

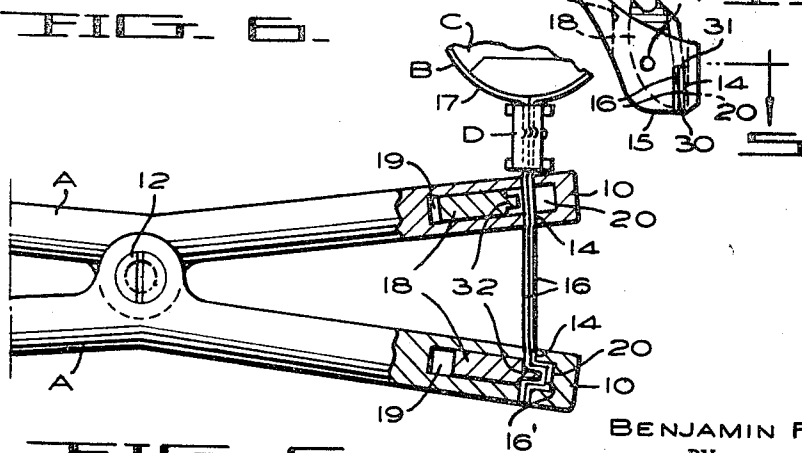
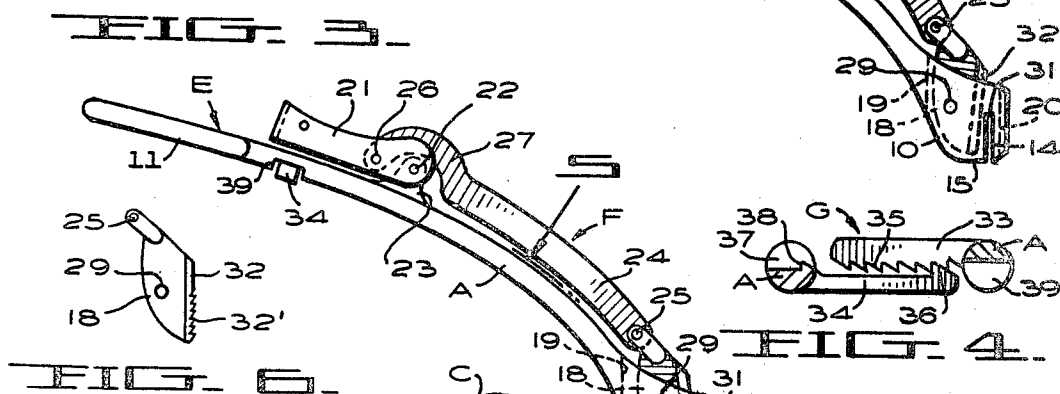
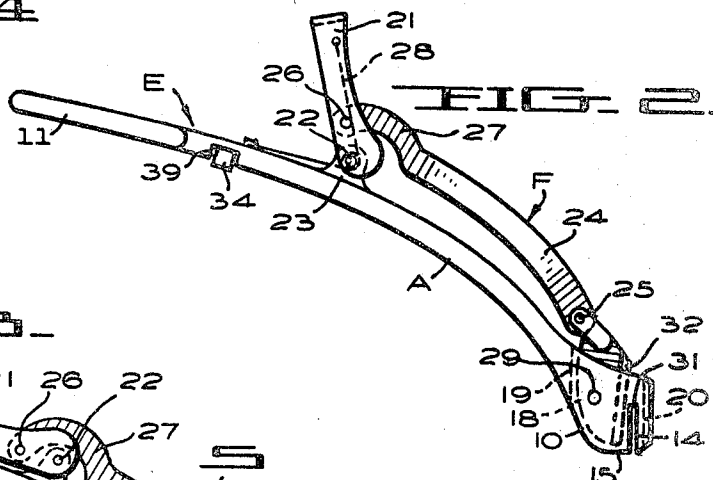
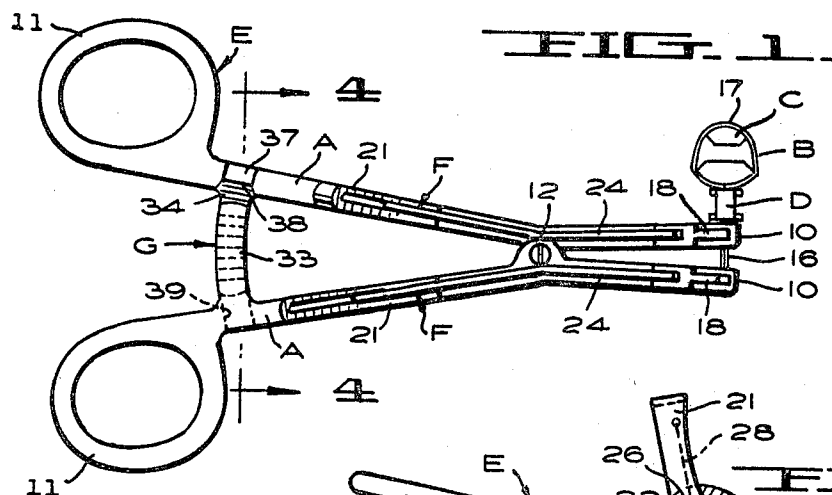
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TRACTION INSTRUMENT FOR DENTAL MATRIX BAND

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TRACTION INSTRUMENT FOR DENTAL MATRIX BAND

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6 Claims

ABSTRACT OF THE DISCLOSURE

A traction instrument for dental matrix band having a pair of operating handles, each handle being provided with a retainer head fashioned with a slot into which overlapped end sections of the band may be inserted edgewise. Each head swingably carries a locking blade that is movable into a position to clamp the end sections of the band to the head. Toggle arrangements are used to operate the locking blades independently of one another so that the end sections may be selectively clamped to one head and slidably disposed in the slot of the other head.

This application relates to improvements over the traction instrument for dental matrix band shown in my copending application Ser. No. 406,371, which was filed in the United States Patent Office on Oct. 26, 1964, now abandoned.

In the above-identified copending application, I show a traction instrument having a pair of operating handles, each being fashioned with a retainer head at its forward end, and these heads have narrow slots extending thereinto from their gingival-facing edges. The slots are dimensioned to snugly receive a pair of overlapped end sections of a looped matrix band edgewise with a frictional sliding fit, whereby the band will be held by the instrument when applying the loop of the band around a tooth.

However, it has been found from practice that dental matrix bands vary considerably in thicknesses, and oversized or thicker bands cannot be inserted into the slots, while those bands that are thinner will fall out of the slots.

Accordingly, it is proposed in this invention to provide each retainer head with a locking blade, each blade being movable into a position to clamp the overlapped end sections of the band to the retainer head with a crimping action, thereby firmly anchoring the band ends to the head. These blades are made to be operated independently of one another, whereby the band may be anchored to one retainer head and slidable in the slot of the other retainer head.

Moreover, in the copending application, special dental matrix bands were required, the outer tips of each band being provided with terminal posts that are large enough to prevent the ends of the bands from sliding through the slots in the retainer heads, when tightening the loop of the band around a patient's tooth.

In the present application, conventional dental matrix bands, without the above-mentioned terminal posts, may be used, since one of the locking blades may be used to clamp the ends of the bands to a selected retainer head.

Other objects and advantages will appear as the specification proceeds, and the novel features of the invention will be particularly pointed out in the appended claims.

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Drawing

For a better understanding of the invention, reference should be had to the accompanying drawing, forming part of this specification, in which:

FIG. 1 is a top plan view of my traction instrument for dental matrix band and illustrating a matrix band as applied around a patient's tooth;

FIG. 2 is a side elevational view thereof and disclosing a toggle arrangement in released position and one of the locking blades being retracted from the slot in a retainer head;

FIG. 3 is a view similar to FIG. 2, but showing the toggle arrangement in locked position and the locking blade advanced into clamping position relative to overlapped end sections of the matrix band;

FIG. 4 is a transverse sectional view taken along the plane 4—4 of FIG. 1;

FIG. 5 is an enlarged sectional view taken along the line 5—5 of FIG. 3; and

FIG. 6 is a face view of a modified embodiment of the locking blade.

Detailed description

Referring now to the drawing in detail, I have shown a pair of operating handles designated generally at A, each being provided with a retainer head 10 and a hand-grasping portion 11 at its front and rear ends, respectively. A hinge connection 12 secures intermediate portions of the handles together, with the hinge connection being located to spread or separate the retainer heads 10 relative to one another, when the rear hand-grasping portions 11 of the handles are swung toward one another into closed position.

Each retainer head 10 is fashioned with a slot 14 extending thereinto from a gingival-facing edge 15 thereof, as shown in FIGS. 2, 3 and 5. These slots are dimensioned to receive a pair of overlapped end sections 16 of a looped dental matrix band B edgewise with a sliding fit, and the loop 17 of the band may be applied around a selected tooth C.

It will be noted that a matrix band retainer clamp D also has been shown as being applied over the end sections 16 of the band B between the loop 17 and the adjacent retainer head 10. This retainer clamp is fully illustrated and described in my United States Patent No. 3,046,659, dated July 31, 1962.

After the dental matrix band B has been inserted edgewise into the slots 14, it is necessary to anchor the overlapped end sections 16 to the retainer head 10 that is remote from the tooth, that is, the lower head in FIGS. 1 and 5, while these band sections must be free to slide through the slot 14 of the retainer head 10 that is disposed adjacent to the tooth, that is, the upper heads 10 in FIGS. 1 and 5. Thus, when the heads 10 are spread apart by moving the hand-grasping portions 11 toward one another, the loop 17 of the band B will be constricted around the banded tooth C.

Now the clamp D may be crimped upon the overlapped end sections 16 of the band by utilizing a crimping dental pliers shown in my United States Patent No. 3,105,402, dated Oct. 1, 1963. This clamp will serve to hold the band around the tooth when the traction instrument is removed from the band ends 16, the traction instrument being designated generally at E.

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It will be noted that a pair of locking blades 18 are carried by the retainer heads 10, one blade on each head, and these blades are movable into positions to clamp the overlapped end sections 16 of the band B to the heads. Operating means F are provided to move either locking blade 18 independently of the other into clamping position relative to the band, whereby the end sections 16 of the band may be selectively clamped to one head 10, while the band sections 16 remain slidable in the slot 14 of the other head.

As shown in FIGS. 2, 3 and 5, each retainer head 10 is formed with a vertical opening 10 in which one of the locking blades 18 is mounted. Moreover, each retainer head is provided with a vertical channel 20 in its forward end that is aligned with the locking blade of that head and into which portions 16' of the band may be crimped (see FIG. 5), when a selected locking blade is moved into clamping position (see lower blade 18 in FIG. 5), thereby firmly locking or anchoring the end sections 16 of the band to the selected head.

The operating means F previously mentioned takes the form of a self-locking toggle arrangement mounted on each of the handles A. Each such toggle arrangement includes an operating lever 21 that is swingably mounted by a journal pin 22 to an ear or lug 23 fixed to one of the handles A. The levers 21 are connected by links 24 to the locking blades 18. The forward ends of the links 24 are attached by journal pins 25 to the tops of the blades 18, while the rear ends of these links are attached by journal pins 26 to the operating levers 21. Each link has a gooseneck 27 for fitting over the adjacent ear 23, when the toggle arrangement is swung into a self-locking position, as in FIG. 3. A suitable spring 28 is provided for urging each lever 21 into raised position, as in FIG. 2, after the lever has been raised sufficiently to unlock the toggle arrangement. This will free the blades 18 from the band end sections 16. The operating levers 21 are positioned remotely and rearwardly of the retainer heads 10 so as to be accessible when the retainer heads are inserted into a patient's mouth.

The locking blades are swingably secured by journal pins 29 to their respective retainer heads 10, and each is swingable on an arc so as to initially engage with a gingival-facing edge 30 of the matrix band (see FIG. 3) as the blade is moved into clamping position, thereby urging the matrix band toward a bottom wall 31 of slot 14 in the retainer head. In order to accentuate this action of urging the band toward the wall 31, each locking blade 18 may be provided with a series of fine teeth 32' (see FIG. 6) that are directed forwardly, that is, toward the depth of the channel 20.

Each locking blade 18 is provided with a vertical wedge 32 on its forward edge (see FIGS. 2 and 5), with the wedge being dimensioned to clear the walls of channel 20 sufficiently to accommodate the overlapped sections 16 of the band B, when the latter is crimped at 16' by the blade. Handles A are provided with coacting locking means G for locking them in closed position (see FIGS. 1 and 4). The locking means consists of lugs 33 and 34 fixed to the handles and projecting toward one another. Lug 33 is formed with ratchet teeth 35 that may be engaged by a single hook 36 on lug 34 as the handles are closed. As the handles are moved closer together during closing movement, the lug 33 passes through notch 37 fashioned in the left-hand handle A in FIG. 4 so that the ratchet teeth 35 will engage with a hook 38 formed in the notch 37. At the same time, the hook 36 on the lug 34 will pass through a notch 39 formed in the right-hand handle A in FIG. 4. This arrangement of the lugs 33-34, ratchet teeth 35, and hooks 36 and 38, will permit wide separation of the hand-grasping portions 11 of the operating handles.

The handles A are contra-angled occlusally at inclinations relative to the retainer heads 10 and the handles are curved along their lengths, as shown in FIGS. 2 and

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3. Thus the rear parts of the handles will clear incisal edges of anterior (front) teeth, or clear the patient's tongue and occlusal surfaces of posterior (back) teeth.

I claim:

1. In a traction instrument for dental matrix band:

- (a) a pair of operating handles, each being provided with a retainer head and a hand-grasping portion at its front and rear ends, respectively;
- (b) a hinge connection securing intermediate portions of the handles together, with the hinge connection being located so as to separate the retainer heads relative to one another, when the rear hand-grasping portions of the handles are swung toward one another into closed position;
- (c) each retainer head being fashioned with a vertical slot extending thereinto from a gingival-facing edge thereof and the slots being aligned with one another transversely of the instrument;
- (d) these slots being dimensioned to slidably receive and guide a pair of overlapped end sections of a looped matrix band, with the loop of the band projecting from one of the retainer heads for encircling a patient's tooth, the handles being contrangled occlusally at inclinations relative to the retainer heads so that the rear parts of the handles will clear incisal edges of anterior teeth, or clear the patient's tongue and occlusal surfaces of posterior teeth, when the vertical height of a slot is arranged parallel to the axis of a banded tooth;
- (e) a pair of locking blades carried by the retainer heads, one blade on each head, and these blades being movable into positions to clamp the overlapped end sections of the band to the heads;
- (f) a pair of self-locking toggle arrangements, each being mounted on one of the handles, and operable to move the locking blades independently of one another into clamping position relative to the band, whereby the end sections of the band may be selectively clamped to one head and slidable in the slot of the other head;
- (g) and coacting means for locking the handles in closed position, thereby holding the retainer heads from moving toward one another.

2. The traction instrument for dental matrix band, as set forth in claim 1;

- (h) and in which each toggle arrangement has an operating lever secured to its respective handle and positioned remotely and rearwardly of the retainer heads so as to be accessible when the retainer heads are inserted onto a patient's mouth and a link connecting the operating lever of each toggle arrangement with its respective locking blade.

3. The traction instrument for dental matrix band, as set forth in claim 1;

- (h) and in which the locking blades are swingably secured to their respective retainer heads, and each is swingable on an arc so as to initially engage with a gingival-facing edge of the band as the blade is moved into clamping position, thereby urging the matrix band toward a bottom wall of the slot in the retainer head.

4. The traction instrument for dental matrix band, as set forth in claim 3;

- (i) and in which each locking blade is provided with a series of teeth that are directed forwardly so as to engage with the matrix band and urge the latter toward said bottom wall of the slot during the clamping operation.

5. The traction instrument for dental matrix band, as set forth in claim 1;

- (h) and in which the coacting means for locking the handles in closed position comprises:

- (1) a pair of lugs fixed to the handles, one on each handle, and these lugs projecting toward one another for overlapping each other;

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- (2) one of the lugs being formed with ratchet teeth, and the other lug having a single hook at its inner end engageable with the ratchet teeth during initial closing movements of the handles;
- (3) the handle on which the single-hook lug is fixed being formed with a hook engageable with the ratchet teeth when the handles are moved closer together.

6. The traction instrument for dental matrix band, as set forth in claim 5;

- (i) and in which each handle is formed with a notch

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through which the lug on the other handle will pass as the handles are moved into closed position.

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