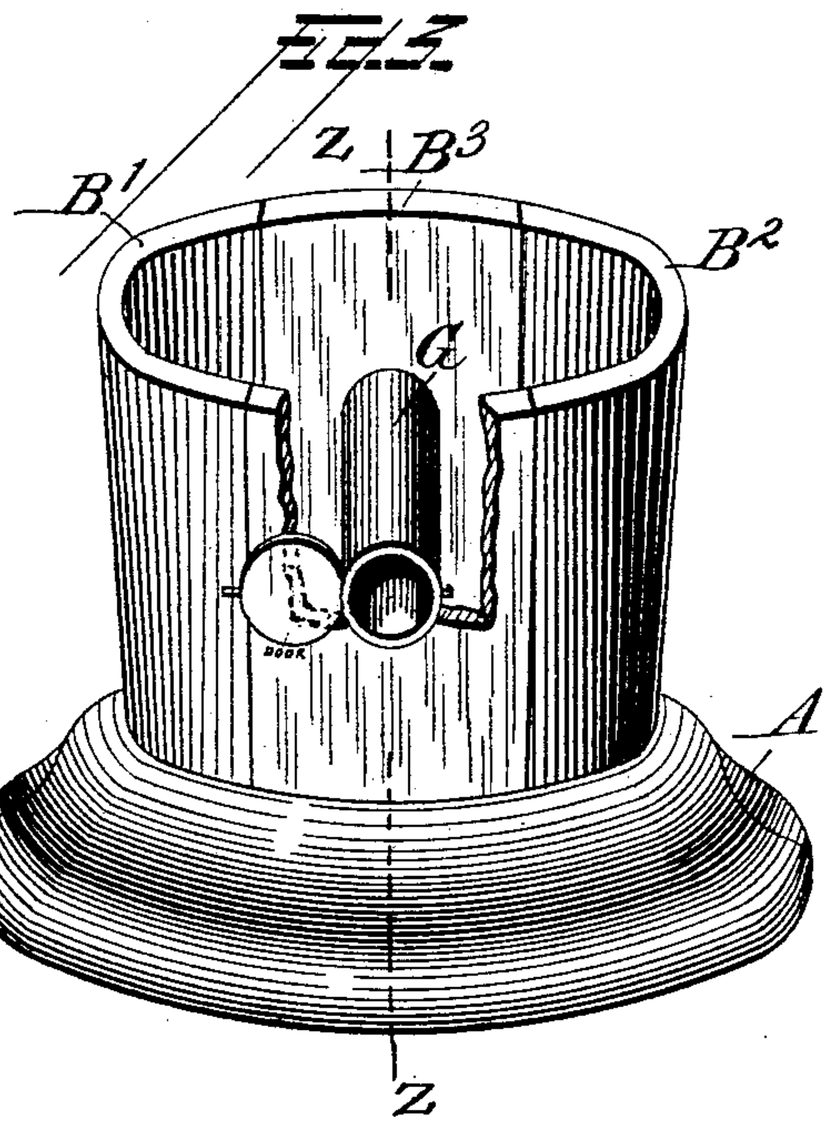


Fig. 4.

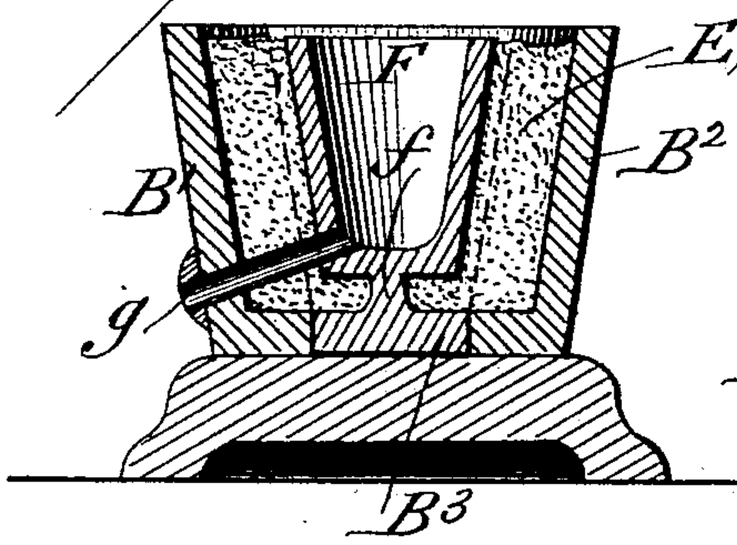


Fig. 6.

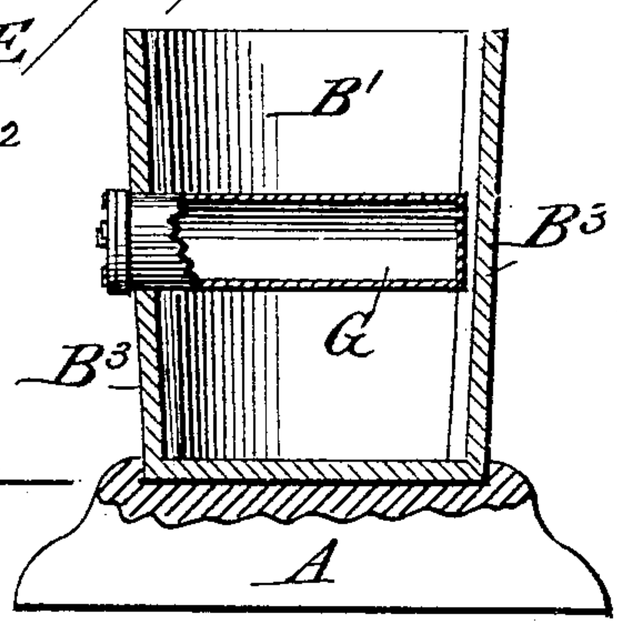
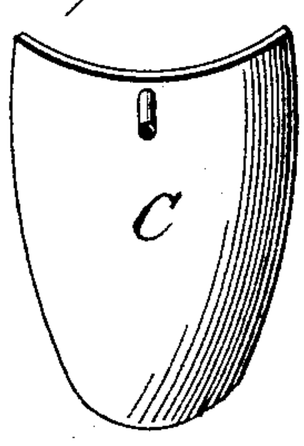


Fig. 5.



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UNITED STATES PATENT OFFICE.

WILLIS MITCHELL, OF MALDEN, ASSIGNOR TO THE AMERICAN ELECTRIC HEATING COMPANY, OF BOSTON, MASSACHUSETTS.

APPARATUS FOR ELECTRICALLY HEATING CRUCIBLES.

SPECIFICATION forming part of Letters Patent No. 494,586, dated April 4, 1893.

Application filed July 28, 1892. Serial No. 441,492. (No model.)

To all whom it may concern:

Be it known that I, WILLIS MITCHELL, a citizen of the United States, residing at Malden, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Apparatus for Electrically Heating Crucibles; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to devices for electrically heating crucibles and other articles; and it consists principally in an inclosing shell hollow forge or receptacle composed of two sections of conducting material of relatively high resistance and interposed insulating material, the said sections being provided with the necessary electrical conductors and the intervening space being preferably supplied with comminuted material such as graphite for allowing the passage of the current from one of these sections to the other with evolution of heat by the way.

The said invention also consists in the construction and combination of devices hereinafter more particularly set forth and claimed.

In the accompanying drawings, Figure 1 represents a perspective view of an electric heating apparatus embodying my invention. Fig. 2 represents a vertical central longitudinal section of the same. Fig. 3 represents a perspective view of a modified form of the same, with the side partly broken away. Fig. 4 represents a vertical central section through another modified form of the same. Fig. 5 represents a detail view of one of the conducting plates, and Fig. 6 represents a vertical section of the modification shown in Fig. 3 on a plane taken along the axis of tube indicated by the line *z*—*z* of the latter figure.

A designates the base which is preferably in the form of a broad shallow inverted basin, having a depression *a* in its top, surrounded by a rim *a'*. This depression is provided with an insulating lining A', if, as is generally most convenient, the said base be made of metal or other conducting material. Of course the lining A' will not be needed when a base of pottery or other non conducting material is used.

B designates the heating shell hollow forge or receptacle which fits at the bottom into the said depression; and consists of two end sections B' B^2 and intervening insulating material B^3. The latter is an U-shaped strip of fire clay or its equivalent. The end sections B' B^2—which may be side sections if preferred—are molded from a mixture of fire clay and graphite. The proportion of one of the former to four of the latter will suffice. This makes a conductor of high resistance giving forth a considerable quantity of heat. In each of these sections a copper or other plate C of high conductivity is embedded. The ends of these plates are allowed to protrude for connection to wires D D' completing, directly or indirectly, the circuit through the generator of electricity. The said connection may be made by clamps, or in any other convenient manner.

E designates a bed of pulverized graphite or other material of similar electrical conductivity and resistance, filling the interior of the said shell or heating receptacle below and around a stone crucible F which, as shown in Fig. 2, is set freely and centrally into the said bed. In Fig. 4 the position of the crucible F' is the same but it is secured at its bottom rigidly by a post or stud *f* to the insulating strip B^3, the said crucible, insulating strip and stud being of fire-clay and preferably in one piece. In this instance the crucible, not being removable, is provided at its bottom with an outlet tube *g* which extends obliquely outward and downward through the wall of the heating receptacle, incidentally acting as an additional brace or fastening for the crucible, and allows the molten metal to flow out of the apparatus from the interior of the said crucible. The said tube is kept plugged with fire clay until the time for such outflow.

The crucible shown in Figs. 1 and 2 has the advantage of being easily removable. Its material may of course be other than stone.

The heating receptacle or shell B may be used without the crucible for many metal-working and other operations. Thus, as shown in Fig. 3 a tube G may be inserted through one side of the insulating strip B^3 for allowing the introduction of bars of metal to the

interior of the said receptacle. The ends of this tube may be closed by doors and it may then be used as a muffle for baking porcelain and similar uses. In any case the current passes from one of the sections B or B′ to the other through the graphite filling E, generating so much heat in the said sections and, both directly and by conduction from the sections, in the filling aforesaid, as to heat the crucible and its contents intensely with the usual results; or similarly to heat the rods or muffle exposed to such action. The copper plates C are of such area that the discharge of electricity is from the greater part of one of the sections aforesaid and to a corresponding part of the other, effectually heating the said sections and the intervening graphite filling.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A heating receptacle for crucibles and other articles and substances consisting of the conducting end sections B′ B^2 of relatively high resistance having electrical circuit connections, in combination with the interposed U-shaped insulating strip B^3 and the filling of pulverized conducting material substantially as set forth.

2. A heating receptacle for crucibles and other articles and substances, the said receptacle being composed of two sections of refractory heating material of electrically high resistance and an interposed strip of insulating material and provided with a filling of pulverized graphite or similar substance in combination with electrical circuit connections to the said sections substantially as set forth.

3. The end sections B′ B^2 of fire brick and graphite mixed in combination with the interposed insulating material B^3 the conducting plates embedded in the said sections, and electrical connections for the said plates, the receptacle which is composed of the said sections and interposed insulating material being adapted to contain a crucible or similar article substantially as set forth.

4. A heating receptacle provided with a filling of pulverized graphite or similar substance, and consisting of two sections of electrically conducting material and an interposed insulating strip in combination with an inclosed crucible attached to and removable with the said strip, and the electrical circuit connections to the said sections substantially as set forth.

5. A hollow heating receptacle or electrical forge consisting of two conducting sections of high electrical resistance and interposed insulating material, in combination with broad plates embedded in the said sections and presenting a considerable surface for the electrical discharge, and the necessary circuit connections for these conducting plates substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIS MITCHELL.

Witnesses:
A. F. SARGENT,
HENRY J. COX.