

H. W. DENHARD.
HEATING DEVICE.
APPLICATION FILED OCT. 31, 1911.

1,102,392.

Patented July 7, 1914.

Fig. 1.

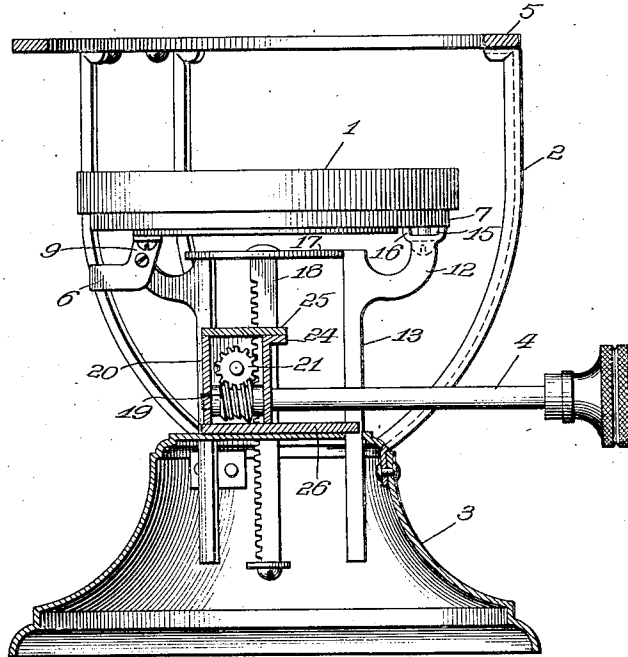
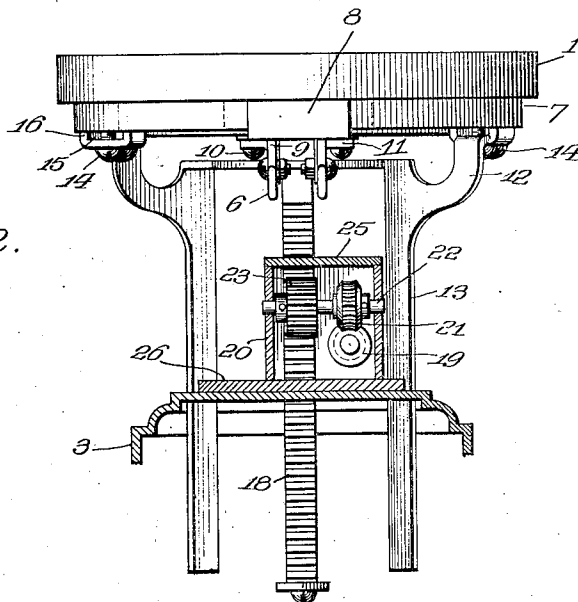


Fig. 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

HARRY W. DENHARD, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO THE CUTLER-HAMMER MFG. CO., OF MILWAUKEE, WISCONSIN, A CORPORATION OF WISCONSIN.

HEATING DEVICE.

1,102,392.

Specification of Letters Patent.

Patented July 7, 1914.

Application filed October 31, 1911. Serial No. 657,806.

To all whom it may concern:

Be it known that I, HARRY W. DENHARD, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented new and useful Improvements in Heating Devices, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to heating devices. It has among its objects to provide an improved heating device.

A further object of my invention is to provide an improved heating device wherein the heat may be readily and instantaneously regulated within a wide range.

A further object of my invention is to provide improved means for varying the position of the heating means with respect to the object to be heated.

Other objects and advantages of my improved construction will hereinafter appear.

In the accompanying drawings I have for purposes of illustration shown one form which my invention may assume in practice. My invention is not however limited to this particular form but may assume other forms.

In the views of these drawings: Figure 1 shows a side elevation of this form of my improved heating device, a portion of the casing being shown in section. Fig. 2 shows an end elevation of the mechanism with the casing broken away.

In these drawings I have for purposes of illustration shown my improved heating device applied to use with an electric heater of the type described in my co-pending application Serial No. 587,359 filed October 17, 1910. As therein described, an electric heating element in the form of a disk 1 is arranged to be reciprocated vertically in a frame 2, carried by a base 3, by means of a rotatable operating member 4, in order to vary the heat delivered to an object to be heated supported on the top plate 5 of the frame. The electrical connections for the disk 1 are made at suitable terminal members 6 preferably carried upon the underside of the disk.

In my improved construction the heating

element is preferably provided with an under heat-retaining plate 7 preferably formed of insulating material, which extends substantially over the bottom of the plate and at one side is preferably provided with a suitable opening adapted to receive an insulating terminal-holding plate 8. If desired both of these plates may be made of a molded stone material. The plate 8 carries the terminal members 6 heretofore referred to, which have shanks 9 extending through the plate 8 to the disk 1, to which they are suitably connected, and are screwed to the insulating plate 8 by means of suitable screws 10, extending through extensions or projections 11 on the lower ends of the terminal plugs.

Obviously the insulating plates 7 and 8 may be integral. In the preferred form, however, they are made up separately and the plate 8 is set in an opening in the plate 7 which corresponds to the shape of the plate 8 and is of greater width at its back. In this way I am able to securely lock the plate 8 in position and prevent its being pulled out in case the terminal plug should stick to the terminals.

An inner frame preferably having arms 12 extending substantially at right angles to downward extending standards 13, is preferably attached at two or more points to the bottom of the insulating plate 7 by means of suitable screws or other devices 14. In a preferred form, the ends of the arms 12 are preferably bent over at right angles as at 15 and the edges of these bent-over portions are bent upward at right angles as at 16 in such a manner as to cut down the amount of their surface in contact with the plate 7 and thus the amount of heat conducted away by these arms. In a preferred form the upper ends of the standards 13 are connected by a plate 17 which if desired may be made integral with these arms and standards, the whole being punched from a single sheet of metal. The upper end of a rack member 18 is preferably centrally located on the plate 17 and extends downward between the standards 13, passing through a suitable opening in the bottom of the base 3 at a point between suitable openings through which the standards 13 are passed.

In order to raise or lower the disk 1 I preferably provide the operating member 4 which carries upon its end a worm 19 and is journaled in a suitable casing 20 carried upon the top of the base 3. This worm preferably engages a pinion 21 whose teeth are slightly turned and beveled to transmit the rotation of the worm in a direction at right angles to the direction of movement of the worm. The pinion 21 is preferably fixed to a rotatable shaft 22 journaled in the casing 20. Upon the opposite end of the shaft 22 is preferably mounted a pinion or gear 23 whose teeth are arranged to engage the teeth of the rack 18. In a preferred form, the casing 20 is provided with one or more extensions 24 which serve as guiding members for the rack and a cap or cover 25 is provided in order to protect the gearing from the entry of dust, dirt and the like. Further in a preferred form, the casing 20 is mounted upon a bottom plate 26 which rests upon the top of the base 3 and is provided with extensions at its corners, provided with suitable slots adapted to cooperate with the openings in the base to act as guides for the standards 13.

When it is desired to operate my improved device to vary the heat supplied to the object to be heated all that is necessary to do is to rotate the operating handle 4 in the desired direction. When this handle is turned, as for instance to increase the heat, the worm wheel 19 is rotated to rotate the pinion 21 which in turn rotates the gear 23 raising the rack 18 and the disk 1 to the desired position. As explained in my copending application, the heat supplied to the object to be heated may thus be varied very rapidly. Conversely when it is desired to reduce the heat supplied to the object to be heated the operating handle is rotated in the opposite direction, and the disk 1 is lowered. The effect of this movement is to cut off the heat of the disk instantaneously and thus avoid any deleterious effects of the residual heat which remains in the disk in those constructions where the disk is stationary and the current flow is controlled by electric switches, rheostats or the like.

In my improved construction I have provided a heating device wherein the heating range of the heater is materially increased and the regulation is obtained substantially instantaneously, the deleterious effects of the residual heat being completely obviated. Further, the device is one which is capable of supplying very delicate regulation within a very large range since the heat supplied may be readily graduated as desired by simply adjusting the height of the heater. By my improved construction of operating means I have provided an extremely rugged

and reliable construction which is well adapted to withstand long use in service. 65 Further, the construction is an exceedingly simple one which may be readily manufactured at a small expense. Further, while I have in this application described my invention as applied to an electric heating disk, 70 it is of course obvious that my invention may be adapted to use in connection with heating devices of other types.

While I have for purposes of illustration in this application specifically described one 75 form which my invention may assume in practice, I do not wish to be limited to this specific construction, but wish rather to cover all of those forms of my invention which fall within its spirit. 80

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In a heating device, a base, one or more standards arranged to reciprocate with respect thereto, a heating element carried by 85 said standards, and means including extensions on said standards having up-turned ends for preventing the conduction of heat to said standards.

2. In a heating device, a base, one or more 90 standards arranged to reciprocate with respect thereto, a heating element carried by said standards, an insulating plate between said element and said standards, and means for preventing the downward conduction of 95 the heat through said standards including extensions on the ends of the same having up-turned edges engaging said insulating plate.

3. In a heating device, a base, one or more 100 standards arranged to reciprocate with respect thereto, a heating element carried upon said standards, an insulating plate between said heating element and said standards, means for preventing the downward con- 105 duction of the heat from said insulating plate through said standards, and a removable terminal carrying plate locked in position in said insulating plate.

4. In a heating device, a base having one 110 or more openings in its top and an upwardly extending frame arranged to support a receptacle, a heating element arranged to reciprocate in said frame, standards fixed to said heating element and insulated there- 115 from, portions of said standards extending through said base, and means for varying the elevation of said heating element including a reciprocable rack member carried between said standards, a plurality of pinions 120 carried upon said base, and a rotatable worm arranged to engage one of said pinions.

5. An electric heating device comprising an electrically heated disk, a base having up- 125 wardly extending arms between which said disk is movable, a utensil-supporting ring

carried on said arms above said disk, standards fixed to said disk and movable therewith, said standards passing through openings in said base and guided thereby, and a
5 rack and pinion mechanism for varying the elevation of said disk with respect to said utensil holding ring.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

HARRY W. DENHARD.

Witnesses:

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GEO. B. JONES.