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3,374,542

ORTHODONTIC BRACKET

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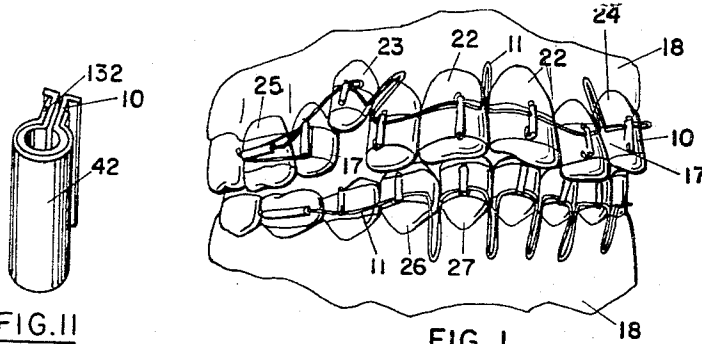


FIG. 1

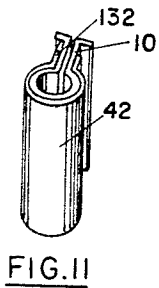


FIG. 11

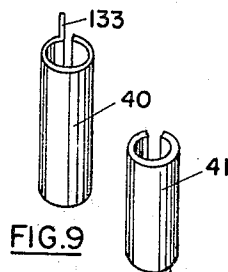


FIG. 9

FIG. 10

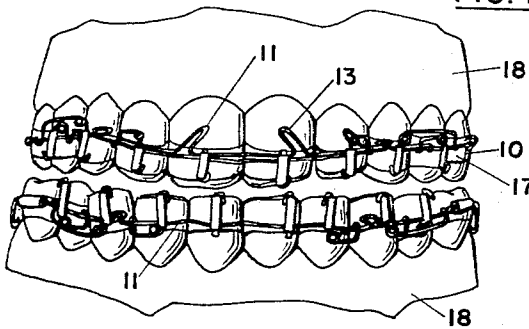


FIG. 2

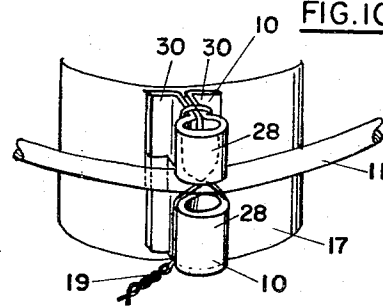


FIG. 3

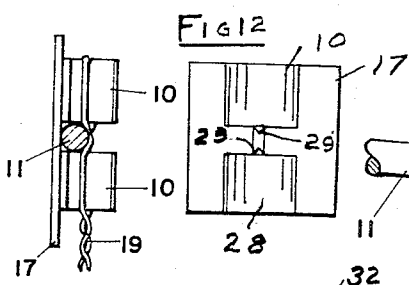


FIG. 4

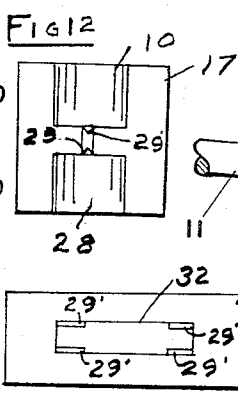


FIG. 12

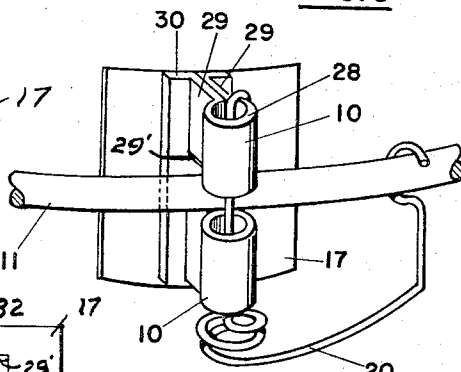


FIG. 5

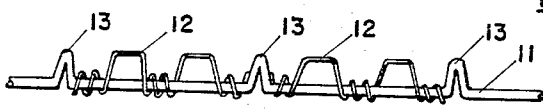


FIG. 6

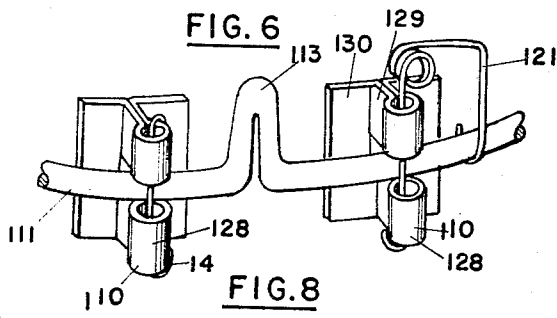


FIG. 8

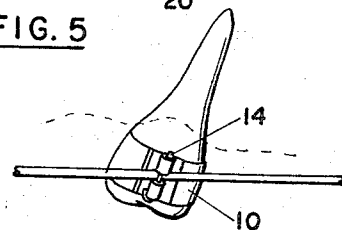


FIG. 7

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ORTHODONTIC BRACKET

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ABSTRACT OF THE DISCLOSURE

The orthodontic device disclosed herein provides caps for teeth having brackets with knife edges that engage the arch wire in both occlusal and gingival. This knife edge contact does not depend on a pin but is a function of the bracket. Because of the nature of forces imposed by the device, the arch wire tends to remain seated in its slot and, therefore, the pin or cap is used to prevent accidental displacement.

This invention relates to orthodontic appliances and, more particularly, to an orthodontic appliance useful in the process of straightening teeth.

The orthodontic device disclosed herein fulfills the requirements of the Begg technique of freedom to tip the teeth by limiting the contact of the arch wire to a knife edge contact. It is superior to the conventional bracket in that the knife edge contact is presented on both sides of the arch wire in both occlusal and gingival. The conventional bracket has a small double contact on the occlusal surface of the arch wire. This knife edge contact is a function of the bracket and does not depend on a pin. Therefore, there is no possibility of binding due to faulty pins, damaged pins, or too tight insertion of the pin.

Many pins which are intended to present a double knife edge contact are available but they are, of necessity, soft and, therefore, easily damaged. In addition, they are difficult to handle and relatively expensive. Caps may be used with the bracket disclosed herein or any suitable gauge wire may be inserted in the tube portions and used to retain the arch wire. Due to the nature and direction of the forces used in this technique, the arch wire tends to remain seated in the slot and, therefore, the pin or cap is actually used to prevent accidental dislodgement. The cap or pin cannot possibly cause binding.

Another advantage of the design disclosed herein is that the arch wire can be directly inserted into the slot between the two spaced brackets whereas in conventional brackets, it must often be flexed past the bracket and then inserted into the slot or, in the case of rotation, the wire simply cannot be inserted without danger of distortion and extension or excessive forces on the teeth.

In the present invention arch wires can be quickly and very easily removed by cutting the pin in the arch slot and removing both ends in the occlusal and gingival directions, respectively, or by removing the caps. Arch wires of .025 inch may be used in the third stage of Begg treatment without alteration of the bracket. Considerable time is saved in placing the third stage arch and auxiliaries by eliminating tedious tying with small gauge ligature wire. Main arches can be preformed into assorted sizes with preformed torquing auxiliaries in place and quickly and easily held in the bracket slot with pins, caps, and/or root paralleling springs.

Some of the specific advantages of the device disclosed herein are: (1) it provides a narrow arch wire contact which allows free tipping; (2) it eliminates pins which, if improperly handled, can be a source of friction or failure; (3) it permits the use of third stage arch wire up to .025 inch and auxiliaries without the necessity of ligature wires; (4) it provides a mechanism to achieve and hold overcorrections of rotations; and (5) it places auxiliaries in

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such a position that there is less gingival impingement and food entrapment.

The device herein constitutes an improvement over Patents No. 3,085,335 and 3,085,336 and other patents.

More specifically, it is an object of the present invention to provide an improved orthodontic device.

Another object of the invention is to provide an orthodontic device which provides knife edge contact to the arch wires and other wires on both sides of a bracket.

Another object of the invention is to provide a very narrow arch wire contact which allows free tipping in an orthodontic device.

Still another object of the invention is to provide an orthodontic device which eliminates special pins.

A further object of the invention is to provide an orthodontic device which eliminates the necessity of ligature wires, particularly in the third stage of treatment.

Still a further object of the invention is to provide an orthodontic device which will achieve overcorrection of rotation in an improved manner.

Yet a further object of the invention is to provide an orthodontic device which places auxiliaries in such a position that there is less gingival impingement and food entrapment.

With the above and other objects in view, the present invention consists of the combination and arrangement of parts hereinafter more fully described, illustrated in the accompanying drawing and more particularly pointed out in the appended claims, it being understood that changes may be made in the form, size, proportions, and minor details of construction without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawing:

FIG. 1 is a partial front view of an orthodontic model in the first stage of "Begg" treatment with the device according to the invention in place thereon;

FIG. 2 is another view of a model similar to FIG. 1 in the third stage of "Begg" treatment with .025 arch and torquing arch;

FIG. 3 is an enlarged view of the device according to the invention;

FIG. 4 is a side view partly in cross section of the device shown in FIG. 3;

FIG. 5 is a front view of the device shown in FIGS. 3 and 4 with a rotation spring substituted for the ligature wire;

FIG. 6 is a front view of an arch wire with a torquing spring thereon;

FIG. 7 is a view of an arch wire supported on a device according to the invention;

FIG. 8 is an enlarged view of the invention shown utilizing root paralleling springs and ligature wires;

FIGS. 9, 10, and 11 show views of sleeve devices for supporting the arch wires in the device according to the invention;

FIG. 12 shows a front view of the bracket; and

FIG. 13 is a view of the bracket before forming.

Now with more particular reference to the drawing, the model shown in FIG. 1 has gums 18 with teeth 22 to 27 thereon. The teeth have the bands 17 with the brackets 10 according to the invention attached thereto. The brackets 10 may be supported on the bands 17 in a manner according to the invention.

The brackets 10 are preferably made of a flat relatively thin sheet of material (for example, .010 to .012 inch thick) with an opening at its center 32 which is bent into spaced cylindrical central portions 28, then having the two intermediate portions 29 formed with knife edges 29' thereon bent parallel to each other and extending from the central portions and having the ends 30 bent from each other generally perpendicular to the intermediate portions 29.

Hollow cylindrical sleeve devices 40, 41, and 42 shown in FIGS. 9, 10, and 11 are of a size that will slide with a friction fit around the cylindrical portions and thus eliminate the pin and, in the instance shown in FIGS. 9 and 11, they have the flanges 132 and 133 which may be along said intermediate portions 29. The sleeve devices will provide a knife edge surface for the arch wire.

The arch wires 11 are intended to pass between the intermediate portions 29 and rest against the knife edge 29' of the brackets so that the tooth can rock about the knife edges 29' formed by the intermediate portions 29. The upper and lower brackets 10 are joined together by the flanges 30 which are an integral part of the whole bracket. FIG. 8 more accurately depicts this.

In the embodiment shown in FIGS. 1 through 7, the device is shown with various spring wires, arch wires 11, spring torquing arch wires 12, pins 14, bands 17, ligature wires 19, rotating springs 20, and uprighting spring or root moving springs or root paralleling springs 21. These devices will all be familiar to those skilled in the art and will readily illustrate how teeth can be straightened by utilizing the device disclosed herein wherein the arch wire engages the brackets at the intermediate part where the two parallel intermediate parts are parallel to each other and present at their edges a knife edge effect.

In the embodiment shown in FIG. 8, the arch wire 113 is shown with the root moving spring 121 inserted into the central cylindrical parts of the brackets indicated at 128. The flanges 130 can be fixed to suitable caps in the manner indicated in the other figures of drawing. It will be noted that the knife edge contact is the function of the bracket 10 and does not depend on the pin in the bracket. Therefore, there is no possibility of binding due to faulty pin or tight insertion of pin. The caps may be used or any suitable gauge wire may be used for retaining the arch wire. The arch wire can be inserted directly into place and does not have to be flexed past the bracket to engage the slot.

The foregoing specification sets forth the invention in its preferred practical forms but the structure shown is capable of modification within a range of equivalents without departing from the invention which is to be understood is broadly novel as is commensurate with the appended claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A bracket for orthodontics comprising a relatively thin plate having edges and ends and having a central part formed into a hollow shape, said plate having two intermediate parts adjacent said hollow shape extending generally parallel to each other and resting on each other, said edges of said plate at said intermediate parts defining knife edges, the end portions adjacent said plate like member being bent outwardly from each other and adapted to be attached to a tooth cap.
2. The bracket recited in claim 1 wherein said end portions being disposed substantially in a common plane are disposed generally perpendicular to said two intermediate parts.
3. The bracket recited in claim 1 in combination with another said bracket and a cap, said end portion of said brackets being attached to said cap member with a space therebetween and with said hollows in said brackets aligned with each other,

a hollow sleeve open at one side receiving and frictionally engaging said central part of said brackets.

4. The bracket recited in claim 3 wherein said sleeve member has one side thereof extending radially therefrom, said radially extending member being adapted to lie along and in engagement with one of said intermediate members.

5. The bracket recited in claim 1 wherein a plurality of said brackets are provided, and caps are provided, said caps being adapted to be attached to spaced teeth, an arch wire engaging the intermediate parts of said brackets, and springs, said springs having one end attached to said intermediate part of said brackets, another end of each said spring engaging said arch wire.

6. The combination recited in claim 5 wherein said spring has an intermediate helical portion, said end of said spring engaging said bracket having a hook member thereon engaging a side of one said intermediate member, said end of said spring engaging said arch wire, said helical portion of said spring exerting a torsional force on said cap tending to rotate said cap about an axis perpendicular to said arch wire.

7. The combination recited in claim 5 wherein said spring has a helical intermediate part, said end of said spring engaging said bracket having a hook engaging said arch wire, each said helical portion exerting a torsional force on said cap about an axis generally parallel to said arch wire and passing through a said cap.

8. The combination recited in claim 3 wherein said sleeve has two spaced flange portions disposed generally parallel to each other attached to said cylindrical portion, said flanges receiving said intermediate parts therebetween.

9. The bracket recited in claim 1 in combination with another said bracket and a cap, said brackets being attached to said cap member with a space therebetween.

10. The bracket recited in claim 1 wherein said knife edges terminate at their parts adjacent each other in edges sloping toward each other.

11. The bracket recited in claim 1 wherein said bracket has an opening formed in the center thereof with said knife edges projecting inwardly toward each other at each corner of said opening and extending a part of the way only along said opening.

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