

Oct. 14, 1947.

M. BERESIN ET AL

2,428,773

ART OF DENTISTRY

Original Filed Oct. 6, 1941 3 Sheets-Sheet 1

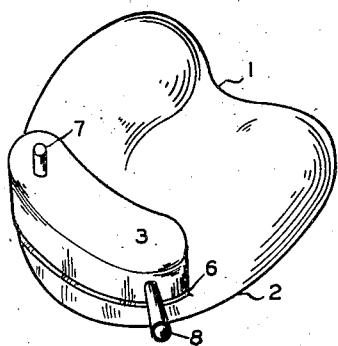


FIG. 1

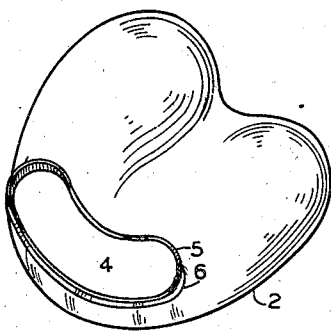


FIG. 2

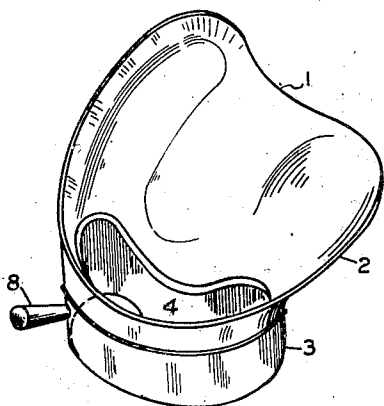


FIG. 4.

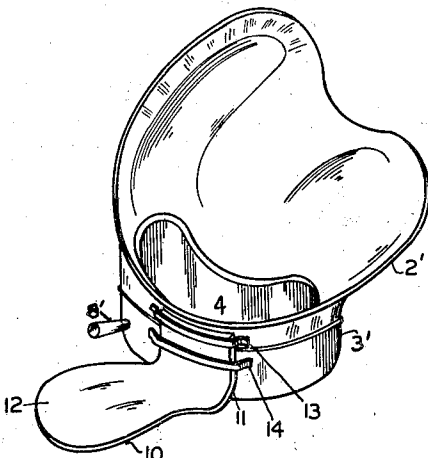


FIG. 5

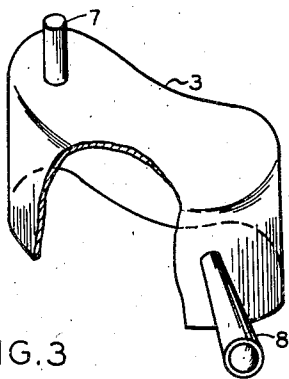


FIG. 3

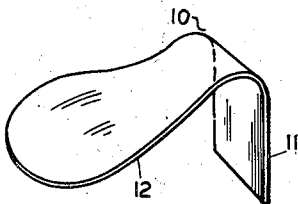


FIG. 6

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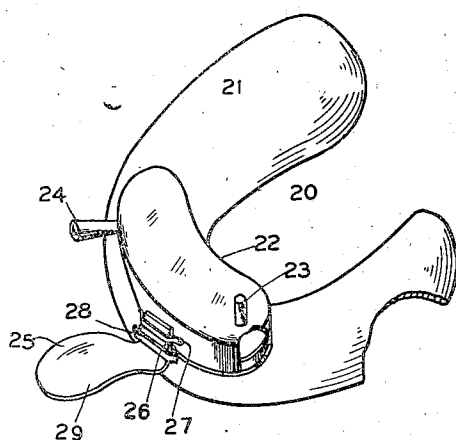


FIG. 8

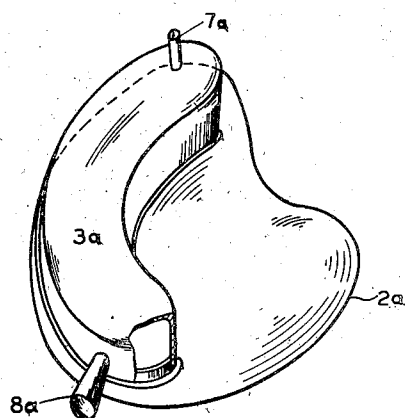


FIG. 7

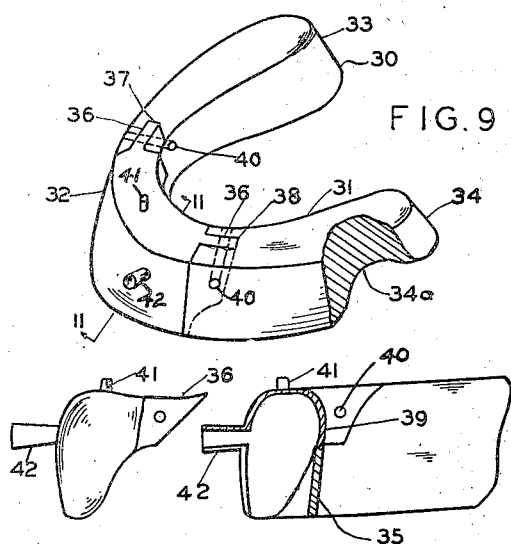


FIG. 10

FIG. 11

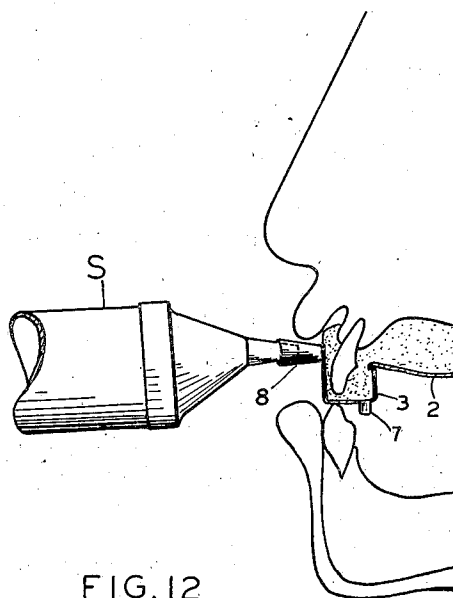


FIG. 12

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3 Sheets-Sheet 3

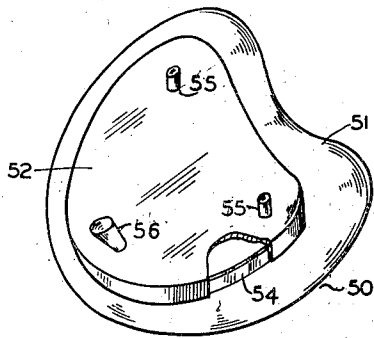


FIG. 13

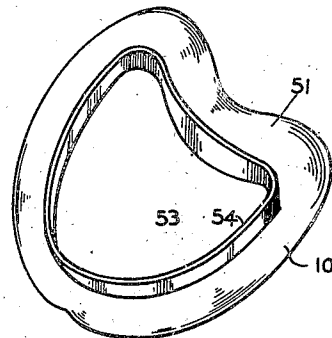


FIG. 14

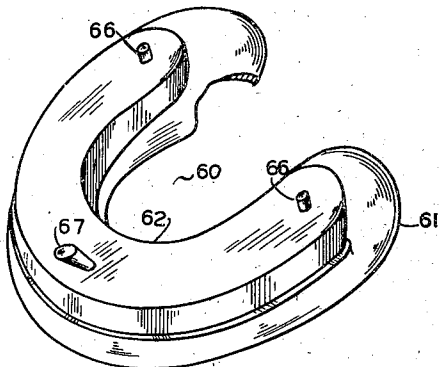


FIG. 16

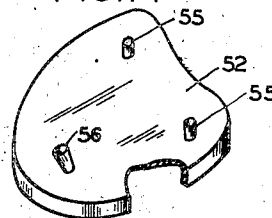


FIG. 15

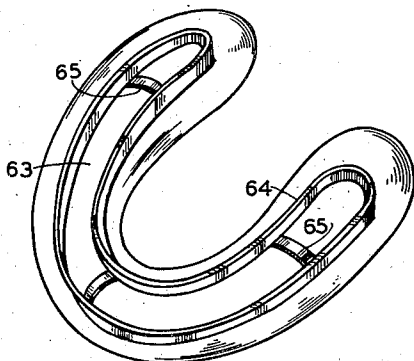


FIG. 17

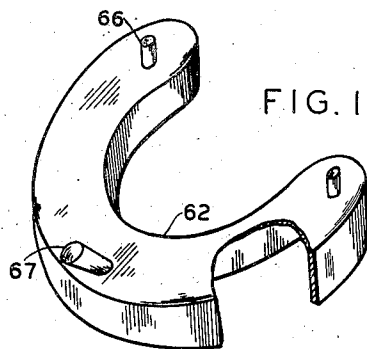


FIG. 18

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UNITED STATES PATENT OFFICE

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ART OF DENTISTRY

Morris Beresin and Victor E. Beresin,
Philadelphia, Pa.Continuation of application Serial No. 413,760,
October 6, 1941. This application February 1,
1944, Serial No. 520,602

4 Claims. (Cl. 32-17)

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This invention relates to the art of dentistry, and has particular reference to that phase of the art which concerns itself with the taking of impressions for use in the construction of dentures.

By way of introduction, it may be stated that an impression may be either of the entire maxilla (upper jaw) or of a portion thereof, or of the entire mandible (lower jaw) or of a portion thereof. An impression may also be of a partially edentulous jaw, where some of the natural teeth still remain, or of a fully edentulous jaw, where all of the natural teeth have been lost.

In the case of a partially edentulous jaw, there are two entirely different anatomic and physiological structures. The ridge consists in part of tissues, soft and pliable, which are easily displaced or distorted. The teeth, on the other hand, are composed of uniformly hard structure with a specific anatomic form. In making an impression for a partially edentulous mouth, it is thought to be clear that the procedure and material best suited for an impression of the teeth is unsuited for an impression of the ridge. Conversely, the material and procedure best suited for an impression of the ridge is not well suited for an impression of the teeth.

A similar situation exists in the making of fully edentulous impressions. In the case of the edentulous jaw, there are also two distinctly different areas which must be treated separately by different processes and materials in order to obtain suction and adhesion and stability, which are essential for the functional retention of full dentures. The impression of the peripheral section, commonly known as the flexion line, requires a certain amount of pressure in order to obtain suction in the final denture, whereas the horizontal or denture bearing areas require non-pressure and non-displacement of tissue in order to obtain adhesion or perfect adaptation of the denture base to the tissues. If the soft tissues of the denture bearing areas are displaced or distorted, the impression will not be an accurate and faithful reproduction.

Although, as above stated, the making of an impression, whether for a partially or a fully edentulous jaw, requires two different materials and two different procedures, both procedures and materials must be embodied in a single process and a unitary impression. This has long constituted a difficult problem in the construction of dental restorations.

An important object of this invention is to overcome the above stated difficulty, that is to solve the problem of making a complete and ac-

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curate reproduction of a jaw, whether partially or fully edentulous, by a single process and in a unitary impression.

The essence of the invention which renders the foregoing object possible of accomplishment resides in the provision of an impression tray of novel and unique form and construction.

Briefly stated, the dental tray of the invention is a composite tray consisting of a main or peripheral section and a subsidiary section, the main section conforming generally to the area of which the impression is to be taken (maxilla or mandible and surrounding tissues), and having a cut-out portion to expose the remaining teeth in a partially edentulous jaw, the crest of the ridge in the mandibular edentulous jaw, or the palate and the crest of the ridge in the maxillary edentulous jaw, the subsidiary section constituting a cover for the cut-out portion and being adapted to be united to the main section of the tray to form a continuous tray.

Briefly stated, the impression tray of the invention may be used as follows:

First an impression is taken of the jaw or of the portion of the jaw for which the denture is to be made, using the main or peripheral section of the tray and one type of impression material. Then the subsidiary section of the tray is affixed to the main section, and the impression is completed, using another type of impression material.

In the case of partial denture prosthesis, the first impression is taken with a material suitable for an impression of the ridge and the second impression is taken with pressure-exerting plastic suitable for a correct reproduction of the teeth. In the case of full denture prosthesis, the first impression is taken with a plastic material which exerts pressure and the second impression is taken with a very soft fluent material which does not exert substantial pressure.

The impression taken with the subsidiary section of the tray may be performed by injecting or spraying a plastic or fluid material.

The composite tray, with its two-step procedure, employing the injection or spraying method, may be used to take an impression for any type of dental restoration. In addition to its application for partial and full denture impression, it may also be used for making impressions of inlays, crowns, bridges, both stationary and removable etc.

At this point, it may be stated that we have found the spraying technique to be particularly suitable for obtaining impressions of edentulous jaws, as it entirely avoids the displacement and

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distortion of soft tissues. We have also found the spraying technique to be very advantageous for impressions which require absolute accuracy and precision, such as inlays and jacket crowns.

Referring now to the drawings, wherein several forms of impression trays are shown for the purpose of illustrating the invention:

Figure 1 is a view in perspective of a tray for taking the impression of the maxilla (upper jaw) for partial denture prosthesis, the tray being shown upside down;

Figure 2 is a similar view of the main or peripheral section of said tray;

Figure 3 is a perspective view, partly broken away, of the subsidiary section of said tray;

Figure 4 is a perspective view of the tray of Figure 1, said tray being shown in normal position for taking an impression;

Figure 5 is a similar view of a modified form of maxilla tray, in which the subsidiary section is secured to the main section by means of a locking device, which also serves as a handle for the composite tray;

Figure 6 is a perspective view of the combined locking means and handle;

Figure 7 is a view in perspective, partly broken away, of a modified form of tray for taking an impression of the maxilla for partial denture prosthesis;

Figure 8 is a view in perspective, partly broken away, of a tray for taking the impression of the mandible (lower jaw) for partial denture prosthesis;

Figure 9 is a similar view of a modified form of such tray;

Figure 10 is an end view of the subsidiary section of said tray;

Figure 11 is a cross-sectional view taken on line 11-11 of Figure 9;

Figure 12 is a transverse section through a part of a human head illustrating the injection process for applying a plastic material in the subsidiary portion of an impression tray for partial denture prosthesis;

Figure 13 is a perspective view of a tray for taking the impression of the maxilla for full denture prosthesis, the tray being shown upside down;

Figure 14 is a similar view of the main or peripheral portion of the tray;

Figure 15 is a similar view of the subsidiary section of said tray;

Figure 16 is a perspective view of a tray for taking the impression of the mandible for full denture prosthesis, the tray being shown in normal position;

Figure 17 is a similar view of the main or peripheral section of the tray; and

Figure 18 is a similar view of the subsidiary section of the tray.

Reference will now be had to Figures 1 to 7 inclusive, wherein are shown several forms of trays for taking an impression of an upper partially edentulous jaw. Referring particularly to Figure 1, wherein such a tray is shown upside down, and to Figure 4, wherein the same tray is shown in normal position, it will be seen that the tray, which is denoted generally by the numeral 1, consists of the two separable sections 2 and 3. The section 2, which may for convenience be termed "the main or peripheral section" conforms generally to the entire area of which the impression is to be taken; i. e. the outer periphery of the maxilla and the palate of the mouth. The concavity in the main section, as will here-

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inafter appear, receives the impression material, and may be termed "the saddle" of the tray.

The main section has a cut-out portion 4 to entirely expose the remaining teeth. The section 3, which may for convenience be termed "the subsidiary section," constitutes a hollow cover for the cut-out portions of the main section of the tray and is adapted to be united to the main section of the tray to form a continuous tray. The subsidiary section 3 is of such size as to receive the remaining teeth which extend through the cut-out portion 4 of the main section 2. The main section may advantageously be provided about the cut-out portion with a continuous vertical rim 5 having substantially the same peripheral configuration as the vertical walls of the subsidiary section, so that the subsidiary section will fit snugly to the main section as shown in Figures 1 and 4. A second rim 6 of somewhat lesser height than the rim 5 may be provided about the rim 5, forming a step upon which the subsidiary section may rest.

The subsidiary section 3 is shown provided on its top with a vent hole 7, for a purpose to be hereinafter pointed out. The section 3 is also provided with a nozzle 8 also for a purpose to be pointed out.

The composite tray may be fabricated out of any suitable material such as metal or artificial plastic. As examples of suitable metals may be mentioned aluminum, tin and steel. As an indication of the many suitable plastic materials may be mentioned the cellulose plastics such as "Celluloid," "Lumerith" and "Tenite," the phenolic resins such as "Durite" and "Bakelite," the urea resins such as "Beetle" and "Plaskon," the vinyl resins such as "Vynilite," and the acrylate resins such as "Acryloid," "Lucite" and "Plexiglas." Both sections may be made of the same material or of different materials.

The main section may advantageously be made of pliable or flexible material, so that it can be made to conform as closely as may be desired to the jaw of the particular patient being treated.

The tray shown in Figure 5 differs from the one just described in being provided with a combined securing means and handle for the two sections. Referring to Figure 5, the two sections of the tray are designated as 2' and 3' respectively. The air vent is hidden from view, and the nozzle is denoted by 8'.

The combined securing means and handle is denoted generally by 10, and is provided with a vertical securing portion 11 and a horizontal handle portion 12. The main section 2' of the tray is shown provided with a horizontal ear or loop 13, and the subsidiary section is shown provided with a horizontal loop or ear 14. The two ears are in vertical alinement, and the vertical securing portion 11 is adapted to be passed through the two ears, thereby securing the two sections of the tray together. When the sections are thus united together, the composite tray may be handled as a unit by means of the handle portion 12.

In the trays thus far described, the cut-out portions were disposed centrally of the outer periphery of the tray. Such a tray is designed to take an impression of a jaw containing several front teeth. In Figure 7, the cut-out portion of the tray extends from the center of the outer periphery to one end of the tray, and the subsidiary section corresponds thereto. Such a tray is suitable in case the teeth on only one side of the jaw are missing.

In Figure 7, the main portion of the tray is

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denoted by 2a, the subsidiary section by 3a, the air vent by 7a and the nozzle by 8a.

At this point, it may be stated that the cut-out portion of the tray may correspond in size and in position to as many or as few teeth as may be remaining in the mouth of a patient. The main section has been shown as corresponding to the entire jaw, but it will be understood that it may correspond to only a portion of the jaw, as when an impression is being taken for a bridge, an inlay or a jacket crown.

In Figures 8 and 9 are shown two forms of trays for taking an impression of the mandibular jaw containing several teeth. Referring to Figure 8, the tray 20 is seen as consisting of a main or peripheral section 21 and a subsidiary portion 22. The section 21 conforms generally to the mandible and the surrounding tissues, and is provided with a cut-out portion to expose the remaining teeth, said portion being covered by the subsidiary portion 22. The subsidiary portion is provided with an air vent 23 and with a nozzle 24, and is secured to the main portion of the tray by means of the element 25. This element, as previously stated, has a vertical securing portion 26, which passes through cooperating loops 27 and 28 provided on the two sections, and a horizontal handle portion 29.

Referring now to Figure 9, it will be seen that the tray therein illustrated consists of a main or peripheral section 31 and a subsidiary section 32. The main section comprises two similar end portions 33 and 34 connected by means of a thin web 35. The end portions 33 and 34 are provided in their lower surface with a groove 34a to receive the impression material, said groove constituting the saddle of the tray. The subsidiary section constitutes a cover for the space between the two end portions of the main section and is hollow so as to receive the remaining teeth in the area of which the impression is to be made. A lug 36 is provided at each end of the subsidiary section; these lugs fitting into corresponding grooves 37, 38 formed in the upper portion of the adjacent ends of the end portions 33 and 34. The rear of the subsidiary section is provided with a downwardly extending ledge 39, which rests on the thin web 35. In order to secure the subsidiary section to the main section, a pin 40 may be passed through aligned apertures in the main section and the lugs. As in the previously described embodiments, the subsidiary section is provided with an air vent 41 and a nozzle 42.

The following is a suggested procedure for taking an impression of a partially edentulous jaw using the composite tray of the invention:

Snap impressions and bites are taken, models are poured, and the case is articulated as in the conventional practice, in order to facilitate the selection of a suitable tray for the patient being treated. After the proper tray has been selected and adjusted, the subsidiary section is detached from the main section so that it will not interfere with the taking of an accurate impression of the ridge of the jaw. At this point, it is to be noted that provision should be made on the main section of the tray for either a central bearing point or a bite block. This is necessary so that the main section of the tray can be readily resealed in exactly the same position each time and held by the opposing teeth during muscle trimming.

In taking the impression of the ridge, we prefer to utilize modelling compound, because it is correctible and can be repeatedly reinserted in the mouth, and can later be modified to obviate any

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overcompression or distortion of the impression.

The modelling compound is softened, and placed in the saddle portion of the main section of the tray. The main section is inserted in the mouth, firmly seated and roughly muscle trimmed. After chilling, the tray is removed from the mouth and the modelling compound reheated. The main section of the tray is again inserted in the mouth and held in position.

This procedure is continued until perfect stability, adaptation, and muscle trimming are obtained. As will be understood by those skilled in the dental art, care must be taken that all positive areas are included in the impression, and that there is no impingement on the muscle attachments.

At this stage, there may be some displacement or distortion of the tissues, due to the fact that the modelling compound is considerably firmer than the tissues. This can be corrected as in the conventional procedure by scraping away a very minute layer of compound from the crest of the ridge, replacing it with molten wax, and reinserting the tray in the mouth.

After the impression of the ridges has been satisfactorily completed, the subsidiary section is secured to the main section of the tray, thereby forming a continuous tray, and an impression is taken using the entire tray. In practice, it has been found preferable to inject the secondary impression material, which may be a hydrocolloid, into the subsidiary section of the tray by means of a suitable form of syringe. This operation is shown in Figure 12 of the drawing. The orifice of the syringe S is inserted into the nozzle 8 and the hydrocolloid is forced into the tray, the air and the excess of plastic being forced out through the vent 7.

At this point, it will be understood, that if the saddle portion of the tray has been properly muscle trimmed, and the tray has been inserted in the mouth in proper position, a perfect peripheral seal is formed and the hydrocolloid material is effectively prevented from seeping under the saddle. After the tray is chilled in the mouth for about five minutes, the tray is taken from the mouth. If the procedure is properly carried out, the primary and secondary impressions will be in accurate relationship to each other, forming one continuous impression. If the tray is provided with a combined securing means and handle such as has been previously described, the composite tray can be handled as a unit in subsequent operations without any danger of the two sections being separated.

Reference will now be had to the impression tray shown in Figures 13, 14 and 15. This tray 50, which is designed to take an impression of the upper edentulous jaw, consists of the two separable sections 51 and 52. The sections 51, which may for convenience be termed "the main or peripheral section," includes the area from the flexion line or the mucco-buccal fold of the maxilla to the crest of the ridge as well as the area at the junction of the hard and soft palate, and is provided with the central cut-away portion 53. The section 52, which may be termed the "subsidiary or palatal section" is of a shape and size to fit the cut-away portion, thereby providing a space below the palate of the patient treated.

The inner periphery of the main section may be provided with a vertical rim 54 which is of the same configuration as the vertical wall of the subsidiary section, so that the two sections

may be snugly fitted together. The subsidiary section may be provided with one or more air vents 55 and a nozzle 56.

The tray 60 shown in Figures 16, 17 and 18 is for a lower edentulous jaw, and consists of the main or peripheral section 61 and the subsidiary or ridge section 62. The peripheral section includes the area of the flexion line just short of the crest of the ridge, the retro-molar triangle and lingually the attachments of the floor of mouth to the ridge. The peripheral section is provided with a cut-out portion 63, about which may be provided a vertical rim 64 to which the subsidiary section may be snugly fitted. The reference numeral 65 denotes a number of spaced thin webs bridging the cut-out portion. These webs serve to partially support the tray on the gums of the patient. As shown, the subsidiary portion may be provided with one or more air vents 66 and a nozzle 67.

The dental trays shown in Figures 13 to 18 may be used in substantially the same manner as has been described in reference to the partially edentulous trays. A variation consists in using spraying method instead of an injection method for the secondary impression.

The following is a suggested procedure:

The primary impression is taken in substantially the same manner as has been previously described. Then into the cut-out portion of the main section, while it is in proper position in the patient's mouth, there is sprayed by means of a suitable device (spraying gun) a molten wax dispersion or one of the many dental pastes available on the market. It is sufficient to produce a spray coating about 2 or 3 millimeters in thickness. On top of the sprayed material, there is then poured a dental plaster or artificial stone. The subsidiary section of the tray is then united to the main section, the excess plaster or artificial stone escaping from the air vents. The plaster or artificial stone serves to reinforce the sprayed coating.

A permissible variation consists in placing the subsidiary section of the tray in position before the dental plaster or artificial stone is applied. In such case, the plaster or stone in liquid form may be injected into the subsidiary section by means of a syringe.

It will be understood from the foregoing disclosure that we have provided a very simple and relatively inexpensive dental impression tray, which has the decided advantage over previously known or used trays in being capable of producing a faithful and accurate reproduction of all the details of a jaw, either partially or fully edentulous, or of a desired portion of such jaw, including both hard and soft areas, without any undue displacement or distortion of the soft tissues. Another advantage of our novel tray is that it effectively confines the plastic material to the areas of which the impression is being taken, thereby preventing spilling of the plastic material over the mouth or into the throat of the patient.

In conclusion, it may be stated that various other modifications of the herein disclosed invention may be made, and that it is therefore to be understood that the invention is not to be considered as being limited by the specific examples herein given as illustrative of the invention, except as may be necessitated by the state of the prior art.

This application is a continuation of ap- 75

plication Serial No. 413,760, filed October 6, 1941.

We claim:

1. A dental impression tray for a partially edentulous jaw, said tray consisting of a main section provided with a peripheral concavity conforming generally to the area of the jaw of which the impression is to be taken, said peripheral concavity being provided with an opening to permit the remaining teeth to extend out from said main section, and a hollow removable cover for said opening, said cover being secured to said main section by frictionally coacting flanges, and being adapted to completely enclose said remaining teeth and forming with said main section a continuous concavity for the reception of impression material, whereby a unitary impression of said jaw may be made, said hollow cover being provided with a nozzle for the introduction of impression material and with a vent hole for the escape of air and excess impression material.

2. A dental impression tray for a fully edentulous jaw, said tray consisting of a main section provided with a peripheral concavity conforming generally to the area of the jaw of which the impression is to be made, said peripheral concavity being provided for substantially its entire length with an opening to expose the crest of the ridge of said jaw, and a hollow removable cover for said opening, said cover being secured to said main section by frictionally coacting flanges, and constituting a subsidiary section of said tray and forming with said main section a continuous concavity for the reception of impression material, whereby a unitary impression of said jaw may be made, said cover being provided with a nozzle for the introduction of impression material and with a vent hole for the escape of air.

3. A dental impression tray consisting of a main section provided with a peripheral concavity conforming generally to the area of the jaw of which the impression is to be made, said peripheral concavity being provided with an opening to expose a portion of the area of which the impression is to be made, and a hollow removable cover for said opening; said hollow cover being secured to said main section by frictionally coacting flanges, and constituting a subsidiary section of said tray and forming with said main section a continuous concavity for the reception of impression material, whereby a unitary impression of said jaw may be made, said subsidiary section being provided with a nozzle through which impression material may be introduced into the tray and with a vent hole for the escape of air.

4. A dental impression tray consisting of a main section provided with a peripheral concavity conforming generally to the area of the jaw of which the impression is to be made, said peripheral concavity being provided with an opening to expose a portion of the area of which the impression is to be made, and a hollow cover for said opening, said hollow cover constituting a subsidiary section of said tray and forming with said main section a continuous concavity for the reception of impression material, whereby a unitary impression of said jaw may be made, said tray being provided with means to secure the sections together, said means consisting of registering loops on said main section and said subsidiary section and a tongue-like member passing through said loops, said tongue-like member being provided with a handle to facilitate handling of said tray.

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(References on following page)

2,428,773

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,155,334	Sitkin et al. -----	April 18, 1937
1,499,973	Douglass -----	July 1, 1924

Number
1,509,376
1,185,518
987,063
5 2,096,375

10

Name	Date
Rodgers -----	Sept. 23, 1924
Marcoux -----	May 30, 1916
Greene -----	Mar. 14, 1911
Jones -----	Oct. 19, 1937

FOREIGN PATENTS

Number	Country	Date
206,913	Germany -----	Feb. 27, 1908