No. 810,842. PATENTED JAN. 23, 1906.

J. M. CARD.

ARTIFICIAL DENTURE.

APPLICATION FILED MAY 19, 1905.

2 SHEETS—SHEET 1.

Fig. 1

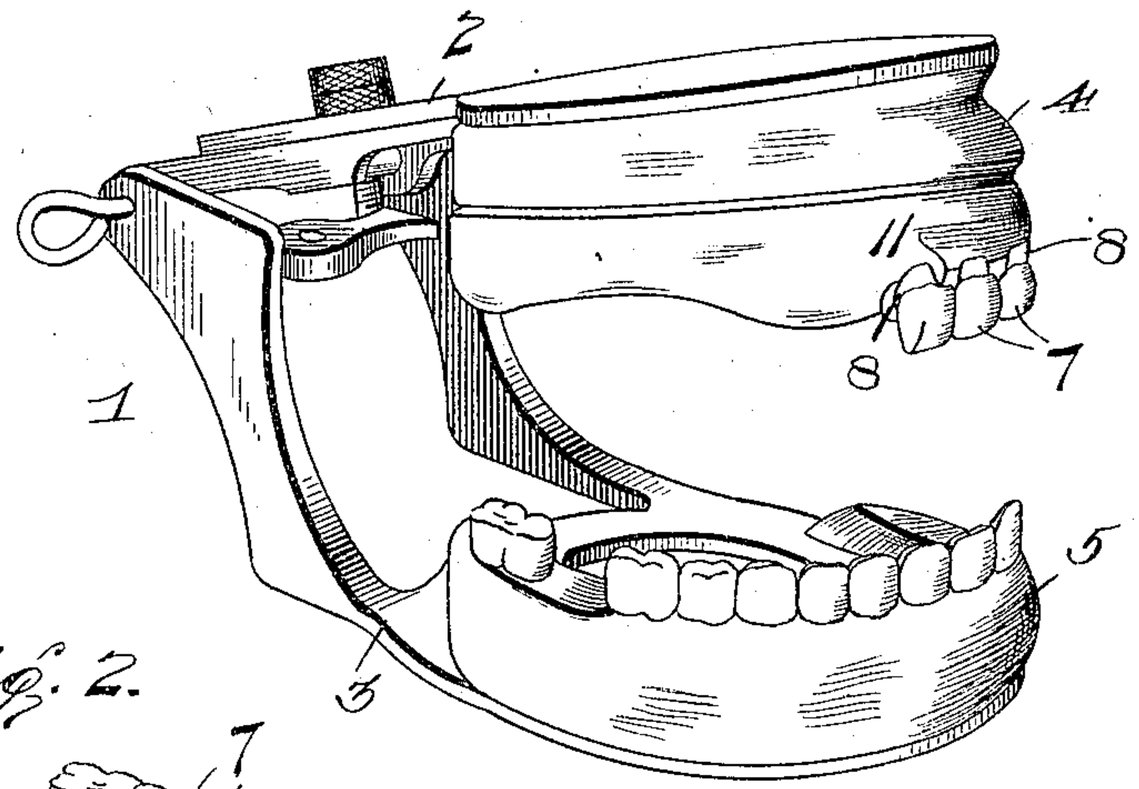


Fig. 2.

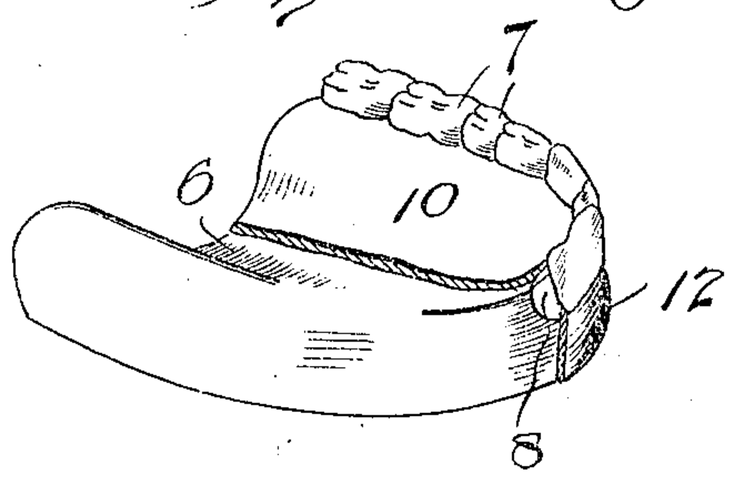


Fig. 3.

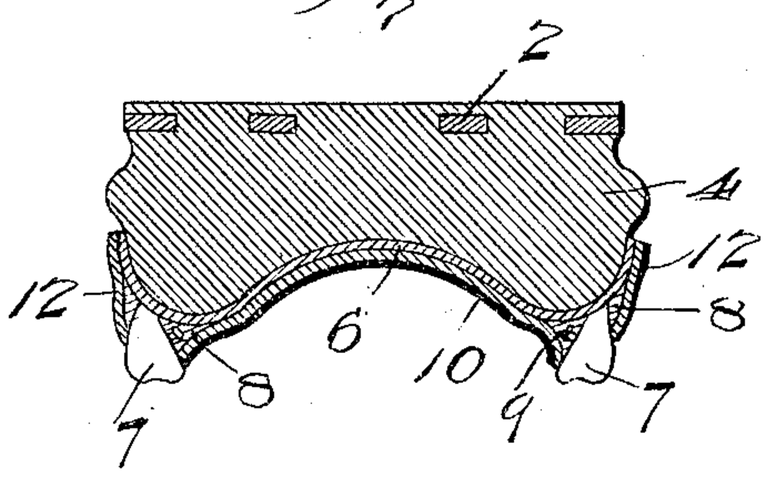


Fig. 4.

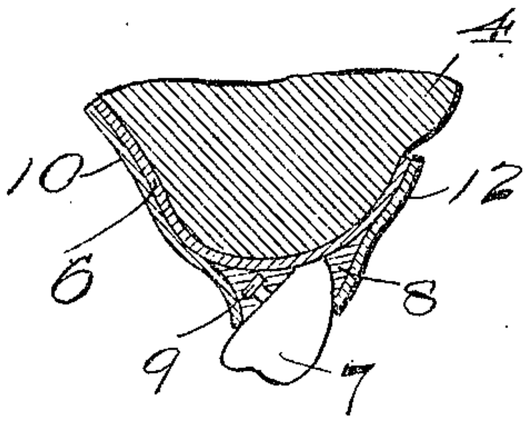
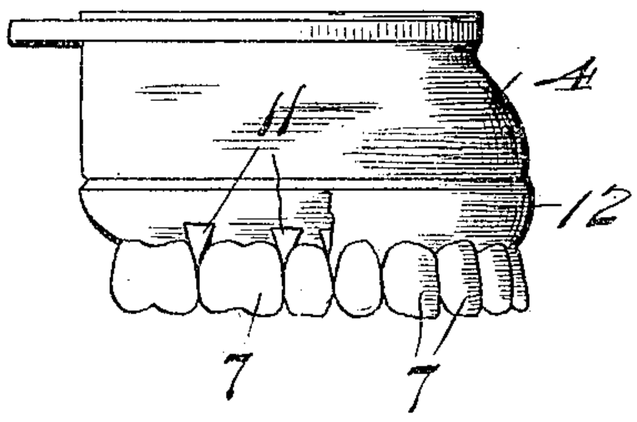


Fig. 5.



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No. 810,842. PATENTED JAN. 23, 1906.

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2 SHEETS—SHEET 2.

Fig. 6.

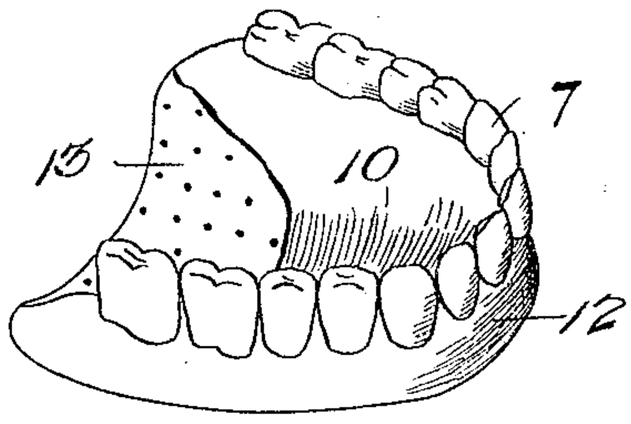


Fig. 8.

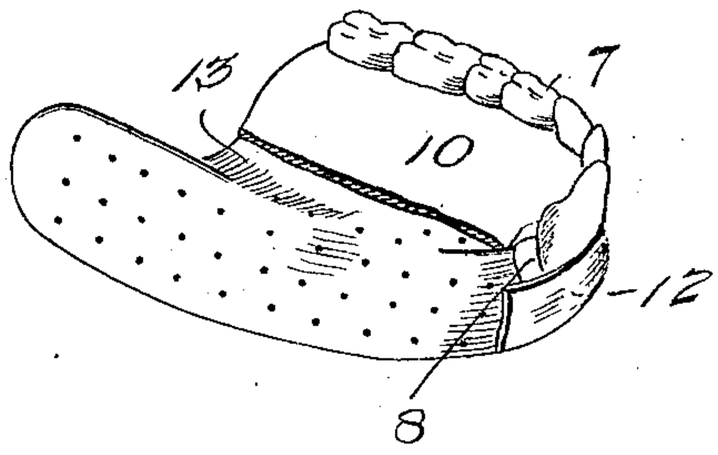


Fig. 7.

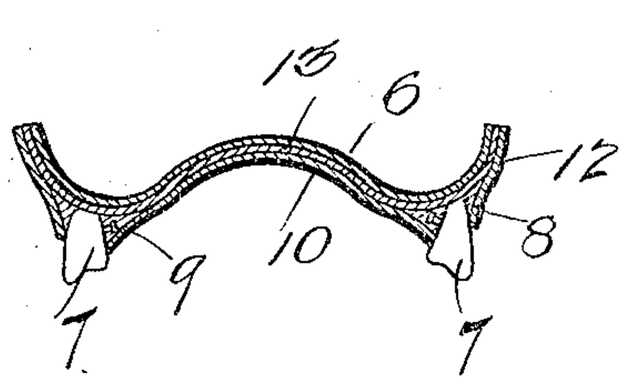


Fig. 9.

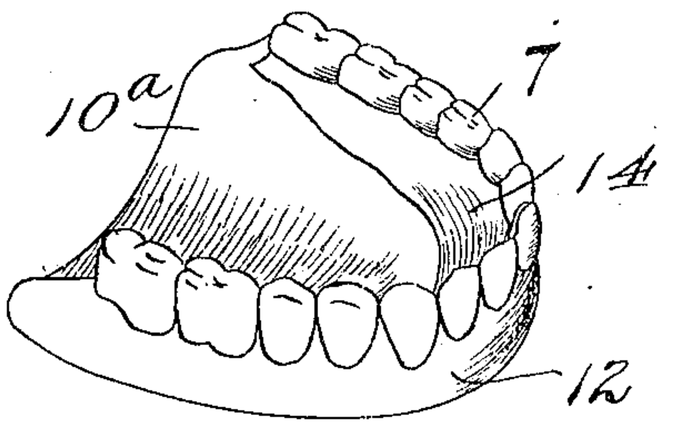
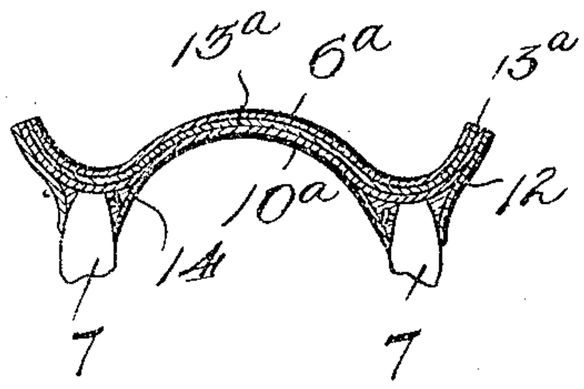


Fig. 10.



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UNITED STATES PATENT OFFICE.

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ARTIFICIAL DENTURE.

No. 810,842. Specification of Letters Patent. Patented Jan. 23, 1906.

Application filed May 19, 1905. Serial No. 261,221.

To all whom it may concern:

Be it known that I, JOHN M. CARD, a citizen of the United States of America, residing at Olean, in the county of Cattaraugus and State of New York, have invented certain new and useful Improvements in Artificial Dentures, of which the following is a specification.

This invention relates to the manufacture of artificial dentures or plates, and has specially in view a simple and practical process for making a denture or plate which greatly economizes the time usually required for this work, while at the same time securing the greatest economy in the use of material and attaining the most perfect results.

A further object of the invention is to provide a practical process or method of making dental plates where all of the steps of making the complete plate, exclusive of the finishing operation of vulcanizing and polishing, are carried out while the model or case is on the articulator, thus entirely obviating the usual tedious and dirty flasking operations which are ordinarily resorted to in the manufacture of artificial dentures.

Another object of the invention is to provide an improved process wherein pink or gum-colored rubber may be applied to the labial surface of the plate or denture while the latter is on the articulator.

In connection with the foregoing process the invention contemplates an improved construction of dental plate of perfect form and articulation and having great molecular strength.

With these and other objects in view, which will more readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts, which will be hereinafter more fully described, illustrated, and claimed.

The essential features of the invention are necessarily susceptible to modification according to the particular character of plate being formed; but for illustrative purposes certain practical embodiments of the process and article are shown in the accompanying drawings, in which—

Figure 1 is a perspective view of an articulator illustrating the manner of carrying out the process of completing a dental plate or artificial denture thereon. Fig. 2 is a sectional perspective view of the plate or denture, illustrating the same partly completed to show the various elements employed in the manufacture thereof. Fig. 3 is a cross-sectional view of the plate or denture in process of formation upon the model carried by one jaw of the articulator. Fig. 4 is an enlarged sectional view of a fragment of the plate or denture, illustrating more clearly the individual tooth-fastening. Fig. 5 is an elevation, partly in section, illustrating the positioning of the interstitial filling-pieces. Fig. 6 is a perspective view of a dental plate embodying a modified structure. Fig. 7 is a cross-sectional view of the plate shown in Fig. 6. Fig. 8 is a perspective view of the plate shown in Fig. 6, but illustrating the same only partly completed to expose the intermediate metallic body-plate. Figs. 9 and 10 are perspective and cross-sectional views, respectively, of another modified form of the plate manufactured by the process claimed herein.

Like reference-numerals designate corresponding parts in the several figures of the drawings.

In order to accentuate the distinctively novel features of the process claimed herein, the exact method of procedure from the initial to the final steps of the process will be pointed out. The first step is to take an impression of the mouth with modeling compound and then a wax bite of the patient's mouth to obtain the proper articulation for the artificial teeth of the denture. The method of obtaining a wax bite is well known in the art, but may be briefly stated to consist of first heating and kneading a sufficient quantity of ordinary beeswax and after shaping it somewhat into a horseshoe form the same is placed between the patient's jaws, who brings the latter partly together to secure a perfect imprint of the jaws in correct apposition, after which the wax-bite is removed from the mouth and allowed to cool. When making a single denture, the imprint of the teeth in apposition is thus obtained, and when no teeth are present in either jaw the correct relationship of the jaws is secured, thus indicating how the artificial teeth must be set upon the model to represent as nearly as possible the natural teeth which have been extracted. After pursuing the above operation the impression of the mouth is taken and the surface thereof scraped slightly where the same has come in contact with the hard palate of the mouth, and then the impression is filled with plaster-of-paris in a

plastic condition, which is allowed to set. After the plaster has set in the impression the plaster model of the jaw is removed by softening the modeling material in warm water, and then the said model of the jaw is placed upon its imprint in the wax bite and articulated—*i. e.*, that portion of the bite containing the imprint made by the natural teeth is oiled and plaster-of-paris poured into the said oiled imprint, the bite being usually sufficiently adhesive to hold the model of the jaw in its proper place. The next step is to place the bite and denture-model between the jaws of an articulator by adding sufficient plaster in soft condition to both the model and the bite to hold the same, respectively, upon the opposite jaws of an articulator. When the plaster has set so as to fasten the model and the bite upon the articulator-jaws, the wax is removed, thus leaving a bite cast upon one jaw of the articulator and the denture-model upon the other jaw of the latter. This is exemplified by the illustration in Fig. 1 of the drawings, which shows an ordinary type of articulator 1, essentially consisting of the upper and lower jaw members 2 and 3, respectively, having a suitable hinge connection and respectively bearing thereon the denture-model 4 and the bite-cast 5 above referred to. With the model and bite-cast in the relative position upon the articulator as specified the denture-model or model of the jaw is first coated with a coating of liquid silex, upon which latter is applied a thin solution of rubber and chloroform. When the denture-model is thus prepared, the first distinctive step of the process is carried out—namely, to heat a thin sheet of plastic vulcanizable rubber, sometimes termed "waxable rubber," and which is not ordinarily available for use in the manufacture of artificial dentures. The thin sheet of plastic vulcanizable rubber (designated by the numeral 6 in Figs. 1, 2, 3, and 4 of the drawings) is heated in warm water or over the flame of a lamp and is pressed by the finger and spatula manipulation upon the model over the entire lingual surfaces of the model. This constitutes the first or primary base of the plate or denture and presents a lingual, labial, and alveolar ridge formation of a dental plate. The next step in the process is to articulate the artificial teeth 7, the positions of which are determined in the ordinary manner. Each artificial tooth 7 is set upon the alveolar ridge of the primary or first base 6 on and in a plastic holding-boss 8, preferably consisting of the waxable rubber of which the first or main base 6 is made. Only sufficient of the plastic holding-boss 8 is placed upon the main base 6 to provide for holding each tooth in position, and to assist in properly fastening each tooth the latter is provided upon its inner side with one or more headed anchoring-pins 9, embedded in the plastic holding-boss 8 for the tooth, as plainly shown in an enlarged detail, Fig. 4, of the drawings. After the articulation of the individual teeth in the manner described, a single piece of ordinary dental rubber (designated by the numeral 10 in Figs. 2, 3, and 4 of the drawings) is slightly warmed and is applied by finger and spatula manipulation over the whole lingual surface of the main base 6 and constitutes what may be termed a "lingual lining" for the plate-body. The lingual lining or second base 10, in conjunction with the main base 6, constitutes what may properly be termed an "all-plastic" plate, and with the teeth articulated and positioned as described it only remains to apply pink or gum-colored rubber on the labial surface of the denture or plate. In connection with this step of the process the preliminary step preferably resorted to is to cut a number of small pieces of the pink rubber (designated by the numeral 11 in Fig. 5 of the drawings) and with a knife or spatula press one of such pieces into each interstice or space between the artificial teeth with or without heat. These individual sections of the pink or gum-colored rubber may be properly termed "interstitial" filling-pieces on account of the function they subserve. After packing or filling in the interstitial pieces 11 between the artificial teeth a strip 12 of pink or gum-colored rubber is placed over the entire labial surface of the plate or denture or the portion thereof necessary to cover. This application of the pink rubber to the entire labial surface of the denture-plate can be accomplished in a few moments time, and in connection with this step it may be observed at this point that when making a denture or plate for a protruding jaw it is sometimes desirable to cut away the labial portion of the first or main base 6 and apply the pink rubber directly on the model of the jaw to prevent too much fullness on the labial surface. This, however, does not change the essential features of the process to provide for entirely completing the setting up and assembling of all parts of the plate while on the articulator. After pursuing the steps above indicated the work is entirely completed so far as the articulator is concerned. The next step is to remove from the articulator the model 4, with the complete denture or plate thereon, and place the model in a dental flask. When this is done, the plaster-of-paris is mixed to a creamy consistency and poured into the flask until the latter is full, after which the cap or top of the flask is applied and the plaster allowed to set. This takes usually about five minutes, after which the flask is placed in the vulcanizer and the latter heated for a sufficient length of time, usually about forty-five minutes, to complete the vulcanizing operation. After the vulcanization has been carried sufficiently far the vulcanizer is permitted to cool, the flask re-

moved, and the vulcanized plate taken from the flask and polished, thus completing the entire process.

The same process in its essential features can be carried out in the formation of an all-metal or part-metal plate or denture, and, as illustrating one of many forms of combination-plates that may be made by the present invention, there is shown in Figs. 5, 6, and 7 of the drawings a dental plate or denture wherein there is interposed between the primary base 6 and the lingual lining 10 an intermediate perforate metallic body-plate 13. This body-plate may cover the entire lingual and labial surfaces of the denture, as shown in Fig. 6 of the drawings, or may cover only a part of such surfaces without affecting the invention; but in the construction shown after the first base 6 has been placed upon the model, as previously described, the metallic plate 13, of aluminium or other suitable metal, is pressed upon or embedded in the main or primary base, after which the teeth are articulated and set up in the same manner as already described, and then the lingual lining and labial rubber strip are applied in the same way as described. In connection with these phases of the process the same reference-numerals are applied to Figs. 5, 6, and 7 of the drawings.

Another variation is suggested in Figs. 9 and 10 of the drawings, wherein the main body or base of the plate or denture may consist of properly-swaged metal plates 6^a and 10^a and an intermediate rubber filling 13^a therebetween. In this modification (shown in Figs. 9 and 10) the artificial teeth are set up in the same way as previously described and also the labial rubber strip employed in the manner previously indicated; but instead of the complete lingual lining there may be set up against the inner sides of the teeth upon the lingual surface of the denture a lingual backing 14, which may consist of dental rubber, dental amalgam, or any suitable low-fusible metal which can be applied with finger-pressure and capable of proper polish.

Whatever the modification may be along the above lines, in each case the entire plate or denture is made and completed upon the model while on the articulator and the flasking and polishing steps are only performed after the completion of the plate or denture.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

1. A process of making dental plates consisting in forming a model and fastening the same to an articulator, then coating the model with liquid silex, next conforming the body portion of the plate to the model while on the articulator, then articulating the teeth on the body portion of the plate and applying a gum-colored rubber strip upon the labial surface while the plate is still on the articulator.

2. A process of forming dental plates consisting in forming a model and coating the same with liquid silex, then applying a solution of rubber and chloroform, next conforming the plate-body to the model, articulating the teeth on the plate-body, and finally applying a gum-colored strip upon the labial surface, all of said several steps being completed while the model is on the articulator.

3. A process of making dental plates which consists in forming a model and fastening it to the articulator, then conforming the plate-body to the model, next articulating the teeth on the plate-body, then applying a gum-colored labial strip on the labial side of the model, while still on the articulator, then removing the model with the completed plate from the articulator, and finally vulcanizing and polishing the plate.

4. A process of making dental plates which consists in forming a model and fastening the same on the articulator, then conforming a plastic vulcanizable rubber sheet to the model to form the main base, next setting up the individual teeth in a plastic holding-boss, then applying a sheet of dental rubber upon the lingual surface of the main base while the model is still on the articulator, then removing the model and plate from the articulator, and finally vulcanizing and polishing the plate.

5. A process of making dental plates which consists in forming a model and fastening the same to the articulator, conforming a sheet of plastic vulcanizable or waxable rubber to the model to form the main base of the plate, then setting up each tooth in a plastic holding-boss on the main base, applying a sheet of dental rubber as a lingual lining upon the main base, working interstitial pieces of pink rubber into the interstices between the teeth at the labial side thereof, then applying a strip of pink rubber over the entire labial surface of the main base while the model and plate are still on the articulator, then removing the model with its completed plate from the articulator, and finally vulcanizing and polishing the plate.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN M. CARD.

Witnesses:
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N. T. GREENWOOD.