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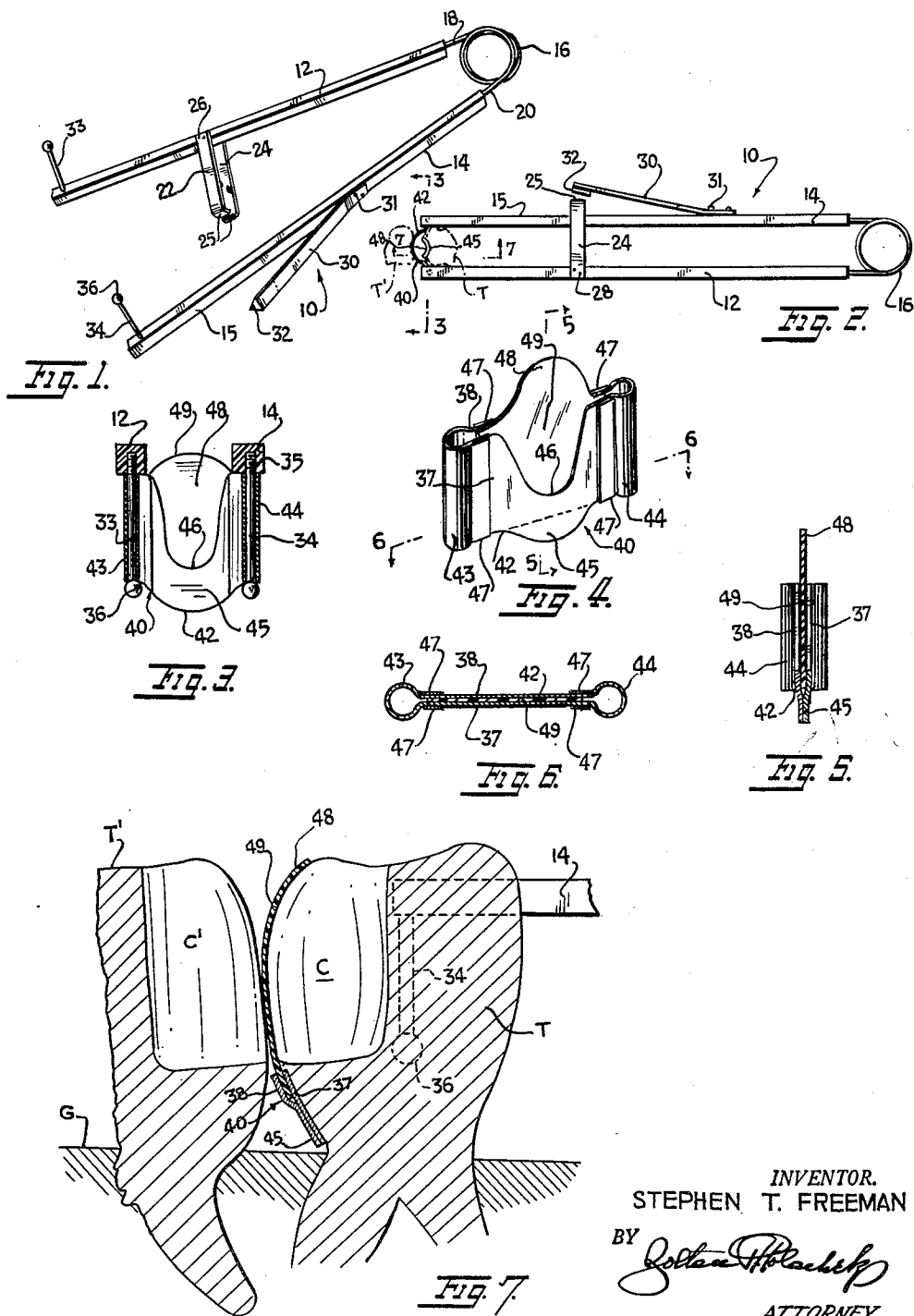
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3,074,169

DENTAL MATRIX RETAINER AND SEPARATOR BAND

Filed April 14, 1961

2 Sheets-Sheet 1



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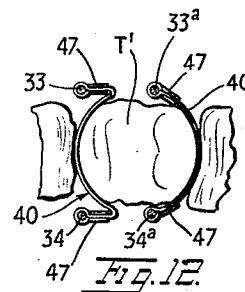
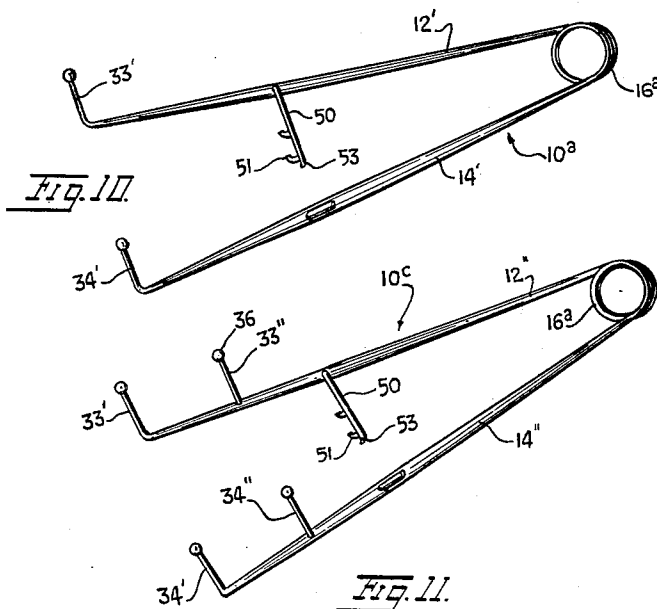
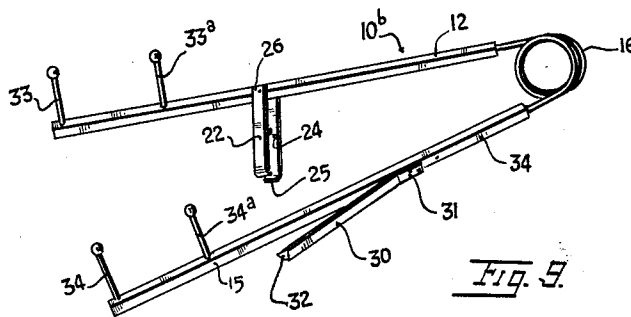
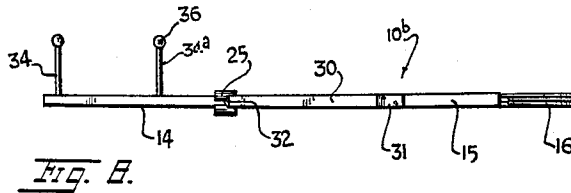
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DENTAL MATRIX RETAINER AND SEPARATOR BAND

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2 Sheets-Sheet 2



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DENTAL MATRIX RETAINER AND
SEPARATOR BAND

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7 Claims. (Cl. 32-63)

This invention relates to the art of dental tools, instruments and devices to facilitate filling cavities in teeth.

According to the invention there is provided an improved matrix retainer and separator which can be interposed between adjacent teeth to contain the filling material of a cavity in a tooth. The matrix retainer is an instrument having two jaws biased apart by spring means. On the ends of the jaws are outwardly extending posts or studs adapted to receive a separator band. On one jaw are hooked catch members adapted to engage the other jaw and hold the jaws in a closed position. A hook release member in the form of a leaf spring having a wedge-shaped hook release element is carried by the other jaw. The separator is a metal foil band having loops at its ends. Between juxtaposed sides of the band is a thin pliable plastic diaphragm which can be folded around a tooth to form a retaining wall of a cavity to be filled. The metal band has a depending portion which can be pressed into juxtaposition with the base of the tooth to be filled. The loops of the separator fit on the posts or studs of the matrix retainer instrument. When the instrument is closed and the separator band is in place on a tooth having a cavity, the dentist can fill the cavity in the tooth without having to manipulate the retainer or separator. In another form of the invention, two pairs of posts are provided on the jaws of the instrument so that retaining walls can be formed for cavities on opposite sides of a tooth.

It is therefore one object of the invention to provide an improved dental matrix retainer instrument for dental use.

A further object is to provide an improved separator for use with a dental matrix retainer instrument.

Another object is to provide an improved dental device to facilitate filling a cavity in a tooth including a matrix retainer instrument having one or two pairs of studs or posts on ends of a pair of jaws biased apart by spring means at the other ends of the jaws, and a separator adapted to be mounted on each pair of posts, the separator including a flat foil band with end loops engageable on the posts and with a thin plastic diaphragm secured between juxtaposed sides of the band.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

FIG. 1 is a perspective view of a matrix retainer instrument in open position.

FIG. 2 is a top plan view of the matrix retainer in closed position and with a separator held thereon.

FIG. 3 is a sectional view on an enlarged scale taken on line 3-3 of FIG. 2.

FIG. 4 is a perspective view of a separator according to the invention.

FIGS. 5 and 6 are sectional views taken on lines 5-5 and 6-6, respectively, of FIG. 4.

FIG. 7 is a sectional view on an enlarged scale taken on line 7-7 of FIG. 2, the device being shown in position for filling a cavity in a tooth.

FIG. 8 is a side elevational view of another matrix retainer embodying the invention.

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FIG. 9 is a perspective view of the matrix retainer of FIG. 8 shown in open position.

FIGS. 10 and 11 are perspective views of other matrix retainer instruments embodying further modified forms of the invention.

FIG. 12 is a part diagrammatic and part plan view showing a pair of matrices in position on a tooth.

Referring to FIGS. 1 to 7, there is shown a matrix retainer instrument 10 including a pair of substantially straight jaws 12, 14. A coil spring 16 has its ends 18, 20 embedded in one end of the jaws 12, 14. The spring tends to unwind and thus biases the jaws apart. In order to hold the jaws in a closed position as shown in FIG. 2, there is provided a pair of leaf spring catch members 22, 24 secured by rivets 26, 28 to the jaw 12. The members 22, 24 have curved hooked ends 25 which oppose each other and engage the outer side 15 of jaw 14. A catch release member 30 in the form of a leaf spring is secured at one end by rivets 31 to the side 15 of jaw 14. The free end of member 30 carries a wedge-shaped element 32 adapted to enter between the spaced curved ends of the catch members and push them apart to disengage from jaw 14 and permit the jaws to open to the position of FIG. 1.

On the free ends of the jaws 12 and 14 and extending perpendicularly to the jaws, two posts or studs 33 and 34 are removably mounted. The posts have threaded ends 35 received in threaded socket openings 37 in the jaws. The other ends of the posts are ball shaped or spherical as indicated at 36.

The instrument 10 is for the purpose of supporting a matrix 40 shown in FIG. 4 in stretched operative position on a tooth T. The matrix 40 also serves to separate adjacent teeth from each other as shown in FIG. 7. The matrix 40 comprises a continuous strip of sheet material, such as metal foil, forming a band in flattened condition, with the sides 37 and 38 thereof in arcuate configuration and with the ends thereof enlarged in the form of tubes or loops 44. The curved bottoms 45 of the sides extend below the bottoms of the tubes or loops 43 and 44. The sides of the band are juxtaposed and retain between them a pliable plastic membrane or diaphragm 49 made of cellophane, polyethylene or the like. The plastic diaphragm 49 is exposed at the upper concave edges 46 of the sides of the band and extends upwardly beyond the plane of the tops of the tubes or loops 43 and 44 to form a rounded flap portion 48. In order to stiffen and rigidify the band adjacent the tubes or loops, narrow rectangular strips 47 of metal or other suitable stiff material are secured in upright position against the outer surface of the sides by welding, adhesive or in any other suitable manner. These strips 47 permit the material of the band to flex along the long edge of the strip as a fulcrum as shown to the left of FIG. 12.

In FIGS. 1, 3 and 7 are illustrated how the instrument 10 is used so that the diaphragm and band can be molded to fit flush with the side of a tooth T having a cavity C to be filled. The matrix 40 is supported and carried by the instrument 10 by inserting the posts 33 and 34 through the tubes or loops 43 and 44 securing them to the jaws 12 and 14, leaving the spherical shaped heads 36 outside as seen in FIG. 3. The plastic diaphragm 49 will define a retaining wall for the filling to be packed into the cavity C. The lower portion 45 of the metal band will fit snugly against the curved lower portion of the tooth just above the gum line G. The cavity C is thus effectively isolated and separated from adjacent tooth T' which may have a cavity C' to be filled after cavity C is filled.

The jaws of the instrument 10 remain closed and extend away from tooth T so that the dentist can fill the cavity without interference by the closed instrument.

When filling is completed, the dentist will press the release member 30 and the catch members will be disengaged from jaw 14 to open the instrument and permit the separator to be lifted from between teeth T, T'.

The separator 40 can then be removed from the studs 33, 34 and discarded. The instrument can be sterilized for repeated use. If desired, the matrix retainer can be made entirely of metal with studs 33', 34' integrally formed by bending the ends of jaws 12', 14' as shown in the instrument structure 10^a of FIG. 10. The coil spring 16^a may be integrally formed with the jaws 12', 14'. Catch member 50 is welded on jaw 12' and has a hooked end 51 to engage the jaw 14'. A projection 53 on the end of the flexible catch member 50 is engageable by a fingernail to disengage the hooked end of the catch member from jaw 14'.

In FIGS. 8 and 9 is shown another matrix retainer instrument 10^b similar to instrument 10, except that two spaced pairs of studs 33, 34 and 33^a, 34^a are provided on the arms 12, 14. A separator 40 can be mounted on each pair of studs across the free ends of the jaws. This structure permits retaining walls to be formed by the two separators for cavities at opposite sides of a tooth so that both cavities can be filled without having to reset the instrument for filling each cavity. The instrument of FIG. 8 can also be made entirely of metal with integrally formed studs 33', 34' and 33'', 34'' on jaws 12' and 14' of instrument 10^c of FIG. 11.

FIG. 12 illustrates the use of the matrix retainer instrument shown in FIGS. 9 or 11. As shown, a matrix 40 is mounted on the outer pair of posts 33 and 34 of retainer 10^b. Another matrix 40 is mounted on the inner posts 33^a and 34^a of retainer 10^b. Matrix 40 fits snugly around one side or tooth T' serving as an outer wall for a cavity on that side of the tooth, the rigidity of the strips 47 permitting the material of the band and diaphragm to flex along the long edge of the strips 47 as a fulcrum as shown to the left of FIG. 12. The other matrix 40 fits snugly around the opposite side of the tooth T' serving as an outer wall for a cavity to be filled on that side of the tooth.

While I have illustrated and described the preferred embodiments of my invention, it is to be understood that I do not limit myself to the precise constructions herein disclosed and that various changes and modifications may be made within the scope of the invention as defined in the appended claims.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent is:

1. A dental device to facilitate filling a cavity in a tooth, comprising a flat pliable metal band having juxtaposed sides and looped ends, said sides being generally U-shaped, a pliable plastic diaphragm disposed between said sides of the band and having an exposed portion exposed above the bight of the band between said looped ends; and a holder for said band comprising a pair of jaws connected at one end by spring means biasing the jaws apart, quick detachable locking means carried by the jaws for holding the jaws in a closed position, and studs extending outwardly perpendicularly to the jaws and through the looped ends of said band, whereby said band defines a separator between said tooth and an adjacent tooth and forms a retaining wall for said filling at said cavity.

2. A dental matrix retainer, comprising a pair of jaws connected at one end by a coil spring biasing the jaws apart, a pair of leaf springs with hooked ends carried by one of the jaws for engaging on the other jaw to hold the jaws in a closed position, another leaf spring carried by said other jaw and having a wedge-shaped element adapted to enter between said hooked ends to separate and disengage the same from said other jaw, and a pair

of studs with bulbous ends extending outwardly of the other ends of the jaws and adapted to support a dental separator band thereon.

3. A dental matrix retainer, comprising a pair of jaws connected at one end by a coil spring biasing the jaws apart, a pair of leaf springs with hooked ends carried by one of the jaws for engaging on the other jaw to hold the jaws in a closed position, another leaf spring carried by said other jaw and having a wedge-shaped element adapted to enter between said hooked ends to separate and disengage the same from said other jaw, a pair of studs with bulbous ends extending outwardly of the other ends of the jaws and adapted to support a dental separator band thereon, with another pair of studs on the jaws spaced from the first-named pair of studs, and adapted to support another dental separator band thereon.

4. A dental separator to facilitate filling a cavity in a tooth, comprising a pliable metal band having juxtaposed sides and looped ends, said sides being generally U-shaped, with a pliable plastic diaphragm carried by the band and disposed between said sides, said diaphragm having a portion extending across the bight of the band between said looped ends, said bight of the band having a portion extending below the bottoms of the looped ends, said diaphragm having a portion extending above the tops of the looped ends.

5. A dental device to facilitate filling a cavity in a tooth, comprising an instrument having a pair of jaws connected at one end by a coil spring biasing the jaws apart, a pair of leaf springs with hooked ends carried by one of the jaws for engaging on the other jaw to hold the jaws in a closed position, another leaf spring carried by said other jaw and having a wedge-shaped element adapted to enter between said hooked ends to separate and disengage the same from said other jaw, a pair of studs with bulbous ends extending outwardly of the other ends of the jaws; and a dental separator carried by said instrument, said separator comprising a pliable metal U-shaped band having cylindrical, axially parallel looped ends, with a pliable plastic diaphragm extending across the band between the ends thereof, said looped ends being engaged on said studs respectively.

6. A dental matrix retainer, comprising a pair of jaws connected at one end by spring means biasing the jaws apart, locking and unlocking means carried by the jaws for holding the jaws in a closed position and for releasing the jaws from said closed position, and studs extending outwardly perpendicular to the jaws at the other ends thereof for supporting a dental separator thereon, said spring means and studs being integrally formed with said jaws, said spring means comprising a spring member formed with a hooked end to engage on one of the jaws and with a projecting tip engageable by a fingernail to disengage the hooked end from said one jaw.

7. A matrix for use on a tooth comprising an endless sheet of flexible metal foil in the form of a band with arcuate shaped sides and tubular ends, a membrane sheet clamped between the sides, and upright stiffening strips on the sides adjacent the tubular ends for stiffening the band whereby the material of the band may be flexed around the stiffening strips.

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