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P. BRANDAU

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DENTAL PROTHESES, JAW-SPLINTS AND JACKET-CROWNS

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Fig. 1

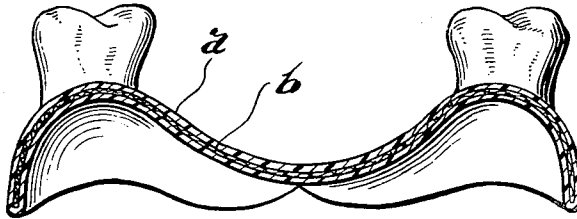


Fig. 2

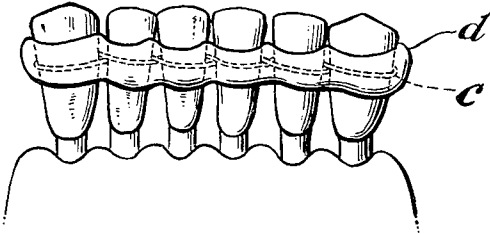


Fig. 3

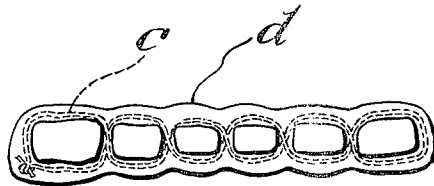


Fig. 4

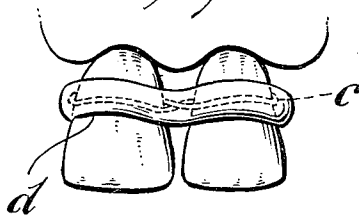


Fig. 5

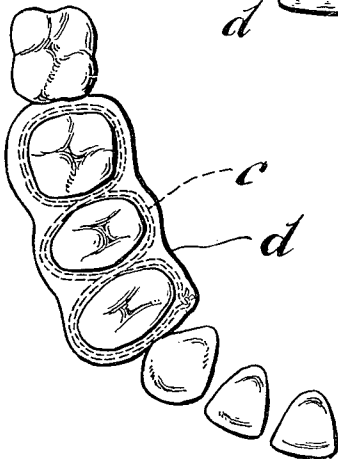
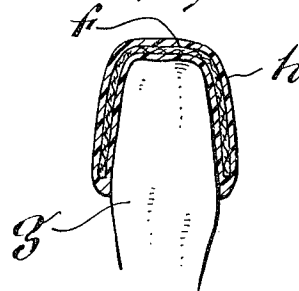


Fig. 6



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DENTAL PROTHESES, JAW-SPLINTS AND JACKET-CROWNS

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3 Claims. (Cl. 32—2)

The present invention relates to dental prostheses, jaw-splints, jacket-crowns, and the like.

There are dental prostheses with fillers for reinforcement already in the market, such fillers consisting, however, of metal webs, whereas at present the material of the plates is of synthetic resins, as a rule. This sort of a combination has its disadvantages, however, in so far as the metal reinforcement is foreign to the synthetic material, thus preventing an intimate adherence, and in case of complete sets of artificial teeth, the metal was brought up to the upper edge of the jaw only so that the upper edge of the gum would still be open to the risk of being injured. A reinforcement to reach as far as the gums' parts was not possible for technical and cosmetic reasons. Even the best retentions of the metal reinforcements would, at their best, result in only a mechanical combination of adherence but according to expert knowledge in general a metal filler will always remain a foreign substance in the finished piece of work, weakening the artificial material and preventing the results from being fully satisfactory.

There is another disadvantage due to the fact that the metal webs cannot be shaped freely off-hand but must first be stamped by means of a die, if they are to fit correctly. Considering the result in question, this procedure would take far too much time, raising the costs of the finished work also without substantial benefit. In addition, there is the disadvantage of a bad appearance, both cosmetic and esthetic, of the fillers usually made of steel, imparting a greyish hue to the rose-tinted synthetic resin. Attempts have been made to remove this difficulty by using gilt steel web fillers, but these, too, made the workpieces more expensive, and besides, the gilding wore out rather quickly at the open spaces of the web in case of a skeleton-prosthesis, followed by a fading into a greyish-brown or even blackish tint, and being most detrimental to the appearance of the finished work. From a mechanical point of view, the grinding-through and polishing-through of the various wires of the web caused trouble and the tender parts of the mouth were injured.

If the synthetic resin plate broke, notwithstanding the metal reinforcement, the metal filler caused some difficulty because it was impossible to get the fragments fitted together perfectly, as they tended elastically to move in various directions, so that repair work was most complicated or not at all possible. Furthermore, the use of glass-silk for this purpose had been suggested; however, there is the disadvantage that in case of a rupture the glass-silk would break as well, thus failing to serve as a reinforcement.

In this field the present invention offers an improvement of importance because a reinforcement-filler will be made of a synthetic material having as the base a polyamide or polyurethane, the basic material preferably consisting of a synthetic substance to be polymerized. Such materials are well-known in the field of plastics. They are formed by condensing an amide with an or-

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ganic poly-acid, such as hexamethylenediamine with adipic acid, in equimolecular proportions; such materials are on the market in filament and other forms under the name of nylon, and the production thereof is described in the literature. Similarly, urethane is condensed with an organic poly-acid.

The new reinforcement-filler may either be consistently attached or also connected to the surrounding plate-material in a less solid way (mechanical only). If a vulcanite base-plate is used, the filler consisting of a nylon network or mesh may be solidly bonded to the surrounding vulcanite by use of any well-known cement. This is true also with reference to acrylic resin plates, being more compatible with the tissue, a material of which artificial dentures are made on a large scale. With the jacket-crowns, too, this reinforcement-filler results in a considerably increased strength of the crown and above all any splintering of the jacket-crown will be avoided, increasing its durability extraordinarily at the same time, whereas as regards the splints a considerable simplification of the operating methods will be obtained in addition to increase of strength. In any case, the invention offers the following advantages:

(1) The new reinforcement-filler is of an origin similar to the surrounding materials, is invisible and elastically ductile at the same time, so that it cannot be torn to pieces. This results in an extraordinary increase of the strength, including that of the base-plate, so that now the base-plate can be made considerably thinner than previously, facilitating the wearing of the artificial teeth in the mouth to a great extent. Besides, due to the great stability and elasticity of the plate, some openings may now be left in the plate, making it far easier to keep in the mouth. If a plate should break, which naturally cannot be completely avoided, the reinforcement-filler offers the advantage that a further use of the broken piece will still be possible for a certain period of time until the repair-work can be carried out. The repair-work itself is most simple because the elastic free fibers need only cutting through in order to have the fragments fixed and duly repaired by means of synthetic resin, fresh reinforcements serving for strengthening applied within the dovetails and retentions in the shape of flat belts, foils, or single fibers, the repaired plate thus regaining its previous strength almost entirely.

(2) The reinforcement-filler being colorless, any protruding parts of the filler will not be apparent and the appearance of the plate will not be affected in any way.

(3) Due to the great elasticity of the reinforcement-fillers the brittleness of base-plates made of synthetic resin will be reduced considerably.

(4) The new artificial denture can be made far more easily, no presses or dies being required as would be necessary in the case of metal webs, and much time will be saved.

(5) Inside of the cavity of the mouth, there will not result any electrolytic currents or other currents detrimental to health, as would be the case with a metal filler getting in touch with saliva or with any other metals in the teeth.

(6) The durability of the dentures, crowns, and splints are considerably increased due to the new filler.

(7) The invisibility of the equipment-material allows the mesh-filler to be worked also across the inner edge of the jaw into the gum-parts, which also helps to produce an especially good stabilization.

Furthermore, the invention includes the entire base-plate, jacket-crowns and splints to be produced of synthetic material having the base of polyamide or polyurethane, increasing the number of advantages considerably.

In the accompanying drawings constituting a part hereof and in which like reference characters indicate like parts:

Fig. 1 is a transverse cross-sectional view of a denture or dental prosthesis, made in accordance with the present invention;

Figs. 2 and 3 are respectively side elevational and top plan views of teeth of an individual having splints of the invention applied thereto;

Fig. 4 is an enlarged side elevational view of a pair of teeth having a splint applied thereto;

Fig. 5 is a top plan view of teeth, three of which are held in a splint of the present invention, and

Fig. 6 is a vertical cross-sectional view of a crown of synthetic material reinforced by the present invention.

Referring to Fig. 1, the base plate *a* is of a polyacrylic resin, such as of polymerized methyl methacrylate. On the inner face thereof is a tissue or mesh or fabric of nylon or the like, said tissue being imbedded in plate *a* before it has become hardened so that the two are intimately combined. Since both substances have practically the same coefficient of expansion, the resulting denture is a single unit of high strength.

Figs. 2 to 5 illustrate several forms of splints of a type used frequently in dental treatment. Nylon or the like fibers twisted to form threads *c* are combined with synthetic materials formed by auto-polymerization, whereby rapid production of splints *d* is obtained. It is applicable to both emergency-splints and permanent bands for fractures of the jaw, replantations of teeth, and of holding- or retention-splints in the orthopaedy of the jaw, when quick action is required.

This is done by placing figure-eight-shaped ligatures round the teeth which are to be splinted, using one or more turns or bandages of a laced or twisted nylon thread of different thickness. Following this and for a matter of consolidation, a layer of 1 or 2 mm. of an auto-polymerizing synthetic material, such as methyl methacrylate, of the same tint of the teeth, as may be had freely in various forms today, will be applied and slightly shaped, following the line of the nylon thread. The synthetic material hardens, is rough ground after a few minutes and fine polished a little later.

Because of its smooth finish, the artificial splint is much more attractive in appearance than the hitherto usual wire bindings with their large number of salient hooks. It is less noticeable, being adapted to the tint of the teeth whereas the metal splints are a nuisance to the wearer because of their outstanding appearance.

The technical improvement includes the possibility of a quick production, independent of technically trained staff or laboratory, resulting also in considerable saving of work, no longer requiring casts, patterns, modelling in wax, castings, or bending technics, followed by insert-

ing by means of cement which readily tends to dissolve in the liquids of the mouth, so that such metal splints must often be inserted repeatedly or have to be tied up by wire-ligatures, the wire-ends of which cause trouble very often.

The combined synthetic splint as above described, will stick automatically owing to the adhesion of the synthetic material itself, without any additional fastenings. The removing is most simple, just by pulling-off or cutting by means of a separating-disk.

This combination of synthetic material and nylon or the like allows for a large number of additional results, including the reinforcement of synthetic jacket-crowns in the shape of rough embossed web-heads *f* etc. which are put on the stump of a tooth to reinforce the crown. Thus, the splintering of parts of the crown will be avoided and the risk of the crown breaking will be diminished extraordinarily. The head *f* is placed on the duly prepared stump of a tooth *g* (Fig. 6) and the synthetic crown, while becoming hard, is placed on top of it as a jacket-crown *h*, so that the reinforcement *f* unites with the crown and becomes integral therewith.

I claim:

1. A dental appliance consisting essentially of a base of a synthetic plastic material taken from the class consisting of polyamide plastics having imbedded therein a reinforcement filler made of threads of a substance taken from the class consisting of polyamide plastics, said filler being intimately united with said base.

2. A method of making dental appliances which comprises wrapping around the teeth at least one turn of a thread made of a substance taken from the class consisting of polyamide plastics, applying to said teeth a strip of an autopolymerizable synthetic plastic in contact with said thread, and causing said synthetic plastic to polymerize and to unite with said thread, whereby the splint so formed is strengthened.

3. A method of making dental appliances which comprises placing on a tooth a head made of a substance taken from the class consisting of polyamide plastics, placing over said head a body of an autopolymerizable synthetic plastic, shaping said body to form a crown for said tooth, and causing said synthetic plastic to polymerize and to unite with said head, whereby the crown so formed is strengthened.

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