

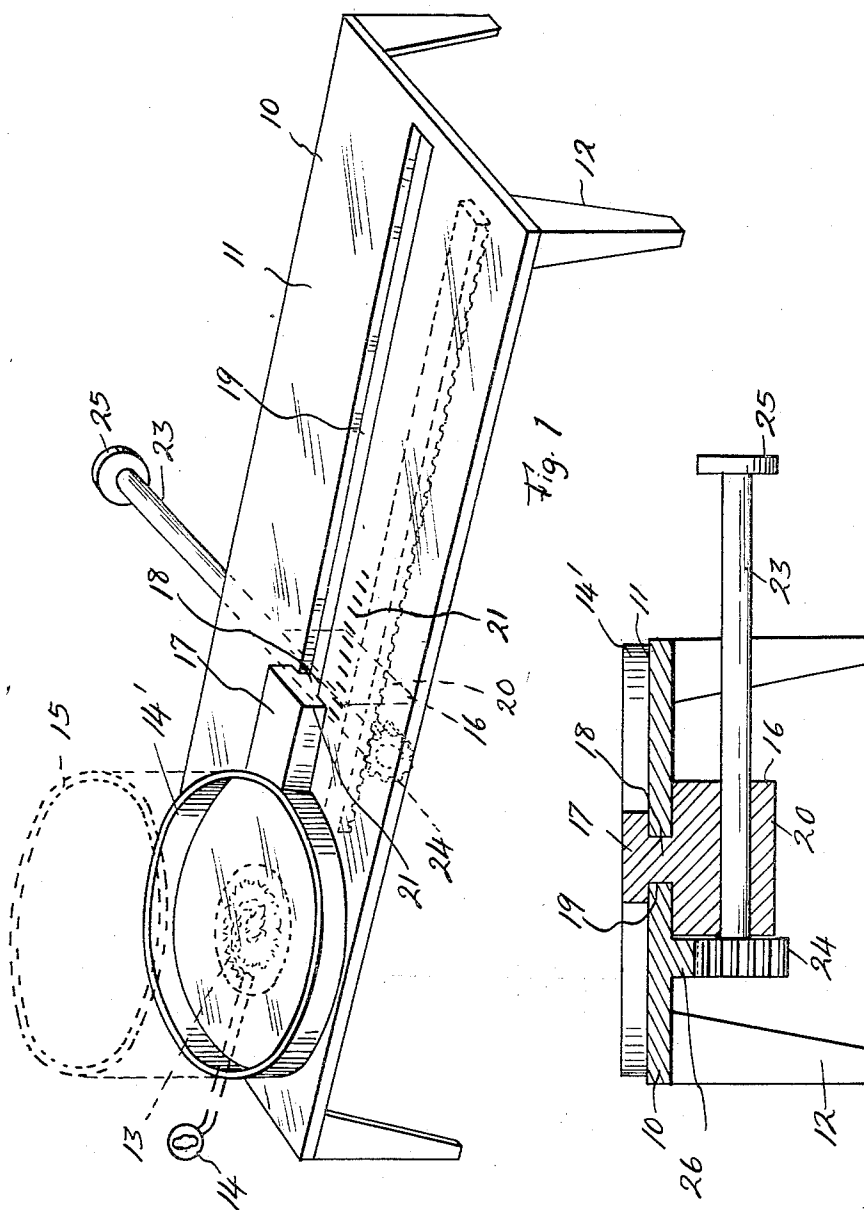
July 25, 1933.

R. M. KERR

1,919,950

DENTAL WATER HEATER

Filed June 16, 1930



INVENTOR

Robert M. Kerr

By *William Bullitt Wheeler*

ATTORNEY

UNITED STATES PATENT OFFICE

ROBERT M. KERR, OF DETROIT, MICHIGAN, ASSIGNOR TO DETROIT DENTAL MANUFACTURING COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN

DENTAL WATER HEATER

Application filed June 16, 1930. Serial No. 461,583.

This invention relates generally to heating apparatus and refers more particularly to a device capable of accurately heating a substance to predetermined temperatures.

The invention while capable of many and diversified uses finds particular utility when used in connection with dentistry for expanding or otherwise conditioning a wax impression prior to making the mold. It is well established in the art of dentistry that different metals when molded, shrink varying amounts and in order to compensate for this shrinkage, it is essential to expand the wax an amount substantially equal to the shrinkage of the particular metal used prior to molding the latter so that when the metal shrinks upon cooling in the wax impression, the finished mold will accurately correspond to the cavity for which it is designed. Thus, it will be observed that the degree of accuracy of the work performed depends largely upon the conditioning of the wax impression and to this end the present invention contemplates means for heating the wax to expand the same predetermined amounts depending upon the particular metal to be used in the casting operation.

With the foregoing as well as other objects in view, the invention resides in the construction of the apparatus for heating the wax to accurate predetermined temperatures. The above apparatus will be made more apparent as this description proceeds, especially when considered in connection with the accompanying drawing, wherein:

Figure 1 is a perspective view of a heating device constructed in accordance with this invention, and,

Figure 2 is a cross-sectional view taken on the line 2—2 of Figure 1.

Referring now more in detail to the drawing and with special reference to Figure 1, it will be noted that my improved heating apparatus comprises a table 10 having a metallic top 11 preferably formed of a material of high thermo-conductivity and normally supported in spaced relation from a suitable platform by means of the legs 12. Supported in any suitable manner from the table 10 beneath the top 11 thereof and adjacent one end of the same is a suitable heat producing unit 13. The heating unit 13 may be of any conventional type, but herein shown for the purpose of illustration as an electric heating element comprising a coil

adapted to be connected to a suitable source of electrical energy through a switch 14. Resting upon the top surface of the plate or table top 11 above the heating unit 13 is a suitable ring or holder 14' adapted to encircle a suitable container 15 which, like the plate 11, is preferably formed of a material of high thermo-conductivity so that the heat from the table will be rapidly transmitted to the container.

When the device is used in connection with dentistry for heat treating wax impressions to expand the same, the container is preferably filled with water or other suitable fluid and the wax impressions deposited therein. As previously described, extreme care must be taken that the degree of expansion of the wax impressions correspond to the characteristics of the particular metal subsequently used in the mold since it is well established that these metals shrink when allowed to cool. In order to control the degree of expansion of the wax impressions, it is necessary to heat the latter to predetermined specified temperatures. For accomplishing this result, the container 15 is mounted upon the table 10 for adjustment longitudinally thereof relative to the heating unit 13.

For accurately adjusting the container 15, as specified above, I provide a carriage 16 having a portion 17 secured in any suitable manner to the side wall of the ring 14' and slidably mounted upon the top surface of the plate 11. In order to guide the portion 17 is an accurate predetermined path, the carriage 16 is further provided with a reduced portion 18 slidably mounted within a suitable slot 19 formed in the plate 11 and extending longitudinally thereof as clearly shown in Figure 1 of the drawing. The carriage 16 is held in assembled relation with the table by means of an enlarged portion 20 arranged below the plate 11 and engageable with the lower surface thereof upon opposite sides of the slot 19 as will be apparent from Figure 2 of the drawing. Thus, it will be observed that movement of the carriage 16 within the slot 19 effects a movement of the container 15 longitudinally of the plate 11 and relative to the heating unit 13. Movement of the container relative to the heating unit 13 effects a change of temperature of the contents within the container and the temperature may be ac-

curately controlled by moving the container either toward or away from the heater predetermined distances.

In order to accurately control the temperature of the contents in the container, I provide a series of graduations designated generally by the reference character 21 and arranged in spaced relation longitudinally of the slot 19 as clearly shown in Figure 1. Each of the graduations 21 correspond to a predetermined temperature and are so calibrated that when the edge 22 of the carriage 16 is in registration with one of the graduations, the temperature of the contents of the container is exactly the same as the temperature represented by the graduation. In other words, if it is desired to heat the contents of the container to 212° for example, the edge 22 of the carriage is caused to register with the first graduation, preferably identified by the number 212, at which time the container assumes a position directly over the heating element 13. On the other hand, if it is desired to heat the contents of the receptacle to 200° for example, the edge 22 of the carriage 16 is caused to register with the graduation identified by the number 200 at which time the container 15 assumes a position upon the plate 11 at a point spaced from the heating unit 13. Thus, it will be observed that as the container is moved away from the heating element 13, the temperature of the contents therein is successively lowered. The foregoing construction is such that when it is desired to fashion a mold of gold, for example, the edge 22 of the carriage is moved into registration with the particular graduation 21 corresponding to the temperature necessary to heat the wax impression within the container to expand the impression an amount substantially equal to the contraction of the gold upon cooling. Thus, insuring a proper fit of the finished mold within the cavity.

For adjusting the carriage within the slot 19 to effect a corresponding adjustment of the container 15, I provide suitable actuating means 23 comprising a shaft 24 having a handle 25 secured to the opposite end thereof and having the inner end portion thereof journaled within the enlarged portion 20 of the carriage and provided with a pinion 24. The pinion 24 is adapted to mesh with a suitable rack 26 formed upon the under surface of the plate 11 and extending substantially parallel to the slot 19. The construction is such that rotation of the handle 25 effects a movement of the pinion 24 longitudinally of the rack 25 and since the carriage is attached to the shaft 24, the latter will be moved within the slot 19.

What I claim as my invention is:

1. In a heating device, the combination with a substantially flat plate, of a heating

element disposed beneath a portion of the plate for heating various parts thereof to different temperatures, a container mounted for sliding movement over the plate in a predetermined path toward and from the heating element and adapted to contain the substance to be heated, and graduations spaced along the path of travel of the container for indicating the temperature to which the contents of the container is adapted to be heated when the latter is in engagement with various portions of the plate.

2. In a heating device, the combination with a substantially flat plate, of means for heating various parts of the plate to different temperatures, a holder adjustably mounted relative to the plate and adapted to support the material to be heated, and means for adjusting the holder to predetermined parts of the plate to heat the material carried thereby to the temperature of said parts.

3. In a heating element, the combination with a substantially flat plate, of means for heating various parts of the plate to different temperatures, graduations upon said plate corresponding to predetermined temperatures, a container slidably mounted upon the plate and adapted to support the material to be heated, and means for adjusting the container on the plate to position the same relative to the graduations and thereby effect a heating of the contents therein to accurate predetermined temperatures.

4. In a heating device, the combination with a substantially flat plate, of means for heating various parts of the plate to different temperatures, a substance to be heated slidable relative to the plate, graduations for indicating the temperature to which the substance is adapted to be heated when in predetermined positions relative to the plate, and mechanism for effecting a sliding movement of the substance over the plate to position the same relative to the graduations aforesaid and thereby heat the substance to accurate predetermined temperatures.

5. In a heating device, the combination with a substantially flat plate, of a heating element disposed beneath a portion of the plate for heating various parts of the latter to different temperatures, a holder slidably engaging the plate and adapted to support the substance to be heated, mechanism for sliding the holder over the plate relative to the heating element to position the same over the various parts aforesaid of the plate, and means for indicating the temperature to which the substance is adapted to be heated when the holder is positioned over the various parts of the plate permitting

the substance to be heated to accurate predetermined temperatures.

6. In a heating device, the combination with a substantially flat plate, of a heating element disposed beneath a portion of the plate for heating various parts of the latter to different temperatures, a container mounted for sliding movement on the plate in a rectilinear path toward and from the heating element and adapted to contain the substance to be heated, mechanism for advancing the container along said path, graduations spaced along the said path of travel of the container for indicating the temperature to which the contents of the container is adapted to be heated when the latter is in engagement with different portions of the plate, and means movable with the container adapted to selectively register with said graduations whereby the contents of the container is heated to accurate predetermined temperatures depending upon the particular graduation with which said last-mentioned means is registered.

7. In a heating device, the combination with a heating element, of a substantially flat plate disposed over the heating element and having an elongated slot therein extending beyond the element, a container slidably engaging the plate and adapted to contain the substance to be heated, a member engaging the container having a portion projecting into the slot for guiding the container throughout a predetermined path of travel toward and from the heating element, means engageable with the portion aforesaid of the member for adjusting said container along the plate, and graduations spaced along one side of the slot for indicating the temperature to which the contents of the container is adapted to be heated when the container is in engagement with different portions of the plate.

8. In a heating device, the combination with a plate member, of a heating element disposed beneath a portion of the plate member, a container slidably mounted upon the plate member in a predetermined path relative to the heating element and adapted to contain the substance to be heated, a plurality of graduations spaced longitudinally of the path of travel of the container for indicating the temperature of various portions of the plate member, and means for sliding the container along the plate member to position the same relative to said graduations and thereby effect a heating of the contents of the container to the different temperatures of the various portions of the plate indicated by said graduations.

9. In a heater, the combination with a metallic support, of a heating appliance operatively associated therewith for heating different portions thereof to different predetermined temperatures, a holder mounted

upon the support for travel in a predetermined path, and graduations extending along said path from the heating appliance for indicating the temperatures the substance supported by the holder is adapted to be heated when the latter is in heat conducting relation with various portions of the support.

10. In a heating device, the combination with a support formed of a material of high thermo-conductivity, of a heating element associated with the support for heating the same, a container arranged in direct heat conducting relation to the support, said heating element and container mounted for relative sliding movement with respect to the support for heating the contents of the container to various temperatures, and graduations upon the support for indicating the temperatures to which the contents of the container is adapted to be heated when the latter and heating element are in different relative positions.

11. In a heating device, the combination with a support, of a heating element associated with the support for heating the same, a container arranged in direct heat conducting relation to the support, mechanism for adjusting the relative positions of the container and heating element for heating the contents of the container to various temperatures, and means associated with said support for indicating the temperatures at which the contents of the container is adapted to be heated when the latter and heating element are in different relative positions.

12. In a heating device, the combination with a support, of a heating element associated with the support for heating various portions of the same to different temperatures, a container arranged in direct heat conducting relation to the support, and means for relatively moving the container and heating element in a predetermined path with respect to the support for heating the contents of the container to various different temperatures.

13. In a heating device, the combination with a support, of a heating element associated with the support for heating various portions of the same to different temperatures, a container arranged in direct heat conducting relation to the support, means for relatively moving the container and heating element in a predetermined path with respect to the support for heating the contents of the container to various different temperatures, and means for indicating the temperature at which the contents of the container will be heated in different relative positions of the container and heating element.

ROBERT M. KERR.