

[54] **ORTHODONTIC APPLIANCE AND METHOD OF USING SAME**

2,775,036 12/1956 Kesling 32/14
2,789,351 4/1957 Gordon 32/14

[76] Inventor: **Earl O. Bergersen**, 950 Linden Ave., Winnetka, Ill. 60093

Primary Examiner—Robert Peshock
Attorney, Agent, or Firm—Larson, Taylor and Hinds

[22] Filed: **June 30, 1969**

[21] Appl. No.: 837,667

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 614,723, Feb. 8, 1967.

[52] U.S. Cl. 32/14 B

[51] Int. Cl. A01c 7/00

[58] Field of Search. 128/260; 32/14

[56] References Cited

UNITED STATES PATENTS

2,479,780 8/1949 Remensnyder 32/14

[57] ABSTRACT

A set of preformed tooth positioning retainers of a size and shape to eliminate the need for custom molding and fitting of such devices. Also, the method of straightening teeth by determining the size of a patient's mouth and then selecting a prefabricated tooth positioning retainer of an appropriate size from a set of such preformed retainers and inserting the same in the patient's mouth.

5 Claims, 29 Drawing Figures

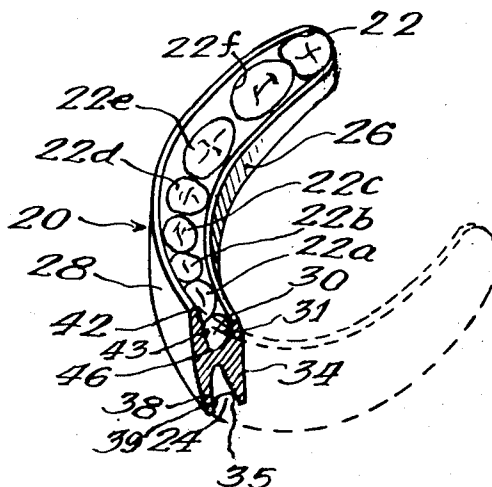


FIG. 2

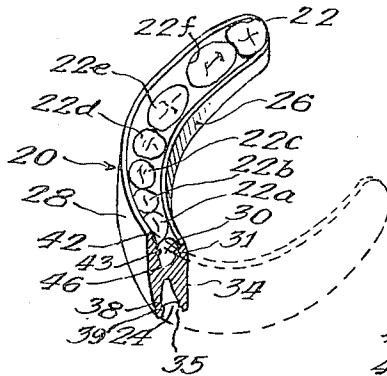


FIG. 1

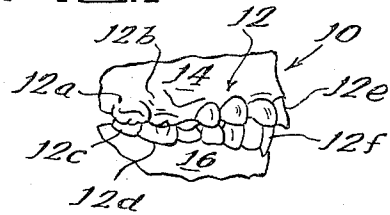


FIG. 3

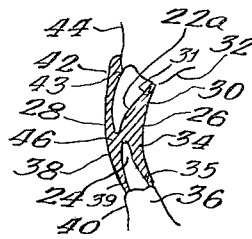


FIG. 4

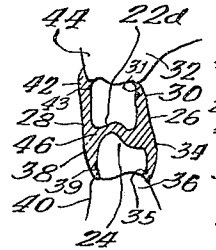


FIG. 5

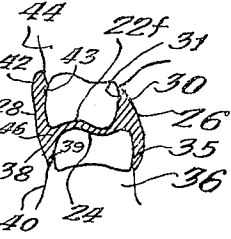


FIG. 6

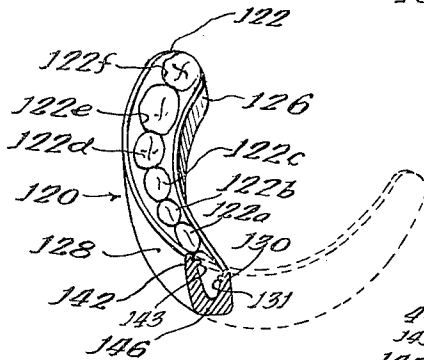


FIG. 7

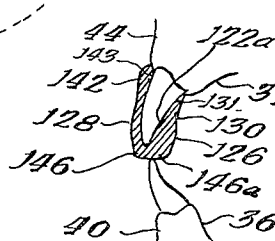


FIG. 8

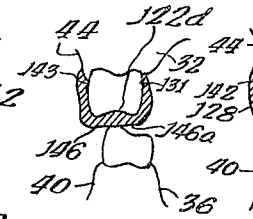


FIG. 9

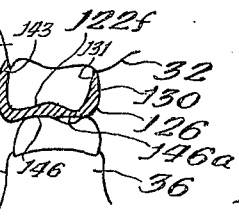


FIG. 10

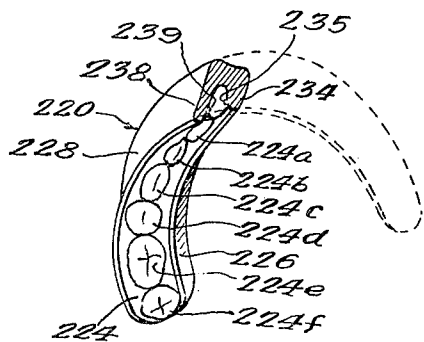


FIG. 11

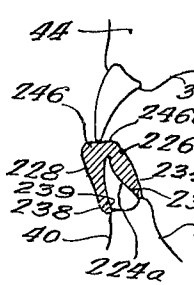


FIG. 12

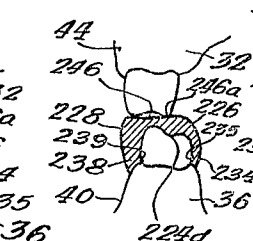
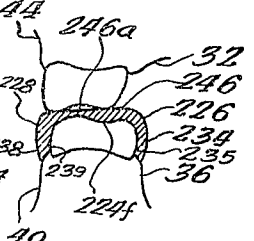


FIG. 13



Inventor:
Earl O. Bergersen
By: Hofgren, Wegner, Allen,
Shellman & McCord
Attorneys

FIG. 14

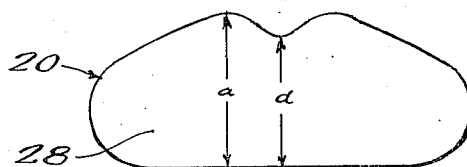


FIG. 17

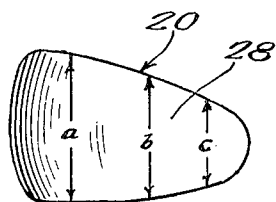


FIG. 15

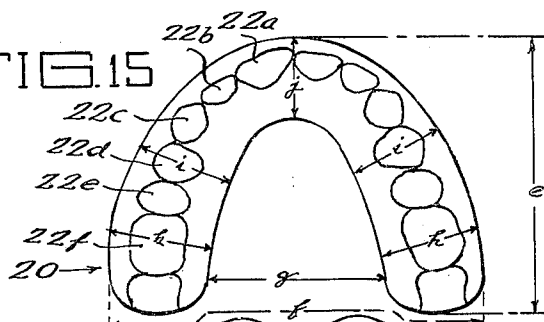


FIG. 16

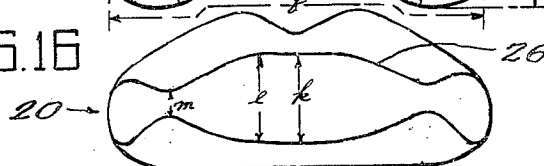


FIG. 21

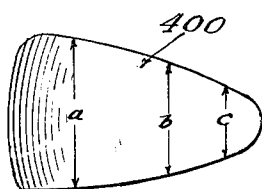


FIG. 18

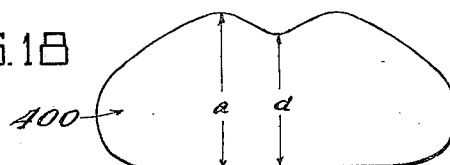


FIG. 19

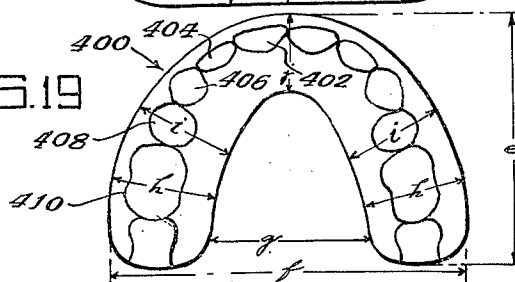


FIG. 20

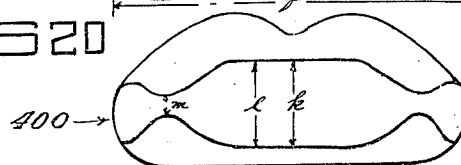


FIG.22

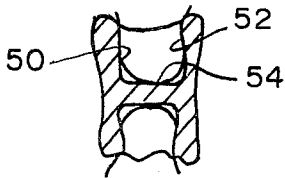


FIG.23

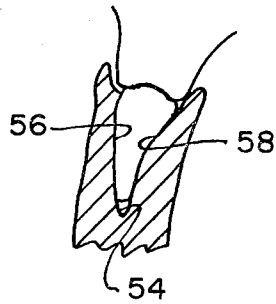


FIG.24

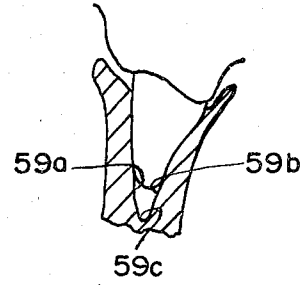


FIG.25

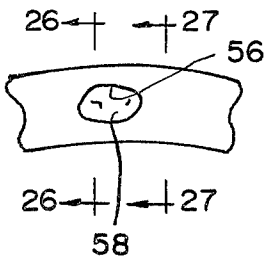


FIG.26

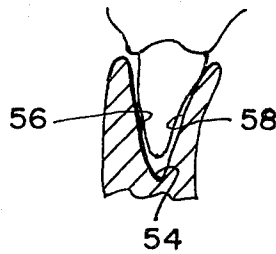


FIG.27

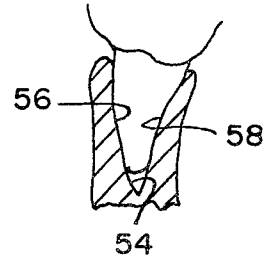


FIG.29

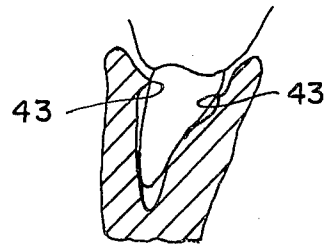
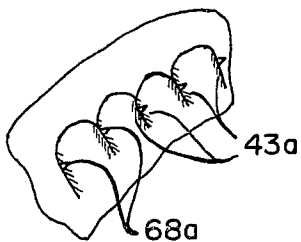


FIG.28



ORTHODONTIC APPLIANCE AND METHOD OF USING SAME

RELATED APPLICATIONS

This application is a continuation-in-part of my co-pending application Ser. No. 614,723, filed Feb. 8, 1967.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to tooth positioning devices used to bring teeth into desired positions without the need for wires or the like.

2. Brief Description of the Prior Art

The pertinent prior art is shown by the patents to Kesling, U.S. Pat. Nos. 2,467,432; 2,531,222; and 2,775,036 and Remensnyder 1,691,785 and 2,479,780. These patents teach that a tooth positioning retainer of the same type as disclosed herein must be custom formed for each patient by first taking an impression of the mouth of a patient and then making a positive casting therefrom to produce a model of the teeth. The teeth of the model are then straightened and reset into the desired ultimate position, and from this reset model, a tooth positioning retainer is molded, this process being performed for each and every patient for whom it is desired to supply a tooth positioning retainer.

SUMMARY OF THE INVENTION

This invention is directed, in brief, to the provision of a prefabricated tooth positioning retainer of a standard size to fit a patient's mouth, eliminating the need for going through the several steps taught by the Kesling patents for each patient, or, in other words, eliminating the need for custom molding such a tooth positioning retainer for each patient. This invention is also directed to the method of straightening teeth by determining the size of a patient's mouth and then selecting a prefabricated tooth positioner of an appropriate size from a set of such preformed tooth positioners and inserting the same into a patient's mouth. Furthermore, the invention is directed to the provision of such a prefabricated tooth positioning retainer wherein the flanges thereof have means in the form of inwardly directed ribs for holding the retainer on the teeth.

The conventional custom-made type of retainer as envisioned by the prior art is expensive both in terms of money and loss of time. It can be readily appreciated that the necessity of going through the same steps with every patient, that is, forming a model of the patient's teeth, straightening the teeth of the model, and forming the retainer therefrom, involves a significant amount of time which, to the patient, means expense, and to the practitioner means a loss of time that could be spent treating other patients.

Upon the removal of orthodontic bands, slight interproximal spaces exist between the teeth, these spaces being difficult to close without the use of some additional retainer. With the prefabricated tooth positioner of this invention, the dental practitioner is able to insert the tooth positioning retainer in the patient's mouth immediately upon removal of the orthodontic bands, thereby gaining control over the movement of the teeth at once, rather than allowing the teeth to drift or relapse into undesirable positions during the time lapse

made necessary in order to procure a conventional custom-made retainer as envisioned by Kesling.

It is a primary object of this invention to provide a preformed set of tooth positioning retainers made up of a plurality of standardized retainers any of which is appropriately sized to fit a patient's mouth.

It is another object of this invention to provide an improved method for straightening teeth including the steps of first determining the size of a patient's mouth and selecting a preformed tooth positioning retainer from a set of such retainers and inserting the same into the patient's mouth.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational fragmentary view of a human mouth with maloccluded teeth;

FIG. 2 is a perspective view, partially in full outline, and partially in dotted outline, showing generally the superior surface of a prefabricated tooth positioning retainer of this invention;

FIG. 3 is a fragmentary section view through a human mouth in the area of the central incisors showing the tooth retainer in place;

FIG. 4 is a fragmentary section view through the human mouth in the area of the bicuspid showing the tooth retainer in place;

FIG. 5 is a fragmentary section view of the human mouth in the molar area showing the tooth retainer in place;

FIG. 6 is a perspective view partially in full and partially in dotted outline of a prefabricated tooth positioner for use with the upper arch only;

FIG. 7 is a section view through the central incisor area of the human mouth showing the tooth retainer of FIG. 6 in place;

FIG. 8 is a section view through the bicuspid area of the human mouth showing the tooth retainer of FIG. 6 in place;

FIG. 9 is a section view through the molar area of the human mouth showing the tooth retainer of FIG. 6 in place;

FIG. 10 is a perspective view, partially in full and partially in dotted outline, of a prefabricated tooth retainer for use only on the lower arch of a patient's mouth;

FIG. 11 is a section view through the central incisor area of the human mouth showing the tooth retainer of FIG. 10 in place;

FIG. 12 is a section view through the bicuspid area of the human mouth showing the tooth retainer of FIG. 10 in place;

FIG. 13 is a section view through the molar area of the human mouth showing the tooth retainer of FIG. 10 in place;

FIG. 14 is a front elevational view of the prefabricated tooth retainer as shown in FIG. 2;

FIG. 15 is a top plan view of the tooth retainer as shown in FIGS. 2 and 14;

FIG. 16 is a rear elevational view of the tooth retainer as shown in FIGS. 2 and 14;

FIG. 17 is a side elevational view of the tooth retainer as shown in FIGS. 2 and 14;

FIG. 18 is a front elevational view of a prefabricated tooth retainer for use in a mouth where there has been an extraction of teeth to assist in the correction thereof;

FIG. 19 is a top plan view of the tooth retainer shown in FIG. 18;

FIG. 20 is a rear elevational view of the tooth retainer shown in FIG. 19;

FIG. 21 is a side elevational view of the tooth retainer as shown in FIG. 18;

FIG. 22 is a fragmentary sectional view through a portion of the retainer of this invention showing a modified form of the tooth receiving socket and particularly showing the incisor pocket as having a relatively flat bottom;

FIG. 23 is a fragmentary sectional view of another modified form of the retainer of this invention showing the incisor pocket as being narrow in dimension between the labial and lingual walls relative to the tooth intended to be received therein;

FIG. 24 is a fragmentary sectional view of a modified form of this invention showing the cuspid socket as having an exaggerated interior configuration for receiving a large range of cuspid configurations;

FIGS. 25 through 27 are illustrations of another modification of this invention showing the difference in dimension between the labial and lingual walls of the incisal socket for creating pressure on one side of the incisor;

FIG. 28 is a fragmentary sectional view illustrating another modification of this invention showing the provision of supplemental ribs on the distal side of each of the tooth receiving sockets; and

FIG. 29 is another fragmentary sectional view of a modified form of this invention showing the incisal area of the flange of the retainer being spaced from contact with the gingival tissue of the patient and enlarged and also showing the rib 43 which defines the tooth receiving socket as being enlarged in the gingival area.

BRIEF DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. 1 is a view of a human mouth 10 wherein the teeth 12 are obviously in need of correction by orthodontic devices or the like. Maxillary molars 12a and 12b are in an end-to-end relationship to their mandibular antagonists 12c and 12d and the upper incisors are generally protrusive and rotated in relation to the lower incisors. Conventional orthodontic devices, such as bands and the like, may be used for initially straightening the teeth of a mouth such as shown in FIG. 1 to bring the teeth to a predetermined position of proper or close to proper occlusion. To bring the teeth into a final position of desired orientation in the mouth, a tooth positioning retainer 20, such as shown in FIG. 2, may be used. Retainer 20 is generally U-shaped in plan so as to conform to typical human mouth configuration and is generally H-shaped in cross section providing an upper or superior tooth receiving trough 22 and a lower or inferior tooth receiving trough 24. The sides of troughs 22 and 24 are bounded by a lingual flange 26 which covers the rear of the teeth of the upper and lower arch and a labial and buccal flange 28 which covers the front of the teeth of both arches.

Both the superior and inferior tooth receiving surfaces 22 and 24 are provided with a plurality of tooth receiving depressions or sockets, such as 22a, 22b, 22c, 22d, 22e, and 22f, of different configurations for receiving the different teeth of the mouth 23a, 23b, 23c, 23d, 23e, 23f and 25a, 25b, 25c, 25d, 25e and 25f (upper and lower, respectively) from the central incisors through the cuspids and bicuspid, into the first molar, and half of the second molar area.

As best seen in FIGS. 3 through 5, the upper lingual flange 30, which secures the lingual cingulum areas of the upper anterior teeth and lingual surfaces of the lingual cusps of the upper posterior teeth, includes an inwardly directed rib 31 and covers a portion of the upper lingual gingival area 32, and the lower lingual flange 34 generally embraces the cingulum area of the lower anterior teeth and the lingual surface of the lingual cusps of the lower posterior teeth and includes an inwardly directed rib 35. This flange also extends over a portion of the lower lingual gingival tissue 36. The lower labial and buccal flange 38 which covers the labial and buccal surfaces of the lower anterior and posterior teeth includes an inwardly directed rib 39 and also extends over a portion of the lower labial and buccal gingival tissue 40 and the upper labial and buccal flange 42 has an inwardly directed rib 43 and covers the entire labial and buccal surfaces of the upper anterior and posterior teeth and also embraces a small portion of the upper gingival tissue 44.

The several ribs 31, 35, 39 and 43 generally follow the outline of the juncture of the teeth and the gingival tissue. Each retainer of the set would be formed by being molded about a model set of teeth wherein notches are cut closely adjacent the juncture of the teeth and the gingival tissue so that when the retainer is formed by molding the same about the teeth of the mold, the ribs would be so formed. However, it is not intended that notches would be formed in the teeth of a patient but rather these ribs would generally fit in the reduced area of the teeth adjacent the juncture of the teeth and the gingival tissue. These ribs provide a means for holding the retainer in place in a patient's mouth without the need for auxiliary fastening devices or the like. These ribs also aid in retention of torque of the anterior teeth by placing pressure apically in the gingival third of the labial surface while maintaining the incisal edge in a stable position as the fulchrum.

The various pockets (such as 22a and 22b) in the retainer for the upper and lower teeth are made so that the teeth are snugly embraced by the retainer. The isthmus 46 which joins the lingual and buccal or labial halves of the positioner is generally thin, though it differs in dimension between the posterior region and anterior region so as to resemble the normal relaxed clearance between the teeth with the exception that the isthmus is slightly thinner in the posterior region. This enables all the occlusal and incisal surfaces of the teeth to be in contact with the positioner at the same time when occlusal pressure is applied. Any change which might be made would be to increase the thickness of the isthmus in the anterior region to enable a corrected anterior vertical overbite to be effectively retained.

It has further been discovered that it may be desirable to make the tooth positioner out of a semi-resilient plastic transparent material. The transparency enables the dental practitioner to actually see where the tooth movement will take place by observing blanching of tissue around the teeth and also enables him to detect potential soft tissue sore spots due to abnormal impingement of the flanges of the tooth positioner. Conventional positioners, such as shown in the Kesling patent, are made of either opaque or similar materials, which prevent the practitioner from using blanching of the tissues as a diagnostic aid when utilizing the corrective appliances.

Certain modifications in the structure of the retainer of this invention have been found to be desirable for use in particular applications of the retainer. With reference to FIG. 22, a section view of the incisal pocket 22a, it may be desirable for the sides 50 and 52 and bottom 54 to be relatively "squared" with respect to each other. That is to say that the sides may be generally straight and the bottom generally flat in a mesio-distal direction so as to fit the widest possible ranges of incisors having different incisal edge configurations. In some instances, incisors may be formed with a generally right angular corner configuration on one edge thereof and the modification as shown herein would accommodate such uniquely shaped incisors. The cuspid incisal edges have been made long and tapered to a point so that any cuspid regardless of the sharpness of its cusp will fit with ease into the depression in the retaining device.

Referring to FIG. 23, it has also been found desirable to make the dimension between the labial wall 56 and lingual wall 58 of the tooth receiving socket, such as the incisor socket 22a, narrower than the normal cross sectional, labial-lingual thickness of the tooth to be received in the socket, at least in the medial area of the tooth, with respect to the free and gingival area thereof. The advantage of this construction is that secure grasping of the tooth by the retainer is insured to assist in holding the patient's teeth, particularly the incisors, in the proper position. This will also cause slight stretching of the retainer socket 22a which has been found to have the effect of shifting the gingival area of the retainer away from the gingival tissue of the patient. In fact, experience has shown that those patients with thicker incisors with respect to the labial-lingual dimension also tend to have more labial gingival tissue and the forcing away of the gingival area of the retainer from the gingival tissue is more significant in those cases of patients with the thicker incisors. Thus, another resultant benefit is that the retainer is held sufficiently spaced from the patient's gingival tissue and the likelihood of erosion of the tissue or creation of sores therein is substantially reduced if not eliminated.

As seen with respect to FIGS. 25-27, the dimension between the labial wall 56 and lingual wall 58 of incisal socket 22a may differ from the mesial side to the distal side. It has been found preferable to make the labial-lingual dimension slightly wider on the mesial side and more tapered and narrower on the distal side so as to exert more pressure on the distal side of the patient's incisor to thereby move the incisors toward the middle of the mouth. This feature is extremely beneficial in cases of significant departure in size of the tooth from that of the normal size range. The same principle of making the tooth socket wider on the mesial side and narrower on the distal side can be utilized for the sockets of the other teeth. In some cases involving extraction of teeth, it may be desirable to force the remaining teeth toward the extraction site. In such cases, the retainer could be altered so that the labial-lingual dimension of the tooth socket is wider on the distal side and narrower on the mesial side, for example, if it is desired to move a tooth distally to close an adjacent extraction space located on the distal side of the tooth.

Another means of accomplishing mesial movement of the other teeth positioned in the retainer is for the ribs such as rib 43, to be accentuated on the distal side each of the tooth receiving sockets, as shown in FIG.

28 at 43a. This will promote mesial movement of the teeth. This is particularly suitable in the case of the upper and lower incisors wherein enlargement of the marginal ribs 43 creates a wedge which may force the movement of the incisors mesially to maintain close contact between the teeth. A similar wedging effect is created in the upper and lower cuspids by accentuating the distal incisal edge in length in order that it facilitates the mesial movement of the upper and lower anterior teeth and hence space closure. This is significant in cases of a large disparity between the size of the central and lateral incisor even though the cumulative width is within the normal range.

Another desirable modification of the retainer has been found to be the lowering incisally and enlargement of the area of the retainer that abuts the gingival tissue as seen in FIG. 29, to accommodate those cases of patients who have gingival tissue which extends toward the biting edge of the teeth for a greater distance than the normal patient, or where the gingival tissue of the patient is extremely enlarged relative to the norm. By lowering the gingival area of the flange of the retainer and enlarging the same, the retainer may still fit within patient mouths without creating sore spots on the gingival tissue of the patient due to contact with the retainer and pressure which might be afforded thereby. It has also been found desirable in some cases to enlarge the rib 43 in the gingival area of the retainer and particularly in the case of the anterior teeth to apply pressure on the teeth in the area adjacent the gingival tissue and on the labial surface thereof to improve the retention of the retainer in the mouth and to improve the corrective torque pressure characteristics of the retainer.

If desired, to further aid in applying mesial pressure to each of the teeth, prongs such as 68a, 68b and the like, shown in FIG. 28 may be formed on the ribs which define the interproximal area on the distal side of each tooth to aid in the retention of the appliance in the mouth and to place medial pressure on the teeth to aid in space closure towards the mid-line of the mouth. In the case of those teeth adjacent the extraction sites, the prongs could be so formed so as to push adjacent teeth toward the extraction site to assist in closure thereof.

Another modification which may be made for extraction cases is to alter the shape of the bicuspid so that either the first or second bicuspid can fit into the bicuspid depression. In such instances, it is envisioned that a constant dimension from front to rear would be maintained but that the shape would be otherwise altered with respect to the mesial-distal dimensions, and particularly in the lingual area thereof, so that the larger and more rounded second bicuspid could fit into the socket as well as the more tapered first bicuspid.

It is further envisioned that the occlusal surface or bottom of the socket in the molar and bicuspid area could also be flattened so that regardless of the configuration of the cusps or without regard to restorative fillings that have been made in the teeth, the tooth configuration could be received within the socket. With respect to the molars, the rounded corner areas of the sockets might be enlarged to accept any unusually sized molar cusp. In addition, the cingulum areas of the upper and lower anterior tooth depressions can be enlarged so that any unusually shaped tooth in the cingulum area will properly fit into the retainer.

It has been found that there is a significant correlation between the arch width and the size of the teeth and this correlation might be utilized to make an average arch width for each different size of retainer. It has been found that the range of arch width for a given range of tooth sizes varies only by a few millimeters. Thus, the size of the isthmus is narrowed so that slight pressure in the order of one or two ounces across the molar width of the tooth will vary the arch width by approximately 3 or 4 millimeters. Small forces of the magnitude mentioned (1 or 2 ounces) are not sufficient to affect the arch width of a patient even over a long period of use of the retainer and such forces are generally dissipated between both jaws and thus will have little or no effect on the patient.

In some cases, it may be desirable to provide apertures through the retainer, such as through the anterior and posterior segments to facilitate breathing through the mouth while the retainer is being worn by the patient who might otherwise have breathing difficulties.

Another modification which may be made in the retainer of this invention is that a form of a rearward protrusion of a resilient material could be placed on the lingual side of the retaining device to prevent forward thrusting of the tongue by a patient which might have a deleterious effect on the positioning of the several teeth. It is to be understood that the retaining device could be shortened to any length and in fact the anterior segment itself could be made as a positioning entity in those cases where it is only desirable to exert a positioning force on the anterior teeth. As shown in FIGS. 6-9 and 10-13, a retainer can be made as individual upper or lower units, and it is envisioned that these individual units could be suitably attached so as to be alternately worn together or separately as the case may require. It is to be further understood that other specific modifications can be made in the retainer to add material in a specific area in the interior of the retainer to place added pressure in certain teeth. Another modification which could be made would be to smooth the interproximal areas of the teeth and gingival areas and rely solely on the holding and positioning forces exerted by the distal tapering and labial-lingual narrowing as previously discussed herein. It is also envisioned that material can be added to any part or to the whole of the interior of the retainer in order to increase the closeness of the fit. It is further likely that the retainer of this invention can also be used with particular retaining clasps of metal for certain teeth which are in need of more severe positioning influence than that afforded by the retainer which can be worn conjointly therewith. Depending upon the desired degree of retention, the arch form and root and crown torque of the teeth can be varied and the elimination or enlargement of certain teeth sockets can be provided to accommodate different cases of fitting mouths which are or have been extraction cases. The gingival area of the retainer can be lowered considerably so that only tooth-bearing material is present without sacrificing the qualities of the retainer. Varying arch forms and root and crown torque of teeth can be incorporated into the different sizes of retainers to enable greater degree of retention. Cervical head-cap tubes can be incorporated into the buccal area of the outer margin of the retainer or hooks can also be imbedded into the outer margin for the reception of head-cap attachments in the region of the anterior teeth.

The retainer of this invention can also be preformed to fit only the upper or lower arches as desired. In FIG. 6 an upper arch preformed retainer 120 is shown. In FIG. 6 an upper arch preformed retainer 120 is shown. This retainer includes a superior tooth receiving trough 122 with a plurality of tooth receiving depressions or sockets such as 122a, 122b, 122c, 122d, 122e and 122f of different configurations for receiving the different teeth of the upper arch. Trough 122 is flanked by the lingual flange 126 and labial and buccal flange 128. The upper lingual flange portion 130 includes a rib 131 and covers a portion of the upper lingual gingival tissue as shown in FIGS. 7 through 9 and the upper labial and buccal flange 142 includes a rib 143 and covers the entire labial and buccal surfaces of the upper anterior and posterior teeth and embraces a small portion of the upper gingival tissue 142 in a manner similar to the upper half of the retainer 20. The isthmus 146 which joins the flanges 126 and 128 is thicker in the anterior regions as seen in FIG. 7, than it is in the posterior regions as seen in FIGS. 8 and 9. The underside 146a of the isthmus 146 is generally flattened so that the teeth of the lower arch merely abut the bottom of the isthmus portion of the retainer 120.

In FIGS. 10 through 13, a preformed retainer for the lower arch 220 is shown. Retainer 220 includes the lower or interior tooth receiving trough 224 which is provided with a plurality of tooth receiving depressions or sockets such as 224a, 224b, 224c, 224d, 224e and 224f, of different configurations for receiving the different teeth of the lower arch. Trough 224 is flanked by the lingual flange 226 and the lower labial and buccal flange 228. The lower lingual flange 234 has a rib 235 and covers part of the lower gingival tissue 236 and the lower labial and buccal flange 238 has a rib 239 and covers the entire labial and buccal surfaces of the teeth of the lower arch and embraces a small portion of the lower gingival tissue.

The isthmus portion 246 which connects the flanges 226 and 228 is thicker in the anterior regions as seen in FIG. 11 than it is in the posterior regions as shown in FIGS. 12 and 13 for the same reasons as previously discussed with regard to the isthmus 46 on retainer 20. The upper surface 246a of isthmus 246 is generally flat so that the teeth of the upper arch merely abut the top of the isthmus portion of the retainer 220.

The depressions or sockets such as 22a, 22b, previously referred to, are made to fit teeth of different patients by changing the sum total of the mesio-distal diameters of the upper and lower anterior and posterior teeth within a standardized range which has been found to accommodate most mouth configurations.

The tooth indentations or sockets formed in the preformed positioners may be molded in a perfect dentition impression differing in the mesio-distal diameter and proportionately in all other dimensions. Generally, patient mouth size falls within one of six different size classes so that only six different preformed positioners need be provided to provide a set which will fit the range of most patient's mouths. For example, with reference to positioner 20 shown in FIGS. 14 through 17, assuming that the positioner is for a "medium" sized mouth, the mesio-distal diameter of the central incisor depression 22a should be 9.1 millimeters, the lateral incisor depression 22b should have a mesio-distal diameter of 7.4 millimeters, and the cuspid depression 22c should have a mesio-distal diameter of 8.0 millimeters.

Furthermore, the first bicuspid depression **22d** should be formed with a mesio-distal diameter of 7.3 millimeters, the second bicuspid depression **22e** should be formed with a mesio-distal diameter of 6.8 millimeters. Finally, the first molar depression **22f** should be formed with a mesio-distal diameter of 11.2 millimeters. The dimensions given relate to the teeth of the upper arch, and it is to be understood that the companion teeth of the other side of the upper arch would have the same dimensions. The depressions for the teeth of the lower arch should have different dimensions. A chart of the dimensions of the tooth indentations of the preformed positioners for all teeth, upper and lower, of each of the six positioners which make up a set, is as follows:

Mesio-Distal Diameters Measured to MM.							
Positioner Size		Central Incisor	Lateral Incisor	Cuspid	First Bi-cuspid	Second Bi-cuspid	First Molar
Very Small	Upp.	7.7	5.5	6.8	6.4	6.3	10.0
	Low.	4.7	5.3	5.8	6.2	6.4	10.5
Small	Upp.	8.2	6.4	6.9	6.4	6.3	10.5
	Low.	5.3	5.5	6.1	6.3	6.7	10.5
Med. Small	Upp.	8.4	7.1	7.7	7.2	6.6	10.5
	Low.	5.3	5.8	6.6	6.9	6.9	10.9
Med.	Upp.	9.1	7.4	8.0	7.3	6.8	11.2
	Low.	5.8	6.5	7.1	7.6	7.6	11.2
Med. Large	Upp.	9.6	8.4	8.5	8.0	7.4	11.3
	Low.	6.4	6.9	7.3	7.7	7.7	11.9
Large	Upp.	10.4	8.5	8.6	8.5	7.4	11.7
	Low.	6.6	7.0	7.6	8.5	9.0	12.2

Similarly, the total dimensions along the mesio-distal diameters of groups of teeth for a non-extraction positioner is as follows:

Mesio-Distal Diameters Measured in MM.						
Positioner Size	Anteriors Upper	Anteriors Lower	Posteriors (Thru First Molars)		Total Upper	Total Lower
			Upper	Lower		
Very Small						
Small	40.0	31.6	45.4	46.2	85.4	77.8
Small	43.0	33.8	46.4	47.0	89.4	80.8
Med. Small	46.0	35.4	48.6	49.4	94.6	84.8
Med. Small	49.0	38.8	50.6	52.8	99.6	91.6
Med. Large	53.0	41.2	53.4	54.6	106.4	95.8
Large	55.0	42.4	55.2	59.4	110.2	101.8

With further reference to FIGS. 18 through 21, there is shown an extraction positioner **400** for use with a mouth where it has been necessary to remove some of

the teeth to correct malocclusions. In the specific example shown in FIGS. 18 through 20, this extraction positioner **400** is intended for use in the mouth wherein four bicuspid depressions have been removed. Assuming this positioner **400** for use in a medium size mouth, the mesio-distal diameter of the upper central incisor depression **402** would be 9.6 millimeters, and the mesio-distal diameter of the lateral incisor depression **404** would be 7.5 millimeters. Continuing, the mesio-distal diameter of the cuspid depression **406** would be 8 millimeters, and the mesio-distal diameter of the depression for the second bicuspid **408** would be 7.1 millimeters. Finally, the mesio-distal diameter for the depression for the first molar **410** would be 11.6 millimeters. The dimensions of the teeth depressions of the upper and lower arches for the different sizes of extraction positioners for use in a mouth wherein four bicuspid depressions have been removed is as follows:

Mesio-Distal Diameters Measured in MM.							
Positioner Size		Central Incisor	Lateral Incisor	Cuspid	First Bi-cuspid	Second Bi-cuspid	First Molar
Med. Small	Upp.	8.3	6.7	7.9	—	7.1	10.7
	Low.	5.4	5.7	6.9	—	7.3	10.6
Med. Large	Upp.	9.6	7.5	8.0	—	7.1	11.6
	Low.	5.8	6.2	7.0	—	7.4	12.1
Med. Large	Upp.	10.1	7.7	8.2	—	7.5	11.9
	Low.	6.0	6.8	7.3	—	7.7	12.3
Large	Upp.	10.2	8.3	9.4	—	7.7	12.7
	Low.	6.6	7.3	8.2	—	8.5	13.3

The total dimension for the distance along the mesio-distal diameter of groups of teeth for an extraction positioner is as follows:

Mesio-Distal Diameters Measured in MM.						
Positioner Size	Anteriors Upper	Anteriors Lower	Posteriors (Thru First Molars)		Total Upper	Total Lower
			Upper	Lower		
Med. Small						
Small	45.8	36.0	35.6	35.8	81.4	71.8
Med. Small	50.2	38.0	37.4	39.0	87.6	77.0
Med. Large	52.0	40.2	38.8	40.0	90.8	80.2
Large	55.8	44.2	40.8	43.6	96.6	87.8

To determine which retainer should be selected for use in a patient's mouth, the cumulative mesio-distal width of the six upper and six lower anterior teeth are measured. The resultant figure obtained is compared against the standardized values for each size such as shown in the charts herein to determine which size most closely corresponds with a patient's mouth. If a measurement falls generally midway between two sizes, it is recommended that the smaller size positioner be used as to obtain greater success in trying to close spaces.

The overall dimensions of the positioner also differ with respect to the different mouths for which the positioner is intended to be used. Referring again to FIGS. 14 through 21, the preferred dimensions of different portions of non-extraction positioners and extraction positioners is as represented below, with the letters shown in the drawing corresponding to the key letters of the chart under which the representative dimensions are found.

GROSS DIMENSIONS OF PREFORMED POSITIONERS
Measurement in Millimeters

NON-EXTRACTION POSITIONERS													
Position- er Size	a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.
Very small	25	21	14	21	41	59	29	17	15	13	15	15	4
Small	25	21	14	22	44	62	30	17	15	13	15	15	4
Med. Small	25	21	14	22	46	62	32	17	15	13	15	15	4
Medium	26	21	14	22	47	65	34	17	15	13	15	15	4
Med. Large	26	21	14	22	52	67	34	17	17	14	15	15	4
Large	26	23	15	22	53	69	35	17	17	14	16	16	4

EXTRACTION POSITIONERS													
Position- er Size	a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.
Med. Small	24	21	14	21	42	58	24	17	13	13	15	15	4
Medium	26	21	14	21	43	61	27	17	15	13	15	15	4
Med. Large	26	21	14	21	45	62	28	17	15	13	15	15	4
Large	28	22	15	22	46	65	29	18	17	14	16	16	4

- KEY:
- a. Greatest anterior vertical height (labial flange).
 - b. Vertical height through first premolar area (non-extraction) (buccal flange).
 - c. Vertical height through premolar area (extraction) (buccal flange).
 - d. Vertical height through the middle of the first molar area (buccal flange).
 - e. Vertical height through the midline on the anterior surface (labial flange).
 - f. Gross length through midline.
 - g. Greatest width through molar area
 - h. Distance between lingual flanges at level of mesio-lingual cusps of the second molars.
 - i. Width through the middle of the first molar area.
 - j. Width through the middle of the first premolar area (non-extraction). Width through the middle of the premolar area (extraction).
 - k. Width through the mesial of the central incisors.
 - l. Height of the lingual flange at the midline.
 - m. Height of the lingual flange through the first premolar area (non-extraction). Height of the lingual flange through the premolar area (extraction).
 - n. Height of the most distal portion of the flange.

This invention provides a novel method and unique preformed set of apparatuses for use with the method for positioning teeth. The time formerly spent custom molding tooth positioning appliances for each patient's mouth is now eliminated. Furthermore, the possibility of undesired displacement of the teeth of a patient while awaiting fitting of the custom molded positioning appliance is also eliminated. With the apparatus and method of this invention, the practitioner may quickly measure the patient's mouth, select an appropriate member of the set and insert the same in the patient's mouth.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, as some modifications may be obvious to those skilled in the art.

- I claim:
1. The method of positioning teeth comprising the steps of: providing a limited number of preformed resilient tooth positioning appliances of different preselected standard configuration and dimension; measuring the oral cavity of the patient to determine the applicable standard size appliance for that patient; selecting such an appropriate standardized size appliance from the preformed group provided; and inserting the selected appliance into the patient's mouth in bite abutting position.
 2. The method of claim 1 wherein the measurement of the oral cavity of the patient is taken along the mesio-distal diameter.
 3. The method of claim 2 wherein the measurement of the mesio-distal diameter terminates with the first molar.
 4. A set of preformed tooth positioning appliances for ready-made application for aligning teeth, comprising: a limited number of members of resilient material, each being generally U-shaped in plan and having a tooth receiving trough generally of a size and shape for reception on the teeth of a patient, said trough being defined by lingual and labial-buccal flanges and having tooth receiving depressions, said tooth receiving depressions being non-identical duplications of a specific tooth configuration and being defined by ribs projecting inwardly of the trough which generally follow the contour of teeth intended to be received therein, said ribs defining the tooth receiving depressions projecting inwardly of the trough a greater distance in the gingival area of the retainer trough than in the remaining area thereof, each such positioner being of a size to fit a representative sampling of patient mouths all of said individual positioners being within a range to fit substantially all patient mouths and none of said positioners being a mating duplication of a specific patient mouth.
 5. A set of preformed tooth positioning appliances for ready-made application for aligning teeth, comprising: a limited number of members of resilient material, each being generally U-shaped in plan and having a tooth receiving trough generally of a size and shape for reception on the teeth of a patient, said trough being defined by lingual and labial-buccal flanges and having tooth receiving depressions, said tooth receiving depressions being non-identical duplications of a specific tooth configuration and being defined by inwardly projecting ribs which generally follow the contour of the teeth intended to be received in the trough, with laterally inwardly projecting abutments on the distal side of each tooth receiving depression in the interproximal area of the ribs which define the tooth receiving depressions, each such positioner being of a size to fit a representative sampling of patient mouths all of said individual positioners being within a range to fit substantially all patient mouths and none of said positioners being a mating duplication of a specific patient mouth.