

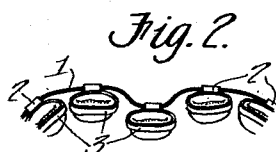
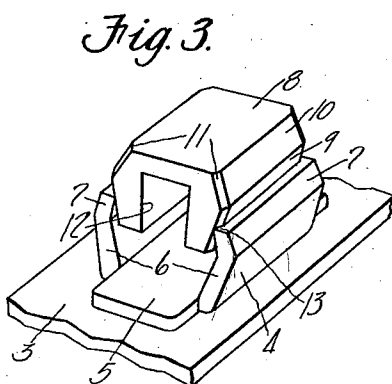
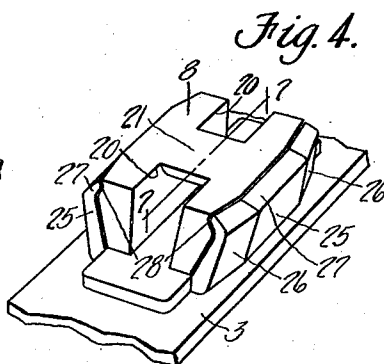
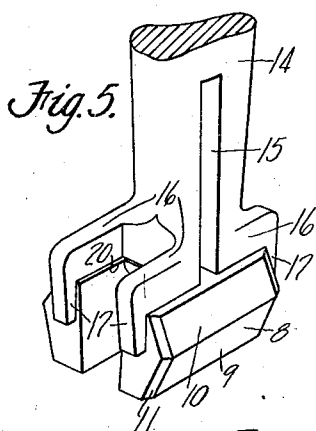
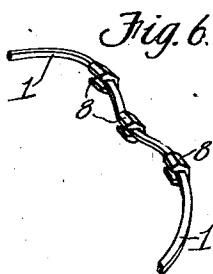
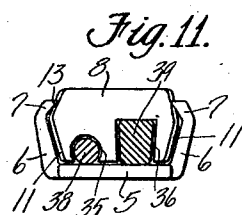
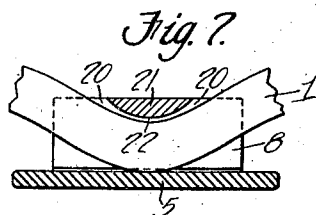
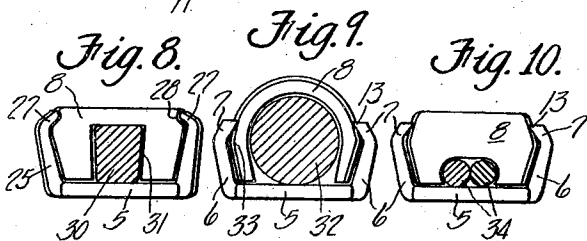
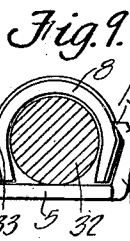
Nov. 5, 1935.

L. H. WIRT

2,019,773

ORTHODONTIC APPLIANCE

Filed May 8, 1933



INVENTOR.

BY *Lordis H. Wirt.*
George H. Wirt.

ATTORNEY.

UNITED STATES PATENT OFFICE

2,019,773

ORTHODONTIC APPLIANCE

Landis H. Wirt, South Bend, Ind.

Application May 8, 1933, Serial No. 669,953

11 Claims. (Cl. 32—14)

The invention relates to orthodontic appliances by which the position of malposed teeth may be corrected.

In the practice of orthodontia, great care must be exercised in the use of appliances to obtain the desired movement of teeth to their correct position by a bodily movement thereof rather than by tipping and dragging thereof. This requires the use of expansion or alignment arch wires which are of very small gage and are highly flexible, whereby the force exerted upon the malposed teeth is very small, for instance three or four ounces, so that the resultant action upon the teeth is just sufficient to move the teeth in a gradual manner and to permit the reformation of the bone cells of the jaw to accommodate the changed position of the teeth. Another requirement for the correct practice of orthodontia is, as various conditions are encountered, to apply various kinds, sizes and dimensions of wires particularly adapted to meet the conditions as they arise. The interchangeability of such different types of arch wires should be possible with the smallest amount of work and the least disturbance to the tooth bands possible. Accordingly, it is the principal object of this invention to provide an appliance by which these results may be achieved.

A further object is to provide a device of this character comprising a socket member and an arch wire mounting block mounted in said socket, said socket member being formed of spring material to retain said block in operative relation thereto by spring action.

A further object is to provide an arch wire block having an arch wire receiving channel formed therein whose mouth dimension is less than its base dimension whereby an arch wire may be strung on said block and held therein in desired position.

A further object is to provide a spring socket member adapted to removably mount an arch wire block in fixed relation thereto.

A further object is to provide an arch wire mounting block shaped to accommodate the curvature of an arch wire with natural bends.

A further object is to provide a tool by which the arch wire mounting blocks may be easily applied to and removed from their sockets on the tooth bands.

With the above and other objects in view, the invention resides in the combination and arrangement of parts as hereinafter set forth, shown in the drawing, described and claimed, it being understood that changes in the precise embodiment of the invention may be made within the

scope of what is claimed without departing from the spirit of the invention.

In the drawing:

Figure 1 is a fragmentary plan view of a jaw illustrating my appliance applied to the teeth thereof.

Figure 2 is a fragmentary plan view of a jaw illustrating an orthodontic appliance applied to the teeth thereof.

Figure 3 is a perspective view illustrating the application of the parts of my appliance to each other.

Figure 4 is a perspective view of my appliance with the parts thereof disposed in cooperating interlocked relation.

Figure 5 is a fragmentary view of a tool and a portion of my appliance manipulable thereby.

Figure 6 is a fragmentary perspective view of an arch wire having parts of my appliance strung thereon.

Figure 7 is a longitudinal sectional view of my appliance taken on line 7—7 of Figure 4.

Figure 8 is an end view of one form of my appliance.

Figure 9 is an end view of a modified form of my appliance.

Figure 10 is an end view of another modified form of my appliance.

Figure 11 is an end view of still another modified form of my appliance.

Referring to the drawing, the numeral 1 designates an arch wire bent to substantially conform with the dental arch of the patient. The arch wire is applied to the malposed and anchor teeth by means of my appliances 2, which are mounted on tooth bands 3 encircling the teeth.

My appliance 2 comprises a socket member or clip 4 which has a base plate 5 which is welded or soldered in face contacting relation to the tooth band 3. A pair of angularly extending plates 6 extend from the opposite sides of base 5 in diverging relation, and said plates 6 terminate in angularly inwardly directed lips 7. The plates 6 are formed of resilient material. A second clip or block 8 is receivable in socket member 4 and is shaped to provide opposed side faces which comprise lower portions 9 extending in downwardly converging planes, and upper portions 10 extending in upwardly converging planes. The corners of the block are bevelled at 11. A channel 12 extends longitudinally through the block at the lower side thereof, and the channel is of slightly greater lateral dimension at its base than at its mouth, for purposes to be hereinafter set forth. The block 8 is adapted to be inserted in

socket 4, in the manner illustrated in Figure 3, by forcing the same to place between the plates 6 which yield to receive it and then snap back to engage the angularly disposed faces 9 and 10 and thus constrictively hold the block therein. To prevent sliding of the block longitudinally out of the socket, the upper inner corners of the lips 7 of plates 6 of the socket are inwardly directed or swaged at 13 to engage the bevelled corners 11 of the block.

In the use of the appliance, the tooth bands 3 carrying socket members 4 having first been applied to the teeth, the arch wire 1 is bent to the desired configuration whereby it will properly apply traction to the malposed tooth or teeth when applied. The blocks 8 are then strung on the arch wire in their approximate position, as illustrated in Figure 6. The channels 12 are formed to provide a lateral dimension at their mouths slightly less than the thickness of the arch wire, as illustrated in Figures 8 to 11, inclusive, whereby the blocks hold and retain the wire thereto against release therefrom. The pre-assembled arch wire and blocks are then inserted in the mouth of the patient, and the blocks 8 are snapped into their sockets 4 to apply the arch wire to the teeth. It will be seen that with this construction a wire of any desired size or cross-sectional shape may be used, and the application thereof to the teeth is very simply and easily accomplished. Furthermore, the construction of the blocks 8 by which they may be strung or snapped on the arch wire before the same is inserted in the mouth of the patient eliminates the care required in handling and applying the blocks, which are of minute size, individually.

To facilitate the application and removal of the blocks 8 to and from socket 4, I employ a tool 14 whose shank is provided with a central longitudinal kerf 15 extending in spaced relation from the head end thereof. Two prongs 16 extend perpendicularly of the shank of the tool and perpendicularly of the plane of kerf 15 at each side of the head thereof in spaced parallel relation, and these prongs 16 terminate in fingers 17 extending perpendicularly outwardly thereof in parallel off-set relation to the shank of the tool. The fingers 17 are adapted to engage the opposite ends of the block, and their normal spacing is less than the length of said block, whereby the fingers are extended, as permitted by the resiliency imparted to the head by kerf 15, to constrictively engage the opposite ends of the block. It will be seen that this tool does not interfere with the seating of the block in its socket, and that the two spaced fingers 17 engage the block on the opposite sides of channel 12 and arch wire 1 mounted therein.

In the use of expansion arch wires to draw malposed teeth into proper position in the dental arch, it is desirable that the arch wire 1 assume a natural or gradual curve at the portion thereof adjacent the malposed tooth, as illustrated in Figure 1, rather than an abrupt curve as illustrated in Figure 2. For this purpose I employ a block of the construction illustrated in Figures 4 and 7, wherein the block 8 is constructed to facilitate such a natural curvature of the arch wire. In this construction the channel cut 12 of the previous construction is enlarged to extend entirely through the block at the ends thereof to provide recesses 20 in the upper face of the block at the opposite ends thereof, whereby only a central web 21 extends between the side portions of the block. The web 21 is rounded at its under

side at 22, as illustrated in Figure 7. The arch wire is thus not required to extend the entire length of the block, but may enter the same partly at the top thereof and exert its pull upon the block centrally thereof to the same effect as in the previously described construction.

A modified construction of the block and socket members is illustrated in the Figures 4 and 8. In this construction the opposed spring plates 25 of the socket member are angularly inwardly bent at 26 at the ends thereof, and the upper end or lip 27 of the plate is inwardly bent to a position substantially perpendicular to the main portion of the plate. The block 8 is provided with an arch wire receiving channel or cut out, as in the previously described construction, and is provided with oppositely tapered end portions whereby its plan outline is complementary to the general shape of the socket member. The sides of the block extend angularly outwardly from the bottom thereof to a point in spaced relation below the top thereof, and a longitudinally extending recess 28 is formed in the outer face of the block at each side and adjacent the top thereof. The block 8 is of smaller lateral dimension at its bottom than the spacing of the lips 27, at all points thereof, and the block is thus readily applied to the socket by forcing the same therein and extending plates 25 until the lips 27 are permitted to snap into the recesses 28. This type of interfitting block and socket connection is of sufficient strength to hold the block in place against the arch wire stress applied thereto, if this stress does not exceed that permitted by approved methods of orthodontia, and holds the block against longitudinal movement in the socket.

With either of the above described interfitting block and socket constructions, any desired type of arch wire may be employed, as illustrated in Figures 8, 9, 10, and 11. The arch wire 30 illustrated in Figure 8 is of substantially rectangular cross section, with one pair of the opposed sides thereof extending in slightly angularly disposed planes, and the channel 31 in the block 8 in which said wire is received is complementary to the shape of the wire whereby it tends to retain said wire therein. The arch wire 32 illustrated in Figure 9 is of comparatively large gage circular cross section, and the block 8 is shaped in the form of a horseshoe to receive the same, lateral shoulders 33 being formed therein for interengagement with the lips 7 of the socket member. The block 8 of the construction illustrated in Figure 10 is adapted to accommodate a pair of small arch wires 34. The block 8 illustrated in Figure 11 is provided with a pair of spaced channels 35 and 36, in which wire 38 of circular and 39 of substantially rectangular cross section, respectively, are receivable. The construction illustrated in Figure 11 is particularly adapted for use in the socket members carried by the anchor teeth, with the wire 38 serving to impart the correcting stress to the malposed teeth and the wire 39 serving to outline the arch of the teeth to which the malposed teeth are desired to be drawn.

It will thus be seen that I have provided an appliance, including a spring socket member carried by a tooth band, into which may be snapped an arch wire carrying block which is retained in desired position, without outward or longitudinal movement, by the spring action of the socket. The strength of the spring socket is sufficient to so retain the arch wire block against the stress

applied by the arch wire, provided this stress does not exceed that approved for the best orthodontic practice; but may be easily overcome to provide and permit withdrawal of the block when desired. The blocks are constructed to permit them to be strung on the arch wire before the wire is inserted in the mouth so that no difficulty is encountered in the application of the arch wire to the teeth, the blocks and arch wire forming and being handled as an assembly. It will also be seen that, as various conditions arise in the orthodontic treatment, which require, for instance, a different type of arch wire, such a wire may be used by simply removing the wire previously used, applying to the new wire blocks of a size and shape to receive the same, and mounting the blocks in the sockets. This obviously considerably simplifies the treatment and gives the appliance universal interchangeability to meet the conditions encountered, without the necessity of removing the tooth bands or the sockets.

The invention having been set forth, what is claimed as new and useful is:

1. In an orthodontic appliance, a tooth band, a spring socket member carried by said band, an arch wire, and a wire mounting block carried by said socket and having a wire receiving channel formed in its inner side, said block being insertible in said socket by snapping the same to place therein, said channel having a mouth of smaller dimension than said wire to retain said wire therein, whereby said block and wire may be assembled and applied to said socket as a unit.

2. In an orthodontic appliance, an arch wire having opposed converging sides, a block having a wire receiving channel therein of a shape complementary to the cross sectional shape of said wire and whose mouth is narrower than its base, said channel normally retaining said wire therein against release from said block, and tooth-carried means including a spring portion into which said block is snapped to be operatively positioned and secured with its channeled portion inwardly disposed.

3. In an orthodontic appliance, a tooth band, a channeled socket member carried by said band including a pair of spaced opposed elongated resilient walls each having an angularly directed lip, an arch wire, and a block clamped between said walls having a channel for receiving said wire, said block having opposed side faces complementary to said socket walls and lips and parallel to the axis of the channel thereof, said block being insertible in said socket by pressure applied angularly to the axis of the socket channel.

4. In an orthodontic appliance, a tooth band, a socket member carried by said band including a pair of opposed resilient plates having inwardly directed lips extending angularly thereof, an arch wire mounting block having opposed side faces complementary to and spring pressed by said socket plates and lips, and an arch wire, said block having a wire receiving channel formed therein whose mouth is of smaller dimension than said wire to retain said wire therein.

5. In an orthodontic appliance, a tooth band, a socket member carried by said band including a pair of spaced, opposed, configured, resilient plates having inwardly directed lugs formed at their ends, an arch wire, and a block mounting said arch wire and mounted in said socket to be

spring pressed thereby, said block having its corners bevelled to bear against the lugs of said socket plates.

6. In an orthodontic appliance, a tooth band, a socket member carried by said band including a pair of spaced, opposed, configured, resilient plates having inwardly directed lugs formed at their ends, an arch wire, and a block adapted to be mounted in said socket by flexing said socket plates and having its corners bevelled to bear against said lugs, said block having a wire receiving channel formed therein whose mouth is narrower than the cross sectional dimension of said wire.

7. In an orthodontic appliance, an arch wire, a block locked on said arch wire and slidable longitudinally thereof, said block having a longitudinal shoulder formed in each side thereof, a tooth band, a configured resilient socket member carried by said band and including inwardly directed portions having spring pressed engagement with said block at said shoulders, and means carried by said socket and engaging said block to prevent longitudinal movement of said block in said socket.

8. In an orthodontic appliance, an arch wire, a block mounting said arch wire and tapering towards each of its ends, said block having a longitudinally extending recess formed in each side thereof, and a tooth-carried member mounting said block comprising spaced, opposed, resilient plates provided with angularly inwardly directed end portions, and inwardly directed lips carried by said plates and seating in said block recesses.

9. In an orthodontic appliance, a tooth band carried by a tooth, a resilient channeled socket member carried by the band and having its channel outwardly disposed, an arch wire in said channel, a block in the channel of the channeled socket member and having a channel in which the arch wire is disposed, said block being receivable within the socket channel by pressure applied thereto at an angle to the axes of the channels of the block and socket, and interengaging connecting means between the block and socket formed at the time of block insertion and in combination with the socket holding the block against lateral movement.

10. In an orthodontic appliance, an arch wire, a block having a channel receiving said arch wire and having a longitudinally extending recess formed in each side thereof, a tooth band, and a channeled socket carried by said band and having a pair of spaced opposed resilient walls for clamping said block in said socket with said block channel inwardly disposed, said walls including inwardly directed lips seating in said block recesses.

11. In an orthodontic appliance, a tooth band carried by a tooth, a channeled socket carried by said band with its channel outwardly disposed and having opposed resilient side walls, an arch wire in said channel, and a block clamped between said socket walls and having a channel in its inner side fitting over said wire, said block being insertible in said socket by pressure applied transversely of the face of the tooth, and means on said block and socket interengaging upon insertion of said block in said socket and cooperating with said socket walls to normally hold said block in said socket against lateral movement.

LANDIS H. WIRT.