United States Patent [19]

Wallshein

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[54] **ORTHODONTIC BIASSING DEVICE**

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[52] **U.S. Cl.** ..... **32/14 E**

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

[58] **Field of Search** 32/14

[56] **References Cited**

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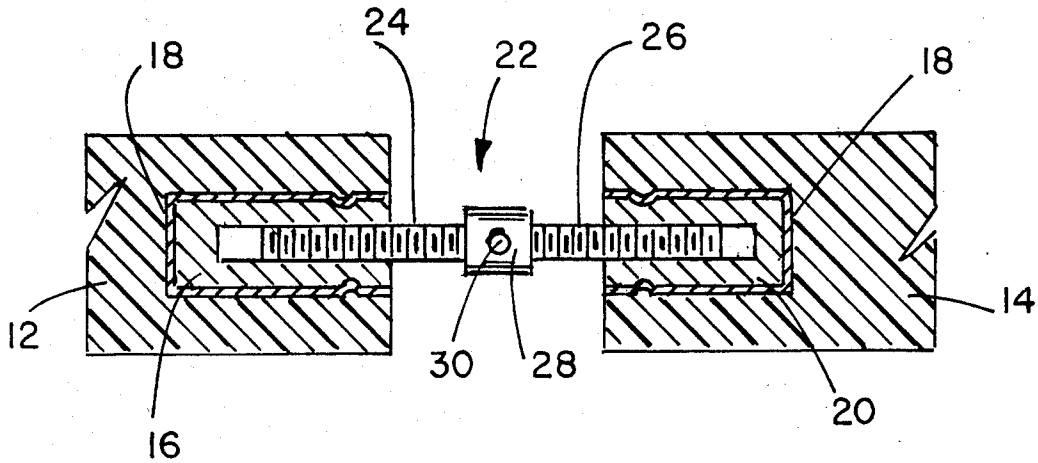
Primary Examiner—Robert Peshock

Attorney, Agent, or Firm—Friedman & Goodman

[57] **ABSTRACT**

An orthodontic biassing device comprising two spaced orthodontic elements is provided with an aperture in each element. The aperture may be in the form of a sleeve for receiving the body housings of an expansion screw. The sleeves are so configurated so as to interchangeably receive body housings having different lengths so that initial spacings between the two elements may be increased by replacing a shorter expansion screw which has been nearly totally extended from its respective body housings by an expansion screw with longer body housings. According to another embodiment, the spaced elements are in the form of resilient receptacles having elongated extensions connectable to teeth and openings which are configurated to receive the body housings by at least partially deforming the receptacles during insertion. Biassing devices which can be utilized both as expansion or contraction devices are described.

22 Claims, 13 Drawing Figures



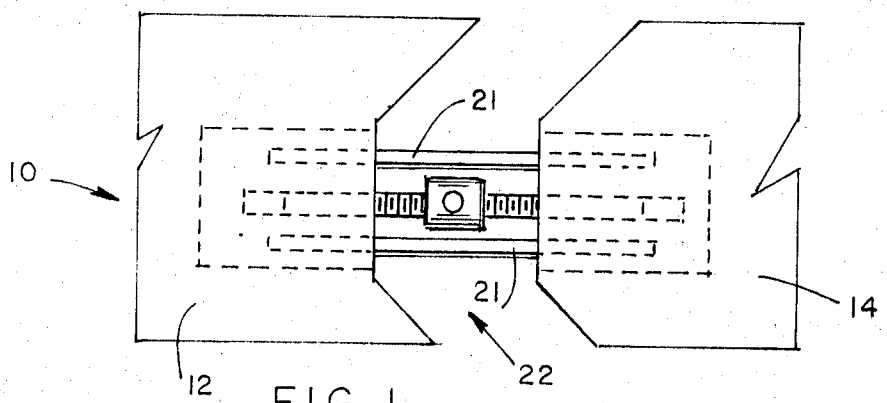


FIG. 1.

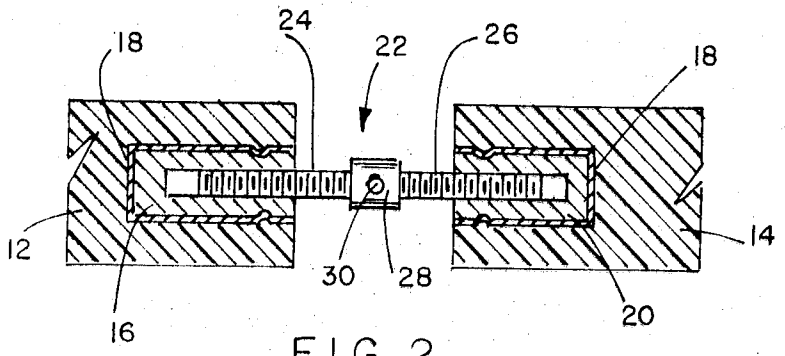


FIG. 2.

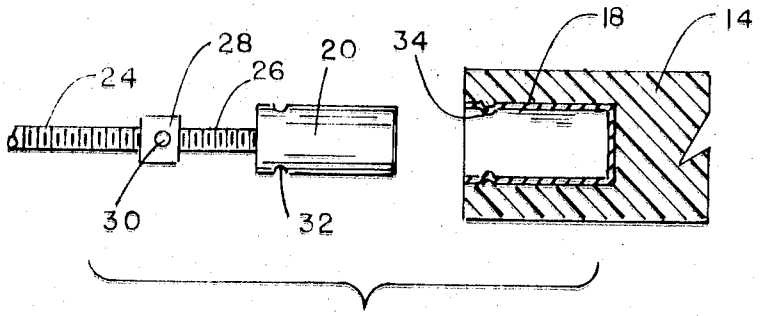
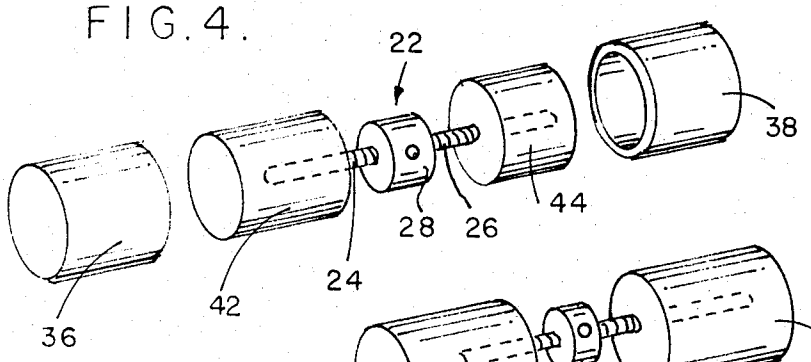


FIG. 3.

FIG. 4.



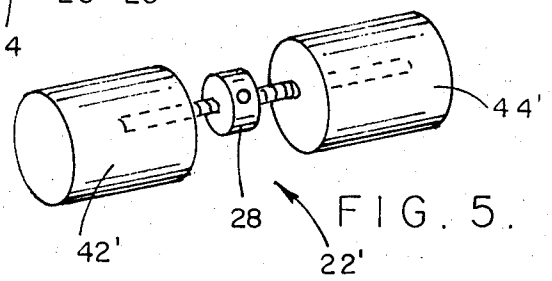


FIG. 5.

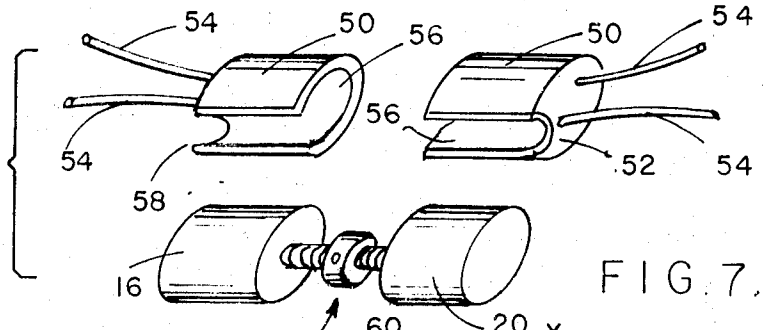


FIG. 7.

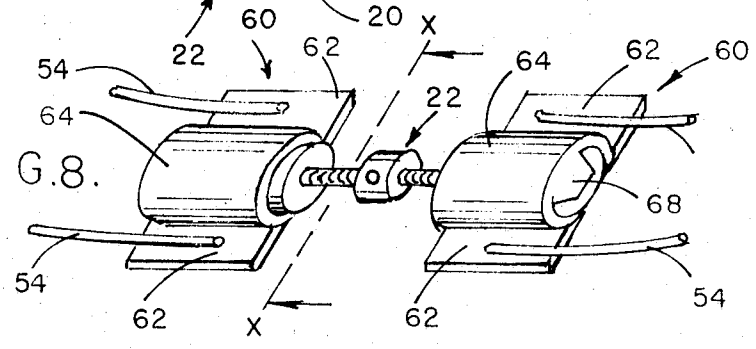


FIG. 8.

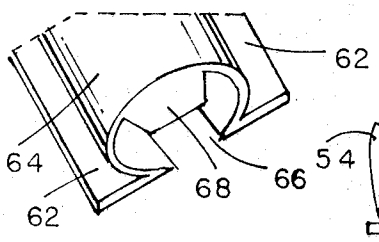


FIG. 10.

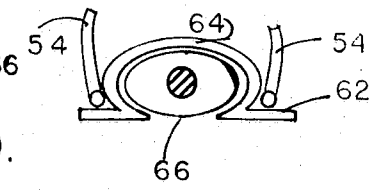


FIG. 9.

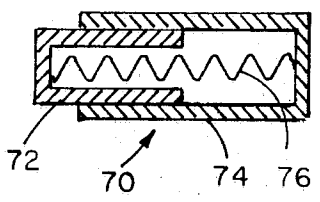


FIG. 11.

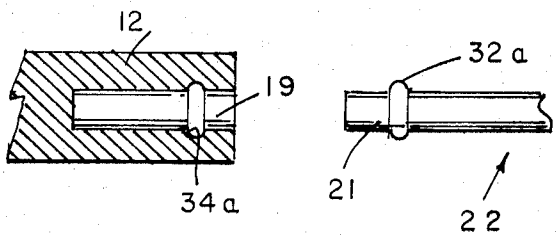


FIG. 6.

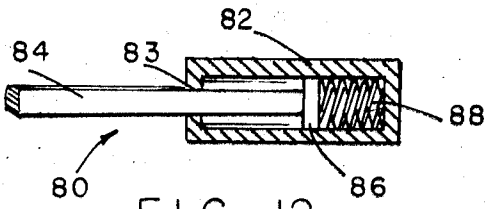


FIG. 12.

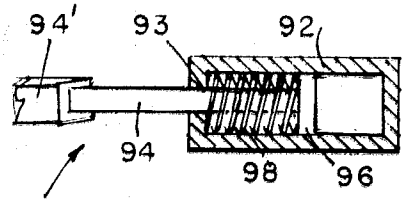


FIG. 13.

ORTHODONTIC BIASSING DEVICE

BACKGROUND OF THE INVENTION

The present invention generally relates to orthodontic devices, and more particularly to an orthodontic biassing device which includes an aperture in each one of two spaced elements, each aperture being configurated to interchangeably receive the body housings of means for separating or drawing together the two spaced elements.

Biassing devices in the form of palatal removable appliances are already well known. One such device, the expansion device, serves as a retaining device which normally engages the teeth in some manner to stabilize the appliance in the mouth and serves as a support for various orthodontic appliances. A common form of expansion device is the expandable acrylic appliance having a spindle which is threaded at both ends but in opposite senses — each end being meshingly engaged with another element of the appliance. Rotation of the spindle causes the two elements either to come closer together or separate further apart. The disadvantage of the known expansion devices arises as a result of the manner in which the expansion screws are associated with the elements of the appliance. Thus, the prior art expansion screws are normally provided with body housings at each end which are rigidly or permanently embedded in the acrylic. As frequently happens, the two elements, at least initially during the tooth movement process, are spaced relatively close to one another — the distance increasing as the teeth are separated in response to forces supplied by the appliance on the teeth. When the acrylic elements are spaced from each other a distance substantially corresponding to the length of the threaded spindle, the particular expansion device cannot serve much further purpose since further expansion or separation of the acrylic elements results in the disengagement of the threaded spindle form the body housings. With the known appliances, new acrylic elements are required when further separation is desirable since the body housings are permanently embedded in the acrylic. This involved great time and expense. The same problem exists in connection with fixed palatal suture splitting appliances which include metal extensions soldered to clasps which are more permanently connected to the teeth. The threaded body housings which mesh with the spindle in this type of appliance define the elements of the appliance and are normally soldered directly or made integral with the metallic extensions. As before, when the spindle has been fully extended from the body housings, it is normally required to disconnect the entire splitting appliance from the teeth and replace it with a new appliance provided with longer meshed body housings.

The disadvantages inherent in all of the prior art expansion devices has been the difficulty and expense with which these appliances were interchanged once an existing appliance became too short for the intended application.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide an orthodontic biassing device which is not possessed of the disadvantages known in similar devices.

It is another object of the present invention to provide a biassing device which is simple in construction and economical to manufacture.

It is an additional object of the invention to provide a biassing device which has two elements each of which includes connecting means for being connected to biassing means for separating or drawing the elements together.

It is another object of the present invention to provide a biassing device of the type under discussion which includes a screw and two end body housings each of which is meshed with the same screw at another end, the body housings being readily removable and interchangeable.

It is yet another object of the present invention to provide a biassing device having two orthodontic elements, each having an aperture for interchangeably receiving the meshed body housings of a biassing screw.

It is a further object of the present invention to provide a biassing device as described above which interchangeably accepts biassing screws having various body housing lengths to thereby provide different initial spacings between the orhtodontic elements forming the biassing device.

It is still a further object of the present invention to provide a biassing device in the form of a fixed palatal suture splitting appliance having two spaced elements which includes interchangeable body housings of biassing screws which are readily insertable and removable from the spaced appliance elements.

It is yet a further object of the present invention to provide an orthodontic biassing device having two spaced elements which includes interchangeable biassing means provided between the two spaced appliance elements — said biassing means being so arranged so as to apply a biassing force to the two spaced elements.

Although the description that follows mostly concerns expansion devices, it should be clear that the invention similarly contemplates contraction biassing devices. Thus, an expansion screw can act as a contraction device if it is turned in a reverse direction. Also, where a compression spring is described, it should be clear that a spring under tension may be substituted to produce an opposite effect.

In order to achieve the above objects, as well as others which will become apparent hereafter, an orthodintic biassing device in accordance with the present invention comprises support means in the form of two spaced orthodontic elements at least one of which is provided with connecting means. Adjustable biassing means are provided which extend between said two elements, said biassing means having at least a portion which engages and interchangeably connects to said connecting means. In this manner, the space between said two elements may be changed by adjusting said biassing means subsequent to being connected to said connecting means. Also, biassing means having various overall lengths may be easily interchanged.

The subject biassing device may be utilized with support means which is either in the form of a plastic appliance, e.g., an acrylic appliance, or a fixed palatal suture splitting appliance.

According to the presently preferred embodiment, said connecting means comprises an aperture in each element. Sleeve means may be provided which are se-

curely positioned in each aperture. Said biassing means includes two threaded body housings and a threaded spindle meshingly engaged in said housings in such a manner that rotation of said spindle changes the spacing between said housings and thereby also between said elements. Each of said housings is removably mounted in a respective sleeve means. With respect to all of the embodiments, said apertures are adapted to interchangeably receive threaded body housings having different overall lengths so as to provide different initial spacings between the appliance elements.

According to one presently preferred embodiment, the exterior dimensions of said biassing means housings are so selected so that the latter are received in said apertures in pressure fitting relation.

With respect to all of the biassing devices in accordance with the present invention, the biassing screws, including the end body housings which support the spindle at both ends thereof are interchangeably insertable in pressure fitting relation internally of the apertures in each of the respective spaced elements.

According to another preferred embodiment, the biassing device is in the form of a biassing cylinder which comprises two concentric cylinders one having a slightly smaller diameter than the other so that the former slidingly fits inside the latter. A stressed spring provided inside the two cylinders tends to force the two cylinders in opposite directions along the axis of the cylinders. Each of the cylinders has a diameter selected to fit into one of the apertures of the biassing device. When the coil is mounted in the cylinders in a compressed state, the cylinders exert separating biassing forces on the two elements which contain the same. However, the coil may also be mounted in the cylinders under tension in which case the cylinders draw the two elements towards each other.

The facility with which the biassing means are interchanged in all of the biassing devices in accordance with the present invention greatly reduces the time which has been expanded in the past in changing biassing devices. In addition to the increased convenience, an important feature of the present invention is that the same biassing device elements may be re-used — the only items which must be interchanged are the acutal biassing means which are engaged with the elements. Also, the original shorter biassing means may similarly be re-used and this further decreases the cost of such biassing devices, when the latter are intended to move the elements a great distance relative to each other during the lifetime of the appliance or device.

BRIEF DESCRIPTION OF THE DRAWINGS

With the above and additional objects and advantages in view, as will hereinafter appear, this invention comprises the devices, combinations and arrangements of parts hereinafter described and illustrated in the accompanying drawings of a preferred embodiment in which:

FIG. **1** is a fragmented top plan view in schematic of an expansion or contraction device in accordance with the present invention;

FIG. **2** is a side elevational view, partly in cross-section, showing the expansion or contraction device of FIG. 1;

FIG. **3** is a side elevational view, partly in cross-section, showing the expansion or contraction device of FIG. 1;

FIG. **4** is an exploded view in perspective showing schematically the relationship between the expansion screw and the sleeves which receive the same;

FIG. **5** is a perspective view of an expansion screw similar to that shown in FIG. **4**, but having longer body housings configurated to be inserted into the sleeves of FIG. **4**;

FIG. **6** is a fragmented side view, partly in cross-section, of one possible connecting means configurated for connecting an element of a biassing device to a portion of a biassing means;

FIG. **7** is a perspective view of a fixed palatal suture splitting appliance having expansion screw elements or receptacles which interchangeably receive expansion screw housings having various overall lengths, and further showing an expansion screw just prior to engagement with the appliance;

FIG. **8** is another embodiment of a fixed palatal suture splitting appliance having lateral flanges from which the metallic extensions extend;

FIG. **9** is a cross-section of the appliance shown in FIG. **8**, taken along line X—X;

FIG. **10** is an enlarged perspective of one end of a receptacle element shown in FIG. **8**, showing the details of a retaining tab;

FIG. **11** is a cross-section of an expansion or contraction device in accordance with the present invention which has two concentric containers and which may be utilized with the above described embodiments in place of an expansion screw;

FIG. **12** is a cross-section of compression means similar to that of FIG. **11**, wherein one container is replaced by a piston; and

FIG. **13** is similar to FIG. **12**, but for tension means.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, wherein identical reference numerals have been utilized to designate the same or similar parts throughout, and first referring to FIG. **1**, an expansion or contraction device in the form of a plastic removable appliance **10**, commonly in the form of an acrylic appliance, comprises two acrylic elements or members **12, 14** which are spaced from one another an adjustable distance, as to be described. In the description that follows, it should be clear that expansion devices may also be utilized as contraction devices.

Connecting the two acrylic elements **12, 14** is an expansion screw generally designated by the reference numeral **22** whose construction per se is well known in the art. Referring also to FIG. **2**, the expansion screw **22** generally comprises a body housing **16** and a body housing **20** each of which is provided with an internal thread which respectively meshes opposite screw portions **24, 26** of a spindle. Positioned between the two ends **24, 26** of the spindle is a non-threaded spindle engaging portion **28** which is provided with radial holes **30** adapted to be engaged by a special tool or simply an elongated pin which may fit in the holes. The body housing **16** of the expansion screw **22** engages or is inserted into a connecting means in the form of a sleeve **18** which is enclosed in the acrylic element **12.** Similarly, a sleeve **18** is embedded in the acrylic element **14.** Advantageously, the exteriors of the sleeves **18** are pro-

vided with a roughened surface so as to provide better retention of the sleeves in the acrylic elements.

The construction of the expansion screws **22,** including the body housings **16, 20,** is known per se and does not form a critical part of the present invention. The invention provides means for simply and interchangeably replacing one expansion screw for another having different body housing lengths — expansion screws commonly being available with body housings having different overall lengths. In this manner, the initial spacing between the acrylic elements **12, 14,** while the expansion screw is fully contracted, may be increased at will. Usually, a new expansion screw having longer body housings is desirable when an expansion screw, having shorter body housings, can no longer be expanded due to the fact that the spindle ends of the expansion screws are almost fully extended from their respective body housings.

In the case of acrylic appliances, it is advantageous to provide at least one guide pin **21,** and preferably two guide pins **21** on each side of the expansion screw as shown in FIG. **1.** The guide pins **21** prevent the relative rotation of the acrylic elements relative to each other about the spindle of the expansion screw. Presently available expansion screws are frequently provided with guide pins and therefore no additional guide pins need be provided.

According to the presently preferred embodiments, wherein the invention is utilized with a plastic, e.g., acrylic, removable appliances, is illustrated in FIGS. **3–5.** In FIG. **3,** the acrylic element is shown to be provided with a sleeve **18** which is embedded in the acrylic. As mentioned above, the sleeve **18** is typically provided with a roughened exterior surface so as to be better retained in the acrylic in order to withstand the substantial forces exerted on the sleeve. The sleeve is of cylindrical configuration. For the purposes of the present application as well as the claims, the term cylindrical shall not be construed to merely include circular cylindrical shapes but includes any cylindrical shape, e.g., such as an oval or square. More specifically, the shape of the sleeve **18** is selected to conform with the exterior shape of the body housings which are to be contained therein. The sleeves and the body housings form mating portions of a connecting means for connecting the expansion screw to the elements.

According to one presently preferred embodiment of the sleeves **18,** the interior dimensions of the sleeves are selected to closely correspond to the exterior dimensions of the body housings so that the housings mate with the sleeves with little clearance therebetween. Preferably, the internal dimensions of the sleeves are so selected so that a press-fit is obtained when the body housings are urged into the sleeves. However, this is not a critical feature since the expansion screws **22** are normally urged or biased in such a manner that the body housings are forced into the acrylic elements. Therefore, there is no danger, practically, of the body housings from coming out of the sleeves.

Accordingly to a modification, the sleeves are provided with radially inwardly projecting annular projections **34** while the body housings are provided with annular grooves **32** configurated to receive the projections in the mated condition of the body housings in the sleeves. Thus, when the body housings are fully inserted into their corresponding sleeves, the annular projections snap into the annular grooves and the housing is retained in the sleeve. However, as above, there is no practical problem with the body housings leaving the sleeves because of the normally expanded condition of the expansion screw.

In FIGS. **4** and **5,** there is schematically illustrated the manner in which the present invention is utilized. The acrylic elements in which the sleeves **36, 38** are embedded are not shown in order to simplify the drawing. However, it is to be understood that the sleeves **36, 38,** are each embedded in acrylic elements as shown in FIGS. **1–3.** The expansion screw **22** includes body housings **42, 44** which have a predetermined length along the axis defined by the expansion screw. As before, although the body housings are shown to be in the form of right circular cylinders, this is only so shown for illustrative purposes and the cross-section of the body housings may be of any shape whatsoever. Typically, body housings commonly available have oval cross-sections.

When the screw portions **24, 26** of the spindle **22** are fully extended or nearly fully extended from the body housings **42, 44** and no further extension is possible, the expansion screw **22** is disengaged from the acrylic elements by urging the body housings **42, 44** from the sleeves **36, 38.**

The next sized expansion screw **22′**, having longer body housings **42′**, **44′** and shown in FIG. **5,** is engaged with the sleeves **36, 38.** Because the body housings **42′**, **44′** of the new expansion screw **22′** are longer along the general axis defined by the expansion screw, the initial spacing of the sleeves **36, 38,** and therefore also the acrylic elements, with the new expansion screw **22′** fully contracted may be selected to be approximately equal to that with the original expansion screw **22** fully extended. Now, should the spacing between the acrylic elements be further increased, the new expansion screw **22′** can be expanded by turning the spindle engaging portion **28** as before. It should be noted that the acrylic elements need not be replaced. Also, the original expansion screw **22,** which has been replaced by a longer expansion screw **22′**, may, but need not, be discarded as with prior art designs.

The above-described connecting means have been described as sleeves forming apertures in the elements **12, 14.** However, it should be clear that the sleeves **18** may be omitted as shown in FIG. **6.** Here, the connecting means comprises an aperture **19** formed directly in the acrylic member **12.** The internal dimensions of the aperture **19** can be selected to receive a body housing or a portion of a pin **21** of a biassing means **22.** The aperture **19** and the pin **21** can each be threaded so as to meshingly engage each other. When not so threaded, the element **12** may be provided with an annular groove **34*a*** while the pin is provided with a correspondingly dimensioned annular projection **32*a*** which can snap into the groove **34*a*.**

The same principal described in connection with plastic or acrylic removable appliances can also be utilized with respect to expansion devices commonly termed fixed palatal suture splitting appliances. Such appliances known in the prior art have generally consisted of an expansion screw to which are welded or soldered metallic extensions which include tooth engaging means at the free ends thereof. As with the acrylic appliances of the prior art, the expansion screws in the prior art could not be easily changed so that

when an original expansion screw was fully expanded, it was a difficult and time consuming task to remove the metal extensions and re-solder them on a new expansion screw having longer body housings.

This problem is aleviated, with respect to the palatal suture splitting appliances, by providing holders **50** as shown in FIG. **7.** The holders **50** are in the general shape of an oval cylinder each having an open and a closed end **52** — the open end being shown as a front opening **56** in FIG. **6.** The holders **50** are also provided with side openings **58** which run along the axial length of the cylindrical holders. Connected to the closed ends **52** are metal extensions **54** which are connected to tooth holding means in a conventional manner. As described above, the oval nature of the holders **50** is merely illustrative and any other cross-sectional configuration of the holders may be utilized.

The palatal suture splitting appliances differ in one important respect to the acrylic appliances in that the holders **50** are normally rigidly held in position by means of the metal extensions and fixed due to the connections of the metal extensions to the teeth. Accordingly, guide pins described in connection with the acrylic appliances need not be utilized.

The holders **50** may be made from any suitable relatively rigid material which, however, is sufficiently flexible so as to permit the insertion of the body housings **16, 20** into the holders **50** through the side openings **58.** The height of the side openings **58** are selected to be somewhat smaller than the height of the body housings **16, 18** so that the latter are retained in the holders **50** after they have been forced therein. When the body housings **16, 20** are urged into the holders **50,** therefore, the side openings **58** are at least partially deformed and enlarged so as to permit entry of the body housing **16, 20.** To remove the expansion screw **22,** it is merely necessary to pull the latter in the direction of the side openings **58** so as to enlarge the side openings and so as to release the body housings **16, 20.**

As with the acrylic appliance, when the holders or elements **50** are fully spaced from each other as a result of a fully expanded condition of an expansion screw **22** associated with the elements, that expansion screw may be removed from the holders **50** as described above and a new expansion screw having longer body housings **16, 20** may be placed therein.

FIGS. **8–10** illustrate another embodiment of the palatal suture splitting appliance of FIG. **7** wherein the elements **60** are slightly modified to have cylindrical holders **64** which may be of the same cross-sectional configuration as the holders **50.** However, the holders **64** are provided with an elongated slot **66** along the lower end of the holders **64** as viewed in FIGS. **8–10.** Extending from the holders **64** in the region of the openings **66** are tabs **62** which serve as supports to which the metal extensions **54** may be soldered. The holders **60** have a front open end and an opposite end which is provided with a screw abutting portion **68** as best seen in FIG. **10.** The portions **68** serve to retain the body housings **16, 20** of the expansion screws **22** in the holders **64** when the expansion screws are expanded.

The embodiment shown in FIG. **7** permits the replacement of expansion screws through a side of the holders **50.** On the other hand, the holders **60** shown in FIGS. **8–10** permit the replacement of expansion screws through the lower or bottom slots **66** of the holders which generally run along the axis of the expansion screw. In some instances, it is easier to interchange an expansion screw with the embodiment as shown in FIGS. **8–10,** particularly when there is little room to maneuver inside the mouth.

An expansion biassing means is illustrated in FIG. **11** and generally designated by the reference numeral **70.** The biassing means generally comprises an inner container **72** and an outer container **74.** The cross-sections of the containers **72, 74** are preferably non-circular so that the elements connected to respective containers do not turn relative to one another about an axis generally defined by the elongated containers. The outer dimensions of the inner container **72** is substantially equal to the inner dimensions of the outer container **74.** In this manner, the inner container is slidably mounted in the outer container. Each of the containers has an open end on the side of the other container while having a closed end on the side facing away from the other container. Resilient means in the form of a helical spring **76** is provided which extends between the closed ends of the two containers. When the helical spring is not compressed, the two containers are spaced relative to each other in a predetermined condition. However, when the two containers are moved in such a manner as to futher insert container **72** into the outer container **74** and thereby compress the helical spring **76,** the latter generates forces which tend to restore the two containers to their normal or predetermined condition. The external dimensions of the two containers are so selected so that they may be inserted into apertures or sleeves, as with the acrylic appliances, or into holders, such as with the palatal suture splitting appliances.

It is clear that the axial lengths of both the inner and outer containers **72, 74** respectively can be selected to be any convenient values — as short or as long as desired.

In using the biassing expansion device **70,** the latter is first compressed or shortened so that the inner container **72** is forced somewhat into the outer container **74.** The extent of compression may vary and is so selected so that the overall length of the device **70** is approximately equal to the initial spacing of the two elements of the expansion device or appliance. The opposite ends of the biassing device **70** are then respectively positioned either inside the expansion sleeves or in the holders, as described above. Once positioned in the sleeves or holders, the biassing device **70,** being in a compressed state, supplies a constant separating and biassing force on the two elements of the expansion appliance. This constitutes an advantage over conventional expansion devices which must periodically be expanded by turning a threaded spindle.

According to another advantageous feature of the biassing device **70,** these may be provided in various length containers — similarly to the various length body housings in connection with expansion screws. Also, the biassing device **70** may be provided with variable constant springs so that greater or lesser biassing forces are applied to the respective removable appliance elements. Both the length as well as the spring constants may be standardized for a convenient selection. In all other respects, the expansion device **70** may be utilized as described above in connection with expansion screws, i.e., the biassing device may be interchanged once the latter has reached a condition wherein the biassing spring is no longer compresses and

therefore no longer has any tendency to increase the spacing of the expansion device elements.

Different embodiments of the biassing device **70** of FIG. **11** are shown in FIGS. **12** and **13.** In FIG. **12** biassing means **80** includes a container **82** which has an opening **83** at one end thereof. Both the container **82** as well as the opening **83** have non-circular cross-sections to prevent rotation of the elements connected thereto as described above. A piston cooperates with the container and includes a shaft or pin **84** having a cross-section which corresponds to the cross section of the opening **83** and which is slidingly mounted in the latter. An abutting member **86** is connected to the pin **84** and is slidingly mounted inside the container **82.** When the pin **84** is moved so as to compress a spring **88,** the latter biasses the piston and container in opposite directions so as to extend the piston and revert the spring to its unstressed state. The pin **84** can, for example, be mounted in an aperture such as shown in FIG. **6.** In FIG. **13,** the biassing means **90** is almost identical to that shown in FIG. **12** except that a spring **98** now abuts against the open end of the container **92** and the abutting member **96** while being concentrically mounted with the pin **94.** Here, when the pin is moved so as to compress the spring **98,** the latter biasses the piston and container so as to contract the biassing means **90.** Otherwise, the operation of the biassing means **80, 90** is similar to that of biassing means **70.** The pin **94** is also shown to have a free end portion having enlarged external dimensions which may, in some cases, be more suitable for mating with an aperture in an element as described above.

Although the connecting means has been described in terms of an aperture in an element, e.g. elements **12, 14,** it is possible to reverse the order and provide an aperture in the biassing means and a projection on the element which mates with aperture. It is also contemplated that other forms of connecting means, other than apertures and mating parts, which can easily engage and disengage can also be used — the novel feature residing in the interchangeability of biassing means with respect to elements of biassing devices.

By connecting the ends of the helical spring **76** under tension to the closed ends of the containers **72, 74,** the biassing device **70** may also be used as a contraction device. Generally, as described above, any expansion device may be utilized as a contraction device and vice versa.

Advantageously, all the above-described biassing devices include conventional means (not shown) for preventing the total separation of the two elements. In the case of the biassing devices utilizing the expansion screws **22,** the meshed relationship between the spindles and the body housings together with the press-fits between the housings and the cylindrical receptacles are usually sufficient to prevent separation. In the case of biassing devices **70,** conventional means (not shown) may be utilized to prevent separation of containers **72, 74** and thereby also separation of the elements due to the press-fit therebetween.

Numerous alterations of the structure herein disclosed will suggest themselves to those skilled in the art. However, it is to be understood that the present disclosure relates to a preferred embodiment of the invention which is for purposes of illustration only and is not to be construed as a limitation of the invention.

What is claimed is:

1. Orthodontic biassing device comprising two spaced orthodontic expansion or contraction elements each suitable for engaging one or more teeth; an elongate biassing assembly extending between said elements, said biassing assembly having an adjustably variable length; and connecting means for frictionally connecting each end portion of said biassing assembly to a respective element, said connecting means including mating portions, said mating portions being conectable and detachable from each other by relative movement between the latter and the former in a single plane with sufficient force to overcome the frictional forces developed by said connecting means, whereby biassing assemblies having different overall lengths can be interchanged.

2. The biassing device as defined in claim **1,** wherein said two elements comprise a plastic appliance, and wherein said mating portions comprise a sleeve embedded in each element of said appliance dimensioned to receive another end portion of said biassing assembly.

3. Orthodontic biassing device as defined in claim **1,** wherein said connecting means comprises snap fastener means.

4. The biassing device as defined in claim **1,** wherein said two elements comprise a removable plastic appliance.

5. The biassing device as defined in claim **1,** wherein said two elements comprise an acrylic appliance.

6. The biassing device as defined in claim **1,** wherein said two elements comprise elongated members including means at the respective free ends thereof for engaging a tooth.

7. The biassing device as defined in claim **1,** wherein said two elements comprise a palatal suture splitting appliance.

8. The biassing device as defined in claim **1,** wherein said connecting means comprises an aperture in each element, and sleeve means securely positioned in each aperture, said biassing assembly including two threaded body housings and a threaded spindle meshingly engaged in said housings in such a manner that rotation of said spindle changes the spacing between said housings and thereby also between said elements, each of said housings being removably mounted in a respective sleeve means.

9. The biassing device as defined in claim **2,** wherein each sleeve is provided with a roughened exterior surface to thereby provide an improved gripping surface when embedded in the plastic appliance.

10. The biassing device as defined in claim **8,** wherein said apertures are configurated to interchangeably receive threaded body housings having different overall lengths.

11. The biassing device as defined in claim **1,** wherein each element comprises a substantially cylindrical and at least partially resilient container having one open and one closed end, and having a lateral opening along the length of said container, and elongated extensions connected to said container in the region of said closed end which includes means for connection to a tooth, said open end and said lateral opening having dimensions to permit the reception of a mating portion of said biassing assembly therein by at least partially deforming said container and thereby permit the removable insertion of said mating portion interiorly of said container.

12. The biassing device as defined in claim 1, wherein each element comprises a substantially cylindrical and at least partially resilient container having an open and a closed end, and having a lower opening along the length of said container bounded by two outwardly extending flanges; and having elongate extensions connected to said flanges which include means for connection to a tooth, said open end and said lower opening having dimensions to permit the reception of a mating portion of said biassing assembly therein by at least partially deforming said container and thereby permit the removable insertion of said mating portion interiorly of said container.

13. The biassing device as defined in claim 1, further comprising guide means extending between said elements and spaced from said biassing assembly for preventing relative rotation of said elements about said biassing means.

14. The biassing device as defined in claim 1, wherein said biassing assembly comprises a first container having an open end, a second container having an open end and so dimensioned that said first container receives said second container through the open end of the said first container, the open end of said second container being positioned interiorly of said first container, and resilient means acting on said first and second containers for generating a force which tends to change the relative spacing between said containers when said second container is moved relative to said first container beyond a normal relative position of said containers against the action of said resilient means.

15. The biassing device as defined in claim 14, wherein said resilient means comprises a helical spring extending between said two containers.

16. The biassing device as defined in claim 1, wherein said biassing assembly comprises a container having an opening at one end, piston means at least a portion of which partially extends through said open end, and resilient means for urging said piston means to move relative to said container when said resilient means is placed under stress.

17. The biassing device as defined in claim 1, wherein said mating portions comprise an aperture in each element configurated to receive an associated end portion of said biassing assembly.

18. The biassing device as defined in claim 17, wherein the exteriors of said biassing assembly end portions are dimensioned to be receivable in said apertures in pressure fitting relation.

19. The biassing device as defined in claim 17, wherein the exteriors of said biassing assembly end portions are dimensioned to be receivable in said apertures in snap fitting relation.

20. The biassing device as defined in claim 16, wherein said resilient means comprises a helical spring under compression and acting on said piston to decrease the length of said biassing assembly.

21. The biassing device as defined in claim 16, wherein said resilient means comprises a helical spring under compression and acting on said piston to increase the length of said biassing assembly.

22. Orthodontic biassing device comprising two spaced orthodontic elements each suitable for engaging one or more teeth and each provided with an opening, said elements being arranged to position said openings in spaced relation in opposition to each other; and an elongate adjustable biassing assembly extending between said elements, said biassing assembly having an adjustably variable length and having opposing end portions detachably and interchangeably receivable in respective openings of said elements, insertion and removal of said end portions being effected by longitudinal movement of said biassing assembly relative to an associated opening, whereby biassing action is provided by the biassing device by changing the length of said biassing assembly and whereby the latter may be connected and disconnected from one or both elements by being longitudinally inserted or removed from one or both of said openings of associated elements.

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