Dec. 21, 1965 S. HARRIS 3,224,044

DENTAL FLASKS

Filed July 8, 1963

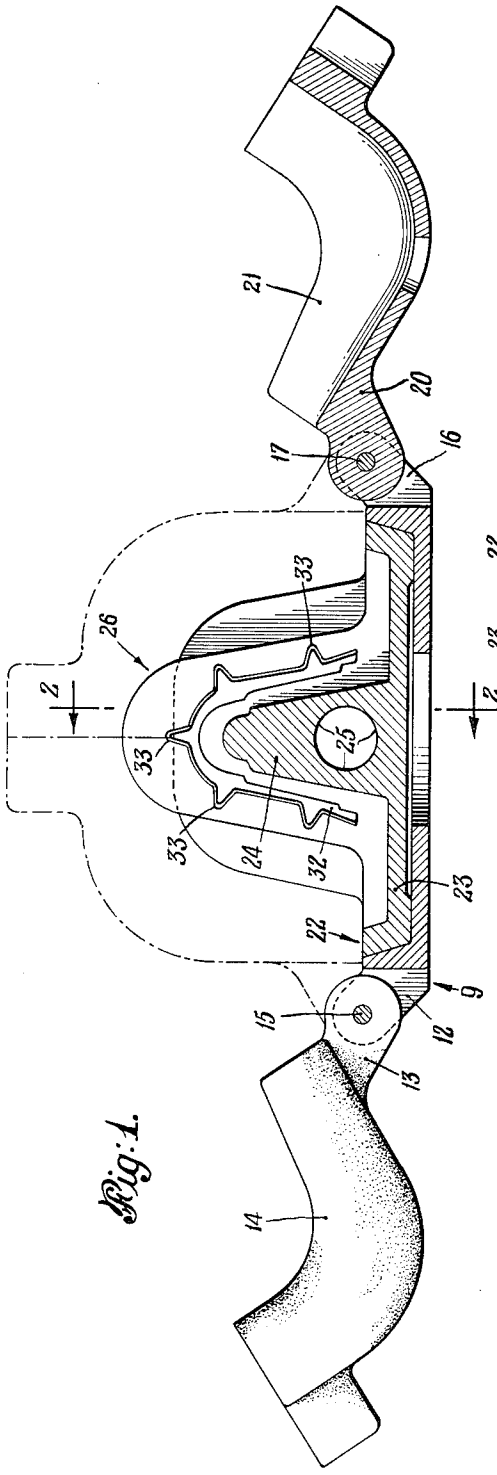


Fig. 1.

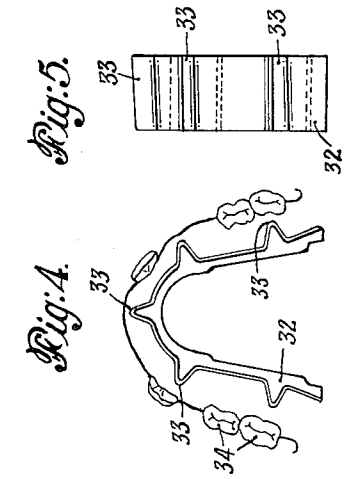


Fig. 5.

Fig. 4.

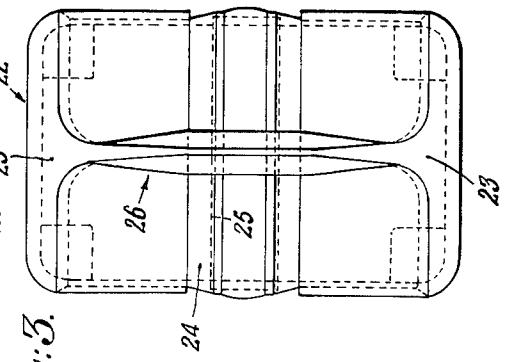


Fig. 3.

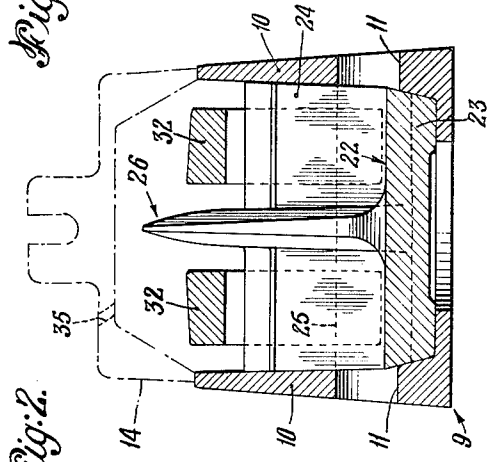


Fig. 2.

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DENTAL FLASKS

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5 Claims. (Cl. 18—33)

This invention relates to an improved dental flask wherein artificial dental bridges are formed and more particularly to a three member hinged molding flask having a matrix element that facilitates the removal of extensive bridgework from the flask.

The present invention is particularly suited to a three member hinged dental flask of the type disclosed in my earlier Patent No. 2,896,259. In the flask therein disclosed, a base member is provided which accommodates a convex platform piece over which investment material is placed. A metal dental bridge having wax teeth formed thereon in the places where acrylic teeth are ultimately to be provided is arched over and embedded in the convex surface of the investment material. An upper flask member hinged to one end of the base member is filled with investment material whereupon it is pivoted into engagement with one half of the bridgework embedded in the investment material formed on the platform. A second upper flask member hinged to the other side of the base member is similarly filled with investment material and pivoted into engagement with the other half of the embedded bridgework. The flask is then clamped tightly closed and the investment material allowed to harden.

After the investment material has hardened and the flask opened, an impression of the wax teeth is found in the investment material of the upper flask members. The wax can then be melted from the metal bridgework to provide a mold cavity into which acrylic material is placed. By reclosing and tightening the flask, the acrylic material in the form of teeth conforming to the pattern of the mold is adhered to the metal bridgework. The acrylic material is then cured by heat and the completed dental bridge thereafter removed from the flask.

While the flask just described has been entirely satisfactory in use and is a significant improvement over earlier flasks, it still presented problems to the dental technician using the flask even though these were significantly reduced and minimized. For example, when the process of forming and curing the acrylic teeth to the metal bridgework was completed, it was necessary for the technician to remove the dental bridge from the hardened investment material in which it was embedded. This meant that the dental bridge had to be pried away from the mold with a knife or other instrument. In performing this task, the technician often bends the bridgework even though he exercises great care. Of course, this means that the bridgework will have to be refitted for otherwise it would not properly fit the unique curvature of the patient's mouth.

It is therefore the principal object of the present invention to provide means to facilitate the removal of a completed dental bridge from the flask in which it is formed.

In carrying out the present invention, a three member hinged dental flask of the type disclosed in my Patent No. 2,896,259 is provided with a matrix element which after some investment material is placed over the platform member of the flask is itself embedded in the investment material. The matrix element is covered with a minimum amount of investment material and the dental bridge having wax teeth thereon is laid over the matrix element. The upper flask members are filled with investment material and the process of forming acrylic teeth on extensive metal bridgework is completed all as described in the aforementioned patent. However, in removing the

finished bridgework itself, the matrix element over which the bridgework is laid is pried free of the hardened mass of investment material molded over the flask platform member. Since the matrix element is a relatively rigid member, the bridgework cannot be bent or distorted as the matrix element is removed from the flask. The bridgework is then readily removed from the matrix element since there is little investment material holding the bridgework to the element. The matrix element may contain prong-like protuberances to further facilitate the removal of the dental bridge therefrom.

Features and advantages of the invention will be gained from the foregoing and from the description of a preferred embodiment of the invention which follows.

In the drawings:

FIG. 1 is a front elevational view, partly in section, of a three member hinged flask embodying the matrix element of the present invention;

FIG. 2 is a sectional view taken along line **2**—**2** of FIG. 1;

FIG. 3 is a top view of the flask locking element;

FIG. 4 is a front elevational view of the matrix element; and,

FIG. 5 is a side elevational view of the matrix element.

In FIGURE 1 of the drawing there is shown a preferred three member hinged dental flask embodying the invention. A base member **9** is illustrated having upstanding spaced-apart sidewalls **10** in the middle section thereof. The sidewalls are provided with aligned apertures **11** as shown. One end of member **9** is provided with two lugs **12** that are spaced apart so as to accommodate an apertured boss **13** formed on the bottom of the upper flask member **14**. A pin **15** passes through boss **13** and is press fitted into lugs **12** and permits member **13** to be pivoted into and out of engagement with the convex surface of sidewalls **10**.

The other end of base **9** is likewise provided with spaced-apart lugs **16** that together with pin **17** cooperate with a boss **20** formed at the bottom of the second upper flask member **21**. Both upper flask members **14** and **21** are of arcuate form and are hollow as is shown.

The top of the base between sidewalls **10** is dished-out to form a receptacle for the platform member **22**. This member comprises an elongated base **23** and an upstanding central arch **24**. An aperture **25** is provided in member **22** and when the member is placed in the base of the flask, aperture **25** is aligned with the sidewalls apertures **11**. The purpose of these apertures is to accommodate a heating element that may be utilized to cure the acrylic teeth of the dental bridge all as described in my co-pending patent application Ser. No. 211,227 filed July 20, 1962, now Patent No. 3,131,434. When the investment material is being placed in the flask and the mold formed, an aligning rod may be slipped through the apertures to hold the platform member rigidly to the flask.

Platform member **22** extends from sidewall to sidewall of the flask as shown and at its center, midway between the sidewalls it is formed with an integral upstanding prong-like locking section **26**. The locking section **26** extends above the sidewalls **10** of the flask base to perform the same function as that of the prong member disclosed and claimed in my earlier patent to which reference was heretofore made. Since, in the present disclosure the locking prong **26** is located approximately midway between sidewalls **10** of the flask, the flask is effectively divided into two compartments so that two dental bridgeworks can be processed simultaneously.

A matrix element **32** (FIGS. 4 and 5) is also provided for use with the flask. This element is of generally U-shaped configuration and of a size to fit loosely over the arched platform member **22**. See FIG. 1. The size is such that the matrix element can be oriented in various

positions with respect to the platform member. Thus, depending on the structure of a particular bridge being made, that is, the location of the teeth on the bridge frame, the matrix element may be positioned upright as in FIG. 1 or it can be turned various degrees clockwise or counterclockwise to make it easier for the technician to work on the teeth. The element **32** is of a width greater than that of any bridge that may be placed thereon, and as seen in FIG. 2 two matrix elements may be placed in the flask at one time.

The outer surface of the matrix element is provided with a plurality of prong-like protuberances **33** that serve to segment the investment material in which the bridge is embedded and render it easier to remove the adhering material from a completed dental bridge. Moreover, the element is tapered to facilitate the removal of the completed dental bridge and hardened investment material from the matrix element. This will be better understood when a description of the flask in use is given.

In operation, the three member hinged flask is assembled as shown in FIG. 1 with the upper flask members opened wide. The platform member **22** is then placed in the dished-out section of base member **9**. The locking member **26** is next placed in position on the platform member. Now investment material is arched over the outer surface of the matrix element **32** and the dental bridgework with wax teeth formed thereon is embedded therein. See for example FIG. 4 where the bridge **34** illustrated may be the initial bridgework with wax teeth formed thereon, or the finished bridge with acrylic teeth before removal from the matrix element. After the wax teeth bridge is embedded in the investment material placed over the matrix element, the technician returns to the flask and places investment material over platform member **22**. A sufficient amount is used so that when the matrix element with the wax teeth bridge in hardened investment material thereon is in turn embedded in the investment material placed on the platform member, the teeth will be located in exposed view in the base member of the flask. When the investment material is hardened fresh investment material is placed in the hollows of upper flask members **14** and **21** and these members are pivoted into engagement with the hardened investment material and the exposed wax teeth. A clamping such as that disclosed in the aforementioned patent may be utilized so as to form a good impression of the wax teeth in the investment material of the upper flask members. When the investment material hardens the flask is opened and the wax teeth melted and removed. What remains is a mold in which acrylic material can be processed to the now exposed metal bridgework.

Plastic acrylic material is then laid over the metal bridgework and the flask closed. The flask is then placed in a press such as that disclosed in co-pending application Ser. No. 110,427 filed May 16, 1961, now abandoned.

After the excess material is removed, the flask is closed and again placed in the press and subjected to high pressures. Again excess material may be squeezed out of the teeth mold cavity to prevent the flask from being completely closed. The excess material is removed and the process completed until such time as the flask closes completely at which time a dense, faithful reproduction of the original wax teeth is obtained. Now the acrylic material must be cured by heat. This may be done by placing the entire flask, locked-up with a screw type clamping device, in an oven for a predetermined time at a selected temperature. Alternatively, the acrylic material may be cured

by means of an electric heating element placed in the aperture **25** provided in the sidewalls of the flask and the platform member. This latter method of curing the arcylic teeth material is disclosed in co-pending application Ser. No. 211,227 filed July 20, 1962. If this latter method is used, a thermometer would have been placed through aperture **35** into the investment material before it hardened. Thus the curing process could be terminated when a prescribed temperature is reached.

After the acrylic material has been cured, the flask is allowed to cool and then it is opened. The completed dental bridge, of course, will be exposed in the bottom flask member. The technican then takes an instrument such as a knife, and pries the matrix element **32** from the great mass of investment material hardened over the platform member. Now the completed dental bridge and the small mass of hardened investment material between it and the matrix element is slid off the element. This is facilitated by the tapered form of the matrix element. In most cases, the investment material will fall away from the dental because it was segmented by the protruberances **33**. Even if it does not, it can be removed with little effort because it is a relatively thin layer rather than a great mass. In either event, its removal is readily accomplished and there is little likelihood that the dental bridge will be bent, thereby assuring a proper fitting of the bridge in the patient's mouth.

Inasmuch as many apparently different embodiments of the invention can be made without departing from its spirit or scope, it is intended that what has been shown in the drawing and described in the specification be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. The combination with a three member hinged dental flask comprising a base member having upstanding spaced-apart sidewalls, a first upper flask member pivotally connected to said base member, a second upper flask member pivotally connected to said base member, and a platform member adapted to be placed in said base member, of a matrix element that is adapted to fit over but spaced from said platform member whereby a dental bridge can be embedded in investment material over said matrix element and the matrix element and bridge in turn embedded in investment material over said platform member.

2. The combination according to claim **1** wherein said matrix element is formed with prong-like protuberances which segment the investment material between said matrix element and a dental bridge arched thereover.

3. The combination according to claim **1** wherein said matrix element is provided with a tapered outer surface which facilitates investment material and a dental bridge embedded therein being removed from the matrix element.

4. The combination according to claim **1** wherein said matrix element is provided with prong-like protuberances and the outer surface of said element is tapered, the arrangement being such as to permit the easy removal of a bridge from the flask.

5. The combination according to claim **1** including a locking member having a locking prong spaced midway betwen the sidewalls of the base member and a second matrix element similar to said matrix element whereby two dental bridges may be processed simultaneously in the flask.

No references cited.

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