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DENTAL IMPLEMENT

Filed Sept. 11, 1934

Fig. 1.

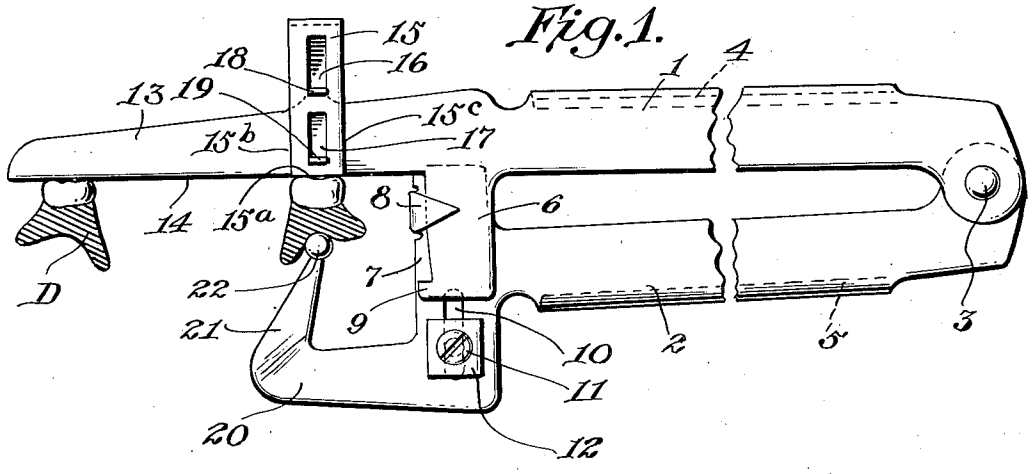


Fig. 2.

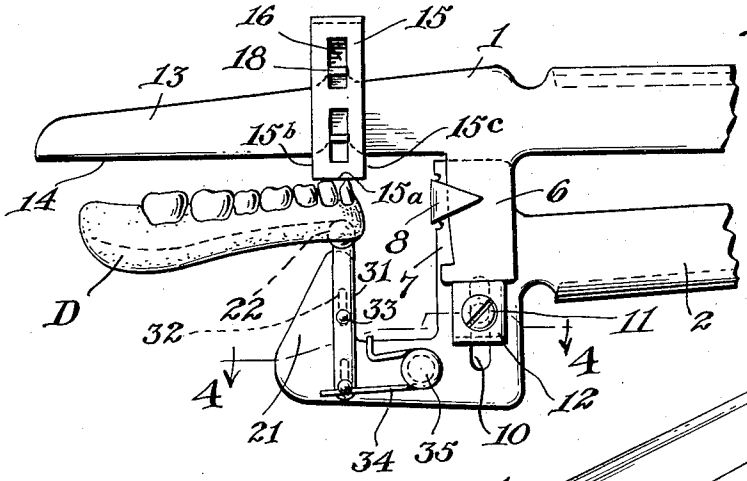


Fig. 3.

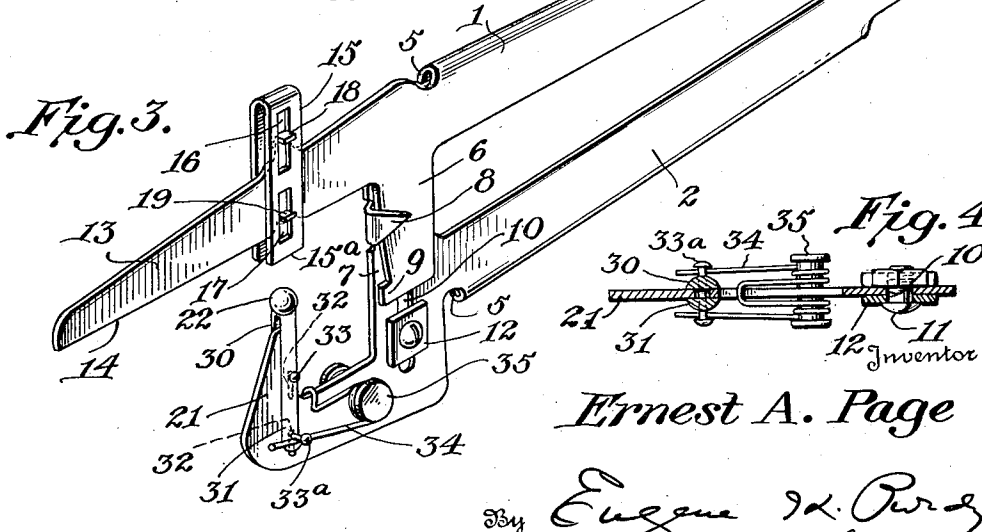


Fig. 4.

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Patented Sept. 10, 1935

2,014,289

UNITED STATES PATENT OFFICE

2,014,289

DENTAL IMPLEMENT

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Application September 11, 1934, Serial No. 743,571

8 Claims. (Cl. 33—174)

This invention relates to dental implements and has for its object to provide an implement desiged for insuring the correct location of the teeth in artificial dentures.

In the making of dentures, and particularly in the manufacture of lower dentures or "dental plates", it is generally recognized by the profession that the teeth, with the exception of the frontal teeth, should occupy a position directly above the alveolar ridge of the jawbone upon which the denture is to be supported in the mouth. This is because any misplacement of the teeth, either to one side or the other of this ridge, results in a tendency when the denture is in use to unbalance it. And this is especially true when the teeth are disposed outside or forwardly of the ridge, which condition permits the denture to rock upon the gums when the teeth are employed in chewing to break the suction between gums and denture that normally retains the latter in place.

While this principle of prosthetic dentistry is generally respected by the dental profession, considerable expertness is called for in the correct articulation of the teeth by the methods of denture making now commonly practiced. According to these methods, after the wax base plate has been formed from the plaster of Paris model conforming to the contour of the gums of the patient being fitted, the teeth are inserted in the plastic wax one by one preparatory to the step of molding the final denture therefrom. In this tooth-setting operation the dentist depends largely upon guesswork in determining the line upon the tooth-sustaining side of the base plate that corresponds to the alveolar ridge. And because the contour of the base plate upon its tooth-sustaining surface seldom conforms precisely to the contour of the gums, quite often a dentist will be misled into believing he is locating a tooth directly over the bottom of the recess corresponding to the ridge of the gums when, as a matter of fact, this is not true.

Similarly, the frontal teeth, and more particularly the incisors, should preserve a definite relationship with respect to the alveolar ridge. That is, they should occupy a position just forwardly or outside of the ridge of the jaw and incline slightly inwardly toward the back of the mouth. The correct placement of these teeth in the base plate likewise calls for considerable skill on the part of the dentist.

It is an important object of the present invention to facilitate denture making and to eliminate to a large extent the element of chance which is involved in the placement of the teeth according to the practices now in vogue. More especially the invention aims to provide an implement designed for checking the location of the teeth at the time they are mounted in the wax base plate in order to insure their correct position with respect to the alveolar ridge in the finished denture. To this end, the invention contemplates the provision of an implement having a finder adapted to be introduced into the gum-engaging recess upon the under side of a base plate and a gauge located in fixed predetermined relationship with respect to the finder and affording a "sight" for determining the correct position of a tooth embedded within the upper surface of the plate.

I prefer to form the gauge with a foot that contacts the crown or cusps of a tooth and assumes a position centrally thereover when the tooth—excepting one of the frontal teeth—is properly located in the base plate, any misalignment of the tooth being readily ascertained by the dentist by noting the amount of displacement of the tooth off-center with respect to the foot.

The implement of my invention is capable of use not only during the preliminary anchorage of the teeth in the base plate, but is also helpful as a fault-finder for checking the teeth of completed dentures that have proved unsatisfactory in service to determine where their trouble lies.

Another object of the invention is to provide a dental implement of the above character which is of simple construction and which lends itself to economical manufacture so as to provide an inexpensive tool within easy reach of any dental worker or student.

Other objects and advantages will be apparent from the following detailed description of two preferred embodiments of the implement of my invention, reference being had to the annexed sheet of drawings in which:

Figure 1 is a view of a dental implement in side elevation shown in position for checking a molar located in a base plate forming the pattern for a lower denture, the base plate being illustrated in cross-section;

Figure 2 is a view in side elevation of one end of a slightly modified form of implement and indicating its position of use for checking the placement of an incisor;

Figure 3 is a view in perspective of the dental implement of Fig. 2; and

Figure 4 is a cross-sectional view of the dental implement of Fig. 2 taken along the line 4—4 of that figure.

The dental implement shown in Fig. 1 comprises a pair of arms 1 and 2 made of light sheet

metal stock pivotally connected at one end by a pin 3. These arms are of sufficient length to afford convenient grips so that the two arms may be clasped in one hand of the operator during use and their opening and closing movement readily controlled. The opposite longitudinal edges of the arms desirably are folded over as indicated at 4 and 5 to eliminate the sharp corners which otherwise would be presented to the hand.

Intermediate the end of arm 1, which I term the upper arm, is a depending leg 6 adapted to slide in face-to-face contact with a companion leg 7 constituting an upwardly disposed section of the arm 2, which latter arm I term the lower arm. The leg 7 is provided with an ear 8 integral with the leg and bent over the outer face of the leg 6 to prevent spreading of the arms out of parallelism but permitting their pivotal movement about the pin 3.

In order to limit the pivotal movement of the arms, I provide a check 9 constituting a step upon the leg 6 which rides into engagement with the ear 8 when the arms are opened. Formed within the leg 7 in alignment with the leg 6 is a longitudinal slot 10, and extending through this slot is a screw 11 carrying a dog 12 which may be adjusted lengthwise of the slot and retained in position by tightening the screw within a nut, not shown, located upon the opposite side of the arm from the dog 12. The dog thus serves as a stop for the lower end of the leg 6 when the arms are closed together.

The upper arm 1 is longitudinally extended beyond the leg 6 to form a guide 13 provided with a straight-edge 14. This guide supports a rectangular-shaped gauge 15 disposed perpendicularly with respect to the straight-edge. The gauge is made of a strip of thin metal bent upon itself to slidingly embrace opposite faces of the arm 1. One face of the gauge is recessed to provide a pair of vertically aligned slots 16 and 17 which receive within them tongues 18 and 19 bent outwardly from the face of the upper arm, the arrangement being such that the gauge is capable of sliding movement, guided by the tongues 18 and 19 and to the extent permitted by the slots, in a direction perpendicular to the straight-edge 14. The lower end of the gauge terminates in a foot 15*a* adapted to contact the crown of a tooth fastened in a base plate D. This foot is of a width approximately equal to that of a molar and is defined by a flat tooth-contacting lower end and parallel side edges 15*b* and 15*c*, which latter edges in the use of the implement constitute reference means for determining the correct location of a tooth.

The free end of the lower arm 2 is fashioned so as to describe a hook 20 terminating in an upright finger 21 defining a finder having a ball point 22 mounted upon its upper end. The finder 21 is slightly bent to dispose the ball point 22 in the plane of the upper arm and this ball point is located in alignment with the gauge 15 so that an extension of the longitudinal median line of the gauge includes a radius of the ball point. In general the dog 12 will be so adjusted within the slot 10 that the two arms 1 and 2 will be approximately parallel when closed together and the ball point 22 spaced about one-half inch from the straight-edge 14. The hook is designed to permit the introduction of the ball point into the bottom of the gum-engaging recess of the denture D while affording sufficient clearance for the walls of the recess.

The construction of the modified form of implement illustrated in Figs. 2 to 4, inclusive, is substantially the same as that shown in Fig. 1, just described. Consequently the same reference numerals are employed to designate corresponding elements of the implements of these figures.

The implement of the latter figures differs from the implement of Fig. 1 only by the provision of a sliding mounting for the ball point 22. As best illustrated in the cross-sectional view of Fig. 4, the ball point is mounted upon the end of a pair of parallel arms 30 and 31 straddling the upright finger constituting finder 21. The finder is provided with two elongated slots 32 disposed in alignment and extending in the direction of the length of the finder. Transverse pins 33 and 33*a* pass through the arms 30 and 31 and through the slots 32, the arrangement being such that the pins sliding within the slots serve to guide the ball point 22 in a straight line coinciding with the extended median line of the gauge 15.

The ball point 22 is normally held in its raised position with the pins 33 and 33*a* engaging the upper ends of their respective slots under the urge of a spring 34. The spring 34 is formed to engage the hook 20 and has its two free ends passed below extensions of the pin 33*a* projecting from opposite sides of the hook. In order to impart tension to the spring, intermediate sections thereof are coiled about the shank of a cylindrical lug 35 drive-fitted within an opening formed in the hook, the lug having its ends extended beyond opposite faces of the hook and suitably headed to retain the spring coils in place thereon.

The manner in which both forms of the implement described above are used is substantially the same: All the teeth having been positioned in the wax base plate according to the best judgment of the dentist, the teeth are checked prior to introducing the base plate into a mold to form the matrix from which the final denture is cast. Care in locating the teeth in the base plate is necessary for the reason that any error in the alignment of the teeth in the base plate will be carried over into the finished denture.

The dentist grasps the arms 1 and 2 of the implement in one hand and with his other hand supports the base plate D in a horizontal plane about on the level with his eyes, sighting from the rear toward the front of the plate. Starting with the rear molars, the dentist separates the two arms 1 and 2 of the implement to the maximum extent permitted by the check 9 and ear 8 and inserts the ball point 22 of the finder 21 into the bottom of the recess upon the under side of the base plate, at the same time seeing to it that the guide 13 is positioned over the corresponding molar upon the distant margin of the plate.

The arms are then closed which causes the straight-edge 14 to rest upon the two molars, the foot 15*a* of gauge 15 upon riding into contact with the molar under which the ball point 21 has been positioned being projected vertically upward into the position shown in Fig. 1. The dentist now notes the displacement, if any, of the molar contacted by the foot 15*a* with respect to the parallel edges 15*b* and 15*c* of the gauge. If the molar is centrally located with respect to the foot, then the dentist knows that this molar, when transferred to the completed denture, will lie directly above the jaw bone. This follows from the fact that the bottommost portion of the recess contacted by the finder, that is, the ball

point 22, corresponds to the crest of the gums covering the jaw bone, and this point is in this way automatically transferred from the lower to the upper side of the base plate by the gauge 15 by virtue of the fact that the gauge is disposed in exact alignment with the ball point of the finder. If, on the other hand, the molar is found to be out of alignment with the foot 15a, then this informs the dentist that the molar requires resetting before proceeding to the next step in the manufacture of the denture.

In the same way the remainder of the teeth may be checked. In checking the incisors, however, the guide 13 will extend diagonally or endwise with respect to the base plate as shown in Fig. 2, and care is exercised, in order to avoid error in taking an observation from the gauge, to see that the implement is held so that the straight edge 14 extends in a plane generally parallel with the crest line of the teeth. The gauge 15 being slidable will accommodate itself to teeth of different heights without spreading the arms 1 and 2, these latter being actuated only upon introducing the ball point into and removing it from the gum-engaging recess.

The rearwardly inclined incisors, however, instead of engaging the foot 15a centrally when in their correct position of placement will, on the contrary, contact the foot about $\frac{1}{16}$th or $\frac{3}{32}$ds of an inch inwardly from the side 15c, as shown in Fig. 2. Of course the above mode of use of my improved dental implement is simply suggestive, and the dentist will doubtless develop his own technique as he becomes familiar with the device.

In the use of the modified form of implement provided with a slidable ball point 22, the spring 34 serves to automatically urge the ball into the lowermost depth of the gum-engaging recess when the finder is introduced into this recess.

While the dental implement of my invention has been described above in connection with a base plate used in forming a lower denture, the invention is not so limited and may be used to good advantage in determining the correct position of the teeth in base plates for upper dentures. Furthermore, as has previously been pointed out, the implement of the invention finds additional utility in checking the teeth of completed dentures to discover their imperfections. The term "dental plate" as used in the appended claims is employed in a broad sense to include the base plates made of plastic material in an intermediate step in the process of denture making, as well as dentures in either their completed or uncompleted state. By the term "ball point" is meant any spherical or dome-shaped element upon the end of finder 21 which easily slides upon the walls of the gum-engaging recess and seeks its deepest portion.

It will be obvious that many changes in arrangement and design may be made in the structure of the dental implements described above without departing from the spirit of my invention.

I claim:

1. An implement for checking the location of teeth on dental plates comprising a finder adapted to be inserted in the gum-engaging recess on the under side of a dental plate, the finder comprising an upright finger terminating in a ball point designed to contact substantially the deepest portions of the recess, an elongated gauge, having a flat tooth-contacting foot of approximately the width of a molar, a support for the gauge, the gauge being disposed perpendicular to the support and in alignment with the ball point, means connecting the gauge and the finder to permit relative movement of the gauge and finder toward and from each other.

2. An implement for checking the location of teeth on dental plates comprising a finder adapted to be inserted in the gum-engaging recess on the under side of a dental plate, the finder comprising an upright finger terminating in a ball point designed to contact substantially the deepest portions of the recess, an elongated gauge having a flat tooth-contacting foot of approximately the width of a molar so as to engage opposite cusps of a tooth, a support for the gauge, the gauge being disposed perpendicular to the support and in alignment with the ball point, and means connecting the gauge and the finder to permit relative movement of the gauge and finder toward and from each other, said gauge having parallel sides adjacent its tooth-contacting foot providing reference means for centering a tooth with respect to the bottom of the gum-engaging recess.

3. An implement for checking the location of teeth in dental plates comprising a finder adapted to be inserted in the gum-engaging recess on the under side of a dental plate, the finder comprising an upright finger terminating in a ball point designed to contact substantially the deepest portions of the recess, an elongated gauge having a flat tooth-contacting foot of approximately the width of a molar so as to engage opposite cusps of a tooth, a support for the gauge, the gauge being disposed perpendicular to the support and in alignment with the ball point, means connecting the gauge and the finder to permit relative movement of the gauge and finder toward and from each other, and a guide upon said gauge support forming an extension of said support beyond the gauge and having a straight-edge at right angles thereto, said guide being of a length approximately equal to the distance between corresponding molars upon opposite sides of the dental plate.

4. An implement for checking the location of teeth on dental plates comprising a finder adapted to be inserted in the gum-engaging recess upon the under side of a dental plate, the finder comprising an upright finger terminating in a ball point designed to contact substantially the deepest portions of the recess, a gauge, means supporting the gauge above the upper side of the denture in predetermined alignment with respect to the finder, the finder and gauge-supporting means being connected for relative movement toward and from each other and the gauge being independently slidable on its supporting means toward and from the finder, a flat tooth-contacting foot upon the gauge of sufficient extent to engage the opposite cusps of a tooth and thereby position the gauge, and reference means on the gauge to permit of the visual determination of the position of a tooth with respect to the recess.

5. An implement for checking the location of teeth on dental plates comprising a finder adapted to be inserted in the gum-engaging recess on the under side of a dental plate, the finder comprising an upright finger terminating in a ball point, designed to contact substantially the deepest portions of the recess, an elongated gauge, a support for the gauge, the gauge being disposed perpendicular to the support and in alignment with the ball point, and means connecting the gauge and the finder to permit relative

movement of the gauge and finder toward and from each other, means slidably connecting the ball point to the finger for movement toward and from the gauge, and resilient means biasing the ball point toward the gauge.

6. An implement as described in claim 1 in which the support for the gauge and the means connecting the gauge and finder comprise relatively long arms pivotally connected together.

7. An implement as described in claim 1 in which the support for the gauge and the means connecting the gauge and finder comprise relatively long arms formed of sheet material pivotally connected together at one end in superposed relation.

8. An implement as described in claim 1 in which the support for the gauge and the means connecting the gauge and finder comprise relatively long arms formed of sheet material pivotally connected together at one end in superposed relation and having means for limiting the pivotal movement of said arms.

ERNEST A. PAGE.