

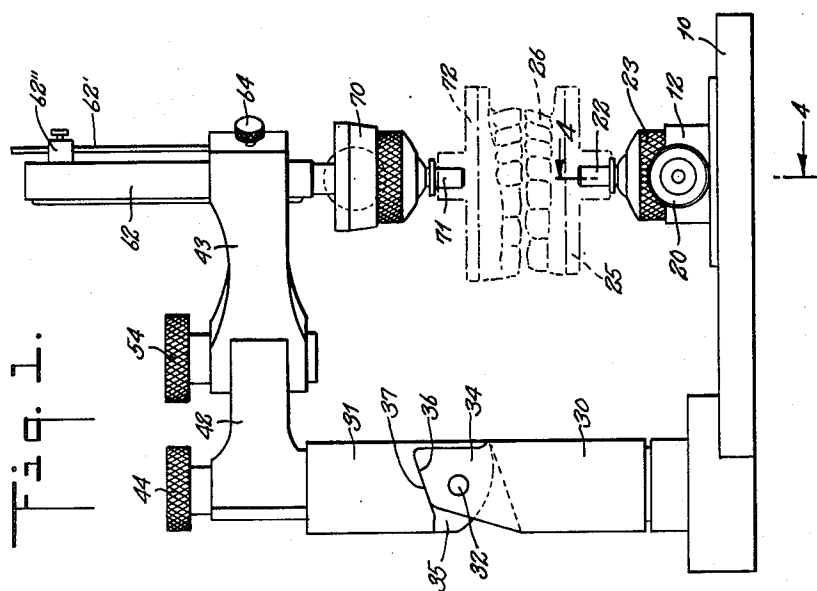
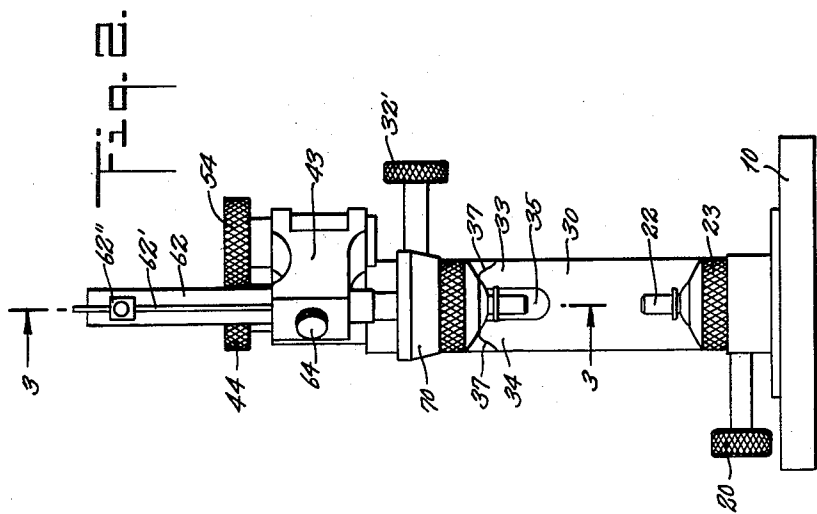
Dec. 12, 1950

S. H. HIRSCHHORN
CENTRIC RELATOR

2,534,023

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3 Sheets-Sheet 1



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3 Sheets-Sheet 2

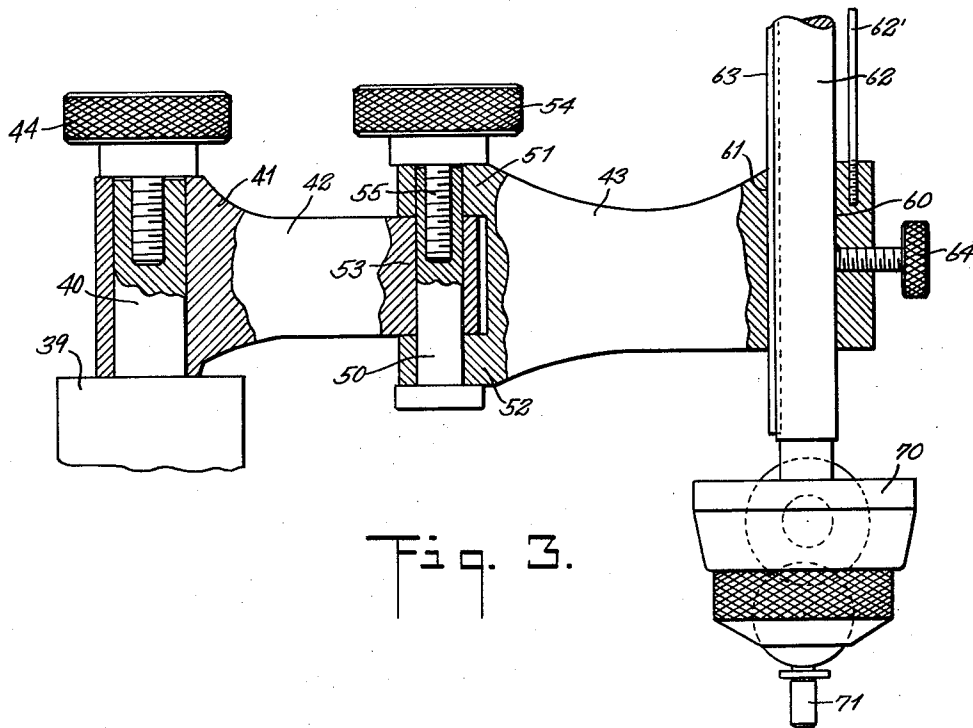


Fig. 3.

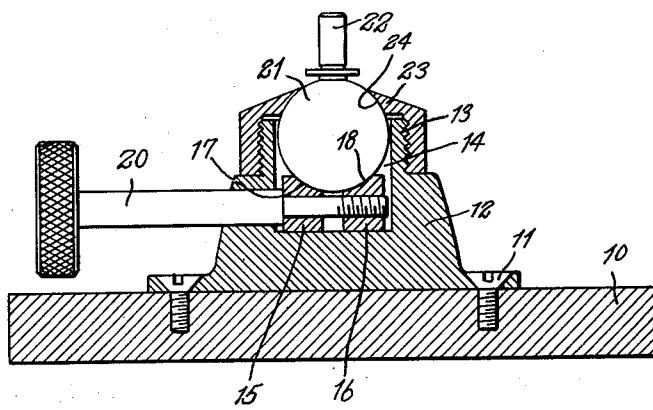


Fig. 4.

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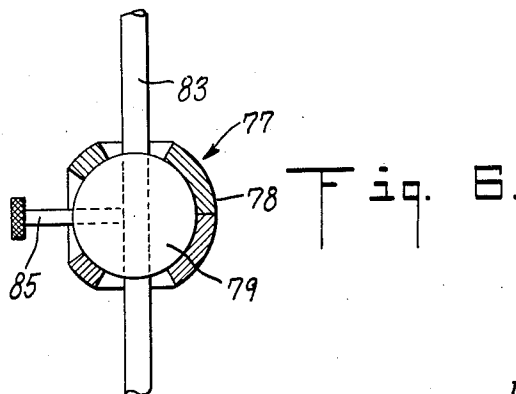
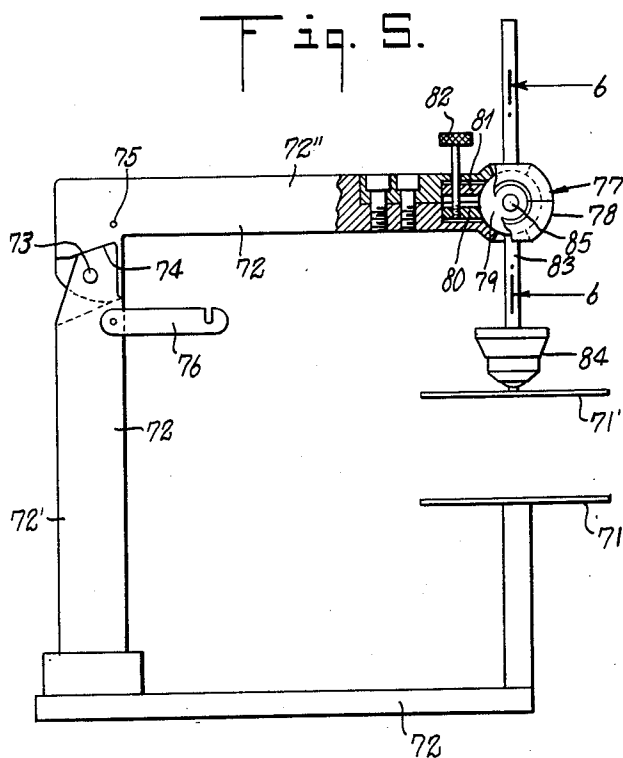
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UNITED STATES PATENT OFFICE

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CENTRIC RELATOR

Sidney H. Hirschhorn, Paterson, N. J.

Application September 23, 1949, Serial No. 117,322

9 Claims. (Cl. 32—32)

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This application is a continuation in part of my application Serial No. 47,460, filed September 2, 1948, now abandoned.

This invention relates to a straight line articulator used in the art of dentistry. It particularly concerns the making of full dentures, partial dentures, and the construction and use of study models.

In making dentures a rather complex series of operations is followed. In general, an impression is taken of the mouth, plaster casts of the upper and lower jaws being made. These plaster casts are mounted on a machine, but they are not properly related, and before perfect dentures can be made, they must have the same centric relationship as the patient's jaws. In order to obtain that relationship a wax bite block is bitten into by the patient, and furnishes this necessary relationship. The bite blocks are mounted on the plaster models and can be removed from it. The plaster models are usually mounted in a machine called an articulator that has supports for the plaster models bearing the bite blocks. The dentures are set up in the wax of the bite block and the blocks are moved back and forth from casts to the patient's mouth in order to accomplish perfect fitting. However, in former machines many had no way to correct error except to dismount the plaster of one model and remount it on a new plaster record of the mouth. Some machines had a kind of adjustment by screws or planes that was a problem in itself, necessitating independent, unconnected, unrelated, and unbalanced movements.

The setting of the two models requires a forward and backward movement to right and left, and an up and down motion that becomes a mathematical problem of delicate proportions which is difficult, laborious, time-consuming, inaccurate, and frequently nerve-racking. The instrument itself becomes a problem and the adjustment is sometimes almost impossible.

It is an object of this invention to correct error in the relationship of forms produced from the wax bite block or from any other transitional material available.

Another object is to correct the error when the centric arrangement of the teeth fails to coincide.

Another object is to accomplish the proper arrangement with the assistance of the patient at the chair, the patient and the instrument being used simultaneously and interchangeably.

Another object of the invention is to have an instrument for establishing centric relationship that is adjustable to a centric relationship brought to it.

A further object is to seat the two jaws into a guide called the centric relationship record.

In order to accomplish the objects of the invention, I have produced a centric relator which

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has no resistance to movement in any direction, forward, backward, right, left, up, down, and spherical.

In the accompanying drawings, wherein like reference characters refer to like parts throughout the several views.

Fig. 1 is a vertical side view of the centric relator;

Fig. 2 is a vertical front view thereof;

Fig. 3 is a detail of the articulated arm;

Fig. 4 is a detail of the universal joint;

Fig. 5 is an elevational view, partly in section, of a modified form of the device; and

Fig. 6 is a section on line 6—6 of Fig. 5.

In the drawings, numeral 10 indicates a pedestal to which is attached by screws 11 a socket 12 having a screw threaded extension 13. The socket 12 has a cylinder hole 14 upon the bottom of which are two movable blocks 15, 16, the upper surfaces of which have cooperating parts 17, 18 of a spherical seat. A screw threaded shaft 20 penetrates the socket 12, passes through block 15, and is screw threaded into the block 16, an arrangement which permits the blocks to be moved toward and away from each other and to grip and release the ball. A ball 21 carrying on one side a supporting stud 22 is received in the seats 17, 18 of blocks 15, 16 and is held therein by a cap 23 which is screw threaded upon extension 13 and has an internal spherical seat 24. Thus, the support 22 is mounted for spherical movement but can be locked in position by use of the thumb screw 20 which jams the ball 21 against the seat 24 by drawing the blocks 16, 15 together.

A metallic supporting plate 25, which carries the form 26, may be mounted upon the stud 22 as indicated in dotted lines in Fig. 1 and may be spherically moved to any desired position.

Also mounted upon the pedestal 10 is an articulated column 30, 31, the upper part 31 of which is mounted upon the lower part 30 by a horizontal pivot pin 32. The upper portion of column part 30 is forked as shown at 33, 34 and receives between the parts of the fork a snugly fitting flange 35 on the lower end of part 31. The upper surfaces 36 of the fork are flat and angularly arranged, and the lower portions 37 of the part 31, just above the flange 35, are similarly flattened and angled. Consequently, in the position shown in Fig. 1, the column 30 is fixed in upright position. It can be pivoted vertically backward, but not forward. The pin 32 is controlled by a thumb screw 32' which locks parts 30, 31 in any desired angular relationship.

The top of the column 30, 31 is flattened near its circumference as shown at 33 in Fig. 3 and has a projecting cylindrical stud 40 which receives a snugly fitting sleeve 41 on an articulated arm 42—43. The sleeve 41 is somewhat longer than the stud 40 so that a screw threaded pin on

the end of thumb screw 44, seated in the stud 40, serves to fix the arm 42 in any selected angular position. The parts of the arm 42, 43 are articulated by means of a bolt 50 which passes through sleeves 51, 52 in the forked end of arm part 43 and through a sleeve 53 in the end of arm part 42. In this case also the bolt 50 is slightly shorter than the distance of the opposite faces of the fork 51, 52 so that a thumb screw 54 can be employed by means of internal screw thread 55 to fix the parts 42, 43 in selected elbow relationship.

The outer end of arm 42, 43 contains a sleeve 60 having a slot 61. In this sleeve there is received a shaft 62 having a spline 63 which is received in slot 61. A thumb screw 64 penetrates the end of the arm 43 and serves to seat the shaft 62 in selected vertical position. The support 62 carries at its lower end a ball and socket joint 70 similar in construction to that which has heretofore been described and is shown in Fig. 4. On a stud 71 of said ball and socket joint there may be mounted a metal plate 72. A small rod 62' adjustably set in the sleeve 62'' by a set screw establishes a precise position of the shaft 62 in the sleeve at the end of arm 43, even when screw 64 is loose.

In Fig. 5 is shown a modified form of the invention. In this figure 71 indicates a lower denture support which is carried in fixed relation to the base 72 of the apparatus. This support 71 may also be universally mounted as indicated in Figs. 1 to 4. One object of this modification is to indicate variations in structure which can sometimes be usefully employed. A standard 72 is carried by the support and is vertically articulated at 73, the upper portion of the standard 72'' being pivoted to lower portion 72' for vertical motion. The vertical motion referred to herein should generally be considered as vertical with respect to the plane of support 71. The upper end of the shaft 72 is reduced at 74 and serves as a support for arm 72'' of the standard 72. The standard 72 is thus provided with a vertical articulation which permits the support 71' to be moved away from support 71. A pin 75 projects from the side of arm 72' and a locking piece 76 is mounted on the lower portion 72' of the standard and can be swung into locking engagement with the pin so as to keep the arm 72'' fixed in its horizontal position when desired. The end of the arm 72'' is provided with a universal joint 77 which includes a sphere 79 within the socket which is capable of being locked in position by jam lugs 80, 81 operated by a thumb screw 82.

The shaft 83 passes through the ball 79 and is given limited universal motion within the casing 78 by releasing the thumb screw 82. In this way, the position of the shaft 83 at its lower end can be varied sufficiently to accommodate all normal variations required by the instrument. At the lower end of shaft 83 is a universal joint 84 of the type which has been described hereinbefore which is in turn, connected to the denture support 71'. The shaft 83 is adjustably held in the ball by a screw 85 which can be released and tightened at will, an aperture in the side of the casing 78 allowing this screw the same liberty of motion which is permitted the shaft 83.

By virtue of the construction which has just been described, there is no resistance to movement in any direction, but all movements are connected and interconnected, related and interrelated. There is relative movement in unity. All movements can be made simultaneously and can balance opposing movements. The entire instru-

ment is based on a series of related balances at work for each other. The number of individual movements required by prior art structures are greatly reduced by combination. Once the mechanism is locked the forms can be separated and brought back together again in perfect alignment by simple motion of the part 31 about elbow 32. The movements are based on circles rather than on planes and screw adjustments thereof.

In locking the flat plane type of relator the probability is that there will be a change at the centric relationship end that will produce an incorrect relationship. There is almost always error introduced when flat planes are locked. With screws error still exists because you cannot tell whether you are correctly seated in the record. In operating the device, the two senses involved are sight and touch, and in the last analysis, touch is the more important because it is the final test of accuracy. This is operative in the present apparatus but not in those of the prior art of the plane and screw type.

If correction is necessary, time and steps are saved in dismounting and remounting forms.

This device gives a direct vertical opening.

It is possible to mount the jaw members independently and away from each other, bringing them into proper relation almost instantly, when wanted.

Another advantage is that complete rotation of the dentures on their axis without changing relationship is possible. This makes for clear and unimpeded view and working conditions.

It is possible to test the inclination of the teeth by tactile sense. This is very important when it is considered that the tactile sense is the only means that the patient has for observing the nature of the arrangement of teeth in his mouth.

Each jaw can be set up independently and prior to gathering the relationship, and this is believed to be the only instrument which permits it, and that can be used at the chair in making corrections in jaw relationship that are brought to the instrument. It does not require any of the jaw members to be removed if the centric relationship is incorrect.

As many apparently widely different embodiments of the present invention may be made without departing from the spirit and scope thereof, it is to be understood that the invention is not limited to the specific embodiments.

What is claimed is:

1. A centric relator including a pedestal, a form support universally mounted on the pedestal, an elbowed column mounted on the pedestal having a vertically tiltable top, a horizontally elbowed arm horizontally pivoted upon the column, a rod vertically and adjustably supported by the arm, a form support universally carried by the said rod, and means to fix each joint of said relator in selected position.

2. A centric relator having opposed form supports, spherically jointed supporting means for one said support, and spherically jointed, vertically adjustable, horizontally and vertically articulated supporting means for said opposed support, and means to fix each said articulation and spherical joint in selected position.

3. A centric relator for dentures including cooperative, universally mounted supports, and supporting means for one said support including a vertical articulation, two horizontal articulations, and a vertical adjustment.

4. A centric relator for dentures including co-

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operative, opposed supports for dentures, and supporting means for one said support including a vertical articulation, two horizontal articulations, a vertical adjustment, and a universal joint.

5. A centric relator for dentures comprising opposed denture supports, a standard having a vertical articulation, a universal joint carried by the standard in alignment with said supports, a shaft adjustably mounted in the universal joint for axial motion, and a universal joint connecting said shaft and one of said denture supports.

6. A centric relator for dentures comprising opposed supports for dentures, and supporting means for one said support including a vertical articulation, a pair of universal joints, and a vertical adjustment.

7. A centric relator for dentures comprising opposed supports for dentures, and supporting means for one of said supports comprising a universal joint, a shaft attached thereto and mounted for vertical adjustment in a second universal joint, an arm supporting said second universal joint, and a vertically adjustable joint supporting said arm.

8. A centric relator having opposed denture supports, one of said supports being positioned

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with respect to the other by means of two universal joints and an adjustable shaft in coaxial alignment.

9. A centric relator having opposed denture supports, one of said supports being positioned with respect to the other by means of two universal joints and an adjustable shaft in coaxial alignment, and means to rotate the said one support into and out of position opposed to the other of said supports.

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