Dec. 7, 1965 J. V. SCULLIN 3,221,408

DENTAL MODEL HOLDER

Filed Dec. 1, 1961

Fig. 1.

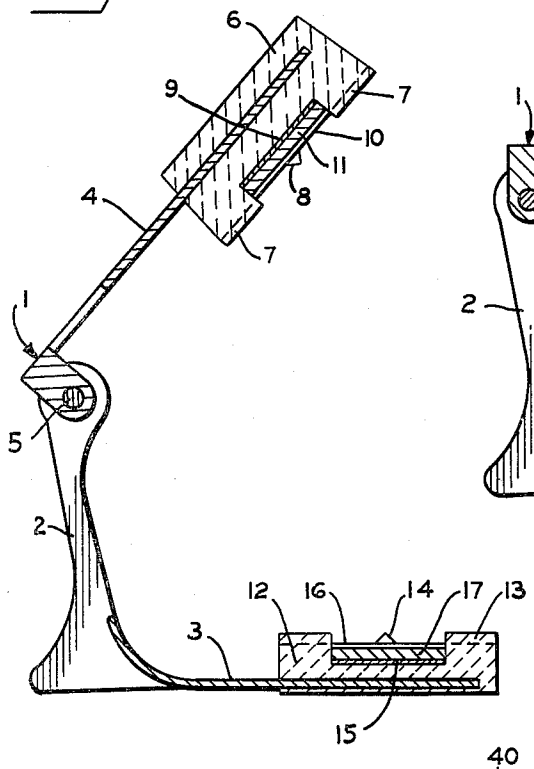


Fig. 2.

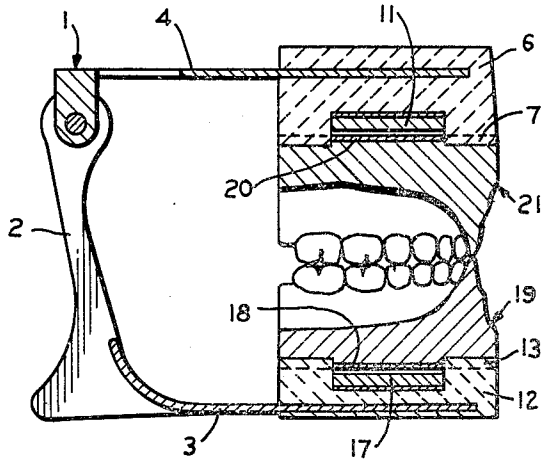


Fig. 4.

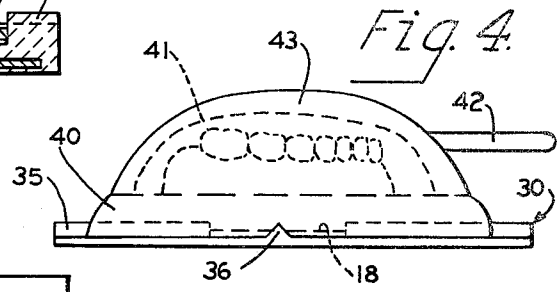


Fig. 3.

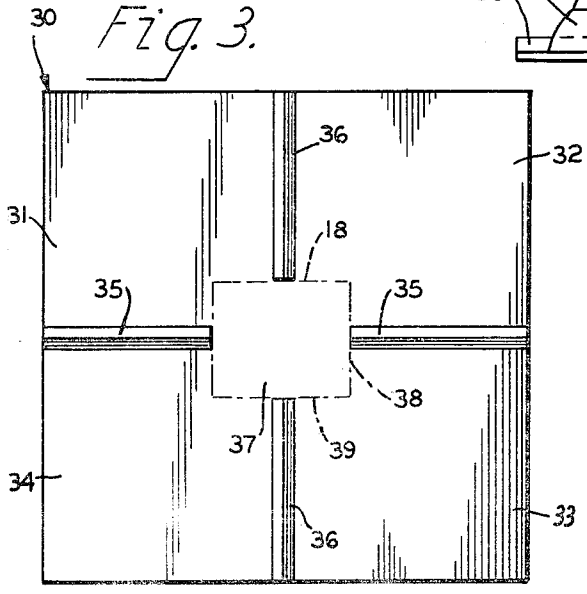
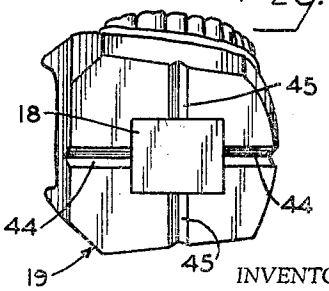


Fig. 5.



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DENTAL MODEL HOLDER

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This invention relates to an articulator or dental model holder in which a magnet assembly is used to hold the model in place.

In the past, dental models have been held in place in articulators in a variety of ways, as by retaining screws, clamps and the like, but seldom in a manner such as to make for easy replacement of the model after its removal from the articulator. A principal object of the present invention is to provide a simple, sturdy mounting system making for easy placement, displacement and replacement of the model, all without undue loss of time on the part of the dental technician. A further object is to provide a convenient method of incorporating mounting, locating and positioning means in the model and articulator, especially in their abutting portions.

Other objects, advantages and features of the invention will be apparent from the description which follows and from the accompanying drawings, wherein:

FIGURE 1 is a central vertical section through an articulator in which features of the invention are incorporated, the articulator being shown in open position.

FIGURE 2 is a like view of the same articulator with upper and lower models in place, the articulator being shown in closed position.

FIGURE 3 is a top plan of the casting mat used in preparing the upper and lower models.

FIGURE 4 is a side elevation illustrating the manner of use of the casting mat.

FIGURE 5 is a perspective of the lower model, seen from beneath, as it appears when ready for mounting on the articulator.

Referring first to FIGURES 1 and 2, what is there shown is an articulator generally designated **1** made up of an upright supporting frame **2**, a stationary or first outwardly extending arm **3**, and a movable or second outwardly extending arm **4**, the latter being pivotally mounted on a pin **5** at the top of the supporting frame. At the outer end of movable arm **4** is a shaped mass **6** of set-up plaster such as is conventionally used in or with articulators. Over much of its lower face, mass **6** is flat, as is usually desirable if such face is to act as a seat for a dental model. Bisecting the seating area in a direction paralleling the axis of arm **4** is an interrupted central rib **7** of triangular cross section. Bisecting the seating area at right angles to rib **7** is an interrupted central rib **8**, likewise of triangular cross section. These ribs are provided for locating purposes, as will appear. Because each is interrupted over its middle portion, the two ribs do not intersect but leave an unobstructed central area on the lower face of mass **6**.

In this unobstructed central area; i.e., where ribs **7** and **8** are interrupted, a rectangular magnet assembly component is embedded in the set-up plaster of which mass **6** is composed. In the preferred form of the invention, such component comprises a channel-shaped pole piece **9** of soft steel, the same having two depending side walls **10**, and, disposed within the pole piece, a wafer **11** of ceramic magnet material. Wafer **11** is somewhat smaller than but of the same general shape as pole piece **9**, to which it is glued by means of an epoxy resin. Because the depth of wafer **11** is less than the depth of pole piece **9**, the lower edges of side walls **10**, although flush with the seating area on the lower face of mass **6**, project slightly beyond wafer **11** as shown in FIGURE 1. Ceramic magnets in the form of wafers are commercially available from the Indiana Steel Products Company, Valparaiso, Indiana.

Stationary arm **3** likewise is provided at its outer end with a shaped mass of set-up plaster, such mass being designated **12** in FIGURES 1 and 2. Its upper face is largely flat except where bisected by triangular ribs **13** and **14**, the former of which extends parallel to the axis of arm **3** and the latter of which extends transversely thereto. Ribs **13** and **14** are interrupted in their middle portions to accommodate an embedded magnet assembly component similar in all respects but reversed in relation to that embedded in mass **6** at the outer end of movable arm **4**. In the prefered form of the invention, such component takes the form of a channel-shaped pole piece **15** having side walls **16** and an associated wafer **17** of ceramic magnet material. The upper edges of side walls **16** of pole piece **15** are flush with the seating area on the upper face of mass **12**. As a result, wafer **17** is depressed below the general plane of such upper face.

The manner in which the two pole pieces **9** and **15** and the two wafers **11** and **17** are embedded in masses **6** and **12** will be apparent from the following description of the manner in which two corresponding armatures **18** and **20** are embedded in the two dental models **19** and **21** appearing in FIGURE 2. For the present, it needs only to be noted that in the preferred form of the invention a flat armature of soft steel of the same general shape as the previously described wafers of ceramic magnet material is embedded in each of the two models. Thus armature **18** forms part of lower model **19** and armature **20** forms part of upper model **21**. These armatures are of dimensions such as to permit them to seat on the projecting edges of side walls **10** and **16** of pole pieces **9** and **15**, respectively. They constitute components of the magnet assembly in its entirety.

In embedding armature **18** in model **19**, it is convenient to make use of a mat **30** of rubber or some other resilient composition, preferably but not necessarily shaped as shown in FIGURE 3. This mat is divided into quadrants **31**, **32**, **33** and **34** by interrupted ribs **35** and **36** of triangular cross section. Formed integrally with the body of the mat, such ribs extend parallel and at right angles to the axis of arm **3**. They are interrupted in their middle portions to allow for the introduction of armature **18**. In this area, mat **30** has a flat central portion **37** indicated by dotted lines **38** and **39** to which armature **18** is applied and in which it fits snugly between the opposed ends of ribs **35** and **36**. Preferably, the lateral edges of the armature are undercut slightly where they overlie the surface of the mat.

Having located armature **18** in place, the next step is to build up on the mat a shallow bed **40** of plaster (FIGURE 4). Bed **40**, which when formed is more or less flat, is indicated in dotted lines. While the plaster in bed **40** is still more or less workable, a conventional dental impression **41**, in this case an impression taken from a mandible is filled with plaster and supplied in the usual way to bed **40**. Handle **42** is embedded in and forms part of the dental impression tray **43** received by the laboratory technician from the dentist.

After the plaster has had time to harden, mat **30** is stripped off; thereafter, dental impression tray **43** and dental impression **41** can be removed by means of handle **42**.

What remains is a rough model which can readily be finished by grinding away superfluous material. This having been done, the model usually presents approximately the same appearance as that shown in FIGURE 5. It will be noted that armature **18** is embedded in the lower face of the model, that the exposed surfaces of both are flush with each other, and that the lower face of the model is bisected by interrupted grooves **44** and **45** of triangular

cross section formed by the ribs **35** and **36** on mat **30**. If, as assumed in this description, ribs **35** and **36** are of the same altitude as and arranged similarly to ribs **13** and **14** on the mass of set-up plaster at the end of stationary arm **3**, ribs **13** and **14** will mate precisely with grooves **44** and **45**.

It is evident that without departing in any way from the spirit of the invention numerous changes may be made, as, for example, by making use of magnet assembly components of circular shape rather than rectangular components of the nature of those shown in the accompanying drawings. The illustrated arrangement of ribs and grooves in the casting mat and elsewhere need not be followed but may be extensively modified; for example, a series of circular ribs surrounding a circular magnet assembly may be used if desired. In other cases, whether the magnet assembly as a whole be circular, square or oblong in shape, the ribs and grooves may be so oriented as to radiate outward with some or all of them defining acute angles with the longitudinal axes of the articulator arms. Other magnet material may be used, if desired, in place of the ceramic magnet material employed in the preferred form of the invention.

It is intended that the patent shall cover, by summarization in appended claims, all features of patentable novelty residing in the invention.

What is claimed is:

1. An articulator comprising a frame; two arms supported by the frame, at least one of said arms being pivotally mounted thereon; shaped masses of set-up material at the unsupported ends of the arms; magnet components incorporated in the set-up material, said magnet components comprising shallow magnet bodies non-detachably held in shallow metal retainers; dental models in contact with the masses of set-up material, said models incorporating other magnet components cooperating with the magnet components incorporated in the masses of set-up material; and means for positioning the models on the masses of set-up material.

2. In a dental articulator, the sub-combination comprising supporting structure; two outwardly extending arms supported thereby, said arms being capable of relative movement; a shaped body of set-up material at the unsupported end of each of said arms; a magnet component embedded in each of said bodies of set-up material, said magnet component taking the form of a wafer of magnet material housed in a soft steel pole piece of channel-shaped cross-section; and, flanking each magnet component, locating means to aid in positioning a dental model on the body of set-up material.

3. In a dental articulator, the sub-combination comprising a frame; two arms supported by the frame, at least one of said arms being pivotally mounted thereon; shaped masses of set-up material at the unsupported ends of two arms; magnet components embedded in the set-up material, said magnet components comprising shallow magnet bodies non-detachably held in shallow metal retainers; and model-positioning means formed in the masses of set-up material outwardly of the magnet components.

4. In a dental articulator, the sub-combination according to claim **3** in which the magnet bodies are adhesively bonded to the retainers.

5. In a dental articulator, the sub-combination according to claim **3** in which the retainers and magnet bodies are rectangular in shape.

6. A method of incorporating a magnet component in a body of settable material such as dental plaster comprising the steps of providing a ribbed surface with an open area in the ribbed portion of dimensions such as to accommodate a magnet component; locating a magnet component in the open area; forming on the ribbed surface a shallow bed of the settable material, said bed enveloping the exposed portions of the magnet component; superimposing a dental impression on the bed so formed, said dental impression being filled with settable material; allowing the settable material to set up; removing the dental impression; and shaping the set-up material to form a mannikin.

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