April 3, 1962 R. STRACK 3,027,642

ARTIFICIAL TOOTH

Filed Feb. 5, 1958

FIG. 1

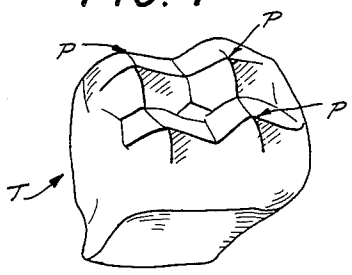


FIG. 2

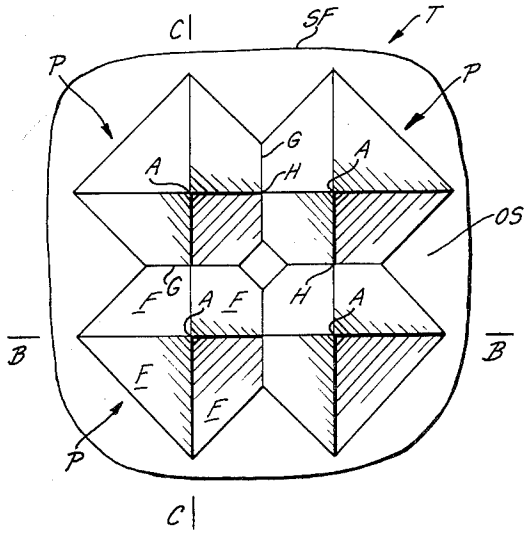


FIG. 3

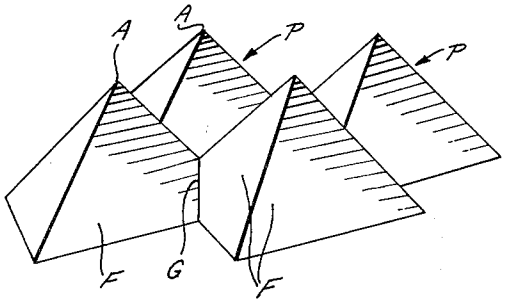
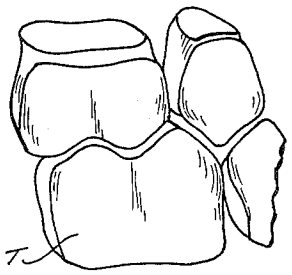


FIG. 4



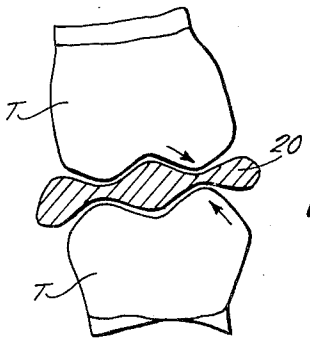


FIG. 5

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ARTIFICIAL TOOTH

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The invention relates to a tooth with cusps (posterior tooth) for dental prosthetic work.

Cinematic survey about the spatial movements of the lower jaw against the unmovable upper jaw have shown that the natural movements, caused by muscles and reflexes do not consist, as assumed up to now, of a prognatic bite, a lateral bite which can be left or right, and a progenic bite. As a rule, the progenic and the prognatic bite will not be found during the normal masticatory movement but can only be produced by intention or by coercion. They will only be found as a component in a lateral movement. But even this kind of lateral bite shows a fundamental different course as the one used in combination with prognatic and progenic bites, which have been employed as a base for the construction of the customary artificial teeth.

The construction of artificial teeth must be adapted to nature at least as far as the natural movements of the jaws are considered as impulse, otherwise the cusps of the teeth will be a hindrance to these smooth-gliding movements, with the result that the dentures which have relatively little attachment to the mucous membranes will tilt very easily. In order to avoid this inconvenience it has been necessary heretofore to do quite a lot of corrective work on the teeth of the denture if said denture was constructed in customary procedure and this in order to adapt the final prosthetic work to the jaws' natural movement. This usually meant that the cusps of the posterior teeth were removed and this in turn meant a reduction of the masticatory value of the denture, at the same time this meant that the initial presence of cusps was quite illusionary. This grinding-in of the customary artificial teeth once the denture was ready for wearing, was considered absolutely necessary in normal prosthetic work.

Up to now, the conception was, that the reflectory lateral movements of the jaws' natural movement took place through an alternating rotation of the lower jaw and this around two definite axes in the space, situated behind the two condylic joints. Accordingly there are customary devices for the manufacture of artificial posterior teeth in which the movements to the left and to the right are obtained by rotating the mechanical part representing the lower jaw, around two axes. Tests made on natural jaws have proved that this is an erroneous assumption. The path of the mandibulary movements in the space—with a fixed maxillary—should rather be considered as a nearly true translation to the side, the front and downwards, to this must be added a slight rotation of the lower jaw, due to the minute difference in the movements of the two condyles. In this case "translation" is understood as a displacement parallel to itself.

Free movements and a high masticatory effect is not all that is needed in a denture, there are also other demands, such as: easy speech, possibility to transport food freely from one side to the other, an easy flow of saliva etc. It is therefore necessary to shape or to form the tooth also in such a way as to have a resemblance to a natural tooth form. The artificial posterior tooth, object of this invention, has as now known, one or more pyramidic occlusal cusps, and said cusps will penetrate stereometrically in certain parts of the corresponding tooth—or the corresponding teeth—in which they have been built in. To obtain this, another characterization

of the tooth claimed in this invention, is the fact, that each pyramidic stump will show at least four sides, said sides to serve for the sliding-in of the cusps of the opposite side into the grooves which have been formed automatically between the pyramidic stumps and this sliding-in is due to a translative sidewards movement. Therefore the tooth claimed in this invention differs fundamentally from the customary and known artificial tooth based on findings—now proved as being erroneous—that the lower jaw is making principally a rotary movement instead of a translation movement and this even when moving sidewards.

The object of this invention is to provide means to increase the capacity of artificial teeth to grind or to crush food by producing on the occlusal surface of the artificial teeth sharp, definitely formed facets and that such facets will become effective during the translation movement, whereby the efficiency of natural or artificial teeth will even be surpassed and at the same time the shape and the position of the cusps on the occlusal side of the teeth shall be arranged in such a manner, that once the denture is in a correct position in the mouth, all movements will be possible without any obstruction or interception from said cusps.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawing, in which:

FIG. 1 is a perspective view of an artificial back tooth according to the present invention;

FIG. 2 is a schematic top view of the tooth shown in FIG. 1 and drawn to an enlarged scale;

FIG. 3 is a schematic perspective view of the cusps or pyramids formed on the occlusal surface of the tooth of the present invention;

FIG. 4 is a perspective view showing the arrangement of opposite back teeth according to the present invention in relation to other teeth; and

FIG. 5 schematically illustrates the chewing action obtained between upper and lower teeth according to the present invention.

Referring now to the drawing and particularly to FIG. 1 of the same, it will be seen that the artificial back tooth according to the present invention comprises a plurality of cusps on the occlusal surface thereof, and each of these cusps has substantially the form of a quadrilateral pyramid P.

The arrangement is more clearly illustrated in FIGS. 2 and 3, which respectively show a top view of the occlusal surface of the tooth T and a perspective view of the cusps or pyramids arranged thereon. As can be seen from FIG. 2, the artificial tooth T according to the present invention has an occlusal upper surface OS for masticating engagement with an opposite tooth, and the artificial tooth T comprises a plurality of cusps on the occlusal surface OS thereof, and each of the cusps has a plurality of facets F defining a quadrilateral pyramid P. The facets of each pyramid P intersect each other along lines respectively located in two planes, indicated for the pyramid P at the left lower corner of the tooth T, as viewed in FIG. 2, by the lines B—B and C—C. The plane extending along the line B—B is parallel to the side face SF of the tooth T, whereas the other plane is substantially normal to the side face SF. Adjacent pyramids P are arranged with respect to each other in such a manner that they engage and interpenetrate each other only at corner portions thereof, so as to form grooves G therebetween. Each of the grooves G between adjacent

pyramids P has its highest point H in the plane of intersection passing through the apices A of the adjacent pyramids and these grooves G extend downwardly inclined from the highest point H to opposite sides of the aforementioned plane.

According to the present invention the cusps and grooves on the occlusal surface of the tooth are not simply a copy of the occlusal surface arrangement of natural teeth, but the cusps and grooves of the artificial tooth according to the present invention are arranged to provide for an improved masticating action. At the very instant when the teeth of the lower denture contact the corresponding teeth of the upper jaw, edges and peaks of definitely constructed cusps in the lower jaw will touch or contact corresponding definitely constructed edges and peaks of the upper teeth of the denture. FIG. 4 shows a plurality of teeth in this situation as seen from the side and FIG. 5 as seen from the front. During the masticating action and lateral translatory movement of the teeth T with respect to each other, corresponding planes or facets of opposite teeth will slide closely along each other as indicated by the arrows in FIG. 5, to produce thus a maximum cutting effect and a maximum crushing effect on food particles 20 located between the teeth. By adapting the cusps or pyramids P and the grooves G therebetween, to the natural movement of the jaws, the teeth are arranged in such a manner that free movement of the cusps in one row of teeth through the grooves of the opposite row of teeth is possible.

It will be understood that each of the elements described above or two or more together, may also find a useful application in other types of artificial teeth differing from the types described above.

While the invention has been illustrated and described as embodied in an artificial tooth having a plurality of cusps on the occlusal surface thereof, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed and desired to be secured by Letters Patent is:

1. An artificial back tooth having an occlusal surface for masticating engagement with an opposite tooth, said artificial tooth comprising a plurality of cusps on the occlusal surface thereof, each of said cusps having a plurality of facets jointly defining a quadrilateral pyramid, the facets of each pyramid intersecting each other along lines respectively located in two planes one of which is substantially normal and the other substantially parallel to one side face of the tooth and adjacent pyramids engaging each other only at corner portions thereof.

2. An artificial back tooth having an occlusal surface for masticating engagement with an opposite tooth, said artificial tooth comprising a plurality of cusps on the occlusal surface thereof, each of said cusps having a plurality of facets jointly defining a quadrilateral pyramid, the facets of each pyramid intersecting each other along lines respectively located in two planes one of which is substantially normal and the other substantially parallel to one side face of said tooth and adjacent pyramids engaging and interpenetrating each other only at corner portions thereof so as to form grooves therebetween, each groove between adjacent pyramids having its highest point in the plane of intersection passing through the apices of said adjacent pyramids and extending downwardly inclined from the highest point to opposite sides of said plane.

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