L. E. EVSLIN.

ARTIFICIAL TOOTH.

APPLICATION FILED APR. 23, 1908.

907,326.

Patented Dec. 22, 1908.

2 SHEETS—SHEET 1.

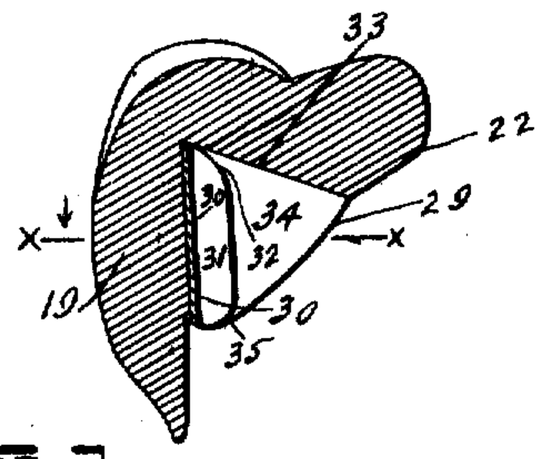

FIG. 1.

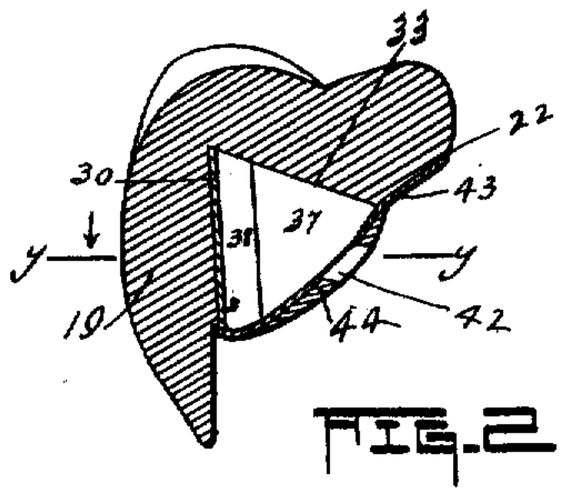

FIG. 2.

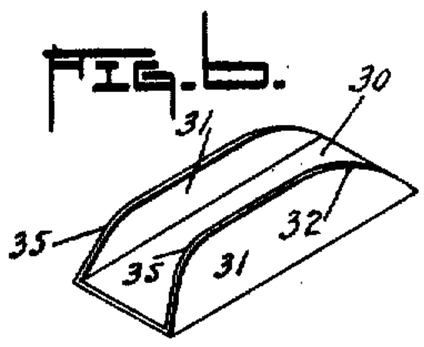

FIG. 6.

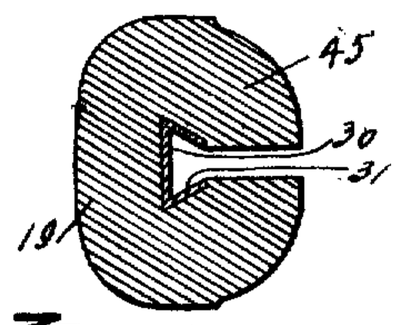

FIG. 3.

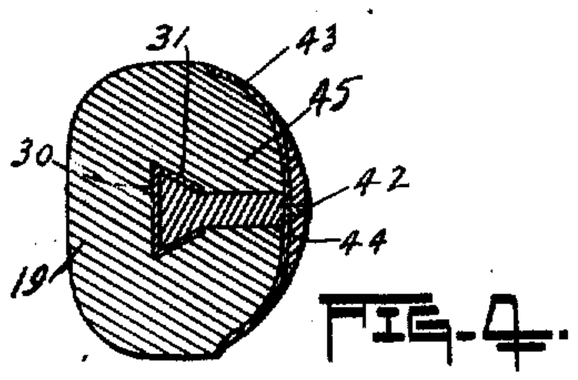

FIG. 4.

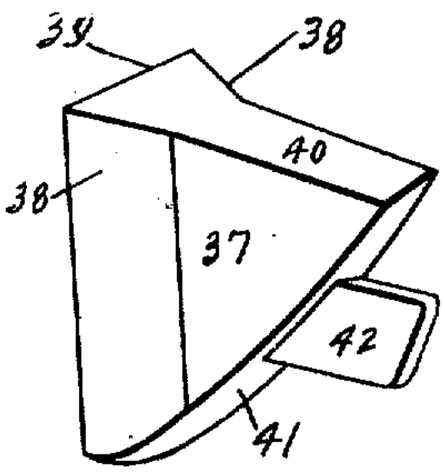

FIG. 5.

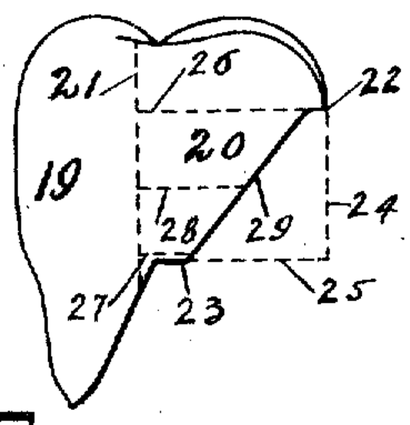

FIG. 7.

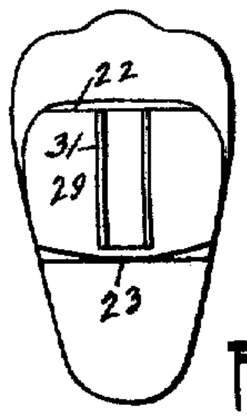

FIG. 8.

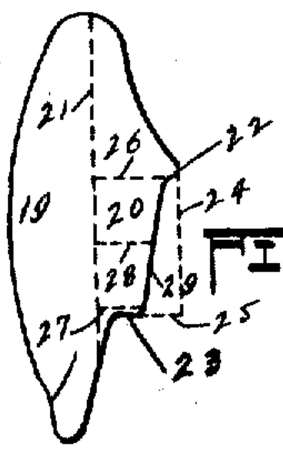

FIG. 9.

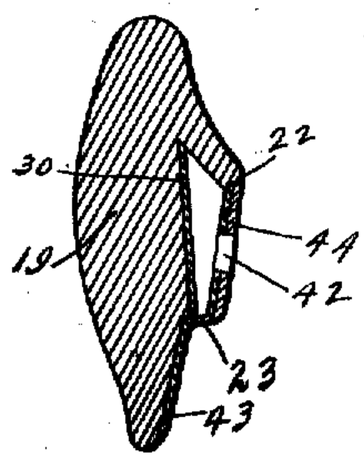

FIG. 11.

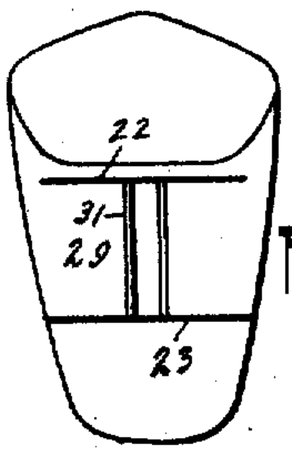

FIG. 10.

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By Chas. N. LaPorte
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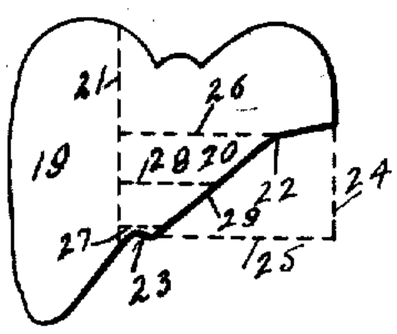


FIG. 12.

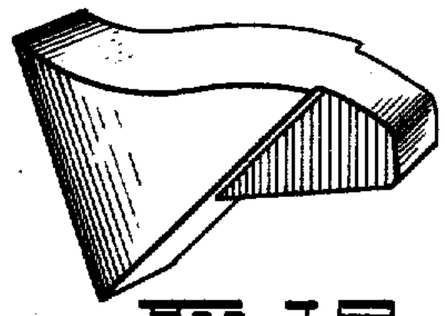


FIG. 13.

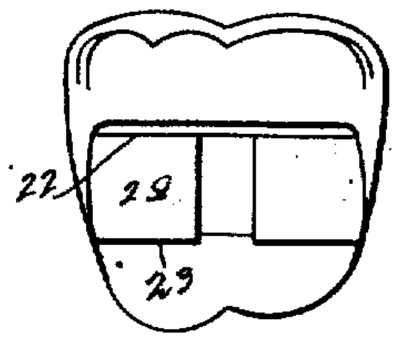


FIG. 14.

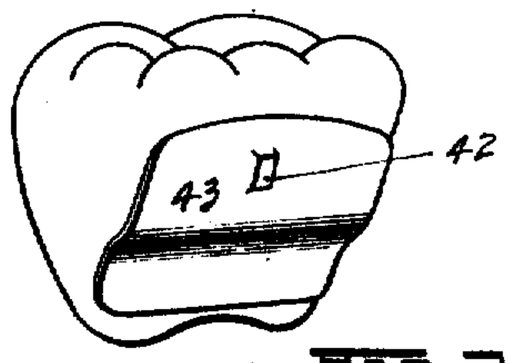


FIG. 15.

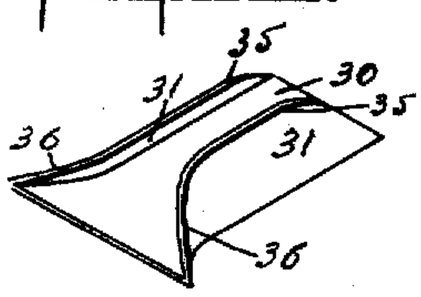


FIG. 16.

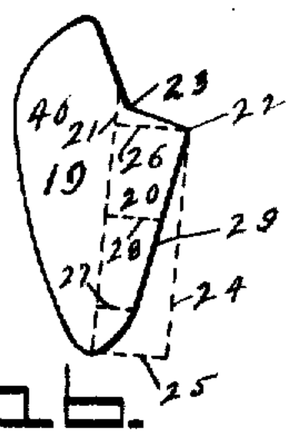


FIG. 17.

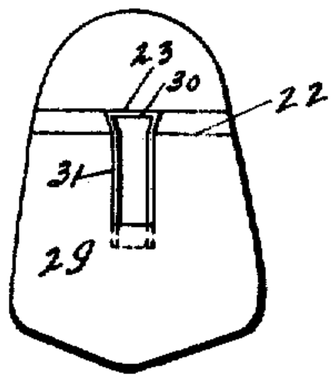
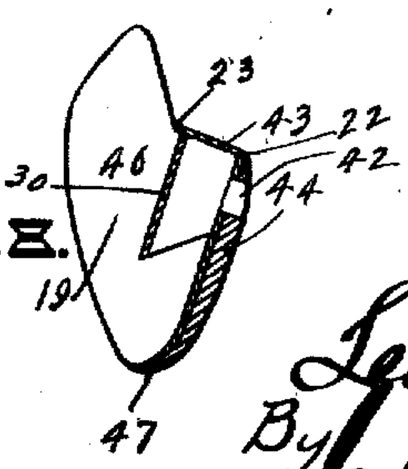


FIG. 18.



Witnesses:-
H. V. Gibson.
L. E. Claypool.

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UNITED STATES PATENT OFFICE.

LEO E. EVSLIN, OF PEORIA, ILLINOIS, ASSIGNOR TO THE UNIVERSAL INTERCHANGEABLE TOOTH COMPANY, OF PEORIA, ILLINOIS, A CORPORATION OF ILLINOIS.

ARTIFICIAL TOOTH.

No. 907,326. Specification of Letters Patent. Patented Dec. 22, 1908.

Application filed April 23, 1908. Serial No. 428,814.

To all whom it may concern:

Be it known that I, LEO E. EVSLIN, a subject of the Emperor of Russia, residing in the United States, at Peoria, in the county of Peoria and State of Illinois, have invented certain new and useful Improvements in Artificial Teeth; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention has reference to certain new and useful improvements in the construction of artificial teeth, and to a new and improved backing for such teeth and the mode of securing the same to the teeth.

One of the objects of the present invention is the producing of artificial teeth which are of more or less universal application. This is obtained by making the back part of each tooth, which is that part having the lingual or posterior face, according to certain predetermined measurements, taken from the labial line, or that line which separates the labial face of the tooth in the mold from the back or posterior face.

A further object of the invention is a metallic-box for each tooth forming a seat for a metallic tongue adapted to be inserted in said teeth, whereby the teeth may be secured to the backing. Said metallic-box is preferably open at both ends and has inwardly sloping side walls forming a dove-tail groove or seat for the tongue aforesaid; the end of the box intended to be at the masticating edge of the teeth having its side walls extensively beveled so that a deep recess may be formed under the bite of the teeth, while the side walls of the opposite end of the box are beveled to a somewhat lesser degree than at the opposite end, which is for the purpose of allowing the porcelain at the cervical border to shape itself regularly at the entrance of the box or groove containing the same, and not permit the metallic edges of the box to be exposed.

In the accompanying drawings, I have illustrated the preferred manner of carrying out my invention. Therein the several views are as follows:—Figure 1 is an enlarged vertical sectional view of a molar showing the groove therein and metallic-box molded in the groove; Fig. 2 is a view similar to Fig. 1, with the addition of the metallic tongue in the box, the backing for the tooth; the backing and tongue shown soldered together; Fig. 3 is a cross-section of the tooth seen in Fig. 1, and as the same would appear if taken on the line X—X of said figure; Fig. 4 is a cross-section of the tooth seen in Fig. 2 and as the same would appear if taken on the line Y—Y of said figure; Fig. 5 is an enlarged perspective of the metallic-tongue seen in Fig. 2; Fig. 6 is an enlarged perspective of the metallic-box seen in Figs. 1, 2, 3 and 4; Fig. 7 is an enlarged side elevation showing a bicuspid and in diagrammatical outline the mode of uniformly constructing the back part of a tooth, so that it is capable of universal application; Fig. 8 is a rear elevation of Fig. 7, showing the lingual or posterior face of said tooth; Fig. 9 is a view similar to Fig. 7 except that the tooth shown is a cuspid; Fig. 10 is a view of Fig. 9, similar to Fig. 8; Fig. 11 is a vertical sectional view of Fig. 9; Fig. 12 is a view similar to Fig. 7 except that the tooth shown is a molar; Fig. 13 is a view of Fig. 12 similar to Fig. 8; Fig. 14 is a perspective view looking at the rear face of the molar seen in Fig. 12 and with the backing therefor in place on said tooth; Fig. 15 shows a modified construction of metallic-box; Fig. 16 is a view similar to Fig. 7 except that the tooth shown is one of the teeth called "facings". Fig. 17 is a view of Fig. 18 similar to Fig. 8; Fig. 18 is a vertical cross-section of a tooth such as is shown in Fig. 18, with the metallic-tongue and backing attached thereto, and Fig. 19 is an enlarged perspective view of a metal tongue such as would be used in connection with the tooth shown in Fig. 12.

I am aware that attempts have been made to produce an interchangeable tooth, that is, a tooth where the backing was not only capable of fitting the groove or a hole in the tooth, but that said backing would also fit the back part of said tooth. This was approximately obtained by grinding all the back or posterior surfaces of the teeth to a certain thickness and to a certain bevel. However, such a construction, produced by grinding, will not permit of the universal application of the different teeth to the backings, and is only accomplished with teeth known as "facings" and not with teeth which have porcelain articulating surfaces.

I produce perfect interchangeability and ~~universal application of all the different~~ classes of teeth, by measurements formed on the carved plaster models of the teeth, repro-

duced in the molds in which the porcelain teeth are formed. In other words, for each tooth a mold must contain two sections, one for the labial portion of the tooth and the other for the lingual portion of the tooth; the line where the two sections unite being referred to as the "labial-line". In Fig. 7, the labial portion of the tooth is indicated as 19 while the lingual portion of the tooth is indicated as 20 and the labial-line, which is indicated by dotted lines, as 21.

To obtain an accurate outline of the lingual or posterior face, measurement is taken from the rubber line, indicated as 22, being a shoulder, to the center of the shoulder 23, which will be known as the "cervical shoulder", the lines by which such measurement is made being indicated as 24 and 25. The slope 29 for the posterior face of the tooth between the rubber line and the cervical shoulder is produced by a predetermined measurement from the labial line to the rubber line, indicated by the dotted line 26, and by a predetermined measurement between the labial line, at the cervical shoulder, indicated by the dotted line 27; also by a third measurement preferably taken midway between the rubber line and the cervical shoulder, being that point indicated by the dotted line 28. In this way, the back part of all the teeth are produced by exact measurements, which not only gives the necessary slope and space for the subsequent soldering of the back part of a tooth, but also, that a backing produced on a molar tooth, will fit on all the molar teeth. This also applies to the bicuspids. In the anterior teeth, a backing produced on a cuspid tooth, will fit all the cuspid teeth; the backing produced on a lateral incisor, will serve as a backing for all the lateral incisors, and a backing produced on a central incisor, will fit all the central incisors, notwithstanding the difference of length or width of the different teeth. Thus it will be seen that the backs of all the teeth of a kind are in all respects similar so far as the shapes of their posterior faces are concerned, between the rubber line and cervical shoulder, and without the necessity of grinding to obtain similar outlines. Inclining or sloping the back wall of the tooth as at 29 from the rubber line to the cervical border and terminating short of the cervical border in the shoulder 23, allows for the extra thickness of the tooth produced by the solder on the back part of the tooth in connection with crown or bridge work, without producing the unnecessary bulkiness of the teeth or of the finished bridge on the lingual surfaces next to the tongue.

The metallic-box, to which reference has been made is shown molded in several of the different kinds of teeth, although it is best seen in Figs. 1 to 4, and also in perspective in Fig. 6. It consists, preferably of the backing 30 of suitable length and width having the inclined side walls 31 which converge towards each other so as to form a dove-tail groove in said box. These boxes may be supported in any suitable manner when molded into the teeth, it being preferable to mold or bake the same in the teeth at the time of molding. These boxes are made preferably of metal, varying from five to ten one thousands of an inch in thickness and are shown open from end to end. The end of the box that is intended to be at the cutting or masticating edge of the tooth, has its sides 31 extensively beveled, as at 32, see Figs. 1 and 6; this is intended for the convenient lodgment of said box under the bite of the tooth, as seen in Fig. 1 to form the deep recess 33 at the inner or terminal end of the groove 34 formed in the teeth, also see Fig. 1. The side walls 31 at the opposite end of the boxing are also beveled as at 35, see Figs. 1 and 6 but to a much lesser degree than at 32, for the purpose of allowing the porcelain at the cervical border to shape itself regularly at the entrance of the box or groove in which the same is seated, as porcelain will shape itself more regularly around a rounded off portion than it will around sharp edges. The arrangement of a box, as described, produces a strong tooth, as there are no overhanging edges of porcelain and therefore no checking of the teeth when the metal tongue, to be described, is inserted into the boxing of the tooth.

In Fig. 15, the inner ends of the side walls 31 are flared outwardly as at 36 in addition to beveling the same as previously described and the backing 30 of said box conforms to this modified construction. By forming the box in this manner, more cement substance will be lodged at the enlarged terminal end of the box and consequently in the teeth at their masticating surfaces, and the holding of the metal tongues that enter the grooves 34 are rendered more secure.

One reason which may be advanced for the metallic-box strengthening the tooth is, that the tongue which is of metal, if slid directly into a porcelain groove might act as a wedge and break the porcelain, whereas with a metallic-box to receive the same, it is the sliding of metal upon metal.

The metallic tongue, of which reference has been made, is indicated as 37 and best seen in Fig. 5. Its outline may differ slightly, governed of course, by the shape of the tooth and groove therein it is intended to fit. It has, preferably beveled or tapered side walls 38 to adapt it to fit and have a sliding relation with the dove-tail groove in the metallic-box heretofore referred to and with a flat rear wall 39 and sloping top wall 40; the former to have a sliding relation with and to rest against the backing 30 of the metallic-

3.

box, while the sloping upper wall 40 conforms to and abuts with corresponding wall of the groove 34 in the tooth, referred to as forming the deep recess 33. Projecting outwardly from the front wall 41, of this tongue, which said wall conforms to and follows the outline of the lingual or posterior face of the tooth, is a lug or extension 42 which is intended to pass through an opening in a backing plate 43, see Fig. 2, and be soldered thereto by the solder 44, as shown in said Fig. 2, so that if the backing 43 is removed from the tooth the metallic-tongue will be thereby also disconnected or detached from said tooth. The backing plate 43, after the tongue 37 has been placed in the tooth, is shaped or made to conform to the posterior surface of said tooth, so that with a tooth constructed in accordance with the plan outlined in Fig. 7, should it be desirable to replace said tooth with another of its kind, the tooth may be removed and another substituted, the plan of the construction of the teeth insuring that the substitute tooth may be easily, quickly and conveniently secured in place.

In Fig. 14, the backing plate 43 which is there shown to conform to the posterior surface of the tooth conforms to and lies against a flat surface, between the lateral surfaces of the tooth, except where the backing plate conforms to the cervical shoulder, while in Figs. 2 and 3 the backing plate 43 is shown to conform to the posterior surface of a tooth which is rounded or oval shaped, as at 45 merging into the lateral surfaces by irregular lines, so as to partially overlap or extend onto the lateral surfaces of the tooth. The entire posterior surface of this tooth between the rubber line and cervical shoulder is spherical like in shape, having its highest point at the center of the back part of the tooth. When the metal backing or backing plate 43 is in place and attached to the metal tongue, as seen in Figs. 2 and 4, and burnished to the posterior surface, the inside of the backing will resemble a half shell, embracing the tooth on the posterior and lateral surfaces. This arrangement is very advantageous in certain forms of teeth and the adoption of the metallic backing or backing plate 43, is more secure.

By reference to the several teeth, it will be seen that each are provided with an offset at the rubber line 22 and with a shoulder at the cervical border, previously referred to as the cervical shoulder 23, which is located at the base of the slope or incline forming the posterior face of the tooth and opening out of which is the groove 34. The shoulder 23 is a pronounced shoulder extending approximately at right angles from the cervical border forming a rest for the tooth on the backing plate which is made to conform to said shoulder.

The cervical shoulder 23, further serves as a resisting point at the cervical end of the tooth. The posterior cervical end of a tooth, as generally produced in artificial teeth, does not help the support of the tooth, and the tooth whether it is a pin tooth or whether it is an interchangeable tooth, hanging upon its backing, and pressure produced on the cutting edges of the anterior teeth, or on the masticating surfaces of the posterior teeth, tends to produce a leverage at the cervical end of the tooth and break it, while with my construction, this shoulder 23 is a resisting point, and the pressure produced on the masticating or biting surfaces of the teeth tends to be supported, as is very clearly seen, at the cervical shoulder.

My improvements in the connection of a tooth with a backing plate, through a metal tongue slidably connected with a metallic-box in the teeth, although plainly seen and understood in connection with the teeth previously described, may be better understood in connection with a "facing" tooth, which is best seen in Figs. 16, 17 and 18 and designated as 46. A "facing" tooth is characterized by the fact that at the posterior part of the tooth commencing at the cervical shoulder 23, the tooth is quite thick, from which part, the posterior surface takes an oblique slope, ending at the cutting edge of the tooth in almost a knife edge, or, in other words, commencing at the cutting edge of the tooth and gradually increasing in thickness in the posterior surface of the tooth until the maximum thickness is reached in the cervical shoulder. The groove 34 in the tooth commences at the cervical shoulder and not only does it open out of the tooth through the posterior surface thereof, but its rear or inner wall is parallel with and in the same plane with the posterior surface of the tooth ending at about the middle of the tooth in a recess, as at 33, similar to that shown in Fig. 1. The groove assumes an oblique course in the tooth, likewise the metal tongue 37 and the backing plate 43 which is adapted to the posterior surface of the tooth, for the purpose of attaching the same to dental apparatuses, will assume the same plane as the posterior surface of the tooth and parallel with the rear wall or backing 30 of the boxing, in which is seated the metallic tongue secured to the backing plate. The backing plate 43 at the cutting edge of the tooth is bent over the same as at 47 to protect the edge thereof, and for the purpose of properly protecting this edge of the tooth and to be locked on the tooth, the backing plate must be inclined similarly to the incline of the posterior surface of the tooth as well as the metallic box therein, so that if the tooth is replaced, as occasion may require, said tooth may be slipped into position on the backing plate, the metal tongue of which will fit snugly the

metallic boxing and the plate lie in juxtaposition to the posterior surface of the tooth with the portion 47 protecting the tip of the tooth, as seen in Fig. 18.

In constructing interchangeable artificial teeth, particularly anterior teeth, the tooth commencing from its middle part at the posterior surface and ending at the cutting edge, must be produced as thin as the labial surface of the tooth will permit. Producing a tooth in accordance with the improvements herein outlined, I overcome and obviate the extra thickness so common both in anterior and short teeth, which renders a tooth practically useless, for the reason that in a great many cases, the superior anterior teeth are found to overlap those of the inferior anterior teeth. In such cases, the bite is very close and the inferior anterior teeth strike about the middle part of the superior anterior teeth therefore the necessary space must be provided.

Having thus fully described my invention, what I claim and desire to secure by Letters Patent of the United States, is:—

1. In combination, a tooth having a shoulder at its rubber line, a shoulder at the cervical border and having its posterior face between the two shoulders inclined towards the cervical shoulder, and a metallic-box within the tooth leading from the cervical shoulder towards the masticating surfaces, said box having its side walls inclined to form a dovetail groove therein.

2. In combination, a tooth having a shoulder at its rubber line, a shoulder at the cervical border and having its posterior faces between the two shoulders inclined towards the cervical shoulder, and a metallic-box within the tooth leading from the cervical shoulder to a point a short distance beneath the masticating surface thereof, said box open at both ends, and having its side walls inclined towards each other and beveled.

3. In combination, a tooth having a shoulder at its rubber line, a shoulder at the cervical border and having its posterior face between the two shoulders inclined towards the cervical shoulder, and a metallic box within the tooth leading from the cervical shoulder to a point removed a short distance from and below the masticating surface thereof, said box having inwardly converging walls, and open at both ends, the open end of the box at the cervical shoulder communicating with an opening in the tooth which extends longitudinally of the posterior face of said tooth.

4. A metallic-box for a tooth, consisting of a backing and two side walls, the side walls converging towards each other to form a dovetail groove throughout the length of the box and open at both ends.

5. A metallic-box for a tooth, consisting of a backing and two side walls, the side walls at one end being extensively beveled, while their opposite ends are beveled to a much lesser degree.

6. A metallic-box for a tooth, consisting of a backing and two side walls, said box open at both ends and having its side walls at one end flared outwardly.

7. In combination, a tooth having a groove leading from the cervical border to a point just beneath the masticating surface and opening out of the posterior surface thereof, and a metallic-box for said groove, said box consisting of a backing and having converging side walls.

8. In combination, a tooth having a groove leading from the cervical border to a point just beneath the masticating surface and opening out of the posterior surface thereof, and a metallic-box for said groove, said box having converging side walls and open at both ends, the side walls at the masticating end of the tooth being extensively beveled, and their ends at the cervical border beveled, but to a much lesser degree.

9. In combination, a tooth having a groove leading inwardly from the cervical border and opening out of the posterior face, its wall below the masticating surface leading inwardly and upwardly from the posterior surface, and a metallic-box for said groove, said box consisting of a backing and converging side walls, the ends of the side walls below the masticating surface being extensively beveled, and the ends of the side walls at the cervical border beveled, but to a much lesser degree.

10. In combination, a tooth having a groove leading from the cervical border to a point just beneath the masticating surface and opening out of the posterior surface thereof, and a metallic-box for said groove, said box consisting of a backing and having converging side walls, the ends of the side walls at the masticating end of the tooth being flared outwardly.

11. In combination, a tooth having a groove leading from the cervical border to a point midway of said tooth and opening out of the posterior face thereof, a metallic box for said groove open at both ends, a metallic-tongue for said box adapted to be inserted into the same from the cervical border, and a backing for said tooth adapted to be shaped to the posterior face of the tooth and be secured to the tongue in a suitable manner, said boxing, tongue and backing assuming positions parallel with each other, whereby they may have interchangeable connection with different teeth of the same kind.

12. In combination, a facing having its labial and posterior faces converging to a biting edge, and provided with a groove extending into the body of the facing from the cervical border and opening out of the posterior face thereof, the back wall of said groove lying parallel with the posterior face;

a metallic boxing adapted to be seated in said groove, a metallic tongue adapted to have a slidable relation with the boxing, a backing for the posterior face of the facing, and conforming to the biting edge thereof to protect the same, and means for securing the backing to the metallic tongue.

In testimony whereof I affix my signature, in presence of two witnesses.

LEO E. EVSLIN.

Witnesses:
CHAS. W. LA PORTE,
LAURA E. CLAYPOOL.