Aug. 28, 1951 R. W. EATON 2,565,598

DENTAL MATRIX AND A MATRIX RETAINER

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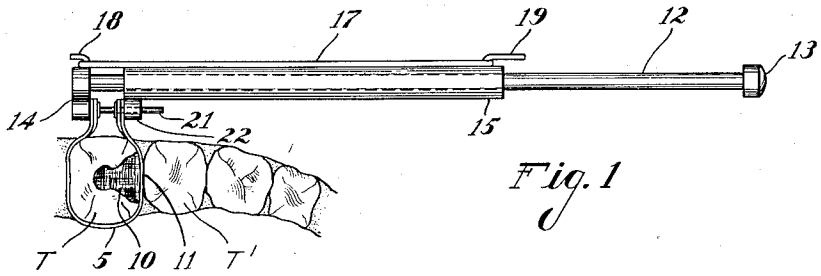


Fig. 1

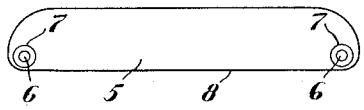


Fig. 2

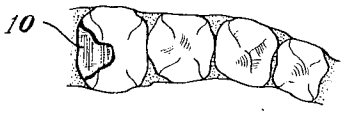


Fig. 4

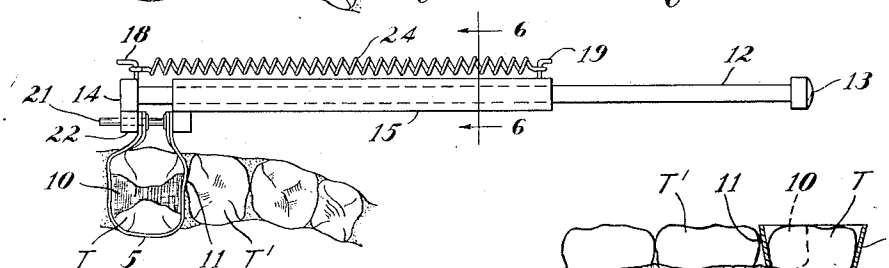


Fig. 5

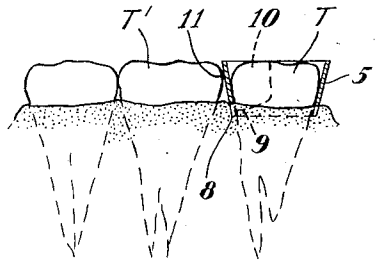


Fig. 3

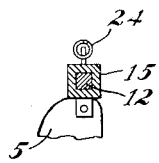


Fig. 6

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DENTAL MATRIX AND A MATRIX RETAINER

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7 Claims. (Cl. 32—63)

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This invention relates to a dental matrix and to a matrix retainer.

In the filling of certain teeth, especially the posterior teeth, it is the practice to use a matrix or band which embraces the tooth being filled, in order to define a desired contour for the filling as well as the essential contact relation between the filled tooth and the adjacent tooth or teeth. Prior matrix retainers have frequently failed to hold the margin of the matrix snugly against the tooth at the gingival seat so that an undesirable bulge of filling material resulted unless the dental surgeon utilized wedges to force the mentioned margin of the matrix against the tooth. The use of such wedges is annoying to the patient and also wastes the time of the surgeon.

Furthermore, prior matrix retainers have been bulky in the patient's mouth and have been so constructed that the matrix frequently became disengaged from the retainer while the matrix was being applied to the tooth. This has resulted in annoyance to the patient and loss of time by the operator. Also prior matrix retainers have required a screw threaded adjustment with a consequent torque on the matrix so that a matrix retainer could not be removed until the filling material had hardened somewhat, and even then there was danger of breaking away a part of the filling. Thus the matrix retainer had to be left in the patient's mouth during a partial setting period even after a tooth had been filled.

Prior matrix retainers used to hold a matrix for mesioclusial, distoclusial, and mesio-distoclusial cavities have applied the same pressure at the contact point as at the gingival seat with the result that it was difficult if not impossible in many cases to obtain a tight contact point of the filling with the adjacent tooth or teeth when the matrix was removed.

In accordance with one feature of the present invention there is provided a matrix and a matrix retainer which are so constructed that it becomes unnecessary to use wedges in holding the margin of the matrix snugly against the tooth at the gingival seat.

In accordance with another feature of the invention, there is provided a matrix retainer which can be adjusted and removed without any torsional effect on the matrix so that the retainer can be removed immediately after the tooth is filled without danger of twisting the matrix while the matrix itself can be left in position on the tooth until the filling material has set sufficiently.

Other features and advantages of the invention

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will appear from the detailed description and claims when taken with the drawings in which:

Fig. 1 is a plan view of the novel matrix retainer and the novel matrix of the present invention shown as applied to a molar having a filled mesioclusial cavity therein;

Fig. 2 is a side view of the matrix;

Fig. 3 is a side elevation of a portion of the lower jaw and a related group of teeth particularly showing in section how the lower margin of the matrix snugly contacts a tooth at the gingival seat while the upper margin of the matrix flares upwardly to insure good contact between the filling in the cavity and the adjacent tooth;

Fig. 4 is a plan view of a group of teeth one of which has a filled distoclusial cavity in the filling of which the present novel matrix is well suited for use;

Fig. 5 is a plan view of a modified form of matrix retainer together with the novel matrix of this invention applied to a molar having a mesial, occlusial and distal type of filling therein; and

Fig. 6 is a section taken on the line 6—6 of Fig. 5.

Referring to the drawings, the numeral 5 designates the matrix of the present invention. This matrix comprises a band of sheet metal, preferably of stainless steel of a length to embrace a tooth and yet have its ends extend laterally beyond the tooth. The matrix has a thickness of the order of .0015 of an inch and a width such that it can extend from a point slightly below the gingival seat of a tooth to a position beyond the contact point of an adjacent tooth. As illustrated in Fig. 2, the lower edge of the matrix is substantially straight and each lower corner thereof is provided with a hole 6. The holes are located at the edge of the matrix and may or may not be reinforced by circular eyelets 7 to be engaged by the matrix retainer hereinafter described. Where the matrix is made from a strip of stainless steel .0015 of an inch in thickness, it is difficult to remove the matrix from between the teeth, unless end lugs or raised portions such as the eyelets 7 are provided thereon. This arises from the fact that in the absence of such end lugs, dental pliers readily slip off the saliva-covered matrix to the annoyance of the patient and the dentist. However an end lug or eyelet 7 on the matrix can be securely gripped in the jaws of a dental pliers, so that the matrix can be promptly removed from a tooth with substantially no danger of accidental disengagement of the pliers from the matrix. The eyelets 7 also insure that the thin edges of the

matrix bordering the holes 6 will not dig into a matrix holder pin (to be described) inserted therethrough, so that the ends of the matrix will adjust themselves freely on the holder pin. Thus the matrix is free to conform to the margins of the cavity of the tooth being filled. This free movement of the pin on the matrix, allows the matrix to be easily applied on the pin of the matrix retainer and readily removed from said pin after the filling has been inserted in the tooth under treatment. The raw edge of steel as thin as .0015 of an inch, in the absence of an eyelet therein, would dig into the pin of the matrix holder with the result that force would have to be used to remove the pin and holder from the filled tooth. Any such force would break some of the soft amalgam from the cavity and the filling would be a failure. Furthermore, it has been discovered that matrix material thicker than .0015 of an inch will fail to give a tight contact point between the filling and the adjacent tooth. With a matrix of excessive thickness, the teeth will not wedge apart sufficiently for good, tight contact under the pressure of condensing the filling material or amalgam. It has been discovered that if one matrix edge is straight and if the holes 6 are placed at one side of the principal axis of the matrix, preferably at the straight edge thereof, the margin 8 (Fig. 3) thereof will always snugly engage a lower tooth T at its gingival seat 9 and yet will flare upwardly and outwardly, that is occlusially, to insure good contact between the filling 10 and the portion 11 of the adjacent tooth T', when the matrix is removed. It will be understood that the present matrix can also be applied to an upper tooth in the same manner as has been described in which case the matrix will flare downwardly and outwardly, that is occlusially, to insure good contact between the filling and the adjacent tooth.

The matrix of the present invention cooperates with the novel matrix retainer of which one embodiment thereof is illustrated in Fig. 1. This retainer comprises a round rod 12 terminating at one end in a knob 13 and terminating at its other end in a laterally extending abutment 14. A round sleeve 15 freely slides on the rod between the knob and the abutment, the sleeve being normally biased in any suitable manner for movement toward the abutment. This biasing effect is herein achieved by tensioning means such as a rubber band 17 engaging the hooks 18 and 19 which are secured on the abutment and sleeve respectively to extend in opposite directions therefrom. While the use of one rubber band 17 has been disclosed, it will be understood that two or more rubber bands may be used as desired. In fact, the dentist can use one low pressure rubber band while the matrix and its retainer are being applied to the tooth after which an additional rubber band or bands can be placed around the hooks 18 and 19 to increase the pressure on the ends of the matrix. It has been found advantageous to use rubber bands since they can be snipped to relieve the pressure on the matrix without danger of twisting the matrix and breaking away part of the filling as is the case where the matrix retainer is adjusted by interengaging threaded parts.

The abutment 14, at the side thereof opposite the hook 18, has fixed thereto a pin 21 extending toward the knob 13 in spaced parallel relation to rod 12 and sleeve 15. This pin is adapted to pass through the holes 6 in the respective ends of the matrix 5. A lug 22 on the adjacent end

of the sleeve 15 serves to retain the ends of the matrix on the pin 21 when the several parts are in the position shown in Fig. 1. The lug 22 is herein illustrated as having an opening therein in alinement with the pin to receive the same.

In use, after the dentist has selected the appropriate matrix for the tooth to be filled, he next places a rubber band 17 around hooks 18 and 19. He then grasps the sleeve 15 of the retainer between his thumb and forefinger with the knob 13 in the palm of his hand and presses on the knob against the action of the rubber band 17 until the pin 21 is separated from the lug 22. The pin 21 is next inserted through the holes 6 at the ends of the matrix 5. In filling a lower left molar as shown in Fig. 1, the matrix is so placed on the pin that the lower border 8 of the matrix 5 is below the gingival seat 9 of the cavity in the tooth. This same relative position of the matrix 5 on the pin 21 is used to fill teeth on the right side of the upper dental arch. To fill teeth on the right side of the lower dental arch and the left side of the upper dental arch, the position of the matrix 5 on the pin 21 is reversed so the border 8 of the matrix 5 is always above the gingival seat on the upper teeth and below the gingival seat on the lower teeth.

Pressure is now relieved somewhat on the knob until the free end of the pin 21 engages the hole in lug 22 to insure that the ends of the matrix will not slip off of the pin 21. While still maintaining some pressure on the knob 13 the matrix can now be adjusted around the tooth to be filled. At this time the pressure on the knob is relieved so that rubber band 17 effects relative movement between the rod 12 and the sleeve 15 until the matrix occupies the position shown in Fig. 3. If the use of one rubber band does not position the matrix with sufficient pressure at the gingival seat, one or more rubber bands may be added to the hooks until the desired pressure is achieved.

Also the following method of using the matrix and matrix retainer may be used. After the dentist has selected the appropriate matrix for the tooth in question, the matrix is placed around the tooth to be filled by forcing the edge 8 thereof between the teeth and just below the gingival seat of the cavity of the mentioned tooth. The dentist then grasps the sleeve 15 of the retainer between his thumb and forefinger with the knob 13 in the palm of his hand. Then he presses on the knob against the action of the rubber band 17 until the pin 21 is separated from the lug 22. Thereafter, the free end of the pin 21 is inserted through the holes 6 at the ends of the matrix 5. Pressure is now relieved somewhat on the knob until the free end of the pin 21 reengages the lug 22 to insure that the ends of the matrix will not slip off of the pin. While still maintaining some pressure on the knob 13, the matrix can be finally adjusted. At this time the pressure on the knob is relieved so that rubber band 17 effects relative movement between the rod 12 and the sleeve 15 until the matrix occupies the position shown in Fig. 3. If the use of one rubber band does not position the matrix with sufficient pressure at the gingival seat, one or more rubber bands may be added to the hooks until the desired pressure is achieved.

After the tooth has been filled the dentist snips the rubber band 17. This permits the rod and sleeve to be moved relatively to each other until the pin 21 can be separated from the lug 22. The retainer can then be removed from the matrix by withdrawing the pin 21 from the openings in

the respective ends of the matrix without twisting the matrix. Thus the retainer can be removed from the patient's mouth as soon as the tooth is filled while the matrix can be left in between the teeth to afford a longer hardening period for the filling before the matrix is removed. The matrix can then be removed in the usual manner.

In some cases, it has been found that the matrix retainer can be used more conveniently, if the pin 21 is mounted on the sleeve 15 and if the abutment 14 on the rod 12 is apertured to serve the same purpose as the lug 22. This construction is illustrated in Fig. 5 wherein the same reference characters refer to corresponding parts having like functions as described above. In this modified construction the rubber band 17 has been replaced by a coiled spring 24 and the rod 12 as well as the sleeve 15 instead of being round as in Fig. 1, are square or non-circular in cross-section (Fig. 6) to prevent relative rotation of these parts.

It should be pointed out that the use of the rubber band or bands 17, or the coil spring 24 continuously tends to draw the margin 8 of the matrix tightly against the tooth at the gingival seat. Thus if the filling bulges out at the margin 8 of the matrix while the dentist is pressing the filling material into the cavity, the spring pressure on the matrix will cause its margin 8 to recontact the tooth at its gingival seat. The mentioned pressure of the matrix will condense the bulging material thereby preventing an undesirable bulge of filling material beyond the gingival seat which bulge would tend to irritate the gum tissue.

While the preferred forms of the invention have been disclosed it will be understood that there can be many modifications, and changes and combinations of the two constructions shown in Figs. 1 and 5, all within the scope of the appended claims, without departing from the spirit of the present invention.

What I claim is:

1. A matrix retainer comprising two relatively movable cooperating parts, one of said parts being provided with only a single pin of a length to pass through an aperture in each of the respective ends of a matrix and the other part being provided with a lug having an opening therein to receive said pin and to retain the mentioned ends of said matrix on said pin, and means for effecting relative movement of said parts in a direction to advance said pin into said opening.

2. A matrix retainer comprising two relatively movable telescoping parts, one of said parts being provided with only a single pin of a length to pass through an aperture in each of the respective ends of a matrix and the other part being provided with a lug having an opening therein to receive said pin and to retain the mentioned ends of said matrix on said pin, and means for effecting relative movement of said parts in a direction to advance said pin into said opening.

3. A matrix retainer comprising two relatively movable telescoping parts, one of said parts being provided with only a single pin of a length to pass through an aperture in each of the respective ends of a matrix and the other part being provided with a member telescoping over said pin to retain the mentioned ends of said matrix on said pin, and biassing means for forcing said pin and said member toward each other.

4. A matrix retainer comprising two relatively movable telescoping parts, one of said parts being provided with only a single pin of a length to pass through an aperture in each of the respective ends of a matrix and the other part being provided with a member telescoping over said pin to retain the mentioned ends of said matrix on said pin, and an elastic band normally biassing said pin and said member toward each other, which band can be snipped to release said pin and said member.

5. A matrix retainer comprising a rod having an abutment at one end therof, a sleeve slidable on said rod, only a single pin on said abutment extending in spaced parallel relation to said sleeve and adapted to engage openings in the respective ends of a matrix, an apertured lug on the adjacent end of said sleeve cooperating with said pin to retain the ends of the matrix thereon, and resilient means for biasing said lug toward said pin.

6. A matrix retainer comprising a rod having an abutment at one end thereof, a sleeve slidable on said rod, an apertured lug on said abutment, a single pin on said sleeve extending in spaced parallel relation to said sleeve and adapted to engage openings in the respective ends of a matrix, the free end of said pin being directed toward the aperture in said lug and cooperating with said lug to retain the ends of the matrix on said pin, and resilient means tending to force said lug and said pin into cooperating relation.

7. A thin elongated integral dental matrix strip having one straight edge for contact with a tooth to be filled, the contact being made with the tooth just below the gingival seat of the cavity, said matrix having a single opening therein at said edge at each of the respective ends thereof, whereby when the matrix is applied around a tooth and the ends of the matrix are drawn tightly toward each other on a single pin of circular cross section extending through said openings, said edge will snugly engage said tooth at the gingival region thereof and the opposite edge of the strip will flare occlusially and outwardly to insure good contact between the filling and an adjacent tooth, and a generally circular eyelet in each opening whereby an end of the matrix can be easily grasped for removal of the matrix from the tooth and whereby the thin edges of the matrix at said openings cannot catch on said pin.

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