

[54] ORTHODONTIC ELEMENT

[76] Inventors: Elliott Silverman, 4829 Atlantic Ave., Ventnor, N.J. 08406; Morton Cohen, 1201 Wrack Rd., Meadowbrook, Pa. 19046

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[51] Int. Cl. A61c 7/00

[58] Field of Search 32/14 A

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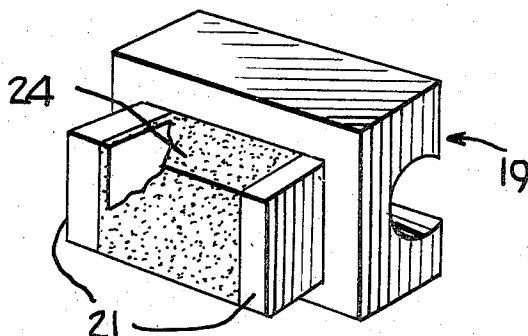
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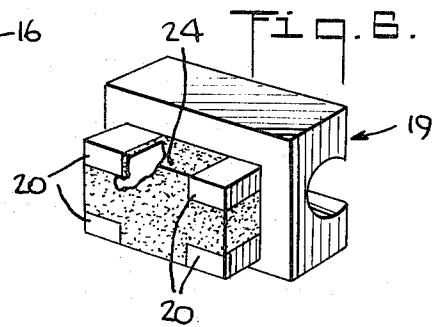
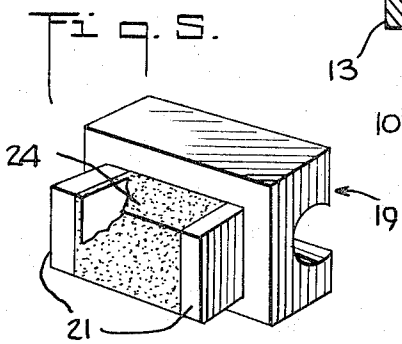
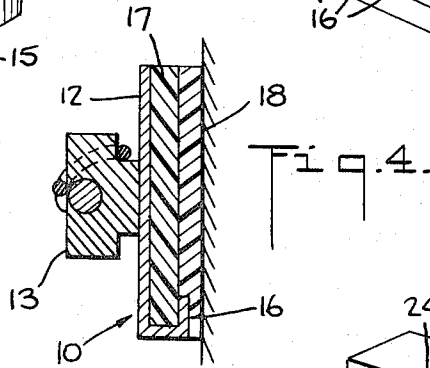
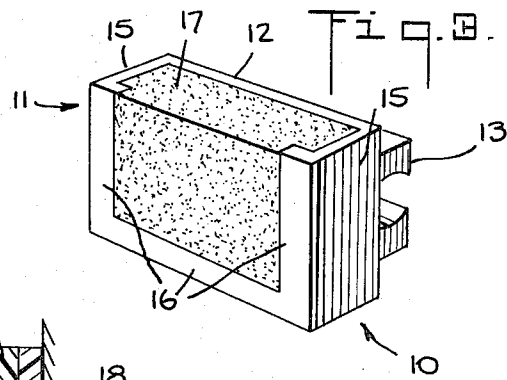
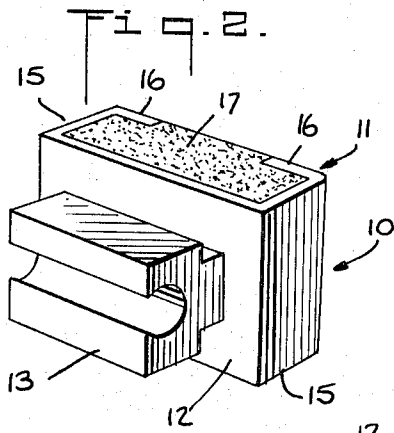
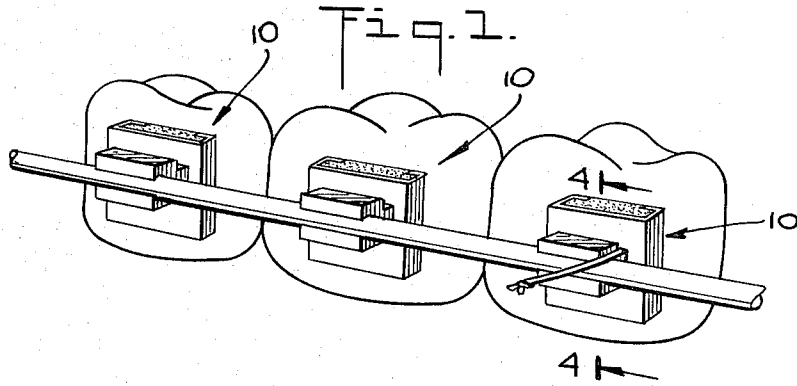
Primary Examiner—Robert Peshock
Attorney, Agent, or Firm—Kenyon & Kenyon, Reilly, Carr & Chapin

[57] ABSTRACT

This invention relates to an orthodontic element to be applied directly to the tooth without the use of a conventional band. The elements described are constructed of metal and are of a shape particularly adapted to be affixed directly to the teeth by use of an adhesive compound.

6 Claims, 6 Drawing Figures





ORTHODONTIC ELEMENT

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates in general to orthodontic appliances and it is especially concerned with orthodontic elements attached directly to the teeth without the use of conventional metal bands.

2. Description of the Prior Art

As is well known to those versed in the art, a conventional orthodontic appliance comprises a band circumposed about each tooth with a wire-receiving bracket anchored thereon. A force is then applied to the brackets by means of wire, as by the lightwire, edgewise, or other techniques. Ligatures are then applied. As is well known, this is a tedious and time consuming procedure, both in the fabrication of the equipment used and in their application to the teeth. Further, during the period of treatment at several stages thereof, which may be over a period of years, it is necessary to change the moving forces applied. This requires repeated removal and replacement of the ligatures, wire brackets and bands which further adds to the time and expense of treatment.

In our previous patents, we described improved orthodontic appliances to solve several of the problems existing in such prior art appliances — see for example U.S. Pat. Nos. 3,464,112-3; 3,421,221 and 3,461,559.

These systems overcame many of the prior art deficiencies in that they greatly reduced the time and effort required of the orthodontist, were neat and highly attractive in appearance, were durable and neat throughout the necessary extended periods of use, and occupied relatively little space with a minimum of protrudences to afford maximum comfort to the patient. All of these systems, however, continued to use metal bands around each tooth. This detracted from their usefulness since it still took much time to apply these, they contributed to the formation of cavities since food would accumulate under and around them and they added to the unsightliness of the systems.

Researchers in the orthodontic field have attempted without success to do away with the metal band for many years. All attempts to do so, however, have failed, either because of inadequacy of the orthodontic element or the adhesive composition, or both.

SUMMARY OF THE INVENTION

This invention is directed to improved orthodontic elements. Three such elements constructed of metal are described in detail. These elements are attached directly to the teeth without the use of a metal band by means of an adhesive, preferably the improved compositions and by the improved method disclosed in our co-pending patent application filed contemporaneously herewith.

It is a primary object of this invention to provide improved orthodontic elements adapted to be applied directly to a tooth without the necessity of an intervening metal band.

It is a further object of this invention to provide an orthodontic appliance which will be pleasing in appearance, easy to work with and change, and sturdy and reliable when in place for a long period of time.

It is a further object of this invention to provide an orthodontic appliance system which is easy to install and which effects a vast savings of an orthodontist's time.

Other objects of the present invention will become apparent upon reading this specification and referring to the accompanying drawings, which form a material part of this disclosure.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a prospective view showing the orthodontic elements of the present invention as applied to several teeth and bound together with wire;

FIG. 2 is a prospective view of one embodiment of the orthodontic element of the present invention;

FIG. 3 is a prospective view showing the rear of the element in FIG. 2;

FIG. 4 is a cross section along line 4—4 of FIG. 1 showing an orthodontic element of the present invention applied to a tooth with an adhesive;

FIG. 5 is a prospective view of another embodiment of the orthodontic element of the present invention;

FIG. 6 is a prospective view of still another orthodontic element of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

As best shown in FIGS. 2, 3 and 4, one embodiment of the orthodontic element of the present invention comprises a metal base member shown generally at 10. This base member in turn comprises a rear portion 11 and a front portion 12. The element is sized so as to be capable of application to a tooth. The metal used is the same as presently used in making orthodontic metal brackets.

The rear portion 11 has three closed sides and one open side, formed by the sidewalls 15 and internal lips and flanges 16. These flanges and sidewalls form a generally U-shaped area defining a rearwardly facing pocket 17 adapted to receive material therein. Conventional orthodontic metal brackets 13, for holding archwire, may be affixed to the base member by any suitable means, as by welding.

Prior to use in the orthodontist's office or during production, pocket 17 is filled with a composition which is a 1:1 powder blend of polymethyl methacrylate and polycyclohexyl methacrylate in hexyl methacrylate, sold commercially under the trademark "Bracket Bond" by GAC International, Inc., of Farmingdale, N.Y. This composition is caused to fill the pocket until it is flush with the exterior edges of flange members 16.

As so constructed, we have discovered that the new element described is a novel and highly beneficial orthodontic element which forms a strong and durable bond with a tooth when applied according to the method described in our co-pending patent application without the use of a conventional band around the tooth.

The element 10 can be mass produced so that the orthodontist would have a supply of such elements for application at his office. The exact procedure for attaching the element to a tooth is described in greater detail in our contemporaneously filed application, but in summary, it entails first cleaning the teeth and then applying a sealer to the area cleaned such as three parts by weight of the reaction product of bisphenol A and glycidyl methacrylate and one part by weight of methyl-

methacrylate monomer. If pocket 17 is filled with Bracket Bond composition when produced, the orthodontist would then apply fresh composition either directly to the tooth area or to the element 10, as at 18; and would then apply element 10 to the tooth with sufficient pressure so that a long lasting bond is formed. Generally the fresh composition sets within three minutes and the element would then be securely and permanently fastened to the tooth in such a manner that the arch wire 14 may be applied.

The bracket of the present invention could also be of a curved or arcuate configuration to more closely fit the contour of the tooth.

It is also within the purview of this invention to affix the bracket directly to the tooth without the use of a base member. In this embodiment of the invention the bracket has a configuration such as that shown in FIGS. 5 or 6, for example.

There a conventional orthodontic metal bracket is shown generally at 19. As best shown in FIG. 6, feet 20 may be affixed to the rear of the bracket 19 by conventional means in one embodiment, e.g., by welding or being integrally formed with the bracket during manufacture. In another embodiment, shown in FIG. 5, at least two rearward extensions or sidewalls 21 are affixed to the bracket 19 at the rear thereof.

In applying these brackets to the teeth, the tooth is first coated with the Bracket Bond and preferably also with the sealer composition as described above. The back of the bracket may also be filled with the Bracket Bond composition between the projecting sides or legs, etc. of the bracket and applied to the tooth as previously described.

Other configurations, such as feet, suction cups, pegs, etc. (not shown) could be used rather than the legs 21. These legs, feet, suction cups, etc. could be placed at the edge of the rear of the bracket or could be placed interior of the edge, but in close proximity thereto, as shown in FIG. 5. The necessary thing is that space 24 be sufficient to hold a sufficient quantity of the cured composition so that a fresh quantity of composition will adhere to it to form a strong, long lasting bond with the tooth.

While we have described this invention in some detail and set forth specific embodiments thereof, it is not meant to limit this invention to the specific embodiments shown or the details thereof, but we intend to cover any device assembled of the same general materials in the same general manner.

What is claimed is:

1. In combination with an orthodontic bracket of the

type adapted to receive an orthodontic arch wire, a metal base member adapted to be adhered to the surface of a tooth which comprises a base plate having one surface thereof attached to said orthodontic bracket, a U-shaped wall member extending substantially perpendicular to and from the other surface of said base plate to form the walls of a pocket, and a flange extending from the free end of each leg of said U-shaped wall member inwardly across the pocket formed by said U-shaped wall member so as to form a pocket enclosure having an open wall and open face opposite said base plate adapted to be filled with a bonding composition to facilitate adhesion of said metal base member and bracket to the surface of a tooth.

2. The combination of claim 1 which further includes within said pocket enclosure a bonding composition which consists of cured polymethyl methacrylate and polycyclohexyl methacrylate in hexyl methacrylate.

3. An improved orthodontic bracket of the type adapted to receive an orthodontic arch wire which comprises orthodontic bracket means adapted to receive an orthodontic arch wire on one surface thereof, a pair of U-shaped extensions extending substantially perpendicular to and from the other surface of said bracket means, said U-shaped extensions being oppositely disposed to one another with the open ends thereof in facing relation to one another to form the ends of a pocket enclosure adapted to be filled with a bonding composition to facilitate adhesion of said bracket to the surface of a tooth, and a flange attached to the free end of each leg of each of said U-shaped members.

4. The combination of claim 3 which further includes within said pocket enclosure a bonding composition which consists of cured polymethyl methacrylate and polycyclohexyl methacrylate in hexyl methacrylate.

5. An improved orthodontic bracket of the type adapted to receive an orthodontic arch wire which comprises orthodontic bracket means adapted to receive an orthodontic arch wire on one surface thereof, four means, said L-shaped feet being disposed to form the four corners of a rectangular pocket adapted to be filled with a bonding composition to facilitate adhesion of said bracket to the surface of a tooth, and a flange attached to the free end of each leg of each of said L-shaped members.

6. The combination of claim 5 which further includes within said pocket enclosure a bonding composition which consists of cured polymethyl methacrylate and polycyclohexyl methacrylate in hexyl methacrylate.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,797,115 Dated March 19, 1974
(Ser. No. 260,489) (Filed 6/7/72)

Inventor(s) Elliott Silverman and Morton Cohen

ORTHODONTIC ELEMENT

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 4, line 41, claim 5, line 5, should read

"four L-shaped feet extending substantially
perpendicular to and from the other surface
of said bracket means, said L-shaped feet
being disposed to form the four corners ..."

Signed and sealed this 29th day of October 1974.

(SEAL)
Attest:

McCOY M. GIBSON JR.
Attesting Officer

C. MARSHALL DANN