May 4, 1948. N. OPOTOW 2,440,910

DENTAL FLASK

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Fig. 3.

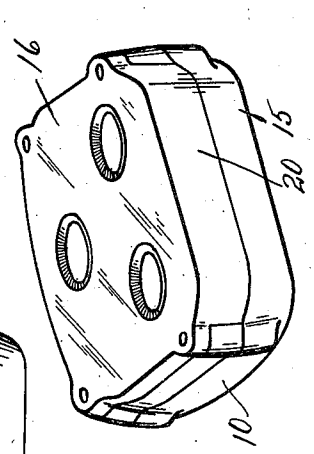


Fig. 2.

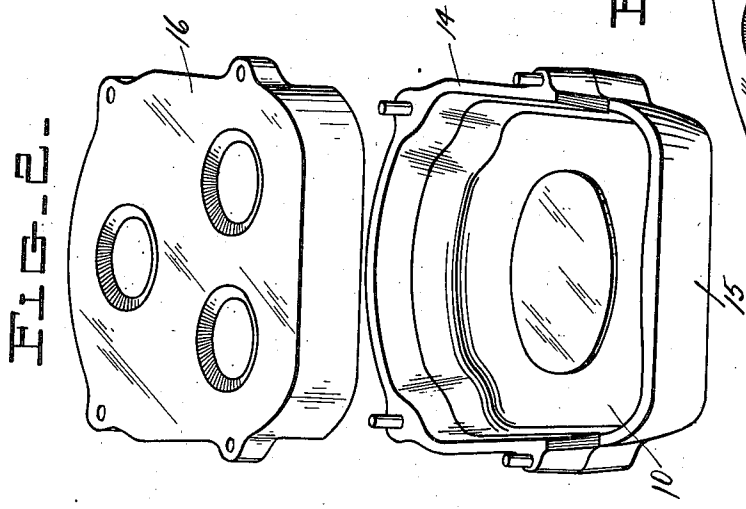
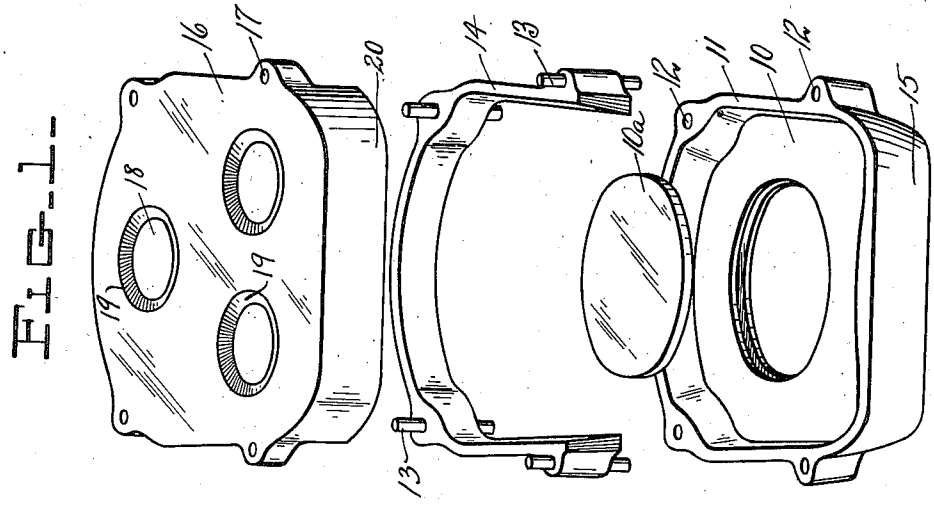


Fig. 1.



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FIG. 4.

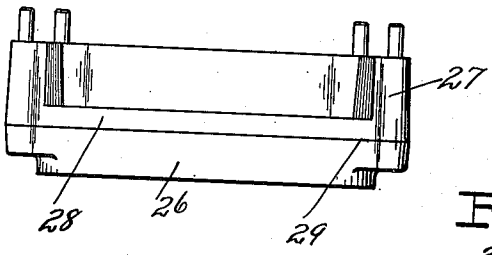
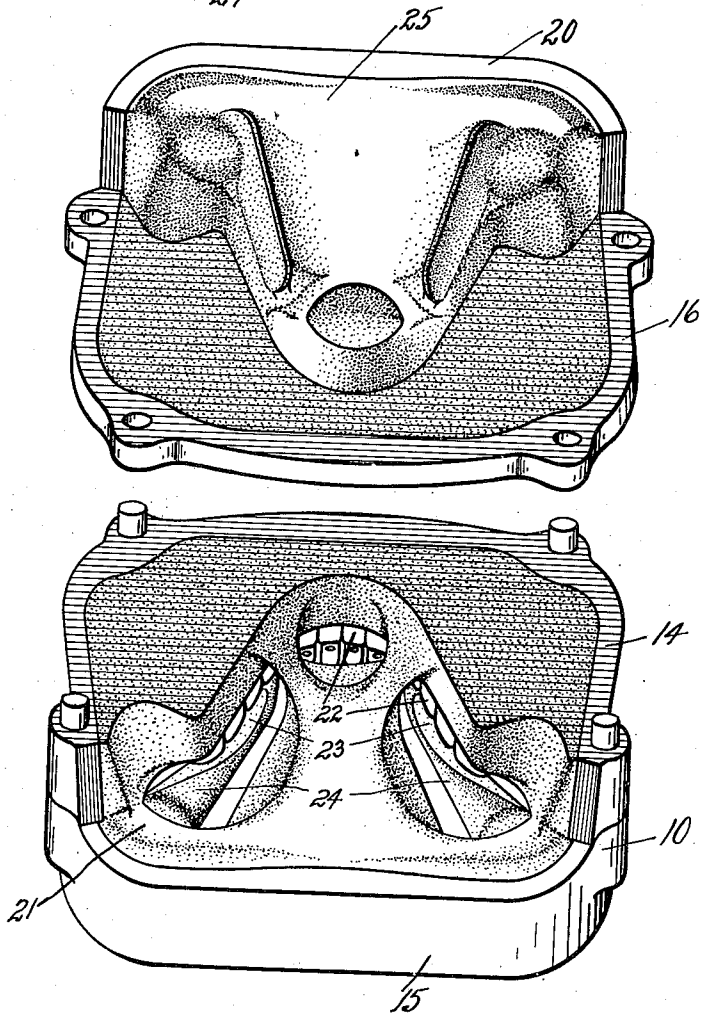


FIG. 5.



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DENTAL FLASK

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2 Claims. (Cl. 18—33)

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This invention relates to dental flasks used by dentists for forming partial or full artificial dentures.

In general, artificial dentures of this type are made by investing a model of the jaw structure into the lower portion of a dental flask together with the waxed-up case representing a prototype of the finished denture. The surface of the plaster investing the model is then coated with oil or soap and the upper section of the flask is thereafter applied over the lower section and filled with plaster or artificial stone serving as investing material. The cover is applied and the investing material is allowed to set. Thereafter, the assembled flask is immersed in boiling water for several minutes whereupon the upper portion of the flask is removed or separated from the lower section, the wax of the waxed-up case having been washed out or softened during the boiling process. Thermoplastic material, such as various acrylates, or any other suitable denture material, is then applied to the space left by the molten wax and the upper portion of the flask is restored. The re-assembled flask is then subjected to pressure in order to force and distribute the plastic material into the space while compressing it to a high density. During the compression process, the flask is re-opened to add denture material, such re-opening usually occurring at least twice to assure an oversupply of plastic denture material to compensate for curing shrinkage. The quantity of material applied is such as to retain the flask slightly open even after final pressure.

The above method, while generally practiced throughout the industry, is recognized as involving many difficulties and productive of unsatisfactory results in a large percentage of cases. In general, the principal objection has been the production of discrepancies between the wax pattern and the cured denture through alteration of the planned occlusion which is caused by the necessity of applying an excessive amount of plastic material to compensate for curing shrinkage.

In order to overcome some of the difficulties inherent in this type of investing, another method, sometimes referred to as a "banking" procedure, has been practiced. This method avoids the necessity of separating the teeth and model after the wax has been washed away. It is accomplished by investing the teeth and model in one half of the flask, while banking the plaster around the teeth and model far above the height of the flask portion in which it is invested. The upper portion is formed with a mound of plaster in the form of a plunger, and prior to its application to the opposing portion of the flask, the wax is eliminated as previously and the denture material is applied through the lingual sides of the waxed-up case. This method practically assures a sufficient supply of plastic denture material to compensate for the curing shrinkage, and furthermore, requires no separation of the teeth and model after they have been initially assembled with the waxed-up case in position.

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Processing of the artificial denture by the banking method above described has not been generally adopted in spite of its benefits because of other difficulties which have made its use impractical in many cases. Thus, the banking procedure may be employed where small partial dentures are required, but it is rarely employed where an extensive partial or a full denture is to be prepared. The principal difficulty has been the fact that the application of pressure to force the plastic material into place and to insure proper density thereof, very often cracks the banked wall of plaster and virtually destroys the denture.

Bearing the foregoing in mind, it is an object of the present invention to provide a dental flask which permits the processing of an artificial denture, either partial or full, by means of a banking process, and with the application of extremely high pressure, but wherein the danger of fracturing the built-up plaster or model is virtually eliminated.

Another object of this invention is to provide a dental flask adapted to permit banking procedures wherein free access, both physical and visual, to the invested teeth is permitted so that the plastic denture material can be applied with ease, accuracy and precision.

Another object of this invention is to provide a dental flask which permits utilization of banking procedures together with its benefits above described and which is further capable of functioning as an ordinary dental flask so as to permit processing of artificial dentures by methods other than banking.

Still another object of this invention is to enable the wax of the waxed-up case to be adequately removed where the boiling process has not completely done so. Allied with this object is the provision of means to permit the effective removal of any foreign material from the invested model and teeth before the application of denture material. Similarly, such means permit the replacement of a tooth loosened during the washing out process.

A further object of this invention is to permit such processing of dentures wherein extremely

high pressure can be applied to the plastic material as it is forced into the place left by the washed out wax.

A further object of this invention is to provide a dental flask wherein the invested plaster may be held securely after having set and wherein it may be removed from the flask with facility when the composite plaster and denture are to be removed therefrom.

Other objects of my invention will be apparent from the following description, it being understood that the above general statements of the objects of my invention are intended to describe and not to limit it in any manner.

Referring to the drawings, Fig. 1 is a disassembled or exploded view of the improved flask.

Fig. 2 is a similar view illustrating the flask partly assembled and in the position wherein the denture material is applied.

Fig. 3 is a perspective view of the completely assembled flask.

Fig. 4 is an elevational view of an investing portion of a dental flask constructed according to the principles of the invention herein but illustrating a modified embodiment thereof.

Fig. 5 is a composite view in perspective of the improved flask illustrating the condition of the invested model and teeth prior to the application of the denture material.

The flask comprises the base section or receptacle 10 which may have a conventional knock-out block 10a to facilitate removal of the finished denture. Base 10 is formed with a wall 11 surrounding the same. Openings 12 formed in wall 11 are adapted to receive lugs 13 of the intermediate section 14, but any conventional connection is suitable.

Intermediate section 14 is U-shaped so that the rear portion thereof is cut away. Thus, referring to Fig. 2, it will be observed that the wall portion 15 of the base 10 does not support any portion of intermediate section 14. A cover section 16 having openings 17 which fit over the pins 13, as do the openings 12, is formed with body openings 18. Body openings 18 may have bevelled walls 19 so that excessive investing material may be forced through and the material may be securely gripped by the beveled walls 19 when the cover section 16 is applied.

Cover section 16 is formed with an offset member in the form of depending flange 20 which supplies the closing wall for the U-shaped intermediate section 14 and may rest upon wall section 15 as shown in Fig. 3.

In order to utilize the improved dental flask, the teeth in the form of a waxed-up case, and the model of the jaw structure are invested in both the base section 10 and intermediate section 14 when assembled, as illustrated in Fig. 2. The investment in the combined base and intermediate sections is then coated with oil, soap or any other separating material and more plaster is applied, the top section 16 being applied thereon. After setting, the plaster last applied is retained by the cover section 16 and assumes the shape of a mound which functions as a plunger means for compressing the artificial denture material thereafter applied.

When the cover section 16 together with the plaster-filled flask enclosing the model and waxed-up case is assembled, and the plaster has set, the flask is heated so as to boil out or soften the wax which retained the artificial teeth on the model. These teeth will now be retained in the plaster of the intermediate section 14 so that when the flask is separated it will assume the appearance illustrated in Fig. 5.

Referring to Fig. 5, the base section 10 has the set plaster 21 therein which secures the intermediate section 14 thereto. In the particular case illustrated, the cuspid teeth of the patient are not being replaced with artificial teeth since it may be assumed that his natural teeth are satisfactory. The particular case of Fig. 5 is illustrated to demonstrate the versatility of the improved flask, but it is apparent that practically any type of partial denture as well as a complete denture can be accommodated thereby.

The wax having been boiled away, the teeth 22 are separated by an air space 23 from the model gum ridges 24. It is now possible to easily remove any wax not boiled away or foreign objects. Similarly, teeth loosened by the washing-out process may be restored. It will be observed in Fig. 5 that the artificial denture material may now be applied with the utmost ease and efficiency since the entire space 23 is fully accessible both visually and physically from the rear opening afforded by the intermediate section 14. The cut away portion of intermediate section 14 is referred to as the rear opening because, in effect, it is formed in the rear wall of the flask. It is through this opening that the rear sides of the teeth may be seen as illustrated in Fig. 5. Thus, any peculiar formation of the gum ridges can be taken into consideration and the denture material applied accordingly. It will be observed, furthermore, that the teeth 22 are not only surrounded and protected by the plaster 21, but are further backed up by the U-shaped section 14. Accordingly, the operator may apply the denture material compactly and firmly into all spaces left by the boiled-out wax, through the lingual sides of the teeth, the open wall of U-shaped intermediate section 14 functioning as a window and offering no obstruction in the procedure.

It will be observed that a sufficient quantity of denture material to compensate for curing shrinkage can be applied without risking any change in the cured denture, since the teeth and model are never separated after investment. The cover section 16 with the set plaster 25 forming a mound thereon, is re-applied to the remainder of the flask and the assemblage is subjected to pressure whereupon the mound or plunger 25 compresses the plastic denture material so that it fills the space 23 satisfactorily and with sufficient density. The degree of compression can be very great, if desired, without fracturing the plaster investment, since the U-shaped intermediate section 14 provides a firm backing for the teeth and plaster behind it. After the artificial denture material has been applied as above set forth, the denture is removed in the usual manner. The application of an extreme over-supply of denture material is made possible to assure sufficient compression and density without altering the planned occlusion.

It will be apparent that the improved dental flask can also be utilized for investment procedures wherein the artificial teeth are retained in the removed section, if this procedure is desired.

Intermediate section 14 serves a further purpose in that it facilitates the removal of the finished denture and the plaster therefrom. This follows by virtue of the fact that it is separable from base section 10 and its area which bounds the plaster is decreased due to the open wall.

It will be further noted that the base recep-

tacle 10 together with the intermediate section 14 constitute the lower model investing portion in that these are assembled and function as a unit when the model is set therein and they may very well be made in one piece except that their separability is of advantage in removing the finished denture.

Referring to Fig. 4, the lower model investing portion comprises the base receptacle 26 and the modified intermediate section 27. Intermediate section 27 is formed with the closing portion 28 which in the former embodiment was part of the base receptacle. The embodiment of Fig. 4 is an exact functional duplicate of the lower model investing portion as illustrated in Fig. 2 except that the portion 28 serves as a strengthening member for intermediate section 27 and prevents distortion thereof. The final separation between base receptacle 26 and intermediate member 27 is, of course, at the line 29.

I have shown a preferred embodiment of my invention, but it is obvious that numerous changes and omissions may be made therefrom without departing from its spirit.

I claim:

1. A dental flask comprising a lower model investing portion, a rear wall of said lower portion being cut away at its upper half, said cut away portion extending substantially across the entire rear wall of the flask so as to permit lateral access to the interior of said lower portion, a cover portion adapted to be assembled with said lower portion so as to form a complete flask, and a depending flange on said cover portion having the same dimensions as said cut away portion so as to nest therein and close the opening formed by said cut away portion.

2. A dental flask comprising a base receptacle, a U-shaped intermediate section fitted thereto so as to form a lower model investing portion having an upper section cut away in a rear wall thereof, a cover portion for said flask, a depending flange on said cover portion, said cover portion being fitted to said intermediate section and base receptacle whereby said cover section may be caused to overlie said intermediate section and said depending flange may be maintained substantially adjacent said base receptacle so as to cover said cut-away section.

NATHAN OPOTOW.

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