Dec. 1, 1970 J. M. RUBIN 3,543,404

ORTHODONTIC APPARATUS

Filed April 9, 1969

FIG. 1

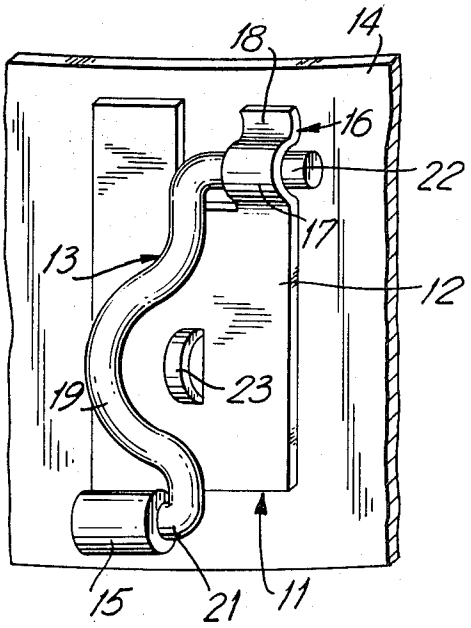


FIG. 2

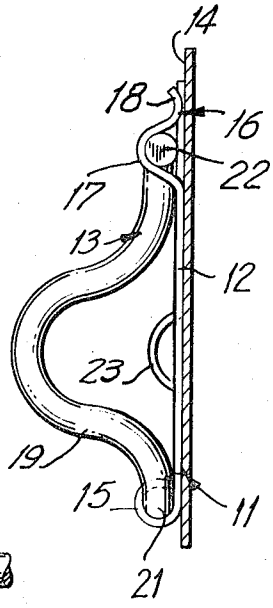


FIG. 3

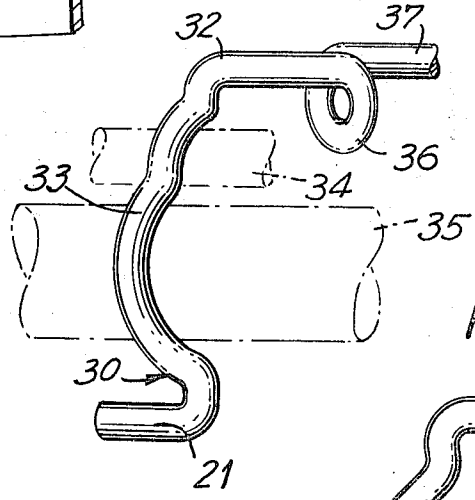


FIG. 4

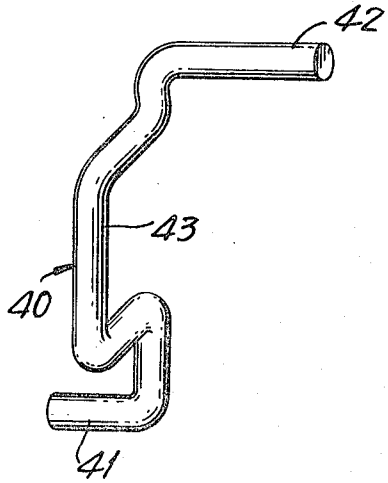
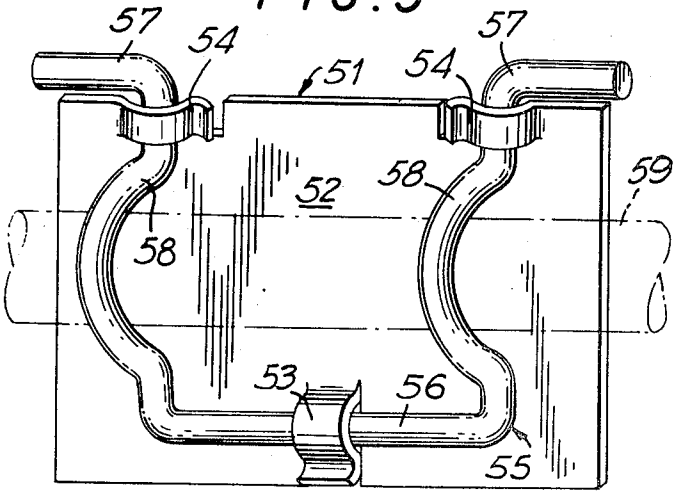


FIG. 5



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ORTHODONTIC APPARATUS

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U.S. Cl. 32—14 8 Claims

ABSTRACT OF THE DISCLOSURE

An orthodontic apparatus for receiving one or more arch wires in the art of orthodontics. The apparatus is in the form of a bracket secured to a tooth band with the bracket having a fixed plate and a hinged clip releasably latched to the fixed plate for releasably securing one or more arch wires.

BACKGROUND OF THE INVENTION

Orthodontic brackets are old and well known in the art and a multitude of various types of apparatus has heretofor been developed, all for the purpose of improving the art. An arch wire bracket must securely hold the arch wire in the predetermined position selected by the orthodontist. While performing such function, it is desirable that the bracket be of minimal size to minimize discomfort to the patient, and be easily manipulated in the patient's mouth for benefit of both the patient and orthodontist.

SUMMARY OF THE INVENTION

Generally speaking, in accordance with the invention, orthodontic apparatus in the form of an arch wire bracket includes a base plate of simple construction which can receive one or more arch wires and a clip hinged to the base plate at one end thereof and releasably connected to the base plate near the other end thereof so that the clip can be readily repositioned to effect an opening and closing of the bracket while the base plate is attached to the tooth band within the patient's mouth.

Accordingly, it is a principal object of this invention to provide improved orthodontic apparatus.

Another object of the invention is to provide an improved orthodontic bracket capable of being utilized in a wide variety of orthodontic techniques.

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 preferred embodiment of the instant invention showing a portion of the tooth band on which the orthodontic apparatus is mounted;

FIG. 2 is a side elevational view thereof;

FIG. 3 is a perspective view of modified form of clip showing a pair of arch wires in phantom;

FIG. 4 is a perspective view of another form of clip; and

FIG. 5 is a perspective view of an alternate form of bracket wherein the arch wire is held within the bracket at spaced locations, the arch wire being shown in phantom.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIGS. 1 and 2 a bracket indicated generally at **11** includes a base plate **12** and a clip **13**. Base plate **12** is preferably formed of thin sheet metal, usually stainless steel, and the base plate is secured, such as by soldering or welding, to a tooth band **14** of the type that encircles a patient's tooth, or to any suitable material that may be cemented or otherwise attached directly to a tooth.

Base plate **12** is generally flat and rectangular. The lower edge thereof is formed into a tube-like member **15** and, using proper metal forming techniques, the tube-like member is formed integrally with the base plate. Tube-like member **15** is generally disposed contiguous with one side edge. At the opposite end of the base plate contiguous with the other side edge, the base plate is provided with a formed tab **16**. The center portion of the tap has an arcuate configuration **17** which merges at one end with the main portion of the base plate and which merges at the other end into a cam shaped portion **18** through which the tab **16** can be deflected.

Clip **13** is formed of relatively stiff wire, usually stainless steel. The ends of the clip are coplanar and extend in opposite directions with both ends being substantially perpendicular to the longitudinal axis of the central portion of the clip. The center portion **19** is of arcuate configuration extending out of the plane of the ends. One end **21** is rotatably received in tube-like member **15** while the other end **22** is received in the center portion **17** of tab **16**. Arcuate center portion **19** overlies base plate **12** and the internal size of the arc is selected so as to receive the largest of a range of arch wires. For example, in the light wire technique, center portion **19** may be designed to receive and partially surround an arch wire having a diameter of .016" or smaller.

In utilizing the brackets shown in FIGS. 1 and 2, end **22** is gripped and cammed out of tab **16** by deflection of the tab and slight deflection of the clip. Thereafter, the clip is rotated about the pivot formed by end **21** within tube-like member **15**. With the clip open, an arch wire can be caused to overlie base plate **12** and the clip thereafter closed by camming end **22** under tab **16**. The closed position is indicated in FIG. 1.

By the construction just described, it is unnecessary to permanently affix end **21** in tube-like member **15**. Once the clip is moved to the closed position, lateral movement of the clip in either direction is prevented as a result of ends **21** and **22** extending in opposite directions. Not only does such feature impart a simplified construction to the apparatus of this invention, but it also permits ready changing of the clips in the event that it is desired to utilize a clip of a different size or configuration or in the event that the clip becomes damaged or distorted.

An embossment **23** is shown as being formed in base plate **12** in the area beneath center portion **19** of the clip. If it is desired to utilize the "one-point" technique the provision of an arcuate embossment will cause an arch wire to contact the base plate at substantially one point only and by proper selection of the size of the arc of center portion **19**, the arch wire can be caused to be contacted by the clip at substantially one point only. The provision of embossment **23** is optional and, of course, the distance between the inner surface of center portion **19** and base plate **12** for any particular range of arch wire sizes will be further determined by the presence or absence of an embossment.

The orthodontic apparatus of the instant invention also readily lends itself to use with the twin arch wire technique. A clip **30** includes an end **21** to be received

in tube-like member **15** and an end **32** for cooperation with tab **16**. The arcuate configuration of the center portion **33** of the tab is specifically designed to accommodate two arch wires. In FIG. 3, a small diameter arch wire is indicated in phantom lines at **34** and a larger diameter arch wire is indicated in phantom lines at **35**. Of course, it will be understood that the arch wires could be of equal diameter.

With the apparatus of the instant invention, it is also possible to utilize the clip as a spring to impart a rotating or uprighting force to the arch wire. While the spring portion is indicated in FIG. 3, it can be utilized with any of the clips envisioned by this invention. With reference to FIG. 3, end **32** is extended to include a loop **36** and a free end **37**. Loop **36** imparts spring like action to free end **37** and, after the arch wire is in place and the clip closed, free end **37** is wrapped about the arch wire to impart a rotating force between the arch wire and the bracket to thereby impart a rotating force to the tooth.

If it is desired to utilize an edgewise technique with a rectangular or square arch wire or to utilize braided arch wire of square or rectangular cross-sectional configuration, a clip as shown in FIG. 4 would be utilized. Clip **40** includes an end **41** to be received in tube-like member **15** and an end **42** which is releasably secured by tab **16**. The center portion **43** opens downwardly with square or rectangular dimensions depending on the dimensions of the arch wire.

Another form of bracket **51** is shown in FIG. 5. Base plate **52** includes a single substantially centrally located clip receiving member **53** at one end thereof and a pair of spaced tabs **54** at the other end thereof. A single clip **55** has a central portion **56** rotatably received in member **53**. Ends **57** are releasably secured by tabs **54** and operate in the same manner as tab **16**, except for the different orientation of tabs **54**. Intermediate each end **57** and central portion **56** is an arcuate portion **58** adapted to engage over an arch wire. An arch wire **59** is indicated in phantom lines.

A bracket of the type shown in FIG. 5 would be utilized in a technique where it is desired to hold the arch wire to the base plate at two spaced locations. By deflection of each end **57** and each tab **54**, clip **55** can be rotated within member **53** to an open position to allow removal or insertion of arch wire **59**. When the arch wire is in place, clip **55** is rotated and each end **57** is deflected under its associated tab **54** which deflects to allow entry of the clip end and thereafter holds the clip end in place until physically removed therefrom.

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 intended 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 apparatus for securing at least one arch wire relative to a tooth band comprising a base plate having a longitudinal area over which an arch wire is adapted to lie, a clip for releasably securing an arch wire to said base plate, clip pivoting means on said base plate for pivoting one portion of said clip to said base plate and clip retaining means on said base plate for releasably securing an other portion of said

clip to said base plate, said clip pivoting means being located on one side of said longitudinal area and said clip retaining means being located on the other side of said longitudinal area (said clip pivoting means being located on one side of a line extending transversely of said longitudinal area, and said clip retaining means being located on the other side of said line, the central portion of said clip between clip-pivoting means and said clip retaining means extending parallel to said line, said central portion being spaced from said base plate for receiving at least one arch wire therebetween, said one portion of said clip extending substantially perpendicular to said central portion on an axis parallel to the longitudinal axis of said longitudinal area and said other portion of said clip extending substantially perpendicular to said central portion on an axis substantially parallel to the longitudinal axis of said longitudinal area.

2. Orthodontic apparatus as claimed in claim **1** wherein said base plate includes embossment means in said longitudinal area, the uppermost surface of said embossment means extending towards said central portion of said clip for receiving an arch wire between said central portion and the uppermost surface of said embossment means.

3. Orthodontic apparatus as claimed in claim **1** wherein said central portion defines an arc for at least partially surrounding a circular arch wire.

4. Orthodontic apparatus as claimed in claim **1** wherein said central portion defines twin arcs for at least partially surrounding two circular arch wires.

5. Orthodontic apparatus as claimed in claim **1** wherein said central portion is substantially U-shaped for at least partially surrounding a rectangular arch wire.

6. Orthodontic apparatus as claimed in claim **1** wherein said clip pivoting means includes tubular means formed integrally with said base plate, said tubular means at least partially surrounding said one portion of said clip for rotatably mounting said one portion in said tubular means.

7. Orthodontic apparatus as claimed in claim **1** wherein said clip retaining means includes tab means formed integrally with said base plate, said tab means including a cam shaped portion at the extremity thereof for camming over said other portion of said clip and a raised portion between said cam shaped portion and said base plate for receiving thereunder said other portion of said clip when said clip is releasably secured by said clip retaining means.

8. Orthodontic apparatus as claimed in claim **1** wherein said one portion of said clip is intermediate the end thereof, said other portion of said clip is defined by the two ends thereof and two central portions are provided for securing the arch wire at two spaced locations, one of said central portions being located between one end of said clip and said one intermediate portion and the other of said central portions being located between the other end of said clip and said one intermediate portion.

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