

United States Patent
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[54] NON-CUMULATIVE-FORCE SPRING
FOR ORTHODONTIC DEVICES

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[51] Int. Cl.A61c 7/00

[58] Field of Search32/22, 14; 128/92

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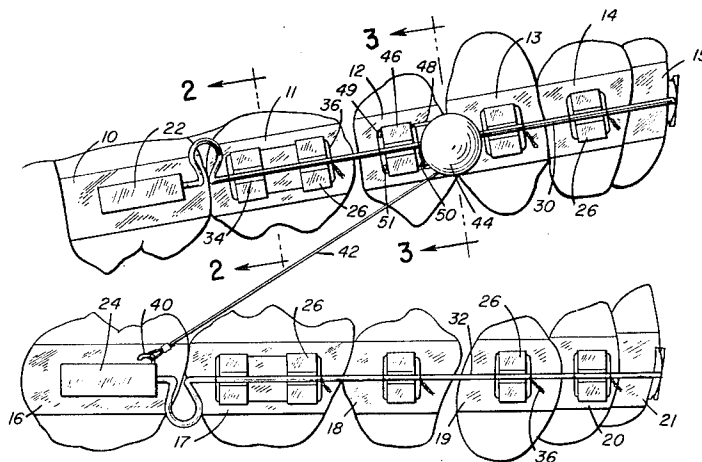
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[57] ABSTRACT

A force powered drum and cable device is utilized in place of latex elastic means in orthodontic correction systems.

5 Claims, 3 Drawing Figures



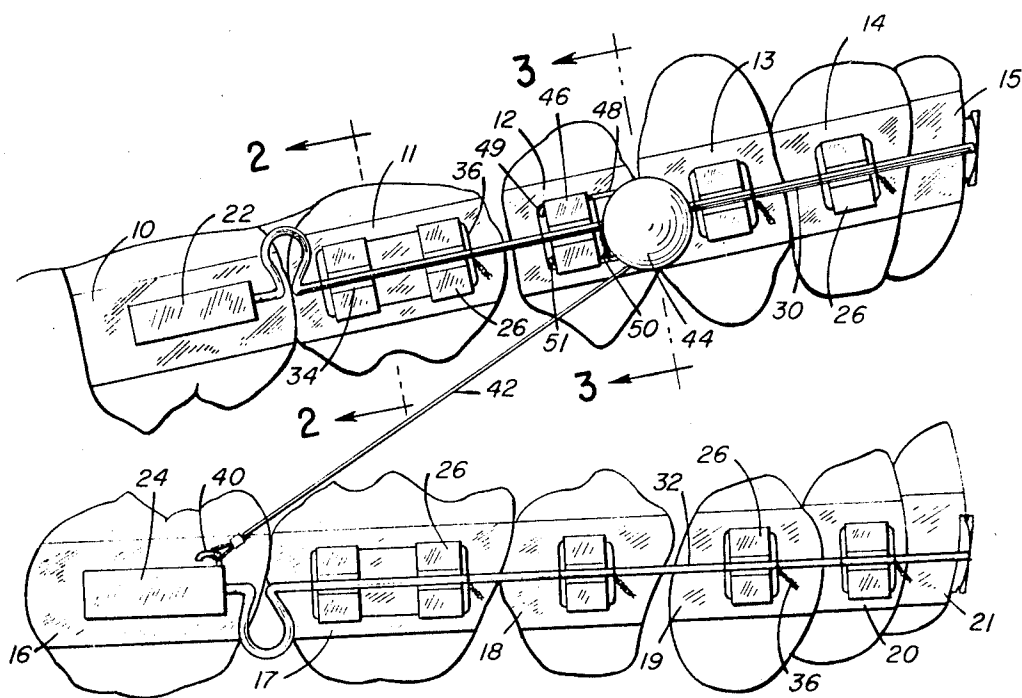


FIG. 1

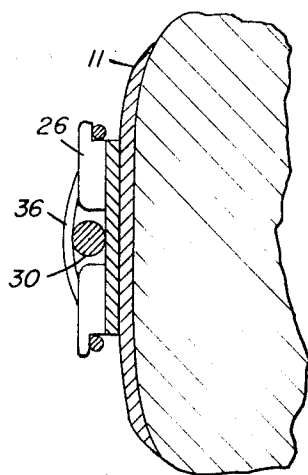


FIG. 2

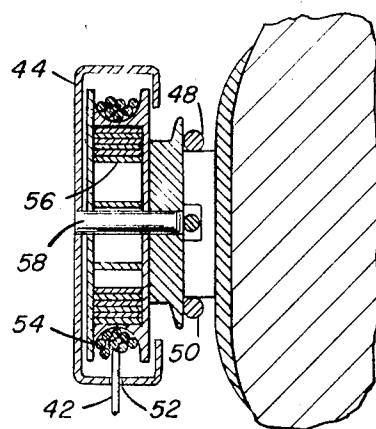


FIG. 3

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NON-CUMULATIVE-FORCE SPRING FOR ORTHODONTIC DEVICES

BACKGROUND OF THE INVENTION

Orthodontic appliances are conventionally used in treatment for correcting faulty occlusions or malpositions of jaws and teeth. Generally, this involves the moving of at least one tooth, and usually more, into a more favorable position with respect to the other teeth. This is accomplished typically by applying forces on the tooth or teeth to be moved utilizing an arch wire, which extends around the tooth arch (upper and/or lower) and by means of its own inherent tension or by the application of secondary tension or bending forces thereto, the selected teeth are brought into proper relationship with the others. Heretofore, conventional practice has taught the use of intermaxillary rubber elastic bands, which are stretched from one dental arch to the other along a force vector oriented in the direction needed to correct the discrepancy. The problem with latex is that it deteriorates in the mouth fluid to such an extent that they must be replaced at least daily by the patient. In addition the patient, usually children, loses the latex bands and in some cases does not use them sufficiently often enough as prescribed for the correction to take place in a reasonable amount of time.

SUMMARY OF THE INVENTION

Accordingly it is an object of the present invention to provide a force system in orthodontic correction and traction devices replacing the heretofore known latex elastic devices and overcoming the problems heretofore incurred therewith. The invention further provides a means for attaching such a spring force device to the arch wire, or bracket, and/or tooth or tooth band.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a side elevational view, depicting as for example the right side teeth, both upper and lower, and employing the embodiment of this invention.

FIG. 2 is a sectional view taken along the line 2—2 of FIG. 1.

FIG. 3 is a sectional view taken along the line 3—3 of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the various views, an intermaxillary force correction is shown. Typically, individual tooth bands 10—15 inclusive are cemented to the upper teeth, while numerals 16—21 inclusive represent bands for the lowers. Typically these bands and most of the equipment used in orthodontic treatment are of stainless steel or synthetic materials. Although a multi-band arrangement is shown, it is understood that various orthodontic arrangements wherein, as for example, the first and/or second molars only are banded and other various arrangements are within the inclusion of this invention. As shown in this embodiment, each distal most band carries a buccal tube 22 and 24 while the intermediate tooth bands have soldered thereon brackets 26 of either a singular or double type as shown and as is well known in the art. Typically this construction protrudes the posterior portion of the tooth arch. Upper and lower arch wires 30 and 32 respectively, are attached at one end to the respective brackets 22 and 24 at the rear molars. The arch wire is received within openings 34 of each buccal tube and held by a fine wire ligature 36. A mounting hook 40 is provided on the bracket 24 to

which a stainless steel cable 42 end loop is attached and extending to a drum preferably powered by a non-cumulative force spring housed within the casing 44 and which is attached to bracket 46 by a pair of parallel support rods 48 and 50 which are inserted and retained by the buccal tube and crimped at the free ends 49 and 51 thereof as shown in FIG. 1.

In the sectional view of FIG. 3 a typical drum arrangement is shown wherein cable 42 enters tangentially through opening 52 of housing 44 to a rotatable output drum or reel 54 about which a sufficient length is coiled. Cover 44 prevents any contact with the interior cheek or mouth portion. Typical of such a spring includes a motor 56 or clock-type spring which is wound inside the output drum 54, such that one end of which is restrained or attached to the intermediate central post or arbor 58, the other end being attached to the inner periphery of output drum 54. The back wound coil strip 56 is restrained around the outer layer while the inner end is fastened to an inner drum or arbor. Typical of a spring of this design is that manufactured and sold by the Hunter Spring Division of Ametek, Inc. under the trademark NEG'ATOR SPRING. Although a non-cumulative force means is preferred this is not to be considered as limiting as there are instances where a cumulative force spring means is inclusive of use with the drum and cable concepts of this invention.

Typical design of the spring reel of this invention would involve one having a diameter within the range of fifteen sixty-fourths inch to seventeen sixty-fourths inch and a thickness of one thirty-second inch and capable of delivering from 1 to 16 ounces force tension, and in some instances in use with head gear arrangements from one-half to 3 pounds. Although the device has been shown attachable to the bracket or buccal tube as shown, it is to be understood that other embodiments wherein the reel is attached to the arch wire and/or to the tooth or tooth band directly are inclusive of this invention. Further the use of this form of force means can be used with intermaxillary force vectors, intramaxillary force vectors, or in some instances, with extraoral anchorage or traction devices using head gear or night braces.

What is claimed:

1. Apparatus to constantly apply a traction force vector in oral orthodontic correction systems comprising
 - a rotatable drum;
 - force means normally biasing said drum in one rotatable direction;
 - a cable, one end of said cable attached to said drum and capable of being coiled thereabout;
 - means to attach said drum at one position substantially adjacent one end of the desired traction force vector and means to attach the other free-end of said cable to the other end of said traction force vector whereby said force is applied along said traction force vector of orthodontic correction.
2. Apparatus of claim 1 wherein said drum is powered by a non-cumulative force spring.
3. Apparatus of claim 2 wherein said drum is powered by a cumulative spring.
4. A method of orthodontic correction between teeth of the same arch comprising the step of:
 - orally maintaining a stretchable constant non-cumulative spring traction force to said teeth.
5. A method of orthodontic correction between teeth of the upper and lower arches comprising the step of:
 - orally maintaining a stretchable non-cumulative spring traction force between said upper arch and said lower arch.

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