

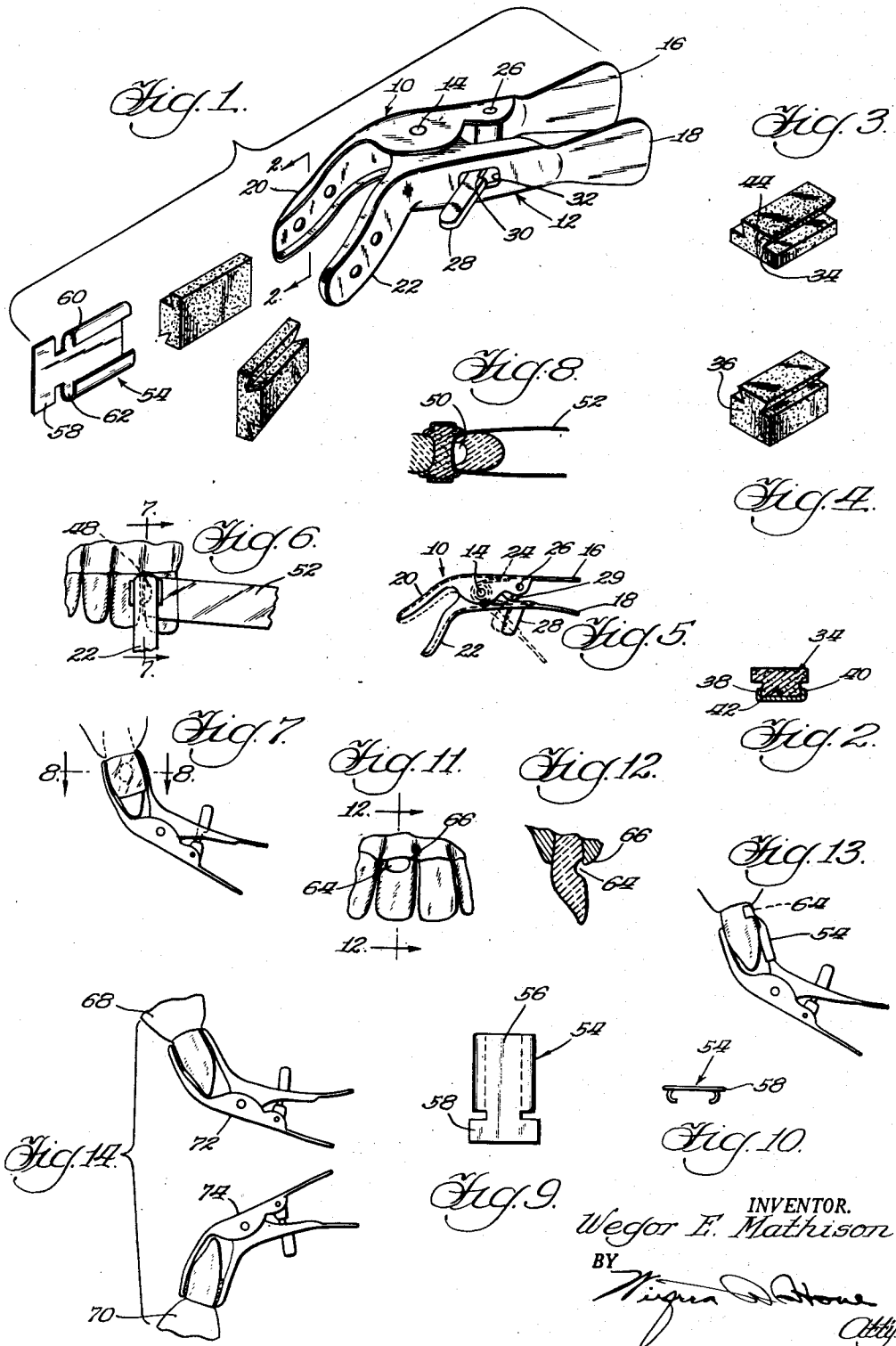
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DENTAL CLAMP

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DENTAL CLAMP

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3 Claims. (Cl. 32—63)

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This invention relates to a dental clamp, and consists of a clamp having two jaws with a formable material in each jaw.

Dentists have long sought a suitable device for holding a porcelain filling in position in a cavity during setting so that it would be unnecessary for the dentist to hold the filling with his fingers for a substantial period of time. In filling upper or lower anterior teeth with porcelain, the general practice has been to fill the cavity with freshly mixed porcelain, position over the surface a matrix of cellophane, and then to hold the matrix and the filling between the balls of two fingers for several minutes until the porcelain has set. This holding operation is tiresome and wastes dentists' time. The porcelain manufacturers combat the difficulty by developing improved quick-setting porcelains and dentists have devised clamps to substitute for the fingers. These clamps attempt to hold the cellophane matrix in place at a point spaced from the porcelain filling and their success, therefore, depends entirely upon the purchase provided on a tooth. These clamps are not designed to hold the matrix adjacent the filling as do the fingers. They hold the cellophane matrix at a point spaced from the filling and it is difficult to hold the flat cellophane over some fillings.

The first object of this invention is to provide a mold which conforms itself under pressure to the exact contour of the surfaces of the filling and adjacent portions of the tooth, and which mold upon hardening holds itself and the filling tightly in position until the filling has set. A feature of applicant's invention is the provision of a clamp on the inner surface of each of whose jaws is an inlay of thermoplastic material such as gutta-percha. Dental gutta-percha is sufficiently hard at room temperatures so that a finger nail cuts its surface with difficulty. With a light application of heat, it softens and its surface will assume any selected contour and upon cooling, hold the contour.

A second object of this invention is to provide a dental clamp that can be effectively sterilized. This is accomplished by making the gutta-percha inlays removable. They are used once and then discarded. Thereupon, the clamp, being made entirely of metal, can be effectively sterilized.

Another object of this invention is so to relate the jaws of the clamp to the handles of the clamp that when the clamp is in position on upper or lower anterior teeth, it will not interfere with the lips or the partial closing of the jaws, or in general obstruct access to the mouth. Good dental

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technique may require holding the mold in position for five to ten minutes, and if the dentist can work on other teeth of the patient during this time, waste time is eliminated.

The fourth object of the invention is to provide a clamp which carries a lock for holding the jaws open so that firstly, the dentist can heat the gutta-percha molds with minimum difficulty and then after carefully positioning them over the cellophane matrix and the filling, can release the jaws so as to press the gutta-percha into engagement with the filling and tooth.

In addition to meeting the general problem of holding porcelain fillings during hardening, applicant has provided an attachment for holding porcelain fillings in a gingival cavity. A gingival cavity is one which is contiguous to or partially beneath the gum, and consequently is in a place where a clamp will not hold a cellophane matrix satisfactorily. As in the case of the interdental cavity, applicant seeks an inelastic, bendable material for shaping to the surface of the filling in the cavity. However, it would be difficult to use the gutta-percha mold because clamp jaws would interfere with the gum. In the case of the gingival cavity, applicant uses a clip made of soft metal sheet such as copper sheet, which has one end which may be slipped over a jaw of the clamp and the other end, which may be shaped, with a dental tool, over the mouth of the cavity.

These and such other objects as may hereinafter appear are attained in one embodiment of the invention, wherein:

Fig. 1 is a perspective exploded view of applicant's clamp with a pair of gutta-percha molds ready for mounting in the jaws, and alternatively one of applicant's copper clips ready for mounting on one of the jaws.

Fig. 2 is a view taken on the line 2—2 of Fig. 1 with a gutta-percha mold in position;

Figs. 3 and 4 are perspective views of gutta-percha molds;

Fig. 5 is a side elevation illustrating applicant's lock in both positions;

Fig. 6 is a front view of adjacent upper incisors showing a cavity with a filled cellophane matrix over it;

Fig. 7 is a view taken on the line 7—7 of Fig. 6 but with one of applicant's dental clamps in position after hardening;

Fig. 8 is a view taken on the line 8—8 of Fig. 7 but with the clamp in position;

Fig. 9 is a front elevation of applicant's metal form attachment;

Fig. 10 is an end elevation thereof;

Fig. 11 is a view of a front upper incisor with a gingival front cavity therein;

Fig. 12 is a cross section taken on the line 12—12 of Fig. 11;

Fig. 13 is a side elevation of the tooth and cavity shown in Fig. 12 with applicant's clamp and metallic attachment in position; and,

Fig. 14 is a view of a portion of upper and lower human jaws illustrating how applicant's clamps can be used simultaneously on upper and lower teeth without excessive interference.

Continuing to refer to the drawings, in Fig. 1, applicant's clamp is of the pincer type and comprises two arms 10 and 12 pivotally joined on a shaft 14 so as to provide two handles 16 and 18 and two jaws 20 and 22. A spring 24, shown in dotted line in Fig. 5, urges the jaws into closed position. Pivotally mounted on a shaft 26 on the arm 10 is a pawl 28 having a shoulder 30. This pawl extends through an opening 32 in the arm 12 and by pressing the handles 10 and 12 together, the shoulder 30 may engage a wall of the opening 32 so as to hold the jaws in spaced relationship against the action of the spring 24. The opening 32 is so related to the shaft 26 that when the pawl 28 is in the position shown in Fig. 1, that is holding the jaws 20 and 22 open, pressing the handles 16 and 18 fully toward each other causes the edge of the hole 32 to engage the shank 29, see Fig. 5, of the pawl 28 and cam the pawl to the left, thereby releasing it.

The jaws are provided with a means for holding the moldable material, which in this case comprises gutta-percha inlays such as 34 and 36. Referring to Fig. 2, the arms have inwardly turned side edges 38 and 40, which with the arm itself forms a guideway 42 into which may be slipped a slide 44 of the gutta-percha inlays 34 and 36. Note the complementary curvatures of the jaws which facilitate firm engagement with the teeth. The axis of the handle and jaw of each arm intersect at an obtuse angle, the handles extending in the same general direction so that it is possible to set the jaws while working from one side of the teeth rather than directly above or below them.

To use applicant's device, the dentist, referring to Fig. 6, will prepare the interdental cavity 48 in the customary manner. He will then load the jaws of applicant's clamp with a pair of gutta-percha inlays or molds and proceed with the mixing of the porcelain. The porcelain filling 50 is positioned in the cavity in the customary manner. He wraps the cellophane matrix 52 thereover and holds the matrix and the filling in position between two fingers. With the other hand, he heats the gutta-percha inlays in the clamp, which has the jaws held in spread position by the pawl 28. Continuing to refer to Fig. 6, he next slips his fingers to the right over the tooth while holding the cellophane matrix tightly and moves the opened jaws of the clamp between the two teeth. When he has positioned the jaws exactly as he wants them between the teeth, he presses the handles 16 and 18 together, thereby releasing the pawl 28 and the soft gutta-percha spreads evenly over the cellophane and adjacent tooth to provide a cross section such as that illustrated in Fig. 8. The dentist may finally apply a jet of cooling water to the clamp jaws and the gutta-percha immediately hardens. The moment the gutta-percha has hardened, it assists the clamp in maintaining its correct position on the teeth and constitutes a mold wall for the filling and the cellophane.

The gutta-percha or a quick-hardening thermoplastic is the important element in applicant's device. An elastic material such as rubber is not satisfactory. If the rubber is soft enough so that it will not press the cellophane inwardly against the porcelain in the cavity and thereby deform the face of the filling, it is not strong enough to keep the filling from itself sliding out of position before it has hardened. On the other hand, if the rubber is hard enough so that it will not permit the filling to escape from the cavity, it will be sufficiently hard to press the cellophane and filling inwardly of the cavity and thereby deform the surface. The gutta-percha on the other hand, when heated is surprisingly soft, having the consistency of butter at about 70 degrees. It will stay on the clamp but the slightest pressure will deform it. The moment it is hardened, it has a toughness such that it is difficult for a finger nail to scratch its surface. Other thermoplastic materials could perform this function but applicant has confined his experiments to gutta-percha because it is a substance familiar to dentists.

Recognizing that it would be useful to have a single clamp for handling not only interdental cavities but also gingival cavities, applicant provides an attachment or clip 54 for the clamp. This clip is a piece of sheet material, such as soft copper, which is divided into two portions, a holding portion 56 and a mold forming portion 58. The holding portion consists of a pair of oppositely disposed channels 60 and 62 which can be slipped over either of the arms 20 or 22 of the clamp.

Referring to Figs. 11 and 12, the numeral 64 identifies a cavity in the upper front portion of an anterior tooth, a portion of the cavity being beneath the gum line 66—see also Fig. 12. In order to fill this cavity, a dentist will slip a clip 54 over the proper arm of the clamp and position it so that the moldable portion 58 will be adjacent the cavity. Then with his dental tools, the dentist will shape the portion 58 so as to form a mold surface over the cavity. He will then fill the cavity in the conventional manner, and then either with or without a cellophane matrix, he will apply the clamp, as illustrated in Fig. 13. In this situation, the upper edge of the clip may be slipped under the gum.

Referring to Fig. 14, upper and lower jaws are indicated by the numerals 68 and 70 with a pair of clamps 72 and 74 in engagement with teeth in the upper and lower jaws respectively. The view is a side elevation of the center of the jaw and shows how the angular relationship of the handles of each clamp to the jaw makes it possible to apply the clamps from in front of the mouth and to work on either the upper or the lower jaw without excessive interference.

Having thus described applicant's invention, what he claims is:

1. A dental clamp comprising a pair of pincers having a pair of jaws and a pair of handles, a thermoplastic liner disposed on the inwardly directed face of at least one of said jaws, a spring urging the jaws into closed relationship, a pawl pivotally mounted on the inner side of one handle and extending through an opening in the other handle, and a shoulder on said pawl engageable with the wall of the opening, the pivotal mounting of the pawl being more distant from the pivot of the pincer than is the shoulder engaging wall of the opening in the second handle, whereby full closure of the han-

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dles will cam the shoulder of the pawl out of engagement with the wall of the opening.

2. A dental clamp comprising a pair of pincers having a pair of jaws and a pair of handles, said jaws being connected to their respective handles at an obtuse angle, a thermoplastic liner disposed on the inwardly directed face of at least one of said jaws, a spring urging the jaws into closed relationship, a pawl pivotally mounted on the inner side of one handle and extending through an opening in the other handle, and a shoulder on said pawl engageable with the wall of the opening, the pivotal mounting of the pawl being more distant from the pivot of the pincer than is the shoulder engaging wall of the opening in the second handle, whereby full closure of the handles will cam the shoulder of the pawl out of engagement with the wall of the opening.

3. A dental clamp mold comprising a pair of pincers having a pair of jaws and a pair of handles, a thermoplastic liner disposed on the

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inwardly directed face of at least one of said jaws, a spring urging the jaws into closed relationship, a pawl pivotally mounted on one handle and engageable with the other handle for holding the jaws in selected, spaced relationship.

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