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E. KELLNER ET AL
REMOVABLE DENTAL BRIDGEWORK

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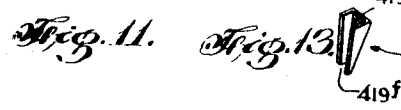
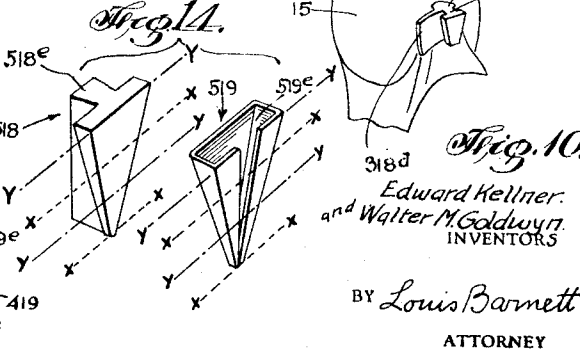
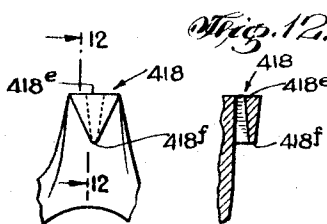
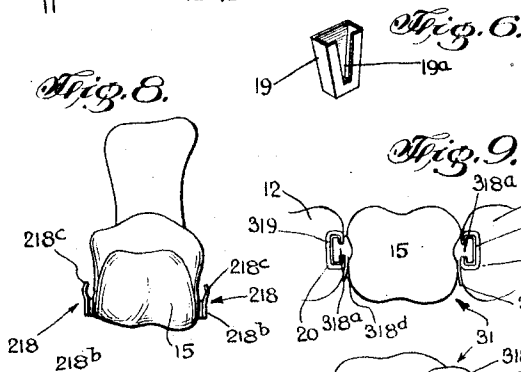
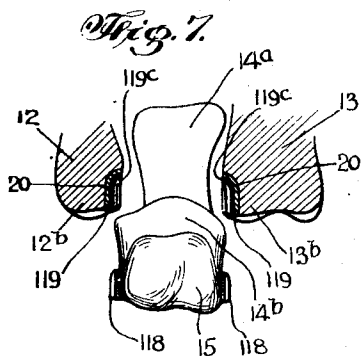
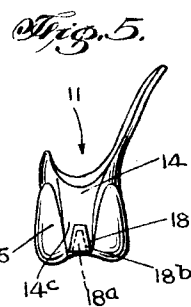
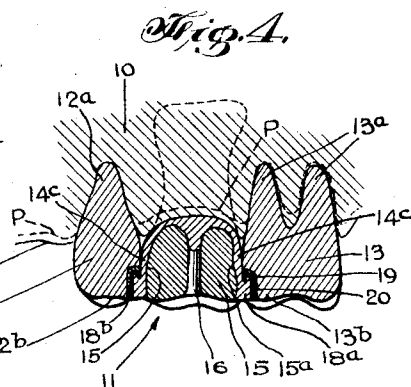
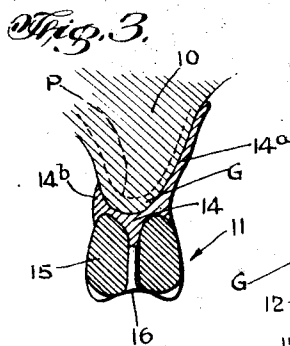
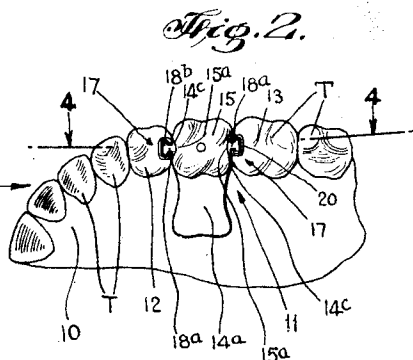
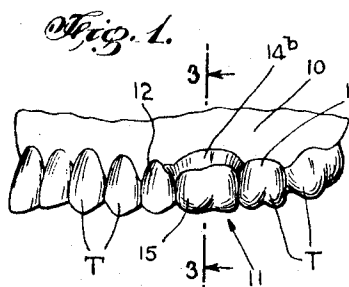


Fig. 10.
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REMOVABLE DENTAL BRIDGEWORK.

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This invention relates to removable dental bridgework or artificial dentures.

One object of the invention is to provide an improved dental bridgework construction having novel retaining and supporting means, including abutment attachments and a saddle which fully covers the area over the absorbed alveolar region caused by the loss of natural teeth to overcome the tipping stress.

Another object of the invention is to provide in a removable bridgework of the character described, an improved construction of retentive attachments, which allow some degree of mobility yet retain the denture in place as a supporting and retaining abutment, said attachment providing slight resiliency to said denture to permit it to respond to vibratory as well as masticatory forces to the same degree as the natural teeth.

A further object of the invention is to provide an improved removable denture of the character described having attachments, no part thereof shall be required to extend within the roots of the natural teeth used as abutments, and which avoid as much as possible mutilation of the coronal sections of said teeth, thus permitting the preservation of the pulp and eliminating possible ill effects due to the devitalization thereof.

Still another object of the invention is to provide in a removable bridgework of the character described, improved retentive attachments, which during mastication tend to tighten the enlockment anchorage of the bridgework in position due to a wedging action, said attachments being constructed to facilitate centering the detachable parts for mounting the bridgework.

A still further object of the invention is to provide an improved denture of the character described, comprising few and simple parts, which shall require the ordinary dental skill in the investment thereof, form a compact and rugged yet neat and regular appearing structure, which shall be readily mounted and removed, relatively inexpensive to manufacture, and practical and efficient to a high degree in use.

Other objects and advantages will in part be obvious, and in part hereinafter pointed out.

The invention accordingly consists in fea-

tures of construction, combination of elements, and arrangement of parts, which will be exemplified in the constructions hereinafter discussed of which a scope of the application will be indicated in the following claims.

In the accompanying drawing in which several possible embodiments of the invention are shown,

Figs. 1 and 2 are front elevation and bottom plan views, respectively, of teeth in the maxillary region, showing the investment of a removable dental bridgework embodying invention.

Figs. 3 and 4 are cross sectional views of the improved removable bridgework taken on lines 3—3 and 4—4 in Figs. 1 and 2, respectively.

Fig. 5 is a side elevational view of the improved bridgework removed from its mounted position.

Fig. 6 is a perspective view of the female attachment member removed from its installed position.

Fig. 7 is a fragmentary elevational view, partly in section, showing a modified construction embodying invention.

Fig. 8 is an elevational view of an improved form of the bridgework having a spring retaining means.

Fig. 9 is a plan view showing another improved form of bridgework provided with a spring retaining means extending from the shank of the male attachment member.

Fig. 10 is a perspective view of the bridgework shown in Fig. 9, removed from its mounted position.

Fig. 11 is a front elevational view of a modified construction of the male attachment member embodying the invention.

Fig. 12 is a cross sectional view taken on line 12—12 in Fig. 11.

Fig. 13 is a fragmentary view, partly in section, of the female attachment member for cooperating with the male member shown in Figs. 11 and 12, and

Fig. 14 shows perspective views of the male and female members before being cut to a required size.

Referring in detail to the drawing, 10 denotes a portion of a maxillary region of a patient's mouth showing the natural teeth T and a removable bridgework or artificial

denture 11, embodying the invention secured in place between a bicuspid 12 and a molar 13 for replacing a missing molar.

As seen from Fig. 4, the roots 12^a and 13^a of said bicuspid and molar, respectively, extend through the gums or fleshy membrane G and into the alveolar process P (indicated in dotted lines) in the well understood manner. The portion of the maxillary region between said bicuspid and molar is shrunk due to absorption of the alveolar ridge thus forming a depression in which is seated a suitably shaped saddle 14 serving as the base of the bridgework 11.

The saddle 14 may be made of any suitable non-corrosive material, metallic or non-metallic, and is preferably made of a moldable substance such as gold, platinum, alloys or rubber compounds.

Extensions 14^a and 14^b on the lingual and the labial sides, respectively, of said saddle may be provided to fully cover the area over said absorbed alveolar bridge which aid in counteracting any tendency for the bridgework to be displaced. Said extensions are shaped to conform to the contour of the underlying portions of the gum G, the labial extension 14^b being made longer or shorter than shown in Figs. 1 and 3, and may be entirely omitted if desired to conceal the material forming the saddle.

Space portions 14^c extending from said saddle between said extensions 14^a and 14^b form a setting for receiving an artificial tooth 15, which replaces the missing molar. Said portions are permanently secured against the opposite side walls 15^a of the tooth 15 and a pin 16 may be provided for reinforcing the anchorage of the tooth 15 to said saddle, as is clearly shown in Figs. 3 and 4.

One dominant feature of the invention is the provision of improved attachments 17 for retaining and supporting the bridgework in position in such a manner as to avoid as much as possible the mutilation of the coronal sections 12^b and 13^b of the natural teeth 12 and 13 used as abutments, thereby preserving the pulps and eliminating possible ill effects due to the devitalization of said teeth. Said attachment comprises interlocking male and female members 18 and 19, respectively, of novel construction, and although here the female members are shown incorporated in the abutting teeth and the male members associated with the bridgework, it is to be understood that a reverse arrangement may be employed.

Each male member 18 is preferably made of material of a single thickness free from slots or other cut portions and is consequently rugged to withstand all stress and strains to which the attachment may be subjected. Said member 18 has a shank 18^a projecting out from the tooth side wall 15^a, adjacent to

crown of the tooth 15, said shank being secured in any suitable manner by soldering or brazing to a saddle portion 14^c. The free end of the shank preferably is terminated by a triangular wedge shaped wing lug 18^b, which detachably engages with a female member 19. The latter may be made of relatively thin material forming a socket, shaped to receive the wing lug 18^b. Each socket has a slot 19^a to permit the passage of the shank 18^a slidably fitting the lug 18^b into said socket. See Figs. 2 and 6.

To fixedly secure said female members in position, they are embedded in suitably shallow inlays 20 provided in the teeth coronal sections 12^a and 13^a, as is clearly shown in Fig. 4.

The practical application of the invention is now apparent, after embedding the female members 19 in the coronal sections of the bicuspid 12 and the molar 13 in alignment to receive the male members 19 and constructing the removable denture 11 as described above and showing in the drawing, the lugs 18^b are simply inserted in the sockets 19. As the saddle contacts with the gums, said lugs wedge themselves in the sockets due to their triangular shaped tightening the interconnection of the attachment members therefore being self-adjusting in this respect and eliminating periodical tightening to correct looseness of the interconnection. Mastication cannot dislodge the bridgework since the force acting against the crown of the tooth 15 always tightens the wedged interlockment of said members. This novel form of attachment facilitates mounting and removal of the denture in a convenient manner. In mounting the denture, the smaller or pointed end of the male member can be easily inserted into the relatively large opening of the socket, and on partially withdrawing the male member from said socket, the attachment is loosened, so that the bridgework is readily removed. If it is necessary to adjust the bridgework the edge portion of the lugs need simply be trimmed a little with sand paper or ground in the well-understood manner. The use of triangular shaped attachment members also permit making a practical structure which is relatively shallow since the outwardly flared end may be made relatively wide to provide a substantial body to give a strong support to the bridgework, and consequently can be applied by cutting the least vital parts of the coronal teeth sections adjacent to the crowns. The narrow end requires the least cutting, thus conserving the more vital parts of the tooth structure adjacent the cervix.

In Fig. 7 is shown a modified construction of attachments embodying the invention. Here the female socket members 119 which receive the male members 118 instead of having pockets in the socket members 17 described above, are provided with outlet pas-

sages or drains 119^c communicating the bottoms of the socket members 119 with the exterior side of the teeth 12 and 13 to facilitate the removal of any food that may accumulate in the sockets.

Supplementary means to prevent loosening of the bridgework due to accidental jarring, particularly in the maxillary region, may be provided when necessary, using the construction shown in Fig. 8. The wing lugs 218 of the male members in this construction are formed with spring extensions or tongues 218^a which are adapted to frictionally contact with the walls of the socket members for retaining the bridgework in position supplementing the wedging interconnection of the lugs 218^b in the sockets.

Another form of supplementary spring retaining means embodying the invention is shown in Figs. 9 and 10. Here one or more resilient projections or tongues 318^a is provided to extend laterally from the shank 318^a of the male member 318 close to the crown of the tooth 15. Each tongue 318^a frictionally contacts the side walls of the abutting tooth when the bridgework 311 is in mounted position.

Since the crowns of the natural teeth are furthest removed from the pulps and have the greatest amount of least vital material which may be cut away to invest the improved bridgework, while the cervices of said teeth are nearer the pulps and have the least material available for cutting away, wing lugs 418 shown in Figs. 11 and 12 and female socket member 419 shown in Fig. 13 may be proportioned to conform to these conditions. Therefore the upper or wider ends 418^e and 419^e of said lug and socket respectively, which aligns with the portions of the natural teeth nearest the crowns are made thicker than the opposite narrow lug and socket ends, 418^f and 419^f respectively, that is the lugs 418 are tapered in both lengthwise and widthwise. Thus a relative shallow attachment is provided for the bridgework in which the thick, wide, upper ends 418^e provide substantial supports that avoid as much as possible the mutilation of structure of the natural teeth surrounding the most vital parts thereof thereby eliminating the requirement to devitalize said parts or cause possible ill effects to such normally sensitive parts.

It should be noted that in each of the constructions described above and shown in the drawing, the attachments are interconnected with the natural teeth adjacent a crown and the saddle is seated on the gums thereby providing a slight resiliency for the bridgework to permit it to respond to vibrations as well as masticatory forces in the same manner as the natural teeth so that the patient enjoys the greatest degree of comfort in using the improved bridgework.

The improved removable bridgework con-

structions embodying this invention is thus seen to require no more than ordinary dental skill in the investment thereof because of the simplicity of the attachment members and the conservation of the natural teeth structures.

Where the improved attachments are provided as an article of manufacture for incorporation in the various bridgework constructions, said attachments must ordinarily be supplied in many sizes or forms as required, depending on the kind of abutting teeth and the particular construction of the bridgework. To overcome the disadvantage of manufacturing many sizes of attachments the male and female members 518 and 519, respectively, may be constructed as shown in Fig. 14, selected portions of said attachments being cut and used for any given type of bridgework. Thus if portions are cut between the parallel dotted lines X—X, the attachments corresponding to those shown in Figs. 11 and 12 are formed. If larger finished attachments are required said members may be cut close to the wide ends 518^e and 519^e as indicated between the dot and dash lines Y—Y.

It will thus be seen that there is provided a device in which the several objects of this invention are achieved and which is adapted to meet the conditions of practical use.

As various other possible embodiments might be made of the above invention and as various changes might be made in the embodiments set forth, it is to be understood that all matters herein set forth as shown in the accompanying drawing is to be interpreted as illustrative and not in a limiting sense.

Having thus described our invention we claim as new and desire to secure by Letters Patent:

1. An attachment for supporting and retaining removable dental bridgework in position comprising detachable interlocking members, one of said members being triangular shape and forming a flat-sided socket acutely tapered lengthwise and of rectangular cross-section, said member being adapted to be embedded in an abutting natural tooth with the widest and deepest end of the member positioned in the crown of the tooth and the pointed thin end extending toward the tooth cervix to avoid excessive mutilation of the tooth structure and to eliminate possible ill effects to sensitive parts of the tooth.

2. As an article of manufacture, attachments for removable dental bridgework comprising interconnectible members of varying cross section, and acutely tapered portions of said members being selectable for use, the remaining portions being adapted to be cut away, as and for the purpose described and specified.

3. An attachment means for supporting and retaining removable dental bridgework, comprising male and female members, the

- female member being a triangular shaped structure forming a socket, the male member including a shank and a wing lug terminating one end of the shank, said lug being demountably seated in said socket for wedgingly interlocking said member, and a spring tongue extending from the said shank adapted to frictionally engage a surface portion of a tooth abutting the bridgework.
- 10 4. In an attachment means for supporting and retaining removable dental bridgework, a shank and a wing lug terminating one end of the shank, and a spring tongue extending from said shank spaced from said lug adapted to frictionally engage a surface portion of 15 a tooth abutting the bridgework.
5. In an attachment means for supporting and retaining removable dental bridgework, a tapered shank and triangular shaped wing lug terminating one end of the shank. 20
- In testimony whereof we affix our signatures.

EDWARD KELLNER.
WALTER M. GOLDWYN.