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DENTIST'S MEASURING DEVICE

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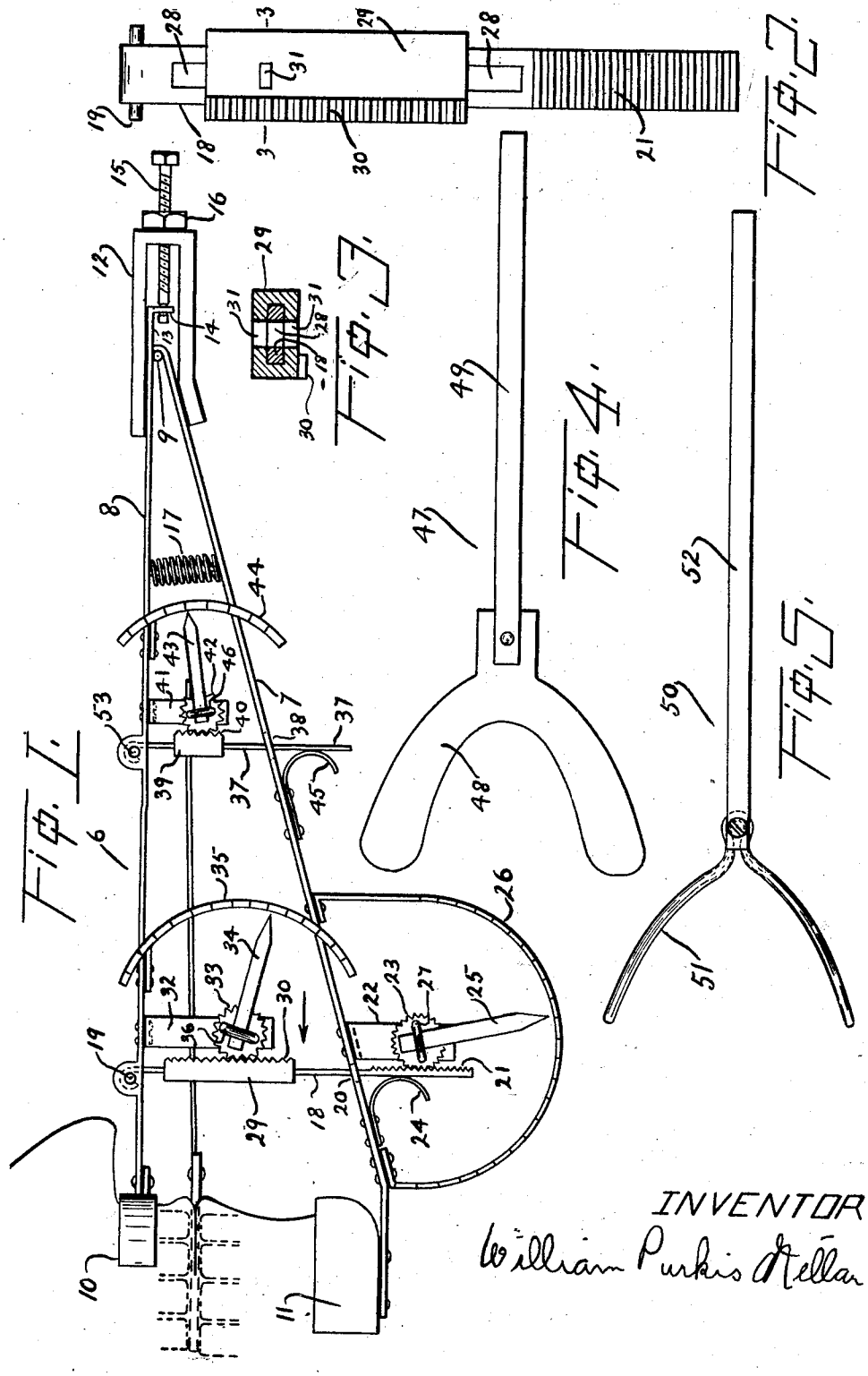


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

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DENTIST'S MEASURING DEVICE

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My invention relates to improvements in dentists' measuring devices and the object of the invention is to devise an instrument for the use of dentists in fitting artificial teeth, the use of which will provide for the accurate mechanical measurement and recording of the natural closed position of the jaw when the natural teeth are in articulation (closed together) before the natural teeth are extracted and which will enable the fitting of the artificial teeth to be accomplished so that this natural closed position of the jaw may be exactly and accurately duplicated when the artificial teeth are in place; a further object is to provide for the accurate mechanical measurement and recording of the occlusal plane of the upper teeth (that is the bottom plane of the upper teeth) so that it may be accurately and exactly duplicated in the artificial teeth.

Other objects of my invention will appear in the course of the following specification.

My invention consists in the construction and arrangement of parts, all as hereinafter more particularly described and illustrated in the accompanying drawings in which:

Fig. 1 is a side elevation of my improved device showing the manner in which it is applied to the jaw of the patient.

Fig. 2 is a detached detail of a portion of the device, to an enlarged scale, looking in the direction of the arrow in Fig. 1.

Fig. 3 is a horizontal section on the line 3—3 of Fig. 2.

Fig. 4 is a top plan view of a plane finder forming part of my device.

Fig. 5 is a top plan view of a wire fitting which is used to replace the plane finder of Fig. 3 at a certain step in the operation of the device.

The device comprises a frame indicated collectively by the numeral 6.

This frame 6 is formed with two legs or branches 7 and 8 which are hingedly connected at 9.

The free end of the upper leg 8 carries an arcuate fitting 10 adapted to engage the upper jaw of the patient immediately below the nose.

The free end of the lower leg 7 carries a fitting 11 into which the chin of the patient is adapted to fit.

The yoke 12 slidably engages the legs 7 and 8 at their hinged ends.

The upper arm 8 carries an extension 13 which terminates in a depending portion 14. An adjusting screw 15 has threaded engagement in the end of the yoke 12 and its end extends through the depending portion 14 being free to rotate therein but locked against axial movement therein. The screw 15 carries a lock nut 16.

The legs 7 and 8 are normally urged apart by a compression spring 17.

The construction it is evident from the above is such that, while the spring 17 normally urges the legs 7 and 8 apart, they may be closed together to any desired degree by means of the set screw 15, by means of this screw, the yoke 12 may be slid inwardly or outwardly over the arms, to force them together or to permit them to be forced apart, by the spring 17. Also they may be locked in any desired position by means of the lock nut 16.

A bar 18 is hingedly carried by the top leg 8 by means of a pin 19.

This bar 18 depends from the top leg 8 and extends through an orifice 20 in the lower leg 7.

The lower portion of this bar carries a rack 21 on one face thereof.

A bracket 22 depends from the lower leg 7 and rotatably mounted thereon is a pinion 23 which operatively engages the rack 21, a leaf spring 24 engaging the opposite side of the bar 18 and forcing it towards the pinion to maintain the rack and pinion in operative engagement.

The pinion 23 carries a pointer 25 which pointer moves over a circular scale 26 carried by the lower leg 7.

The pinion may be locked against rotation by a wing nut 27 and when so locked the rack 21 and pinion 23 cannot move relatively to each other nor can the pointer 25 move over the scale 26.

The construction, it will be seen, is such, that when the wing nut 27 is loosened any relative movement of the legs 7 and 8 will

cause the pointer 25 to move over the scale 26 through the medium of the rack and pinion 21 and 23. Also the arms may be locked in any set position by tightening this wing nut 27 to lock the rack and pinion against relative movement.

The bar 18 is provided with a longitudinal slot 28 (see Fig. 2) the purpose of which will later be explained.

Slidably mounted upon the bar 18 is a bar 29 one face of which carries a rack 30 and this bar is formed with an opening 31 therethrough which opening registers with the slot 28.

A bracket or arm 32 depends from the upper leg 8 and mounted thereon is a pinion 33 which operatively engages the rack 30.

The pinion 33 carries a pointer 34 which pointer moves over a scale 35 carried by the upper leg 8.

The pinion 33 may be locked against rotation by a wing nut 36 and when so locked the rack 30 and pinion 33 cannot move relatively to each other nor can the pointer 34 move over the scale 35.

A second bar 37 is hingedly connected to the top leg 8 by a pin 53 and depends therefrom extending freely through an orifice 38 in the lower leg 7. This bar 37 is also formed with a longitudinal slot similarly to the bar 18.

Slidably mounted upon the bar 37 is a bar 39 somewhat similar to the bar 29 and carries upon one face a rack 40 and is also provided with an opening therethrough registering with the longitudinal slot in the bar 37.

A bracket or arm 41 depends from the upper leg 8 and mounted thereon is a pinion 42 which operatively engages the rack 40.

The pinion 42 carries a pointer 43 which pointer moves over a scale 44 carried by the upper leg 8.

A leaf spring 45 carried by the lower leg 7 engages the lower end of the depending bar 38 on the side remote from the pinion 42 and serves to maintain the rack 40 and pinion 42 in operative engagement.

The pinion 42 may be locked against rotation by a wing nut 46 and when so locked the rack 40 and pinion 42 cannot move relatively to each other nor can the pointer 43 move over the scale 44.

A member 47 (see Fig. 4) which will be referred to as a plane finder and the use of which will be later described consists of a head portion 48 to which is secured a shank 49.

This member 47 is detachably mounted in the device so that the shank 49 extends through the aforementioned orifices in the bars 29 and 39 and through the slots in the depending bars 18 and 37, the construction being such that, when the member 47 is in place, any upward or downward movement of the head portion 48 thereof will also move the shank 49 up or down so that the bars 29 and 39 will thereby be slid up or down upon the depending bars 18 and 37, in which movement the shank 49 is free to move up or down in the slots in these depending bars.

Any such upward or downward movement of the bars 29 and 39 will rotate the pinions 33 and 42 through the medium of the racks 30 and 40 and with this rotation of these pinions the pointers 34 and 43 will be moved over the scales 35 and 44.

A member 50 (see Fig. 5) is interchangeable in the device with the member 47 and consists of a wire head portion 51 to which is secured a shank 52.

This member 50 is mounted in the device in exactly the same manner as the member 47 above described and in fact is inserted into the device in place of the member 47 at a certain point in the operation as will be later explained.

In using the device it is essential that provision be made for locking the pinions 23, 33 and 42 against rotation and this may be done in any suitable well known manner and there is no novelty in the particular manner of accomplishing this. For purposes of illustration I have indicated wing nuts 27, 36 and 46 and by tightening these nuts the respective pinions would be pressed against their respective brackets 22, 32 and 41 so as to secure them against rotation.

The operation of my device will be now explained.

In the fitting of artificial teeth as will be readily understood, it is essential that the original natural bite of the jaw should be exactly duplicated in the artificial teeth if the utmost comfort of the patient is to be obtained and in order to accomplish this it would be of great value if the natural closed position of the natural teeth and jaw could be exactly and mechanically measured and recorded before the natural teeth are extracted and it is to facilitate this that my invention has been developed.

In using my device the procedure is as follows.

In the first operation the natural closed position of the jaw is measured by applying the device with neither of the elements 47 or 50 inserted.

In this operation the arcuate fitting 10 is placed against the upper jaw immediately below the nose of the patient as shown in Fig. 1. This locates or positions the upper leg 8.

The fitting 11 of the lower leg 7 engages the chin of the patient and the jaw is closed so that the natural teeth are in articulation.

This gives a reading of the pointer 25 upon the scale 26 which reading may be recorded so that this exact position may be accurately duplicated when desired and may also be

filed away permanently on the patient's record sheet.

The next operation consists in measuring the occlusal plane of the upper teeth, that is the bottom plane of the upper teeth.

This is done by inserting the plane finder 47 into position in the device and with the wing nuts 36 and 46 loosened to free the pinions 33 and 42, the natural teeth are closed upon the head piece 48 which will give a reading of the pointers 34 and 43 upon the scales 35 and 44 which reading may be permanently recorded for future reference.

In this operation it is necessary to first open the device the necessary distance to allow opening of the patient's mouth sufficiently to insert the plane finder 48 between the teeth. The position of pointer 25 is then recorded.

In this operation the up or down movement of the portion 48 will also move the shank 49 which in turn will move the bars 29 and 39 upon the depending bars 18 and 37 which movement will be transmitted to the pointers 34 and 43 through the medium of the rack and pinions 30, 33, and 40, 42 respectively. When the setting has been made the parts may be locked in position by the wing nuts 36 and 46.

After these readings have been made the natural teeth are extracted.

The usual wax bite is then placed into position within the jaw.

With neither of the elements 47, or 50 in the device it is again placed in position against the jaw of the patient and the bite is taken and recorded.

The fitting 50 is then inserted into the device and with all the pointers 25, 34 and 43 locked in the positions they occupied when finding the occlusal plane, it is applied to the patient's jaw.

It was necessary when finding the occlusal plane to open the device slightly beyond the point at which the teeth were in occlusion. Therefore it is necessary to have this same adjustment when we register the plane on the wax bite.

The wire portion 51 is so positioned that the plane of its top edge occupies the same position with respect to the shank 52 as the top face of the portion 48 of the plane finder 47 occupies with respect to the shank 49. The result is that when the fitting 50 is substituted in the device in place of the fitting 47, the plane of the top edge of the wire 51 occupies the same position relatively to the other parts, of the device as did the top face of the portion 48 of the plane finder 47.

Thus when the device, as above described, is applied to the patient's jaw, the wire 51 makes a line upon the wax bite block coinciding with the position originally occupied by the top face of the portion 48 of the plane finder 47, which is the bottom plane of the upper teeth or the occlusal plane of the upper teeth.

This then gives a means for positively and accurately obtaining a line on the wax bite block whereby the natural occlusal plane of the upper teeth may be exactly duplicated in the artificial teeth.

From the foregoing it will thus be clear that the use of my device will facilitate the fitting of artificial teeth by providing a means whereby the natural closed position of the jaw and the natural occlusal plane of the upper teeth may be measured and recorded mechanically so that they may be very accurately and positively duplicated in the artificial teeth.

Various modifications may be made in my invention without departing from the spirit thereof or the scope of the claims and therefore the exact forms shown are to be taken as illustrative only and not in a limiting sense and I desire, that only such limitations shall be placed thereon as are imposed by the prior art or are specifically set forth in the appended claims

What I claim as my invention is:

1. In a device of the class described, in combination, a frame comprising two divergent branches hingedly connected at their convergent ends, jaw portions carried at the free ends of said branches, a bar hingedly connected at one end to one branch, the other branch having an orifice receiving the free end of the bar, a rack on said bar, a scale carried by said last mentioned branch, a bracket also carried by said branch, a pinion mounted upon said bracket and operatively engaging said rack, a pointer carried by said pinion and adapted to move over said scale, and means for locking said pinion against rotation.

2. In a device of the class described, in combination, a frame comprising an upper and a lower branch, said branches inclined away from each other and hingedly connected together at their convergent ends, jaw portions carried at the free ends of said branches, a bar hingedly connected at one end to the upper branch, the lower branch having an orifice receiving the free end of the bar, a rack on said bar, an arcuate scale carried by the lower branch, a bracket carried by the lower branch, a pinion mounted upon said bracket and operatively engaging said rack, a pointer carried by said pinion and associated with said arcuate scale, and means for locking said pinion against rotation.

3. In a device of the class described, in combination, a frame comprising an upper and lower branch, said branches inclined away from each other and hingedly connected together at their convergent ends, jaw portions carried at the free ends of said branches, spring means normally urging said branches apart, means for closing said branches to-

wards each other, a bar hingedly connected at one end to the upper branch, the lower branch having an orifice receiving the free end of the bar, a rack on said bar, an arcuate scale carried by the lower branch, a bracket carried by said lower branch, a pinion mounted upon said bracket and operatively engaging said rack, a pointer carried by said pinion and associated with said arcuate scale, and means for locking said pinion against rotation.

4. In a device of the class described, in combination, a frame comprising an upper and a lower branch, said branches inclined away from each other and hingedly connected together at their convergent ends, jaw portions carried at the free ends of said branches, spring means normally urging said branches apart, means for closing said branches towards each other, a depending bar hingedly connected at one end to the upper branch, the lower branch having an orifice receiving the end of said depending bar, a rack on the portion of said bar projecting below the lower branch, an arcuate scale carried by the lower branch and depending therefrom, a depending bracket carried by the lower branch, a pinion mounted upon said bracket and operatively engaging said rack, a pointer carried by said pinion and associated with said scale, a second depending bar hingedly connected at one end to the upper branch in spaced relation from the first mentioned depending bar, the lower branch having an orifice receiving the end of said second depending bar, sliding bars slidably mounted upon said depending bars and formed with racks thereon, a depending bracket carried by the upper branch adjacent to each of said depending bars, a pinion mounted upon each bracket and operatively engaging the rack on the adjacent sliding bar, two arcuate scales carried by the upper bar, a pointer carried by each of said pinions and each pointer associated with one of said arcuate scales, said depending bars formed with longitudinal slots, each of said sliding bars having an orifice therethrough registering with the slot in the associated depending bar, means for locking each of said three pinions against rotation, a shank extending through the orifices in said sliding bars and the slots in said depending bars, and a head piece carried at one end of said shank.

5. In a device of the class described, in combination, a frame comprising an upper and a lower branch, said branches inclined away from each other and hingedly connected together at their convergent ends, jaw portions carried at the free ends of said branches, spring means normally urging said branches apart, means for closing said branches towards each other, a depending bar hingedly connected at one end to the upper branch, the lower branch having an orifice receiving the free end of said depending bar, a rack on the portion of said bar projecting below the lower branch, an arcuate scale carried by the lower branch and depending therefrom, a depending bracket carried by the lower branch, a pinion mounted upon said bracket and operatively engaging said rack, a pointer carried by said pinion and associated with said scale, a second depending bar hingedly connected at one end to the upper branch in spaced relation from the first mentioned depending bar, the lower branch having an orifice receiving the free end of said second depending bar, sliding bars slidably mounted upon said depending bars and formed with racks thereon, a depending bracket carried by the upper branch adjacent to each of said depending bars, a pinion mounted upon each bracket and operatively engaging the rack on the adjacent sliding bar, two arcuate scales carried by the upper bar, a pointer carried by each of said pinions and each pointer associated with one of said arcuate scales, said depending bars formed with longitudinal slots, each of said sliding bars having an orifice therethrough registering with the slot in the associated depending bar, means for locking each of said three pinions against rotation, a shank detachably extending through the orifices in said sliding bars and slots in said depending bars, and a head piece carried at one end of said shank.

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