

Sept. 18, 1945.

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2,385,143

PLASTIC TREATING APPARATUS

Filed Jan. 13, 1944

2 Sheets-Sheet 1

Fig. 1.

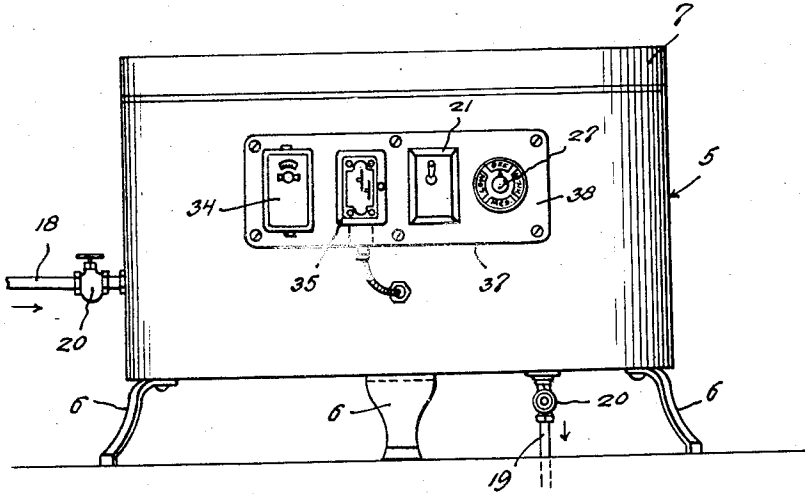
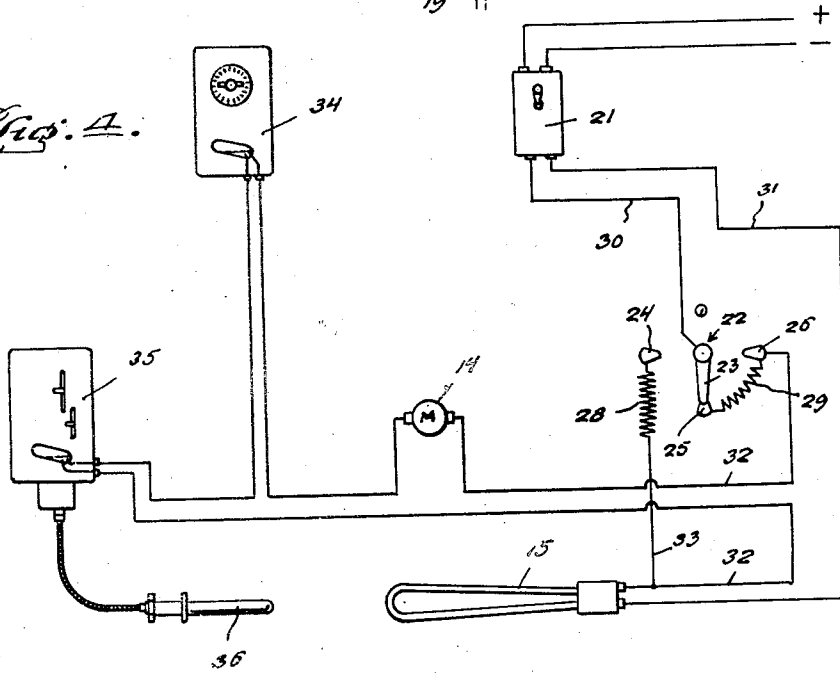


Fig. 4.



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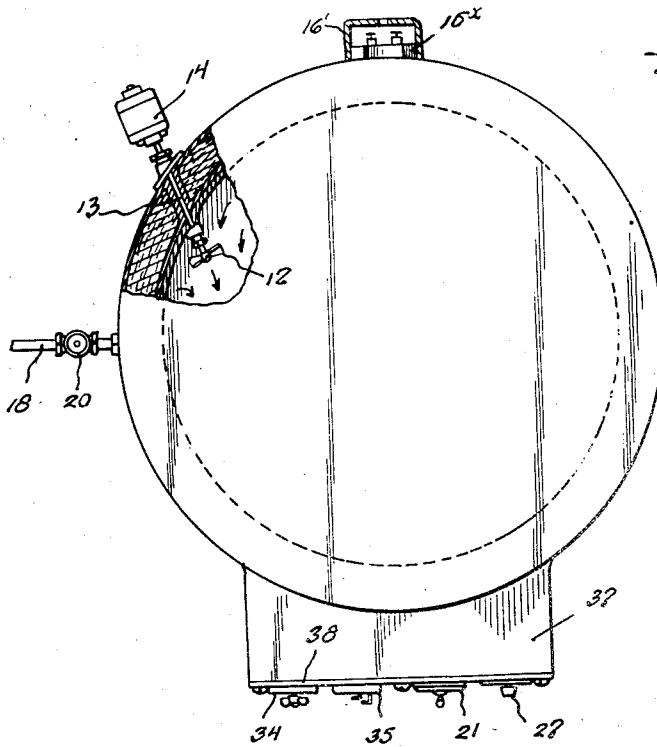


Fig. 2.

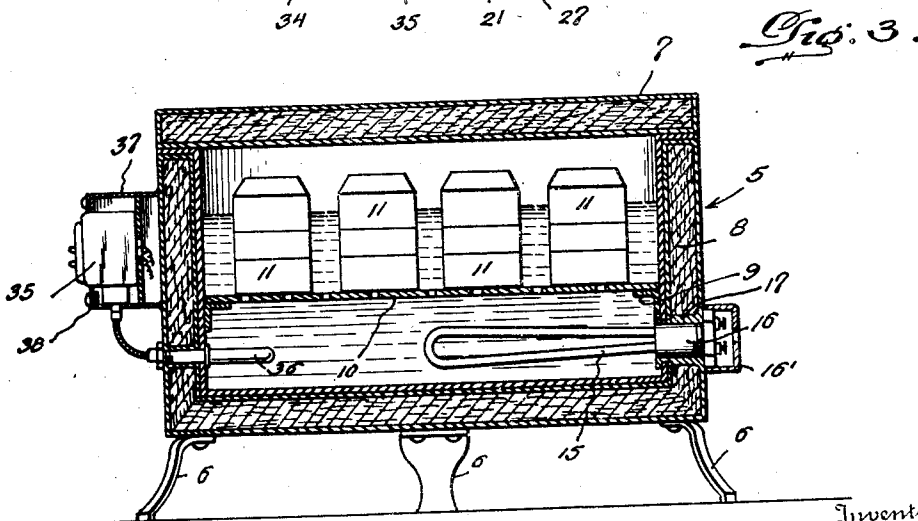


Fig. 3.

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UNITED STATES PATENT OFFICE

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PLASTIC TREATING APPARATUS

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Application January 13, 1944, Serial No. 518,151

4 Claims. (Cl. 219—39)

This invention relates to a plastic treating apparatus and while the device may be employed for the treatment of various kinds of plastics, it is especially adapted for processing and curing methyl methacrylate resin, known to the dental profession as acrylic resin used for the making of denture plates, bridges, crowns, etc.

The primary object of the invention is the provision of an apparatus of the above stated character which will be automatic in operation to assure the proper processing and curing of the material, eliminating any human negligence from affecting the treatment of said material.

Another object of the invention is the provision of an apparatus wherein the material will be processed and cured by heat derived from a circulated liquid of a predetermined temperature and for a selected length of time, assuring against over or under curing of the material.

A further object of the invention is the provision of a device which is convenient to operate and will be both economical to manufacture and use.

With these and other objects in view as will become more apparent as the description proceeds, the invention consists in certain novel features of construction, combination and arrangement of parts as will be hereinafter more fully described and claimed.

For a complete understanding of my invention, reference is to be had to the following description and accompanying drawings, in which

Figure 1 is a front elevation illustrating a plastic treating apparatus constructed in accordance with my invention.

Figure 2 is a top plan view, partly in section, illustrating the device.

Figure 3 is a vertical sectional view showing the support for the material immersed within the heated liquid and the electrical heating means for effecting the heating of the liquid.

Figure 4 is a diagrammatical view showing the wiring diagram of the apparatus.

Referring in detail to the drawings, the numeral 5 indicates a tank or container supported by legs 6 and provided with a removable cover 7. While the tank or container is shown as of cylindrical shape, it may be manufactured in other shapes if desired. It is preferable that the tank or container and the cover be constructed with double walls, as shown in Figure 3, providing dead air spaces between the walls in which insulation 8 may be arranged. The container or tank is fully open at its upper end when the cover is removed so that the material to be treated can be easily placed therein and removed.

At a selected distance from the bottom of the tank or container brackets 9 are provided for supporting a perforated plate 10 on which molds or

the like containing the material to be treated may be arranged and immersed within a liquid, such as water, partly filling the tank or container. The molds are indicated by the character 11 and are frequently employed in the dental art for supporting plastic material in the manufacture or making of denture plates, bridges, crowns, etc.

In order that the liquid be freely circulated with relation to the material being treated, a propeller 12 is arranged within the tank or container, above the perforated plate 10, and is secured to a shaft 13 journaled in the walls of the tank or container and connected with an electric motor 14 arranged exteriorly of the tank or container. It is preferable that the shaft 13 be arranged at an angle, as shown in Figure 2, so that when the propeller is in operation the liquid will be caused to travel in a substantially circular, or spiral, path within the tank or container thereby freely moving into and out of contact with the material containing molds, as well as with an electric heater 15 arranged in the tank or container below the perforated plate 10. The base of the electric heater is indicated by the character 16 and is removably mounted in a boxing 17 provided in the walls of the tank or container positioning the electric terminals thereof exteriorly of the tank or container for connection with an electric circuit which will be hereinafter described in detail.

A suitable cap 16' is arranged over the terminals of the electric heater.

A liquid supply pipe 18 connects with the interior of the tank or container and also a drain pipe 19 connects therewith preferably by extending through the bottom of said tank or container. The pipes 18 and 19 are provided with control valves 20. This arrangement permits liquid to be readily introduced into the tank whenever desired and to be drained therefrom.

The electric circuit, as shown in Figure 4, includes a master relay type switch 21 which may be conveniently connected into an electric output through the use of a conventional extension cord provided with the necessary electric fixture. It is preferable that the master switch be of a type which will prevent an electric overload from damaging or otherwise affecting any of the electric equipment connected in the circuit and is to be automatic in operation.

A heater control switch 22 including a movable contact 23 and fixed contacts 24, 25 and 26 is provided in the electric circuit for the control of the electric heater as to its capacity for heating. The heater switch 22 includes a finger piece 27 movable manually over a dial labeled "off," "low," "medium" and "high." The contact 24 has an electric resistance 28 connected thereto and the contacts 25 and 26 are connected together by an electric resistance 29. The mov-

able contact 23 is electrically connected to a terminal of the master switch 21 by a conductor 30 and another terminal of the master switch is connected to a terminal of the electric heater by a conductor 31. The resistance 28 of the switch 22 is connected to a conductor 32 by a conductor 33. The conductor 32 is connected to a terminal of the electric heater and connects in series with the contacts 26 or 25 of the switch 22, the electric motor 14, a timing apparatus 34 and a temperature control apparatus 35. The timing and temperature control apparatus are conventional in construction. The temperature control apparatus is preferably of the aquastat mercury type including a thermal element 36 immersed in the liquid of the tank or container below the perforated plate 10. The temperature control apparatus 35 is for the purpose of controlling the electric heater in such a way that the liquid may be maintained at any predetermined temperature within the tank or container with the master switch 21 in circuit closing position.

The timing apparatus is for the purpose of controlling the electric heater as to its period or time of operation. The switches 21 and 22 and the timing and temperature controlling apparatus are preferably mounted in a casing 37 secured to or forming a part of the tank or container and which has a removable panel 38 apertured to expose the controls of the switches as well as the timing and temperature controlling apparatus so that they may be manually adjusted or operated at desired times.

The purpose of having the resistance 28 of the switch 22 connected to the electric heater, as shown, is that the switch 22 may be adjusted manually for the purpose of maintaining the liquid in the tank or container at some temperature between atmospheric temperature and below the temperature of curing or processing of material in the tank or container. To accomplish this the master switch is arranged in circuit closing position and the contact 23 of the switch 22 is engaged with the contact 24. Over long periods of time it may be desired that the liquid in the tank be kept at some temperature other than atmospheric temperature and a curing temperature and the switch 22 makes provision therefor. During the curing period, the contact 23 of the switch 22 is engaged with either the contact 25 or 26 depending on the desire of the operator as to the amount of heat that is wished to be provided by the electric heater. The temperature control apparatus 35 is then adjusted so that the liquid will be maintained at a predetermined temperature. Also the time control apparatus 34 is adjusted for stopping the curing or processing operation at a predetermined time. After the material has been arranged in the tank or container as heretofore described, the master switch is moved into circuit closing position, the temperature of the liquid being kept at a predetermined temperature by the apparatus 35 and when the period of curing operation should be discontinued, the apparatus 34 acts to cut the electricity to the heater thereby eliminating any negligence on the part of the operator from affecting the processing or curing operation of the material.

From the foregoing description taken in connection with the accompanying drawings, it will be seen that the apparatus is simple in construction and operation and will efficiently process

and cure plastic without the human element endangering or spoiling the plastic through negligence in the operation of the device. Further, it will be seen that the device can be easily and quickly set up for operation and will be economical to manufacture permitting its sale to be at a low cost.

While I have shown and described the preferred embodiment of my invention, it will be understood that minor changes in construction, combination and arrangement of parts may be made without departing from the spirit and scope of the invention as claimed.

Having thus described the invention, what I claim is:

1. In a processing and curing apparatus, a container including insulated walls and having a liquid therein for curing of material, a perforated plate removably supported in the container within the liquid for supporting the material within the liquid, means including an electric drive mounted in a wall of said container and above said perforated plate for circulating the liquid in the container, and electrical means for the operation of said first named means and for automatically heating said liquid to a predetermined temperature and for a predetermined length of time.

2. In a processing and curing apparatus, a container including insulated walls and having a liquid therein for curing of material, a perforated plate removably supported in the container within the liquid for supporting the material within the liquid, means including an electric drive mounted in a wall of said container and above said perforated plate for circulating the liquid in the container, an electric circuit having said means connected therein, an electric heater connected in said circuit and immersed within the liquid between the bottom of the container and the perforated plate, a thermal apparatus in contact with the liquid connected in said circuit for controlling the heater to produce heat sufficient to maintain the liquid at a predetermined temperature.

3. In a processing and curing apparatus, a container including insulated walls and having a liquid therein for curing of material, a perforated plate removably supported in the container within the liquid for supporting the material within the liquid, means including an electric drive mounted in a wall of said container and above said perforated plate for circulating the liquid in the container, an electric circuit having said means connected therein, an electric heater connected in said circuit and immersed within the liquid between the bottom of the container and the perforated plate, a thermal apparatus in contact with the liquid connected in said circuit for controlling the heater to produce heat sufficient to maintain the liquid at a predetermined temperature, and a time controlled apparatus connected in said circuit for the operating of the heater for a predetermined length of time.

4. The invention as in claim 1, with said container of vertical cylindrical form, and said electrically driven means comprised in a shaft journaled angularly in the wall of said container, an electric motor operatively coupled to said shaft exteriorly of said container, and a propeller mounted on the inner end of said shaft in substantially close proximity to the container wall, so that the circulatory motion imparted to the liquid within the container by the action of the propeller is substantially spiral.

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