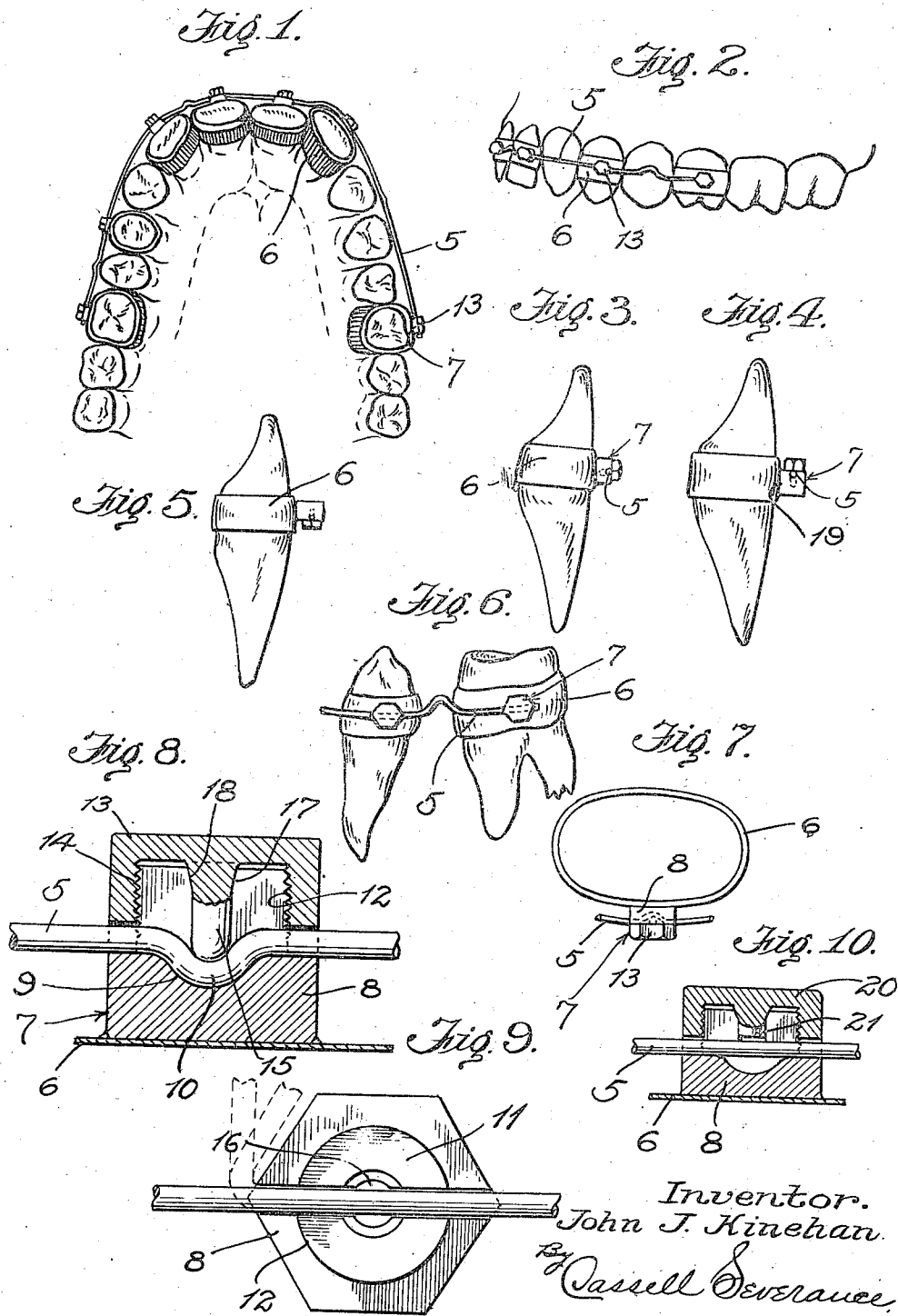


J. J. KINEHAN,  
ORTHODONTIC APPLIANCE.  
APPLICATION FILED, DEC. 29, 1916.

1,240,731.

Patented Sept. 18, 1917.



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# UNITED STATES PATENT OFFICE.

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## ORTHODONTIC APPLIANCE.

1,240,731.

Specification of Letters Patent. Patented Sept. 18, 1917.

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*To all whom it may concern:*

Be it known that I, JOHN J. KINEHAN, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Orthodontic Appliances, of which the following is a specification.

This invention relates to improvements in orthodontic appliances, and particularly to that class of apparatus in which tooth bands are so fastened to the arch band that twisting or rotary or other strains may be placed upon any desired teeth, without the possibility of the clamping means employed, permitting the arch wire to move longitudinally, or in a rotary manner with respect to the tooth bands.

It is an object of the invention to provide an orthodontic appliance in which the individual tooth bands may be so clamped upon the arch wire by means of a sharp bend in the wire, that it is absolutely impossible for one to slip, with respect to the other one, or the arch wire to slip or turn with respect to the tooth bands.

It is also an object of the invention to provide an orthodontic appliance with an arch wire or band formed as described, which is provided with lateral or angular projecting portions opposite the tooth bands, whereby the tooth bands may be caused to grip the said lateral or off-set portions of the wire.

It is a further object of the invention to provide a device of the class described, in which a bend in the arch wire may be gripped by means of a socket member and a cap member, said cap member having an extension so constructed as to engage and hold the bend in the wire positively between the members, whereby the wire cannot slip longitudinally or rotatively.

With these and other objects in view, the invention comprises certain novel constructions, combinations, and arrangements of parts as will be hereinafter more fully described and claimed.

In the accompanying drawing forming a part of this specification:

Figure 1 is a plan view of the teeth of an upper jaw, showing the improved orthodontic appliance of the present invention, in position thereon.

Fig. 2 is a side elevation of the teeth and device shown in Fig. 1.

Fig. 3 is a side elevation of a single tooth

with a band thereon, and showing the cap or clamping member of the gripping device labially arranged.

Fig. 4 is a similar view, but showing the cap of the clamping device occlusally arranged.

Fig. 5 is a similar view of a banded tooth, but showing the clamping member of the gripping device gingivally arranged.

Fig. 6 is a side elevation of a pair of teeth with bands thereon, and showing a portion of an arch wire clamped labially thereon.

Fig. 7 is a top plan view of a tooth band upon an enlarged scale, and showing one of the arch clamping devices mounted thereon.

Fig. 8 is an enlarged sectional view taken through one of the clamping devices, but showing a bent wire or band extending through the same in side elevation.

Fig. 9 is a plan view of the wire engaging socket member of one of the clamps, the arch wire being shown in place therein.

Fig. 10 is a sectional view taken transversely through a wire holding device at intermediate points, where it does not need to be clamped.

The appliance of the present invention is designed to afford an orthodontic mechanism, in which means for clamping any teeth that require moving to correct malocclusion, can be positively connected with the arch wire of the mechanism, without injury to the material of the said arch wire or band, and without subjecting the same to the effects of heat, as in the case of soldering or welding. A very positive connection between the tooth band and the arch wire can be had by the soldering of one device to the other, but it is substantially impossible to resort to this expedient, and yet not affect the temper of the spring arch wire, thus weakening the device. With the device of the present invention, the arch wire is positively gripped in such a way that the clamping means cannot slip longitudinally or turn about the arch wire, yet without the soldering of the parts.

The details and features of the invention will now be more specifically described, reference being had to the accompanying drawing, in which 5 indicates an arch wire of an orthodontic appliance, 6 a tooth band and 7 a clamping device for connecting the tooth band with the said arch wire. As in orthodontic appliances, heretofore used, the arch wire 5 is shaped to approximate as nearly

as possible an ideal or perfect arch for the teeth to be operated on. The individual teeth which are to be brought to conform as nearly as possible to the ideal arch, are provided with bands 6 of any usual or ordinary type. The control over the position of the individual teeth is secured by the clamping means 7, which is connected to the tooth band 6, and is so formed as to mechanically grip the arch wire in a manner to prevent longitudinal movement on said wire, or a rotary or twisting action with respect thereto.

The clamping means 7 preferably comprises a base block or socket member 8, having a recess 9 formed centrally therein, and extending transversely across the said block. Wherever a tooth band is to be fastened to the arch wire, the said arch wire 5 is bent laterally, with respect to the other portions of the wire as at 10. Such lateral bent portion is made to extend to one side of the axis of the arch wire 5 a sufficient distance to afford an ample leverage for holding the clamping device with respect to the wire. The wire may be bent laterally or angularly in any desired manner or any desired shape, within the spirit and scope of the invention, but a simple lateral crimp or double bend to the extent of approximately the diameter of the wire as shown in Fig. 8, is ample to so connect the clamping means and the band or wire, that one is positively held against movement in any direction, with respect to the other. The block of the socket member 8 is provided centrally with a bifurcated stem or connection 11, the outer surface of which is screw threaded as at 12. A cap or clamping member 13 is provided, being substantially a nut shaped piece, having interior threads 14 adapted to engage the threads 12 of the stem 11. The interior of the cap member or nut is provided with a central stud or pin 15, made of sufficient length to extend into the hollow depressed portion or recess formed by the bend 10 in the arch wire or band. The said stud 15 is accommodated by an enlargement 16 of the transverse wire receiving notch or recess of the bifurcated portion of the stud 11. The said enlargement 16 is outwardly flared at 17 to receive a tapered base portion 18 formed upon the said stud 15, so that when the screw cap or nut is tightened into its clamping position, the portions of the bifurcated stud will be somewhat crowded in the corners of the nut, making substantially a lock for preventing the unscrewing of the parts.

Any tendency of the outer ends of said bifurcated stud 11 to be contracted or spread is absolutely prevented by the outer walls of the cap or nut, and the inward movement of said stud parts is prevented by the tapered base of the stud pin 15. The said stud

pin 15 is preferably rounded at its ends, so as to fit the curved shape of the band in the arch wire, so that the said pin holds the said bent portion 10 of the arch wire in the socket 9, thus rendering any longitudinal movement upon the wire impossible, and at the same time guarding against any rotative movement whatever between the wire and the clamp. The external shape of the cap or nut 13 may be varied as described, but, of course, it is many sided, being usually square, hexagonal, octagonal, or the like.

In applying the clamping device to a tooth band, the base portion or socket member 8 may be disposed upon the band, so that the cap or nut 13 extends labially, as shown in Figs. 1, 2, 3 and 6 of the drawing. If however, a tooth has been crowded back out of place between two adjacent teeth; and must be drawn forwardly by the arch, it is sometimes more convenient to fasten the block or socket member 8 with one edge as 19 to the tooth band, as shown in Fig. 4 of the drawing, in which event the cap or nut member 13 will be occlusally arranged. The position of the teeth may also make it convenient to fasten the block or socket member 8 to the band, so that the cap or nut will be gingivally disposed as shown in Fig. 5 of the drawing. Any convenient socket or other wrench, adapted to fit the cap or nut 13 is used to screw the said cap in assembling or separating the parts. The clamping device can, of course, be applied to the band of a tooth in any desired manner, either substantially straight or in angular relation, as will be readily understood.

It will be evident that the tooth band can thus be fastened to the arch wire, so that there is no possibility of movement between the parts and yet without the soldering of the device to the wire, and the danger of drawing the temper of the metal thereof. It will be noted by reference to Figs. 8 and 9, that the wire of the arch 5 is not merely clamped at a single point, or only for the length of the bend therein, but that the edges of the nut and the socket member 8 extends outwardly upon the wire a sufficient distance beyond the bent portion thereof to obtain a firm alined hold or grip thereon, whereby the shape of the arch is not interfered with.

With arch clamping means as heretofore employed it has been difficult to make a sharp bend at points immediately adjacent to the clamps. With the device of the present invention, a sharp bend in the wire can be made at a greater angle than a right angle, with respect to the portion of the wire outside the clamp, as indicated in dotted lines in Fig. 9.

It will be noted that the clamping device of the present invention is not only adapted for the securing of teeth to intermediate portions thereof for treating them, but that

the same kind of a clamp is just as effective for anchoring the ends of the arch wire to the anchor teeth holding the said wire in proper place, without the necessity of other connecting means, as shown for instance, in Figs. 1 and 2 of the drawing.

As shown in Fig. 10, the socket member may be employed in connection with a cap member or nut 20 for loosely holding the wire 5, with respect to the teeth, at points where it is not necessary to clamp the wire. In this instance, the cap or nut has a short center stud or pin 21 for engaging the bifurcated stud upon the socket member and acting as a nut lock, but said pin does not touch the wire, which in such an instance merely extends through the clamping means.

The single spring wire arch as has heretofore been known, is found to be effective for bringing moving strains upon different teeth, and is if anything, rendered more perfect and effective by the simple mechanical clamping means employed in holding the tooth bands, with respect to the arch wire.

The weakening of the wire by soldering is entirely prevented, and the injury to the wire by a clamping means is absolutely obviated for there are no mutilating or biting portions in the clamping mechanism, which even roughens the surface of the said wire.

While the arch wire is preferably a perfectly plain rounded wire, it will be readily understood, of course, that it may have any other desired cross sectional shape. It may thus be square, hexagonal, or other many sided shapes, or may be flattened transversely so as to be in the nature of a band or ribbon, or any other desired shape, all within the spirit and scope of this invention.

It will be readily understood also that as many clamps may be used on any of the tooth bands as found desirable. Thus more than one clamp may be placed upon an anchor band, which are mounted on molar teeth, if additional strength is required in anchoring the arch in place. Such a duplication of clamps, of course, falls within the spirit of the invention.

What is claimed is:

1. An orthodontic appliance comprising a spring arch wire, having laterally projecting portions, adjacent to teeth to be affected, tooth securing means having a socketed member with a band receiving depression therein, a nut member adapted to clamp the wire in said socket member, and having a wire engaging centering stud, having a flaring base portion adapted to lock the members together.

2. An orthodontic appliance, having an arch wire gripping means, made up of a socketed member, having a bifurcated screw stud adapted to project around the arch member, a cap member adapted to engage said screw stud, having a central centering band engaging pin therein, the said pin having a flaring base, the bifurcated screw stud having an enlarged portion for fitting upon said flaring base, whereby, the bifurcated screw stud will have its parts crowded against the threads of the said cap to lock the parts in place.

In testimony whereof, I have hereunto set my hand, in presence of two witnesses.

JOHN JAMES KINEHAN.

Witnesses:

CASSELL SEVERANCE,  
ELLA SCOTT.