

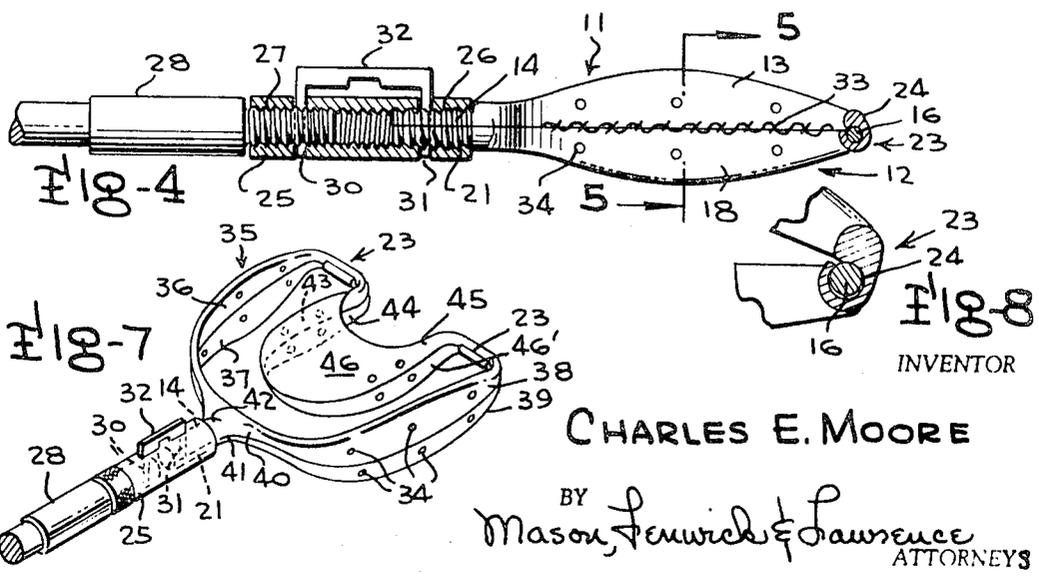
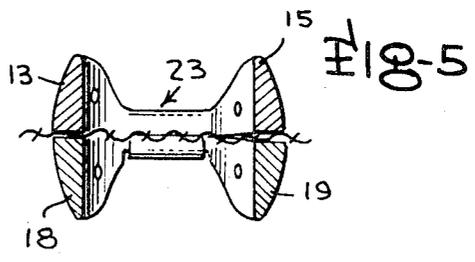
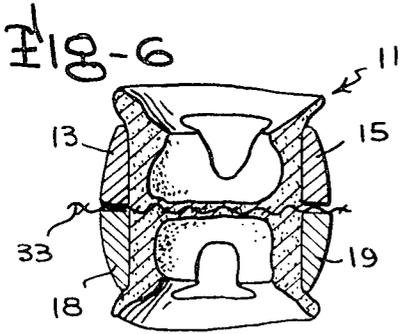
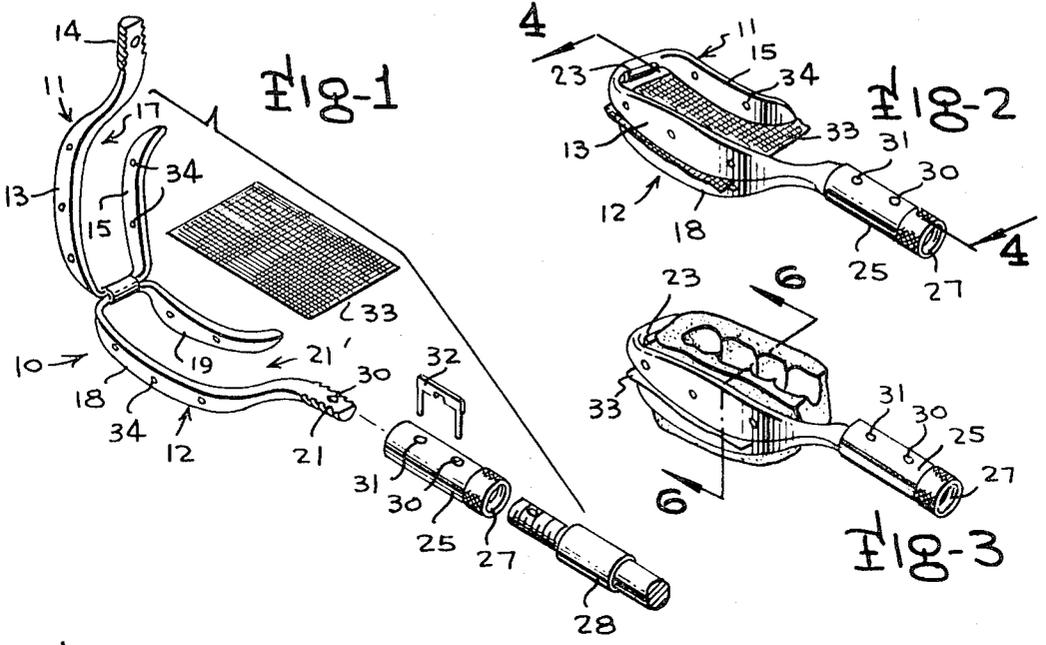
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DENTAL IMPRESSION FRAME AND DISPOSABLE TRAY

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**DENTAL IMPRESSION FRAME AND
DISPOSABLE TRAY**

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8 Claims

ABSTRACT OF THE DISCLOSURE

A dental impression instrument for holding dental impression materials on a flexible supporting material such as gauze between upper and lower frames, each frame having a buccal and a lingual section. The upper and lower frames are interconnected at the posterior end by a hinge including a bearing member which may be deformable. The anterior ends of the upper and lower buccal frame sections are releasably connected as by a threaded handle to provide a tight gripping means therebetween for the supporting material. The upper and lower lingual frame sections are pivotally fixed at the posterior end by hinge and free at the anterior end to provide therebetween a loose gripping action for the supporting material in order to permit necessary slippage of the supporting material at occlusion to conform to the various occlusal planes of the patient.

This application is a continuation-in-part of Ser. No. 390,963, filed Aug. 20, 1964 and now abandoned.

This invention relates to improvements in a dental impression instrument and has more particular relation to improvements in impression instruments for holding elastic impression materials used in the taking of impressions from the teeth of patients, which impressions may be subsequently used for making tooth restorations in the dental laboratory.

Prior devices in this general field of endeavor have generally proved unsatisfactory because of a number of features embodied within these devices. A common type of prior impression frame uses beeswax for making the impression of a patient's teeth, wherein the patient bites down upon the beeswax to impart to it centric occlusal bite registration and impression of the teeth to be restored, after which the dentist makes hard casts from the beeswax which are sent to a suitable laboratory which then prepares suitable dental restorations. The obvious problem with beeswax is that it softens at room temperature and thereby loses, to some degree, the accurate bite registration and accurate tooth impression. For this reason beeswax is also unsuitable for use if the laboratory returns the dental restoration by mail to the dentist.

The use of a heavy paper to attain a dental impression also has the failing that the paper at the points of tooth contact will tear, with the result that the stone subsequently poured into the mold formed by the impression material, in order to cast the dental restoration, will be found to seep between the impression material and the paper at the point where the bridge is exposed, or will pass through the paper due to cuspal penetration, in either case rendering an imperfect model.

Accordingly, the primary object of the present invention is the provision of a dental impression instrument which gives an accurate impression of the teeth to be restored.

Another object of the present invention is the provision of a dental impression instrument which maintains a supporting means for the impression material in a manner

that permits the impression material to be vertically disposed in accordance with the varying occlusal planes.

This invention also has as a further object the provision of a dental impression instrument which permits gauze or other like thin material to be used as a supporting medium for the impression material without the supporting material dropping through the instrument, due to the weight of the impression material.

A further object of the present invention is the provision of a dental impression instrument which sufficiently grips the supporting medium for the impression material and yet permits sufficient sliding of the impression material from the jaws of the instrument, in order that the supporting medium can accurately attain the undulations of the varying occlusal planes.

Yet another object of the present invention is to provide a dental impression frame formed of upper and lower portions which are hinged together at one end and form pairs of jaws on the lingual and buccal side towards the opposite end and which provide for a relatively loose grip on the lingual side of the instrument.

Another object of this invention is the provision of a dental impression frame which gives an accurate impression of the opposing maxillary and mandibular dental arches at the same time, thus eliminating the taking of separate impressions of each arch.

A still further object of this invention is a provision for a dental impression instrument which gives an accurate occlusal bite registration, each time it is used, in a material which will retain its exact shape when removed from the patient's mouth, thereby reducing the necessity for adjustments or occlusal equilibrations at the dental chair.

Another object of this invention is the provision of a dental impression instrument which by its construction may be reversibly used in the patient's mouth, yet is of low cost and of increased efficiency for reducing the time spent by the dentist and the amount of materials required.

These and other objects and advantages of the present invention will become apparent to those skilled in the art from the following description when read in conjunction with the accompanying drawing, wherein:

FIGURE 1 is an exploded perspective view of a dental impression instrument shown in proper position ready to accept the gauze forming the occlusal floor;

FIGURE 2 is a perspective view of the impression instrument in closed position with the supporting medium for the impression material forming the occlusal floor properly placed therein;

FIGURE 3 is a perspective view of the impression instrument showing a completed impression which has just been taken from the patient's mouth;

FIGURE 4 is a horizontal sectional view partly broken away of the impression frame taken along lines 4—4 of FIGURE 2;

FIGURE 5 is a vertical sectional view taken along lines 5—5 of FIGURE 4 and illustrating the relatively loose gripping on at least one side of the instrument;

FIGURE 6 is a vertical sectional view taken along lines 6—6 of FIGURE 3 and showing a sectional representation of the completed registration;

FIGURE 7 is a perspective view, partly broken away, of a second embodiment of the present impression instrument by which an impression may be taken of the complete dental area of the patient's mouth and including a major portion of the anterior palate for use in making partial dentures, and

FIGURE 8 is an enlarged cross sectional view, partly broken away, of the hinge of the present invention.

Referring to the drawings wherein like reference characters designate corresponding parts throughout the several figures, the impression instrument of the present

invention is indicated by the numeral 10. The instrument consists of an upper frame 11 and a lower frame 12. If the instrument is to be constructed to be of a reusable nature, it should be of a material that will resist rust and autoclaving, such as stainless steel. In particular, 410 Stainless Steel is preferred. However, it is anticipated that a disposable plastic may be used to manufacture the instrument and that after one use the frame would be discarded.

The upper frame 11 is composed of an upper buccal frame section 13, which generally has an arcuate bowed anatomical shape, and at its anterior end there is a threaded shank portion adapted to be received in a later described handle. Spaced laterally inwardly of the upper buccal frame section 13 is an upper lingual frame section 15, generally conforming to the configuration of the buccal frame section 13 and being symmetrical therewith. At the posterior end of the upper frame 11, the upper buccal frame section 13 and the upper lingual frame section 15 are interconnected by a generally dowel shaped bearing or torsion bar 16, which maintains the upper muco-buccal frame section and upper lingual frame section in proper lateral spacing and which also permits the upper lingual frame section 15 to be twisted vertically to obtain a variable gripping action. The anterior end of the upper frame section, as noted by numeral 17, is left open so that the entire impression instrument may be easily placed within the patient's mouth without interfering with the frontal teeth.

Corresponding generally to the upper section 11 is the lower frame 12 comprising matching lower muco-buccal frame section 18 and lower lingual frame section 19. The lower muco-buccal frame section 18 further has at its anterior end a threaded shank 21 which also mates with the same handle, as mentioned above. The numeral 21' denotes the open anterior end between the lower muco-buccal frame 18 and the lower lingual frame 19 and coincides with the opening 17 of upper frame 11. At the posterior end of the lower frame 12 is a hook portion 22 forming a hinge 23 that is integral with and generally comprising the laterally extending interconnecting portion 24 which maintains the lower muco-buccal and lower lingual frame sections 18, 19 in proper relationship.

The hinge 23, as shown in FIGURE 8, includes the overlapping means or hook 22, which encloses a substantial portion of the surface of the bearing on torsion bar 16. This hinge 23 significantly provides a loose gripping action on at least one side of the frame. The torsion bar 16, when deformed in torsion, will retain a position in which the lingual upper frame section 15 will not be in as close contact with its corresponding lower frame section 19 forming one gripping means as the respective buccal sections 13 and 18, forming one gripping means since the latter are fixed at one end by the hinge and at the other end by the handle, while the lingual sections are fixed at one end only.

To bring the upper and lower frames together, it is merely necessary to pivot them about the hinge point until the anterior portion of the instrument, and specifically the threaded shanks 14 and 21, are brought into registry, as shown in FIGURE 4. To maintain the frames together, a suitable tubular handle 25, being internally threaded, as noted by numerals 26 and 27, is placed over the threaded shanks 14 and 21 and drawn up to a fully closed position, thereby both maintaining the frames together and providing a suitable handle means for carrying the impression tray to and from the patient's mouth. The threading 27 is primarily for the purpose of permitting a bar 28 to be inserted into the opposite end of the handle, which is to be used to secure the instrument into the conventional face bow (not shown). To maintain the bar 28, handle 25 and the instrument in a fixed or relative position, bores 30 and 31 are provided through the handle 25, the bar 28 and threaded shanks 12 and 21 to receive a U-shaped cleat 32, as best shown in FIGURE 4.

In order to support the dental impression material by the sections 11 and 12, a supporting medium 33, forming an occlusal floor, is provided to be used in conjunction with the present invention. The floor 27 comprises a piece of thin, soft, and flexible open mesh material. The material is preferably of light weight and of extremely small thickness, so that it does not interfere in any manner with the taking of centric occlusion. It should also offer no resistance to the occlusion of the teeth as the patient closes his jaws, in order that a proper centric occlusion may be registered. It has been found that the preferable material is gauze, rather than the paper conventionally used, which is not of an open mesh variety and far too thick to obtain an accurate occlusion. The flexible open mesh type of material, such as gauze, renders a far superior impression in that it can be contoured precisely in accordance with the occlusal and possesses generally no undesirable elasticity nor any inherent tension that would warp or distort the impression once obtained. The openings in the open mesh material, such as gauze, also serve an important function in that they will be filled with the impression material at the time of the occlusal, assuring as far as is possible a completely closed surface along the occlusal which will retain all of the stone later to be cast in the impression material mold and will not permit the stone to seep between the gauze forming the supporting medium 33 and the impression material.

The occlusal floor or supporting medium for the impression material is supported between frames 11 and 12 by the placement of a sufficiently large piece of the gauze material that bridges the lateral space between the lower muco-buccal frame 18 and the lower lingual frame 19. After this is done it is merely necessary to close the upper section 11 upon lower frame 12 and then engage handle 25 upon the threaded shank of the respected sections. The gripping action of the instrument upon the gauze is one of the unique features of the present invention. As was stated with respect to the hinge 23, the buccal side of the frame, both upper and lower sections, is fixed by means of the hinge 23 at one end and the threaded shanks 14 and 21, which are held within the handle 25. Such gripping action between the upper and lower buccal frame sections is tight, or at least relatively so, in order that there may be a minimum of slippage of the gauze between these frame sections. On the opposite side, however, as best shown in FIGURE 5, the lingual frame sections, both upper and lower, are fixed only at one point against the hinge 23. At the opposite end they are free and not fixed. Accordingly, the gauze 33 is held somewhat more loosely, permitting a necessary slippage to occur upon occlusion of the patient with the impression material placed on the gauze. The importance of this slippage can be readily determined upon inspection of the impression material after occlusion, since the flexible gauze will be contoured precisely in accordance with the occlusal and will be raised and lowered vertically in accordance with the undulation of the variety of occlusal planes. To do this, the gauze must be released or slipped through the jaws of at least one side of the upper and lower frame of the instrument. In view of the fact that the lingual side of the instrument has only one end fixed, the slippage will primarily occur at that location. The impression made by the occlusal will also be one which is completely closed, in view of the fact that the impression material will fill the voids in the gauze and result in a closed impression that will not permit the stone later to be cast to form the teeth to seep between the impression material and the gauze or from one side of the gauze to the other.

The gripping action, while necessarily requiring at least some slip on one side of the instrument, nevertheless should be sufficiently tight, in order that the gauze with the impression material placed thereon will not fall between the buccal and lingual sections by the action of gravity.

The sides of the instrument, as best shown in FIGURES 1 through 4, include a plurality of apertures 34,

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which pass transversely through the buccal and lingual frame sections for the purpose of allowing the impression material to flow within these holes in order to prevent any distortion of the impression material while it is setting up and when it is removed from the mouth after occlusion by the patient.

FIGURE 7 is an illustration of an alternate embodiment of the present invention for use in obtaining a full mouth dental impression. As will be noted, the lingual sides of the full mouth instrument 35 are precisely the same as for the partial impression instrument, illustrated in FIGURES 1 through 6. The upper lingual frame section 36 and the lower lower frame section 37 corresponds to the upper and lower lingual frame sections 13 and 18, shown in FIGURE 1. On the opposite side of the full mouth instrument 35, upper and lower lingual frame sections 38 and 39 are the mirror images of their corresponding upper and lower lingual frame sections 36 and 37. The hinge 23 including the torsion bar 16 are precisely the same on both sides of the full mouth instrument, as shown in FIGURE 7, and identical to that shown in FIGURE 8 for the first embodiment described. In a manner identical to that of FIGURES 1 through 4, one end of the lingual frame sections is fixed by hinge 23 and the other end forms a yoke 40, which is integral with the upper lingual frame sections and a similar yoke 41 for the lower lingual frame sections. Each of the yoke members 40 and 41 form a half of a shank 42 and 43 which are threaded in precisely the same manner as the threading at 14 and 21 of FIGURE 1, to receive a handle 5 having the bores 30 and 31 to receive the cleat 32 in a manner identical to that shown in FIGURE 4.

The full mouth instrument of FIGURE 7 differs primarily in the fact that the upper and lower lingual frame sections 43 and 44 are precisely the same as those shown in 15 and 19 of FIGURE 1 and have corresponding opposing lingual upper and lower frame sections 45 and 46' facing the lingual upper and lower frame sections 43 and 44; however, the full mouth impression instrument 35 is provided with a palatal portion connecting the upper opposed lingual frame sections 43 and 45, as best shown at 46. The lower lingual frame sections 44 and 46' are made integral by a connecting portion 47. The purpose of the palatal portion 46 is to cover the anterior two-thirds of the palate and enables the full mouth impression to be used for partial dentures. It should be understood that one of the important features of the present invention which permits some slipping of the gauze between the upper and lower lingual frame sections, as in FIGURES 1 through 5, is also present in the full mouth instrument 35, shown in FIGURE 7, since the lingual frame sections while connected to their mutually confronting and opposing lingual frame sections, nevertheless are not fixed together and therefore will provide the necessary slip when gauze is positioned between the upper and lower frames on both sides of the palatal portion 46.

In the operation of the present invention, particularly with reference to the embodiments shown in FIGURES 1 and 4, the supporting medium 33 in the form of gauze is positioned within the instrument 10 and permitted to overlap the lower buccal and lingual frame sections 18 and 19, respectively, at which time the upper lingual and buccal frame sections 13 and 15 are closed and held tightly in place by securing handle 25 onto the cooperating threaded shanks at 14 and 21. In this position the gauze will be held relatively tightly between the buccal frame sections 13 and 18, but will be permitted some slipping by the loose gripping of the lingual frame sections 15 and 19. In this manner the gauze will not be able to slip through the instrument upon placing the impression material on both sides of the gauze, and yet upon occlusion the gauze will be permitted to slip from the gripping action of the lingual frame sections 15 and 19 to attain the undulations produced in accordance with the variety of occlusal planes inherently found in the average patient's

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occlusal. The mesh of the gauze will serve to hold the impression material to prevent cuspal penetration at the contact point of the opposing teeth and in this manner a firm closed impression can be made which will receive the stone in the impression material for subsequential dental reproduction. The thinness of the gauze, which may be approximately $\frac{1}{10}$ mm. is so thin that it will not prevent undesirable occlusion, and thus as accurate an occlusion will be obtained as is possible. The impression material is retained within the instrument by the apertures 34 and the gauze, and accordingly cannot fall out by gravity.

The impression material may be of any suitable rubber base material or synthetic silicone, such as "Neo-Plex," manufactured by Surgident, Limited.

The hinge 23 plays an important part in the present invention in that it provides one of the fixed points for the buccal frame sections, but also permits, through torsion, an adjustment of the necessary spacing between the lingual upper and lower frame sections 15 and 19, in order to obtain the loose gripping action which will provide the necessary slip of the gauze upon occlusion.

When the instrument is placed in the mouth of the patient, hinge 23 is placed distal to the last molar of the jaw. When all of the normal molars are present, hinge 23 is placed behind the maxillary tuberosity and rests upon the retro-molar pad when the teeth are closed in centric occlusion. It should be noted that the frames of the present invention may be of different sizes to accommodate differences in anterior and posterior dimensions of the dental arches of different patients.

The lingual section halves are positioned inwardly from the dentition and extend along their longitudinal lengths anteriorly to about the midline of the patient's mouth. Once the frame has been inserted with the material, the patient is then instructed to close his teeth into centric occlusion until the teeth touch or close together at every contact point around the dental arch. Once this is done, the patient holds his mouth together in proper position until the impression material sets up.

Normally the teeth are prepared for impression taking by covering them with a syringe impression material of the same general material as the frame impression material, but being of a lighter body. The heavier the body impression material placed upon the frame will force the lighter material on the teeth into every detail of the dentition and over the gingival tissues. Once in position the impression material sets to an elastic state and can be moved without distortion by having the patient open his mouth and then removing the instrument. To remove the completed impression from the frame, it is necessary to cut the impression material from the instrument to prevent damage to the hinge and the instrument.

I claim:

1. A dental impression instrument comprising an upper frame and a lower frame, each frame having an anterior end and a posterior end, the upper frame having a buccal frame section and a laterally spaced lingual frame section, a hinge connecting said upper and lower buccal and lingual frame sections at their posterior ends, the lower frame section having a lower buccal frame section and a laterally spaced lower lingual frame section, the upper frame section having an upper buccal frame section and a laterally positioned lingual frame section, the posterior ends of one buccal and lingual frame section being connected by an overlapping means forming a portion of said hinge, the other buccal and lingual frame sections being connected by a bearing member forming another portion of said hinge, said lingual sections being mutually opposed to form a first gripping means, said buccal sections being mutually opposed to form a second gripping means, the anterior ends of said upper and lower buccal frame sections being provided with means for releasably connecting said upper and lower buccal frame sections to form a relatively tight gripping action at one of said gripping means, said upper and lower lingual frame sections be-

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ing connected together at said hinge only to provide a loose gripping action at the other of said gripping means whereby when taking a dental impression sufficient slippage occurs between one gripping means of a supporting medium for impression material without permitting the supporting medium to fall through the instrument due to gravity.

2. The instrument of claim 1, wherein overlapping means includes a hook portion which receives therein said bearing member.

3. The instrument of claim 1, wherein said bearing member is deformable by a torsion force to adjust the gripping action of said upper and lower lingual frame sections.

4. The instrument of claim 1, including a thin, flexible gauze between said upper and lower frames, said gauze being held tightly between said upper and lower buccal frame sections and loosely between said upper and lower lingual frame sections to provide slippage when taking a dental impression.

5. The instrument of claim 1, including threaded shanks integrally connected to said upper and lower buccal frame sections, a tubular threaded handle receiving said shanks at one end and releasably securing said upper and lower buccal frame sections, a face bow bar connected to the opposite end of said handle.

6. The instrument of claim 5, wherein a bore is pro-

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vided through said shanks and said handle at one end and another bore through said face bow bar and handle at the other end, a cleat received in said bores to maintain said face bow for said instrument in aligned position.

7. The instrument of claim 1, including an adjacent instrument mutually facing said first instrument and connected by a pair of yoke members, a palatal portion connecting adjacent upper lingual frame sections.

8. The instrument of claim 1 wherein said first gripping means is relatively tight and said second gripping means is loose.

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