Dec. 24, 1940. A. H. CHENOWETH 2,225,857

MEANS FOR MAKING DENTURES

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Fig. 1.

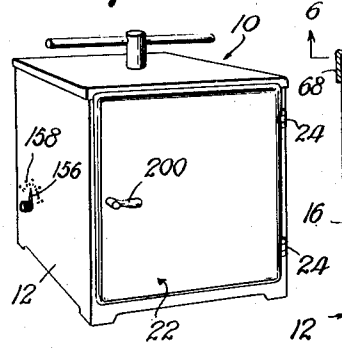


Fig. 2.

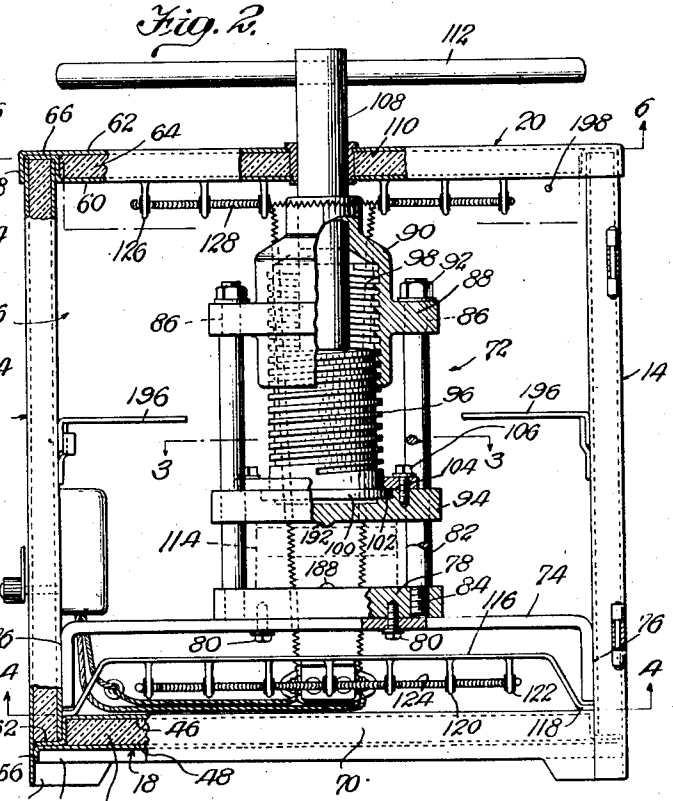


Fig. 3.

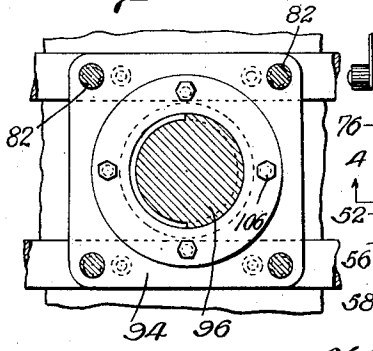


Fig. 4.

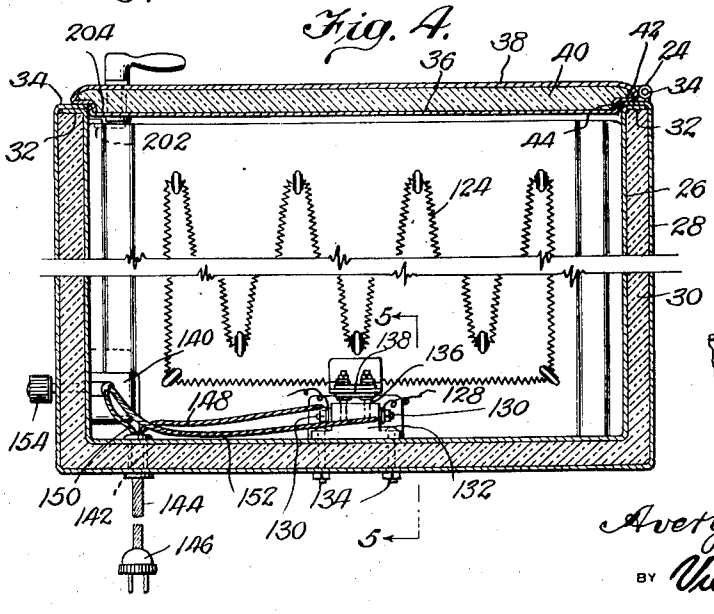
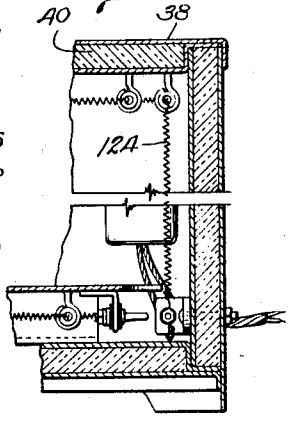


Fig. 5.



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Fig. 6.

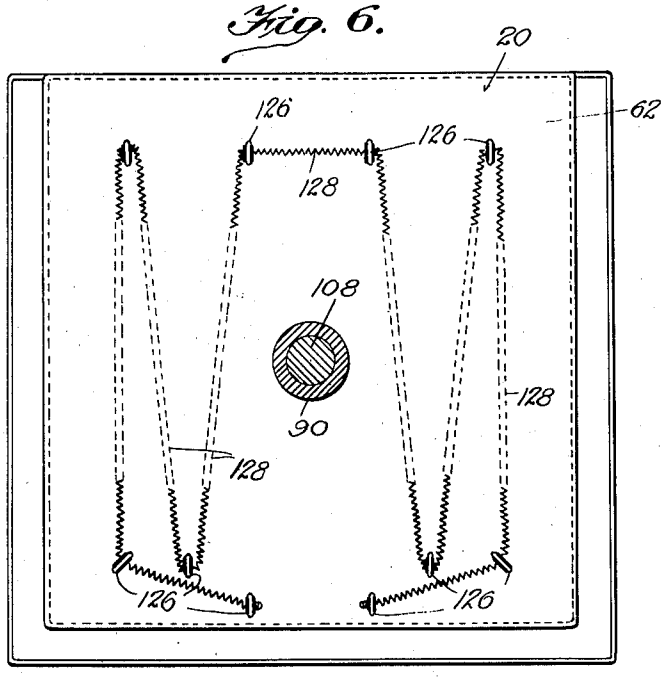


Fig 7.

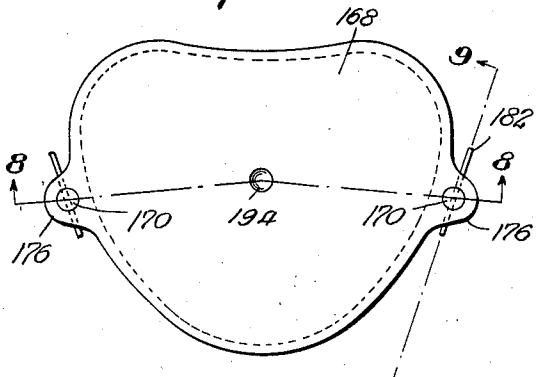


Fig. 8.

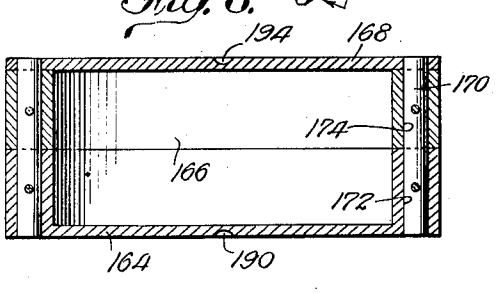


Fig. 9.

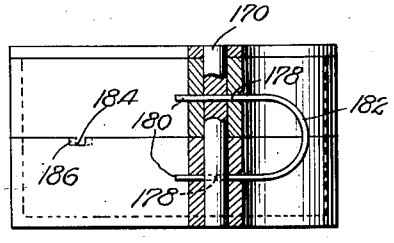
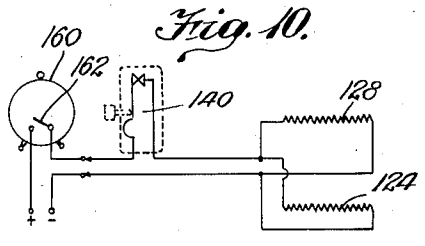


Fig. 10.



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UNITED STATES PATENT OFFICE

2,225,857

MEANS FOR MAKING DENTURES

Avery Hobart Chenoweth, Mason City, Ill.

Application June 21, 1937, Serial No. 149,527

2 Claims. (Cl. 18—33)

My invention relates to dentures, and includes among its objects and advantages the provision of an improved dry technique of and means for making dentures.

In the accompanying drawings:

Fig. 1 is a perspective view of my novel press and oven;

Fig. 2 is a front view with the door removed and certain parts broken away for the sake of clearness;

Fig. 3 is a sectional view along the line 3—3 of Fig. 2;

Fig. 4 is a sectional view along the line 4—4 of Fig. 2;

Fig. 5 is a sectional view along the line 5—5 of Fig. 4;

Fig. 6 is a sectional view along the line 6—6 of Fig. 2;

Fig. 7 is a top plan view of my dental flask;

Fig. 8 is a sectional view along the line 8—8 of Fig. 7;

Fig. 9 is a sectional view along the line 9—9 of Fig. 7; and

Fig. 10 is a diagrammatic view of the electric circuit.

In the embodiment selected to illustrate my invention, I make use of an oven 10 comprising side walls 12 and 14, a back wall 16, a bottom 18, and a top 20. A door 22 is hingedly connected at 24 with the front vertical edge of the wall 14.

Walls 12, 14 and 16 comprise two spaced metallic plates 26 and 28 between which insulating material 30 is provided. Plate 26 is provided with flanges 32 arranged in overlapping relation with flanges 34 of the plate 28 and connected into a unitary structure by welding. The door 22 comprises spaced metallic plates 36 and 38 between which insulating material 40 is positioned. Plate 38 is shaped to provide ledges 42 along its four edges, which ledges overlap the forward edges of the walls 12 and 14, the bottom 18 and the top 20. Plates 36 and 40 may be provided with overlapping flanges 44 secured into a unitary structure by welding.

Bottom 18 comprises spaced metallic plates 46 and 48 between which insulation 50 is provided. Plate 46 is bent to provide an L-shaped flange 52 within which the lower edge of the side walls 12 and 14 and the back wall 16 rest. Plate 48 may be welded to the flange 52 and the plate is provided with a flange 54 which may be welded at 56 to the plate 28 which defines the outer faces of the side walls 12 and 14 and the back 16. Plate 28 is shaped to provide legs 58 at its lower end.

Top 20 comprises two spaced plates 60 and 62 arranged to support insulation 64. Plate 60 includes an L-shaped flange 66, while the plate 62 is provided with a flange 68 co-operating with the flange 66 for housing the upper edges of the side walls 12 and 14 and the back wall 16. Flange 68 may be welded to the plate 28, while the flange 66 may be welded to the plate 62. The ledge 42 along the upper edge of the door 22 presses against the flange 68 of the plate 62 along the forward edge of the top 20. In Fig. 2, I illustrate the bottom 18 as being provided with a flange 70 comprising an extension of the plate 46 against which the lower ledge 42 of the door 22 rests.

Within the oven 10 I mount a press 72. The press comprises a base plate 74 welded at 76 to the side walls 12 and 14. Upon the base plate 74 I mount a plate 78 which is secured in position by bolts 80 passing through the base plate 74 and having threaded relation with the plate 78. Four vertical bars 82 have threaded connection with the plate 78 as indicatd at 84. The upper ends of the bars 82 terminate in reduced shanks 86 passing through openings in the flange 88 of a head 90. Nuts 92 have threaded relation with the shanks 86 for securely fastening the flange 88 in position and for supporting the head 90 in fixed relation with respect to the plate 78.

A pressure plate 94 is bored to loosely receive the bars 82. Pressure plate 94 may be raised and lowered on the bars 82 which guide the pressure plate. In Fig. 1, I illustrate a screw 96 as having threaded relation with the threaded bore 98 in the head 90. At the lower end of the screw 96, I provide a circular flange 100 of larger diameter than the screw 96. Pressure plate 94 is recessed at 102 sufficiently far to bring the upper ace of the flange 100 flush with the top face of the plate. A retaining washer 104 is attached to the pressure plate 94 by bolts 106 for rotatably connecting the flange 100 with the pressure plate. It will thus be seen that the flange 100 is rotatably related to the pressure plate 94 but any vertical movement of the screw 96 as it is rotated imparts vertical movement to the pressure plate 94. This plate is maintained in parallel relation with the plate 78 in all positions of adjustment.

Screw 96 terminates in a shaft 108 which is rotatably supported within a sleeve 110 connected with the top 20. The outer end of the shaft 108 may be provided with a handle 112 to facilitate turning. Nuts 92 hold the flange 88 in

fixed relation with the guide rods 82 so that rotary movement of the screw 96 is translated into vertical movement of the pressure plate 94. In Fig. 2, I have illustrated the dental flask in dotted lines at 114. The flask is positioned on the plate 78 and the pressure plate 94 is so related to the plate 78 as to impart pressure to the flask.

Means is provided for electrically heating the oven 10. Within the oven I mount a plate 116 having a flange 118 along its edges arranged to rest on the bottom 18. Plate 116 carries a plurality of depending eyes 120 provided with insulating liners 122 through which the heating element 124 is threaded. Fig. 4 illustrates the staggered arrangement of the eyes 120 so as to distribute the heating element substantially over the entire area of the plate.

The top 20 is provided with eyes 126 of the same construction as the eyes 120 through which a heating element 128 is threaded. The ends of the element 128 are electrically connected with terminals 130 carried by a socket 132 anchored to the rear wall 16 by bolts 134. The ends of the heating element 124 are electrically connected with prongs 136 arranged to have electrical connection with the socket 132. Prongs 136 are anchored on a lip 138 formed from the plate 116.

Plate 116 is removably retained within the oven 10. Because of the prongs 136, the plate may be removed as a unit with the heating element 124. Electrical connection is established between the heating element 124 and the socket 128 by merely pushing the plate 116 home. Within the oven 10, I mount a conventional thermostat 140. I provide the rear wall 16 with an opening 142 for accommodating the electric cord 144 provided with the usual plug 146 for electrical connection with a wall outlet. Cord 144 has its wire 148 electrically connected with one of the terminals 130, while the other wire 150 is electrically connected with the thermostat 140 by a wire 152. The thermostat may be regulated as to temperature response through the medium of a knob 154 located exteriorly of the side 12. This knob may be provided with a needle 156 arranged in reading relation with graduations 158 in terms of temperature. Thermostats are well known in the art and need not be described in further detail. In Fig. 10, I illustrate the electric circuit. In this circuit I have included a clock 160 for controlling the conventional switch 162 so that the current may be shut off automatically after a predetermined time. The clock may be exterior of the oven 10 at any desirable place.

Figs. 7, 8 and 9 illustrate the dental flask. The flask comprises a bottom section 164, a top section 166 and a cover 168. The cover 168 is provided with two fixed guide pins 170 arranged to be inserted in bores 172 and 174 in the sections 164 and 166, respectively. The bores 172 and 174 lie within ribs 176 projecting laterally of the flask and the ribs and pins 170 are provided with aligned openings 178 for the reception of the reaches 180 of a U-shaped lock wire 182. Two wires are associated with the flask. Section 164 may be provided with recesses 184 for the reception of lugs 186 carried by the section 166 for registration purposes. In Fig. 2, I illustrate the plate 78 as being provided with a slight projection 188 arranged to lie within the depression 190 in the bottom of the section 164. Pressure plate 94 is also provided with a projection 192 which lies within a depression 194 in the cover 168. Thus, the flask may be accurately centered with respect to the axis of the screw 96. This screw is of relatively large diameter, which is also true of the flange 100 so that pressure forces will be distributed substantially over the entire area of the pressure plate 94. The large diameter screw distributes pressure forces uniformly throughout the plate 94, which aids in maintaining the pressure plate in parallel relation with the plate 78. The large diameter screw in combination with the guide rods 82 operate to maintain uniform pressure throughout the entire top and bottom of the flask positioned between the two plates.

In connection with the structure so far described, make use of a dry heat method of vulcanization in connection with such materials as rubber, synthetic rosin such as cellulose, luxene, etc. The denture cast or mold is positioned in the bottom section 164 previously provided with the proper amount of plaster of Paris or stone common to the art. After the plaster has set it is treated with a separating fluid in the usual manner. The upper section 166 is then placed in position on the section 164. A creamy mix of plaster of Paris is poured into the flask up to its top. The cover 168 is then placed in position with the pins 170 located within the bores 172 and 174, after which the spring lock wires 182 are placed in position as illustrated in Fig. 9. At this time the flask is set aside for at least an half hour until the plaster is hard.

After the plaster has set, the flask is placed in the oven 10 and the thermostat is adjusted for a heat of about 200° F. The flask is maintained under this temperature for about ten to fifteen minutes. After heating, the flask is removed from the oven and the spring lock wires 182 removed. The sections of the flask may now be separated. The wax in which the teeth have been set is soft but not in a liquid state and can be lifted from the plaster mold. At this time all the teeth should be taken from the mold and kept in proper relationship. If some wax remains on the cast or mold it should be removed with a sharp instrument or wiped clean with chloroform.

After separation of the flask, and the removal of the wax remains from the cast or mold, the two sections of the flask are kept apart and placed in the oven to remove moisture. The thermostat is set to maintain a temperature of 300° F., and the time required to remove the moisture is approximately two hours. Higher temperatures may be employed, but I have found that it is not advisable to employ a temperature in excess of 350° F. A temperature of 225° F. may be employed for an all night drying job. In providing the oven with the time clock 160 and the thermostat 140, temperature and time are controlled automatically without the attention of the operator. After the moisture has been entirely evaporated, the flask is taken from the oven and placed on the laboratory bench to cool for a few minutes. A liquid comprising Celluloid dissolved in acetone is painted over the entire cast or mold with the exception of the area occupied by the teeth. The teeth should be cleaned of all wax and placed in the mold in their proper places.

With the flask still separated it is again placed in the oven at a temperature of about 215° F. for ten minutes. The section of the flask containing the teeth is removed and ground Luxene is placed around the teeth and the mold completely filled. When the Luxene becomes semi-

liquid the other section of the flask is taken from the oven and placed in position on its companion part. The assembled flask is then placed in the press and the screw **96** turned slowly until the flask is correctly closed.

The spring lock wires **182** are then slipped into place the flask removed from the press and placed on one of the shelves **196** for the curing process. A temperature of 250° F. is maintained in the oven for about two hours and thirty minutes, but the temperature should not be raised to this degree within less than twenty minutes. After the curing process, the flask is permitted to cool and is then removed and placed in water. The trimming, filing and polishing are done in the customary manner.

In connection with Celluloid materials, such as are known in the trade as Hecolite, Parfait, Fiberloid, Alcolite, etc., no drying out is necessary. In connection with these materials, after the wax has been removed from the cast or mold the dental material is placed between the two halves of the flask and the flask placed in the press. The thermostat is set at the desired temperature advisable for the specific material employed. The temperature is so constant that the pressing process is exceedingly simple and easy. After the flask has been in the press for thirty minutes at the desired temperature, the screw **96** is turned down slowly. Ten to fifteen minutes time should be consumed in closing the flask. After the flask is closed, the spring lock wires **182** are placed in position and the flask may be removed from the oven and permitted to cool slowly. In connection with rubber, the technique is identical as in connection with Luxene except for the curing time. The vulcanizing of rubber should be done in the manner advised by the manufacturer.

The rear wall **16** is provided with a vent opening **198** for the escape of vapors in the event that the denture material should catch on fire. The vent opening prevents the occurrence of explosions. In connection with the dry heat method of vulcanization, I eliminate the necessity for hot water or steam. The flasks when removed from the oven after curing are clean and dry, which is a desired advantage over the steam vulcanizing systems. The oven **10** is well insulated and the radiation of heat has been reduced to a minimum. The thermostat **140** maintains the heat at the desired temperature so as to insure proper heating but with no waste. The oven is easily operated. Because of the clock **160** the system is largely automatic. I eliminate the necessity for nut and bolt fastenings and the oven may be opened through the medium of the door **22**. Because of the door, the curing process may be watched in addition to permitting access to the inside of the oven. According to my method, the plaster molds remain hard and dry and the finished dentures fit accurately. They are harder, tougher and more dense than dentures made according to conventional steam pressure methods.

In Figs. 1 and 4, I have illustrated the door **22** as being provided with a handle **200** rotatably mounted and including a lug **202** arranged to lie behind a lug **204** on the wall **12** for latching the door in its closed position.

Without further elaboration, the foregoing will so fully explain my invention that others may, by applying current knowledge, readily adapt the same for use under various conditions of service.

I claim:

1. In a device of the type described, a supporting floor for a dental flask, a head having a threaded bore, means for securing the head in fixed relation with the supporting floor, a flask pressure plate slidably guided by said means and paralleling said supporting floor, a screw having an annular flange at one end located on the pressure plate, the flange being of larger diameter than the screw and the latter having a cross-sectional area substantially equal to the area of the flask engaged by the pressure plate, means fastened to the pressure plate and extending over said flange for rotatably connecting that end of the screw with the pressure plate, and means for turning the screw.

2. In a device of the type described, a supporting floor for a dental flask, a head having a threaded bore, means for securing the head in fixed relation with the supporting floor, a flask pressure plate slidably guided by said means and paralleling said supporting floor, a screw having an annular flange at one end located on the pressure plate, the flange being of larger diameter than the screw and the latter having a cross-sectional area substantially equal to the area of the flask engaged by the pressure plate, said pressure plate having an annular ledge against which the peripheral margin of the flange contacts, and means fastened to the pressure plate and extending over the annular flange for rotatably connecting that end of the screw with the pressure plate.

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