April 29, 1941. W. C. HARBART 2,239,960

DENTIST'S PLASTIC TRAY

Filed July 30, 1938

Fig. 1

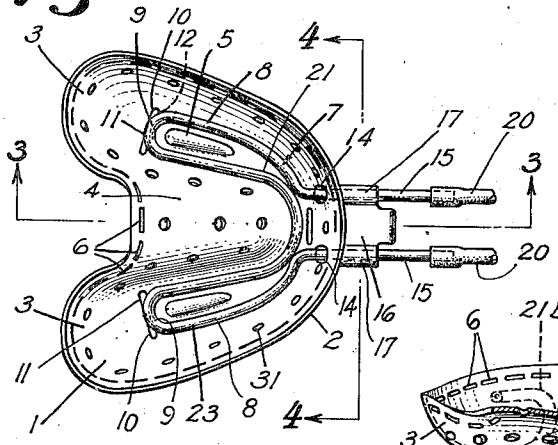


Fig. 6

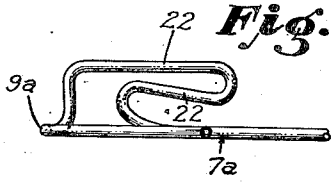


Fig. 3

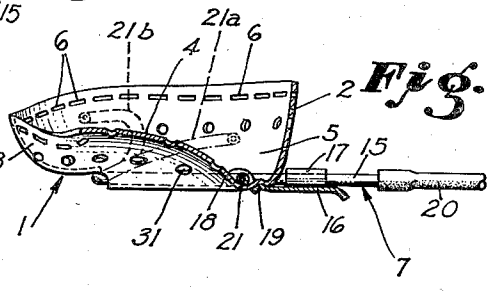


Fig. 2

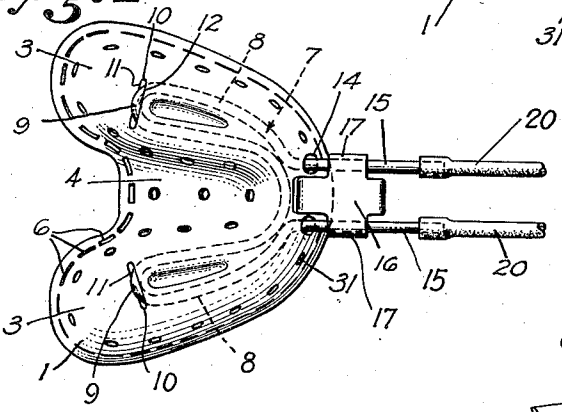


Fig. 4

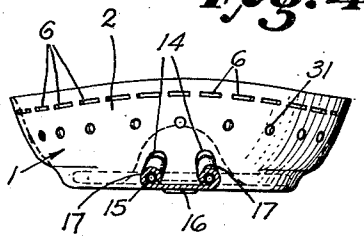
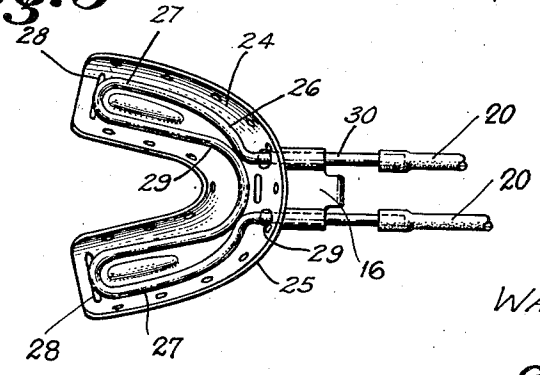


Fig. 5



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DENTIST'S PLASTIC TRAY

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2 Claims. (Cl. 32—17)

This invention relates to a dental tray. These trays are used by dentists for taking impressions of a patient's jaw, and are particularly useful in the preparation of upper and lower partial dentures. These trays in practice, are of rudimentary horse-shoe form, so that they conform to the shape of the jaw, the impression of which is to be taken in the plastic material; and they are formed with a peripheral wall or flange which assists in retaining the plastic material. The impression is taken in the plastic material while it is in a plastic condition as a result of a relatively high temperature, and it is the practice to effect the cooling of the plastic material as rapidly as possible so as to enable the tray to be moved as quickly as possible from the patient's mouth. Heretofore trays have been employed having ducts in their wall for circulating a cooling fluid through the same to accelerate the cooling and setting of the plastic material. Such trays are open to the objection that they are quite rigid, and on account of the fact that the duct is formed in the walls of the tray, it is not possible for the dentist to bend the tray in order to make it conform more closely to the dimensions of the patient's jaw. Furthermore, in such trays the cooling fluid cannot pass into the mass of plastic material, but the cooling of the plastic material must be effected by transfer of heat through the wall of the plate.

Furthermore, the dentist may desire to reduce the width of the flange or peripheral wall of the tray to adapt the tray to the special requirements of the patient's jaw. With trays as ordinarily constructed, this is impossible.

The general object of this invention is to provide a tray which will overcome these difficulties.

One of the objects of the invention is to produce a tray provided with means for effecting the rapid cooling of the plastic material, but constructed in such a way that the tray can be readily bent by the dentist to enable it to conform as nearly as possible to the size and shape of the patient's jaw.

A further object of the invention is to construct the tray in such a way that if desired, a considerable portion of the edge of the peripheral flange and margin of the tray can be quickly removed by the dentist if desired.

A further object of the invention is to construct a dental tray in such a way that a duct member is provided as a part distinct from the body of the tray, and to provide simple means for securing the same in a substantially fixed position when desired, in the tray. One of the advantages of this is that corrosion of the duct member due to the cooling liquid, merely injures the tubular member, which is preferably in the form of a simple tube, which can be thrown away and a new tube substituted. The plastic material is usually a hydrocolloid, and in accordance with my invention I employ ammonium nitrate circulated through the duct member to effect the cooling. Ammonium nitrate develops a very low temperature and quickly effects the cooling. It is, however, quite destructive to the wall of a dental tray, and on account of the corrosion that would occur, its use would necessitate the frequent replacement of trays. By employing the removable tube capable of being fixed in the body of the tray, my invention overcomes this objection.

A further object of the invention is to provide a dental tray with a removable tube for carrying the cooling fluid through the interior of the tray, and to construct the tube in such a way that when desired a portion of the tube can be bent laterally so that it will pass the fluid through the interior of the chamber formed in the tray for the plastic material. In other words, the tube can be bent into such a form that it will be surrounded on all sides by the plastic material.

Further objects of the invention will appear hereinafter.

The invention consists in the novel method, novel parts and combination of parts to be described hereinafter, all of which contribute to produce an efficient dentist's plastic tray.

A preferred embodiment of the invention is described in the following specification, while the broad scope of the invention is pointed out in the appended claims.

In the drawing:

Fig. 1 is a top plan view of a dental tray for taking the impression of the teeth of the upper jaw. This view shows portions of the hose connections braken away.

Fig. 2 is a bottom plan view of the tray illustrated in Fig. 1.

Fig. 3 is a vertical section taken through the tray about on the line 3—3 of Fig. 1. This view illustrates the form of the tray and the normal position of the tube within the tray in full lines, but in dotted lines indicates how the tube can be bent if desired, to carry the tube to a considerable elevation in the plastic chamber. This is particularly useful where the patient has what is known as a "high vault."

Fig. 4 is a vertical section taken about on the line 4—4 of Fig. 1.

Fig. 5 is a bottom plan view of a dental tray of the type employed for taking an impression of the teeth of the lower jaw of the patient. In other words, this tray is illustrated in a position inverted from its position when actually applied to the patient's jaw.

Fig. 6 is a vertical section corresponding to the section 3—3 of Fig. 1, and illustrating another form that may be employed for the tubular member, particularly useful where the patient has a "high vault."

Referring more particularly to the parts and especially to Figs. 1–3 inclusive, 1 indicates the body of the tray adapted for taking an impression of the upper jaw. This tray body preferably has substantially the rudimentary outline of a horse-shoe as illustrated in Fig. 1, being formed with an integral peripheral wall or flange 2, which extends around the front of the plate and along the rear edge of the curved rear lobes 3 of the plate. On the central axial line on which the section line 3—3 is located, the plate is formed with a dome or mound 4 that is convex on its upper side, and in this way the body presents a substantially horse-shoe shaped channel 5.

In accordance with my invention, I form this body 1 of any suitable metal composition, preferably aluminum, which is pliable. This enables the plate to be bent at its flange 2 so as to increase or decrease the general over-all dimensions of the plate to adapt the tray to the special requirements or dimensions of the patient's jaw.

In order to enable the plate to be cut down in size readily by the dentist if desired, I prefer to provide the margin of the plate with a series of elongated perforations or slots 6. As the material of the plate can be readily cut or ground off, the dentist can if he desires, cut the flange 2 of the plate off along the line indicated by these slots 6. This is accomplished merely by cutting the material between the adjacent ends of the slots and cutting or grinding the rough edge down on a grinder to produce a more or less smooth edge.

In accordance with my invention, I also provide the tray body 1 with a removable duct member 7. This duct member is preferably in the form of a bent tube of copper or similar material, which can be readily bent to the desired shape.

Suitable means is provided for enabling this duct member to be removably mounted in the tray and secured therein in a substantially fixed position.

In the present instance, I prefer to construct the duct member so that it presents two rearwardly extending bifurcated forks 8 having curved ends or bights 9 that extend toward the lobes 3. In the present instance, the plate body is provided with a pair of slots or sockets 10 formed in the material of the plate, one edge 11 of each of these sockets being offset upwardly and the other edge 12 offset downwardly. The forward portion or forward bend of the plate is perforated to facilitate the attachment and removal of the duct member. In order to facilitate this, I prefer to provide two openings 14 which are preferably in the form of upwardly elongated slots or eyes (see Fig. 4). The duct member or tube 7 is preferably provided with two necks or shanks 15 that are substantially straight. In applying the tube to the tray body, these shanks 15 are passed through the eyes 14 from the inside, and they are shoved outwardly as far as possible. This will bring the bights 9 slightly forwardly with relation to the sockets 10, whereupon the body of the duct member is swung downwardly so as to bring the bights 9 substantially to the level of the sockets 10, whereupon the duct member is shifted in a rearward direction with respect to the tray body, and this would cause the bights 9 to pass into the slots or sockets 10 so that they will retain the duct member in position.

In order to lock the duct member in position, other means may be provided. This preferably consists of a locking plate 16 having sleeves 17 formed at opposite sides of the same to slip over the ends of the shanks 15. This locking plate slides up against the tray body at the front as indicated in Fig. 3, and at this point interlocking means is formed on the tray body and the plate to lock the plate yieldingly in position. For this purpose the wall of the plate at this point is offset upwardly to form a rudimentary socket 18, and the forward edge of the plate is similarly bent upwardly to form a catch or detent 19 to press itself yieldingly into this socket.

In practice, the tube is preferably constructed so that the shanks 15 tend to separate slightly. In other words, they are thrown more or less out of line with the sleeve 17 so that they are somewhat constrained by the locking plate when the plate is in position. The cooling liquid is preferably ammonium nitrate, and this liquid is circulated through the tube 7 by means of a hose, the ends 20 of which are illustrated in Figs. 1 to 3. Although it is preferable to employ this liquid, of course, any cooling liquid or fluid may be employed.

In a condition where the patient has what is known as a "high vault" it may be desirable to circulate the cooling fluid at a higher level in the mass of plastic material. The tube constructed as illustrated in Figs. 1 to 3, is admirably adapted for this condition because it preferably includes a bifurcated tongue 21, which extends toward the forward portion of the tray from the rear ends of the bifurcated forks 8. This tongue may lie at the bottom of the channel 5 at the forward portion of the tray, as illustrated in Fig. 3, or if desired, it may be bent up into a slightly elevated position as indicated by the dotted lines 21*a*; and where it is desired to produce a local cooling effect toward the rear of the tray, this tongue 21 can be bent around toward the back as illustrated by the dotted lines 21*b* in Fig. 3.

It is obvious that the tube 7 may have any desired form; for example, it may be shaped as illustrated in Fig. 6, which is a vertical section corresponding to Fig. 3. As illustrated in Fig. 6, this tube 7*a* may have side convolutions 22 disposed in a more or less vertical plane and curved around to fit the plan contour of the tray. The rear end of the tube 7*a*, however, would be provided with two rearwardly projecting forks corresponding to the forks 8 and terminating in bent tips 8*a* corresponding to the bights 9 to be received in slots corresponding to the slots 10. This shape illustrated in Fig. 6, of course, brings a considerable cooling area into the interior of the plastic mass, and should result in a very rapid cooling effect for setting the plastic.

If desired, the floor of the tray may be formed with upwardly projecting bosses or "mounds" 23 (see Fig. 1) to be received between the bifurcations of the bifurcated forks 8.

My invention is applicable to a lower tray as well as to an upper tray. This is illustrated in

Fig. 5, in which 24 indicates a tray which is channel-form in cross-section so as to present upwardly extending side flanges 25 between which the body of the tube 26 lies. The bights 27 at the rear ends of the bifurcated forks are received in slots 28 similar to the slots 10, and the tube includes a forwardly projecting bifurcated tongue 29 which, if desired, can be bent laterally up or down to alter its location in the plastic mass.

The forward peripheral wall of flange 25 is provided with openings 29 through which the shanks 30 of the tube pass in the same manner as described in connection with Figs. 1 to 3, and in other respects the construction is substantially the same as that already described.

In order to enable the plastic to secure itself to the tray to facilitate its removal intact with the tray, I prefer to provide the wall of the tray with a plurality of perforations 31. The perforations that are located near the bottom of the tray, that is to say, near the bottom of the channel 5, are preferably of larger size than the upper perforations.

It will be evident that in using this tray, the tube 7 can be readily put in place and removed when desired. Furthermore, the tray, being formed of relatively pliable material such as aluminum, can readily be bent by the dentist to adapt its shape to the particular requirements. Furthermore, when desired, the size of the plate can be reduced by cutting the same away along the line indicated by the slot 6. The cooling tubes are, of course, very inexpensive, and when they become corroded, they can be thrown away and the tray fitted with a new tube.

It is understood that the embodiment of the invention described herein is only one of the many embodiments this invention may take, and I do not wish to be limited in the practice of the invention, nor in the claims, to the particular embodiment set forth.

What I claim is:

1. In a dental tray for taking dental impressions in a plastic material, the combination of a tray body in the form of a plate having a peripheral flange with a pair of openings therethrough, a duct member having a pair of oppositely disposed extensions lying on the said body and having a pair of substantially straight necks passing through the said openings adapted to be attached to a hose, said body having a pair of sockets to receive the inner ends of said extensions, and a locking clip engaging said necks and engaging the said body to secure the duct member on the body.

2. In a dental tray for taking dental impressions in a plastic material, the combination of a tray body in the form of a plate having a peripheral flange with a pair of openings therethrough, a duct member having a pair of oppositely disposed extensions lying on the said body and having a pair of substantially straight necks passing through the said openings adapted to be attached to a hose, said body having a pair of sockets to receive the inner ends of said extensions, and a locking clip having a pair of sleeves to slide over the said necks, said clip and a portion of the wall of said tray adjacent to the said clip having interlocking means for holding the clip in position to secure the duct member on the body.

WALTER C. HARBART.