Feb. 14, 1961 S. M. BIEN 2,971,258

ORTHODONTIC APPLIANCE

Filed Nov. 25, 1955

FIG. 1

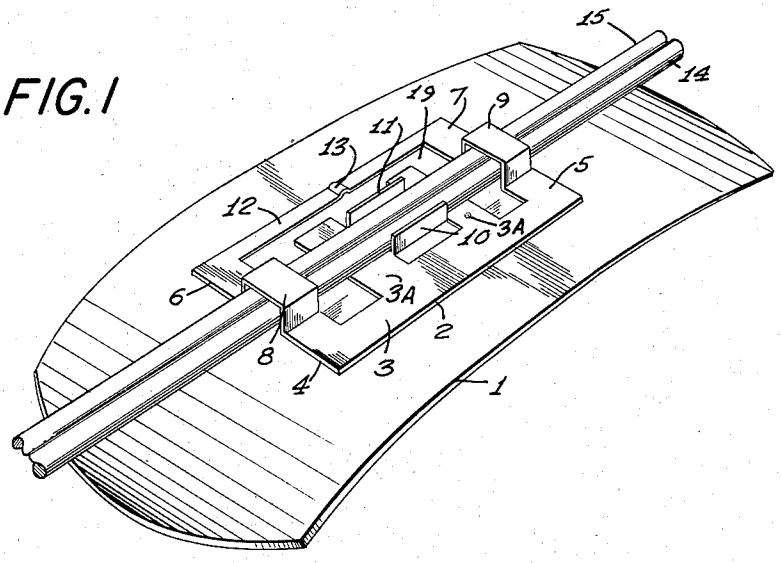


FIG. 2

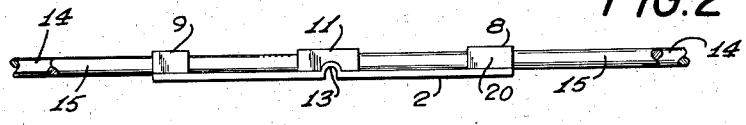
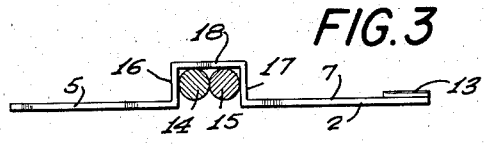


FIG. 3



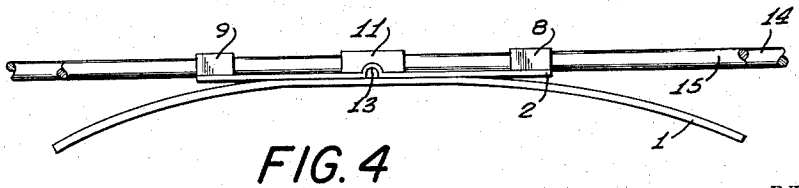


FIG. 4

INVENTOR

SAUL M. BIEN

BY Michael S. Striker

ATTORNEY

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ORTHODONTIC APPLIANCE

Saul M. Bien, Lynbrook, N.Y., assignor to Paul Robert Bien Foundation, Lynbrook, N.Y.

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5 Claims. (Cl. 32—14)

This invention relates to an orthodontic appliance known as a bracket. Its general purpose, although not entirely, is to maintain arch wire or wires in proper relation to the tooth or teeth to which they are applied so that controlled force may be used.

One of the objects of this invention is to provide an improved form of orthodontic bracket constructed with an arch wire receiving channel at each side of the bracket and a central receiving channel for proper maintenance and positioning of the arch wire or wires. The receiving channels on each side of the bracket are on members of the bracket in continuous construction with the base of the bracket but so formed that they are free of rigid attachment to the base. This particular construction, which will be described in detail in the specifications, creates an improvement in that a spring effect, basic to this invention, is exerted bilaterally at the side receiving channels. A balanced tension is exerted upon the arch wire or wires at these points to permit greater accuracy, control and stability of the stress forces applied to the arch wire or wires and, in finality, accurate control of tooth movement.

An additional object of this invention is to provide an improved form of orthodontic bracket capable of maintaining the usual flexible arch wire or wires and, in addition, the rigid type. With the use of the rigid arch wire or wires, distortion of the wire and resulting alteration of the stress forces is avoided in cases when the patient bites into hard objects or foods.

Another object of this invention is to provide a very small, simple, improved one piece construction of a bracket in which the arch wire or wires can be quickly inserted in position without the use of a separate clamping unit or device and maintained securely.

Another object of this invention is to provide a bracket which is so gentle in its action that it may be cemented directly to the tooth as well as being attached to a band which is in turn cemented to a tooth.

The objects enumerated above and the advantages of this invention will appear from the following details. A description of the several views of the drawings is as follows:

Fig. 1. A front view of the bracket attached to a tooth band with arch wires in position.

Fig. 2. A top view of bracket in vertical position with arch wires in position.

Fig. 3. A right end view of the bracket with arch wires inserted.

Fig. 4. A view of Fig. 1 vertically from top of tooth with band and bracket and arch wires in position.

It is to be understood that this invention is not limited in its application to the details of construction and arrangement of its members shown in the drawings as this invention is capable of other embodiments and of being constructed in other ways. It is further understood that the language used herein is for the purpose of description and not of limitation.

Referring to the drawings, 2 in Fig. 1 represents the bracket in it's entirety attached to a metal tooth band 1 by means of spot welding or by any suitable means, at the base of the bracket 3, preferably at the points 3A.

The bracket is essentially constructed by die stamping or by any other suitable method of fabricating a metal suitable for insertion and retention in the human mouth. A suitable plastic may be used with apropriate means of attachment to the tooth band or to the tooth directly. The bracket is composed of a base 3 and parallel lateral side members 4, 6 and 5, 7; which are at right angles to and in the same plane with the base 3 and perpendicular members 16, 17 and 20, 21 (not shown). Also, a horizontal member 12 which is at right angles to the sides 4, 6 and 5, 7. The area indicated by 19 represents the cut out portion of the bracket. The arch wire receiving channels 8 and 9 are continuous with side members 4, 6 and 5, 7. One method of forming this channel is shown in Fig. 3 which is an end view of the right side of the bracket shown in Fig. 1. In Fig. 3, the walls 16 and 17 of the channel are vertical and parallel and at right angles to the side member 5, 7 of the bracket. The top of the channel 18 is parallel to the member 5, 7 and at right angles to its sides 16, 17. Members 4, 8, 6, 12, 13, 7, 9, 5 are continuous with the base 13. The center receiving channel is shown in Fig. 1 at 10 and 11 which represent its wall members. Construction of the center channel comprises two vertical and parallel wall members 10 and 11 and a connecting flat base (not shown) to form a U-shape. This center channel may be formed by a milling operation, die stamping or made continous with the bracket by a variation in construction. The center channel represents a refinement in the construction of the bracket but may be omitted since it is not essential to the basic advantages of the invention.

The improvement in this bracket is in the creation of a spring effect with a one piece construction, giving an outrigger type of balance to the tooth. It is to be noted that when the base 3 is welded to the tooth band 1 at points indicated by 3A, the members 4, 6, 12, 7, 5 are free of attachment. This construction creates a spring tension. To further increase the tension effect, the side portions 4, 6 and 5, 7 together with the portion 12 connecting the ends of the side portions, may be bent out of the plane in which the supporting portion 3 of the bracket is located in a direction toward the ring 1 to which the supporting portion 3 of the bracket is welded or fastened. The top wall portions of the U-shaped channels 8 and 9 respectively formed on the lateral side portions will thereby press the arch wires 14, 15 located in the U-shaped channels against the top surface of the supporting portion 3. By properly bending the side portions of the brackets downwardly against the ring 1 the tension against the arch wire or wires may be properly adjusted and balanced so that the desired regulating force is exerted on the tooth onto which the ring 1 is fastened. In Fig. 1, 13 is a small channel for the purpose of using a pointed instrument to be inserted therein in order to lift the free members 4, 6, 12, 5, 7 away from the tooth band and allow space through which to insert easily and quickly the arch wire or wires 14, 15 into the center channel between walls 10 and 11 and through the receiving channels 8 and 9. Upon release the free members spring back towards the wall of the tooth band thereby locking the arch wire or wires in position. The improved construction described above permits the bracket to be moulded or shaped to the irregularities of the shape of the teeth thereby assisting further in regulating the pressures necessary to effect a particular tooth movement.

Fig. 2 represents the elements of construction when viewed from the top of the bracket in vertical position.

Fig. 4 shows the relationship of the bracket to the tooth band which is attached to a tooth.

It is to be understood that modifications in the construction of the above described bracket, one form of which is described and illustrated herein, may be made without departing from the scope of this invention.

The following claims are made:

1. An orthodontic bracket for the retention of a least one arch wire, said bracket being formed from an elastically deformable piece of sheet material and including a flat supporting portion adapted to be mounted on a front surface of a tooth in a plane substantially parallel to said tooth surface; a central wire retaining portion located on said supporting portion and shaped so that the wire is removable from said central wire retaining portion by movement in a direction substantially normal to the plane of said supporting portion and away therefrom without movement of said central wire retaining portion relative to said supporting portion; and two lateral wire retaining portions integrally connected to said supporting portion in such a manner as to be bendable in a direction substantially normal to the plane of said supporting portion and away therefrom for release of the wire therefrom.

2. An orthodontic bracket for the retention of at least one arch wire, said bracket being made from an elastically deformable piece of sheet material formed with a U-shaped slot dividing said sheet into a flat supporting portion adapted to be attached to a tooth, a pair of lateral side portions, each integrally connected at one end thereof to said supporting portion, and a connecting portion integrally connecting the other ends of said side portions, said supporting portion having a central wire-retaining portion shaped so that the wire is removable from said central wire retaining portion by movement in a direction substantially normal to the plane of said supporting portion and away therefrom without movement of said central wire retaining portion relative to said supporting portion, and each of said side portions being formed with a lateral wire-retaining portion shaped so as to press the wire against said supporting portion, said side portions with said lateral wire retaining portions thereon being resiliently movable in a direction substantially normal to the plane of said supporting portion and away therefrom for release of the wire from said lateral wire retaining portions.

3. An orthodontic bracket for the retention of at least one arch wire, said bracket being made from an elastically deformable piece of sheet material formed with a U-shaped slot dividing said sheet material into a flat supporting portion adapted to be attached to a tooth, a pair of lateral side portions integrally connected at one end thereof to said supporting portion, and a connecting portion integrally connecting the other ends of said side portions, said bracket including a central wire retaining portion including a pair of spaced wall members projecting substantially parallel to each other and substantially normal to said supporting portion, each of said side portions being formed with a U-shaped channel, the side walls of which extend in the same direction as said pair of spaced wall members of said wire retaining portion and said U-shaped channels being substantially aligned with the channel formed between said wall members whereby an arch wire may be placed over said supporting portion and between said wall members by resiliently bending said connecting portion and said side portions out of the plane in which said flat supporting portion is located.

4. An orthodontic bracket for the retention of at least one arch wire, said bracket being made from an elastically deformable piece of sheet material formed with a U-shaped slot dividing said sheet material into a flat supporting portion adapted to be attached to a tooth, a pair of lateral side portions integrally connected at one end thereof to said supporting portion, and a connecting portion integrally connecting the other ends of said side portions, said connecting portion being formed with means for insertion of an instrument therein for lifting said connecting portion and said side portions connected thereto out of the plane of said flat supporting portion, said bracket including a central wire retaining portion including a pair of spaced wall members projecting substantially parallel to each other and substantially normal to said supporting portion, each of said side portions being formed with a U-shaped channel, the side walls of which extend in the same direction as said pair of spaced wall members of said wire retaining portion and said U-shaped channels being substantially aligned with the channel formed between said wall members, whereby an arch wire may be placed over said supporting portion and between said wall members by resiliently bending said connecting portion and said side portions out of the plane in which said flat supporting portion is located.

5. An orthodontic bracket for the retention of at least one arch wire, said bracket being made from an elastically deformable piece of sheet material formed with a U-shaped slot dividing said sheet material into a flat supporting portion adapted to be attached to a tooth, a pair of substantially parallel, lateral side portions integrally connected at one end thereof to said supporting portion, and a connecting portion extending substantially normal to said side portions and integrally connecting the other ends of said side portions, said bracket including a central wire retaining portion including a pair of spaced wall members projecting substantially parallel to each other and substantially normal to said supporting portion, each of said side portions being formed substantially midway between the ends thereof with a U-shaped channel, the side walls of which extend in the same direction as said pair of spaced wall members of said wire retaining portion and said U-shaped channels being substantially aligned with the channel formed between said wall members, whereby an arch wire may be placed over said supporting portion and between said wall members by resiliently bending said connecting portion and said side portions out of the plane in which said flat supporting portion is located.

References Cited in the file of this patent

UNITED STATES PATENTS

2,381,128	Laskin	Aug. 7, 1945
2,548,864	Brusse	Apr. 17, 1951