

[54] **ORTHODONTIC SEPARATING SPRING**

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[51] Int. Cl. **A61c 7/00**

[58] Field of Search **32/14, 64, 66**

[56] **References Cited**

UNITED STATES PATENTS

2,897,598 8/1959 Kesling **32/64**

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[57]

ABSTRACT

A spring wire device having a special planar configuration is inserted between two teeth to be separated in preparation for orthodontic banding. An activating portion of the inserted device projecting from the teeth is crimped by a bending plier to effect relative lateral deformation of occlusal and gingival arm portions exerting spreading forces on the teeth.

11 Claims, 8 Drawing Figures

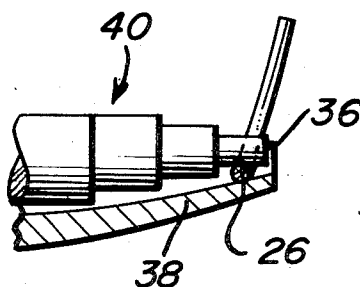


Fig. 1

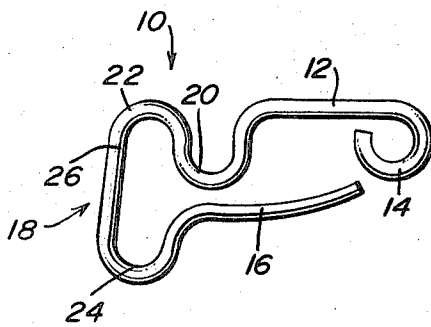


Fig. 2

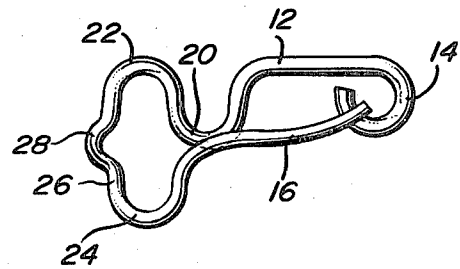


Fig. 3

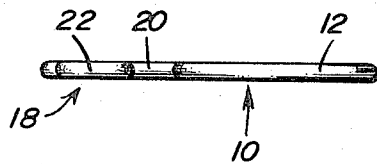


Fig. 4

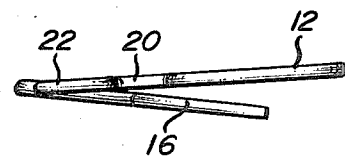


Fig. 5

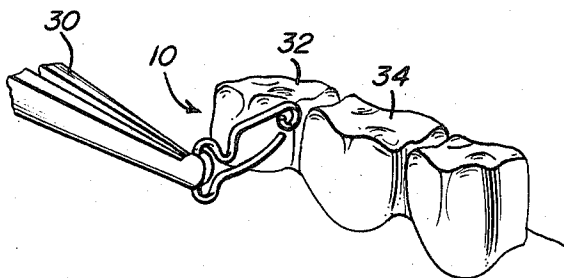


Fig. 6

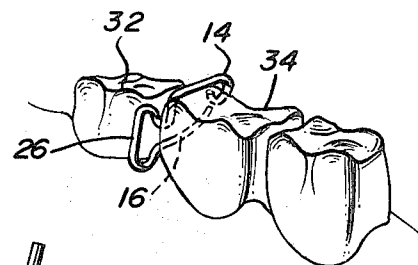


Fig. 8

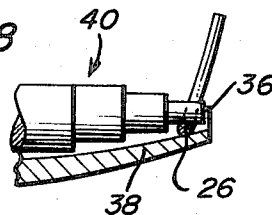
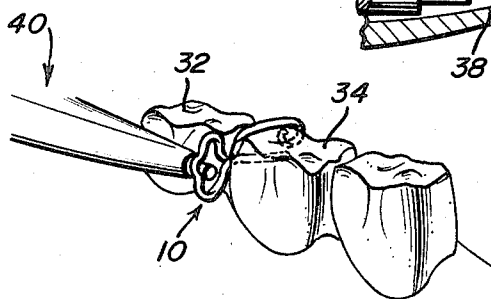


Fig. 7



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ORTHODONTIC SEPARATING SPRING

This invention relates to an orthodontic device and more particularly to a device for separating adjacent teeth in order to accommodate the placement of bands about the teeth during the construction and installation of an orthodontic appliance.

In the installation of orthodontic appliances, it is sometimes necessary to spread adjacent teeth in order to permit placement of a band about one or more teeth to which the arch wire is attached. One such device has been proposed in connection with this problem, as disclosed in U.S. Pat. No. 2,897,598. In this device, a horizontal pinching or contracting force is applied to the contact area of the teeth through the action of a helical spring. It is an important object of the present invention to provide a device for separating teeth in connection with the installation of an orthodontic appliance which is adjustable unlike the aforementioned patented device and which also applies a lateral or mesio-distal force between the adjacent teeth in order to more positively obtain separation.

In accordance with the present invention, a spring wire device having a planar configuration, is inserted between adjacent teeth and when activated by means of a wire bending plier, applies both a contracting force on the occlusal area between the teeth as well as a mesio-distal separating force. The amount of separating force applied is adjustable in that it will vary with the degree to which the activating portion of the spring wire device is crimped. The spring wire device includes an upper occlusal arm that is anchored between adjacent teeth on the lingual side and a lower, curved gingival separating arm which is inserted between the teeth adjacent the gum lines from the labial side. The two arms are interconnected by two loop formations which project labially from the teeth between which the spring wire device is inserted. A segment of the loop formations when crimped by a wire bending tool causes the arms to close resulting in lateral deflection of the lower gingival arm which is thereby operative to exert a lateral force on the teeth for separation thereof.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIG. 1 is a side elevational view of the spring wire device of the present invention in its undeformed state prior to insertion between two adjacent teeth.

FIG. 2 is a side elevational view of the spring wire device after it has been deformed by a wire bending tool, in accordance with the present invention.

FIG. 3 is a top plan view of the undeformed spring wire device illustrated in FIG. 1.

FIG. 4 is a top plan view of the spring wire device in its deformed state as illustrated in FIG. 2.

FIG. 5 is a perspective view showing the spring wire device being inserted between two adjacent teeth.

FIG. 6 is a perspective view showing the spring wire device fully inserted.

FIG. 7 is a perspective view of the inserted spring wire device being crimped in order to exert a spreading force on the adjacent teeth.

FIG. 8 is a sectional view showing the wire bending tool applying a crimp to the spring wire device.

Referring now to the drawings in detail, and initially to FIGS. 1 and 3, the spring wire device of the present invention is generally referred to by reference numeral 10. The device 10 is made of an elongated spring wire of suitable cross-sectional dimension for insertion between the teeth of a dental patient. The spring wire is formed into a particular planar configuration aligned in a single plane so that the device in its undeformed state may lie flat on a planar surface. The device includes an occlusal anchorage arm 12. Formed at one end of the occlusal anchorage arm, is an occlusal anchorage loop 14. The device is furthermore provided with a lower gingival separating arm 16 having a certain curvature. The two arms

12 and 16 are interconnected by an activating portion of the spring wire device generally referred to by reference numeral 18.

The activating portion of the spring wire device includes a loop formation 20 extended from the end of the occlusal anchorage arm 12 opposite the anchorage loop 14. The loop formation 20 extends toward the end of the gingival separating arm 16 and is interconnected therewith by an activating loop arranged at an obtuse angle to the linear arm 12. The activating loop includes an upper curved end 22 interconnected with a lower curved end 24 by means of a straight activating segment 26.

FIGS. 2 and 4 illustrate the spring wire device after it has been deformed by the placement of a crimp 28 in the activating segment 26. As a result of this crimp, the loop formation 20 is in engagement with the end of the gingival separating arm 16 producing lateral deflection of the arms 12 and 16 relative to each other from the original plane with which the spring wire device was aligned in its undeformed state.

FIG. 5 illustrates the spring wire device 10 being held along its segment 26 between the jaws of a tool 30 in alignment with the space between adjacent teeth 32 and 34 on the labial side. In FIG. 6, the spring wire device is in place with the upper anchorage arm 12 in contact with the occlusal surfaces of the teeth. The arm 12 is anchored in place by virtue of the anchorage loop 14 engaging the lingual side of the adjacent teeth opposite the labial side engaged by the loop formation 20 so that the activating portion 18 of the spring wire device projects from the teeth. The lower curved arm 16 projects between the teeth adjacent the gum line. Once the spring wire device is inserted as shown in FIG. 6, it is activated by grasping the activating segment 26 between the convex and concave jaws 36 and 38 of a wire bending plier tool 40 as shown in FIGS. 7 and 8. The crimp 28 aforementioned is thereby formed in the activating segment 26 by the tool 40. The action causes the closing of the occlusal and gingival arms 12 and 16. As the gingival arm comes in contact with the loop formation 20, it is laterally deflected in order to exert a spreading force on the adjacent teeth while a pinching force is applied to the teeth between the loop formation 20 and anchorage loop 14. The degree of crimp placed on the activating segment 26 will determine the amount of separating force applied to the teeth.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be restored to, falling within the scope of the invention.

What is claimed as new is as follows:

1. A device adapted to be inserted between adjacent teeth for separating the same, comprising an elongated wire having a substantially planar configuration, said wire including two spaced arms one of which is inserted between said adjacent teeth and an activating portion interconnecting the arms, said activating portion having means spaced from one side of the teeth while said one of the arms is inserted for laterally deflecting said arms relative to each other in response to deformation of the activating portion.

2. The combination of claim 1 wherein said activating portion comprises a loop formation projecting toward said one of the arms interconnecting the laterally deflecting means with the other of said arms.

3. The combination of claim 2 wherein said laterally deflecting means includes an activating loop interconnecting with said loop formation between said two spaced arms.

4. The combination of claim 3 including an anchoring loop connected to said other of the arms at an end opposite the activating portion.

5. The combination of claim 4 wherein said other of the arms is substantially linear while said one of the arms is curved toward said anchoring loop from the activating portion.

6. The combination of claim 5 wherein said activating loop extends at an obtuse angle to the linear arm.

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7. The combination of claim 1 wherein the laterally deflecting means comprises an activating segment adapted to be crimped and connected to said one of the arms.

8. The combination of claim 7 including a loop formation interconnecting the activating segment and the other of the arms, said loop formation being engageable with the teeth on the labial side to space the activating segment therefrom.

9. The combination of claim 8 including an anchor formation connected to the other of the arms at an end opposite the activating portion for engagement with the lingual side of the teeth.

10. A device adapted to be inserted between adjacent teeth for separating the same, comprising an occlusal arm adapted to be positioned substantially in an occlusal plane relative to said teeth, anchor means connected to opposite ends of the

occlusal arm for holding the same in said occlusal plane between the adjacent teeth, a deflection arm adapted to be inserted between said teeth adjacent to the gingiva, and an activating portion interconnecting the arms spaced from each other while substantially aligned in a common plane, said activating portion including means for laterally deflecting the deflection arm from said common plane when deformed.

11. The combination of claim 10 wherein said laterally deflecting means comprises an activating segment connected to the anchor means at one end of the occlusal arm and extending transverse to said arms in spaced relation to the occlusal arm and means interconnecting the deflection arm and the activating segment for engagement with said anchor means in response to deformation of said activating segment.

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