Dec. 30, 1941. E. V. PARKIN 2,267,836

MATRIX AND HOLDER THEREFOR

Filed April 27, 1940 2 Sheets-Sheet 1

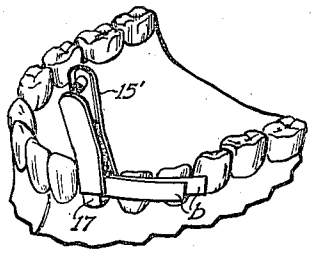


Fig. 1

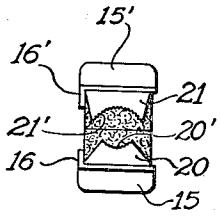


Fig. 4

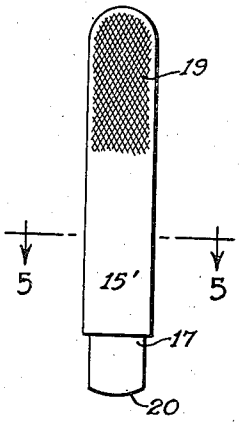


Fig. 3

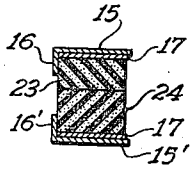


Fig. 5

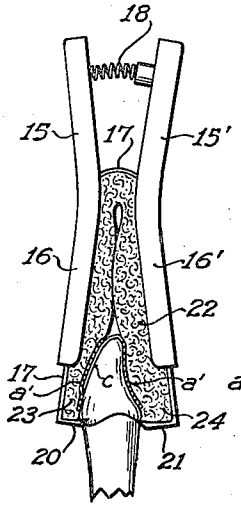


Fig. 2

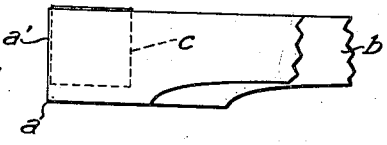


Fig. 7

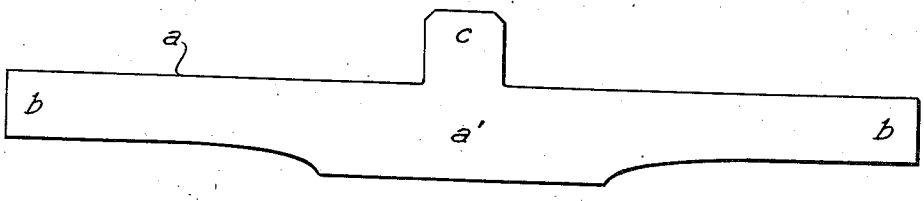


Fig. 6

Inventor
Ernest V. Parkin
T. J. Feiler
By and H. H. Feiler.
Attorneys

Dec. 30, 1941. E. V. PARKIN 2,267,836

MATRIX AND HOLDER THEREFOR

Filed April 27, 1940 2 Sheets-Sheet 2

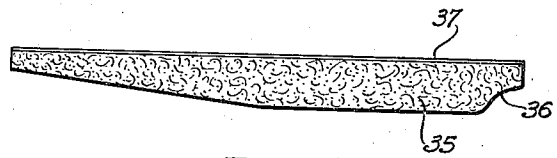


Fig. 13

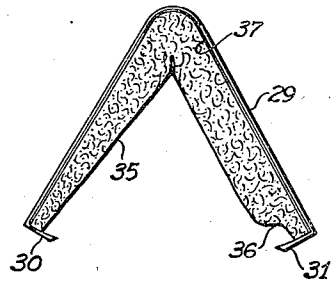


Fig. 11

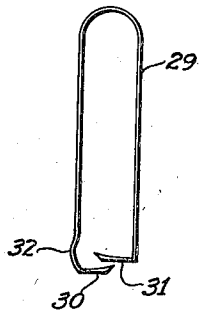


Fig. 12

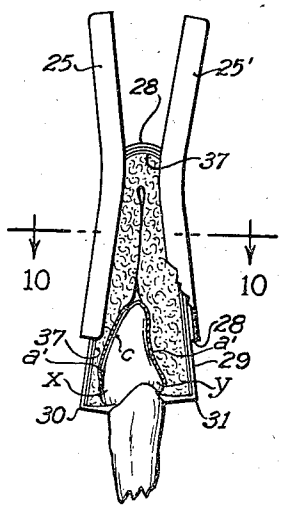


Fig. 8

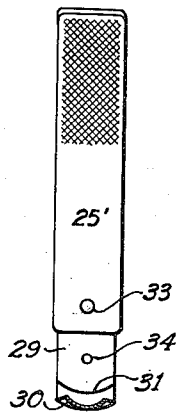


Fig. 9

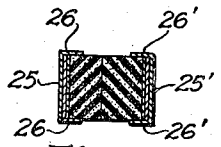


Fig. 10

Inventor
Ernest V. Parkin
By T. J. Geyler and F. R. Geyler.
Attorneys

Patented Dec. 30, 1941 2,267,836

UNITED STATES PATENT OFFICE

2,267,836

MATRIX AND HOLDER THEREFOR

Ernest V. Parkin, Portland, Oreg.

Application April 27, 1940, Serial No. 332,003

7 Claims. (Cl. 32—63)

This invention relates in general to the use of matrices in dentistry as an aid to the filling of teeth cavities, and, in particular, to matrices employed for the setting of silicate or other plastic or cement fillings in teeth.

Such silicate cement fillings are customarily used in front teeth, in place of metal fillings or inlays, in view of the fact that the silicate or plastic cement can be made to resemble in color the natural enamel of the teeth and thus be less conspicuous than other types of fillings.

When placing such a plastic filling in a tooth, however, it is necessary to hold the filling firmly in place for several minutes until the cement or plastic has properly set. For this purpose dentists use a band or ribbon of thin Celluloid which is placed around the tooth so as to hold the filling in place, and the ends of the band or ribbon are grasped by the dentist's hand and held tightly, generally by thumb and forefinger, for several minutes while the filling sets. This method is not entirely satisfactory, however, since it is quite difficult, even under favorable conditions, for the dentist to hold such matrix or Celluloid strip firmly and steadily for several minutes in this manner, and a release of the tension, should the hand or fingers develop a cramp, or other slight movement or the relaxing of the hold, before the filling has properly set, might injure the filling or interfere with the proper adhesion of the cement to all parts of the cavity wall.

One of the objects of this invention is to provide a holder for keeping the matrix tightly and properly in place during the setting of the filling, thereby dispensing with the necessity for the holding of the matrix manually by the dentist during such period.

I have also found that the ordinary strip or ribbon of Celluloid, which heretofore has been used as the matrix for such filling, does not cover the entire tooth sufficiently so as to be able to exert pressure on the entire exposed surface of the filling, especially when the filling extends to the top of the tooth; and, furthermore, that a straight ribbon of Celluloid is sometimes apt to slip on the tooth or else to be forced too far into the gum.

A further object of my invention is therefore, to provide an improved form of matrix designed to cover substantially the entire exposed surface of the tooth, and designed particularly to be used with my improved holder without slipping on the tooth.

These, and incidental objects, I attain by making an improved matrix and a holder therefor in the manner hereinafter briefly described with reference to the accompanying drawings.

In the drawings:

Figure 1 is a perspective view showing my improved matrix and holder in operative position, this view being drawn to approximately actual size;

Figure 2 is a corresponding end elevation showing the holder and tooth, drawn to a much larger scale, and with the matrix entirely omitted;

Figure 3 is a side elevation of the holder corresponding to Figure 2;

Figure 4 is a bottom plan view of the holder;

Figure 5 is a sectional plan taken on line 5—5 of Figure 3;

Figure 6 is a view of my improved matrix drawn to approximately twice the size shown in Figure 1;

Figure 7 illustrates the manner of folding the matrix of Figure 6;

Figure 8 is an enlarged end view of a modified form of my matrix holder;

Figure 9 is a corresponding side elevation of the holder of Figure 8;

Figure 10 is a sectional plan taken on line 10—10 of Figure 8;

Figure 11 is an enlarged view of the detachable prong member and compressible lining for the modified form of my holder;

Figure 12 is a side view of the prong member of Figure 11, but showing the prongs or jaws contracted, and the lining element removed, and illustrating certain improved features; and

Figure 13 is a detailed view of the removable lining element for my holder.

Referring first to Figures 6, 7, and 1, my improved matrix *a* comprises a strip of thin Celluloid or similar suitable material cut or stamped from a sheet into the form shown in Figure 6. The elongate body portion of the matrix is made substantially rectangular in form, with an increased width at its middle-section *a'* corresponding to the approximate length of the tooth exposed beyond the gum. My matrix is preferably made in several widths at the center portion to correspond to teeth of different lengths. The central portion extends a distance approximately equal to one and one-half times the girth of the tooth, thus about three times the width of the tooth, although this may be made longer if desired. The lower edge beyond the center portion a' is preferably cut away to provide narrow end portions *b, b* as shown. A tab *c* extends con-

centrically from the upper edge of the matrix. The width of the tab *c* is approximately equal to the width of an average tooth, although this tab may be made slightly narrower for convenience if desired. The length of the tab *c* should be less than the width of the matrix at the central portion *a'* to which the tab is attached.

When it is desired to use my matrix for holding a silicate or similar filling of plastic material in place in the tooth cavity while the filling is setting, the matrix is placed with the central part at the back or lingual side of the tooth so that the tab *c* will lie over the biting edge of the tooth. The matrix is then brought forward on both sides of the tooth, between the tooth and the adjacent teeth. The tab *c* is folded down over the top of the tooth and one end of the central portion of the matrix is folded over it.

Let it be assumed that the filling is on the side of the tooth corresponding to the dentist's left hand. The left-hand end of the matrix will then be the one brought around the front of the tooth and the position of the matrix will be as illustrated in Figure 7 with the two ends *b*, *b* lying adjacent each other at the dentist's right. This is also the position of the matrix in Figure 1. Now if the matrix is held tightly in this position, it will keep the plastic filling pressed in place, and even if the filling extends to the biting edge of the tooth, the folded tab *c* will also press on the biting edge of the filling and prevent any tendency for the filling to be squeezed out at that point. Furthermore the folded tab *c* will prevent any tendency of the matrix to be pushed too far down into the gum around the base of the exposed portion of the tooth.

While this matrix, arranged in the manner described, may be held in place manually by the dentist, by holding the two ends *b*, *b* of the matrix firmly between thumb and forefinger,—the long thinner end of the matrix making it easier for the dentist's fingers to clamp the matrix,—nevertheless, for the reasons indicated in the introduction to this specification, the holding of any matrix manually while the filling is setting is not entirely satisfactory, and, accordingly, in order to dispense with the necessity of such manual holding of the matrix, I prefer to employ a special holder designed for this purpose which I shall now briefly describe.

This holder is illustrated in position in Figure 1 and is shown more clearly in Figure 2. The handle portion of the holder consists of a pair of thin metal plates **15** and **15'** which are preferably dished in their intermediate portion to make their ends flare outwardly as shown in Figure 2; and their edges, **16**, **16'** are bent inwardly along one side and around the top end. The resulting inwardly-turned flanges **16**, **16'** afford stiffness to the thin metal plates **15** and **15'**, and also serve to hold the liner in place, as will be explained later.

The opposed handle plates **15**, **15'** are retained in the proper spaced relationship at the middle by an inverted U-shaped metal spring **17** which is riveted or soldered or otherwise firmly secured to the handle plates, and which is formed with initial tension to cause the ends of the spring, and thus the lower ends of handle plates, to draw towards each other. This tendency of the spring **17** to draw the lower ends of the handle plates **15**, **15'** towards each other may also be supplemented, if desired, by a helical compression spring **18** interposed between the upper ends of the handle plates as shown in Figure 2. The outer surface of the upper ends of the handle plates may be roughened or knurled, as shown at **19** in Fig. 3, to prevent the operator's fingers from slipping off the holder when the holder is gripped.

The inverted U-shaped spring **17** is placed between the handle plates **15**, **15'** with the loop of the spring slightly above the middle of the plates and with the lower ends **17** of the spring extending below the bottom ends of the handle plates, as shown in Figure 2. These lower ends have their extremities bent inwardly to form the opposed jaws **20** and **21** (Figure 2), the jaw **20** being designed to fit the front or labial side of the tooth and the jaw **21** being designed for the inside or lingual side of the tooth at the intersection of the tooth and gum. The engaging edge **20'** of the jaw **20**, and the engaging edge **21'** of the jaw **21** are curved, as shown in Figure 4, to correspond with the formation or curvature of the tooth on labial and lingual sides respectively, and both of these engaging edges furthermore are preferably serrated to afford increased grip on the tooth at the lines of intersection of tooth and gum. These jaws also are preferably curved upwardly at the sides, as shown in Figure 3, this convex form being adapted to follow more closely the normal lines of intersection of tooth and gum, and also, by bringing the points at the side of the jaws to a higher plane, any possibility of these points injuring the gum by being placed too low on the gum is prevented. The shaping of the jaws in the manner described thus insures firm engagement of the jaws with the tooth above the line of intersection of tooth and gum.

The liner **22** for the matrix holder is made of a strip of sponge rubber or similar material of approximately the same length and width as the jaw spring member **17** and this liner is folded together at the center and placed inside the jaw member **17** as shown in Figure 2. The flanges **16** and **16'**, along one side of the finger plates **15**, **15'**, assist in preventing lateral displacement of the liner in the holder. I have found it desirable to make one end of the liner thinner than the other and to place the thinner end **23** in the labial side of the jaw spring **17** where the liner will bear on the comparatively flat labial side of the tooth, and to make the other end of the liner considerably thicker as at **24** (Figure 2), where it bears against the more irregular lingual side of the tooth. Thus the liner, under the compressing action of spring **17**, adapts itself to the curvature of the labial and lingual surfaces of the tooth and provides a firm steady pressure with which to hold the interposed matrix against the tooth surfaces, while the jaws of the holder prevent any inadvertent slipping of the holder, and therewith of the matrix, off of the tooth. In this way the matrix remains held pressed around the plastic filling until the filling is properly set, whereupon the matrix and holder may be removed.

Should it become desirable to place a new liner in the holder, this is easily done by pulling out the old liner on the side opposite the flanges **16**, **16'** and inserting a new liner in the jaw spring **17**. In Figure 13 I show an improved and preferred form of liner for my holder. The sponge rubber liner **35** is wedge-shaped at one end while the other end has a cut-away portion **36** roughly conforming to the contour of the lingual side of a front tooth. This liner is made with a reinforcing back **37** of thin metal or mesh to which the sponge rubber is cemented. This reinforc-

ing back serves to prevent the ends of the liner from being pushed longitudinally or upwardly away from the jaws of the spring when the holder is pushed over the matrix on the tooth.

Figures 8 to 12 inclusive illustrate a modified form of my matrix holdler. In this modified form the jaw spring is made detachable from the handle portions, so different sizes or shapes of jaw springs may be inserted in the handle portion. The making of the jaw spring member removable also facilitates the changing of the liner of the holder.

Referring to Figures 8 and 9, the handle portions **25**, **25'** are similar to those previously described with reference to Figure 2; except that they are flanged along both edges instead of along one edge only. These flanges **26** and **26'** on both sides are shown in Figure 10, and act as slideways and retaining flanges for the removable jaw member **29**. The two handle portions **25** and **25'** are secured to a U-shaped spring **28** (Figure 8), the ends of which terminate flush with the bottom ends of the handle portions.

The detachable jaw member, which is shown separately in Figure 11, has the removable liner **35** inserted therein, and, when the jaws are moved closer together, may be slid into the handle portion and held in place by any suitable means, such as a cooperating protrusion and indentation as indicated at **33** in Figure 9. A hole **34** may be provided near the bottom of each side of the jaw member for the insertion of a suitable dentist's tool to facilitate the removing of the jaw member from the handle portion.

From Figures 8 and 9, it will be noted that one jaw **30** is no longer than the other jaw **31**. In most front teeth the outside or labial surface is longer than the lingual surface, as illustrated by the tooth in Figure 8. Thus it will often be desirable to have the labial jaw of the matrix holder longer than the other jaw. When the jaw member is made removable it is possible to insert either a jaw member having jaws of uneven length or jaws of even length, depending upon the tooth to be filled.

I have also found it desirable in some cases to make the leg of the labial jaw member with a bulge near the bottom (as shown by **32** in Figure 12) to accommodate pronounced shoulders on certain teeth.

Various other modifications might be made in the shape and structure of the jaw members as well as in the other portions of my matrix holder without departing from the principle of my invention. It is not my intention to limit my invention otherwise than as set forth in the attached claims.

I claim:

1. A matrix designed to be used for holding a filling in place in a tooth during the setting of the filling, and a holder for holding said matrix on the tooth, said holder including, a handle portion, a pair of inwardly-extending opposed jaws adapted and arranged to extend transversely of the labial and lingual tooth surfaces, spring means connected to said handle portion and adapted to bring said jaws towards each other, the tooth-engaging edges of said jaws being concaved to fit the curvature of the labial and lingual surfaces of the tooth at the gum line, and a liner for said holder on the inside of said holder, said liner comprising resilient material, said liner adapted to press against the labial and lingual surfaces of the tooth throughout their entire extent when said holder is in position.

2. A matrix of the character described and a holder for said matrix on the tooth, said holder including, a pair of handle plates, a U-shaped jaw-spring member secured to said handle plates, the ends of said jaw spring member bent inwardly substantially at right angles to form opposed jaws extending transversely of the tooth surfaces, the tooth-engaging edges of said jaws being concaved to fit the curvature of the labial and lingual surfaces of the tooth at the gum line, and a liner for said jaw-spring member on the inside of said jaw-spring member, said liner comprising a strip of resilient material, said liner adapted to press against the labial and lingual surfaces of the tooth throughout their entire extent when said holder is in position.

3. A matrix of the character described designed to be used for holding a filling in place in a tooth during the setting of the filling, and a holder for holding said matrix on the tooth, said holder including, a handle portion, a U-shaped jaw-spring member within said handle portion, the ends of said jaw-spring member bent inwardly substantially at right angles to form opposed jaws extending transversely of the tooth surfaces, the tooth-engaging edges of said jaws being concaved to fit the curvature of the labial and lingual surfaces of the tooth at the gum line, and a liner for said jaw-spring member on the inside of said jaw-spring member, said liner comprising a strip of resilient material, said liner adapted to press against the labial and lingual surfaces of the tooth through their entire extent when said holder is in position.

4. A matrix designed to be used for holding a filling in place in a tooth during the setting of the filling, and a holder for holding said matrix on the tooth, said holder including, a pair of handle plates, said plates having inwardly-turned flanges along one side, a U-shaped jaw-spring member secured to said handle plates, the ends of said jaw-spring member bent inwardly to form opposed jaws, the tooth-engaging edges of said jaws being curved to fit the curvature of the tooth, and a removable liner for said jaw-spring member on the inside of said jaw-spring member, said liner comprising a strip of resilient material, said liner adapted to press said matrix against the labial and lingual surfaces of the tooth throughout their entire extent when said holder is in position, and the engaging surface of said liner with said matrix and tooth being shaped to conform approximately to the labial and lingual surfaces respectively of said tooth.

5. A matrix designed to be used for holding a filling in place in a tooth during the setting of the filling, and a holder for holding said matrix on the tooth, said holder including, a pair of handle plates, said plates having inwardly-turned flanges along both sides, a spring connecting said handle plates, a removable U-shaped jaw-spring member, the ends of said jaw-spring member bent inwardly to form opposed jaws, the tooth-engaging edges of said jaws being curved to fit the curvature of the tooth, said jaws being convex in form to correspond to the lines of intersection of tooth and gum whereby to prevent the side points of said jaws from piercing the gum at the sides of the tooth, and a liner for said jaw-spring member on the inside of said jaw-spring member, said liner comprising resilient material, said liner adapted to press said matrix against the labial and lingual surfaces of the tooth throughout their entire extent when said holder is in position.

6. A matrix designed to be used for holding a filling in place in a tooth during the setting of the filling, and a holder for holding said matrix on the tooth, said holder including, a handle portion, a removable U-shaped jaw-spring member within said handle portion, means for securing said spring member in place, the ends of said jaw-spring member bent inwardly to form opposed jaws, the tooth-engaging edges of said jaws being serrated and curved to fit the curvature of the tooth, said jaws being convex in form to correspond to the lines of intersection of tooth and gum whereby to prevent the side points of said jaws from piercing the gum at the sides of the tooth, and a liner for said jaw-spring member on the inside of said jaw-spring member, said liner comprising resilient material, said liner adapted to press said matrix against the labial and lingual surfaces of the tooth throughout their entire extent when said holder is in position, and the engaging surface of said liner with said matrix and tooth being shaped to conform approximately to the labial and lingual surfaces respectively of said tooth.

7. A matrix designed to be used for holding a filling in place in a tooth during the setting of the filling, and a holder for holding said matrix on the tooth, said holder including, a pair of handle plates, said plates having inwardly-turned flanges along both sides, a spring connecting said handle plates, a removable U-shaped jaw-spring member, the ends of said jaw-spring member bent inwardly to form opposed jaws, the ends of said jaw-spring member being of unequal length to correspond to the unequal length of the labial and lingual surfaces of the tooth, the tooth-engaging edges of said jaws being curved to fit the curvature of the tooth, said jaws being convex in form to correspond to the lines of intersection of tooth and gum whereby to prevent the side points of said jaws from piercing the gum at the sides of the tooth, and a removable liner for said jaw-spring member on the inside of said jaw-spring member, said liner comprising a strip of resilient material with a reinforcing back, said liner adapted to press said matrix against the labial and lingual surfaces of the tooth throughout their entire extent when said holder is in position, and the engaging surface of said liner with said matrix and tooth being shaped to conform approximately to the labial and lingual surfaces respectively of said tooth.

ERNEST V. PARKIN.