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2,821,020

ORTHODONTIC SECTIONAL ARCH WIRE

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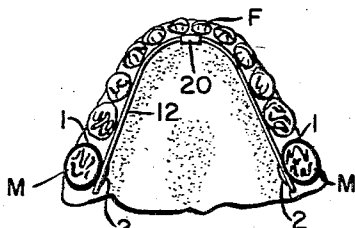


FIG. 1.

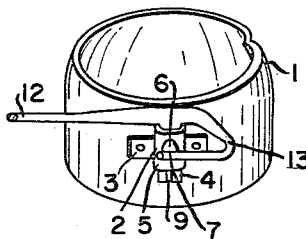


FIG. 2.

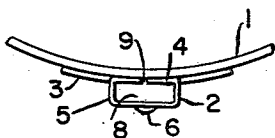


FIG. 3.

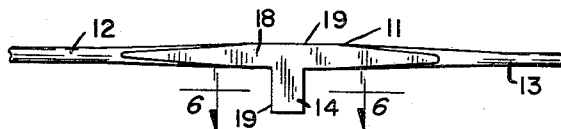


FIG. 4.

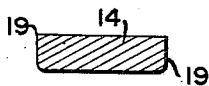


FIG. 6.

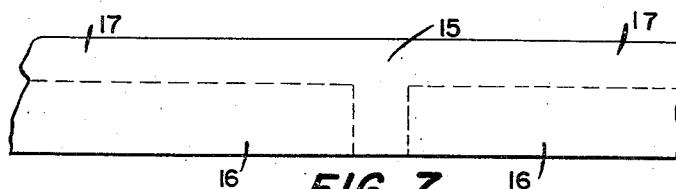


FIG. 7.

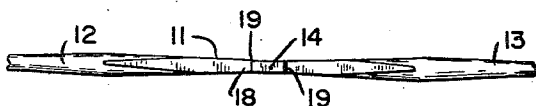


FIG. 5.

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ORTHODONTIC SECTIONAL ARCH WIRE

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2 Claims. (Cl. 32-14)

This invention generally relates to orthodontic appliances and particularly to an improved sectional arch wire for use with brackets affixed to the tooth bands mounted on teeth, such as molars or rear teeth of the human dental arch. This invention will hereinafter be described in connection with use as a lingual sectional arch wire, but this is only for convenience and not limiting as the structure and principles thereof are readily applicable to buccal or labial sectional arch wires.

As is well known, the lingual arch is applied or employed in accordance with orthodontic practice to the interior or lingual surface of the teeth. To accomplish this, a tooth band is attached to each of, for example, the upper molars and thereafter suitable brackets are integrally affixed to each band on the lingual side of the human arch, these brackets being for the purpose of supporting the arch wire by means of a post or stud-like member received thereby. Reference is made to my previously issued United States Patents Numbers 2,524,763, 2,582,230 and 2,495,692 which illustrate prior art techniques for applying to the human teeth bands, brackets and a suitable orthodontic arch.

Sectional lingual arch wires of the prior art type have generally proved satisfactory, but have been rather difficult and expensive to construct, have been of the type having a tendency not to include sufficient strength at the point of attachment to the brackets and have had, due to their construction, weakened areas. For example, in the past sectional lingual arch wires have been made by soldering a post to a round wire and, of course, not only does the soldering provide a weakened joint but it is a difficult operation which necessitates, following soldering, a grinding action which weakens the product.

With the above in mind, it is one of the principal objects of the present invention to provide an improved sectional arch wire for orthodontic use that overcomes the difficulties enumerated above and a new method of making same.

It is also an object of this invention to provide a sectional arch wire having no soldered joints whereby the strength of the wire is maintained and there are no weakened areas or joints due to soldering.

Yet another object of the invention is to provide a method of making a sectional arch wire which requires no soldering, which may be produced expediently, and which is a one piece assembly having improved strength characteristics.

A further object of the invention is to provide an improved sectional arch wire which may be readily constructed to provide improved locking and strength characteristics with the bracket in which it is fitted or secured and which may be readily attached to the bracket affixed to a tooth band whereby there will be no rocking action at the point of attachment.

Other objects and advantages of the invention will become apparent upon considering the following detailed

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description in conjunction with the drawings wherein like numerals represent similar parts throughout and wherein:

Figure 1 is a perspective view of a lower human dental arch illustrating two sectional lingual arch wires of this invention applied thereto;

Figure 2 is an elevational perspective view showing a tooth band and bracket with one end of the sectional arch wire secured thereto;

Figure 3 is a considerably enlarged top view of part of the tooth band and bracket illustrated in Figure 2;

Figure 4 is an elevational view of one side of the arch wire, shown partly broken away;

Figure 5 is a bottom view of the arch wire illustrated in Figure 4, with the lateral extension thereof shown as upstanding;

Figure 6 is a considerably enlarged view taken along the lines 6-6 of Figure 4; and

Figure 7 is an elevational view of a flat sheet of metal stock from which the sectional arch wire is constructed.

Perhaps it should be mentioned at the outset that the invention is not limited in its application to the details of construction of the brackets and tooth bands illustrated in the drawing and, furthermore, the arch wire, as stated, may be utilized as a sectional buccal or labial arch and is not restricted to lingual arch techniques. Also, the phraseology and terminology employed herein is for the purpose of description and not of limitation.

Now referring specifically to the drawings, numeral 1 represents a tooth band and suitable such bands may be applied in the usual manner to the mandibular molar teeth M of a human arch as illustrated in Figure 1. Affixed by welding or the like to the lingual side of the band 1 are brackets 2, one of said brackets being shown more clearly in Figures 2 and 3 and being similar to the types shown and claimed in my said United States patents. Other suitable types of brackets may be employed, but briefly each preferred bracket 2 comprises horizontal and vertical flanges 3 and 4 which are welded or suitably bonded to the lingual periphery of the band 1 and the main body of each bracket consists of an elongated vertically extending hollow tube 5 forming a recess 8 of oblong or, more accurately, substantially completely rectangular configuration as clearly depicted in Figure 3. On the lingual side of tube 5 is formed a projection 6 on one edge of which is a flat shoulder 7 facing in the direction of the bottom or tissue engaging edge of the tooth band. Also, the interior wall of recess or socket 8, this being formed by flanges 4, is slotted as at 9 to permit expansion and contraction of the socket and for another purpose which will become apparent. It has been mentioned that tube 5 extends vertically, but this is not in any sense to be construed as limiting.

Considering Figures 4, 5, 6 and 7, there is illustrated my improved sectional arch wire generally represented by numeral 11 and comprising a round wire main body portion 12 and an end round wire portion 13. Intermediate the portions 12 and 13 the wire 11 is treated to form a substantial T connoted by numeral 18 and including a solid lateral substantially rectangular extension, post or stud member 14.

To construct the sectional arch wire 11, reference is made to Figure 7 wherein is disclosed a flat piece or strip of metal 15, preferably of stainless steel. First this strip 15 is stamped out, by means of a conventional stamping machine, in the manner illustrated to form the dotted line areas and the portions 16 are thus separated from the strip 15. Next a substantial part of the portions 17 are rounded, by means of a suitable swedging machine, to form round portions 12 and 13. After these treatments, the wire will be substantially of the configura-

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tion shown in Figures 4 and 5. However, if desired and preferably, the post 14 is further treated on, for example, one side thereof by exposure to the operation of a suitable press to round slightly one side of the post 14 as shown in Figure 6. Of course, a press may be used to cause the stud member 14 to assume the shape of half round, but preferably the post should be completely flat including the edges 19 thereof or a substantially solid rectangle as shown in Figure 6.

An example of one orthodontic use of the illustrated arch wire 11 is shown in Figure 1. Assuming the bands 1 and brackets 2 have been mounted on mandibular teeth M and that the posts 14 of two arch wires 11 have been inserted in their respective sockets 8, then portions 12 are properly flexed and coupled by any suitable means such as soldering at joint 20 and portions 13 are turned back to a position until the extremity of each is beneath and engaging a respective shoulder 7, as clearly illustrated in Figure 2. Each solid post 14 is received by a tight wedge-like frictional fit within a recess 8 of a tube 5 and actually, each extension or post 14 is made to be slightly larger than socket 8 and due to slits 9, the posts 14, when inserted, will cause the tube S to resiliently grip its respective post 14. Also, the flat edges 19 and sides of each post 14 have face contact with the walls of a socket 8 and therefore a connection which is sturdy and permits no relative movement or rocking action is provided. Of course, the locking effect of each arch wire 11 is increased by jointure at 20 and projection 6, joint 20 being necessary to construct a complete arch.

It should be emphasized again that the process for making the present arch wire 11 eliminates the need for soldering joints and it should be apparent that there is provided an arch wire having no weakened areas, which requires no grinding action and which has improved strength characteristics, especially at the area where the post and wire are joined. Further, the arch wire 11 constitutes a one piece assembly which may be made expediently and without costly operations. As to the top of T 18, there are advantages in having this flattened as shown in Figures 4 and 5. For example, such eliminates thickness and provides a thinner area for the wire which is immediately adjacent the band 1 and above the tube 5 when the plug 14 is received in socket 8. Also, the flattened T provides increased strength where such is needed and most desired as the weakest point of an arch wire of this type is the area immediately above that point which is received in tube 5.

By providing sectional arch wires, in use, a direct technique may be employed, which means that the section wires can be fit directly in the patient's mouth. Not only did many prior art procedures require soldering of portion 12 to post 14 but also they necessitated the soldering of portion 13 to the wire adjacent post 14 or, in other words, parts 12, 13 and 14 were separately constructed and connected, thereby resulting in several weakened areas in the final product.

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From the foregoing it will be seen that this invention is one well adapted to attain all the ends and objects hereinabove set forth, together with other advantages which are obvious and which are inherent to the structure of the several embodiments. It will be understood that certain features and subcombinations are of utility and may be employed with reference to other features and subcombinations and this is contemplated by and is within the scope of the claims. As many alterations may be made of the invention without departing from the scope thereof, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. An orthodontic sectional arch wire comprising an elongated body of a length equivalent to at least a substantial portion of a human dental arch, said body having ends and being round in cross section except for an area adjacent but spaced from one end thereof, said area consisting of a T, the top of that T being substantially rectangular in shape with the side, top and bottom walls of the rectangle being flattened, the top of the T being in substantial alignment with the round portion of the body, and the leg of the T forming with the body a laterally extending rectangular extension having sides and edges which are substantially flat.

2. The combination of a sectional arch wire and a bracket for attachment to a tooth band, said bracket having a rectangular passage of uniform cross section, said arch wire comprising an elongated body of a length equivalent to at least a substantial portion of a human dental arch, said body having ends and being round in cross section except for an area adjacent but spaced from one end thereof, said area consisting of a T, the top of the T being substantially rectangular in shape with the side, top and bottom walls of the rectangle being flattened, the top of the T being in substantial alignment with the round portion of the body, and the leg of the T forming with the body a laterally extending rectangular extension having sides and edges which are substantially flat, said extension being constructed to fit in wedge-like relation in said passage whereby said wire is durably and rigidly secured to said bracket and relative movement therebetween is minimized, said T being of a size to reduce thickness and provide a thinner area for the wire at the area of attachment of the bracket to the band.

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