Sept. 23, 1941. J. D. PEAK 2,257,069

ORTHODONTIC BRACKET

Filed Jan. 27, 1941

Fig-1-

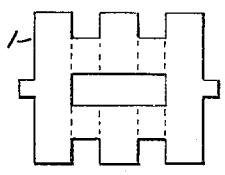


Fig-2-

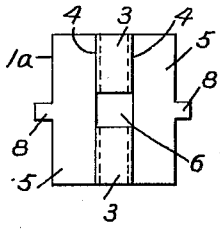


Fig-3-

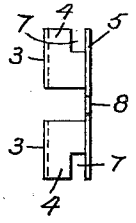


Fig-4-

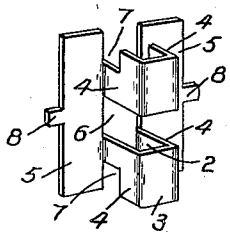


Fig-5-

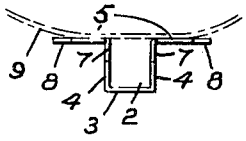


Fig-6-

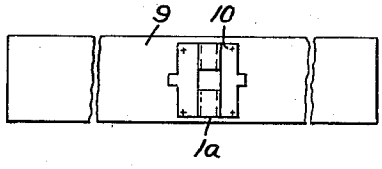


Fig-7-

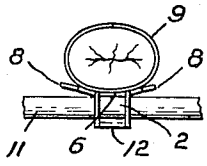


Fig-8-

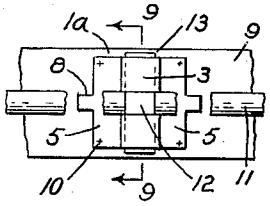


Fig-9-

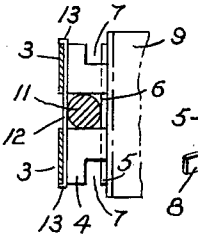


Fig-10-

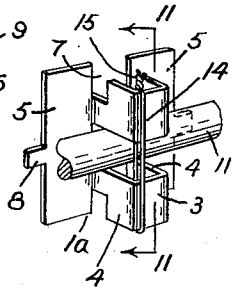


Fig-11

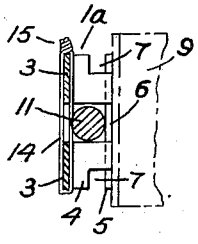


Fig-12-

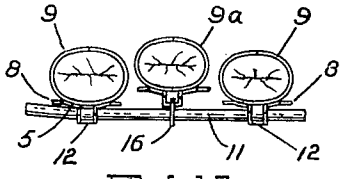


Fig-13-

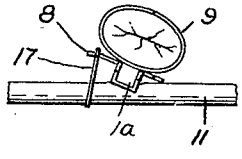


Fig-14-

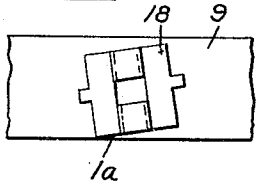
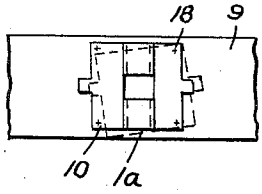


Fig-15-



Inventor

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By

Attorney

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UNITED STATES PATENT OFFICE

2,257,069

ORTHODONTIC BRACKET

Joseph Dayton Peak, Austin, Tex.

Application January 27, 1941, Serial No. 376,233

3 Claims. (Cl. 32—14)

This invention relates to improvements in orthodontic appliances and particularly to brackets designed to be applied to tooth bands for use as a means of attachment thereto of regulating arch wires and other orthodontic devices employed in connection with tooth bands for correcting the position of malposed teeth of the dental arch.

One object of the invention is to provide an anchoring bracket which may be made of thin metal and yet will be strong and durable so as to properly withstand and distribute the stresses produced by the attachments over a large area of the tooth band.

Another object of the invention is to provide a bracket which may be readily and desirably formed of either precious metals or of a comparatively cheap metal, such as stainless or chrome steel.

Still another object of the invention is to provide a bracket which will hold a regulating arch wire properly seated and secured out of irritating contact with the cheeks, lips or other portions of the mouth.

Still another object of the invention is to provide a bracket which may be fixed to the tooth band by soldering, brazing or electric spot welding, and which may be temporarily welded in an approximate position for adjustment and after adjustment welded firmly in permanent position.

Still another object of the invention is to provide a bracket to which a regulating arch wire may be secured by a fastening pin or by a wire or other ligature.

Still another object of the invention is to provide a bracket which will allow forces to be applied for positively rotating a tooth and controlling its amount and degree of rotation, or for extruding, intruding, elevating, depressing or changing the axial inclination of a tooth by means of forces applied through the bracket to the tooth band.

Still another object of the invention is to provide a bracket which is simple and inexpensive in construction, adapted to be readily, conveniently and efficiently employed for any of the aforesaid purposes, and which may be produced and sold at a comparatively low cost.

With these and other objects in view, which will appear in the course of the subjoined description, the invention consists of the novel features of construction, combination and arrangement of parts, hereinafter fully described and claimed, and as shown in the accompanying drawing, in which:

Fig. 1 is a plan view of a thin metal blank from which my improved bracket may be formed.

Fig. 2 is a front elevation of the bracket formed from the blank shown in Fig. 1.

Fig. 3 is a side elevation of the bracket.

Fig. 4 is a perspective view of the bracket.

Fig. 5 is a plan view of the bracket as it appears from the top or bottom thereof.

Fig. 6 is a front elevation of the bracket applied to a tooth band.

Fig. 7 is a plan view of a band as applied to a tooth to which the bracket is fixed, illustrating one manner in which a regulating arch wire may be fastened to the tooth band.

Fig. 8 is a front elevation of the parts shown in Fig. 7.

Fig. 9 is a section on the line 9—9 of Fig. 8.

Fig. 10 is a perspective view of the bracket showing a different manner of fastening a regulating arch wire to the tooth band.

Fig. 11 is a section on the line 11—11 of Fig. 10.

Fig. 12 is a plan view showing a manner of fastening an arch wire to a bracket and tooth band applied to an out of line tooth.

Fig. 13 is a plan view showing a manner of fastening a regulating arch wire to a tooth band for positive control of rotation of a banded tooth.

Fig. 14 is a front elevation illustrating a manner of temporarily fastening a bracket to a tooth band so that it may be shifted for alinement.

Fig. 15 is a similar view showing in full and dotted lines a temporary position of the bracket and an alined position in which it is fixed.

In carrying my invention into practice I provide a blank 1, shown in Fig. 1, of thin metal from which a bracket 1*a* comprising the invention may be formed. This bracket is formed by bending the blank along the dotted lines shown in Fig. 1. The bracket formed by the bending of the blank comprises a longitudinally extending, central channel 2 consisting of front walls 3 and opposed side walls 4, said channel being open at each end or at the top and bottom and also open at its rear side. At the opposite sides of the channel the bracket is provided with similar laterally extending flanges 5, which also extend longitudinally alongside the walls 4 of the channel and are of a length equal to the length of the channel. These flanges may be of any suitable width and are integral with the rear edges of the walls 4 of the channel.

The channel is provided with a transverse slot 6 arranged midway of the length thereof and dividing the channel into upper and lower sections of equal or substantially equal dimensions. The slot 6 opens through the front wall 3 and both side walls 4 in advance of the flanges 5. Notches 7 may be formed in the upper and lower edges of the side walls 4 for the purpose of reducing width, facilitating bending of the metal in the formation of the blank, or to permit of the use of fastening devices under some conditions. These notches 7 may be omitted, however, if their provision is not desired. Formed upon the outer longitudinal edges of the flanges 5 are laterally extending tabs or lugs 8 for the attachment of ligatures or other fastening elements in certain uses of the bracket.

The bracket 1*a* is adapted to be fastened to a tooth band 9 by brazing, soldering or spot-welding. Ordinarily the tooth band is formed of very thin and soft metal, while the bracket is made of a thin but much harder metal. The construction of this bracket adapts it to be made of any of the precious metals customarily employed, but also adapts it to be made of hard stainless or chrome steel so that, while formed of very thin metal, it will provide a strong and rigid support for arch wires and other orthodontic fastenings or elements used in connection therewith. The channel 2 of the bracket as shown in the present instance is of rectangular form, but in practice may be of any desired and approved cross-sectional shape.

Fig. 6 shows the manner in which the bracket 1*a* is preferably fastened to a tooth band 9 by electrical spot-welding at a plurality of points 10, but, as stated, the bracket may be soldered, brazed or otherwise fastened in position. The thinness of the metal of which the bracket is formed, however, adapts it to be effectively fastened in position by spot-welding the flanges 5, utilized as attachments, to the band 9 at desired points.

The slot 6 provides for the mounting of an arch regulating wire 11 so that the wire is wholly received within the slot and rests against the flanges 5 and between the flanges against the tooth band, so that the wire will fit snugly against the tooth band, and avoid any possibility of its coming in contact with and causing irritation to the cheek, lips or other portions of the mouth of the patient. When the arch wire is seated in the slot, the wire rests against the tooth band, but all forces exerted thereon act through the bracket and are thus distributed to the entire area of the band where the bracket is attached to it. When the bracket is applied to the tooth band and the arch wire is fitted in position, the arch wire also may rest against the tabs which give a greater area of support.

The construction described adapts the arch wire to be secured to the bracket in various ways. In Figs. 8 and 9 the use of a thin metal fastening strip or key 12 is shown, which is extended vertically through the channel 2 between the outer side of the arch wire and front wall of the channel and secured in position by bending its extremities, as shown at 13, outwardly against the upper and lower edges of the front wall of the channel.

In Figs. 10 and 11 the arch wire 11 is shown as secured in position by means of a ligature 14 of silk, wire or other material, which is disposed between the arch wire and front wall of the channel and looped about said front wall with its ends twisted or otherwise united together, as shown at 15. Other means for securing the arch wire in position and ways of connecting it with the bracket may conceivably be employed to suit varying conditions of service and to adapt different strains or stresses to be placed upon the arch wire for corrective purposes.

Fig. 12 shows a mode of attaching a tooth band 9*a* applied to an out of line tooth to an arch wire 11 for the purpose of exerting stress to draw the tooth into alinement with adjacent teeth. As shown, here the bracket 1*a* applied to the tooth band is secured to the arch wire by a ligature 16 looped through the channel 2 and suitably fastened to the wire, which ligature may be of silk or other material which contracts under action of the moisture of the mouth to place a pulling strain on the tooth. As a substitute for such a ligature a small ligature of stainless steel wire twisted to create a tension between the arch wire and the bracket may be used. Such a ligature may be applied, if desired, to either one or both of the tabs or lugs 8 and the arch wire to increase the area of the pulling strain or tension pull to effect the draw of the tooth in place.

Fig. 13 shows an arrangement for transmitting a force necessary for rotation of a malposed tooth to bring it into position, in which the bracket is arranged at an angle with one of the tabs 8 bearing against the arch wire and the other tab 8 connected by a tension ligature 17 to the arch band so that a force will be exerted thereon to rotate the tooth in the opposite direction. Obviously the tension ligature 17 may be applied in this way to either tab 8 for the purpose of effecting rotation of the tooth in either direction as required to bring it into position. By the use of proper ligatures or other attachment devices and applying the same to the arch band and to proper portions of the bracket forces may be applied from the regulating arch wire to the tooth through the medium of the tooth band for extruding, intruding, elevating, depressing, rotating or changing the axial inclination of teeth as may be required to correct the positions of malposed teeth, and the forces imposed or transmitted may be regulated and controlled to the exact degree necessary for the purpose.

Figs. 14 and 15 illustrate a manner in which the bracket may be temporarily secured to the tooth band in an approximate position for use and held so that it may be adjusted to final position desired. As here illustrated, the bracket is spot-welded to the band at one point, as indicated at 18 in Fig. 14, so that it may be rotatably adjusted from such position and from the temporary position illustrated in dotted lines in Fig. 15 to a final position as shown in full lines, in which it may be spot-welded at additional points to fix it firmly to the tooth band. The construction of the bracket and character of thin metal of which it is made adapts it to be secured for adjustment in this manner and accurate adjustment made, whereupon it may be finally fixed in position.

From the foregoing description, taken in connection with the drawing, the construction, mode of manufacture and use of my improved orthodontic bracket will be readily understood by those versed in the art without a further extended description and it will be seen that the invention provides a bracket which may be made of very thin metal but yet will be of great strength to

adapt it to withstand the stresses and strains and distribute the stresses and strains uniformly over the tooth band so as to avoid liability of causing annoyance or pain to the patient. Also it will be seen that the invention provides a bracket which may be firmly fixed to the tooth band in any of the ways set forth and utilized for holding an arch regulating wire in position wholly out of contact with any portion of the mouth and in various ways so that stresses or strains of various kinds for corrective actions may be imposed upon teeth to be treated. Furthermore, it will be seen that the invention provides a bracket which may be made in a simple manner and of stainless or chrome steel so that a highly efficient bracket may be produced at a low cost.

What I claim is:

1. An orthodontic appliance comprising a thin sheet metal bracket adapted to be applied to a tooth band and bent to provide a longitudinally extending channel open at each end and one side, laterally extending flanges at the sides of the channel, the channel being formed with a transverse slot opening through its front and side walls, and tabs carried by and projecting laterally from the flanges.

2. An orthodontic appliance comprising a thin sheet metal bracket adapted to be applied to a tooth band and bent to provide a longitudinally extending channel open at each end and one side, laterally extending flanges at the sides of the channel, the channel being formed with a transverse slot opening through its front and side walls, and tabs carried by and projecting laterally from the flanges in transverse alinement with each other and with said slot in the channel.

3. An orthodontic appliance comprising a thin sheet metal bracket adapted to be applied to a tooth band and bent to provide a longitudinally extending channel open at its upper and lower ends and rear side, flanges extending laterally from the side walls of the channel and longitudinally of said walls, the channel being formed with a slot located centrally of its length and opening through its front and side walls, and tabs extending laterally from the flanges in transverse alinement with each other and in the horizontal plane of the slot.

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