United States Patent

Frush

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[45] **Sept. 12, 1972**

[54] **IMPRESSION TRAY AND METHOD FOR MAKING IMPRESSIONS**

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[22] Filed: **March 8, 1971**

[21] Appl. No.: **121,754**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 80,269, Oct. 13, 1970, abandoned, which is a continuation-in-part of Ser. No. 15,652, March 2, 1970, abandoned.

[52] **U.S. Cl.** **32/17**
[51] **Int. Cl.** **A61c 9/00**
[58] **Field of Search** 32/17

[56] **References Cited**

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Primary Examiner—Robert Peshock
Attorney—Christie, Parker & Hale

[57] **ABSTRACT**

An impression tray for the lower mouth of an edentulous patient comprises a downwardly opening arch-shaped trough for holding impression material in contact with the gum tissue overlying the patient's mandible. The trough has a downwardly extending buccal flange along its outer side, and a downwardly extending lingual retaining wall along its inner side. The lingual retaining wall extends below the bottom edge of the buccal flange continuously for the length of the mylohyoid ridge in the patient's mandible to hold the floor of the mouth away from the mylohyoid ridge while the impression material covers the gum tissue overlying the ridge. A shelf spans the inside of the lingual retaining wall and projects inwardly toward the patient's tongue to support the tongue in an elevated position away from the mylohyoid ridge while the impression is taken.

A single cast impression of the entire lower mouth is made from a first impression material carried in the impression tray, and a second impression material of a different color disposed in the mucobuccal and mucolabial folds and merged with the first impression material.

17 Claims, 9 Drawing Figures

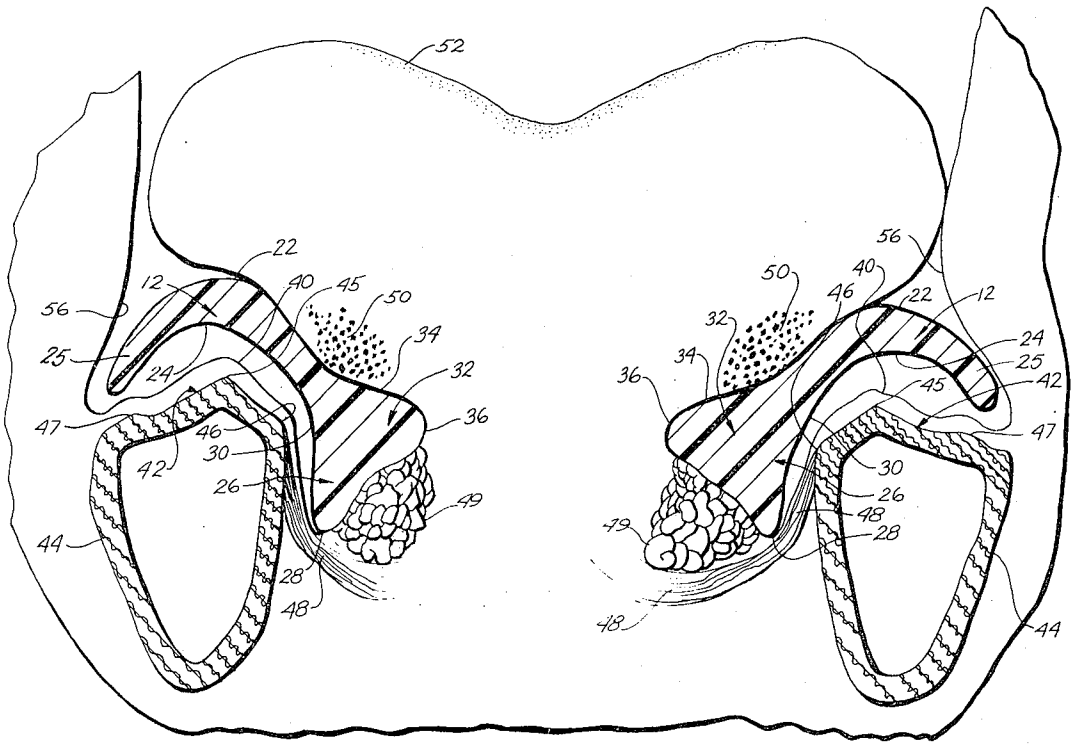

FIG. 1

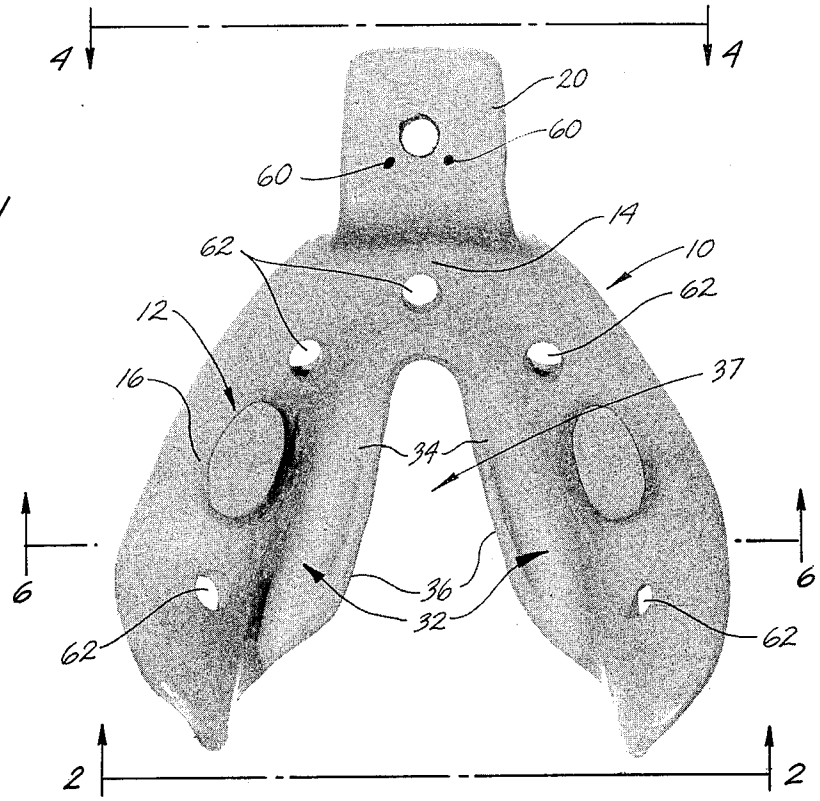

FIG. 5

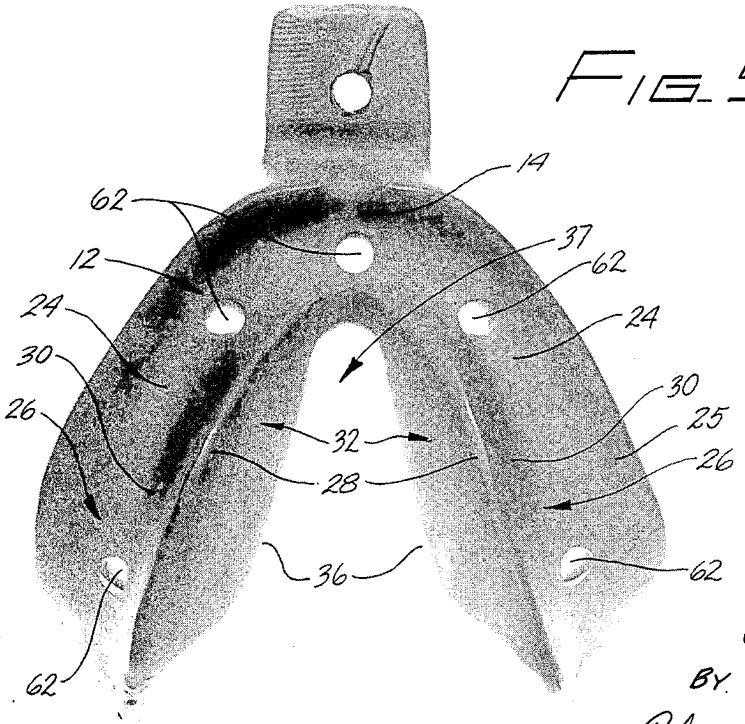

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FIG. 2

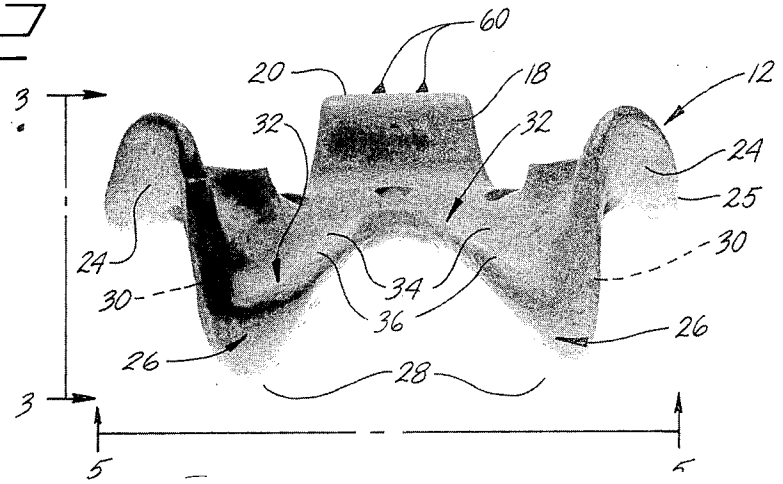


FIG. 3

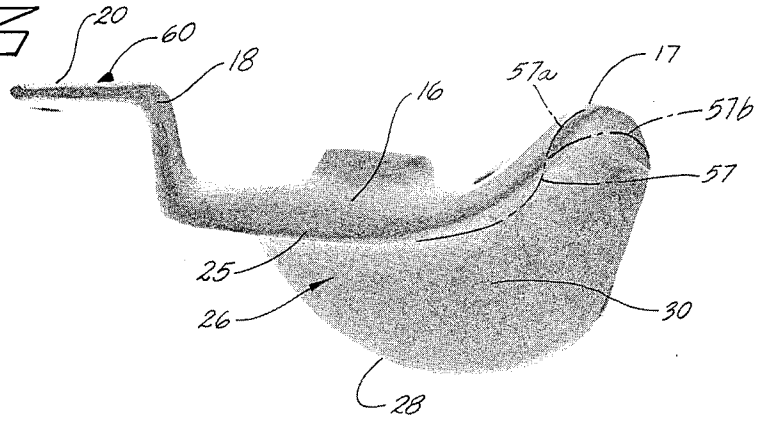
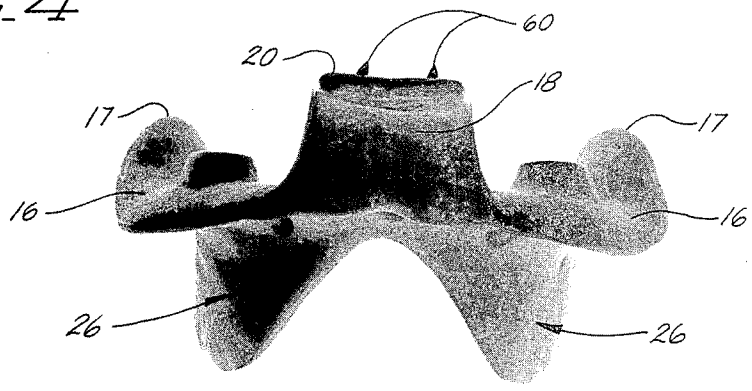


FIG. 4



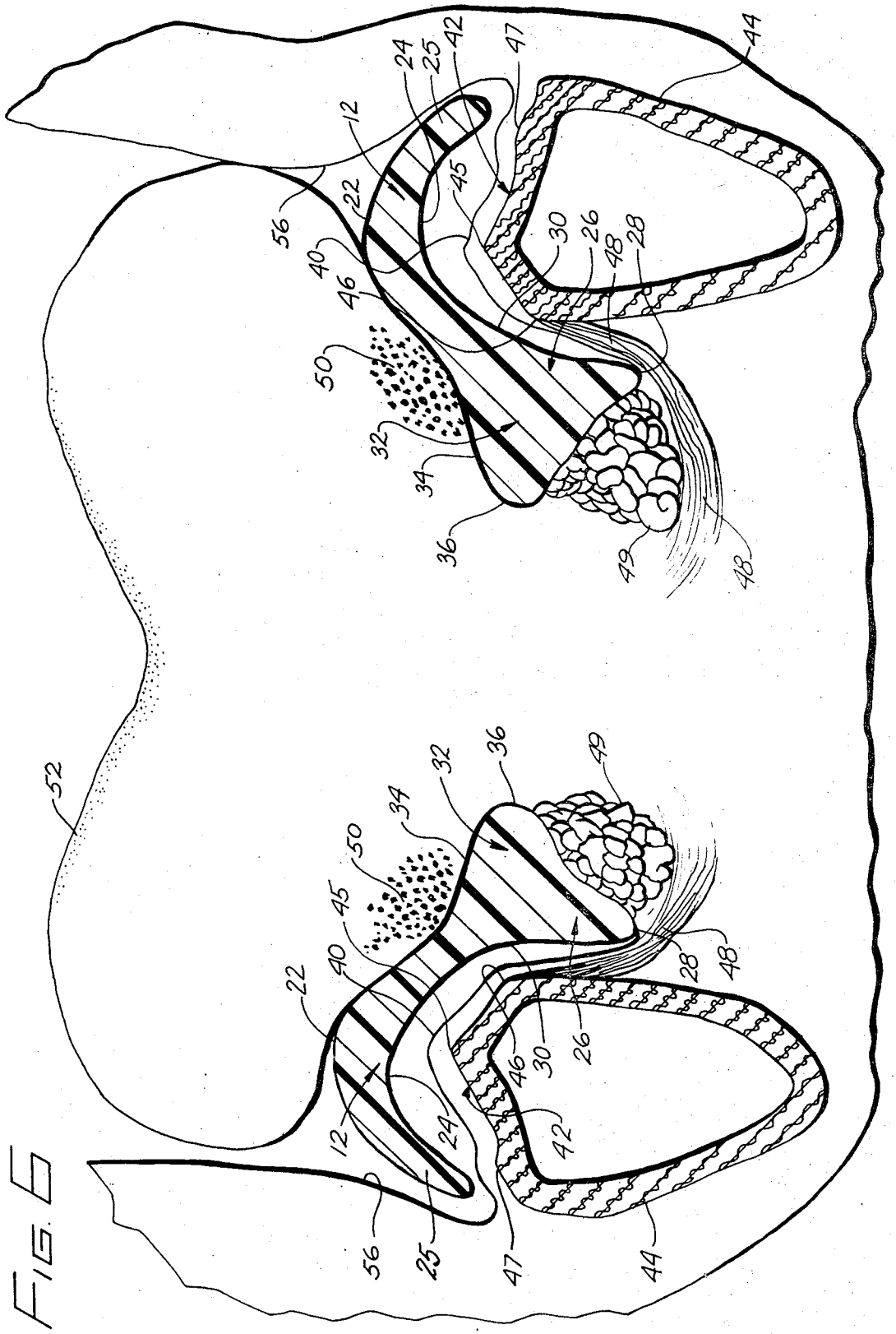

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FIG. 6

FIG. 7

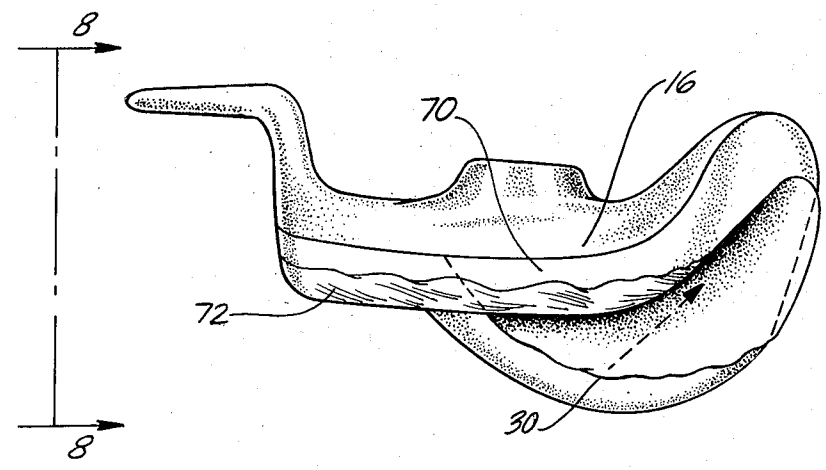


FIG 8

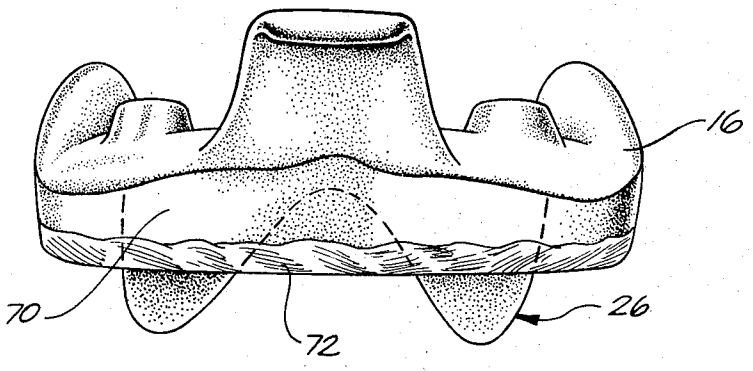
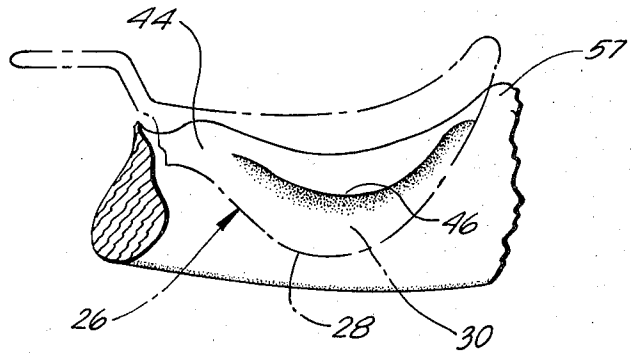


FIG. 9



IMPRESSION TRAY AND METHOD FOR MAKING IMPRESSIONS

CROSS-REFERENCE TO RELATED APPLICATIONS

This is a continuation-in-part of my copending application, Ser. No. 80,269, filed Oct. 13, 1970 and now abandoned, which in turn is a continuation-in-part of my copending application, Ser. No. 15,652, filed Mar. 2, 1970 and now abandoned.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to the manufacture of artificial teeth, and more particularly to an impression tray and a method for taking impressions of a lower mouth of an edentulous or partially edentulous patient.

2. Description of the Prior Art

Impressions of the mouth for repair or replacement of natural teeth are taken by a mold of plastic impression material disposed in a carrying device or "impression tray" which simulates the size and shape of a particular area of interest in the patent's mouth. The impression tray is placed over the area of interest to permit the impression material to flow around the teeth and the tissue in the area. The impression tray is held in a stationary position while the impression material sets.

The prior art impression trays have been satisfactory for the carrying and confinement of impression material, but they are constructed in such a manner that two successive impressions usually must be taken before an accurate impression of the patient's lower mouth is obtained. When taking an impression of a lower mouth with the prior art impression trays, a "primary impression" is made first by using an impression tray which loosely, or inaccurately, fits over the area to be covered by the impression material. The primary impression then is used to construct a more accurately fitting "secondary impression tray" for making a final impression of the patient's lower mouth.

Generally speaking, the primary impression taken by the prior art impression tray does not qualify as a final impression, because the prior art impression trays are constructed in such a manner that they are unable to obtain an accurate impression of the gum tissue covering the mylohyoid ridge of the patient's mandible (lower jaw bone). Furthermore, many prior art trays fail to obtain accurate impressions of the retromolar pads at the rear of the patient's mouth. It is important to obtain an accurate impression of the mylohyoid ridge so as to construct an accurate lingual flange at the base of the patient's lower denture. The accuracy of the lingual flange directly affects the stability of the patient's lower denture, as well as the comfort of the denture. An accurate impression of the retromolar pads is necessary so that the pads may be used to stabilize the lower denture in its posterior position.

Voids are usually formed in the primary impression of the mucobuccal and mucolabial folds. It is important to obtain an accurate impression of this area to construct the lower outer periphery of the lower denture base which, in turn, affects the stability and comfort of the denture.

SUMMARY OF THE INVENTION

This invention is based on the recognition that prior art impression trays are unable to obtain accurate primary impressions because they fail to properly place the tongue muscles and the floor of the mouth away from the mylohyoid ridge, so that the impression material can make an accurate impression of the ridge. This invention provides an improved impression tray which maintains the muscles of the tongue and the floor of the patient's mouth away from the impression area so an accurate impression of the mylohyoid ridge can be obtained. Furthermore, the distal portion of the tray makes an accurate impression of the retromolar pads. The resulting impression permits an accurate extension of the lingual flange of the denture to be formed, with the result that an accurately-fitting and stable denture base is obtained. The impression provided by this invention is capable of use as a final impression. Thus, the time and expense involved in obtaining accurate impressions of the patients lower mouth are substantially reduced.

Briefly, the impression tray contemplated by this invention includes an elongated downwardly opening trough adapted to fit over the mandible of the patient. The transverse lower surface of the trough holds impression material in contact with the gum tissue overlying the mandible. A downwardly projecting lingual retaining wall has an outer surface continuous with the lower surface of the trough. The lingual retaining wall extends downwardly adjacent to the mylohyoid ridge of the mandible continuously for the length of the ridge. The bottom edge of the lingual retaining wall depresses the mylohyoid muscle away from the mylohyoid ridge and prevents the sublingual and submaxillary glands from interposing themselves between the lingual retaining wall and the mylohyoid ridge. Thus the floor of the mouth is maintained in a remote position from the mylohyoid ridge while the impression material covers the gum tissue.

In a preferred form of the invention, a glossal shelf formed integrally with the inner surface of the retaining wall extends inwardly toward the tongue of the patient to support the muscles of the tongue so that the tongue is maintained in an elevated position remote from the mylohoid ridge.

Preferably, the distal ends of the trough are curved upwardly and spaced slightly from the retromolar pads to avoid contact with the pads so an accurate impression of this area of the patient's mouth may be obtained. The trough is substantially horseshoe-shaped when viewed from above so as to cover the gum tissue on both sides of the patient's mandible. The shelf is preferably continuous for a distance spanning the inside of the lingual retaining wall from one side of the mouth to the other side. The upper surface of the shelf on one side of the mouth extends inwardly toward the tongue for a distance substantially equal to that on the other side of the mouth to form a narrow notch between them in the center of the tray. Thus, the preferred form of the shelf exerts equal pressure on both sides of the patient's tongue. In use, the shelf separates the root of the tongue from the body of the tongue and positions the body of the tongue on the upper surface of the shelf. Thus, the shelf provides an equalizing force on the sides of the tongue which posi-

tions the tray substantially in the center of the mouth, with the lingual retaining wall being spaced equidistantly from the mylohyoid ridge on each side to provide an accurate impression of the ridges.

An accurate primary impression of the entire lower mouth is obtained by applying a first impression material to the impression tray and disposing a layer of a second impression material of a different color in the mucobuccal and mucolabial folds. The lingual retaining wall and shelf of the tray permit the first impression material to accurately cover the mylohyoid ridge. The color difference of the first and second impression materials enables the dentist to completely merge them and still not apply so much pressure to the tray that it destroys the accuracy of the impression. As a result, an accurate impression of the gum tissue overlying the upper surface of the mandible and the tissue in the mucobuccal and mucolabial folds also is obtained.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other features of the invention are more fully set forth in the following detailed description of the embodiment of the invention which is presently preferred, such description being presented with reference to the accompanying drawings, in which:

FIG. 1 is a plan elevation of an impression tray;

FIG. 2 is a rear elevation taken on line 2—2 of FIG. 1;

FIG. 3 is a side elevation taken on line 3—3 of FIG. 2;

FIG. 4 is a frontal elevation taken on line 4—4 of FIG. 1;

FIG. 5 is an elevation taken on line 5—5 of FIG. 2;

FIG. 6 is a schematic sectional elevation of a patient's mouth through the first molar and a sectional elevation of the tray taken on line 6—6 of FIG. 1, the tray being placed over the patient's lower mouth in an impression-taking position;

FIG. 7 is a side elevation of the impression tray showing the first impression material merged with the second impression material;

FIG. 8 is a front elevation taken on line 8—8 of FIG. 7; and

FIG. 9 is an elevation showing the lingual flange of the impression tray adjacent to the mylohyoid ridge of an edentulous mandible.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, an impression tray **10** includes a downwardly opening trough **12** which is generally horseshoe-shaped in plan view, as shown best in FIGS. 1 and 5. When viewed from above, the trough defines an arcuately curved front portion **14** and a pair of rearwardly extending rear portions **16**. Each rear portion **16** has an upwardly curved distal or free end **17**, as shown best in FIG. 3. A handle **18** is formed integrally with front portion **14** of trough **12**. The handle includes a flat upper surface **20** arranged to project horizontally outwardly away from the front of trough **12**.

As shown best in FIG. 6, trough **12** has a downwardly opening, substantially U-shaped cross-sectional configuration defining an upper surface **22** curved convex upwardly, and a lower surface **24** curved concave downwardly. A downwardly extending buccal flange **25** extends along the outer edge of each rear portion **16** of the trough.

A downwardly projecting lingual retaining wall **26** extends along the inner edge of each rear portion **16** of the trough. When viewed from the side as in FIG. 3, each retaining wall **26** defines a bottom edge surface **28** curved concave upwardly and projecting downwardly a substantial distance below the bottom edge of buccal flange **15**. When viewed in cross-section as in FIG. 6, each lingual retaining wall **26** defines an arcuately curved, downwardly extending outer surface **30** which is continuous with lower surface **24** of trough **12**.

An inwardly projecting shelf or "glossal table" **32** is formed integrally with the upper inner portion of each lingual retaining wall **26** so as to extend lengthwise along the inside of each rear portion **16** of the trough. The shelf defines a substantially horizontal, inwardly extending upper surface **34** continuous with the upper surface **22** of trough **12**, and an arcuately curved inner edge surface **36** projecting inwardly and spanning the inside of trough **12**. Inner edge surface **36** defines a "glossal notch" **37** in the central portion of the trough **12**.

The advantages of the impression tray of this invention will be more fully understood from the following description with reference to FIG. 6 which shows schematically the lower mouth of an edentulous patient, and a cross-sectional view of the impression tray mounted in an impression-taking position over the gun tissue **40** overlying the upper surface **42** of the patient's mandible **44**. The upper surface of the mandible has a centrally disposed "mandibular ridge" **45**, a "mylohyoid ridge" **46** which spans the inside of the mandible, and an "external oblique ridge" **47** adjacent to the outer edge of the mandible. These ridges are hereafter referred to as the "lower ridges" of the mandible.

When taking an impression of a patient's lower mouth, it is very important to obtain an accurate impression of the gum tissue overlying the mylohyoid ridge **46**. A typical lower denture (not shown) includes at its base an inwardly projecting lingual flange which is seated on the mylohyoid ridge when the denture is properly positioned on the lower ridges of the mandible. The lingual flange has an inner peripheral "finish line", and it is very important to construct the denture so that the finish line accurately follows the contour of the mylohyoid ridge. If the finish line extends down below the mylohyoid ridge, for example, the lingual flange of the denture may depress the elastic mylohyoid muscle **48** when pressure is exerted on the denture, say during chewing. The mylohyoid muscle is located under the sublingual and submaxillary glands **49**, which makes up the floor of the mouth. When the patient chews, the muscle moves the sublingual and submaxillary glands up and down every time the tongue moves. Thus, when pressure is removed from the denture, the mylohyoid muscle **48**, or the sublingual and submaxillary glands **49**, raise the denture off the lower ridges, and allow food particles to flow under the denture, creating discomfort for the patient.

The overextension of the lingual flange may also be a lateral extension in the form of too thick a periphery.

This may cause the flange to intercept the sublingual or submaxillary glands and also raise the denture. A denture having a lingual flange with an accurately formed finish line is not raised by the floor of the mouth, and remains stable on the lower ridges. Thus, when the patient chews, food particles do not flow under the denture.

To obtain an accurate finish line for the lingual flange of the denture, it is necessary to obtain an accurate impression of the gum tissue overlying the mylohyoid ridge **46**. As previously discussed, conventional impression trays used for primary impressions of a patient's lower mouth generally fail to make an accurate impression of the gum tissue over the mylohyoid ridge, because they do not simultaneously maintain the muscles **50** at the sides of the patient's tongue **52**, and the mylohyoid muscle **48** and the sublingual gland **49** at the floor of the patient's mouth away from the impression area, so that the impression material (not shown) held by the tray may obtain an accurate impression of the mylohoid ridge. Thus, during use of the prior art impression trays, the patient's tongue or his sublingual and submaxillary glands often become interposed between the tray and the mylohyoid ridge and thereby prevent an accurate impression from being made of the ridge.

On the buccal side of the patient's mouth, the patient's cheek **56** sometimes blocks the tray from access to the gum tissue overlying the external oblique ridge **47**.

The distal ends of the prior art trays often extend into the retromolar pads **57** (see FIG. **9**) at the rear of the patient's mouth. This distorts the pads and thereby prevents obtaining an accurate impression of this area of the patient's mouth. It is important to obtain an accurate impression of the retromolar pads. Denture base movement may be caused by adverse occlusal forces as well as overextension of the lingual flange. To prevent traumatic movement under occlusal forces, I have developed an artificial denture which is the subject of a copending U.S. Pat. application, Ser. No. 6,904, filed Jan. 29, 1970. The structure and stability of the denture depending upon accurately defining the position of the patient's retromolar pads. Therefore, a reliable impression of the pads is necessary.

The impression tray **10** of this invention obtains an accurate impression of the gum tissue over mylohyoid ridge **46** and the mandibular ridge **45** when positioned in the patient's lower mouth as shown in FIG. **6**. Glossal shelf **32** extends inwardly toward both sides of the patient's tongue **52**. The glossal notch **37** accommodates the root of the tongue, and the muscles **50** at the base of the tongue rest comfortably on the horizontal upper surface **34** of the shelf. Thus, the tongue is maintained in an elevated position remote from the mylohyoid ridge. The tongue also is held in a relaxed, stationary position which prevents it from moving the impression tray and creating an inaccuracy as the impression material sets.

The tongue is a strong muscle, and its position is important in the proper adaptation of the tray and the impression material to the edentulous lower ridges. Glossal shelf **32** is specially designed to separate the narrow root of the tongue from the body of the tongue and force the body of the tongue into a position superior to the shelf of the tray. The glossal shelf projects inwardly from each lingual retaining wall a sufficient distance to make the glossal notch **37** relatively narrow. Preferably, the width of the glossal shelf is about one-half the lateral distance between the bottom edge of the lingual retaining wall and the bottom edge of the buccal flange (see FIG. **5** for the clearest view of these dimensions). This restricted area between the lingual retaining walls accommodate the root of the tongue, but cannot accommodate the body of the tongue. Thus, the body of the tongue is forced into a position above glossal shelf **32**, as shown best in FIG. **6**. If the space between the lingual retaining walls is not restricted, the body of the tongue imposes itself under the lingual retaining walls and can move around at will and displace impression material in the area of the lingual retaining wall. The impression tray itself also may be displaced.

The outer surface **30** of each lingual retaining wall **26** is closely spaced from both the mylohyoid ridge and the inner side wall of the mandible on its respective side of the patient's mouth. FIG. **9** shows a mandible **44** of an edentulous mouth after resorption of the gum tissue. The mylohyoid ridge **46** extends forwardly from the retromolar pads **57** toward the front of the mouth on the lingual side of the mandible, the ridge being located below the plane where the necks of the teeth were located before they were removed.

In use, the outer surface **30** of lingual retaining wall **26** extends below the mylohyoid ridge **46** continuously for the entire length of the ridge. Thus, impression material carried in the tray makes an accurate impression of the entire mylohyoid ridge. The bottom edge surface **28** of the retaining wall **26** on each side of the tray depresses the adjacent mylohyoid muscle **48** away from the mylohyoid ridge **46** on its respective side of the patient's mouth. This depressing of the mylohyoid muscle also prevents the sublingual or submaxillary glands **49** on each side of the mouth from becoming interposed between the retaining wall and the mylohyoid ridge. Thus, impression material (not shown) held within the impression tray accurately covers the gum tissue overlying the mylohyoid ridge **46** and the mandibular ridge **45**.

The bottom edge **28** of the lingual retaining wall is curved concave upward from the front to the back of the retaining wall. The deepest projection of the lingual retaining wall's curved bottom edge is in the area of the sublingual and submaxillary glands. This point of deepest projection is at least one-half inch below the bottom edge of buccal flange **25**. The curved bottom edge of the linqual retaining wall extends below the bottom edge of the buccal flange continuously for the entire length of the mylohyoid ridge. This configuration of the lingual retaining wall is necessary to provide comfort for the patient while at the same time separating the anatomic structures of the floor of the mouth to achieve a clear impression of the mylohyoid ridge. By way of example, the vertical distance from the uppermost portion of the lower surface **24** of the trough to the bottom edge of buccal flange **25** generally measure one-eighth to three-sixteenth of an inch, as compared to five-eighths inch distance from the same point on lower surface **24** to the deepest projection of the lingual retaining wall in the area of the sublingual and submaxillary glands.

The portion of the trough between the buccal flange and lingual retaining wall, i.e., the "vault" of the impression tray, is not deep enough to accommodate a mandible with natural teeth. The vault provided by trough **12** is relatively shallow because it is designed to accommodate an edentulous mouth instead of one with teeth.

When the impression tray is positioned as shown in FIG. **6**, it also obtains an accurate impression of the gum tissue overlying the external oblique ridge **47**, because buccal flange **25** of trough **12** maintains the patient's cheek **56** away from this area of the lower mouth.

The impression tray also obtains an accurate impression of the retromolar pads. The lower surface **24** at each distal end **17** of the tray is spaced from the upper surface of its respective retromolar pad, so that the impression material flows backwardly and upwardly into a position covering the pads to obtain an accurate impression of them. The upward slope or "distal rise" **57** (see FIG. 3) of the lower surface **24** at each distal end **17** of the tray varies depending upon the condition of the patient's lower ridges. After the teeth are extracted, either the retromolar pads nor the mylohyoid ridge changes position, whereas the remainder of the lower ridges melts away, or "resorbs". The height of the retromolar pads above the ridges depends upon the amount of resorption that takes place. If a relatively substantial amount of resorption has occurred, an impression tray with a sharp distal rise **57*a*** (shown in phantom line in FIG. 3) is used to make an accurate impression of the retromolar pads, whereas a tray with a shallow distal rise **57*b*** (shown in phantom line in FIG. 3) is used when less resorption has occurred.

The width of the inwardly extending glossal shelf **32** is preferably the same on each side of the tray. Thus, when the root of the tongue is centered in the narrow glossal notch **37**, with the body of the tongue bed in a superior position on the glossal shelf, the shelf exerts equal pressure on each side of the tongue. This provides means for both accurately guiding the tray into position in the patient's mouth and seating the tray in the center of the patient's mouth, with the lingual retaining walls being equidistantly spaced from the patient's mylohyoid ridges. When an impression tray is holding impression material, it is extremely difficult for the dentist to observe whether the tray is accurately positioned over the ridges on each side of the patient's mouth. The self-positioning structure of the impression tray of this invention assures the dentist that when the patient positions his tongue on top of the shelf **32**, the base of the tongue will provide an equalizing force which positions the tray substantially in the center of the mouth and in the same position relative to the ridges on each side.

A pair of laterally spaced apart tips **60** project upwardly from the upper surface **20** of handle **18**. In use, when the impression tray is seated in the patient's mouth, the patient extends his tongue forwardly to the tips and holds his tongue continuously in contact with the tips so that the lingual frenum (not shown) of the tongue is raised upwardly. A single tip (not shown) or other similar bench mark can be used in place of the pair of tips **60**, if desired.

The impression tray **10** of this invention produces such extremely accurate impressions of the lower ridges and retromolar pads that it is capable of making primary impressions that may be used as final impressions. Thus, there is no need for using the primary impression to construct a primary cast which, in turn, is used to form a more accurately fitting impression tray in which to carry impression material for use in making a secondary impression for the final cast.

The cast for making the lower denture base must accurately reveal the mucobuccal and mucolabial folds as well as the lower ridges and the retromolar pads. The mucobuccal fold is the depression or "valley" in the lower mouth forward of the retromolar pads between the inside of the cheek and the tissue overlying the outer surface of the mandible. The mucolabial fold is the valley in the anterior portion of the lower mouth between the inside of the lower lip and the tissue overlying the outer surface of the mandible. Thus, the mucobuccal and mucolabial folds together define the U-shaped valley that spans the outer surface of the mandible. It is necessary to obtain an accurate impression of this area to form a stable and comfortable lower denture base. Prior art impression trays and methods have been generally unsuccessful in obtaining accurate primary impressions of this area. Numerous voids usually appear in the cast, so the dentist must make a secondary impression.

I have developed means for making an accurate impression of the mucobuccal and mucolabial folds. When used with the impression tray described above, it makes an accurate single primary impression of the entire structure of the lower mouth. Thus, a secondary impression is not necessary to form the cast from which to construct a stable, comfortable lower denture base.

The preferred impression material is an irreversible hydrocolloid which is water soluble and therefore compatible with the moisture of the mouth. Rubber and silicon base materials are not water soluble, so they are displaced by the mucous of the tissue and the salivary glands. A water soluble colloid absorbs the water coming out of the tissue and salivary glands and therefore makes an accurate impression of the tissue.

The preferred impression colloid is made partly of agar-agar, which is a gelatinous colloidal extract from seaweed. This material may be mixed with water to form a relatively thick mass without losing its character and accuracy. Thus, when the colloid is used to make an impression, its thick consistency prevents the tray from being easily pushed through the colloid onto the tissue and distorting the tissue.

The preferred impression colloid also has easy surface smoothing capabilities. After the colloid is mixed and placed in the impression trays, all the wrinkles in the material are smoothed from the surface by wetting with water before it is inserted in the patient's mouth.

The preferred impression colloid is used as the base for two types of colloid material, one type being used in the impression tray and called "tray colloid", and the other type being applied with a syringe and called "syringe colloid".

Tray colloid is a relatively thick, high resistance colloid which is initially applied to the U-shaped lower surface **24** of trough **12**. The consistency of the tray colloid prevents it from flowing evenly when applied to the tray, so it is pressed against lower surface **24** and through the holes **62** in trough **12** for good retention.

After it is initially applied to the impression tray, the tray colloid has too rough an outer surface for making a detailed impression. Thus, the outer surface is diluted with water and smoothed to remove the surface irregularities. Preferably, this is done by rubbing the surface of the tray colloid with water using the thumb and forefinger. The portion of the tray colloid that spans the outer rim of the impression tray is smoothed and shaped by the thumb and forefinger to form a triangular ridge around the outside of the tray.

In its finished condition the tray colloid has two consistencies, the heavy mix underneath that provides a firm body with good resistance to the seating of the tray, and a thinner surface dilution that permits accurate impressions to be made of the gum tissue. The triangular ridge provides good visual control of the impression colloid when it is seated in the mouth, as described in detail below.

Syringe colloid is mixed with substantially more water than the tray colloid to give it a relatively thin consistency. A soluble colorant is mixed with the syringe colloid to give it a color which is easily distinguishable from the tray colloid. The difference in color between the two colloids is useful in providing good visual control when merging the two colloids in the mouth, as described in detail below. A syringe (not shown) is filled with the syringe colloid, and the dentist places a layer of syringe colloid in the mucobuccal and mucolabial folds from the retromolar pad on one side around the outer surface of the mandible to the retromolar pad on the other side.

In using the impression tray to make an impression, the tray is centered above the patient's lower mouth and then seated on the anterior portion of the mandible so the tray colloid merges with the syringe colloid in the front portion of the patient's mouth. A gentle downward force is applied to the anterior portion of the tray at this time until the tray colloid and syringe colloid have completely joined in the area of the mucolabial fold. The difference in color between the two colloids permits the dentist to easily see when the two colloids have completely merged so the downward pressure may be stopped.

Gentle downward pressure is then applied to the distal ends of the tray so the tray colloid covers the lower ridges and the front of the retromolar pads. The downward force merges the triangular ridge formed in the tray colloid with the syringe colloid in the mucobuccal folds. The dentist watches the distal end of the tray and when the colloid appears at the top of the distal end, the downward pressure is stopped. The color difference of the two colloids enables the dentist to see when a complete merger is obtained.

As the downward pressure is applied to the distal ends of the tray, the patient is asked to lay his tongue on the shelf **32** that spans the inside of the impression tray. The shelf holds the tongue in a stationary position, which prevents the floor of the mouth from bulging and thereby interfering with a good impression of the mylohyoid ridge. The tray is held gently in position with the index fingers as the impression colloid sets. When the tray is removed form the patient's mouth, as shown in FIGS. **7** and **8**, it reveals an accurate single impression of the patient's lower mouth. The tray colloid **70** clearly defines the structure of the external oblique ridge, the mylohyoid ridge, and the retromolar pads. The syringe colloid **72**, which is shown to be darker in color than the tray colloid, is completely merged with the tray colloid to accurately define the mucolabial and mucobuccal folds. No voids appear in the cast.

An impression of the upper mouth is taken in substantially the same manner. The impression tray for use with the upper mouth is preferably a conventional tray comprising a horseshoe-shaped trough (not shown) having no retaining wall **26**, or the like, for separating the structures of the mouth. Tray colloid is mixed and applied to the tray by pushing it through holes, or the like, in the tray for retaining the impression material. The outer surface of the tray colloid is then diluted with water and smoothed with the thumb and forefinger to form a relatively high ridge around the outside of the tray, particularly at the anterior portion of the tray. The dentist then places a layer of syringe colloid in the mucobuccal and mucolabial folds.

In using the impression tray to make an impression of the upper mouth, the tray is first centered in the patient's mouth and then seated on the anterior portion of the gum tissue. A light upward pressure is applied to the front of the tray. The upward force merges the tray colloid and the syringe colloid at the front of the mouth, and the different colors of the two colloids enable the dentist to see when a complete merger is obtained. The tray is then seated in the distal portion of the upper mouth by applying a gentle upward force to the distal portions of the tray. The ridge formed in the tray colloid is merged with the syringe colloid in the mucobuccal folds using the visual control provided by the difference in color of the two colloids. When colloid appears below the distal edge of the tray, the light upward pressure is stopped. The tray is held firmly in position to permit the impression colloids to set. When the tray is removed, it reveals an accurate unitary impression of the patient's upper mouth, including the mucobuccal and mucolabial folds.

After removal of the tray, the "post dam" area, i.e., the rear portion of the roof of the mouth between the patient's second molars, is sprayed with a mucous solvent to remove mucous and saliva accumulated in this area. The proper position of the "postpalatal seal", i.e., the distal end of the upper denture base, is marked on the roof of the patient's mouth by an indelible marker. The tray and colloid is then reinserted into the patient's mouth to permit the colloid to pick up the indelible mark. The mark is then used to properly position the postpalatal seal of the upper denture base.

The impressions are then used as final impressions for constructing the upper and lower denture bases.

I claim:

1. An impression tray to be positioned in the mouth of an edentulous patient for separating the patient's sublingual gland from the mylohyoid ridge in the gum tissue overlying the mandible to obtain an accurate impression of the patient's mandible, the impression tray including an elongated, downwardly opening arch-shaped trough shaped to fit over the mandible of the patient and hold impression material in contact with the gum tissue overlying the mandible, the trough including:

a. a downwardly extending buccal flange along its outer side, the buccal flange having an elongated bottom edge; and

b. a downwardly extending lingual retaining wall along its inner side, the lingual retaining wall having an outer surface extending below the bottom edge of the buccal flange continuously for the length of the mylohyoid ridge to hold impression material against the ridge, and a bottom edge curved concave upwardly to depress the patient's mylohyoid muscle away from the mylohyoid ridge and prevent the sublingual and submaxillary glands from interposing themselves between the outer surface of the lingual retaining wall and the mylohyoid ridge, so the floor of the mouth is maintained away from the mylohoid ridge while impression material covers the gum tissue overlying the mandible.

2. Apparatus according to claim 1 wherein the lingual retaining wall has an inner surface adjacent to the tongue of the patient; and including an elongated, inwardly projecting shelf formed integrally with an upper portion of the inner surface of the lingual retaining wall, the shelf extending inwardly toward the tongue of the patient for supporting the muscles at the base of the tongue so the tongue is maintained in an elevated position remote from the mylohyoid ridge.

3. Apparatus according to claim 1 wherein the trough is a relatively horseshoe-shaped member when viewed from above so as to cover the gum tissue at the front and on both sides of the patient's lower mouth.

4. Apparatus according to claim 3 wherein the outer surface of the lingual retaining wall on one side of the patient's mouth is spaced inwardly from the mandible by a distance substantially equal to that on the other side of the mouth.

5. Apparatus according to claim 2 wherein the trough is a relatively horseshoe-shaped member when viewed from above so as to cover the gum tissue at the front and on both sides of the patient's lower mouth.

6. Apparatus according to claim 5 wherein the shelf is continuous for a distance spanning the inside wall of the trough from one side of the petient's mouth to the other side, and wherein the upper surface of the shelf on one side of the patient's mouth extends inwardly toward the tongue for a distance substantially equal to the distance of the upper surface on the other side of the mouth, the shelf on each side forming a relatively narrow notch between them to separate the root of the tongue from the body of the tongue and hold the body of the tongue in a position resting on top of the shelf.

7. Apparatus according to claim 2 including an elongated handle secured to the trough and extending outwardly from the mouth of the patient, the handle being positioned to cooperate with the shelf to provide additional means for supporting the tongue of the patient in its elevated position.

8. Apparatus according to claim 7 including indicator means on the upper surface of the handle for maintaining the tongue in a fixed position relative to the trough.

9. Apparatus according to claim 1 wherein the trough has an upwardly curved distal portion spaced above the retromolar pad of the patient.

10. Apparatus according to claim 1 including a first impression material held by the lower surface of the trough and the outer surface of the lingual retaining wall against the gum tissue overlying the upper surface of the mandible and the mylohyoid ridge, respectively; and a second impression material having a color different from that of the first impression material, the second impression material being disposed within the mucobuccal fold adjacent to the outer periphery of the mandible and merged with the first impression material.

11. Apparatus according to claim 2 including a first impression material held by the lower surface of the trough and the outer surface of the lingual retaining wall against the gum tissue overlying the upper surface of the mandible and the mylohyoid ridges, respectively; and a second impression material having a color different from that of the first impression material, the second impression material being disposed within the mucobuccal and mucolabial folds spanning the outer periphery of the mandible and merged with the first impression material.

12. A cast impression of the lower mouth of an edentulous patient comprising a first impression material forming an impression of the gum tissue overlying the upper surface of the mandible, and the tissue overlying the mylohyoid ridge; and a second impression material forming an impression of the mucobuccal fold, the second impression material having a color different from that of the first impression material and being merged with the first impression material.

13. Apparatus according to claim 12 wherein the first impression material forms an impression of the gum tissue overlying the retromolar pad.

14. Apparatus according to claim 12 wherein the first impression material forms an impression of the gum tissue overlying the upper surface of the anterior portion of the mandible; and wherein the second impression material forms an impression of the mucolabial fold.

15. A cast impression of the lower mouth of an edentulous patient comprising a first impression material forming an impression of the gum tissue overlying the upper surface of the mandible, and a second impression material forming an impression of the mucobuccal and mucolabial folds, the second impression material having a color different from that of the first impression material and being merged with the first impression material.

16. The method of forming an accurate primary impression of the lower mouth of an edentulous patient, the method comprising the steps of applying a first impression material to an impression tray, disposing a second impression material of a different color in the mucobuccal fold, depressing the mylohyoid muscle away from the mylohyoid ridge with a portion of the impression tray and maintaining the side of the tongue in a position remote from the mylohyoid ridge with another portion of the impression tray so that the first impression material covers the gum tissue overlying the mylohyoid ridge, and merging the first impression material with the second impression material with the aid of the color difference before the impression material sets so as to cover the gum tissue overlying the upper surface of the mandible and the tissue in the mucobuccal fold.

17. The method according to claim 16 including the steps of disposing the second impression material in the mucolabial fold, and merging the first impression material with the second impression material in the mu-

colabial fold with the aid of the color difference before the impression material sets so as to cover the gum tissue overlying the upper surface of the anterior portion of the mandible and the tissue in the mucolabial fold.

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