June 12, 1934. W. F. RODIN 1,962,410

DENTAL FLASK

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Fig. 1.

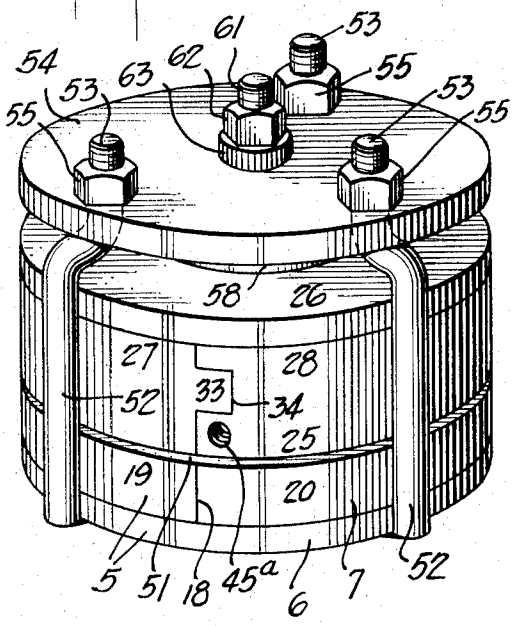
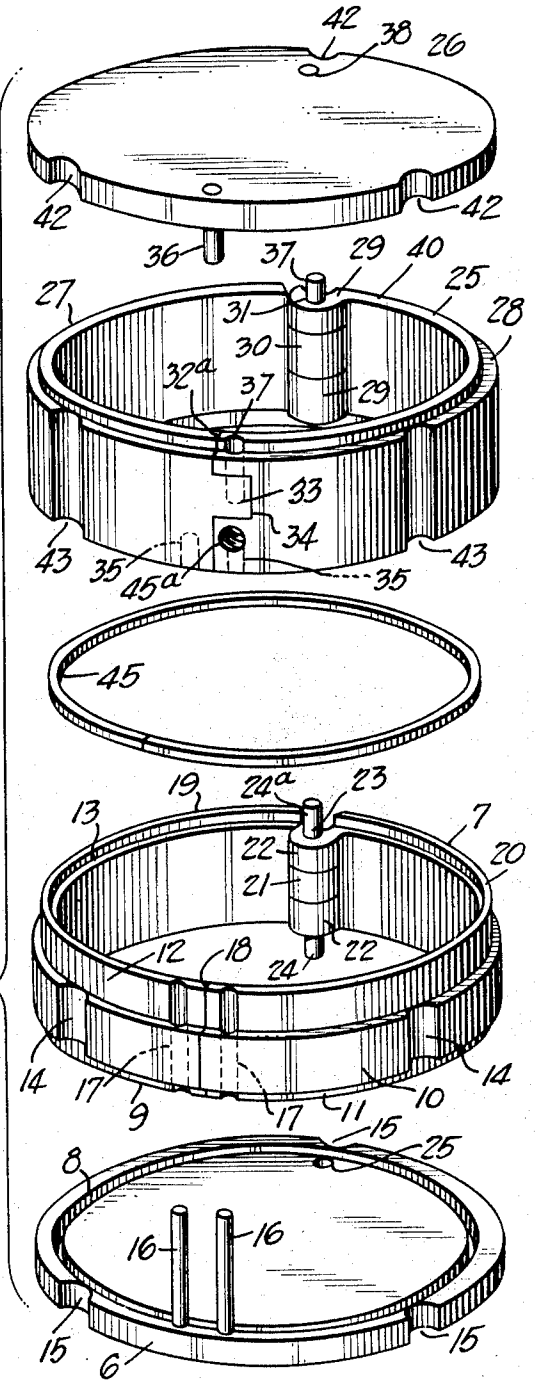


Fig. 2.



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Fig. 3.

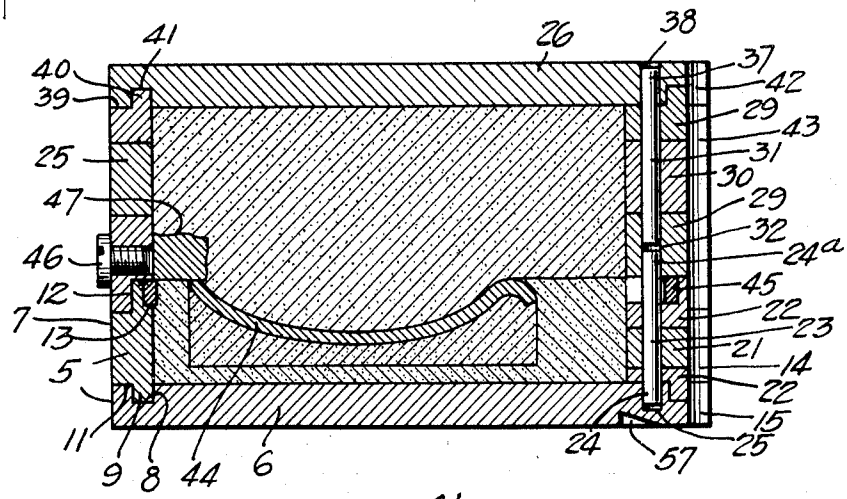
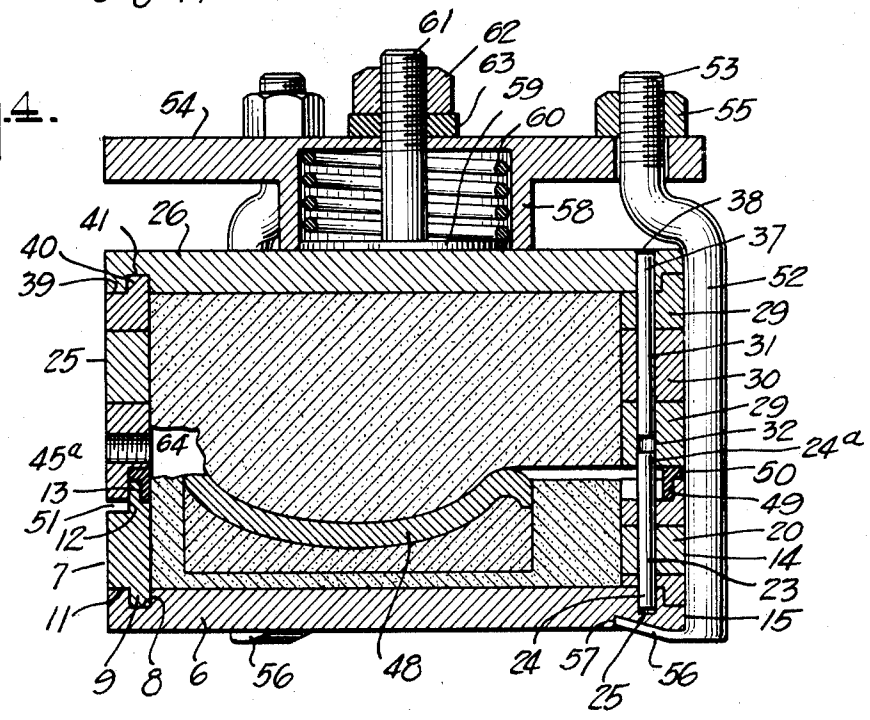


Fig. 4.



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DENTAL FLASK

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Application June 11, 1930, Serial No. 460,480

3 Claims. (Cl. 18—33)

This invention relates to dental flasks, and has for its primary object the provision of thermally responsive means which functions automatically under the action of a vulcanizing heat to insure the highest measure of accuracy in the manufacture of dentures, and which serves to cause the molten mass of vulcanizable material in the mold cavity of the flask to be closely packed and subjected to the effect of self-compensating means that freely and positively adapts itself to conditions induced by the action of expansion and contraction of said vulcanizable materials so that the denture when removed from the flask will be of a shape correctly following the lines of the mouth and free from voids, cracks and other imperfections occurring in vulcanizing processes practiced herebefore.

The invention provides positively acting means for first producing a mold cavity in the plaster of the flask, and self-compensating means for both acting upon an excess of vulcanizable material and to permit same to be vented from the flask during the vulcanizing process and for then setting up that action against the vulcanizable material that will reduce same to a shape truly complementary to the cavity formed by the model.

A further object of the invention is to provide a flask of this character consisting of sections adapted to be readily set up and knocked down, respectively.

Another object of the invention is to provide a flask the sections of which can be opened quickly and the parts separated so that convenient access can be had to the vulcanized denture without the necessity of manually cutting away the plaster, as heretofore practiced.

A further object of the invention is to provide a flask of this nature embodying novel means which can be incorporated therein and used in conjunction with other structural elements of the flask and which will be effective and automatic in action in causing the vulcanizable material to gradually assume a shape precisely in conformity with the mold cavity as produced by a wax pattern or model.

In the accompanying drawings,

Figure 1 is a perspective view of the complete flask;

Figure 2 is a perspective view of the respective parts of the flask in superposed relation, the fusible element being omitted;

Figure 3 is a view in vertical section of the flask showing the manner of producing a mold cavity from a wax model; and

Figure 4 is a view similar to Figure 3, showing the parts of the flask assembled preparatory to the insertion of the flask in a vulcanizing chamber.

In carrying the invention into practice, use is made of a lower flask section 5 consisting of a flat base plate 6 and a superposed ring 7, the former provided on its upper face with an annular groove 8 for the reception of the reduced flange 9 at the lower edge of the ring 7. The ring 7 has a circumferential portion 10 of larger thickness than any other portion of said ring, and as illustrated there is produced a horizontal shoulder 11 which extends at right angles to the edge 9 so as to rest upon the marginal surface of the base plate 6. The said ring 7 is formed with an outer rabbet 12 and an inner rabbet 13, the former being somewhat deeper than the latter. The circumferential portion 10 is formed with equidistantly spaced vertical grooves 14 adapted to register with corresponding grooves 15 in the base plate 6. Rising from the base plate are spaced apart vertical pins 16, 16, which are adapted to enter passageways 17, 17, formed in the ring 7 and positioned, respectively, at the opposite sides of a vertical joint 18 in the ring. The ring 7 comprises two substantially identical sections 19 and 20, the former having a hinge loop 21 arranged in registration with corresponding loops 22 on the section 19 of the ring. A hinge pin 23 passes through the said loops, and as shown the said pin is provided with an extension 24 at its lower end adapted to enter an opening 25 formed in the base plate 6. From the arrangement just set forth, it follows that when the two sections 19 and 20 of the ring 7 are closed, as shown in Figure 2, same may be superposed with respect to the base plate 6 and associated therewith to the extent that the reduced portion 9 becomes associated with the groove 8, while the shoulder 10 is made to rest upon the marginal edge of the aforementioned base plate. At this point, the pins 16, 16, enter the receiving passages 17, 17, whereby the ring 7 is held in a closed condition.

The top section of the flask comprises a ring 25 and a flat top plate 26. This ring is quite similar to the ring 7 and, as illustrated, it comprises sections 27 and 28, the latter having hinge loops 29, 29, arranged in vertical registration with a hinge loop 30 on the section 27. These coinciding loops accommodate a hinge pin 31, and, as illustrated in Figures 3 and 4, the lower end of said pin 31 occupies a position above the base of the lower hinge loop 29, so that the pin opening 32 is adapted to receive the upper end

24a of the hinge pin 23, the latter forming a part of the aforementioned ring 7. In this manner, the hinge pin 23 is brought into vertical registration with the hinge pin 31. The joint 32 of the ring 25 is stepped, there being an offset 33 on the ring 27 that engages in a corresponding recess 34 in the ring section 28. At the respective sides of the joints 32 and at the lower edge of the ring 25 are formed vertical recesses 35, 35, which are adapted to accommodate the upper extremities of the pins 16, 16, which latter are of a length sufficient to cause their upward extremities to protrude slightly above the upper edge of the ring 7 when the latter is supported on the base plate 6. It obviously follows that the pins 16 serve also to hold the sections 27 and 28 of the ring 25 in their closed positions. Extending downwardly from the top plate 26 is a pin 36 adapted to enter a receiving passage 37 in the ring 25. The hinge pin 31 is formed with an upper extension 37 adapted to enter a passage 38 formed in said top plate 26. In this manner I propose to hold the respective sections of the flask in operative co-ordinated relationship to one another and to lock the rings 7 and 25 in their closed positions when the assembled flask is in use. The ring 25 is rabbeted at 39 so as to produce a peripheral projection 40 adapted to enter an annular groove 41 on the lower face of the top plate 26. The said top plate 26 is formed in its peripheral edge with equidistantly spaced peripheral grooves 42, which are adapted to coincide with similar vertical grooves 43 formed on the exterior surface of the ring 25. These grooves 42 and 43 are, therefore, intended to coincide with the aforementioned grooves 14 and 15 in the ring 7 and its co-acting base plate 6, the purpose of which will appear presently.

On reference to Figure 1, it will be observed that the mold sections have been filled with plaster and that the two sections now operatively accommodate a wax model 44. I do not make any claim to the process of producing this wax model, but for clarity, it is now stated that in the work of applying the model to the flask the ring 7 is first placed upon the base plate 6 and plaster is applied within the ring so as to entirely fill the space formed thereby. Before doing this, however, I insert a split ring 45 in the shallow rabbet 13 of the ring 7. As shown in Figure 3, the upper edge of this ring comes flush with the upper edge of the ring 7 and it serves to prevent plaster contained within the ring 7 from filling the rabbet. The model is then associated with the plaster in the customary manner. The top section of the flask is then applied, it being intended that the ring 25 shall be filled with plaster and that it shall be pressed down against the model in such manner as is also common to the work of producing a mold cavity for the denture to be made. Naturally it follows that before applying the top mold section the plaster in the lower section is permitted to first set and harden. After this is done and plaster has been applied within the top section, the top plate 26 is applied and the entire flask is then permitted to stand over that interval that will bring about a complete setting of the plaster. The plaster in the top section of my flask will also be isolated from the plaster in the lower section in the customary manner, such as by varnishing same with a suitable material that will prevent the two plasters from adhering to one another. At this point, it should be observed that the ring 25 is formed with a vent passage 45a which is screw-threaded to removably accommodate a corresponding threaded plug 46. This vent passage opens against a destructible wax body 47 which I embed in the plaster of the top flask section. This destructible body presents itself against an adjacent face of the wax pattern or model 44, as shown in Figure 3. After the proper period common to the work of producing a mold cavity for the denture to be formed, it obviously follows that the entire flask is subjected to the action of those heats which will melt away the wax from which the model or pattern is constructed, thus leaving a cavity or mold space the form of which precisely follows the shape of the pattern employed.

After the mold cavity is produced, I introduce vulcanizable material 48 thereto, first making sure that there is an excess of material to the extent that will allow for subsequently subjecting the flask sections to relative axial movements that will be conducive to the creation of pressure upon this vulcanizable material that will cause all air to be evacuated therefrom and which will insure reducing the material to an ultimate structural form which will be truly complementary to the shape of the mold cavity produced by the aforementioned pattern 44. In order to do this, I remove the ring 45 which I employed when producing said mold cavity, and I substitute therefor a ring 49 constructed of fusible material of any suitable well-known variety, preferably one which fuses at a temperature of 320° F. I have found that a fusible material suitable to this purpose may be constructed from lead, bismuth and zinc. However, in this connection, I, of course, do not wish to be in any way limited because of the fact that there are many well known materials that might be equally suited to the purpose. The ring 49 has a spacer 50 formed as an integral part thereof, and as illustrated in Figure 4, same is adapted to occupy the space between the rings 7 and 25 to the extent that there is a clearance 51 formed between the lower edge of said ring 25 and the adjacent horizontal shoulder of the rabbet 12 of the ring 7. It is in this manner that I elevate the top flask section to a position above that which it occupied during the process of producing the mold cavity.

I have now disclosed means whereby the respective upper and lower sections of the flask are capable of being moved along an axial line on the destruction of the fusible ring 49. Now, and to take advantage thereof so that effective pressure of the bottom face of the plaster in the top flask section may be applied against the vulcanizable material 48, I employ what in a sense may be referred to as an automatically functioning press, the same consisting of vertical rods 52, 52, 52, exteriorly positioned upon the flask and equidistantly spaced apart by the office of offset upper extremities 53 formed on said rods and associated with a plate 54, the offset upper extremities 53 of said rods being passed through said plate and maintained in confinement therewith by regulating nuts 55. These rods respectively co-act with the alined grooves 14 and 15, 42 and 43, hereinbefore referred to. The lower extremities of the rods are formed with lugs 56 which engage in depressions 57 in the under surface of the base plate 6. I have now described means for initially advancing the lower face of the top ring 28 of the flask against the spacing portion 50 of the fusible ring 49. It should be observed that no more pressure

should be exerted against the spacer 50 than is necessary to a requisite initial assemblage of the flask sections preparatory to subjecting the vulcanizable material 48 to the action of a vulcanizing heat.

Depending from the plate 54 is an open-ended vertical barrel 58, the lower edge of which comes in smooth contact with the central portion of the upper face of the plate 26 of the flask. Working in this barrel is a reciprocal piston head 59 which, under the influence of a spring 60 within the barrel, is adapted to be pressed firmly against the said plate 26. Said piston head 59 is provided with a threaded stem 61, the same carrying an adjusting nut 62. Interposed between the nut 62 and the upper face of the plate 54 is a thermal washer 63, the thickness of which is somewhat greater than the thickness of the spacing portion 50 of the fusible ring 49. The material of which the ring 63 is formed may be the same as the material of which the ring 49 is formed.

After the flask sections have been assembled, as shown in Figure 4, the plug 46 is removed from the vent opening 45a in the ring 25. It is assumed now that the flask sections are ready to be subjected to a vulcanizing treatment. Any well-known form of vulcanizer can be employed. Let it be assumed that the flask is contained within a vulcanizing chamber and that the heat of the chamber has reached a temperature of 320° F. It manifestly follows that the ring 49 and the washer 63 fuse under the action of this heat, and in so doing a clearance space is established between the respective mold sections so that, under the office of the piston head 59 and its spring 60, pressure will be advanced against the top mold section so that the plaster contained therein will be uniformly pressed against the molten vulcanizable material contained in the mold cavity of the lower flask section. The material is now reduced down to the size intended to be produced by the wax pattern or model. Any excess of material incident to the induced pressures herein described will find egress to the outside of the flask by way of the said vent passage 45a. At this point it will be observed that the plug 47 used in the work of reducing the mold cavity has given rise to the creation of a vent space 64 in the plaster of the upper flask section and that this space opens directly to the vent passage. It is so correlated to the mold cavity that the molten material may pass thence to the said vent passage under the persuasion of pressures produced within the flask.

I have now fully described a flask wherein all of its sections, when once alined, will always be alined throughout the process of making the denture. In consequence thereof and in view of the pressure inducing thermally controlled means hereinabove referred to the plaster within the top flask section will be automatically advanced into contact with the rubber or vulcanizable material contained in the cavity of the flask. I thereby insure an equation of pressures and I have positively exhausted from the vulcanizable material any free air that might be contained therein, and I have done all other things so necessary to the production of a denture which will be absolutely free of cracks, blowholes or other imperfections which heretofore have been the result of the manufacture of faulty and greatly imperfect dentures. I wish particularly to emphasize the fact that the flask is entirely automatic in action when subjected to those vulcanizing temperatures which are commonly used in the practice of mechanical dentistry. I wish, too, to emphasize the fact that the rings 7 and 25 may be conveniently moved to opened positions with respect to the plastic masses contained therewithin. By merely inserting some convenient form of tool into the open joints of the rings, the ring sections can be swung apart on their pintles. In this manner, the flask sections can be knocked down most expeditiously and without the necessity of scraping into the plaster in order to gain complete access to the manufactured denture.

I claim as my invention:

1. A dental flask comprising a plurality of slidably connected rings each embodying a plurality of hingedly connected portions, plates associated with the respective rings, and co-acting with the hinge pins thereof to maintain relative vertical alinement of the rings, and means on the plates co-acting with the respective rings to hold the hinged portions thereof against swinging movement.

2. A dental flask comprising a plurality of slidably connected rings each embodying a plurality of hingedly connected portions, plates associated with the respective rings, and co-acting with the hinge pins thereof to maintain relative vertical alinement of the rings, means on the plates co-acting with the respective rings to hold the hinged portions thereof against swinging movement, pressure exerting means, and means removably connected with the respective flask sections for maintaining association of the pressure exerting means against one section of the flask so as to normally urge said section in the direction of the mating section.

3. A dental flask comprising a plurality of slidably connected rings each embodying a plurality of hingedly connected portions, plates associated with the respective rings, and co-acting with the hinge pins thereof to maintain relative vertical alinement of the rings, means on the plates co-acting with the respective rings to hold the hinged portions thereof against swinging movement, pressure exerting means, means removably connected with the respective flask sections for maintaining association of the pressure exerting means against one section of the flask so as to normally urge said section in the direction of the mating section, and thermally actuated means for rendering the pressure exerting means operative for an application of pressure against its co-acting section of the flask.

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