July 10, 1962 L. L. MORRIS 3,043,005

DENTURE ANCHORING SYSTEM

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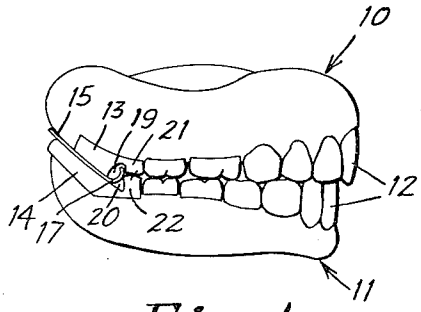


Fig. 1

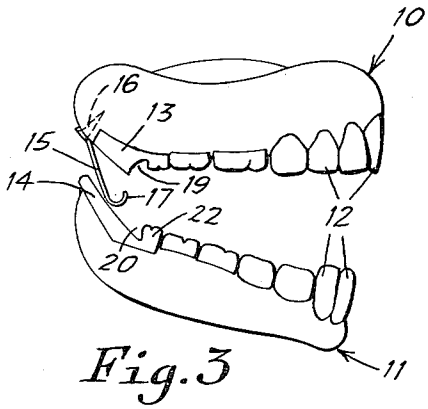


Fig. 3

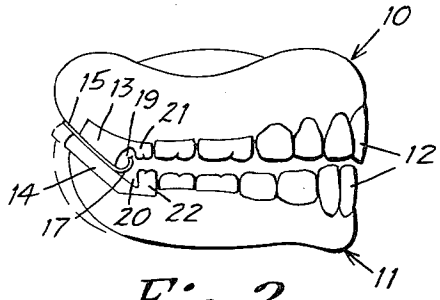


Fig. 2

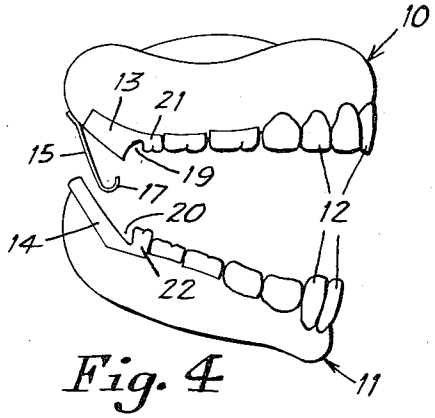


Fig. 4

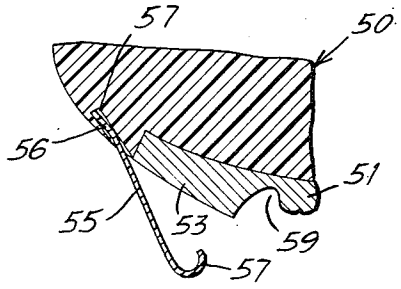


Fig. 5

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# DENTURE ANCHORING SYSTEM

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10 Claims. (Cl. 32—2)

This invention relates to a denture anchorage system and it consists in the combinations, constructions and arrangements of parts hereinafter described and claimed.

Generally there is provided upper and lower denture plates having mating inclined surfaces at their rear ends which provide a wedge action for firmly seating or anchoring the lower plate in place. A pair of leaf springs is fixed to one of the plates and is positioned between the mating wedge surfaces to exert an anchoring separation of the plates. In order to relieve the strain of holding the jaws closed against the action of the springs (which is the greatest in the closed or rest positions of the jaws) magnets are mounted on or embedded in the spring-carrying denture and are of such strengths as almost but not quite fully to neutralize the forces of the springs in said rest or closed positions of the patient's jaws.

The term anchorage, as employed herein, denotes, holding the denture plates in a manner to restrict movement, entirely, or to some lesser degree, relative to the patient's jaws.

Anchorage for lower plates has long been a subject of concern to members of the dental profession. Many methods of providing anchorage have been tried. Various trials date back to the early history of making false teeth. Paul Revere carved an ivory set of dentures for George Washington, and to provide anchorage they were equipped with a spring attaching the upper and lower plates. Weights have often been cast in the lower plate. Magnets, placed to create repulsive forces between plates, have been used. Surgery, to anchor dentures, has a long, but not especially successful, history. This outlines but a few of the many schemes that represent attempts to provide improved lower-plate anchorage.

The grafting of human or animal teeth, or attaching false teeth directly to the jawbone, would appear an ideal answer. However, as long as plates with mounted teeth are involved, a mechanical connection between the plates, entirely capable of following the jaw-action, while maintaining a force to anchor the plates, except when the jaw is at rest, could be considered an ideal solution. This invention provides a solution reasonably closely approaching this ideal arrangement.

A first point of view holds that there is hardly room at the back of the mouth to incorporate an anchorage system. This invention employs a novel arrangement of parts to overcome that misapprehension. Parts are designed and arranged in a manner to maintain a connection between the upper and lower plates through a considerable cycle of opening and closing of the mouth. The biting cycle will normally permit separating the back teeth three-eighths to five-eighths inch before entire disengagement of the plates need occur.

It is accordingly a principal object of this invention to provide a simple and compact means for anchoring denture plates.

It is another object to provide such means including wedge-action portions for imparting rearward and downward thrust at the rear ends of the lower plate.

It is a further object to provide a system of the type disclosed in which the anchoring force is exerted by leaf springs connected to one but not both of the plates.

It is yet another object to provide such means including permanent magnets constructed and arranged to neutralize a major part of the plate-separating force to relieve the strain on the patient's jaw muscles during rest periods.



Other and further objects of the invention will become apparent from a reading of the following specification taken in conjunction with the drawing, in which:

FIGURE 1 is a side elevational view of a preferred embodiment of the invention showing the dentures in fully closed positions,

FIGURE 2 is a view similar to FIGURE 1 but showing the dentures slightly separated,

FIGURE 3 is a side elevational view disclosing the dentures opened to the point of separation of the springs from the lower plate,

FIGURE 4 is a view similar to FIGURE 3 showing the dentures separated corresponding to fully open jaw positions, and

FIGURE 5 is an enlarged fragmentary elevational view, in medial longitudinal section, of a modified form of the spring-attaching structure.

With reference now to the drawing, the numerals **10** and **11** generally designate, respectively, the upper and lower denture plates. Plates **10** and **11** are formed of conventional materials and in known manners. Artificial teeth **12** are either molded integrally with the plates **10** and **11** or are molded separately and attached thereto in conventional manners.

The novelty of this disclosure resides largely in the materials and construction of the rearmost upper and lower wedge elements **13** and **14** on both sides of the dentures **10** and **11**. The upper wedge elements **13** are formed of permanent magnets and have upwardly and rearwardly sloping flat lower faces. A leaf spring **15** of ferromagnetic material is fixed to the upper denture, as by a screw **16** (FIG. 3), so as to overlie the lower face of each wedge element **13** when pressed thereagainst by the lower wedge element **14**, as the bite of the user is closed.

The lower wedge elements **14** may be formed of magnetic or non-magnetic materials, as desired, and if magnetic substance, the same may optionably be permanently magnetized to add to the attraction exerted by the upper element. In any event the magnetic forces between elements **13** on the one hand and springs **15** and/or elements **14** on the other hand are such as almost but not quite fully to overcome the plate-separating forces of springs **15** in their closed (rest) positions of FIGURE 1. This proportioning insures enough plate-separating force for firm anchorage thereof while relieving the patient's jaw muscles of the strain of overcoming the forces of springs **15** at their points of maximum thrust.

It should also be noted that the slopes of the mating faces of wedge elements **13** and **14** produce a very desirable downward thrust at the ends of the U-shaped lower plate where anchorage is most difficult to maintain.

A further advantage of the wedge action is the rearward thrust given to the lower plate thereby (illustrated by the broken line of FIGURE 2). This rearward thrust desirably adds a slight grinding action to the bite which largely compensates for the inability of most dentures to provide relative lateral grinding movement between the plates. The rearward thrust also desirably separates the teeth of the upper and lower plates when the bite is closed (compare FIGURES 1 and 2) to facilitate mouth breathing when necessary.

The free ends of springs **15** are curved at **17** to provide low friction wiping engagement thereof against wedge elements **14**. Both wedge elements **13** and **14** have recesses **19** and **20**, respectively, to receive the curved ends of springs **15**, said recesses being depressions between the

elements proper and their integrally attached teeth **21** and **22**.

In the species of FIGURE 5, the spring **55** is slightly curved at its fixed end **56** to be frictionally retained by its curvature in a socket **57** in the denture body **50**. The magnetic element **53** corresponds in structure and function to element **13** of the first-described species.

While but two forms of the invention have been shown herein, it will be readily apparent to those skilled in the art that many minor modifications may be made without departing from the spirit of the invention or the scope of the appended claims.

In the operation of the system, it is apparent that in the plate positions of FIGURES 3 and 4, the spring forces are zero and the magnet forces are of negligible values. As the bite closes the spring forces increase at substantially linear rates while the counteracting magnetic forces acting on the springs and/or magnetic bodies (permanently or inductively magnetized) in the other plate, increase inversely as the square of the distance between the plates. When the bite is fully closed, the spring and the opposing magnetic forces attain their maximum values. Said values may be so selected that the magnets then overcome any desired percentage of the maximum spring force from, for example, fifty percent to a hundred percent thereof, or even more if desired. That is, the maximum magnetic forces could even exceed somewhat the spring forces, if desired, to help hold the patient's mouth closed. However, their excess forces should not be sufficiently great to cause dislodgement of the dentures as the bite is opened.

What is claimed is:

1. In combination, an upper denture plate, a lower denture plate, said plates having opposed surfaces constructed and arranged to approach close parallelism in the closed-bite relative positions of said plates, resilient means fixed to one of said plates and biased to separate said plates by pressure exerted thereby against the other plate, and permanent-magnet means carried by at least one of said plates and constructed and arranged to substantially neutralize the force exerted by said resilient means in the closed-bite positions of said plates.

2. Structure according to claim 1, said resilient means being leaf springs lying between and biased to separate said opposed surfaces.

3. Structure according to claim 2, said springs being formed of ferromagnetic material for substantial neutralization by said permanent-magnet means of the force exerted by said springs in the closed-bite positions of said plates.



4. Structure according to claim 1, additionally comprising ferromagnetic means fixed to the other plate and positioned for mating cooperation with said permanent-magnet means of the first-mentioned plate.

5. Structure according to claim 4, said ferromagnetic means being permanent magnets.

6. In combination, an upper denture plate, a lower denture plate, said plates having opposed surfaces constructed and arranged to approach close parallelism in the closed-bite relative positions of said plates, resilient means fixed to one of said plates and biased to separate said plates by pressure exerted thereby against the other plate, and permanent-magnet means carried by at least one of said plates and constructed and arranged to substantially neutralize the force exerted by said resilient means in the closed-bite positions of said plates, said opposed surfaces being located adjacent the rear ends of said plates and being inclined upwardly and rearwardly to provide a wedge action forcing the rear ends of said lower plate rearwardly and downwardly for better anchorage and for slight rearward movement thereof relative to said upper plate.

7. Structure according to claim 6, said resilient means being leaf springs lying between and biased to separate said opposed surfaces.

8. Structure according to claim 7, said springs being formed of ferromagnetic material for substantial neutralization by said permanent-magnet means of the force exerted by said springs in the closed-bite positions of said plates.

9. Structure according to claim 6, additionally comprising ferromagnetic means fixed to the other plate and positioned for mating cooperation with said permanent-magnet means of the first-mentioned plate.

10. Structure according to claim 9, said ferromagnetic means being permanent magnets.

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