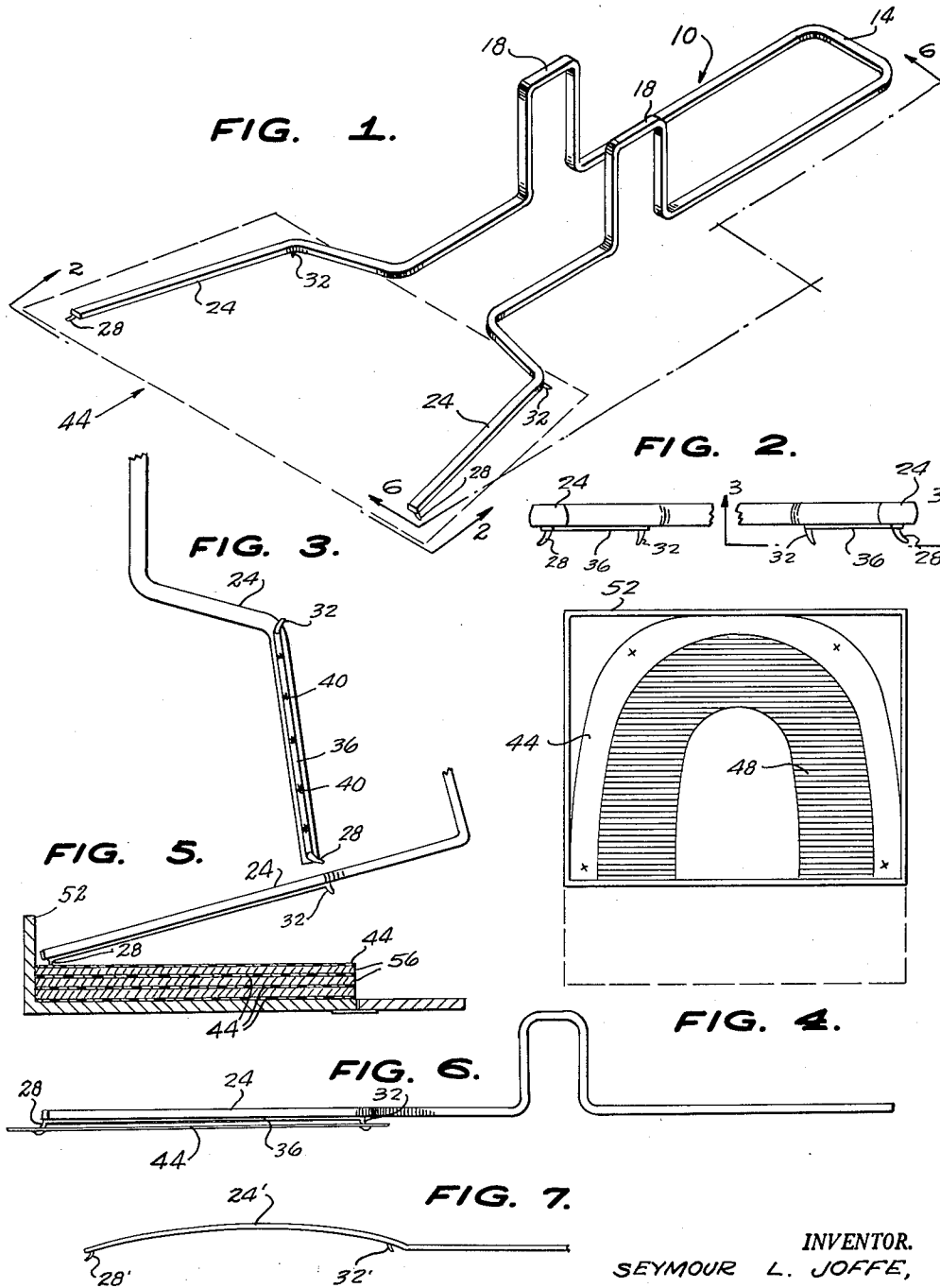


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CONTACT OF OPPOSING TEETH
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MARKING DEVICE FOR DETECTING DENTAL PREMATURE CONTACT OF OPPOSING TEETH

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This invention relates to dental instruments and more particularly to a marking instrument or device for placing telltale markings on prematurities which cause interference between occluding teeth of the upper and lower jaws. Likewise, when the occlusion is most nearly correct, there will be many opposing contacts widely distributed throughout the dental arches, as evidenced by as many telltale marks.

It is an object of the invention to provide a simple and easily operable device which can be inserted into the mouth of a patient for the purpose of marking with certainty opposing tooth-to-tooth contact.

It is another object of the invention to provide a tool or device which can be readily inserted into a patient's mouth, fitting a large range of mouth widths, and which can be readily withdrawn.

It is a further object of the invention to provide a device which will minimize or eliminate false markings on opposing promontories which do not interfere with each other.

It is a still further object of the invention to provide a marking device which makes possible the testing of the entire dental arch at one time, thus avoiding the distortion caused when only one side of the mouth is tested, by eliminating unbalance and the tendency of patients to shift the lower jaw.

A still further object of the invention resides in the provision of a device which requires a minimum of handling of the medium which carries the marking color pigment coating, e.g., a dye, and wherein the handling thereof may be accomplished in a neat, quick, and sanitary manner.

Other objects and features of the invention will be apparent from the description which follows.

Briefly, my invention comprises the combination of a handle and a filmlike marking medium secured by the handle and disposable within a patient's mouth. The handle is of flexible material and grips the marking film at spaced points by means of barbs which engage or pierce the marking film. The marking film itself is preferably of a stretchable latex which may be coated in predetermined areas with a suitable dye on both sides, which dye comes off on interferring promonotories. The arrangement provides for ready pickup by the handle or holder of the film material with a minimum of handling of such material by the dentist. Thus, pickup may be achieved by merely pressing certain of the barbs of the holder or carrier into the film at opposed corners thereof, then picking up the film by lifting the holder and thereafter pulling other corners of the film by mere fingertip engagement with corresponding edges or corners so as to bring such edges or corners into engagement, either piercing or non-piercing, with other barbs carried by the holders. Inasmuch as the holder is of resilient material in the form of a Y, which may be bent, e.g., from stainless steel wire, it may be compressed so as to narrow its dimension at the time of initial pickup and, accordingly, upon release, the natural resiliency of the holder stretches the film. Flexibility of the handle is of further advantage in that the transverse dimension of the device may be reduced by squeezing the handle so as to more readily move the marking medium into a patient's mouth and also out of the mouth.

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A detailed description of my invention will now be given in conjunction with the appended drawing in which:

FIG. 1 is a perspective showing the holder in working position having a stretched sheet of latex marking film applied thereto and shown in phantom.

FIG. 2 is an end view taken in the direction of 2-2 of FIG. 1.

FIG. 3 is an underside view taken in the direction 3-3 of FIG. 2 and showing one leg of the yoke-like holder.

FIG. 4 is a plan view of a supply box for the latex films.

FIG. 5 is a section taken generally longitudinally through FIG. 4 showing the magazine for holding the films and also showing the initial step in picking up a film with the holder; and

FIG. 6 is a view in elevation looking in the direction 6-6 of FIG. 1.

FIG. 7 shows a modified construction.

Referring now to the drawing, and in particular to FIG. 1, the invention comprises a flexible or resilient wire handle 10 which is generally yoke-like in configuration, having the resilient bend 14, finger pressure loops 18 and arms 24 which are offset as shown so as to be spaced apart a convenient distance to fit into the average person's mouth. Each of the arms is provided with a pair of forward barbs 28 and rearward barbs 32, the barbs being suitably curved to achieve a "hooking" effect. The curvature of the barbs is generally as shown on FIG. 2. By referring to FIG. 3 the mode of affixing the barbs to the arms will be noted. In this instance the barbs are pointed ends of a piece of spring wire 36 which may be spot welded as at points 40 to the underside of each arm 24, the ends 28 and 32 being suitably shaped and bent to form barbs as shown in FIG. 2. The barbs are quite short with preferably rounded and polished points. The forward barbs 28 are bent generally outwardly and are provided with a slight curvature, the bend being primarily in a forward direction, that is, the slope of the barbs being forward. However, the rear barbs 32, while similarly bent somewhat outwardly, are sloped rearwardly and are likewise provided with a slight curvature.

The shape of the barbs is such as to conveniently impale, hook or grip a latex film 44 substantially at the corners of the film; the film is preferably trapezoidally shaped as shown to conform approximately to the shape of the dental arch.

Referring to FIGS. 1 and 6, the position of the film with respect to the barbs and the holder is clearly shown and it will be understood that the film is in somewhat stretched and reasonably taut condition so as to be in a perfectly flat plane.

In order to bring about proper working relationship between the holder and the film, the pickup of the film is accomplished as generally illustrated in FIGS. 4 and 5. Thus, in the plan view of FIG. 4, the film 44 is shown having a generally horseshoe area 48 coated with a suitable marking medium or dye of which various types are commercially obtainable and have heretofore been used in connection with so-called marking papers. The film will be seen to repose in a magazine or carton 52 and, by referring to FIG. 5, it will be noted that a series of films may be superimposed on each other with intermediate layers 56 of wax paper or thin cardboard to keep the individual films separate from each other.

As noted from the position of the holder 24 in FIG. 5, the front prongs or barbs 28 are pressed into the uppermost film, due to the inherent softness of the film. The barbs grippingly engage the film at the areas marked "X" on the upper portion as shown in FIG. 4. The barbs need not actually pierce the film. In fact, as a matter of

practice, I have found that the film, being of soft and exceedingly flexible material, tends to become hooked on the barbs without being pierced. It will be understood that the finger portions 18 of the holder are pressed together so as to compress the lateral spacing between the arms 24 at the time the front barbs 28 are pressed into the film. Upon release of pressure against finger portions 18, the arms 24 move away from each other, thereby insuring digging in of the barbs into the material of the film and secure gripping thereof; at the same time the material is stretched to give a flat surface. The holder 10 is then lifted together with the film 44 which is now secured at its forward edge only. Each of the other corners of the film is then gripped with the fingertips and in turn pulled to stretch the film while being applied to the corresponding rear barb 32. Here, again, there need be no piercing of the film since I have found that the film has a tendency to merely wrap itself around the barb at the lowermost areas marked "X" as shown in FIG. 4.

It will be noted from FIG. 4 that the horseshoe dye area avoids a peripheral margin of the film so that film may be readily handled at the uncoated areas without soiling the fingers.

In the use of my invention, the holder may be squeezed at the finger portions 18 to narrow the space between the arms and, as will be readily apparent, the arms and adhering film may then be conveniently moved between the lips into a patient's mouth without touching the outside skin of the patient. To accommodate the holder to an unusually wide arch, the resilient bend 14 may be bent by the operator to increase the space between the arms 24. Once inside the mouth, the holder is released so that the film is once more stretched taut enough to serve its purpose. A very important effect of using a thin film of latex as the marking medium, such film being the order of only a couple of thousandths of an inch thick, is the avoidance of false markings left on promontories which are not to be ground and which, in fact, do not interfere with promontories of the opposing jaw. Thus, due to the high flexibility of the films, when a promontory is merely touched, the force of engagement is not normally sufficient to remove any of the dye coating and thus mark the promontory. In other words, the film gives and stretches so that there is no support against which it may rest while the promontory touches or grazes the film. Accordingly, any dye which may come off on such a promontory is so exceedingly minute as to be readily detectable as a false marking and ignored. However, when the film is in position between the contacting teeth, as the jaws are closed, any promontory of one tooth interferring with a promontory of another tooth surface of the other jaw, will clench the film therebetween and leave very pronounced marks to apprise the dentist that there is normal contact or interference between those points.

The latex films are, of course, disposable after once being used. In keeping with the spirit of the invention, I believe that while latex film is disclosed and taught herein as being preferable to other media for carrying the dye because of advantages hereinabove set forth, other types of materials may be used of a stretchable or non-stretchable nature. For example, thin plastic film of nylon or silk which has a certain amount of stretch, or even film of materials which are substantially non-stretching, for example, cellophane, may conceivably be used. The resiliency of the holder will serve to maintain non-stretchable materials in fairly taut, planar condition, transversely at least. Of course, where materials of a non-stretching type are to be used, it would be preferable to use a two-way stretching holder. The transverse stretch would be accomplished precisely as taught in FIG. 1, while the front-to-back stretch could be accomplished as shown in FIG. 7. Thus, the arms 24', one such being shown in FIG. 7, is of fairly thin material and provided with a bow or curvature between the barbs 28' and 32'. The resiliency provided by the curvature is utilized to maintain fore and

aft tautness. In other words, the curvature is increased slightly when the barbs 32' are applied to the film and upon release will, of course, tend to stretch the film in the left-right direction as viewed on FIG. 7. In this manner, two-way tautness may be accomplished with a non-stretchable film. Where a non-stretchable medium is used, the barb points may be required to be sharp.

Having thus described my invention I am aware that various changes may be made without departing from the spirit thereof, and, accordingly, I do not seek to be limited to the precise illustration herein given except as set forth in the appended claims.

I claim:

1. In a device of the class described, a holder having a pair of arms spaced at substantially mouth-wide distance from each other, and a thin and flexible marking film affixed to and held in substantially planar taut condition between said arms, said film having a marking medium transferable to promontories of teeth when said film is contiguous therewith.
2. In a device as set forth in claim 1, said arms carrying means for gripping said film at a plurality of points.
3. In a device as set forth in claim 1, said film being of a stretchable material.
4. In a device as set forth in claim 1, said arms being flexibly bendable toward each other by manual pressure.
5. In a device as set forth in claim 1, said film being of a stretchable rubber-like material.
6. In a device as set forth in claim 1, said film being of a stretchable rubber latex.
7. In a device as set forth in claim 1, said film having a thickness of the order of a couple of thousands of an inch.
8. In a device of the class described, a yoke-like holder comprising a pair of arms normally spaced at mouth-wide distance from each other and manually and resiliently movable toward each other; and film gripping means carried by said arms engageable with a film of marking material when said arms are forced toward each other, whereby said film is secured to said arms by said gripping means and said arms by virtue of resilient stress therebetween exert a tensioning effect on said film to maintain said film in taut, planar condition.
9. In a device as set forth in claim 8, said gripping means comprising barbs extending from said arms.
10. In a device as set forth in claim 8, and including, in combination therewith, a rubber-like marking film of thin, flexible, stretchable sheet material, said film having a marking medium transferable to promontories of teeth when said film is contiguous therewith, said film being held between said arms.
11. In a device as set forth in claim 9, said barbs extending out of the plane of said arms and having a curved shape.
12. In a device as set forth in claim 8, said holder being comprised of bent wire and having a handle portion, said arms being integral with said handle portion and extending therefrom.
13. In a device as set forth in claim 8, said arms being resilient in two directions so as to effect a gripping force on said film in directions which are generally normal to each other in order to effect uniform tension on said film.
14. In a device as set forth in claim 12, wherein said arms are bowed to effect resiliency thereof in one direction.
15. In a device of the class described, the combination of a holder comprising spaced barbed arms resiliently stressable by manually squeezing them toward each other, and a thin, flexible film having a transferable marking medium and having an area of suitable size so as to be gripped adjacent the periphery thereof by said barbed arms and picked up thereby when said arms are stressed and brought into contiguity with said film and released, said holder being operative to maintain a mouth-wide

mutual spacing of said arms in stressed condition to maintain said film in taut planar condition for insertion in a mouth.

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