April 20, 1926. 1,581,913

H. A. BONOFF

ACTO-PASSIVE PLANE ANGLER

Filed Jan. 24, 1924 2 Sheets-Sheet 1

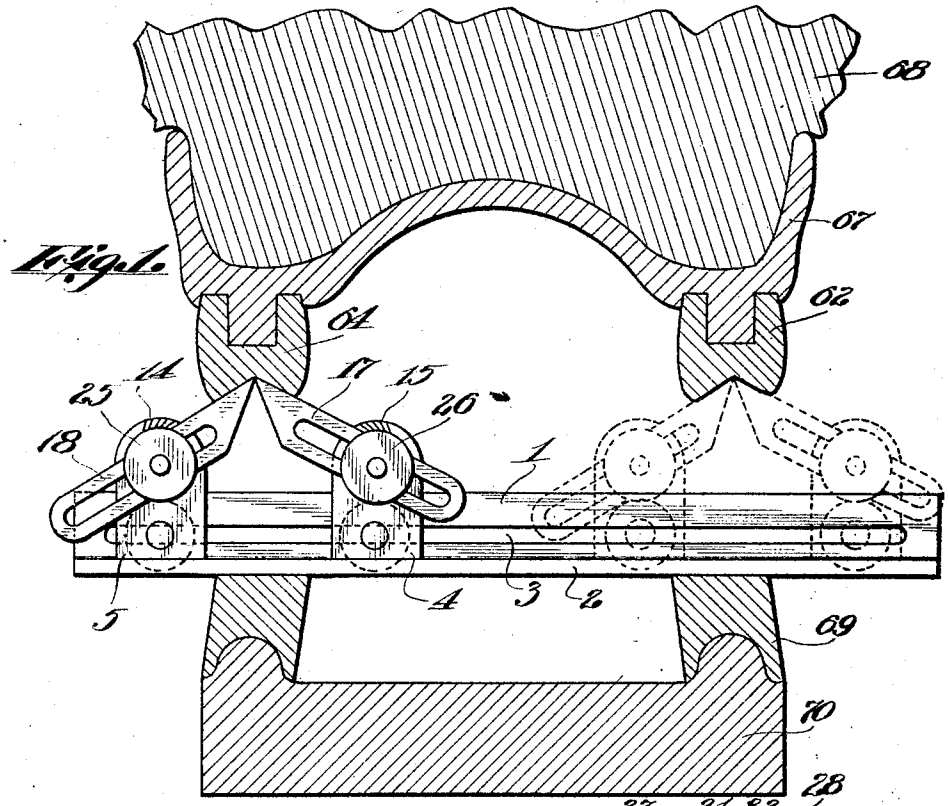


Fig. 1.

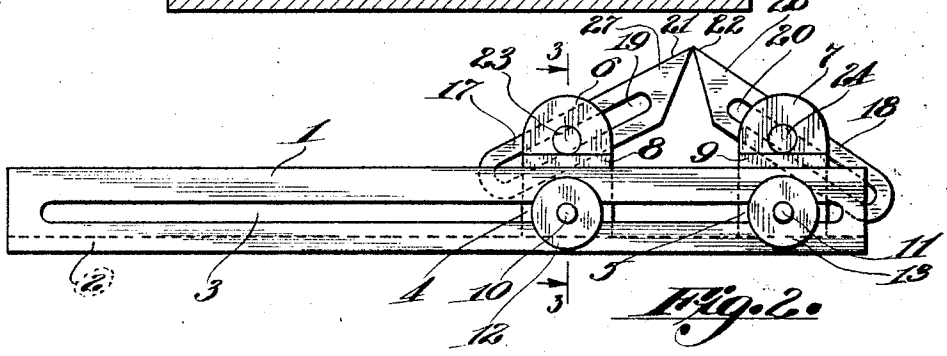


Fig. 2.

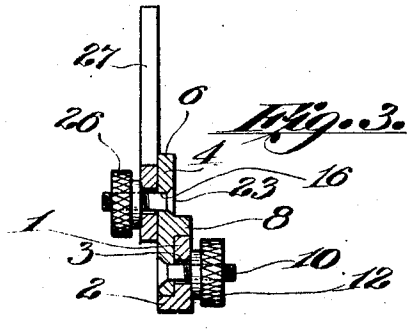


Fig. 3.

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Fig. 7.

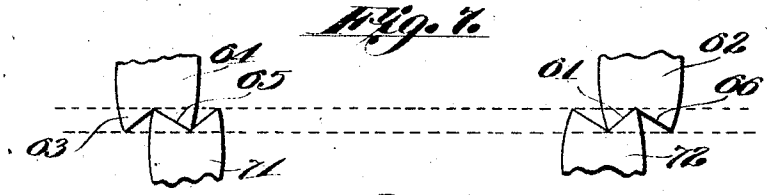


Fig. 5.

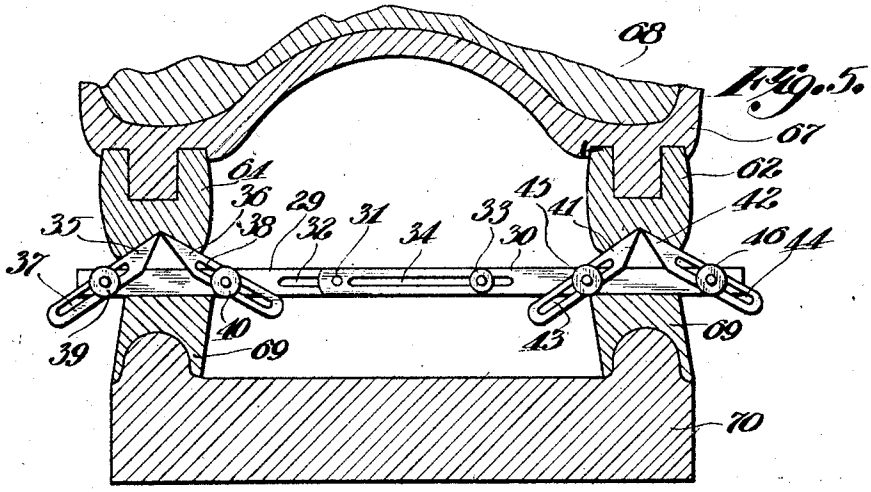


Fig. 6.

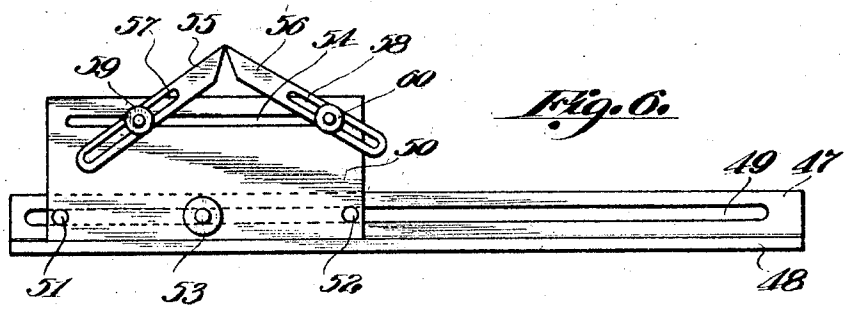
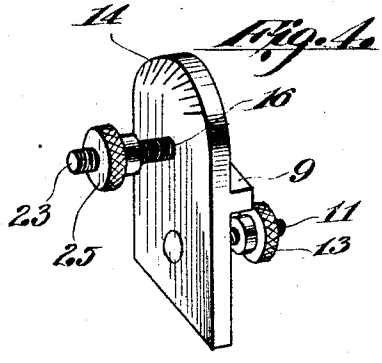


Fig. 4.



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UNITED STATES PATENT OFFICE.

HARRY A. BONOFF, OF LOS ANGELES, CALIFORNIA.

ACTO-PASSIVE PLANE ANGLER.

Application filed January 24, 1924. Serial No. 688,244.

To all whom it may concern:

Be it known that I, HARRY A. BONOFF, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Acto-Passive Plane Anglers, of which the following is a specification.

My invention relates broadly to the art of setting, grinding and finishing false teeth, and especially to a tool for facilitating the work, and my invention consists of the novel features herein shown, described and claimed.

Heretofore, in setting the four upper molars on each side of an upper plate, it has been a long tedious job to get the active and passive planes even approximately right and it is my object to make a tool which may be readily set to the desired angles and used to set the molars at the desired angles in the wax, and which may be used as a gage in grinding and correcting the angles of the molars.

There is a definite relation between the angles of the condyle paths and the angles of the active and passive planes of the four upper molars on each side of the upper plate, and the lower molars are made to fit the upper molars, so that the molars will meet properly in a rest position and when articulating follow the planes established by the instrument.

The drawings illustrate my acto-passive plane angler and its use.

Figure 1 is an enlarged vertical cross section through the upper and lower casts and showing my acto-passive plane angler in use, the angler being shown in elevation.

Fig. 2 is a rear elevation of the angler shown in Fig. 1 and on the same scale.

Fig. 3 is a vertical cross section of the angler on the line 3—3 of Fig. 2.

Fig. 4 is a perspective of one of the movable posts shown in Figs. 1, 2 and 3.

Fig. 5 is a view analogous to Fig. 1 and showing a modified form of the angler.

Fig. 6 is a view in elevation of a second modified form of the angler.

Fig. 7 is a cross sectional diagram of a set of false molars set and finished in accordance with the principles of my invention.

Referring to Figs. 1, 2, 3 and 4, the details of the first form of my acto-passive plane angler are as follows:

The rigid base or frame 1 is a long straight narrow bar and has a ledge 2 extending throughout its length at its lower edge and front side, the ledge 2 being at right angles to the bar 1. A slot 3 extends from near one end of the bar 1 to near the other end and is parallel with the ledge 2.

The movable posts 4 and 5 fit against the front side of the bar 1 and against the ledge 2 and have rounded upper ends 6 and 7 extending above the bar 1 and have flanges 8 and 9 fitting the upper edge of the bar 1. Flat-head screws 10 and 11 are inserted from the front side through the posts 4 and 5, and through the slot 3, and thumb nuts 12 and 12ª are applied to the screws 10 and 11 against the rear face of the bar 1, so that when the nuts 12 and 13 are loosened the posts 4 and 5 may be moved along the bar 1. Graduations 14 and 15 are formed on the front faces of the rounded upper ends 6 and 7 and bolt openings 16 are formed through the posts 4 and 5 concentric to the rounded faces.

The angler fingers 17 and 18 fit against the smooth flat front faces of the posts 4 and 5, and have longitudinal slots 19 and 20, and have bevelled meeting ends forming upper points 21 and 22. Bolts 23 and 24 are inserted from the back side through the openings in the posts 4 and 5 and through the slots 19 and 20, and thumb nuts 25 and 26 are applied to the bolts against the fingers 17 and 18, so that when the nuts are loosened the fingers may be adjusted and the nuts tightened. The upper edges 27 and 28 of the fingers 17 and 18 are the anglers.

Referring to the modification shown in Fig. 5, the details are as follows:

The rigid base bars 29 and 30 fit side by side and are adjustably connected by a screw 31 fixed in the bar 30 and extending through a slot 32 in the bar 29 and a screw 33 fixed in the bar 29 and extending through a slot 34 in the bar 30. The angler fingers

35 and 36 have slots 37 and 38 and fit against the bar 29 and thumb nut screws 39 and 40 extend through the slots 37 and 38 and through the bar 29 to hold the fingers 35 and 36 adjustably in position.

In a like manner the angler fingers 41 and 42 have slots 43 and 44, and screws 45 and 46 connect the fingers to the bar 30. The fingers 35 and 36 may be set and the fingers 41 and 42 may be set, and the bars 29 and 30 may be adjusted to set the anglers the proper distance apart to fit molars of both sides at once.

Referring to the second modification, shown in Fig. 6, the details are as follows:

The base bar 47 is a long straight bar, having a ledge 48 and a slot 49. The movable post 50 fits the side of the bar 47 against the ledge 48 and is held adjustably in place by thumb nut screws 51, 52 and 53.

A slot 54 is formed in the upper part of the post 50, parallel with the bar 47, and the angler fingers 55 and 56 have slots 57 and 58, and thumb nut screws 59 and 60 are inserted through the slots 57 and 58 and through the slot 54 to hold the anglers adjustably in position.

I find that the angles of inclination of the active planes of the upper molars are equal to the angles of inclination of the condyle paths and that the passive angles of inclination of the planes of one side are equal to the angles of inclination of the active planes of the other side, and that the inclination of the condyle paths of the two sides may be different and consequently that the inclination of the active and passive planes of the two sides may be different.

Referring to Fig. 7, the upper molars are indicated at 62 and 64 and the lower molars are indicated at 71 and 72. The planes 61 and 65 of the upper molars are known as the active planes of these teeth for the reason that they are opposite similar planes upon the lower teeth 71 and 72. The passive planes of the upper molars are indicated at 63 and 66, as the surfaces of these teeth are not abutted by corresponding surfaces upon the lower teeth, but are merely passed over by the upper edges of the lower teeth when the jaw is moved from side to side. If the jaw carrying the lower teeth 71 and 72 is moved toward the right in Fig. 7, the upper edge of the lower molar 72 will pass down along the passive plane or surface 66 of the upper molar 62 and will draw away from the active plane 61 of the upper molar 62. The lower molar 71 will have its active plane opposite the active plane 65 of the upper tooth slide along this active plane in moving in that direction. In a similar manner, if the lower jaw is moved toward the left, the molar 71 will be drawn away from the active plane 65 and will have its upper edge slide downwardly along the passive plane 63 of the upper molar 64, and the lower molar 72 will have its active plane opposite the active plane 61 of the upper molar 62 slide thereon. The jaw carrying the lower molars 71 and 72, upon being thrust sideways, does not move horizontally, but moves downwardly on a given plane. The angle of inclination of this plane depends upon the angle of inclination of the condyle path; thus if the angle of inclination of the condyle path upon the right side is 40 degrees, the teeth upon the lower jaw or mandible move downwardly upon a plane having an inclination of 40 degrees when the mandible is thrust toward the left. In a similar manner, if the angle of inclination of the condyle path on the left side is 30 degrees, the teeth 71 and 72 move downwardly in a plane whose inclination is 30 degrees when the mandible is thrust towards the right. It will be noted that the active planes 61 and 65 are most adjacent to each other upon the teeth 62 and 64 and that the passive planes 63 and 66 are most remote. Because of the movement of the mandible upon the certain planes upon being thrust towards the right or left, which planes are determined by the inclination of the condyle path, the angle of inclination of the passive plane 63 must be parallel to the angle of inclination of the active plane 61; and conversely the angle of inclination of the active plane 65 upon the tooth 64 is equal to the angle of inclination of the passive plane 66 upon the tooth 62.

From this it follows that the passive plane upon a molar upon one side of the jaw is parallel to, or has the same angle of inclination as, the active plane upon a corresponding tooth on the opposite side of the jaw. In this manner, by determining the angles of inclination of the condyle path, the active and passive plane angular may be set accordingly to properly grind the teeth so that they will articulate in accordance with the angles of inclination of the condyle path of a given person. Then I set up the plane angler shown in Fig. 2 with the finger 17 at an angle of 40 degrees and the finger 18 at an angle of 30 degrees, with the points 21 and 22 close together. Then I set the molars 64 and 62 in the wax 67 applied to the upper cast 68 and place the angler upon the bite block 69 upon the cast 70 and bring the molar 64 down upon the angle and tilt the molar one way or the other until it fits the angler fairly well, and proceed in the same way with the other upper molars of the same side. Then I loosen the nuts 12 and 13 and move the anglers to the other end of the bar and proceed with the other molar 62 and its adjacent molar in the same manner as with the molar 64.

Of course, the casts 68 and 70 are mounted in an articulator which is set as near as possible to match the mouth to be fitted with

the molars. After the molars have set and the wax hardened, the molars are ground and the angles corrected to fit the angler.

Attention is called to the fact that the outside angles at one side are the same as the inside angles at the other side, so that when the angler is set for one side, the posts and fingers may be moved from the base to the other side without resetting.

The modified forms shown in Figs. 5 and 6 may accomplish the same purpose as the first form.

After the upper plate carrying the upper molars has been made, the lower molars 71 and 72 may be made to fit the upper molars and the angler may be used as a gage in grinding the angles of the lower molars to match the corresponding angles of the upper molars.

Thus I have produced an acto-passive plane angler comprising a base, angler fingers adjustably mounted upon the base and having upper edges terminating in upper points adapted to come together to form an angular gage.

Various changes may be made without departing from the spirit of my invention as set up in the following claims.

I claim:

1. A device for measuring and indicating the angles of inclination of the active and passive planes of teeth comprising a base member, movable means adjustable upon said base member, and tapered fingers adjustably mounted upon said movable means adapted to have their ends engage whereby the angles of inclination of the active and passive planes may be determined from the edges of said fingers.

2. A device for measuring and indicating the angles of inclination of the active and passive planes of teeth comprising a base member, movable means laterally movable upon said base member, means for holding said movable means in adjusted position, and tapered fingers carried by said movable means, and means providing for adjustment of said fingers whereby the pointed ends of the fingers may be caused to contact with each other and the edges of said fingers may register the angles of inclination of the active and passive planes.

3. A device for indicating the angles of inclination of the active and passive planes of teeth comprising a slotted base member, movable means carrying screw means which extends through said slot, slotted fingers carried by said movable means, there being screw means on said movable means extending through the slots in said fingers, and nuts upon both of said screw means for tightening said movable means and fingers in adjusted position, said fingers being pointed and being adapted to have their points engage each other, whereby the fingers may register the inclination of the active and passive planes.

In testimony whereof I have signed my name to this specification.

HARRY A. BONOFF.