June 23, 1964 L. F. ANDREWS 3,137,941

EXTRA-ORAL DENTAL RETRACTOR

Filed May 31, 1961

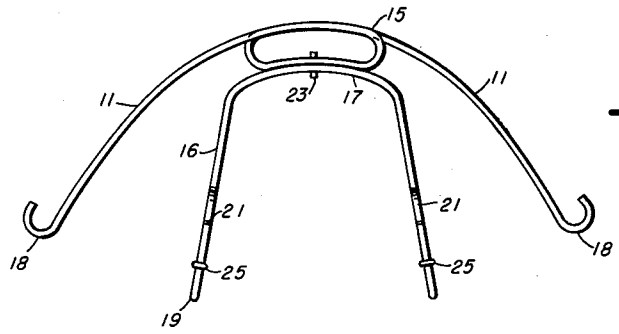


Fig. 2

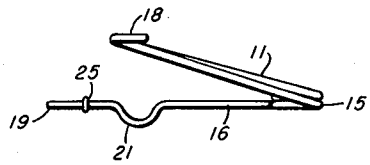
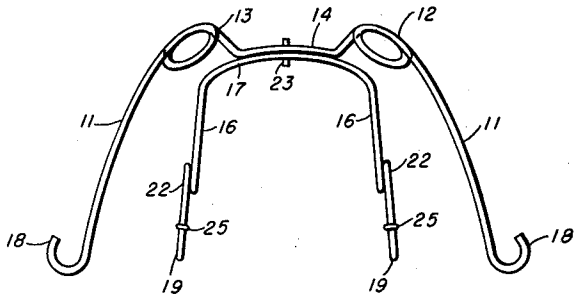


Fig. 1

Fig. 3



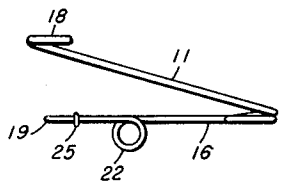


Fig. 4

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EXTRA-ORAL DENTAL RETRACTOR

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This invention relates to an orthodontic appliance and more particularly to extra-oral dental retractor utilizing at least one spring loop for tension application.

The prior art extra-oral dental retractors, of the type having an inner U-shaped member for positioning around a patient's teeth and engaging a patient's posterior molars, and an outer U-shaped member attached thereto extending around each side of the patient's face and attached to an elastic band which completes a loop around the patient's head, have serious disadvantages both to the patient wearing them and to the orthodontist when fitting a retractor to an individual patient. One of the more serious disadvantages lies in the necessity for constant adjustment of the elastic head band that connects the two posterior ends of the extra-oral dental retractor around the back of the neck for achieving the desired pressure upon the patient's teeth from the retractor. Thus, as the teeth move back in the desired position, the pressure lessens considerably and the strap requires frequent readjustments, in addition to readjustments required due to deterioration of the elastic. This obviously extends the period of treatment or if extra tension is maintained to limit the extended treatment period, results in extreme discomfort to the patient. Another serious disadvantage lies in the necessity of length adjustment of the inner wire for the individual patient which in turn makes commercially presoldered solder stops impossible since their placement is not known until the length adjustment has been made on the patient, after which the stops are soldered. This, of course, requires additional time and work on the part of the orthodontist making the fitting.

According to the invention, an extra-oral dental retractor is provided with a loop coil spring feature which tends to exert uniform pressure against the patient's mouth and requires fewer adjustments of the elastic head band. Further features of the present invention are adjustable bends in the inner U-shaped member which facilitate length adjustment and allow presoldered solder stops to be incorporated. A further time saving feature of the present invention lies in the use of a presoldered pinch tube in the center thereof for the quick insertion of spurs in situ. The above mentioned difficulties and disadvantages inherent in the prior art extra-oral dental retractors are thereby obviated.

It is thus an object of the present invention to provide an extra-oral dental retractor in which tension is applied substantially equally over extended periods of time without adjustment.

A further object of the invention is to provide an extra-oral dental retractor which is extremely comfortable to the wearer.

Another object of the present invention is to provide an extra-oral dental retractor in which length adjustments can be made quite simply and expediently.

Still another object of the present invention is the provision of an extra-oral dental retractor utilizing presoldered pinch tube for spurs, which aide in elevating the upper jaw and front teeth.

Yet another object of the present invention is to provide an improved extra-oral dental retractor which is simple and inexpensive to construct and easily adaptable to a wearer's mouth at a minimum of time and effort to the orthodontist.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same

becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings in which like reference numerals designate like parts throughout the figures thereof and wherein:

FIG. 1 shows a plan view of one embodiment of the present invention;

FIG. 2 shows a plan view of another embodiment of the present invention;

FIG. 3 shows a side view of one embodiment of FIG. 1 and FIG. 2; and

FIG. 4 shows a side view of another embodiment of FIGS. 1 and 2.

Referring to FIG. 1 there is shown an extra-oral dental retractor having outer member **11** with springs loops or coils **12**, center portion **14** and end hooks **18**. Connected to outer member **11** is inner member **16** having center portions **17** soldered to center portion **14** of member **11**. Inner member **16** has prewelded spur tube **23** and solder stops **25**.

Referring to FIG. 2 there is shown an extra-oral dental retractor having outer member **11** with spring coil **15** and inhooks **18**. Inner member **16** has center portion **17**, solder stops **25** and ends **19**. Center portion **17** is soldered to spring coil **15** of outer member **11**.

FIG. 3 is a side view of both FIG. 1 and FIG. 2. Inner member **16** is shown having an adjustable U-shaped bend **21**.

FIG. 4 is also a side view of another embodiment of FIGS. 1 and 2 having length adjusting loop **22** in inner member **16**.

Referring back to FIG. 1 the inner member **16** is placed within the patient's mouth and around the outside of the teeth making contact with the semi-permanent braces attached to the six year or twelve year molar teeth. The ends **19** fit in a tube provided on a molar tooth band (not shown) for terminating the movement of this member at solder stops **25**. If the length of member **16** is adjusted correctly, pressure exerted in a downward direction on end hooks **18** of outer member **11** which fits around each side of the wearer's head, will cause member **16** to exert pressure upon these braces which, of course, tends to pull the patient's or wearer's teeth upward and toward the rear of the patient's head. Obviously, if coil loops **12** were not present in member **11**, as the teeth moved back, less pressure being applied upon member **17** would result in less pressure being applied to the wearer's braces or teeth. Thus, it would become necessary to make frequent adjustment on the pressure applied to end hooks **18**, which, of course, is accomplished by an elastic head band (not shown) attached to these hooks which completes a loop around the patient's head. The addition of coil loops **12** reduces greatly the number of adjustments necessary to the head band to maintain a constant pressure against the patient's teeth. It further allows a greater overall pressure to be applied with no discomfort to the patient due to the evenness of the applied torque from the coil spring action. In practice, this has resulted in a greatly increased overall efficiency since the applied pressure is not solely dependent upon the elastic head band.

FIG. 2 shows another embodiment of the present invention embracing the same principle but utilizing only one spring loop shown at **15**. The theory here is exactly the same as the embodiment illustrated and described with respect to FIG. 1.

FIG. 3 shows a side view of either FIG. 1 or FIG. 2 with the additional feature of a U-shaped bend at **21** which allows for a simple and expedient length adjustment of member **16**. This allows solder stops **25** to

be presoldered since the length adjustment is made without physically cutting off the ends of inner member **16**.

In FIG. 4 there is shown a modification of the length adjustment of FIG. 3, in which, the adjustment is accomplished by a loop bend shown at **22**.

An extra-oral dental retractor has thus been disclosed which applies even pressure to the patient's teeth over long periods of time without adjustment, permits greater pressure to the teeth of the patient without an accompanying greater discomfort to the patient, and allows for presoldered stops by virtue of an inner member length adjusting feature, thus saving considerable time to the orthodontist.

It should be understood, of course, that the foregoing disclosure relates to only preferred embodiments of the invention and that it is intended to cover all changes and modifications of the examples of the invention herein chosen for the purpose of the disclosure which do not constitute departures from the spirit and scope of the invention.

What is claimed is:

1. An orthodontic appliance comprising a first U-shaped spring wire member adapted to be positioned in front of a wearer's mouth, said first member having ends adapted to be attached to a head strap at the rear of a wearer's head, said first member having at least one coil spring in the center portion thereof, a second U-shaped member fixedly attached to said first U-shaped member at the center portions of each, said second U-shaped member disposed within said first U-shaped member in a first plane of view, said first and second U-shaped members forming an acute angle in a second plane of view, said first and second planes of view being at right angles to each other, said second U-shaped member adapted to fit within a wearer's mouth around a wearer's teeth.

2. The orthodontic appliance of claim 1 wherein said first U-shaped member has two coils symmetrically disposed in the center portion of said first U-shaped member and said second U-shaped member is soldered to said first U-shaped member between said coils.

3. The orthodontic appliance of claim 1 wherein said second U-shaped member includes length adjusting means.

4. The orthodontic appliance of claim 3 wherein said length adjusting means comprises a U-shaped bend in each straight portion of said second U-shaped member.

5. In an orthodontic device which comprises two U-shaped members, one an inner member and the other an outer member, which outer member has at least one resilient looped portion, said two members being connected together adjacent their median points, said portion being symmetrical about said points, said inner member to be inserted into a mouth with portions of the inner member exerting pressure against teeth to correct the positions thereof, the outer member to be external to a mouth and to have a resilient element attached to its outer ends for maintaining a force thereon, which force is to be transmitted to said inner member, said device further comprising open loops formed in the two sides of the inner member, said loops being bendable but of relatively fixed size and shape once bent into position to provide said inner member with size adjusting means without unduly modifying the force transmitted therethrough, and preformed stops mounted on the sides of said inner member near the ends thereof for bearing against teeth.

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