July 6, 1965 R. J. SCHULSTAD 3,193,094

DENTAL WEDGES AND PACKAGE THEREOF

Filed March 20, 1961

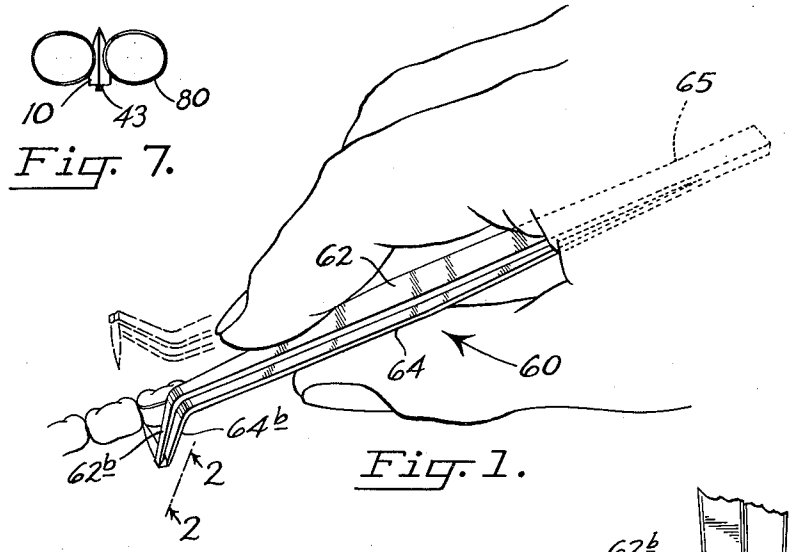


Fig. 1.

Fig. 7.

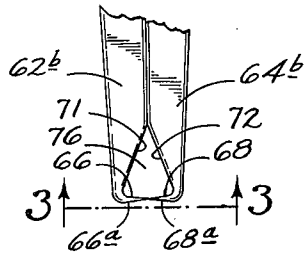


Fig. 2.

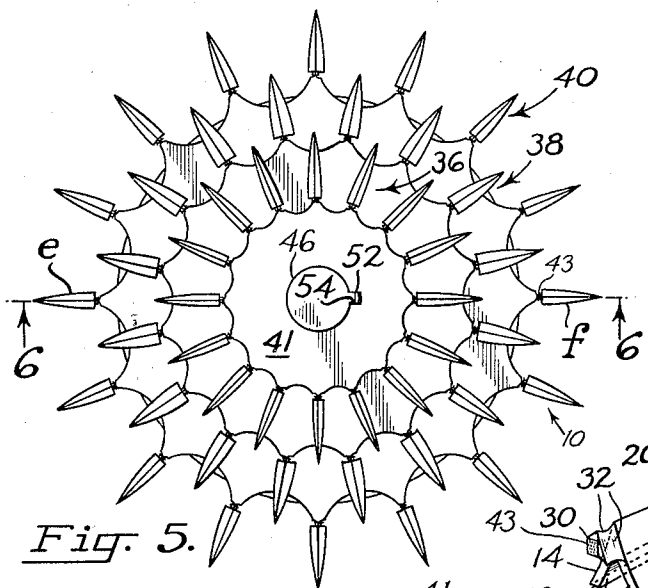


Fig. 5.

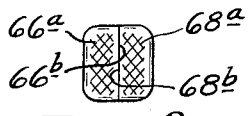


Fig. 3.

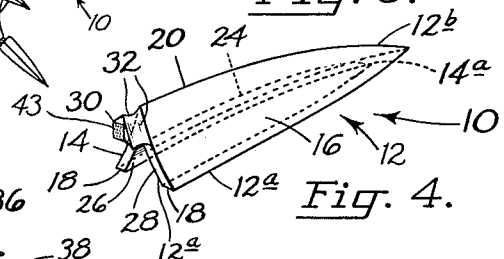


Fig. 4.

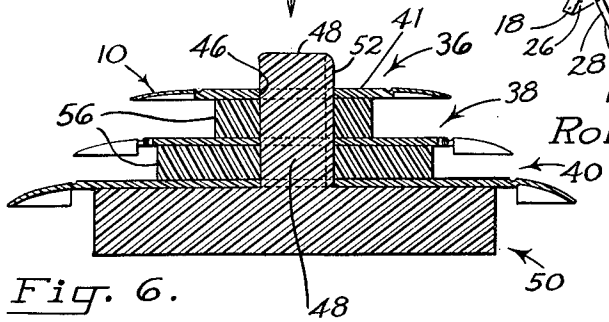


Fig. 6.

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DENTAL WEDGES AND PACKAGE THEREOF

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This invention relates to dental wedges, and more particularly to an improved form of dental wedge, and means and method for applying the same into the embrasure that is present between the proximal walls of two adjacent teeth.

A general object of the invention is to provide an improved dental wedge, that properly positioned is operable to exert pressures distributed along the length of the wedge against the bodies which the wedge is between.

Another object of the invention is to provide an improved wedge that is relatively easily manipulated by a dentist during positioning of the wedge.

A still further object of the invention is to provide a novel packet containing plural wedges, and a novel mechanism for dispensing them, which facilitates the picking up of different sized wedges by a dentist, in the course of his placing them between teeth.

Also part of the invention, and an object thereof, is the provision of an improved method for applying wedges to embrasures between teeth, and an improved tool used in such application.

A dentist frequently during his treatment of a patient is required to encircle one or more teeth with a band or bands, and then force portions of a band in the embrasure between two teeth tightly against a tooth. For these purposes, dental wedges are usually used. For instance, in preparing an amalgam filling, a band may be used as a matrix, with the inside of the band where it extends over a cavity preparation forming the contour of the finished filling. Pressure on the band, particularly near the gum line, is desirable, as it results in a filling having a contour that is flush with the contour of the tooth where the filling meets the tooth. Pressure distributed over an area, particularly an area extending over where the point angles of a cavity preparation are located, is preferred to line pressure, as this results in the margins of a filling being flush with the margins of a cavity preparation over a larger extent of the filling. Wedges known to date have been characterized by several disadvantages, a major one being their inability to produce satisfactorily distributed pressures on a band. Further, the ordinary wedge is difficult to handle, in that it is hard to pick up from off a dental table, and then be inserted between two teeth.

A more specific object of the invention is to provide a dental wedge, which comprises an elongated flexible and resilient body, that tapers from a butt to a pointed end, such body having essentially three sides so that it has a triangular cross section, and which includes along one of its sides a groove extending from adjacent its pointed end to adjacent its butt end. The groove accommodates flexing of the other of the sides of the wedge body, inwardly into the space of the groove, during the insertion of the wedge. After insertion, the resilient nature of the material is effective to cause the wedge to expand outwardly where such movement is permitted, with pressure being applied against a band disposed alongside over a large area.

Another object is to provide a novel packet of wedges where the wedges can be removed one at a time by a dentist single handedly, which facilitates the selection of wedges as they are needed by a dentist.

Another object of the invention is to provide an improved type of dispenser for wedges, that enables wedges to be removed one at a time, prior to their insertion between two teeth.

Still another object is to provide a new method for picking up wedges, and inserting them between two teeth, using forceps with gripping members for holding onto the wedges.

Yet another object of the invention is to provide an improved type of forceps, useable in picking up wedges and applying them to teeth, and also useable in removing wedges from between teeth after the need for them is over.

These and other objects and advantages are attained by the invention, and the same is described in the following description, to be read in conjunction with the accompanying drawings, wherein:

FIG. 1 is a perspective view of a hand manipulating dental forceps as contemplated by this invention, showing such forceps as they are used in applying a wedge between adjacent teeth;

FIG. 2 is a view, somewhat enlarged, and taken along the line **2—2** in FIG. 1, showing one end of the forceps, and the configuration of the ends of gripping members in the forceps;

FIG. 3 is a view taken along the line **3—3** in FIG. 2, showing a push surface provided the forceps;

FIG. 4 is an enlarged, perspective view, of a dental wedge;

FIG. 5 illustrates a dispenser for wedges, such dispenser holding plural packets of wedges according to the invention;

FIG. 6 is a cross-sectional view, taken generally along the line **6—6** in FIG. 5; and

FIG. 7 is a top view looking down at a pair of bands, as they might look after positioning them about a pair of teeth, showing how the wedge contemplated produces good contact with the bands.

Referring now to the drawings and in particular to FIG. 4, at **10** there is indicated generally a single wedge constructed according to an embodiment of the invention, such wedge having an elongated body **12**. At **12***a* is indicated the butt end of body **12**, and the body tapers progressing toward the pointed end **12***b* of the body. The body has substantially a triangular cross section, with essentially three longitudinally extending sides, indicated at **14**, **16**, and **18**. Two of the sides, that is sides **14** and **16**, are the sides that bear on a band and tooth, respectively, when the wedge is inserted into the embrasure between a banded tooth and an unbanded tooth therebeside. Thus, these sides have a slight concavity, extending transversely of the body member, as illustrated in FIG. 4. The other side, i.e., side **18**, forms the base of the wedge, and ordinarily slides on the gum when the wedge is inserted between two teeth. Sides **14** and **16** join along

a top edge **20**, and flare outwardly progressing downwardly from this top edge.

According to a preferred embodiment of this invention, body **12** of the wedge is to be made of plastic, such plastic being flexible and somewhat resilient. A polyethylene plastic, for instance, may be used for the wedge. A common dental wedge is made of maple, because of its hardness characteristics, and thus a plastic having a hardness close to that of maple is preferred.

In order that sides **14** and **16** be somewhat deformable, and flexible toward each other when pressures are applied inwardly thereagainst, an elongated V-shaped groove, indicated at **24**, is provided body **12**, and this extends from adjacent the pointed end of the wedge to the butt end of the wedge. Defining groove **24** along its sides are walls **26** and **28**. These wall portions curve convexly in a manner approximately to match the concave curvature of sides **14** and **16**, and substantially parallel the sides of the wedge, so that portions of the wedge between sides **14**, **15** and walls **26**, **28** have approximately uniform thickness extending along the length of the wedge.

Adjacent the butt end of the wedge, near top edge **20**, is a nubbin **30** that extends out from the butt end. Nubbin **30** has grooves **32** down either side that facilitate gripping of the wedge by an instrument, as when pulling it out from between two teeth. Sides of the grooves prevent an instrument clamped onto the wedge from slipping off the end of the wedge when the same is pulled on, thus constituting grip shoulders accommodating positive gripping of the wedge.

Dental wedges are small, and in the past have been difficult to handle. An important feature of the invention is the provision of a unit packet of wedges, wherein the wedges are detachable from the unit, one at a time, as they are used. Such packets, and a dispenser with the packets mounted thereon, is illustrated in FIGS. 5 and 6.

Referring to these figures, three packets of wedges are illustrated, and these are indicated at **36**, **38** and **40**, respectively. Each is in the shape of a disc, and has a central supporting hub portion, indicated for packet **36** at **41**, and projecting radially out from the hub portion and detachable therefrom plural wedges **10**, each of which resembles the wedges described more in detail above. The wedges have their butt ends disposed inwardly on the packet, and their pointed ends disposed outwardly. The wedges and the hub portion of a packet are integral, which is to say that they are all made of plastic and are one piece.

The dental wedges **10** of a packet are detachable from a hub portion by snapping them off. Thus, each wedge is joined to a hub portion through a stem portion **43**. A stem **43** projects rearwardly from the butt end of a wedge near top edge **20** and where the main bulk of the wedge at the butt end is located. The stems **43** have reduced cross sections, compared to the cross sections of portions of the packet at either end, so that when a wedge is grasped by an instrument, such as by a pair of forceps, and abruptly twisted, it breaks off at the stem. The stems function as break locations for the wedges.

Hub portions **41** of the varoius packets have apertures **46** extending therethrough at approximately their centers. These apertures have extending up therethrough the upstanding column **48** of a stand **50**. Column **48** is provided with a key **52**, and this fits within a notch **54** provided the aperture **46** of each hub portion. Thus, each aperture has an irregular shape, which complements an irregular cross section in column **48**, and the packets thus are prevented from rotating on the stand.

Three different packets of wedges are illustrated, since in practice it has been found that three sizes of wedges conveniently are used in the wedging of a band tight against a tooth. Thus, bottom packet **40** contains wedges that are somewhat larger than middle packet **38**, and top packet **36** contains the smallest wedges. Note also that the hub portion of a lower packet is larger in diameter than the hub portions of the packets above, and that on the stand the wedges of adjacent packets are offset or staggered. Otherwise the construction of the packets are similar.

Since the packets are stacked on top of each other, it is desirable to place the wedges of each so that they may be broken off without encumberance by the wedges of the packets above and below it. Thus, spacers **56** are provided between the packets. These are shown as separate parts slipped onto column **48**, however, obviously they could be made integral with the supporting hub portion **41** of a packet.

In using the wedges, it is contemplated that a dental tool taking the form of the forcepts **60** indicated in FIG. 1 be employed. These forceps comprise a pair of tweezers, having a pair of digitally operated gripping members **62**, **64** which are joined at one set of ends (the right set of ends in FIG. 1) by a spring portion **65** which is resilient and normally urges the gripping members **62**, **64** apart to a separated position. As indicated by the outline of the hand, the tool or instrument is ordinarily held between the thumb and forefinger, and to bring the members together the thumb and forefinger are pinched together.

Gripping members at their unjoined set of ends terminate in turned over gripping end portions *62b*, *64b*. These are turned over at an angle, in the plane in which members **62**, **64** move toward and away from each other.

At the base of gripping end portions *62b*, *64b* are opposed, inwardly directed lips **66**, **68**. The outer faces *66a*, *68a* of these lips function as push faces, and with the gripping members together, they in concert provide an expansive push surface for pushing onto the butt end of a wedge. Preferably these outer faces are knurled for tractive purposes. Edges *66b*, *68b* at the ends of the lips, or defining adjacent margins of the push faces *66a*, *68a*, are sharpened, and are used to bite onto the butt end of a wedge when pulling the wedge to withdraw it.

In back of lips **66**, **68** and defined by the back faces of the lips and walls **71**, **72** of the gripping members, is a passage **76**. The passage extends transversely between the gripping end portions of the gripping members. Passage **76** has a triangular outline, substantially corresponding to the triangular cross section of a wedge. Note that the base of the passage is substantially flat, and that the sides of the passage converge at the top of the passage, with the gripping end portions depending downwardly as shown in FIG. 2. In this position, the forceps can be used easily to pick up a wedge disposed horizontally, with such wedge having its grooved side down and its sides **14**, **16** on top. The wedge fits in the passage as illustrated in FIG. 1.

In FIG. 7 there is illustrated a pair of bands **80**, as they might appear after being positioned about a pair of adjacent teeth. A wedge **10** is shown inserted between the bands. It will be seen that because of the groove along the base of the wedge, the sides of the wedge can flex inwardly, where it is necessary to conform to the outlines of the bands on either side. While being flexed inwardly, the sides of the wedge at the same time exert a pressure directed outwardly on the bodies of either side, and where such body is a band, it is forced against any tooth behind it over a substantial portion of the length of the wedge.

Now will be expained the use of forceps **60**, and the method in which the wedges are broken off from the dispenser of FIGS. 4 and 5, inserted between teeth, and subsequently removed. As already indicated, a dentist first holds the forceps, with his hand positioned substantially horizontally, and with the forceps between this thumb and forefinger, as illustrated in FIG. 1. The forceps are then manipulated to bring the depending gripping end portions thereof against opposite sides of a wedge in the dispenser of FIGS. 4 and 5, with the wedge fitting in passage **76**, and firmly held by the forceps. If a dentist then quickly turns his hand, he can snap the wedge off from its connection with a hub portion **38**. By proper selection of the

side of the dispenser from which the wedge is removed, the wedge then is automatically properly positioned in the forceps for easy insertion between two teeth.

It will be noted with reference to FIG. 5, considering wedges *e* and *f*, that the wedges are horizontal, and extend in opposite directions with butt ends toward each other and pointed ends spaced farther apart. The wedges both have their sides corresponding to side **18** down, so that they correspond with respect to those portions that are up and those portions that are down.

Assuming that a right handed dentist is at work, and that a patient is seated at his left with the right side of his mouth near the dentist, if it is desired to place a wedge in the embrasure between adjacent teeth on the lower jaw and the right side of the patient, the dentist removes a wedge from the right side of the dispenser, as viewed in FIG. 5, and the wedge after removal will be positioned in the forceps as indicated in FIG. 1. In FIG. 1, teeth in the right lower jaw portions of a patient are shown, and it will be seen that the dentist, without any rolling of his hand and while keeping the turned over gripping end portions of the forceps down, can position a wedge between teeth, merely by shifting his hand laterally away from him.

If the dentist wishes to place a wedge between teeth in the left upper jaw portions of a patient, the wedge is broken off from the same side of the dispenser (so that the wedge is positioned with relation to the forceps as illustrated in FIG. 1) and when bringing the wedge to the tooth the hand is rolled to turn the palm inwardly and upwardly, which places the gripping end portions up and has the effect of shifting the pointed end of the wedge toward the viewer as indicated in dashed outline in FIG. 1. The wedge then has its base **18** on top and its edge **20** below the base, and the wedge can be placed between teeth by pulling it into position.

When inserting wedges into the left lower and right upper jaw portions of a patient, wedges are removed from the left side of the dispenser in FIG. 5. If the wedges are grabbed at their butt ends by the forceps, with the gripping end portions of the forceps down the wedges after removal will have their pointed ends positioned so that they would point toward the viewer in FIG. 1. Without rolling of the hand, wedges are automatically in position for placement in the teeth of the left lower jaw portion. By revolving the hand to turn the palm in and up, a wedge is turned so that it is in position to be placed between teeth of the right upper jaw portion.

It should be noted that in all parts of the mouth, the wedge is inserted with the hand conveniently positioned with relation to the mouth cavity. Thus, when inserting wedges in the upper jaw the hand is below the forceps, and when inserting wedges in the lower jaw the hand is above the forceps.

Once a wedge has been positioned, the forceps are released, and when the gripping end portions are afterwards brought together, they provide a push surface that can be used to push the wedge entirely in by applying the push surface against the butt of a wedge. A wedge is removed by clamping edges **66***b*, **68***b* in the grooves provided the nubbin of the wedge, and then pulling the wedge using the forceps.

I claim:

1. The combination of plural plastic dental wedges, each comprising an elongated tapered body with a butt end and a pointed end and having a pair of elongated sides extending between the ends joined along one set of margin thus to define an upper longitudinal edge for the body, said sides flaring outwardly from each other progressing transversely of the body from this edge, and each wedge having an elongated groove in said body between their said pair of sides and along the base thereof starting adjacent the pointed end of said body and progressing to the butt end of the body, and a supporting hub portion for the wedges of plastic material and integral with the wedges, said wedges and hub portion forming a disc-shaped packets, said wedges being circumferentially spaced about the hub portion and extending radially with their butt ends in and their pointed ends out, said wedges being correspondingly positioned in said packet with respect to those portions of the wedges that face one side of the packet and those portions of the wedges that face the other side of the packet, said wedges being joined to said hub portion by stems of reduced cross section extending inwardly from the wedges adjacent their said upper longitudinal edges, said stems providing break locations enabling the detachment of wedges from said hub portion by breaking said stems.

2. A dental wedge comprising an elongated body of plastic material that is flexible and resilient, said body having essentially three longitudinally extending sides and tapering from a butt end to a pointed end, an elongated groove along one side of the body progressing from adjacent the pointed end to adjacent the butt end of the body, the other two sides of said body adjacent where they join with said one side being resiliently deformable into the space within the groove on pressure being applied thereagainst, and means defining a groove extending transversely of said wedge adjacent the butt end of the body, said second-mentioned groove accommodating the attachment of forceps to the wedge body with slippage of said forceps longitudinally of said body being inhibited by said groove.

3. The dental wedge of claim **2**, wherein said wedge includes a stem portion projecting from the butt end of said body, and said groove is formed on said stem portion.

4. A packet of dental wedges comprising a supporting hub portion, and plural dental wedges with butt and pointed ends secured thereto but detachable therefrom, said wedges being spaced from each other circumferentially about said hub portion, said wedges extending radially outwardly from said hub portion, said wedges having their pointed ends disposed outwardly and their butt ends disposed inwardly and being spaced laterally at their butt ends whereby they may be gripped individually thus to enable one at a time removal of the wedges from the packet, said wedges having a generally triangular cross section, said wedges being correspondingly positioned in and packet with respect to those portions of the wedges that face one side of the packet and those portions of the wedges that face the other side of the packet, those portions of the wedges facing one side of the packet having a groove formed therein and extending longitudinally therealong, said wedges and hub portion being integral, and the connection between the wedges and hub portion being joined by reduced stem portions projecting from the butt end of the wedges at points laterally offset from the groves in the wedges.

5. A dental wedge comprising an elongated body of plastic material that is flexible and resilient, said body having essentially three longitudinally extending sides and tapering from a butt end to a pointed end, and an elongated grove along one side of the body progressing from adjacent the pointed end to adjacent the butt end of the body, the other two sides of said body having concave faces and adjacent where they join with said one side being resiliently deformable into the space within the groove on pressure being applied thereagainst, the wedge adjacent the butt end of said body having a portion for gripping on to the wedge with an instrument, and means beyond said portion, progressing away from said pointed end of the body, means defining a grip shoulder whereby an instrument is inhibited from slipping off the wedge, to enable positive gripping of the wedge on its removal from between two teeth.

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