Sept. 2, 1952 J. E. SCOTT 2,608,761

ARTICULATOR

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Fig. 1.

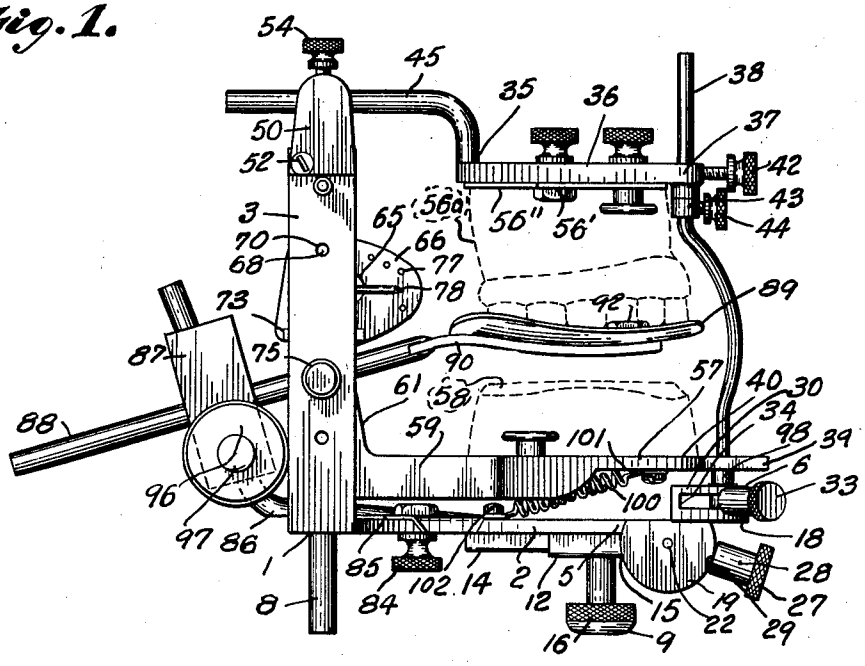
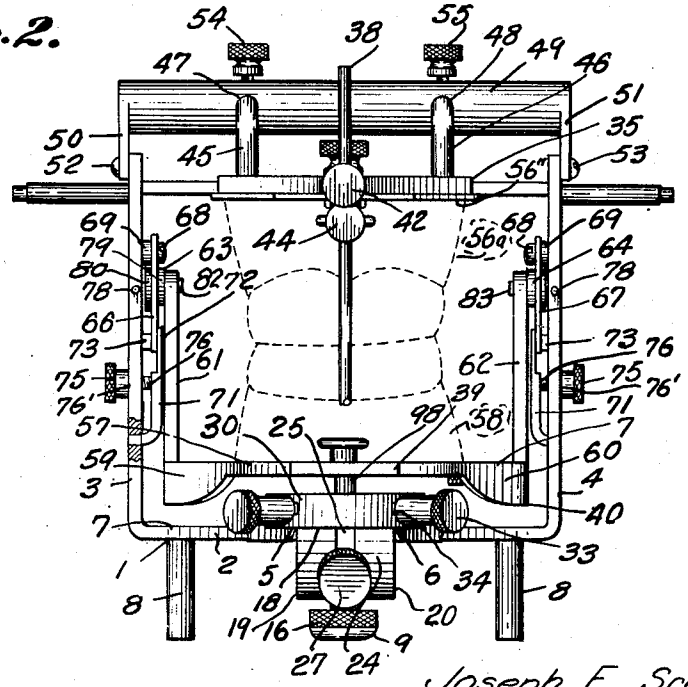


Fig. 2.



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Fig. 3.

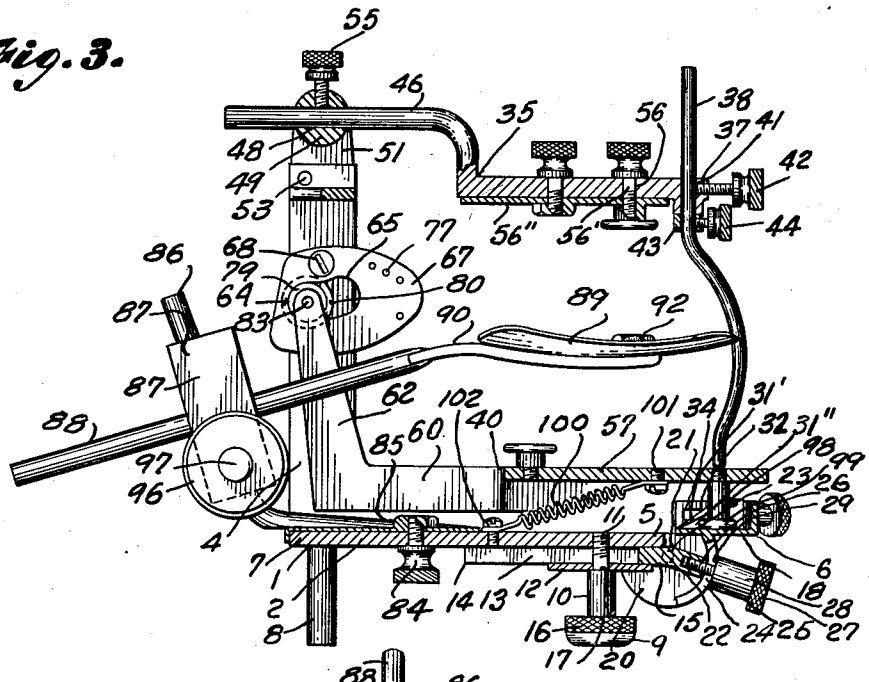
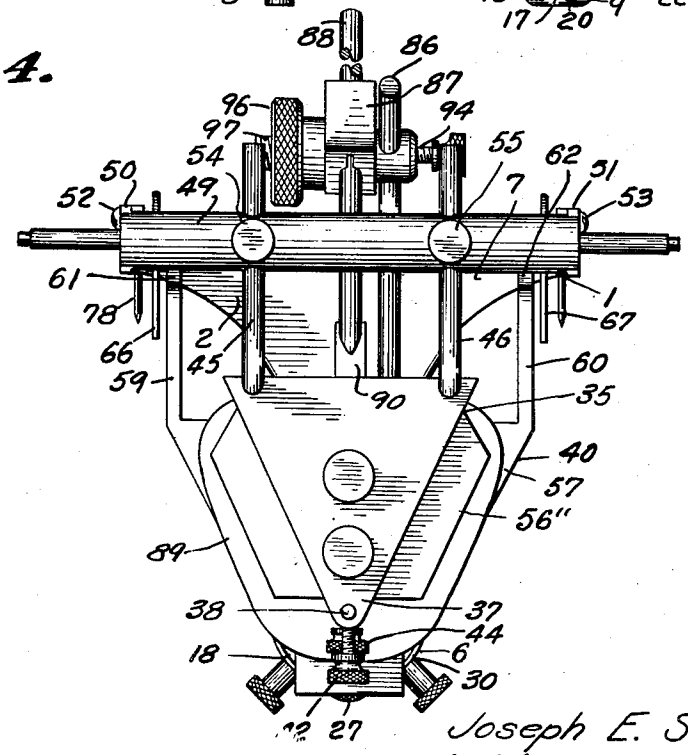


Fig. 4.



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Fig. 5.

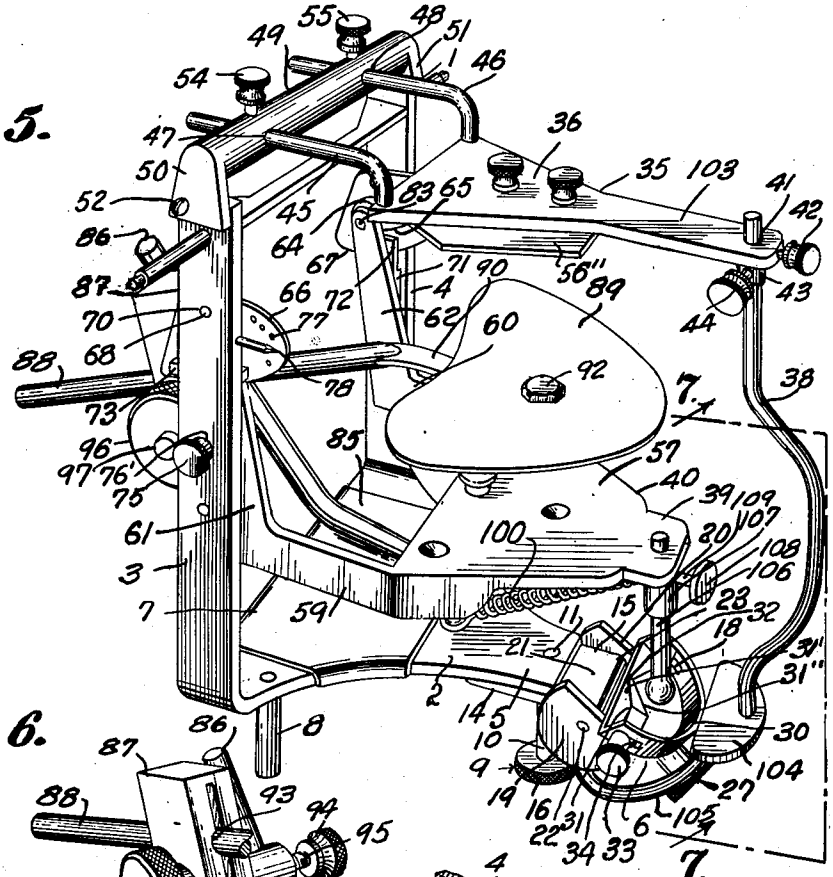


Fig. 6.

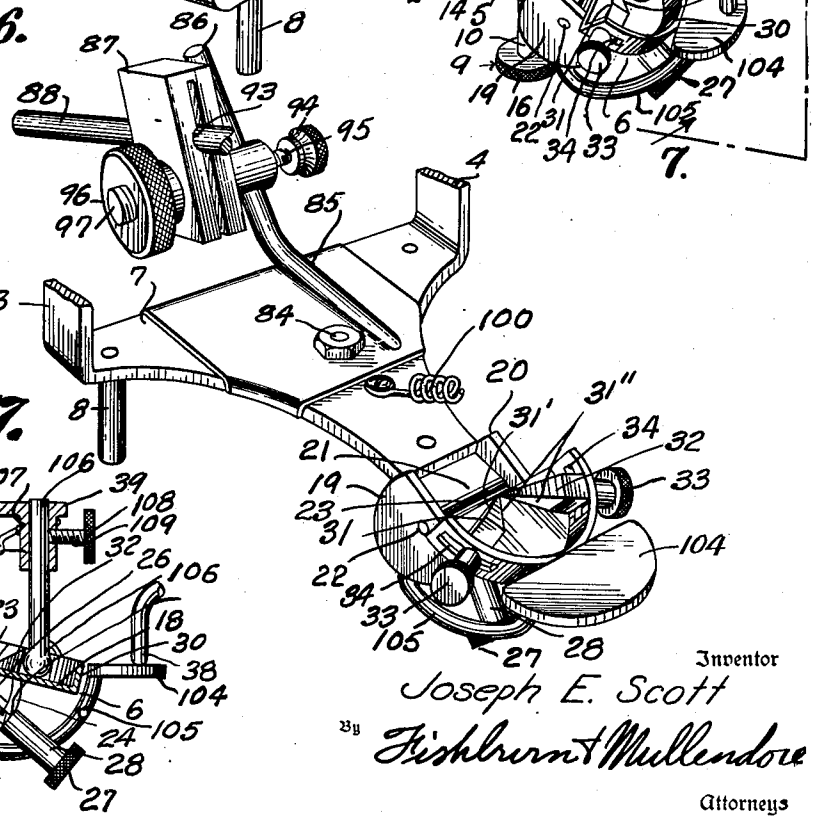


Fig. 7.

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ARTICULATOR

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7 Claims. (Cl. 32—32)

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This invention relates to articulators for use in the construction of artificial dentures and has for its principal object to provide an articulator with a mandibular movement capable of reproducing the natural action of the lower jaw thereby permitting placement of the teeth within the bite plates so as to give the proper tooth contacts and clearances of the teeth of the finished dentures.

Other objects of the invention are to provide an articulator having a movable mandible arm and an incisal guide therefor which are of simple construction and capable of adjustment in correspondence with the cusp angle of the posterior teeth; and to provide a removable templet support on the articulator to facilitate setting of the teeth in the upper bite plate.

In accomplishing these and other objects of the invention, as hereinafter pointed out, I have provided improved structure the preferred forms of which are illustrated in the accompanying drawings wherein:

Fig. 1 is a side elevational view of an articulator embodying the features of the present invention.

Fig. 2 is a front elevational view of the articulator.

Fig. 3 is a longitudinal central section through the articulator.

Fig. 4 is a plan view of the articulator.

Fig. 5 is a perspective view of an articulator embodying a slightly modified form of the invention.

Fig. 6 is a fragmentary perspective view of the form of invention shown in Fig. 5 particularly illustrating the right and left stops for limiting lateral stroke of the mandible arm.

Fig. 7 is a fragmentary section on the line 7—7 Fig. 5.

Referring more in detail to the drawings and first to the form of the invention illustrated in Figs. 1 to 4 inclusive:

1 designates an articulator constructed in accordance with the present invention and which is used to facilitate setting of the teeth in the upper and lower bite plates and to determine proper clearance of the cusps of the teeth when the articulator is caused to effect relative movement of the plates. The articulator includes a substantially triangular base plate 2 having uprights or posts 3 and 4 and a forwardly extending portion 5 for mounting an incisal pin guide table 6 that controls the relative movement of the plates as later to be described. The rear or wider portion 7 of the base plate is carried at the sides on legs 8 which cooperate with a clamping screw 9 having a shank 10 provided with a reduced and threaded terminal 11 passing through a clamping

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plate 12 and through a slotted opening 13 in a plate portion 14 of a bracket 15 that is adjustably supported under the base plate 2 and adapted to be retracted or projected relatively to the forward portion of the base plate for adjusting the incisal pin guide table 6 as best shown in Fig. 3. The adjusting screw 9 has a knurled head 16 by which a shoulder 17 on the shank 10 is turned into contact with the clamping plate 12 for bringing the clamping plate into clamping contact with the plate portion 14 of the bracket and the plate portion 14 into contact with the base plate 2. The knurled head also forms extended footing area to support stably the front of the articulator.

The incisal table guide includes a substantially semi-circular table portion 18 having depending spaced apart wings 19 and 20 that are to accommodate a forward extension 21 of the bracket 15 therebetween and which carries a transverse pivot shaft 22 extending through a transversely arranged tubular bearing portion 23 of the bracket extension 21, the ends of the shaft journaling the wings 19 and 20. Connecting the wings is an arcuate guide 24 having a central slot 25 extending arcuately about the axis of the shaft 22 for passing a threaded terminal 26 of a clamp screw 27 having a shank portion 28 of larger diameter to provide a shoulder 29 adapted to be drawn into clamping engagement with the arcuate guide 24 when the threaded terminal is turned into an internally threaded socket formed on the transverse bearing 23 of the bracket 15 so as to support the incisal pin guide table at a desired angle relatively to the base plate and in accordance with the cusp angle of the posterior teeth to be used. The plate portion of the incisal table also has an upstanding flange 30 extending around the arcuate side thereof to limit the forward movement of the mandible arm as later described.

Adjustably supported by the flange 30 of the incisal table guide are right and left stops 31 and 32 that are adjustable circumferentially of the incisal table guide, the stops being retained in adjusted position by clamping screws 33 having reduced shank portions extending through slots 34 at the opposite ends of the flange 30 and into the respective stops. The stops 31 and 32 have converging sides 31' and 31'' so that the inner sides 31'' are in planes passing through the axis of the flange.

The maxilla arm 35 of the articulator includes a substantially triangular plate portion 36 having a forward extension 37 adjustably mounting an occlusal rod 38 and which is adapted to rest upon an extension of the mandible arm 40, later described.

The upper end of the rod 38 is slidably mounted in a bearing opening 41. The rod is retained in adjusted position by a thumb screw 42 threaded into the extension 37 and adapted to engage against the rod 38 as best shown in Fig. 3. The rod 38 carries a collar 43 that is sleeved thereon and which is adapted to be retained in adjusted position by a thumb screw 44 as will be apparent in Fig. 3.

The rear or base portion of the plate 36 carries rearwardly extending rods 45 and 46 that extend through openings 47 and 48 in a transverse bar 49 having depending ears 50 and 51 at the ends thereof.

The ears are pivotally mounted on the upper ends of the uprights or posts 3 and 4 by screws 52 and 53 on which the maxilla arm is adapted to pivot on a horizontal axis. The maxilla arm is adjustably retained relatively to the bar 49 by clamp screws 54 and 55 that engage the rods 45 and 46. The plate portion of the maxilla arm has openings 56 for passing threaded studs 56' on a plate 56'' to which the upper model 56a is adapted to be attached.

The mandible arm 40 includes a substantially triangular plate portion 57 to which the lower model 58 is adapted to be attached. The plate portion 57 has arms 59 and 60 extending rearwardly at respective sides thereof and which terminate in upwardly extending terminals 61 and 62 by which the mandible arm is movably suspended from trunnions 63 and 64 that operate in cam slots 65 provided in plates 66 and 67. The plates 66 and 67 are adjustably located on the inner sides of the uprights 3 and 4 and when adjusted, are adapted to pivot on attaching screws 68 that extend through the plates, through spacing washers 69 and into threaded openings 70 in the arms 3 and 4. The plates are retained in fixed position by clamps 71 having portions 72 overlying the plates 66 and 67 and adapted to clamp arcuate lugs 73 on the plates against the inner faces of the uprights 3 and 4, under action of clamping screws 75. The clamping screws 75 are journaled in openings formed in the uprights and have threaded terminals 76 threaded into openings in the clamps 71. The screws 75 have shoulder portions 76' engaging against the outer sides of the uprights so that when the screws are turned the clamps are drawn into clamping engagement with the plates 66 and 67. The plates 66 and 67 have markings in the form of apertures 77 that are adapted to register with pointers 78 extending forwardly from the respective uprights as best shown in Fig. 1.

The trunnions 63 and 64 include rollers 79 that are operative in the cam slots 65 and which have flanges 80 on their outer side loosely engaging the plates. The rollers are secured to the terminals 61 and 62 of the arms 59 and 60 by pins 82 and 83. With the above structure the mandible arm 40 has the movements of the lower jaw, that is the trunnion on one side may rotate in the cam slot of the plate on that side while the other trunnion drops down in the other cam slot in the manner substantially analogous to the head of the condyle on one side of the lower jaw rotating in its socket while the other on the opposite side drops down in its socket. The mandible arm may also move forwardly and return to its original position with the trunnion rolling in the cam slots simultaneously with the other movements.

Mounted on the base plate and secured thereto by thumb screws 84 is a bracket 85. Bracket 85 has an upwardly and rearwardly extending rod like arm 86 on which is adjustably mounted a guide block 87 carrying a supporting rod 88 mounting a templet plate 89. The templet plate 89 provides a support for the teeth to be set into the upper bite plate and is removably attached to a forward extension 90 of the rod 88 by a fastening device 92. The rod 88 is slidably supported in a transverse opening 93 of the block 87 for positioning the templet under the upper bite plate. The block 87 is adjustably retained on the bracket by means of a clamp screw 94 having a shank 95 engaging against the rod 86. The block 87 is split to the opening 93 and the rod 88 is retained in adjusted position by a clamp nut 96 that is threaded on a stud 97 fixed to one side of the block and extending loosely through an opening at the opposite side so that the rod may be clamped between the respective sides of the block upon tightening of the nut.

The forward end of the mandible arm is supported on an incisal pin 98 depending from the under side of the plate portion of the arm and having a foot 99 bearing upon the incisal pin guide table 6 as best shown in Fig. 3. The mandible arm 40 is normally retained in retracted position by means of a coil spring 100 having one end hooked to a screw 101 carried on the under side of the plate portion of the mandible arm and having its opposite end hooked to a screw 102 carried by the base plate.

The form of the invention illustrated in Fig. 5 is substantially the same as the structure just described with the exception that the occlusal rod is carried on a longer extension 103 of the maxilla arm 35 and the lower end is supported on a shelf 104 that is carried from the incisal table guide bracket 15 by laterally spaced arcuate arms 105 as best shown in Fig. 7. In this form of the invention, the incisal pin 106 is adjustably mounted in a tubular guide 107 depending from the forward extension 39 of the plate portion of the mandible arm 40 as shown in Fig. 5. The incisal pin is retained in adjusted position by a setscrew 108 having a shank 109 threaded in the tubular guide and bearing against the side of the pin.

In the use of the articulator, the bite plates are sealed together while in the patient's mouth and then removed. The bite plates are then applied to the models that have been previously made of the patient's mouth and the upper and lower models attached respectively to the maxilla arm and to the mandible arm of the articulator. The rods 45 carrying the maxilla arm are adjusted in the cross bar 49 and the thumb screws 54 and 55 tightened to retain the bite plates in the same relative position after the connection seal has been broken. The occlusal rod 38 is adjusted so that it bears on the extension 39 of the mandible arm to maintain proper spacing and relative position of the arms when setting the teeth. After breaking of the connecting seal between the bite plates, the lower bite plate is removed from the lower model to accommodate the templet used in setting the upper teeth.

The bracket 85 is then applied to the base plate 2 and block 87 and the arm 88 are adjusted to retain the templet 89 in desired position under the upper bite plate. The plates 66 and 67 are then adjusted with the pointers 78 aligned with the desired marking 77 which marking is selected according to the angularity of the cusps of the posterior teeth to be used.

The incisal pin guide table is also adjusted to

the same angle. The stops 31 and 32 are then adjusted to limit movement of the incisal pin to the right and left in accordance with the right and left movement of the patient's jaw. After setting up the upper teeth, the lower bite plate is replaced on the lower model and the lower teeth are set up in occlusion with the upper teeth. After initial setting up of the teeth, the mandible arm is moved with the incisal pin moving in its orbit on the guide table. If the teeth are properly set the lower plate will be movable throughout the various positions that can be attained by the patient's lower jaw. If there should be any interference those teeth may be reset until the desired fit is attained.

From the foregoing it is obvious that I have provided an articulator with a mandible movement capable of reproducing the natural movement of a patient's jaw to assure placement of the teeth so as to provide the proper tooth contact.

I claim:

1. An articulator including a base member having laterally spaced uprights, trunnion supports having cam slots provided with upper and lower curving portions, means pivotally mounting said trunnion supports for movement on a horizontal axis to change the angularity of the cam slots according to the angularity of the cusps of the posterior teeth which are to be employed when the articulator is in use, a mandible arm for supporting a lower bite plate and having rearwardly extending arm portions provided with upwardly extending terminals, trunnions carried on said terminals and extending through said cam slots so that when the mandible arm is moved and a trunnion rotates in one cam slot the other trunnion moves down following the curvature in the other cam slots analogous to rotation of the head of the condyles the sides of a lower jaw, an incisal pin carried by the mandible arm, an incisal guide having pivotal mounting on the base about a transverse horizontal axis for defining an orbital path for movement of the incisal pin, means for securing the incisal guide in an adjusted angular position relative to its pivotal mounting to retain the incisal guide at an angle corresponding with the cusp angle of the posterior teeth to be used for effecting said trunnion movement when the incisal pin is moved in said orbital path, a maxilla arm for supporting an upper bite plate, and means hingedly supporting the maxilla arm above the mandible arm.

2. An articulator including a base member having laterally spaced uprights, trunnion supports having cam slots provided with upper and lower curving portions, means pivotally mounting said trunnion supports for movement on a horizontal axis to change the angularity of the cam slots according to the angularity of the cusps of the posterior teeth which are to be employed when the articulator is in use, a mandible arm for supporting a lower bite plate and having rearwardly extending arm portions provided with upwardly extending terminals, trunnions carried on said terminals and extending through said cam slots so that when the mandible arm is moved and a trunnion rotates in one cam slot the other trunnion moves down following the curvature in the other cam slot analogous to rotation of the head of the condyles on sides of a lower jaw, an incisal pin carried by the mandible arm, an incisal guide having pivotal mounting on the base about a transverse horizontal axis and having a table portion supporting the incisal pin and provided with an arcuate flange with the inner side facing the trunnion mounting of the mandible arm, laterally disposed stops cooperating with the arcuate flange in supporting and defining an orbital path for movement of the incisal pin, means for securing the incisal guide with said table portion in an adjusted angular position relative to its pivotal mounting and in accordance with the cusp angle of the posterior teeth to be used for effecting said trunnion movement when the incisal pin is moved in said orbital path, a maxilla arm, and means hingedly supporting the maxilla arm above the mandible arm.

3. An articulator including a base member having laterally spaced uprights, trunnion supports having cam slots provided with upper and lower curving portions, means pivotally mounting said trunnion supports for movement on a horizontal axis to change the angularity of the cam slots according to the angularity of the cusps of the posterior teeth which are to be employed when the articulator is in use, a mandible arm for supporting a lower bite plate and having rearwardly extending arm portions provided with upwardly extending terminals, trunnions carried on said terminals and extending through said cam slots so that when the mandible arm is moved and a trunnion rotates in one cam slot the other trunnion moves down following the curvature in the other cam slot analogous to rotation of the heads of the condyles on sides of a lower jaw, an incisal pin carried by the mandible arm, an incisal guide having pivotal mounting on the base about a transverse horizontal axis and having a table portion with an arcuate flange with the inner curvature facing the pivotal mounting, laterally disposed stops having an adjustable mounting on the arcuate flange and having guide faces intersecting the axis of the arcuate flange to cooperate therewith providing an orbital path for movement of the incisal pin, means for securing the incisal guide with the table portion in an adjusted angular position relative to said pivotal mounting to retain the table portion at an angle in accordance with the cusp angle of the posterior teeth to be used for effecting said trunnion movement when the incisal pin is moved in said orbital path, a maxilla arm, and means hingedly supporting the maxilla arm above the mandible arm.

4. An articulator including a base member having laterally spaced uprights, trunnion supports having cam slots provided with upper and lower curving portions, means pivotally mounting said trunnion supports for movement on horizontal axis to change the angularity of the cam slots according to the angularity of the cusps of the posterior teeth which are to be used, a mandible arm for supporting a lower denture and having rearwardly extending arm portions provided with upwardly extending terminals, trunnions carried on said terminals and extending through said cam so that when a trunnion rotates in one cam slot the other trunnion moves down following the curvature in the other cam slot analogous to rotation of the head of the condyles on sides of a lower jaw, an incisal pin carried by the mandible arm, an incisal guide having pivotal mounting on the base about a transverse horizontal axis for defining an orbital path for movement of the incisal pin, means for securing the incisal guide in an adjusted angular position relative to its pivotal mounting to retain the incisal guide at an angle corresponding with the cusp angle of the posterior teeth to be used

for effecting said trunnion movement of the mandible arm when the incisal pin is moved in said orbital path, means hingedly supporting the maxilla arm at the upper portions of the spaced uprights, an occlusal rod carried on the maxilla arm and having bearing support upon a part of said base.

5. An articulator including a base member having laterally spaced uprights, trunnion supports having cam slots provided with upper and lower curving portions, means pivotally mounting said trunnion supports for movement on horizontal axis to change the angularity of the cam slots according to the angularity of the cusps of the posterior teeth which are to be used, a mandible arm having rearwardly extending arm portions provided with upwardly extending terminals, trunnions carried on said terminals and extending through said cam so that when a trunnion rotates in one cam slot the other trunnion moves down following the curvature in the other cam slot analogous to rotation of the heads of the condyles on sides of a lower jaw, an incisal pin carried by the mandible arm, a bracket having adjustable support on a forward part of the base member, an incisal guide having pivotal mounting on the bracket about a transverse horizontal axis and having means forming an orbital path for the incisal pin to effect said movements of the trunnions in the cam slots, a maxilla arm, and means hingedly supporting the maxilla arm above the mandible arm.

6. An articulator including a base member having laterally spaced uprights, trunnion supports having cam slots provided with upper and lower curving portions, means pivotally mounting said trunnion supports for movement on horizontal axis to change the angularity of the cam slots according to the angularity of the cusps of the posterior teeth which are to be used, a mandible arm having rearwardly extending arm portions provided with upwardly extending terminals, trunnions carried on said terminals and extending through said cam so that when a trunnion rotates in one cam slot the other trunnion moves down following the curvature in the other cam slot analogous to rotation of the heads of the condyles on sides of a lower jaw, an incisal pin carried by the mandible arm, a bracket having adjustable support on a forward part of the base member, an incisal guide having pivotal mounting on the bracket about a transverse horizontal axis and having means forming an orbital path for the incisal pin to effect said movements of the trunnions in the cam slots, a maxilla arm, means hingedly supporting the maxilla arm above the mandible arm, an extension on said bracket, and an occlusal rod fixed to a forward portion of the maxilla arm and having bearing support on said extension.

7. An articulator including a base member having laterally spaced uprights, a mandible arm having spaced apart rearwardly extending arm portions provided with upwardly extending terminals, trunnions carried on said terminals, trunnion supports on the uprights for mounting the trunnions, an incisal pin depending from a forward portion of the mandible arm, an incisal guide table on the base and having means forming a support for the incisal pin, a templet plate supporting bracket mounted on the base between the uprights and having an upwardly extending terminal, a clamp member having adjustable support on said terminal, a templet plate, and an arm carrying the templet plate and having adjustable support in said clamp member.

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