T. H. VEALE.

DENTAL APPLIANCE.

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1,346,998.

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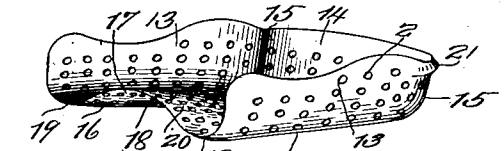


Fig. 1.

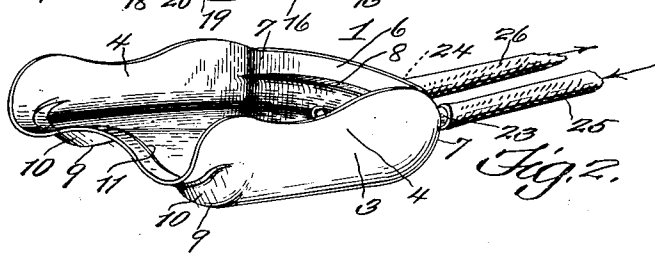


Fig. 2.

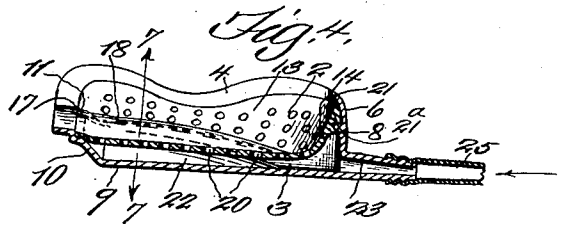


Fig. 4.

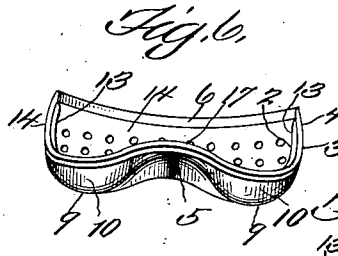


Fig. 6.

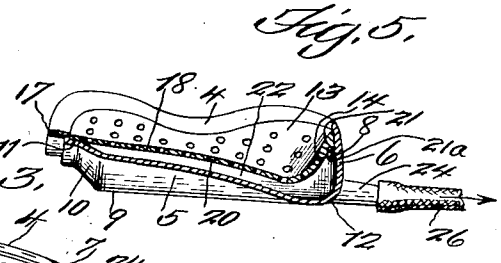


Fig. 5.

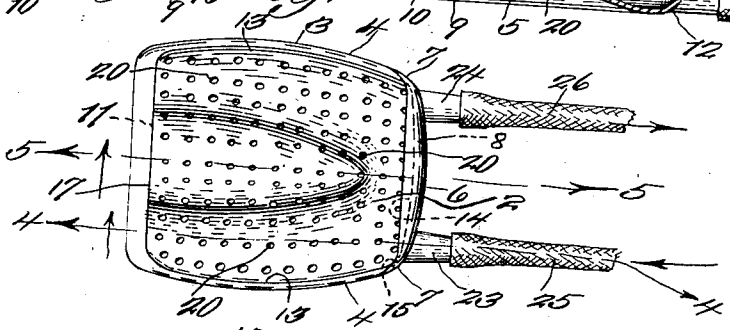


Fig. 3.

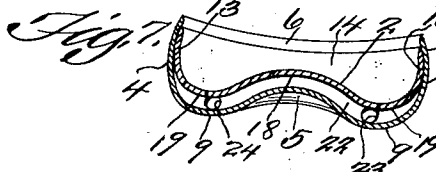


Fig. 7.

Inventor

Thomas H. Veale,

By Watson & Coleman

Attorney

UNITED STATES PATENT OFFICE.

THOMAS HERBERT VEALE, OF CAMP DEVENS, MASSACHUSETTS.

DENTAL APPLIANCE.

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To all whom it may concern:

Be it known that I, THOMAS H. VEALE, a citizen of the United States, residing at Camp Devens, in the State of Massachusetts, have invented certain new and useful Improvements in Dental Appliances, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to the art of dental appliances and particularly to an improved impression tray and an object is to provide a device of this kind especially adapted for taking complete or partial impressions of any part of the mouth or teeth, for constructing complete, partial, crown and bridge plates, in other words to provide a cup or matrix to contain the impression material, whereby an impression can be taken.

Another object is to provide a device of this kind, which is novel, simple and efficient in construction, capable of being cheaply made and sold at a reasonable profit.

Still another object is to provide an impression tray comprising inner and outer trays, one to be supported within the other and adapted to receive the impression material, and so arranged with relation to each other as to provide a thermal water jacket or space between the two trays in order to receive any amount of running hot, warm, cool or cold water which is used for the purpose of keeping the impression compound or material soft and workable, and then to harden the same more quickly in order to insure that the material will retain the shape in which it has been molded. In other words, the principle of circulating different temperatures of water through the jacket or space is to hasten or retard the hardening of the impression material, in other words to govern the degree of hardening as the case may be.

A further object is to provide an impression device or matrix consisting of inner and outer trays and in which case the outer tray can be employed if desired by itself, as an ordinary impression tray, where it is not desired to use the principle of different temperatures of water, but it will be noted that the inner tray may be easily and very quickly inserted in the outer tray, thereby transforming the outer tray into an impression device having the water jacket or space. It is obvious that the water jacket or cooling fluid receiving space principle may be employed in connection with an impression tray for use in taking impressions of the lower part of the mouth or the teeth thereof.

A still further object aims to provide an impression tray wherein inner and outer trays are employed, in combination with means adjacent the interior part of the outer tray and the forward and posterior or palatal portion of the outer tray to support the inner tray in order to provide the surrounding water jacket or space.

Additionally the invention aims to provide a device of this kind wherein the palatal surface of the inner tray of the impression device is supplied with a plurality of perforations, so that the circulating, cooling fluid may contact direct with the impression material such as modeling compound, plaster of Paris and the like. In the case of using beeswax or modeling compound as the impression material it is the aim to employ the perforations, but when using the plaster of Paris, the perforations of the inner tray are eliminated, and also in such an instance the hardening of the plaster is retarded by the flow of cold water and hastened by the flow of hot water. In using the beeswax or modeling compound with the perforations in the palatal surface of the inner tray it is the aim to permit the cooling fluid to come directly in contact with the impression material.

While the design and construction at present illustrated and set forth are deemed preferable, it is obvious that as a result of a reduction of the invention to a more practical form for commercial purposes, the invention may be susceptible to changes, and the right to these changes is claimed, provided they are comprehended within the scope of what is claimed.

The invention comprises further features and combination of parts, as will be hereinafter set forth, shown in the drawings and claimed.

In the drawings:—

Figure 1 is a perspective view of the inner tray of the impression device showing the same constructed in accordance with the invention,

Fig. 2 is a perspective view of the outer tray of the impression device likewise constructed in accordance with the invention,

Fig. 3 is a plan view of the impression device in which case the inner tray is mounted within the outer tray,

Fig. 4 is a longitudinal sectional view on line 4—4 of Fig. 3, showing the water receiving jacket as it is formed toward either side of the impression device,

Fig. 5 is a longitudinal sectional view on line 5—5 of Fig. 3, showing the construction of the water jacket or space between the inner and outer trays at the center of the impression device,

Fig. 6 is a view in elevation of the impression device showing the posterior or palatal edge portion of the device, and

Fig. 7 is a transverse sectional view on line 7—7 of Fig. 4, clearly showing the palatal surface of the inner and outer trays.

Referring to the drawings, 1 designates the impression device as a whole which comprises the inner and outer impression trays 2 and 3. The outer impression tray is designed to be cast or drop forged in any suitable shape or configuration, preferably as shown, so as to fit and be properly inserted in the mouth for taking impressions and furthermore may be constructed of any suitable material. The outer tray comprises a bottom and the side flanges 4. The bottom is constructed in the shape shown so as to provide a palatal surface 5, in other words, a surface that will substantially conform to the mouth, or a surface that will substantially conform to the mouth over the surface of the tongue and near the palate in particular. The flanges 4 are curved and gradually merge into the bottom or palatal surface 5 and have their upper edges formed into the shape shown, though not necessarily, for it is obvious that these flanges may be otherwise constructed. The outer tray 3 has an anterior flange 6, which merges or blends gradually into the side flanges 4, the corners where the flanges 4 and the anterior flange 6 unite are rounded or curved as shown at 7.

The inner surface of the anterior flange has an anterior rib 8, which extends transversely of the flange 6 at a point a trifle below the upper marginal edge of the flange, and is designed primarily for the support of the inner tray 2 as will be hereinafter explained. The forward portion of the bottom of the outer tray on opposite sides of the palatal surface 5 is downwardly curved and bulged as shown at 9 and where this part is so constructed, the sides 4 of the outer tray gradually merge or curve thereinto, so as to provide a contour of tray which will not be awkard or uncomfortable in the mouth, or in other words to conform to the shape of the mouth. It will be noted that these bulges 9 incline, slope or are beveled upwardly as shown at 10, and merge into a posterior or palatal ledge 11, which as shown in Fig. 6 conforms to the palatal surface or bottom of the outer tray. This ledge is designed primarily for the support of the inner tray, as will be hereinafter explained.

The palatal surface 5 of the outer tray, particularly its longitudinal central portion inclines or slopes downwardly and gradually merges into the anterior flange 6 as shown at the curved portion 12 where the flange 6 and the palatal surface unite.

The inner tray 2 is also designed to be constructed in one piece and of any suitable metallic material. In fact, the inner tray is designed to be constructed by stamping or by means of a drop forge method, or cast as may be desired. The inner tray comprises the bottom, the two side flanges 13, and the anterior flange 14. This anterior flange 14 as shown in plan view of Fig. 3 conforms to the anterior flange 6, though not necessarily for it is obvious that the curvature may be varied if desired, as well as the combination of the upper edges of the flanges 13. Where the flanges 13 and the anterior flange 14 gradually merge or curve into each other integrally, such portions are rounded or curved off as shown at 15.

Furthermore the portions 16 where the flanges 13 merge into the bottom of the inner tray are also rounded or curved off. The bottom of the inner tray has its central longitudinal portion bulged upwardly, gradually from the bottom of the anterior flange 14 toward the posterior or palatal edge 17 so as to provide a palatal surface 18, and on each side of this palatal surface the bottom of the inner tray is bulged downwardly as shown at 19. At the point where the bulges 19 (which extend longitudinally of the inner tray) the side flanges 13 curve or merge thereinto. The bottom or palatal surface of the inner tray as shown in Fig. 1 is provided with a plurality of perforations 20. It is to be noted that when the inner tray is supported within the outer tray and the impression material such as modeling compound or plaster of Paris is placed in the device, the cooling fluid will contact directly with the impression material, preferably when beeswax, modeling compound or like material is employed, for it is obvious that when plaster of Paris is used, it is unwise to have the cooling fluid to contact directly with it. In this instance, it is to be noted that the perforations are to be eliminated as they are not shown in Fig. 7, even though Fig. 7 is a cross sectional view on line 7—7 of Fig. 4.

When the inner tray is placed in position within the outer tray, its posterior or palatal edge 17 is supported upon the posterior or palatal ledge of the posterior portion of the

outer tray, and the anterior shoulder or groove 21 of the anterior flange 14 of the inner tray engages or rests upon the inner anterior rib 8 of the anterior flange of the outer tray 6, thereby readily supporting the inner tray in position. The inner tray is so supported by the anterior rib 8 and the posterior or palatal ledge 11 as to face the palatal surface 18 and the inner tray from the palatal surface or bottom of the outer tray, thereby providing a water jacket or water receiving space 22. When the inner tray is placed within the outer tray, the side flanges 13 are so constructed as to conform to the contour of the side flanges 4, in fact all portions of these flanges engage as shown clearly in Figs. 6 and 7 and since the anterior shoulder or groove of the flange 14 engages upon the anterior rib 8, and when the palatal edge of the bottom of the inner tray is in engagement with the rib 11, with the impression material on the interior of the inner tray, the two trays are hermetically sealed so as to prevent the escape of suitable cooling fluid that may be allowed to enter the water jacket or space 22. The anterior flange 6 of the outer tray adjacent its opposite ends and near the bottom of the tray is provided with a pair of tubular extensions 23 and 24, to which rubber tubes 25 and 26 are connected as shown clearly in Figs. 3 and 4.

By the use of hot water caused to be siphoned through the tube 25 into the water jacket and allowed to pass off through the tube 26, the impression material may be maintained soft and workable and as the temperature of water is changed for hastening the hardening of the material as desired, the material will conform to the contour of the mouth. By causing cold water to be siphoned through the tube 26 in a well known manner, the hastening of the hardening of the material may be facilitated and increased and in this case the cold water after circulating through the jacket will pass out through the tube 25.

It will be noted that the sides of the inner and outer trays and the interior shoulder or groove and rib and the posterior or palatal edge and ledges of the inner and outer trays are sealed by the impression material, and owing to the impression material covering the perforations in the palatal surface of the inner tray, there is no possible chance of the escape of water. Furthermore, it will be noted that the water contacts directly with the beeswax modeling compound or other impression material, and will facilitate the action upon the material, whether it is the aim to maintain the material soft or to hasten the hardening of the material. In either case it will be noted that the fluid contacts with the material. As previously stated it is the aim to eliminate the perforations when taking impressions with plaster of Paris and in this instance cold water is used for retarding the hardening of the plaster, while hot water is used for hastening the hardening of the material.

As before stated the outer tray can be readily converted into a hollow impression tray by inserting the inner tray (which is anatomically curved or shaped) within the outer tray with the palatial surfaces of both trays conforming to each other, whereby the anterior and posterior supporting means may engage and be substantially hermetically sealed automatically upon the introduction of the impression material into the completed tray.

In other words, the inner anatomically curved or shaped ridge following and palate following plate or inner tray acts as a cover to the cavity of the outer tray, and provides the proper anatomical shape or form to the cavity of the completed tray. It is practically hermetically sealed to the outer tray automatically upon the introduction of and proper distribution, working or shaping of the plastic impression material into the completed tray.

The perforations or holes of the inner tray are used to permit the hot or cold water or other fluid to come in close contact with the impression material, such as beeswax, or modeling compound when introduced into the water jacket, thus enabling the dental mechanic or operator to keep the impression material at any desired degree of softness or plasticity. The operator is also enabled to fit the tray and its contained impression material leisurely and properly to all parts of the mouth. Then after the tray and its material are properly placed, considerable time is saved, and the operator can give much comfort to the patient by quickly cooling and hardening the impression material by introducing a flow of water cooled to any degree desired, thereby also eliminating greatly the possibility of bending or changing the form or proper shape of the impression when removing the impression from the mouth.

In Fig. 1 the inner tray has the shoulder 21 which rests upon the inner anterior rib 8 to support the inner tray. It is obvious that this shoulder 21 can be eliminated and in its stead a groove 21^a can be employed as in Figs. 4 and 5. In this way, the groove will not only support the inner tray, but will also hold the inner tray down, particularly after the posterior edge of the inner tray is in engagement with the ledge of the posterior edge of the outer tray and especially when the side flanges of the inner tray are sealed in contact with the flanges of the outer tray. Furthermore, the apertures of the inner tray are also formed in the flanges of the inner tray so as to permit the cooling

fluid to contact with the impression material at the flanges of the inner tray.

The invention having been set forth, what is claimed as new and useful is:—

1. In an impression device, inner and outer impression trays, the former being insertible and removably supported within the latter, said trays having sides and anterior flanges, means at the posterior portion of both trays for supporting the inner tray, means adjacent the anterior flanges to further support the inner tray, the sides of both trays and supporting means being in contact, and a water jacket between the bottoms of both trays, said jacket being made watertight by introduction of impression material in the inner tray.

2. As an article of manufacture, an impression tray comprising a palatal surface or bottom, side and anterior flanges, gradually curving or merging into the bottom or palatal surface, and the posterior portion of the palatal surface and the inner surface of the anterior flange having a posterior ledge and anterior rib for the support of an inner impression tray, the inner impression tray comprising a bottom or palatal surface and side and anterior flanges, conforming to the palatal surface and flanges of the former tray, the posterior edge of the palatal surface of the inner tray adapted to engage the ledge, the anterior flange of the inner tray having an anterior shoulder engageable with said rib.

3. As an article of manufacture, an inner tray comprising a bottom or palatal surface, side and anterior flanges gradually curving or merging into the palatal surface, the posterior edge of the palatal surface and the anterior flanges being adapted to engage supporting means of an outer tray, to support said inner tray with its palatal surface spaced with the palatal surface of the outer tray, the bottom of the inner tray having perforations.

4. As an article of manufacture, an outer impression tray comprising a palatal surface or bottom, side and anterior flanges gradually curving or merging into the bottom or palatal surface, said anterior flange having means for the support of the anterior portion of an inner impression tray, the posterior portion of the palatal surface having means merging and blending off into the side flanges and adapted to support the posterior portion of an inner impression tray.

5. As an article of manufacture, a dental impression device comprising inner and outer impression trays, the former being insertible and removably supported within the latter, said inner and outer trays having marginal spaced walls rising from the palatal and anterior portions, means for supporting the inner tray within the outer tray, the posterior portion of the palatal surface of the inner tray and the marginal edge of the wall of the inner tray being offset from and within the edge of the posterior portion of the outer tray and the edge of the wall of the outer tray, whereby the impression material contained in the inner tray may overlie and seal the edge of the wall of the inner tray and the edge of the posterior portion of the inner tray to the wall and posterior portion of the outer tray.

In testimony whereof I hereunto affix my signature.

THOMAS HERBERT VEALE.