United States Patent

[11] 3,574,259

[72] Inventor **Russel J. Jones**
13804 Lake Shore Drive, Cleveland, Ohio 44110

[21] Appl. No. **874,578**
[22] Filed **Nov. 6, 1969**
[45] Patented **Apr. 13, 1971**

[54] **DEVICE FOR OBTAINING IMPRESSION OF OCCLUSAL SURFACES OF THE TEETH IN CENTRIC OCCLUSION**
9 Claims, 5 Drawing Figs.

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

[56] **References Cited**

UNITED STATES PATENTS

2,860,414	11/1958	Brant	32/17
3,468,029	9/1969	Moore	32/17

Primary Examiner—Robert Peshock
Attorney—John Harrow Leonard

ABSTRACT: The tray comprises two identical frames each open at the front and having a buccal frame member and a lingual frame member connected by a rear frame member. The buccal member at its forward end has a handle which, at its forward end, has a connecting portion. A clamp common to the frames detachably clamps the connecting portions in adjusted positions wherein the frames are spaced edgewise from each other in coplanar relation with the lingual members innermost. The frames can be adjusted edgewise by swinging them about the connecting portions and by moving the connecting portions bodily toward and away from each other. A sheet of soft, flexible woven sheet material bridges from the lingual to the buccal frame member of each frame. Each frame is composed of plastic with the members, handle, and connecting portion integral. The lateral margins of the sheet material are embedded in the plastic midway between the upper and lower surfaces of the frame.

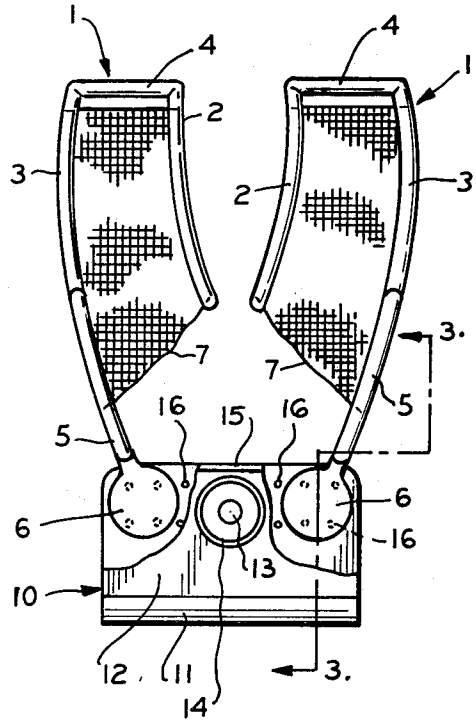


Fig. 1.

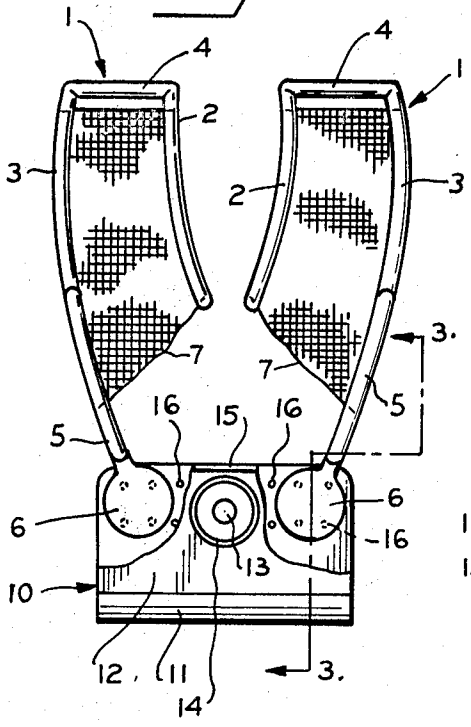


Fig. 2.

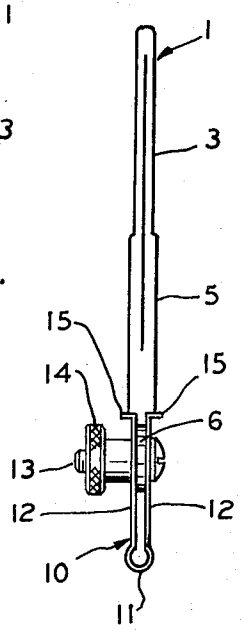
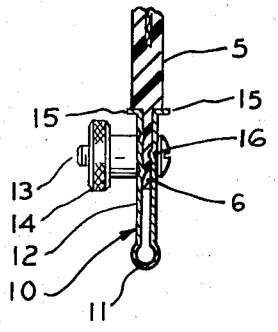


Fig. 3.



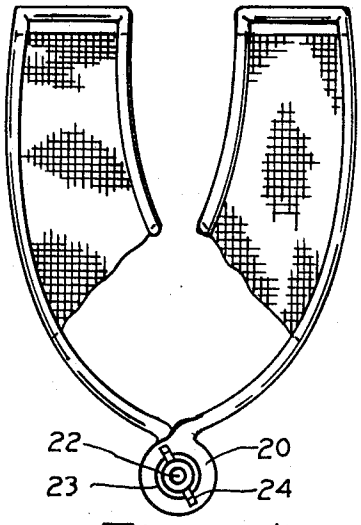


Fig. 4.

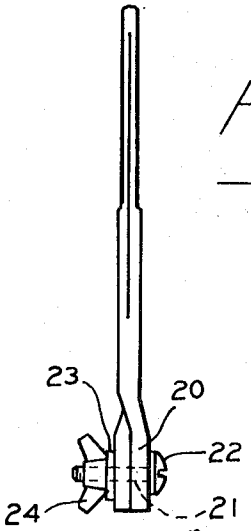


Fig. 5.

INVENTOR.
Russell J. Jones,
BY
John St. Kinnard,
his ATTORNEY.

DEVICE FOR OBTAINING IMPRESSION OF OCCLUSAL SURFACES OF THE TEETH IN CENTRIC OCCLUSION

This invention relates to a disposable bite impression tray and is an improvement on the tray disclosed in my U.S. Letters Pat. No. 2,713,202, of Jul. 19, 1955, entitled Bite Tray.

As more fully described in the above patent, in taking a bite impression, the earlier practice was to insert a wad or sheet of soft wax between the upper and lower teeth and to have the patient bite them until his teeth reached a closed position. It was therein noted that if there is any substantial resistance to closure, the teeth are temporarily shifted from that position which would occur were they closed with no resistance to closure, and, therefore, it was almost impossible to obtain duplicate bite registrations. To overcome the difficulties in the prior structures the bite tray of the above patent was invented.

It employs two forwardly open frames arranged in coplanar relation and adjustable edgewise with respect to each other. These frames could extend above the lower teeth at opposite sides of the jaw, respectively. To eliminate any substantial resistance to closure, a sheet of very thin woven gauze of plastic material was detachably mounted on each frame and used to support the impression material. The gauze was provided at one edge with a tubular support which slid over the lingual frame member, the opposite edge of the sheet being lapped over the buccal frame member.

This manipulation is inconvenient for the dentist due to the time required for installing the gauze on the frame and due to the frame being of hard wire metal from which removal of the gauze with the impression material therefrom after taking the bite impression, is difficult. The patented tray is too expensive to be discarded after each use and, accordingly, is cleaned and reused repeatedly. The frame must be sent to the dental laboratory with the impression attached, and is unavailable for use by the dentist meanwhile.

The present invention is directed to an improved tray by which objections and inconveniences of the earlier tray are eliminated.

The present tray is very inexpensive to produce and is a disposable item. It can be used for taking the bite impressions of either side of the mouth, selectively, or of both sides concurrently. It is readily adjustable to the size of the mouth and can be clamped firmly into the adjusted position so that no slippage whatever can occur. The tray is of a material which can be readily cut by a knife or lancet so as to separate the frame from the set impression material. It is stiff enough to support the impression material adequately during the taking of an impression and to resist lingual displacement of the frame by engagement of the cheeks with the buccal frame member. The gauze sheet for the impression material is permanently attached to the frame by interpenetrating margins of the gauze with the plastic of which the frame is composed.

Various specific objects and advantages of the invention will become apparent from the following description wherein reference is made to the drawings, in which:

FIG. 1 is a top plan view of a tray embodying the principles of the present invention;

FIG. 2 is a side elevation of the tray illustrated in FIG. 1;

FIG. 3 is a fragmentary longitudinal cross-sectional view taken on the line 3–3 in FIG. 2;

FIG. 4 is a fragmentary sectional view, similar to FIG. 3, and showing a modification of the invention; and

FIG. 5 is a side elevation of the tray illustrated in FIG. 4.

Referring first to FIGS. 1 through 3, the tray comprises a pair of frames 1. Each frame comprises an inner or lingual frame member 2, an outer or buccal frame member 3, spaced laterally therefrom, and a transverse rear end frame member 4 which at its ends is connected to the adjacent ends of the frame members 2 and 3.

A handle portion 5 is provided on the outer or forward end of the buccal frame member 3 and has at its outermost end a clamping portion 6.

Mounted on the frame members 2 and 3 is a sheet 7 of soft, flexible, open meshed woven gauze. The sheet or gauze bridges the space between the frame members 2 and 3 and terminates in forwardly spaced relation to the transverse rear end frame member 4.

The frame members 2, 3, and 4, handle portion 5, and connecting portion 6 are integral and comprised of molded plastic material, such as a dry heat thermal setting plastic which is medium hard, and resilient when set.

The sheet 7 is connected at its lateral margins to the frame members 2 and 3, respectively, preferably by interpenetration of the unset plastic material of the frame with the margins of the sheet. It is desirable that the margins of the sheet be in a median plane midway between the upper and lower faces of the associated frame. Hence the sheet is installed during the molding of the frame by supporting the sheet with its margins in the median plane and embedding the margins in the plastic at this plane by the molding operation.

The frame members must be soft so that they can be cut readily by a knife or lancet at the laboratory for the purposes of removing all or part of the frame from the set impression material. At the same time, each frame is made sufficiently stiff to hold the sheet 7 under light lateral tension, to support the weight of the bite impression material without lateral contraction, and to prevent displacement of the frame in the lingual direction by flexure of the handles or flexure of the buccal frame members due to the pressure exerted on the frame by the jaws of the patient after the frames are adjusted and released by the dentist.

At the same time the frame must be such that it will fit in spaced relation around the lower teeth at a location below the occlusal surfaces of the teeth so as to assure that the teeth of the patient do not in any way strike the frame as such contact, due to the reflexes of the patient, would cause the lower teeth to be moved laterally relative to the upper teeth, in a manner for chewing instead of directly in a manner for taking a bite impression. Accordingly, the frame members 2 and 3 are made as small as consistent with the weight to be supported, and the handle portion 5 and the forward end of the buccal frame member are thickened in the direction normal to the plane of the frame, as indicated at 8.

The connecting portion 6 is preferably in the form of an integral disc and is thinner than the thickened portion 8 of the handle 5. The connecting portion 6 can be gripped and held between the fingers for taking an impression if only a unilateral bite is to be taken.

Frequently it is necessary to take a bilateral bite impression, in which cases, the impression of the teeth at both sides of the jaw must be taken simultaneously. For this purpose, two of the frames are supported with their lingual frame members facing, but spaced laterally from, each other. To support the frames, a clamp 10 is provided. The clamp 10 is preferably a sheet of stiff resilient metal bent between its ends to provide a generally base portion 11 of generally circular cross section, and clamping jaws 12 connected thereto. The jaws 12 are spaced apart so as to receive snugly therebetween the connecting portions 6 and to hold them in place sufficiently tightly so that the frames can be adjusted to fit the mouth of the patient, either by rotating the portions 6 about axes normal to the plane of the frames or by moving the connecting portions bodily laterally of the clamp to desired positions, or both.

After the frames are adjusted in position in the mouth of the patient, the clamp is tightened by means of a screw 13 and a nut 14 so as to assure that the frames will be held securely precisely in position during the taking of the impression. In order to assure that the clamp can exert sufficient pressure without undue deflection, the margins of the jaws 12 are upturned to provide integral stiffening flanges 15.

Further, to assure that the frames do not shift during the taking of the impression, the jaws 12 may be provided with small nibs or projections 16 which are distributed over the inner faces of the jaws 12 so that at least two of the nibs will engage the connecting portion 6 between the jaws, regardless of the position transversely of the clamp to which the portions 6 are moved.

It is important that the frames be coplanar in the position in which used. If, for example, one frame is offset from the other slightly in a direction normal to their planes, then if a bilateral bite impression is to be taken, a true impression cannot be obtained. Therefore, the margins of the sheet **7** on each frame should be coplanar with the margins of the sheet **7** on the other frame.

In the form illustrated in FIGS. **1** through **3**, in order to make the frames **1** interchangeable from left to right while maintaining the sheets **7** and frames in coplanar relation, the lateral margins of each sheet **7** are embedded in its frame members midway between the upper and lower planes or surfaces of the frame. Also, the clamp engaging surfaces of the connecting portions **6** are equidistant from the median plane between the upper and lower planes.

Under such conditions, assuming the frame on the right in FIG. **1** is installed, a duplicate frame rotated 180° about its longitudinal axis and placed at the left will be disposed with its sheet **7** in coplanar relation with the sheet of the right-hand frame.

If this is not done, then a pair of right-hand and left-hand frames would have to be used to maintain this coplanar relation. This coplanar relation is desirable, however, even in the latter case.

In the modified form of tray, duplicate frames such as illustrated in FIGS. **4** and **5** are employed. As there illustrated, instead of the connectors **6**, the frames have connectors **20** which are similar to the connectors **6** in that they are integral with the handles of the frames. However, these connectors are offset from the median plane of the frame faces to a degree such that if the frames are placed in reverse positions for right and left use, the juxtaposed faces of the connectors **20** lie on the median plane midway between the opposite faces of the frames and, therefore, in a plane of the gauze sheet. The two connecting portions **20** have aligned apertures **21** therethrough, through which extends a bolt **22**. A washer **23** engages the outer face of one of the connectors **20** and a wingnut **24** cooperates with the bolt to draw the two connectors **20** into tight face-to-face contact. The inner adjacent faces of the members may be slightly roughened, if desired, with a mat finish, so that they will retain their position firmly when so clamped.

It is apparent, therefore, that with the present structure, a very simple and economical bite tray is provided, in that the frame members are duplicates of each other, and yet may be readily assembled as rights and lefts while assuring that the two frames are coplanar.

I claim:

1. A device for introducing bite registration material between the occlusal surfaces of the teeth, and comprising a pair of open end frames;

each frame having a buccal frame member, a lingual frame member spaced laterally therefrom, and a transverse end frame member at, and connecting, the rear ends of the buccal and lingual frame members, said buccal frame member having at its forward end a forwardly extending handle portion;

a sheet of soft, flexible woven open mesh material bridging the space between the buccal and lingual frame members;

characterized in that said members of each frame are of integral set soft resilient synthetic plastic material which can be cut readily with a knife, and the buccal and lingual frame members are unconnected at their forward ends so that the lingual frame member is readily resiliently flexible toward and away from the buccal frame member;

said frames are free from buccal and lingual buttressing sidewall portions extending an appreciable distance from the plane of the sheet;

said sheet has its lateral margins permanently bonded to the buccal and lingual frame members, respectively, by interpenetration of the plastic material with said lateral margins;

said handle portion of each frame has at its forward end a connecting portion; and

detachable clamp means common to the two connecting portions are provided and are operable to detachably engage the connecting portions in different adjusted relative positions, wherein the frames are spaced a selected position apart edgewise and are in coplanar relation, and to hold them firmly in said relatively adjusted positions.

2. The structure according to claim **1** wherein the connecting portions are of greater width than the handle portions and are accommodated in the clamp means in laterally spaced relation to each other for rotation about axes, respectively, normal to the plane of the frames.

3. The structure according to claim **1** wherein the margins of the sheet of material of each frame are embedded in the buccal and lingual frame members midway between the opposite surfaces of the frame.

4. The structure according to claim **3** wherein each frame is so shaped that it can be interchanged from a right-hand to left-hand position; and

the frames are generally coplanar with each other when either frame is in the right-hand position and the other frame is in the left-hand position.

5. The structure according to claim **3** wherein the frames are duplicates.

6. A bite tray comprising an open end frame having:

a buccal frame member, a lingual frame member spaced laterally therefrom, and a transverse end frame member at, and connecting, the rear ends of the buccal and lingual frame members; said buccal frame member having at its forward end a forwardly extending handle portion;

a sheet of soft, flexible, organic, open mesh woven material bridging the space between the buccal and lingual frame members;

characterized in that

said members are integral, set soft resilient synthetic organic plastic material which can be cut readily with a knife, and the buccal and lingual frame members are unconnected at their anterior ends to that the lingual frame member is readily resiliently flexible toward and away from the buccal frame member;

said frames are free from buttressing sidewall portions extending an appreciable distance from the plane of the sheet;

the sheet is permanently bonded at its lateral margins to the buccal and lingual frame members, respectively, by interpenetration of the plastic material with said lateral margins of the sheet.

7. The structure according to claim **6** wherein the frame members are of such thickness in a direct normal to plane of frame that the top of the frame is disposable below the occlusal surfaces of the teeth in the closing position of the bite;

whereby the frame can fit around the outside of the lower teeth; and

the handle portion is of greater thickness in said direction than the lingual and end frame members.

8. The structure according to claim **6** wherein the frame members are sufficiently stiff to support a charge of bite impression paste carried on the sheet without substantial lateral contraction due to the weight of the paste and to exert light lateral tension on the sheet, and the forward portion of the buccal frame member and of the handle contiguous thereto are more resistant to resilient flexure normal to the frame than is the lingual frame member.

9. The structure according to claim **6** wherein the margins of the sheet lie in a median plane substantially midway between the upper and lower faces of the frame.

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,574,259 Dated April 13, 1971

Inventor(s) Russell J. Jones

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Col. 4, line 44, that portion reading "said frames" should read --said frame members--; Col. 4, line 52, that portion reading "in a direct normal to plane of" should read --in a direction normal to the plane of the--

Signed and sealed this 26th day of October 1971.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Acting Commissioner of Pa