

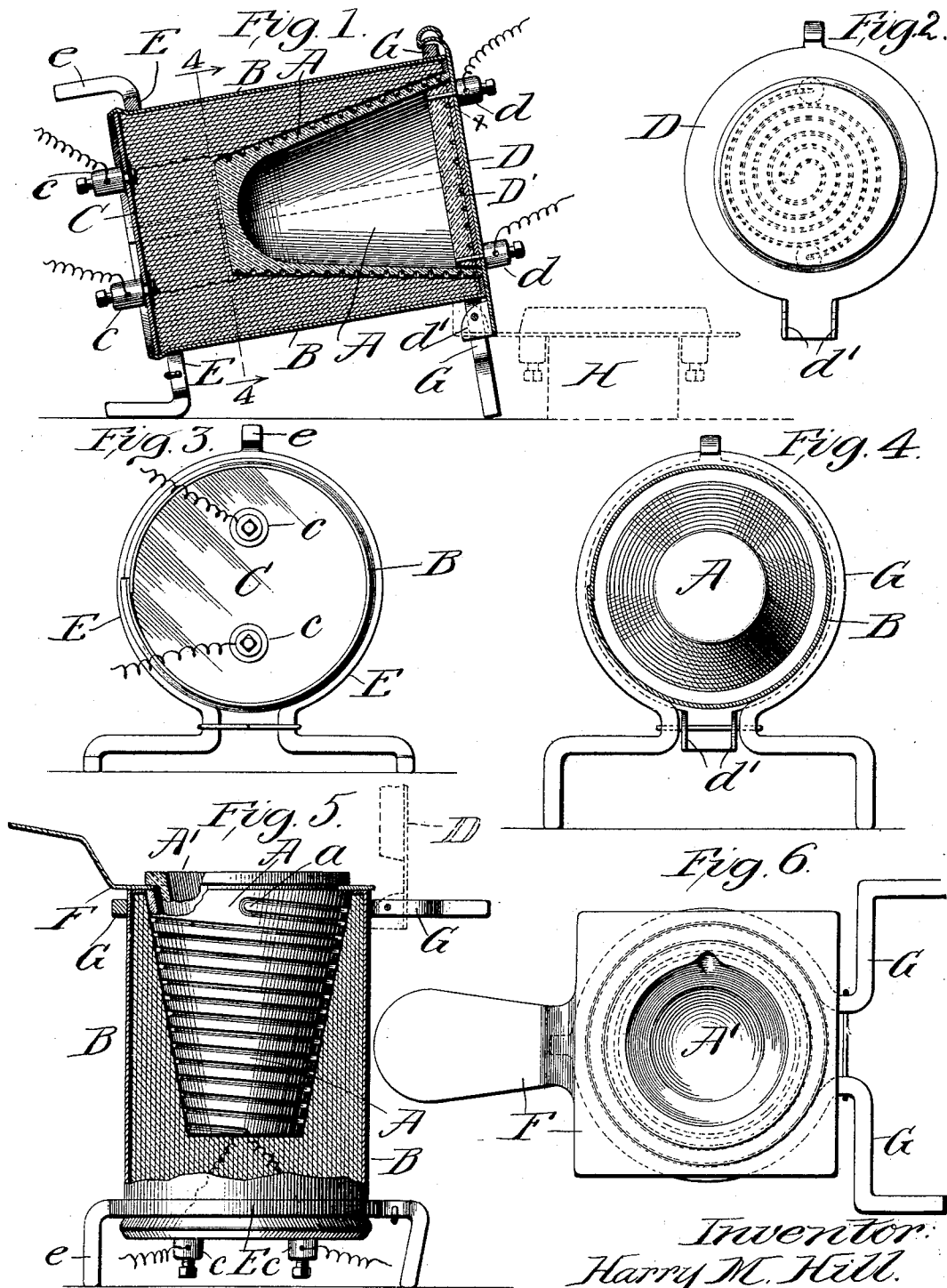
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Patented Feb. 20, 1900.

H. M. HILL.
DENTAL OVEN.

(Application filed Jan. 23, 1899.)

(No Model.)



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UNITED STATES PATENT OFFICE.

HARRY M. HILL, OF ST. LOUIS, MISSOURI.

DENTAL OVEN.

SPECIFICATION forming part of Letters Patent No. 643,898, dated February 20, 1900.

Application filed January 23, 1899. Serial No. 703,174. (No model.)

To all whom it may concern:

Be it known that I, HARRY M. HILL, a citizen of the United States, residing at the city of St. Louis, State of Missouri, have invented a certain new and useful Improvement in Dental Ovens, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a longitudinal sectional view of my improved dental oven. Fig. 2 is an inside elevational view of the closing cap or cover used in connection with the same. Fig. 3 is a rear end elevational view of the oven. Fig. 4 is a sectional view on line 4 4 of Fig. 1. Fig. 5 is a longitudinal sectional view, partly in elevation, showing the oven arranged on end for the purpose of utilizing the same as a crucible; and Fig. 6 is a top plan view of the construction shown in Fig. 5.

This invention relates to a new and useful improvement in ovens for use by dentists and others, the object being to construct a device of the character described for use in glazing or baking porcelain teeth, assaying, melting, and such other purposes for which ovens of this character are usually employed.

The essential features of this invention reside in the construction of the oven proper and the manner in which the same is wound by a wire through which the current of electricity is passed for the purpose of generating heat.

Another feature of the invention resides in the method of packing said oven in a suitable casing for confining the heat therein and preventing the excessive radiation of heat from the oven proper.

Another feature resides in the construction and method of wiring the door or closure used in connection with my improved oven, which door or closure in certain uses may be employed for a support for articles to be heated in the oven; and, finally, the invention consists in the construction, arrangement, and combination of the several parts, all as will hereinafter be described and afterward pointed out in the claims.

In the drawings, A indicates the oven proper, which is preferably circular in cross-

section and tapered toward its rear end. This oven, or, more properly speaking, crucible, is made of fire-clay, magnesia, or other high-heat-resisting material which will stand excessive heat without deterioration by fusing, which would not only cause articles introduced therein to adhere to the glaze thereof, but which would possibly contaminate the introduced articles for treatment by such high heat as is necessary in dental work. The periphery of this crucible is formed with spiral grooves, commencing, preferably, at the larger or forward end in a junction *a*, from which the parallel grooves, spirally arranged, encircle the crucible until they reach the rear or smaller end, where they terminate on opposite sides, as clearly shown in Fig. 5. In these grooves—or, rather, in this groove, as it is practically continuous—is arranged a suitable conductor of electricity, preferably in the form of a platinum wire. From experiments I have made a platinum wire of thirty-six gage will answer admirably and heat the oven to a high temperature, which I believe exceeds the melting-point of iron, or, say, 2,500° to 3,000° Fahrenheit. The groove in the exterior face of the crucible or oven proper is sufficiently deep so that when the wire is introduced therein said wire is wholly buried below the surface, so as to prevent any possible short-circuiting thereof.

In winding the crucible I take a platinum wire of proper length, bend it substantially in the middle, and introduce the bend of the wire at the junction *a*, then by turning the crucible gradually fitting and burying the wire into the parallel grooves until the rear end of the crucible is reached, from which the ends of the wire lead at diametrically opposite sides. After the wire has been introduced in position I then moisten asbestos or mineral-wool paper for the purpose of making it flexible and wind said dampened paper around the crucible, so as to inclose the wire and hold the same in position. When the wire is introduced around the crucible for the first heating, it occupies the bottom of the groove. The current is then turned on and the crucible is allowed to bake in order that all moisture may be driven off, and after a sufficient time has elapsed to accomplish this the current is turned off and

the parts allowed to cool, when it will be found that the shrinkage of the crucible will require a much shorter length of wire than that originally used. The cool wire is then cut to the proper length and finally wound in position the second time, so that said wire will occupy the bottom of the groove. The asbestos is then wound in position, as above described, and, as shown in Fig. 1, there is left sufficient room between the asbestos covering and the top of the groove to permit the wire to expand without rupture. This is an important feature, as where the wire is buried and closely surrounded by material it has to make its own path when it expands; but where the groove is of sufficient size to allow the wire to play therein and accommodate the expansion a longer life of the wire is insured.

B indicates an external casing or shell, consisting of a piece of metal, preferably sheet-iron, having its edges overlapping each other, as shown in Figs. 3 and 4, the ends of said cylinder or shell being suitably flanged or otherwise formed for the attachment at the rear end of an inclosing plate C and at the front end to form a seat for a door or closure D. The end plate or head C has mounted thereon, but of course suitably insulated therefrom, binding-posts *c*, to which the two ends of the platinum wire leading from the crucible are connected. The supply and return wires of a circuit are externally connected to these binding-posts *c*, as shown in Fig. 1.

E indicates a band surrounding the rear end of shell B, which band not only assists in holding said shell together, but by bending the extremities thereof downwardly and rearwardly supporting-legs are formed, which not only support the oven from the table on which it is used, but such rearward extensions enable the oven to be arranged upright, as shown in Fig. 5, in which position a third leg *e*, extending from the opposite side of the band, is employed. When the oven is thus arranged, it may be employed as a crucible, or, as shown in Figs. 5 and 6, a frame-plate having suitable openings therein may be arranged above the crucible A and a removable crucible A' introduced, the frame-plate in such instance, which is marked F in the drawings, being used merely as a handle and support for such auxiliary crucible, enabling the same to be removed with ease without handling the entire oven, to which wires are connected. Crucible A' is preferably made of fire-clay or some suitable refractory material.

The door or closure D to which I have heretofore referred is best shown in Figs. 1 and 2, in which it will be seen to consist of a plate suitably shaped to close the front end of the oven, said plate having lugs or ears *d'* bent up therefrom at its lower edge for the purpose of attachment to the extremity of a band G, encircling the front end of the shell, whose ends are bent outwardly and downwardly, as

shown in Fig. 4, to form the front legs. I therefore attach a plate or block D' of refractory material on the inner face of door D, not only for the purpose of protection with respect to the metallic portion of said door, but also for the purpose of providing an additional heating-surface to the oven, if such is desired. This can be accomplished by grooving the under face of said block, as shown by dotted lines in Fig. 2, and introducing a heat-generating wire into such groove, whose ends terminate in binding-posts *d*, which are externally arranged, and to which binding-posts supply and return wires may be connected, similar to those explained with reference to posts *c*. Binding-posts *d* are of course insulated from the cover and are preferably provided with stems *x*, which pass through the refractory block D' to secure the same in position and also offer means for the attachment of the ends of the heating-wires, which are thus electrically connected to the binding-posts. The wiring of the door and oven may be in series or parallel, as best suited to different circumstances. By the construction of the ears *d'* the door when in a lowered position is supported practically horizontal and may be used as a shelf on which articles may be placed to be dried by the radiated heat from the oven. By placing a support H under the door, as shown by dotted lines to the right of Fig. 1, this door may receive articles and the oven be thereafter turned over on said door for the purpose of heating the articles supported by the door without disturbing said articles. In this position the crucible proper would practically be inverted with respect to the position shown in Fig. 5.

As shown in Figs. 1 and 5, there is an additional winding of non-heat-conducting material, such as asbestos, which is also supposedly incombustible, which winding is placed directly upon the crucible, as heretofore described, for the purpose of holding the wire in position, and I continue such winding until a diameter is reached practically equivalent to the internal diameter of the shell or casing, so that said crucible is firmly supported in position. When a current of electricity is turned on, the moisture is of course driven out of the asbestos paper, and the intense heat bakes the asbestos in the vicinity of the crucible to such an extent that it is almost stone-like in its hardness. This is advantageous in that the adhesion or fusion of the particles of asbestos in the glaze of the outer face of the crucible affords a solid and firm support for the crucible, effectually protects the wire in the groove against accidental displacement, and positively holds said wires in their designed position.

I am aware that minor changes in the construction, arrangement, and combination of the several parts of my invention can be made and substituted for those herein shown and described without in the least departing from the nature and principle of my invention.

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

1. The combination with a grooved crucible 5 and heating-wires arranged in the grooves of said crucible, of non-heat-conducting material around said crucible, a casing or shell, bands on the ends of the casing, said bands being provided with supporting-legs, an end 10 wall containing binding-posts to which the heating-wires are connected, and a cap or cover for the crucible; substantially as described.

2. The combination with a crucible A and 15 its electrical heating-wires, of the casing B, the head C, provided with binding-posts for the heating-wires of the crucible suitably insulated therefrom, the band E arranged at the end of casing B and provided with suitable 20 supporting-legs, the band G, provided with suitable supporting-legs, and a cover or cap D; substantially as described.

3. The combination with an oven, of a hinged cap or cover therefor, a refractory 25 plate secured to the inner face of said cover, an electrical heating-wire arranged in the face of the plate so that said plate will be interposed between the wire and the oven and binding-posts on the cover for said wire; sub- 30 stantially as described.

4. The combination with an oven, of a door D therefor, lugs *d'*, for pivotally supporting said door as a shelf, a spirally-grooved plate secured to the inner face of said door, and

an electrical heating-wire arranged in said 35 groove; substantially as described.

5. The combination with a crucible and its heating-wires, of non-heat-conducting material around said crucible, a casing or shell, bands at each end of the casing, legs on said 40 bands for supporting said crucible in substantially a horizontal or vertical position, and a cap or cover for the crucible; substantially as described.

6. The combination with the oven or crucible 45 formed with deep grooves in its periphery, of an electrical heating-wire which is wound so as to occupy the bottoms of said grooves, and a covering for said crucible for closing said grooves, whereby the wire has 50 sufficient room to expand without affecting the walls of said grooves; substantially as described.

7. The combination with the oven or crucible 55 formed with parallel spiral grooves, of an electrical heating-wire wound tightly in said grooves, and an asbestos covering for closing the tops of said grooves and holding said wire in position, said grooves being sufficiently deep to permit said wire to expand; 60 substantially as described.

In testimony whereof I hereunto affix my signature, in the presence of two witnesses, this 17th day of January, 1899.

HARRY M. HILL.

Witnesses:

F. R. CORNWALL,
A. S. GRAY.