

[54] **BIB AND COMBINATION THEREOF WITH BITE TRAY**[76] Inventor: **Russell J. Jones**, Bratenahl, Ohio[22] Filed: **Apr. 12, 1974**[21] Appl. No.: **460,430**

[52] U.S. Cl. 32/17

[51] Int. Cl.² A61C 9/00

[58] Field of Search.....32/17

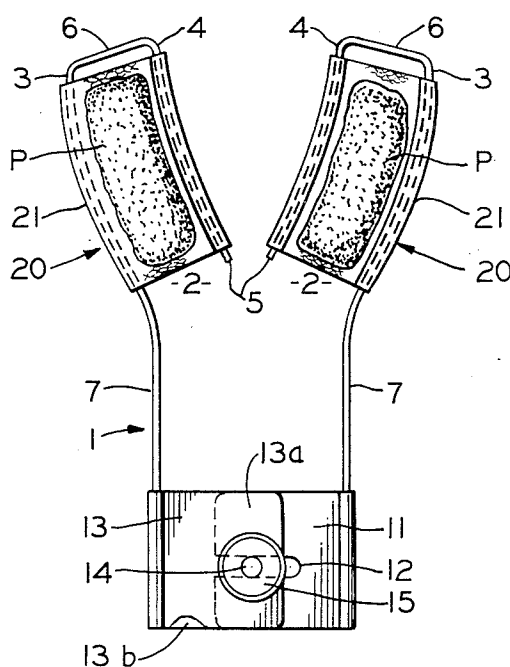
[56] **References Cited****UNITED STATES PATENTS**

3,822,473 7/1974 Jones 32/17

Primary Examiner—Robert Peshock*Attorney, Agent, or Firm*—John Harrow Leonard[57] **ABSTRACT**

A bib for a bite registration tray has a paste supporting sheet of soft, flexible, open mesh material, its lateral margins embedded in resilient snap fastening channels

of set plastic material. The sheet is from about 0.002 to about 0.004 inch thick, is of loosely felted fibres, and is unsized. The channels are coextensive in length with the sheet. Each channel has a restricted entry passage with guide walls flaring outwardly from the passage, so that the channels can be snapped onto laterally spaced wire frame members, respectively, of a bite registration tray in a direction radially of the frame members for holding the strip in bridging relation to the space between the wire frame members. Each of the guide walls has a plurality of very small protuberances thereon and extending transversely of the entry passage toward the opposite guide wall and terminating short thereof. The protuberances of each guide wall are spaced from each other endwise of their associated wall, and restrict the space between the guide walls. The channels are of such resiliency and the strip is so connected thereto that the strip can be adjusted for slack or tensioned condition by rotating one or both of the channels about the axes of the frame members, respectively. The gripping power of the channels is such that they remain in the adjusted position to which they have been rotated, and thus retain the strip with the selected degree of slackness or tension. The finished bibs are produced in multiple by a molding method.

7 Claims, 5 Drawing Figures

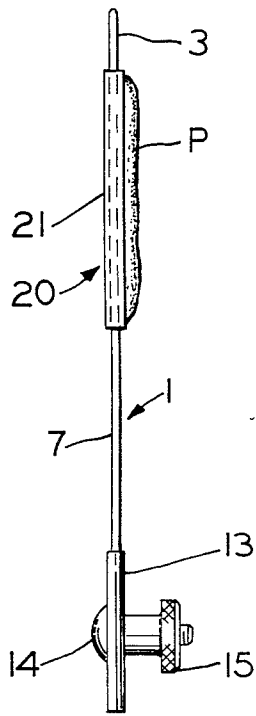


FIG. 2.

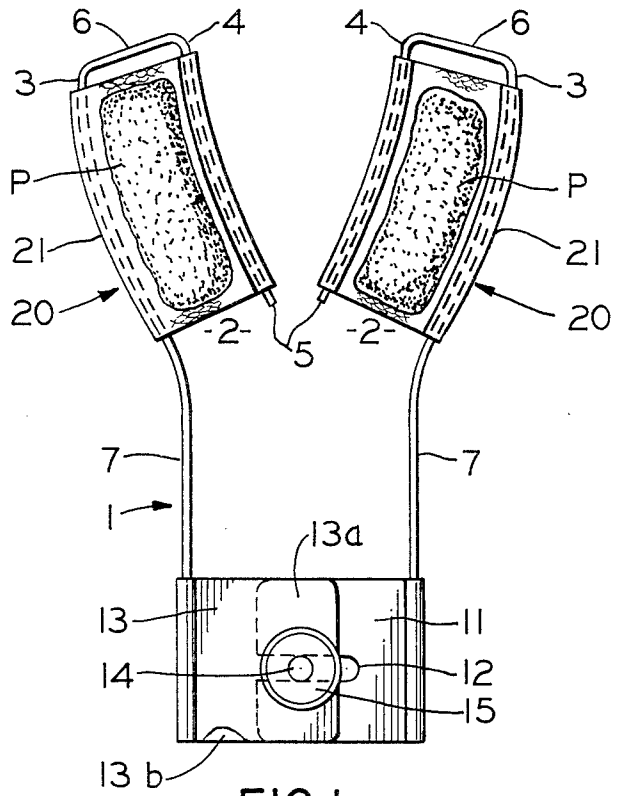


FIG. 1.

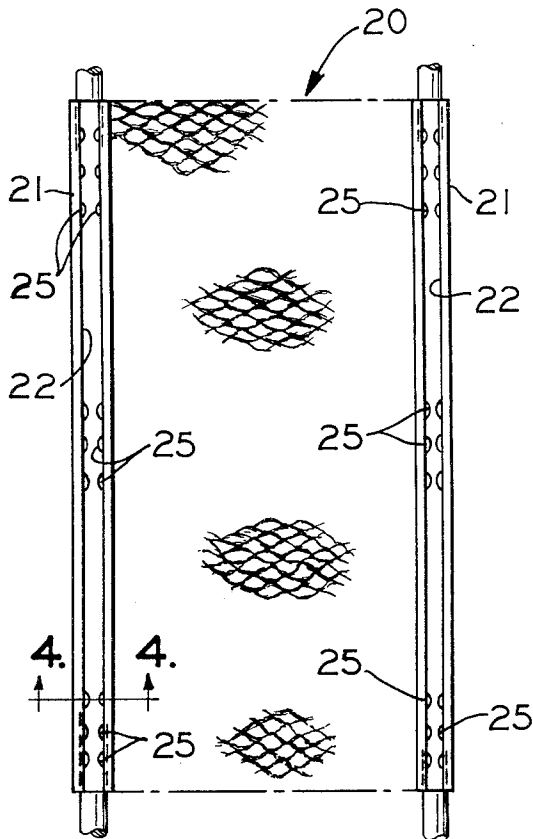


FIG. 3.

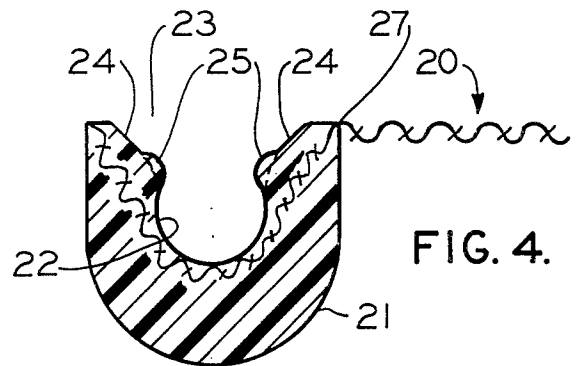


FIG. 4.

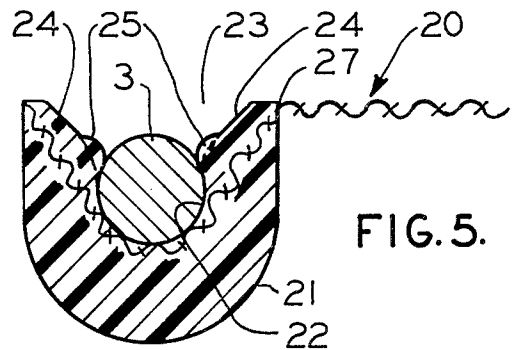


FIG. 5.

BIB AND COMBINATION THEREOF WITH BITE TRAY

BACKGROUND OF INVENTION

1. Field of Invention
Bite impression trays.
2. Description of Prior Art

This invention relates to a bib and its combination with a bite tray frame for taking bite impressions and is an improvement on the bibs and bite trays and frames described in my U.S. Letters Pat. No. 2,713,202, of July 19, 1955, U.S. Pat. No. 3,574,259 of Apr. 13, 1971, and my copending application Ser. No. 369,271, filed June 12, 1973 and new Pat. No. 3,822,473 issued July 9, 1974, and entitled Bib and Combination Thereof with Bite Tray.

As described in U.S. Pat. No. 2,713,202, and my above identified copending application, a bite tray frame is provided in the form of a single length of stiff, resilient wire bent to provide a buccal side frame member, a lingual side frame member spaced laterally therefrom, and an intermediate frame member integral with and connecting one end of the buccal frame member to one end of the lingual frame member. A portion of the wire continues beyond the opposite end of the buccal frame member to provide a handle, and the opposite end of the lingual frame member is left free and unconnected in any way to the buccal frame member.

In order to support impression paste by such a frame, a bib in the form of a strip of soft, flexible, open mesh material, which may be molded or woven, is connected to the side frame members. In the form of the bib disclosed in my copending application, Ser. No. 369,271, the bib strip is connected at its lateral margins to the buccal and lingual frame member by channel shaped members. The walls of the channel are formed so as to provide a restricted throat of somewhat less width than the diameter of the buccal and lingual frame members, respectively. These channel members are made of resilient plastic material so that the buccal and lingual frame members can be forced past the throats into wire receiving portions in the base of the channels by movement radially of the frame member to spring the sides of the channel apart. When the side frame members are seated in the wire receiving portions, the channel walls self-restore and hold the channel members on the frame members with a sufficient degree of tightness to support the bib bridging from one frame member to the other, and with the charge of impression paste thereon.

The manner in which the sheet material is fastened to the channel members, as disclosed in my above identified application, is employed herein.

SUMMARY OF THE INVENTION

The present invention is directed to a new and improved bib, and combination thereof with the frame described in U.S. Pat. No. 2,713,202 and is characterized by the different sheet material employed in the bib, whereby an improved bite registration impression can be obtained, and by an improvement in the channel members whereby the wire frame members can be more readily installed in, and more effectively gripped by, the channel members. The bib

structures, due to the different sheet material, can be manufactured more efficiently in multiples than heretofore.

Various other specific objects and advantages will become apparent from the following description wherein reference is made to the drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a top plan view of a bite tray frame and bib combination embodying the principles of the present invention, the frame and bib being shown with impression material carried on the bib in position for taking a bite impression;

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

FIG. 3 is an enlarged plan view of the bib of the present invention as viewed from the rear or under face;

FIG. 4 is a much further enlarged fragmentary cross sectional view of one of the channel shaped connecting members of the bib, and a portion of the bib mesh sheet material, and is taken on line 4-4 of FIG. 3; and

FIG. 5 is a view similar to FIG. 4 with the wire frame member installed therein.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawing, the bite tray frame comprises essentially two substantially identical frames, indicated generally at 1, each frame being formed of a single length of wire. The frame 1 is open at one end as indicated at 2, so as not to interfere with the patient's bite. The frame includes a buccal frame member 3 and a lingual frame member 4 spaced laterally inwardly therefrom. The lingual frame member 4 has one end free, as indicated at 5. The other end of the lingual frame member 4 is connected to an intermediate transverse frame member 6, which, in turn, has its opposite end connected to one end of the buccal frame member. The buccal frame member 3 has a handle 7 extending from its opposite end and integral therewith and forming a continuation of the wire of which the frame 1 is composed. One of the handles 7 has at the end opposite the buccal frame member 3 a tab 11 with an elongated slot 12 therein. The companion frame 1 has a tab 13 with a hole there-through through which extends a bolt 14 carrying a nut 15. The tab 13 has upper and lower spaced wings 13a and 13a between which the tab 11 is slidably and snugly received, and between which it can be clamped for holding the handles at the desired distance apart endwise of the slot 12, and also in the desired rotated position about the axis of the bolt 14, all as described in my U.S. Pat. No. 2,713,202.

Referring specifically to the improvement of the present invention, the new and improved bib is indicated at 20 and comprises an elongated very thin strip of soft, flexible, open mesh, sheet material of loosely felted fibres which extend lengthwise predominantly in the same general direction. Preferably the sheet is free from sizing or stiffening agents. This material is available on the market in sized condition in large sheets and is often referred to in the trade as "unwoven" cloth or fabric. The sheet ranges in thickness from about 0.002 to 0.004 inch. The opposite margins of the strip are connected to channels 21,

respectively, which extend the full length of the strip 20.

As best illustrated in FIGS. 3 and 4, each of the connecting channels 21 has a central trough or frame receiving portion 22 of circular cross section and of a size to resiliently grip and snugly accommodate an associated one of the frame members 3 or 4. The portion 22 has a restricted entry passage 23.

It is desirable that the channel 21 be such as to be received on one of the frame members, for example on the member 3, by movement of the channel radially of the frame member 4. For this purpose, the channel has guide walls 24 which are flared outwardly from their juncture with the holding portion 22 and restricted entry passage 23 to provide a guide. The outward flare is such that its maximum width, at the outer surface of the channel, is slightly greater than the diameter of the frame member 4. The width of the entry passage 23 is of the same or slightly less diameter than the wire. Small protuberances or tits 25 are provided on one or both of the guide walls 24. The protuberances are integral with their associated wall and preferably hemispherical. Each protrudes from its associated guide wall toward the opposite guide wall so as to partially bridge the space therebetween and restrict the passage of the wire radially into the channel. The protuberances 25 are arranged in groups which are spaced apart from each other endwise of the channel and preferably arranged one group of three near each end of the channel and a group of two midway therebetween. The protuberances 25 of each group are spaced from each other a distance greater than the diameter of the protuberance. Preferably, when protuberances are provided on both guide walls, those on one wall are aligned with corresponding protuberances on the opposite wall. The protuberances restrict the space between the guide walls sufficiently so that the walls are spread apart, by engagement of the wire with the protuberances, sufficiently so that the wire can snap readily into the entry passage 23 of the holding portion 22.

The material of the channel 21 is set plastic which is relatively stiff yet sufficiently resilient so that the channels 21 can be bent or flexed in all directions transversely of their axes. This is important in view of the fact that the frame members, particularly the lingual frame member 4, is curved about an axis spaced from, and normal to, the plane of the frame, and thus is curved transversely of its axis. The channels have such resiliency that they grip the frame members 3 and 4, respectively, sufficiently firmly to hold themselves fixedly in rotated positions about their axes relative to the frame members 3 and 4, when in installed position thereon, against lateral forces imposed on the channels by the bib strip.

The channels 21 are identical, both being normally straight and extending the full length of the strip of the bib material carried thereby. Thus the bib can be installed by mounting on one of the connecting members by snap fastening one of the channels on one of the frame members 3 and 4, and then snapping the other connecting member on the other of the frame members 3 and 4. After installation both channels can be slid endwise of the frame members 3 and 4 to desired positions, and their gripping force is such that they hold themselves in the endwise position to which they are moved.

On the other hand, it is sometimes more convenient to install the channels 21 on the lingual frame member 24 by introducing the free end of the frame member into the holding portion 22 and sliding the channel 21 endwise onto the lingual frame member, and thereafter installing the other of the channels onto the buccal frame member by snapping it thereonto radially of the buccal frame member.

Here it is pointed out that the flexible strip of bib material is not superficially adhered to the channels 21, but, instead, is secured thereto by embedding its margins therein so that the plastic of which the channels are formed interpenetrates the margins of the strip, passing through the mesh, thus locking the strip fixedly to the channels.

As described in my above identified application, Ser. No. 369,271, the material of the strip extends entirely across each channel 21. At its inboard edge, the strip extends a distance dictated by the width of the bib and the spacing of the frame members 3 and 4. Generally the bib strip is embedded in the surface stratum of the holding portion 22, this embedment extending about one fourth of the circumference of the holding portion 22. At the lateral limits of this circumferential embedded portion, the bib strip extends tangentially to the circular holding portion 22 and through the body to the intersection of the outer surface, indicated at 25, of the channel and the outermost lateral edge of the marginal walls 26 at the outer end of the outer guide wall 24.

The strip thus issues from the channel member at an outermost corner of its cross section, indicated at 27.

Here again it is to be noted that the corner 27 is spaced beyond the side of the diameter of the holding portion 22 opposite the bottom of the holding portion 22, and is also spaced laterally from the circumference thereof. Since the strip issues from the channel 21 at this location, any pull on the bib strip 20 tends to rock the channel 21 about the axis of the wire, but does not impose any force tending to unwrap or peel the bib from the channel, or break its bond therewith. The channel 21 has a sufficient grip on the wire of the bite frame member 4 to prevent its rotation about the axis of the wire by tension exerted by the bib transversely of its width in any of the adjusted positions of the bib, as is later described.

The connecting channels retain the positions in which they are mounted on the frame members, their clamping pressure on the wire frame members being augmented by the fact that the frame members are curvilinear so that, when the channels are snapped thereon and rotated to a given position, they are warped transversely of their axes and therefore resist to a greater degree rotation out of the installed positions.

The present felted sheet material has distinct advantages, especially when unsized. It is extremely soft and pliable and offers substantially no resistance to occlusion of the teeth, yet it is strong enough to support the impression paste. It is loose enough and has a large enough mesh so that the paste placed on the top of the bib can penetrate the open mesh material and will be supported and adhered in a sufficient amount on the underface of the bib for making a good bite impression of the lower teeth. The present unsized felted open mesh sheet material also has dis-

inct advantages in the manufacture of the bibs themselves. As described in my above identified copending application, the bibs are formed in groups by a conventional injection molding method in molds in which the bottom mold plate has cavities conforming to the exteriors of the channel members to be formed on the bibs and the top plate has core portions for entering the cavities for forcing the bib material into the cavities so it becomes embedded in the resultant channel members. In the mold the cavities are arranged in a row in laterally spaced relation and a strip of bib material is laid onto the parting face of the lower mold plate and extends endwise of the row of cavities, bridging across the open sides of a plurality of them. Slack endwise of the strip is allowed so that when the mold plates are closed, there is just enough excess strip material to be depressed facewise simultaneously into a number of cavities by the cores to remove the slack endwise of the strip.

With the present material, this allowance for slack and pressing of the material facewise by the cores into the channel cavities is unnecessary. The stresses imposed by the cores as it pushes the web material into the cavities merely causes the loose fibres of the material to slide and migrate slightly relative to each other endwise of the overall strip without any danger of breaking at the boundaries of the channel forming cavities. Instead the material is merely thinned down a bit at the channels because of its loosely felted condition instead of being stressed considerably as in the case of a woven fabric. It readily elongates sufficiently to compensate for the greater length required to follow the contour of the cavities, as compared to its unstressed length.

Furthermore, since the felted material does not have to be strong enough to withstand endwise stresses imposed during molding as above explained, the felted open mesh starting material may be from about 0.002 to 0.004 of an inch thick, as compared to 0.008 of an inch thick for the prior woven fabric. Even after thinning down near the channel members, it is strong enough for bite registration procedures.

Having thus described my invention, I claim:

1. A bib for a bite registration frame having a pair of laterally spaced, stiff, resilient wire side frame members and comprising:

a strip of think flexible, soft, open mesh, sheet material;
elongated, straight, channel members connected to the lateral margins of the strip, respectively;
each channel member having a frame receiving portion near its bottom and extending endwise of the channel member for the full length of the channel member, and having side walls defining

a radially open restricted entry passage and outwardly divergent guide walls leading to the entry passage and being coextensive endwise with the channel members, respectively, so as to be capable of receiving the side frame members, respectively, of a bite tray by insertion of the side frame members radially thereinto;

said channel members being composed of resiliently distortable self-restoring set plastic material capable of clamping engagement with the wire frame members, respectively, when the members are inserted radially into the frame receiving portions thereof through the radial entry passages, respectively;

the ends of the strip terminating at the ends of the channel members and being free;

said margins of said strip being interpenetrated by the set plastic material of the channel members, respectively, for the full length of the strip; and each channel member being resiliently resistant to flexure transversely of its longitudinal axis; characterized in that the sheet material is of unwoven loosely felted fibres.

2. The structure according to claim 1 wherein the sheet material is from about 0.002 to about 0.004 inch thick.

3. The structure according to claim 1 wherein the sheet material is unsized.

4. The structure according to claim 1 wherein each of the guide walls has a plurality of very small protuberances thereon and extending toward, and terminating short of, the opposite guide wall, and spaced apart from each other endwise of their associated wall.

5. The structure according to claim 4 wherein the protuberances are arranged in groups which are spaced apart from each other endwise of their associated guide wall a distance much greater than the distance between the adjacent protuberances of each group.

6. The structure according to claim 5 wherein groups of the protuberances are located near the opposite ends of the one guide wall, respectively, and one group is located about midway between said groups which are near the ends of said one guide wall.

7. The structure according to claim 1 and further characterized in that at least one of the guide walls has a plurality of very small protuberances thereon and extending toward, and terminating short of, the opposite guide wall, and spaced apart from each other endwise of their associated wall.

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