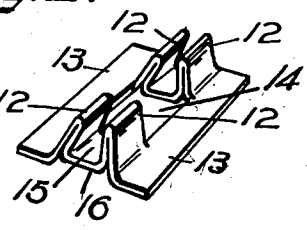
Dec. 9, 1941. A. B. BRUSSE ET AL 2,265,420

ORTHODONTIC APPLIANCE

Filed Oct. 30, 1939

Fig. 1.



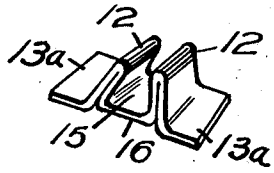


Fig. 2.

Fig. 3.

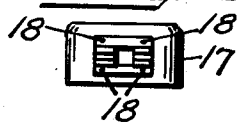
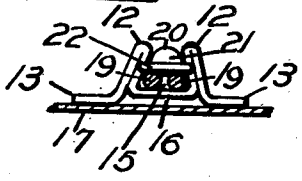


Fig. 4.



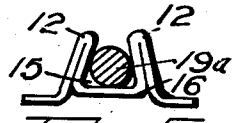


Fig. 5.

Fig. 6.

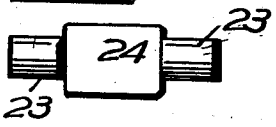


Fig. 7.

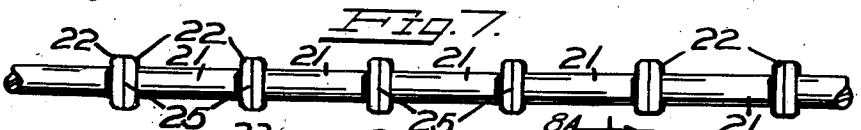


Fig. 8.

Fig. 9

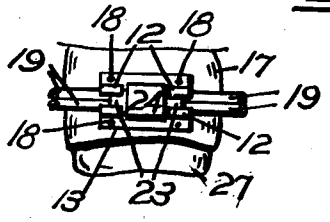
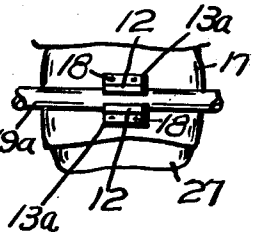


Fig. 10



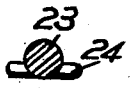


Fig. 8A.

INVENTORS

ARCHIE B. BRUSSE AND
FRANCIS M. GODDARD

BY

Rolland, McGraw & Campbell

ATTORNEYS

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UNITED STATES PATENT OFFICE

2,265,420

ORTHODONTIC APPLIANCE

Archie B. Brusse and Francis M. Goddard, Denver, Colo., assignors to Rocky Mountain Metal Products Co., Denver, Colo., a corporation of Colorado

Application October 30, 1939, Serial No. 302,012

3 Claims. (Cl. 32—14)

This invention relates to improvements in orthodontic appliances. The present invention is a further development over the patent to A. B. Brusse et al., issued December 1, 1936, No. 2,062,395.

The principal object of this invention is to provide an improved means for fastening the arch wire to a tooth band.

The improved means is advantageous in that it serves its intended purpose more efficiently, at the same time is more economical to manufacture and to use than the devices of the prior art.

Another object is to provide in appliances of this type, means to prevent inadvertent rotation of the arch wires.

Other objects and advantages reside in details of design and construction which will be more fully disclosed in the following description and in the drawing wherein like parts have been similarly designated and in which:

Figure 1 is a perspective illustration of a double snap channel bracket, which is drawn on a scale considerably larger than the manufactured article, and which embodies the present inventive concept;

Figure 2 is a perspective illustration of a single snap channel bracket made according to the present invention;

Figure 3 is a front elevation of a channel bracket of the type shown in Figure 1, mounted upon a tooth band, and drawn to a smaller scale than Figures 1 and 2;

Figure 4 is an end elevation of either the bracket shown in Figure 1 or that shown in Figure 2, as it would appear with two arch wires in position therein, shown in cross section, together with an arch wire lock made according to this invention;

Figure 5 is an end elevation of either the bracket shown in Figure 1 or that shown in Figure 2, as it would appear with a single arch wire shown in position in cross section;

Figure 6 is a plan view of an arch wire lock that is well suited to be used with the type of channel bracket shown in Figure 1, and drawn to about that scale;

Figure 7 is a fragmentary plan view of a strip of metal that has been fabricated into a plurality of joined but separable arch wire locks such as that shown in Figure 4;

Figure 8 illustrates a metallic strip that has been fabricated into a series of joined but separable arch wire locks of the type shown in Figure 6;

Figure 8A is a cross section taken along the line 8A—8A of Figure 8;

Figure 9 is a front elevation illustrating a band in place on a tooth and provided with an arch wire channel bracket of the type shown in Figure 2, and drawn to a smaller scale; and

Figure 10 is a front elevation of a band in place on a tooth and provided with an arch wire channel bracket of the double type as illustrated in Figure 1, drawn on a reduced scale.

In order to illustrate an operable reduction to practice of the present inventive concept, the examples herewith illustrated will be described in detail. However, it is to be understood that the examples herewith illustrated and described are merely typical and are not intended to express or imply any specific limitation to the present invention.

The general organization of the present orthodontic appliances is similar to others now in use and well-known to those skilled in the art in that the basic elements of anchor bands preferably positioned around molar teeth, provide anchorage for arch wires which in turn are used to apply force in the desired direction to other teeth to be straightened, guided, or treated, through the intermediary of other bands on the treated teeth that are connected with the arch wire or wires by improved means in which the present inventive concept resides.

The double type arch wire channel bracket illustrated in Figure 1, comprises two alined pairs of complementary converging folds 12 on opposite sides of which are integral flanges 13 which serve as means for attaching the bracket to the band. The space 14 between the alined pairs of channel folds and between the flanges 13, preferably is cut out to facilitate fabrication and to improve the function of the channel.

The channel bracket preferably is made of alloy steel such as a steel alloy containing chromium, which resists rust, stain and corrosion, and lends itself well to spot welding which is the preferred means of attaching the bracket to the band. Such an alloy also provides a factor of resilience in the complementary upstanding folds 12, which is highly desirable. The same material is also preferred for the bands.

It will be understood that the channel brackets herein illustrated and described may, however, be made of any desired material such as gold or silver or alloys thereof. Soldering may be used as the means for attaching the brackets to the bands if the brackets and/or the bands are made

of material which does not lend itself readily to the spot welding process.

The brackets of the type shown in Figure 1 may be fabricated as separate units as illustrated, or they may be fabricated in strip form with transverse scores across the strip enabling the user to separate readily the individual double brackets.

The single type arch wire channel bracket as illustrated in Figure 2, likewise comprises a pair of complementary converging folds 12, at opposite sides of which are integral flanges 13a.

The upstanding complementary converging folds 12, in both types of brackets, define a channel 15, the bottom 16 of which is in a plane slightly above that of the flanges 13 or 13a. As a consequence of this particular construction, the bottom 16 of the channels 15 will be spaced away from the tooth band when the channels are mounted thereupon. This spacing of the bottom of the channels 15 away from the tooth band is for a particular purpose that will be hereinafter set forth.

Figure 3 illustrates a typical tooth band 17 upon which has been mounted a double type arch wire channel bracket of the type shown in Figure 1, by means of four spot welds 18. If the metal of the band and/or the bracket is not amenable to spot welding, then other means such as soldering may be used for mounting the bracket upon the band.

After a bracket, either of the type shown in Figure 1 or that shown in Figure 2, is mounted upon a tooth band as shown in Figure 4, then arch wires are placed in the channel 15 as well understood by those skilled in the art.

Figure 4 illustrates two small arch wires 19 that are held in place by a special arch wire lock 20, which lock comprises a cylindrical center portion 21 and flat wider portions 22. The cylindrical portion 21 is of the proper length and diameter to snap or spring into position between the upper extremities of the complementary converging folds 12, thus positioning the flat wider ends 22 firmly against the arch wires 19 and just beyond the opposite ends of the channel-forming folds 12.

The arch wire lock 20 is particularly fabricated to cooperate with the channel brackets and the flat wider ends 22 have a surface that is substantially flush with a surface of the central cylindrical portion of the lock so that said surface of the flat wide ends of the lock will firmly contact the arch wires 19, holding them against inadvertent movement from the channel and also holding them against unwanted rotation.

Figure 5 illustrates the end view of either the bracket shown in Figure 1 or that shown in Figure 2, containing one larger arch wire 19a. Due to the size of the arch wire 19a with reference to the spacing of the upstanding complementary converging folds 12, the wire snaps or springs into place in the channel 15 requiring no additional lock.

Figure 6 illustrates an arch wire lock that is specifically designed to cooperate with the double channel bracket of Figure 1. The arch wire lock of Figure 6 comprises cylindrical end portions 23 and a central flat wider portion 24, a surface of which is substantially flush with surfaces of the cylindrical end portions 23.

The diameter of the end portions 23 with reference to the spacing of the complementary converging channel-forming folds 12, is such that the portions 23 can be snapped or sprung into position over the arch wires 19, bringing the flat wider portion 24 of the lock into firm contact with the wires in the space between the alined pairs of folds 12. This lock securely holds the wires 19 from inadvertent movement from the channel 15 and prevents unwanted rotation of the arch wires 19.

Figure 7 illustrates a preferred method of fabrication of the arch wire locks shown in Figure 4, wherein an original bar of material having a circular cross section, is fabricated into a plurality of locks 20, each having a cylindrical center portion 21 and flat wider portions 22. Across the flat wider portions are scores 25 which make it easily possible for a user to separate the individual locks from the strip as required for use. The operator merely breaks off a complete lock from the strip at the score 25 next adjacent the end of the strip. Arch wire locks of the type illustrated in Figures 4 and 7 may be used with either the double channel bracket of Figure 1 or the single channel bracket of Figure 2. The length of the cylindrical portion 21, which determines the spacing of the flat wider end portions 22, is such that when the cylindrical portion is snapped or sprung into a channel 15 between the complementary converging folds 12, then the flat wider end portions 22 will be positioned immediately adjacent opposite ends of the channel 15 bearing on the arch wires running through the channel.

Figure 8 illustrates a preferred method of fabricating the arch wire locks as shown in Figure 6, wherein a piece of stock material having a circular cross section is scored and fabricated to produce a series of locks, each having cylindrical end portions 23 and a flat wider central portion 24. Transverse scores 26 are cut into the material across the cylindrical portions thereof, so that an operator readily may separate an individual lock from the strip by breaking it off at the score nearest the end of the strip.

Arch wire locks as illustrated in Figures 6 and 8 are particularly adapted to be used with the double channel bracket of Figure 1 or with two spaced single brackets as illustrated in Figure 2. It will be understood that two single brackets of the type illustrated in Figure 2 may be attached in alinement upon a single tooth band, if and when desired.

Figure 8A illustrates the feature that the central flat wide portion 24 of the wire lock of Figure 6 has a surface which is substantially flush with surfaces of the cylindrical end portions 23 of said locks.

Figure 9 illustrates a band 17 that is positioned upon a typical tooth to be treated, indicated by reference character 27. A single channel bracket having complementary converging folds 12, of the type illustrated in Figure 2, is shown attached to the band as by spot welds 18. A single arch wire 19a is snapped or sprung into the undercut channel between the complementary converging folds 12, where it will remain securely without additional locking.

Figure 10 illustrates a typical tooth band 17 mounted upon a tooth 27. A double channel bracket of the type illustrated in Figure 1, is here illustrated as attached to the band 17 as by spot welds 18. Two small arch wires 19 pass through the channels provided by the alined pairs of complementary converging folds 12. An arch wire lock of the type shown in Figure 6, has its end portions 23 snapped or sprung into

the alined channels over the arch wires 19, thus positioning the flat wider central portion 24 of the lock securely against the wires 19 intermediate the alined pairs of channel-forming folds 12. As a consequence of the positioning of the lock in the channel bracket over the arch wires, said wires will be securely held in the bracket against inadvertent movement therefrom or unwanted rotation therein.

It will be manifest that the small double arch wires 19 or the larger single arch wire 19*a* may optionally be used with either channel bracket as illustrated in Figure 1 or Figure 2. Since the material of the brackets from which the upstanding complementary converging folds 12 are made, is preferably resilient, the various arch wire locks and the large arch wire 19*a* readily may be snapped or sprung in position between the complementary converging folds 12. Likewise, the arch wire locks and the large single arch wire 19*a* may, when desired, be removed from the channels 15.

The relationship of the parts as hereinbefore set forth is such that when the appliance is positioned upon the teeth of a patient, it will remain in position without accidental movement. If, for any reason, it is desired to place a tie wire around the arch wire and the bracket, such a tie wire may be inserted in the space between the band 17 and the bottom 16 of the channel 15, as illustrated in Figure 4, and then brought around over the arch wire and twisted or tied.

The space between the central bottom portion 16 of the bracket, and the band 17 provides means whereby a tie wire may be inserted diagonally between the bracket and the band and fastened around over the arch wire for optional or additional security in the anchorage of said arch wire to the bracket. Furthermore, by having the bottom 16 of the bracket raised above the flanges 13, a solid bearing contact of said flanges 13 upon the tooth band 17 is assured, because thus is provided a two-point contact of the bracket on the band.

A further advantage in this construction, best illustrated in Figure 4, is that added factors of flexibility and resilience are attained by having the central bottom portion 16 of the bracket entirely out of contact or any possible contact with the tooth band.

The complementary converging folds 12 that form the channels 15 are advantageous for several reasons. In the first place, thus folding the metal of which the channel brackets are made, is a highly efficient method of fabrication. The folds 12 being of double thickness of metal, provide an essential factor of strength in these brackets, and at the same time the folds are desirably resilient.

Furthermore, since the complementary converging folds 12 are an integral part of the flanges 13 or 13*a*, the entire channel bracket is secure with no danger of separation of the channel from the flanges. The flanges 13 and 13*a* provide an optimum means for securing the brackets upon the tooth band.

As above pointed out, the double channel bracket of Figure 1 and also the single channel bracket of Figure 2, may be fabricated in scored strips for individual separation at the time of their use. Obviously, either style of channel bracket may be fabricated as a single unit if preferred.

Thus the stated objects of the invention are fully accomplished in that the improved channel brackets and the improved arch wire locks provide a new and better means of fastening the arch wire to the tooth band in an orthodontic appliance. And the various parts that cooperate to produce the improved results, are fabricated in an unusually efficient manner.

What we claim and desire to secure by Letters Patent is:

1. In an orthodontic appliance inclusive of a tooth band and an arch wire, a resilient channel bracket on the band for the wire having complementary converging sides, and an anchor for the wire in the channel having a central portion of a size to spring into the channel and having widened ends positioned outside the ends of the channel over the wire.

2. In an orthodontic appliance inclusive of a tooth band and an arch wire, a resilient channel bracket on the band for the wire having complementary converging sides, and an anchor for the wire in the channel having a central cylindrical portion of a size to spring into the channel and having widened flat ends positioned outside the ends of the channel over the wire.

3. In an orthodontic appliance, inclusive of a resilient channel bracket mounted on an orthodontic band, the improvement which comprises having the channel bracket formed with complementary converging folds spaced apart at their extremities, and having a portion connecting said folds and maintained in spaced relation to the band, whereby an arch wire of larger diameter than the channel entrance may be forced thereinto, and an anchor for the wire in the channel having a central portion of a size to spring into the channel and having widened ends positioned outside the ends of the channel over the wire.

ARCHIE B. BRUSSE.
FRANCIS M. GODDARD.