Aug. 24, 1937. E. SINGER 2,090,904

DENTAL MATRIX

Filed July 8, 1935

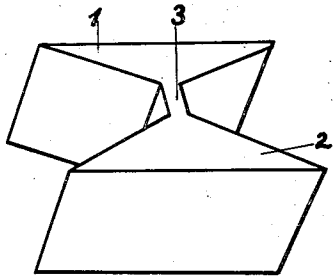


Fig. 1

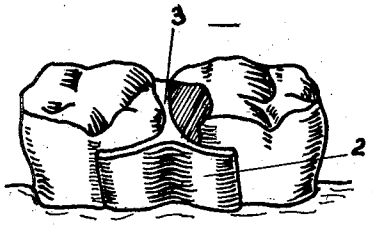


Fig. 2

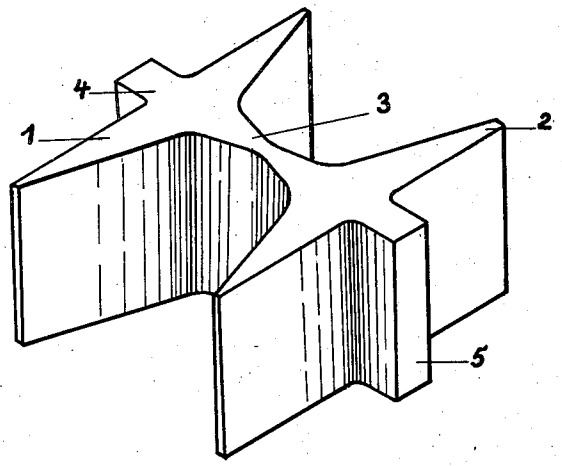


Fig.3

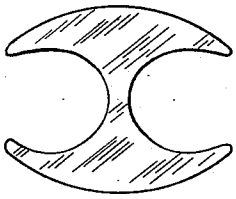
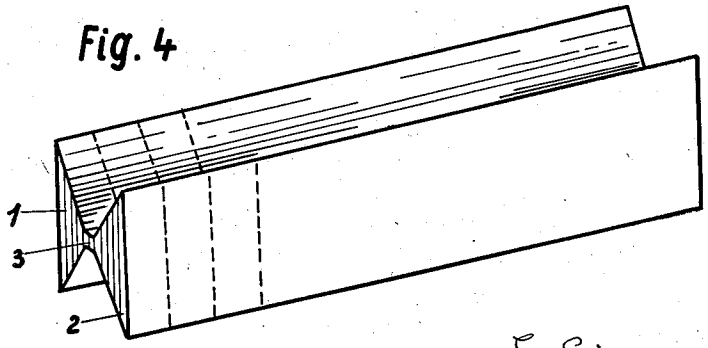


Fig.5

Fig. 4



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Patented Aug. 24, 1937

2,090,904

UNITED STATES PATENT OFFICE

2,090,904

DENTAL MATRIX

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Application July 8, 1935, Serial No. 30,371
In Austria April 10, 1935

6 Claims. (Cl. 32—63)

This invention relates to a new and improved type of dental matrix and to a device for fitting the same. It frequently occurs that one (and more often both) of the adjacent surfaces of two consecutive teeth become defective as a result of caries. To put in proper stoppings in these circumstances while at the same time retaining the natural gap at the gum papilla and also establishing a point of contact, that is to say bringing the two stoppings so close together at one point that displacement of the teeth after the hardening of the stoppings is impossible, and further to ensure that the cavity does not become overfilled at the lower edge while at the same time providing the possibility of satisfactorily condensing the plastic stopping within the cavity, it has hitherto been usual to employ so-called dental matrices. These matrices are made from stiff material (such as German silver, copper, rustless steel, or celluloid) and are fitted in between the teeth. In order to render over-filling of the inter-dental space impossible and to adapt the matrix to the shape of the tooth it is then necessary to insert wedges of wood or cotton-wool.

This known type of matrix has the following numerous disadvantages:

In consequence of the non-yielding character of the material used, and the relatively sharp edge, the papilla is invariably injured. The already injured papilla is then crushed by the forcing in of the wedges, which, although unavoidable, is extremely painful. Hemorrhages are set up which are aggravated by removal of the matrix and are difficult to stanch.

To put stoppings simultaneously into two contiguous cavities it has hitherto been necessary to fit two matrices and to insert a wedge between these two matrices. A consequence of this procedure is naturally to increase excessively the gap between the adjacent teeth. This procedure is thus not only very wasteful of time but also, as mentioned above, very painful for the patient.

In order to be absolutely certain of not damaging the stopping material in removing the matrix of stiff material it would be necessary to have the patient wait with open mouth for the considerable length of time required for the hardening of the stopping material (in the case of amalgam as much as two hours) before removal of the matrix, which is of course impossible. At the same time it is not feasible for the patient to remove the matrix himself after hardening of the amalgam. It has therefore hitherto been necessary to remove the matrix before the hardening of the stopping, and every dentist is aware of the unpleasant fact that a laboriously built-up stopping can become damaged or pulled out by the act of removing a metal matrix so that the work has to be done afresh. Even slight damage, which may not even be visible at the moment, or displacement of the plastic amalgam, renders the stopping nugatory.

The dental matrix according to the present invention consists of an H-shaped body of elastic, waterproof material such as rubber or the like, the intermediate web portion of which is inserted between the teeth while the side portions, in consequence of their elasticity, adapt themselves to the shape of the teeth.

In accordance with the invention, the side or flange portions of the matrix are tapered down wedge-shaped from the intermediate web portion towards the outer ends, and the thickness of the web portion may gradually increase, if desired, from the middle towards the points of attachment to the side or flange portions.

The application or fitting of the matrix is effected by a single operation in a fraction of a second, either with the hands or with the aid of a special instrument. In consequence of the inherent elastic tension set up, the matrix becomes adapted automatically to any shape of tooth, and the two cuneiform side or flange portions become so forced into the gap between the teeth that there is no possibility of overfilling the inter-dental space (whether with amalgam, cement, or silicate). The tight fitting of the matrix also effectually prevents the intrusion of saliva into the cavity, thus very considerably facilitating the drying or keeping dry of the latter during stopping. The papilla cannot possibly become injured; it becomes forced aside to the requisite extent by the matrix, and resumes its position in its natural shape after removal of the matrix. No special means, such as the wooden wedges and cotton-wool plugs mentioned above, are required for holding the matrix in position. The further advantage is also provided that, after the stopping is finished, the matrix can be left in the patient's mouth without the least inconvenience or danger, so that the stopping material inserted can be kept constantly under pressure until it has completely hardened.

Forms of construction embodying the invention are shown, by way of example, in the accompanying drawing, in which:

Fig. 1 shows one form of the dental matrix according to the invention.

Fig. 2 shows the matrix fitted in position with the web portion between two adjacent teeth.

Fig. 3 shows a modified form of the matrix, with lateral projections.

Fig. 4 illustrates how the matrices can be cut as required from a stick of material of the same cross-sectional configuration as the matrix.

Fig. 5 shows a further modification in the shape of the matrix.

As shown in Fig. 1, the matrix according to the invention is substantially of H-shaped section, and consists of two side portions or flanges 1 and 2 which are interconnected by a web portion 3 disposed substantially at right angles to the flanges. The matrix is made from elastic waterproof material innocuous to the organism, for example from rubber or rubber-like materials. This material also has the advantage of being capable of sterilization and of being non-oxidizing. The matrix is so fitted or applied that the web 3 is inserted between the teeth (Fig. 2), while the side portions 1 and 2 become adapted exactly to the shape of the teeth, by virtue of their inherent elasticity. In fitting the matrix, the web can be so distended that it becomes extremely thin and readily capable of being inserted between closely crowded teeth. I have found it to be advantageous to make the side portions 1 and 2 wedge-shaped, tapering in towards the web, as shown in the drawings, since in this case they become partly drawn into the interdental space and fit very tightly and closely against the sides of the teeth in this region.

The effect achieved by making the side portions wedge-shaped, and the adaptability of the matrix, can be still further increased by tapering the web also from both sides to a "waist" in the middle, as shown in Fig. 3.

The side portions of the matrix may be either substantially rectilinear or curved in shape (the latter variation is illustrated in Fig. 5), and can also be furnished with gripping projections 4 and 5 (Fig. 3) to facilitate grasping and distension by hand or with the aid of implements.

I have found it advisable to make matrix stock in strip or bar form (as shown in Fig. 4) from which pieces of the required depth can be cut off when needed for use. There is no difficulty, however, involved in supplying the matrices already cut to size. It is advantageous to make the matrix of white colored material since it is then practically invisible in the mouth.

The removal of the matrix is normally effected by retracting the cuneiform side or end portion, and thereby distending and attenuating the web to such an extent that it can easily be withdrawn from the interstice between the teeth, or alternatively by retracting one of the side portions and cutting it off with a pair of scissors, after which the other side portion can be withdrawn together with the remainder of the web. Silicate and cement stoppings do not adhere to the rubber matrix after setting, so that there is no difficulty in removal, and the stopping does not require to be polished after the detachment of the matrix. The same applies to amalgam stoppings.

The design of the matrix according to the present invention makes the same suitable for various other purposes in dentistry apart from the stopping of cavities at the sides of teeth, for example for separating crowded teeth. Through the action of the elastically tensioned wedges the teeth become sufficiently separated with absolute certainty from one day to the other, without any danger of their becoming moved away from each other in any but the desired direction. Moreover there is provided the possibility (which has not been given hitherto by any of the known separating materials) of regulating the effective tension by inserting larger or smaller sized pieces of matrix.

A small piece of matrix inserted between the teeth pushes back the papilla and protects it from injury during drilling and other work, so that the matrix according to the invention can also be used as papilla protecting means.

I claim:

1. A dental matrix comprising an H-shaped body of extensibly elastic and plastic material composed of two side portions and a middle connecting web, which is of such dimensions that after it is stretched by pulling the side portions the web is adapted to be inserted between the teeth and, owing to its extensibility, it presses the side portions against the flanks of the teeth.

2. A dental matrix comprising an H-shaped body of extensibly elastic and plastic material composed of two side portions and a middle connecting web, the wall thickness of the connecting web gradually increasing from the middle outwardly on both sides and the connecting web being of such dimensions that after it is stretched by pulling the side portions the web is adapted to be inserted between the teeth and, owing to its extensibility, it presses the side portions against the flanks of the teeth.

3. A dental matrix comprising an H-shaped body of extensibly elastic and plastic material including two side portions and a middle connecting web, the wall thickness of the side portions increasing on both sides towards the connecting web so that the side portions form cuneiform tapering lugs of the height of the matrix.

4. A matrix according to claim 1, characterized by the fact that lugs adapted to be operated by hand and with the aid of pliers are provided on the outside of the side portions facing the connecting web.

5. A dental matrix comprising an H-shaped body of extensibly elastic and plastic material including two side portions and a middle connecting web, said body being made in rod-form, from which pieces of any length corresponding to the desired height of the matrix can be cut off.

6. A dental matrix comprising an H-shaped body of rubber including two side portions and a middle connecting web, the wall thickness thereof gradually increasing from the middle outwardly on both sides and the connecting web being of such dimensions that after it is stretched by pulling the side portions the web is adapted to be inserted between the teeth and, owing to its extensibility, it presses the side portions against the flanks of the teeth while the wall thickness of the side portions increases on both sides towards the connecting web so that the side portions form cuneiform tapering lugs of the height of the matrix.

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