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J. M. RUBIN

3,477,129

ORTHODONTIC APPARATUS

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FIG. 1

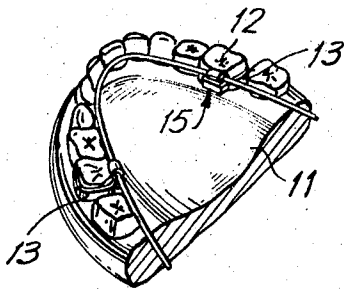


FIG. 2

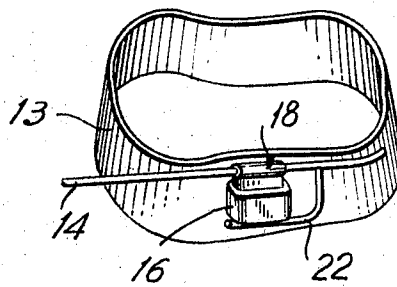


FIG. 3

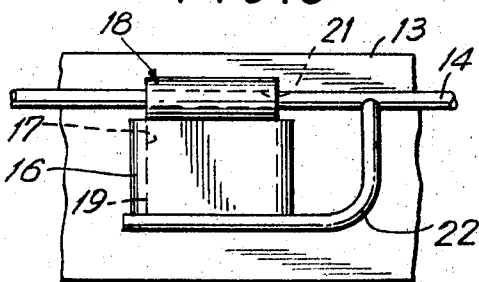
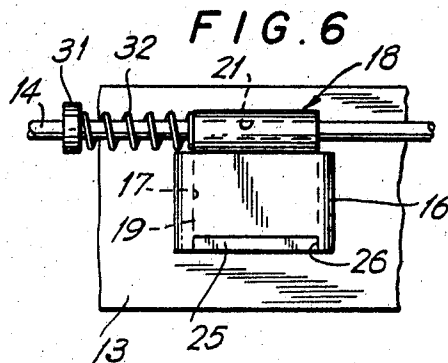
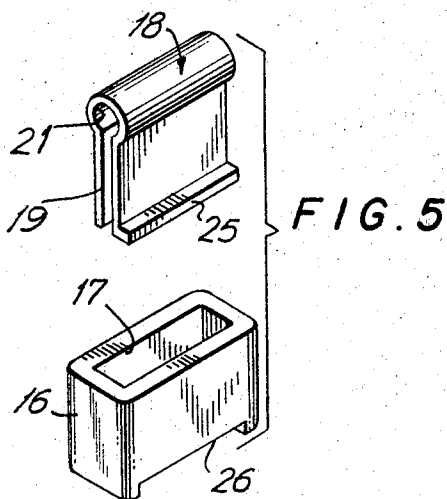
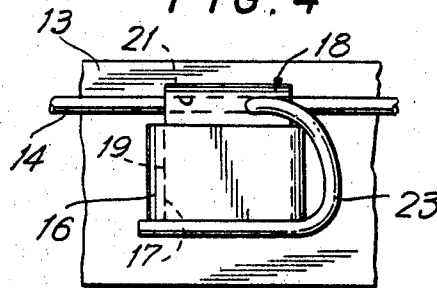


FIG. 4



INVENTOR.
JAMES M. RUBIN

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ORTHODONTIC APPARATUS

James M. Rubin, 141 W. 17th St.
 New York, N.Y. 10011

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4 Claims

ABSTRACT OF THE DISCLOSURE

An orthodontic apparatus of the lingual arch type including an improved shaft and tube assembly in which the shaft surrounds the arch wire and is vertically inserted in the tube, with means being provided to removably secure the shaft in the tube.

Background of the invention

Orthodontic apparatus of the lingual arch type is well known in the art. One form typically used is the Mershon type in which a half round shaft has an arch wire butt soldered thereto with the shaft inserted into a tube and held therein by a piece of lock wire. The butt soldering of the arch wire to the shaft has proven unsatisfactory in many cases as a result of breakage of the soldered connection as well as the inability to easily adjust the position of the arch wire with respect to the shaft prior to soldering.

Another type is the Atkinson arch in which the arch wire is bent sharply back on itself and is horizontally inserted in a tube secured to a tooth band. The primary drawback of the Atkinson arrangement is the requirement for the horizontal insertion of the arch wire, which is often difficult, if not impossible, to manipulate.

Summary of the invention

Generally speaking, in accordance with the invention, an apparatus is provided which can be used for most prior art applications but which overcomes many of the drawbacks of the prior art constructions. The shaft of the invention surrounds the arch wire to eliminate the butt joint found in the Mershon type construction and eliminate the necessity for horizontal insertion of the Atkinson type construction.

With the invention, a lock wire can be utilized to secure the shaft in the tube, or the shaft can be constructed so as to resiliently lock itself in the tube. Furthermore, the apparatus of the invention can be utilized when it is desired impart distal movement to a tooth.

Accordingly, it is an object of this invention to provide an orthodontic apparatus of an improved lingual arch type.

Another object of the invention is to provide an orthodontic lingual arch arrangement which will perform similar to many of the prior art arrangements, but in a superior manner.

A further object of the invention is to provide an orthodontic lingual arch tube and shaft arrangement wherein the final assembly is a vertical insertion operation.

Still another object of the invention is to provide a lingual arch which can be utilized as a distal movement device.

Still other objects and advantages of the invention will in part be obvious and will in part be apparent from the specification.

The invention accordingly comprises the features of construction, combinations of elements, and arrangement of parts which will be exemplified in the constructions hereinafter set forth, and the scope of the invention will be indicated in the claims.

Brief description of the drawing

For a fuller understanding of the invention, reference is had to the following description taken in connection with the accompanying drawing, in which:

FIG. 1 is a perspective view of a lingual arch assembled to a plurality of teeth;

FIG. 2 is a perspective view of a lingual arch assembly of the instant invention secured to a tooth band;

FIG. 3 is an elevational view, at an enlarged scale, of the arrangement of FIG. 2;

FIG. 4 is a view similar to FIG. 3, but showing the lingual arch utilized for a purpose different from that of FIG. 3;

FIG. 5 is a perspective, exploded view of a modified embodiment of a tube and shaft; and

FIG. 6 is a view similar to FIG. 3, but showing an alternate embodiment.

Description of the preferred embodiments

FIG. 1 is a perspective view of a lingual arch as it would appear when secured to the lower teeth or to a model thereof. The base is indicated as 11 and the teeth as 12 and to two teeth are secured tooth bands 13. The bands are of any standard known type. A U-shaped arch wire 14 is formed adjacent the teeth on the lingual side thereof and is attached to the bands by means of a tube and shaft assembly of the instant invention designated generally as 15.

Referring to FIGS. 2 and 3, a tube 16, which is soldered to band 13 has a generally rectangular cross section with a generally rectangular aperture 17 there-through, with the longitudinal axis of aperture 17 being vertically oriented with respect to the horizontal longitudinal axis of band 13. A shaft 18 is formed of flat material into a generally keyhole shaped configuration so as to define an arch wire receiving channel 21 at the top of the keyhole. In end wise appearance, the top of the keyhole is slightly wider than its legs 19, with the channel 21 being sufficiently large to slidably receive an arch wire. In the embodiment of FIGS. 2 and 3, a lock wire 22 has one end thereof soldered to the arch wire and is bent to a position beneath tube 16.

The embodiment of FIGS. 2 and 3 may be utilized for a Mershon type lingual arch. After tubes 16 have been secured to the tooth bands 13 and the bands are in place on the teeth, the arch wire is bent to follow the curvature of the lingual arch and shafts 18 are slidably mounted over the arch wire. Each shaft 18 is inserted in its respective tube 16 and the position of the arch wire is accurately adjusted. When adjustment is complete, the shaft is soldered or welded on the arch wire to rigidly maintain the adjusted position. Lock wire 22 is then bent under tube 16 as shown in FIGS. 2 and 3 to releasably hold the shaft in the tube.

In an Atkinson type lingual arch, it is desirable that the arch wire be axially slidable with respect to the shaft and the construction of FIG. 4 is used for the Atkinson type arrangement. As shown in FIG. 4, lock wire 23 is soldered to shaft 18 rather than to the arch wire and, in the assembled position, the lock wire is bent beneath tube 16 to releasably secure the shaft in the tube. In the Atkinson type arrangement, the shaft is not welded or soldered to the arch wire so that the axial movement of the shaft in channel 21 is permitted. Note that in the FIG. 4 arrangement, the assembly of the arch wire to the tube constitutes a vertical insertion operation, thereby eliminating the usual drawback of the Atkinson lingual arch which requires horizontal insertion.

The embodiment of FIG. 5 can be used for both the Mershon and Atkinson type lingual arches, but eliminates the requirement for lock wire. In the FIG. 5 construction,

the outer end of one of the legs of shaft 18 is bent at right angles to the leg to provide a lip 25. After the arch wire has been inserted in channel 21, the legs of shaft 18 are squeezed together for insertion in rectangular aperture 17. When insertion is complete, the inherent resiliency spreads the legs 19 and biases lip 25 beneath a recess 26 at the lower edge of the front face of tube 16 to thereby resiliently secure the shaft in the tube while permitting withdrawal of the shaft upon depression of lip 25. In this manner, the shaft is resiliently secured in the tube without the use of lock wires 22 or 23. In a Mershon type arrangement, the arch wire would be soldered or welded in channel 21 while in the Atkinson arrangement the soldering or welding would be eliminated so that longitudinal movement of the arch wire in channel would be possible.

The construction of FIG. 6 is especially useful when it is desired to impart a resilient force to the tooth for distal movement of same.

As shown in FIG. 6, a stop 31 is secured to the arch wire and a spring 32 surrounds the arch wire and acts between stop 31 and shaft 18. With arch wire 14 slidably mounted in channel 21, relative movement between the arch wire and the shaft-tube-band assembly secured to the tooth is possible with a resilient distal movement force being applied to the tooth through spring 32 acting against the stop on the arch wire.

From the foregoing, it is evident that the considerable weakness and drawbacks of the prior lingual arch devices have been eliminated while providing simple and improved apparatus which may be used for the different types of applications selected by the Orthodontists during this correction of various orthodontic problems.

The basic apparatus of the instant invention is the improved shaft and tube construction, with various elements being selectable for use in conjunction with the basic shaft and tube to perform the desired operation.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above constructions without departing from the spirit and scope of the invention, it is in-

tended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. Orthodontic lingual arch apparatus comprising a tube, a rectangular aperture in said tube having its longitudinal axis vertically oriented, and a shaft slidably received in said aperture and slidable in a vertical direction, said shaft having a generally keyhole shaped configuration with legs defining the sides thereof received in said aperture and the top of the keyhole defining a generally horizontal channel for receiving an arch wire, said legs defining a shaft of rectangular cross-sectional configuration, said legs being spaced, one from the other, and being compressible for insertion in said aperture, said legs defining external surfaces for frictional engagement with walls of said aperture, the length of said legs in said aperture being no greater than the length of said aperture along the longitudinal axis thereof.

2. Orthodontic lingual arch apparatus as claimed in claim 1 wherein the width of said top is greater than the width of said aperture.

3. Orthodontic lingual arch apparatus as claimed in claim 1 wherein one of said legs includes a lip portion extending outwardly therefrom for engagement with an end of said tube for releasably securing said shaft in said tube, said legs being resiliently compressible for permitting insertion and withdrawal of said shaft through said aperture.

4. Orthodontic lingual arch apparatus as claimed in claim 3 wherein said tube is provided with a recess for receiving said lip when said shaft is mounted in said tube.

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ROBERT PESHOCK, Primary Examiner