

Jan. 5, 1954

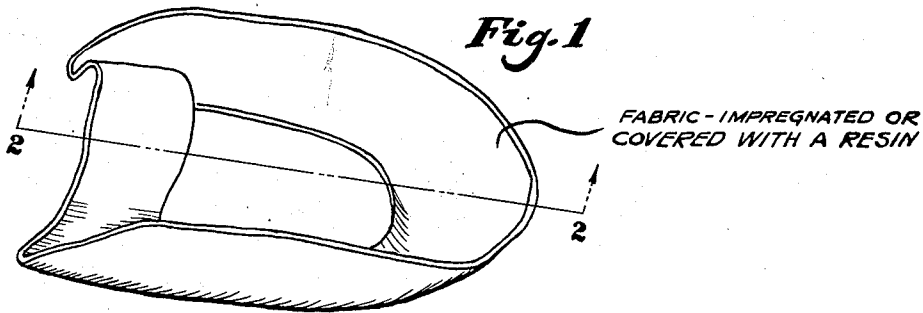
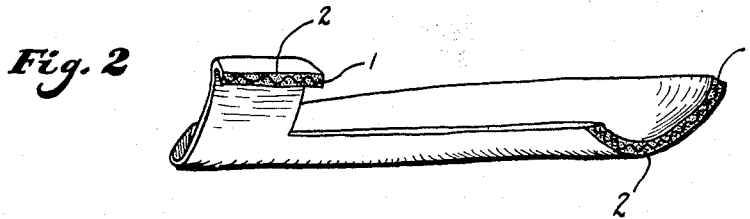
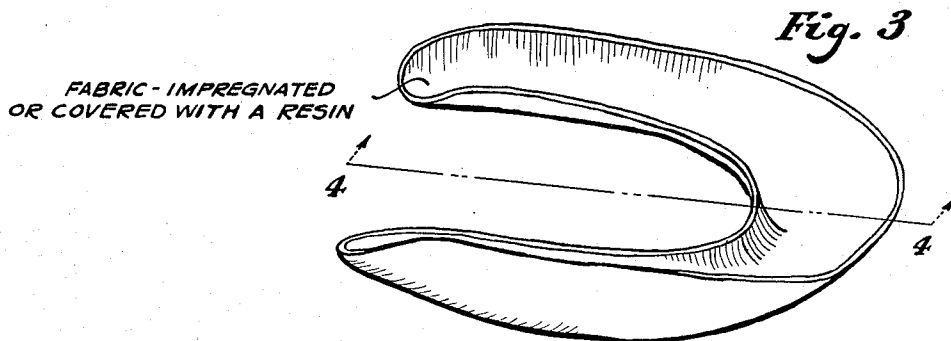
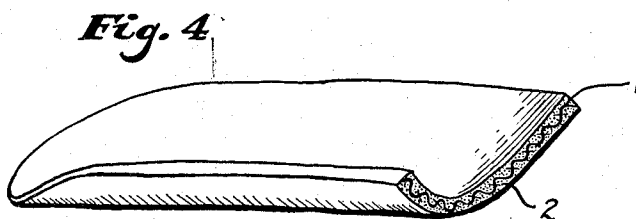
J. HOLLANDER ET AL

2,664,631

CUSHION FOR ARTIFICIAL DENTURES

Filed Nov. 2, 1946

3 Sheets-Sheet 1



INVENTOR,
JULIUS HOLLANDER
BERNARD S. SABREEN

BY

Caesar and Rivise

ATTORNEYS.

Jan. 5, 1954

J. HOLLANDER ET AL
CUSHION FOR ARTIFICIAL DENTURES

2,664,631

Filed Nov. 2, 1946

3 Sheets-Sheet 2

Fig. 5

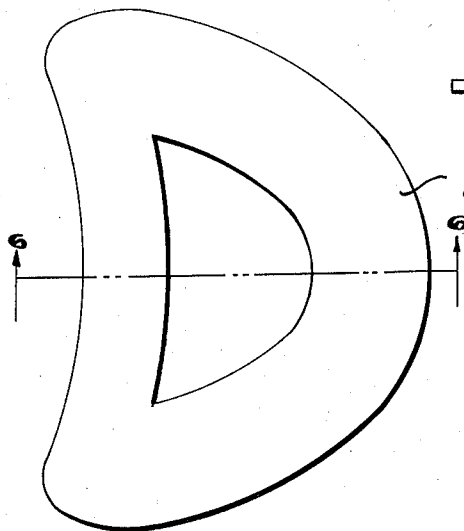
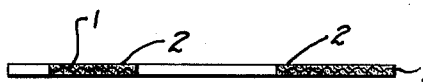


Fig. 6



FABRIC-IMPREGNATED OR
COVERED WITH A RESIN

Fig. 7

FABRIC-IMPREGNATED OR
COVERED WITH A RESIN

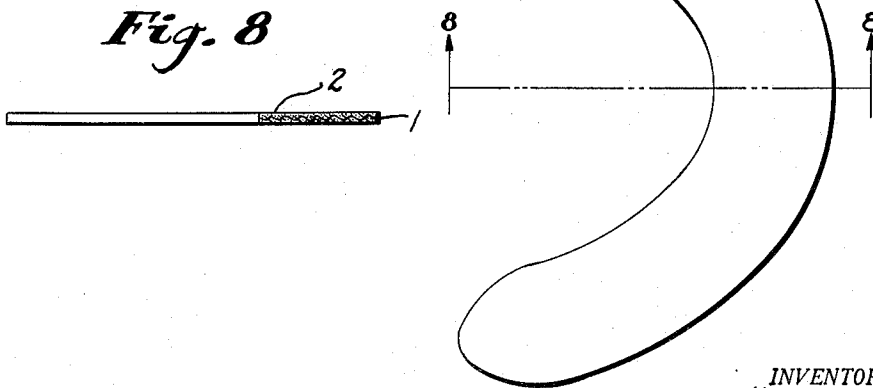


Fig. 8

INVENTOR.
JULIUS HOLLANDER and
BERNARD S. SABREEN

BY

Caesar and Rivise

ATTORNEYS.

Jan. 5, 1954

J. HOLLANDER ET AL
CUSHION FOR ARTIFICIAL DENTURES

2,664,631

Filed Nov. 2, 1946

3 Sheets-Sheet 3

Fig. 9

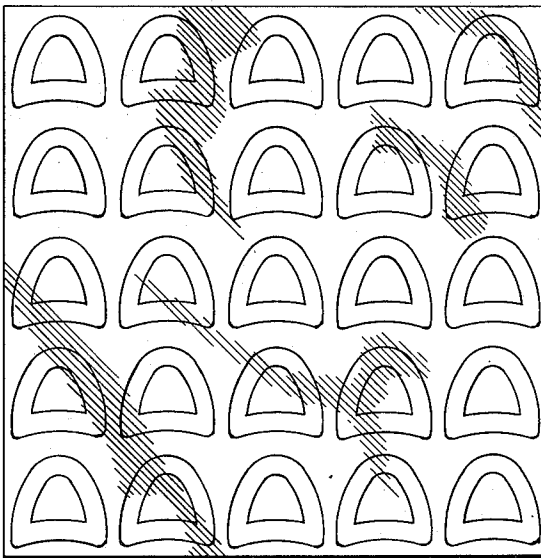


Fig. 11

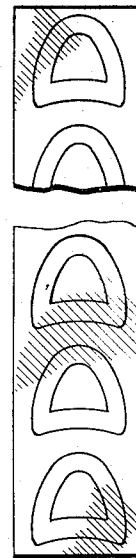


Fig. 10

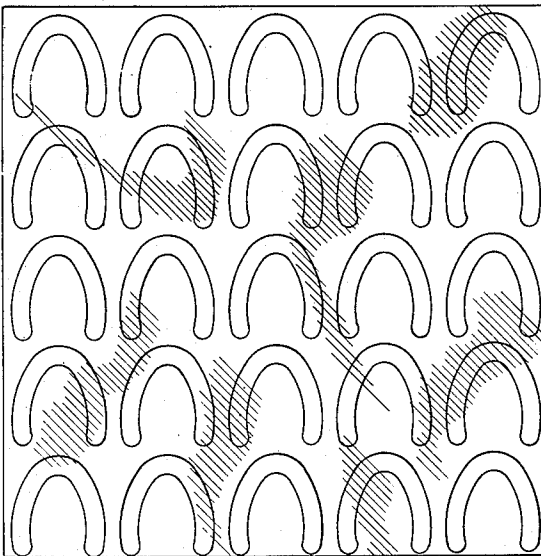
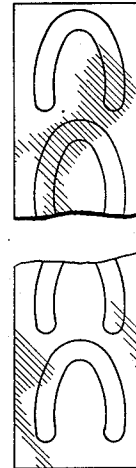


Fig. 12



INVENTORS
JULIUS HOLLANDER AND
BERNARD S. SABREEN

BY

Caesar and Rivise
ATTORNEYS

UNITED STATES PATENT OFFICE

2,664,631

CUSHION FOR ARTIFICIAL DENTURES

Julius Hollander, Yeadon, and Bernard S.
Sabreen, Philadelphia, Pa.

Application November 2, 1946, Serial No. 707,434

7 Claims. (Cl. 32-2)

1

This invention relates to dental cushions which are to be used with artificial dentures in order to compensate for the "looseness" in the fit of the denture. This "looseness" is occasionally due to improper fit at the time the denture is made but in most cases is due to a recession of the gums which normally occurs after the teeth have been extracted. This recession greatest soon after the extraction but continues thereafter.

This looseness has many well known deleterious effects.

The prior art cushions for artificial dentures which attempted to solve this problem consisted of a piece of cloth or similar material covered with some extraneous substance. These dental cushions have been found to be objectionable on one or more of the following grounds:

(a) The material with which they were covered would dissolve when the cushions were in use. In most cases this would happen no matter whether "hot" foods or "cold" foods or foods at "normal temperatures" were eaten. In at least one instance where the material with which the cushions were covered did not dissolve appreciably when "cold" and "normal temperature" foods were being eaten there was some solution of this material when "hot" foods particularly hot liquids such as soups, coffee and tea were being consumed.

(b) The cushions frayed at the edges.

(c) The cushions disintegrated rapidly in use.

(d) Certain of the materials with which the cushions were covered crystallized, flaked and separated from the base material particularly in cold weather.

(e) Certain of the materials with which the cushions were covered melted or fused in comparatively warm weather with the result that the cushions would stick together. This either resulted in loss in shipment or in storage or made it necessary to specially pack the cushions for shipment or storage, as, for instance, by placing suitable strips between the cushions, in order to avoid these losses.

(f) The cushions were comparatively difficult to manufacture.

(g) The cushions were very tacky and therefore unappetizing in appearance.

It is one of the objects of this invention to produce a dental cushion which will be free of the foregoing objections.

We attain the foregoing as well as other objects by providing a dental cushion consisting of a fabric base impregnated or covered with a resin. The cloth may be covered or impregnated

2

with the resin by depositing the latter on the former with or without the use of a plasticizer in any manner desired as from a solution, dispersion or emulsion, or in the dry powder state plus heat either with or without pressure. Where heat is used, no matter whether on the resin in solution or on the resin in dry powder form, care must be taken not to heat the resin to its decomposition point.

The resin imparts body and thickness to the cushion. The plasticizer gives the cushion softness and increases its pliability.

The resin may vary from 10% to 50% by the weight of the total solution. The plasticizer may range from 0.25% to 6.00% of the weight of the solution. In each case sufficient solvent is used to make up the total to 100% of the weight of the solution.

At present we prefer to use a plasticizer and to deposit the resin on the cloth from solution.

The shape of the cushion depends on whether it is to be used in connection with an "upper" or "lower" denture. The shapes used in connection with the "lower" dentures vary among themselves as do also the shapes used in connection with the "upper" dentures. We contemplate using dental cushions of any shape now known or which may be designed in the future.

For the purpose of illustration only, we have shown in the drawings which form a part hereof representative cushions for use in connection with an "upper" denture and with a "lower" denture.

In said drawings:

Fig. 1 is a perspective view of an illustrative cushion for use in connection with an "upper" denture.

Fig. 2 is a similar view of a fragment broken off on the line 2—2 of Fig. 1.

Fig. 3 is a perspective view of an illustrative cushion for use in connection with a "lower" denture.

Fig. 4 is a similar view of a fragment broken off on the line 4—4 of Fig. 3.

Fig. 5 is a plan view of a cushion for an upper denture made flat.

Fig. 6 is a section taken on the line 6—6 of Fig. 5.

Fig. 7 is a plan view of a cushion for a lower denture made flat.

Fig. 8 is a section taken on the line 8—8 of Fig. 7.

Fig. 9 is a plan view of a piece of cloth with cushions for upper dentures stamped therein.

3

Fig. 10 is a plan view of a piece of cloth with cushions for lower dentures stamped therein.

Fig. 11 is a plan view of a strip of cloth with cushions for upper dentures stamped therein.

Fig. 12 is a plan view of a strip of cloth with cushions for lower dentures stamped therein.

NOTE.—The cushions in Figs. 1 to 4 are shown in approximately the shape they assume when in the mouth between the gums and the denture. Incidentally although we prefer to give our finished cushions this contour nevertheless it is not necessary to give said curvature to said cushions. Instead they may be made flat as shown in Figs. 5 to 8. In the latter case they readily will assume the desired shapes when placed in the mouth. In cases where the cushions are sold in shaped form as illustrated in Figs. 1 to 4 instead of in flat form as illustrated in Figs. 5 to 8, the stamping and shaping may be done either in one operation or in two successive operations.

Among the resins which may be used are the following:

Vinyl acetate resins sold by the Bakelite Corporation, Unit of Union Carbide and Carbon Corporation, having an office at 30 East 42nd Street, New York 17, New York, and a factory in South Charleston, West Virginia, under the trade designations AYAB, AYAA, AYAF, and AYAT having the following distinguishing physical characteristics:

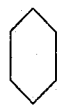
Type	Softening point	Viscosity in centipoises of 86.1 grams plus benzene to make 1 liter of solution
AYAB.....	111.2° F. (44.0° C.).....	2.5
AYAA.....	150.8° F. (66.0° C.).....	5.0
AYAF.....	170.6° F. (77.0° C.).....	15.0
AYAT.....	187.0° F. (86.5° C.).....	21.0

Styrene resin

Methacrylate resins

Cellulose acetate resins, cellulose acetate-butyrate resins, and cellulose acetate-nitrate resins

Among the solvents which may be used as the following:

Class	General formula for class	Exemplary compound	Formula of exemplary compound
Ketones.....	$\text{RC}=\text{O}$	Acetone.....	CH_3COCH_3
Glycols.....	$\text{R}(\text{OH})_2$	Ethylene glycol.....	$\text{CH}_2\text{OHCH}_2\text{OH}$
Halogenated glycols.....	$\text{R}(\text{OH})(\text{X})$	Ethylene chlorhydrin.....	$\text{ClCH}_2\text{CH}_2\text{OH}$
Alcohols.....	ROH	Ethyl alcohol.....	$\text{C}_2\text{H}_5\text{OH}$
Oxides.....	RO	Propylene oxide.....	$\text{CH}_3(\text{CHCH}_2)\text{O}$
Ethers.....	ROR	Diethyl ether.....	$\text{C}_2\text{H}_5\text{OC}_2\text{H}_5$
Halogenated ethers.....	RXORX	β , β ' Dichloroethyl ether.....	$\text{ClCH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{Cl}$
Halogenated paraffins.....	RX	Carbon tetrachloride.....	CCl_4
Nitrated paraffins.....	RNO_2	Nitroethane.....	$\text{CH}_3\text{CH}_2\text{NO}_2$
Aromatics.....		Benzene.....	C_6H_6
Halogenated aromatics.....		Chlorobenzene.....	$\text{C}_6\text{H}_5\text{Cl}$
Esters.....	RCOOR	Ethyl acetate.....	$\text{CH}_3\text{COOC}_2\text{H}_5$

NOTE.—R=methyl (CH_3) group taken any number of times. X=halogen.

4

Among the plasticizers which may be used are the following:

Name	Formula
Tricresyl phosphate.....	$\text{PO}(\text{OC}_6\text{H}_4\text{CH}_3)_3$
Triphenyl phosphate.....	$\text{PO}(\text{OC}_6\text{H}_5)_3$
Dibutyl phthalate.....	$\text{C}_6\text{H}_4(\text{COOC}_4\text{H}_9)_2$
Diethyl phthalate.....	$\text{C}_6\text{H}_4(\text{COOC}_2\text{H}_5)_2$
Dimethyl phthalate.....	$\text{C}_6\text{H}_4(\text{COOCH}_3)_2$
Diphenyl phthalate.....	$\text{C}_6\text{H}_5(\text{COOC}_6\text{H}_5)_2$

Plasticizers sold by Monsanto Chemical Company of St. Louis, Missouri, under the following trade designation:

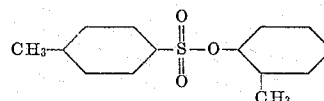
Santicizer 10

Santicizer B-16

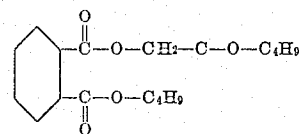
Santicizer E-15

Santicizer M-17

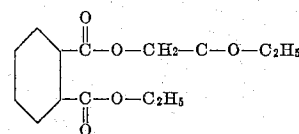
Santicizer 10 is ortho-cresyl para-toluene sulfonate.



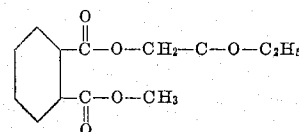
Santicizer B-16 is butyl phthalyl butyl glycolate.



Santicizer E-15 is ethyl phthalyl ethyl glycolate.



Santicizer M-17 is methyl phthalyl ethyl glycolate.



5

In making the solution the solvent may be hot or cold. The plasticizer, resin and solvent may be added to each other in any order. We prefer a hot solvent since it effects a more rapid solution of the resin and plasticizer. Where a hot solvent is used care must be taken either to choose one the boiling point of which is below the decomposition point of the resin or to keep the temperature of the solvent below said decomposition point.

The following are a few of the many possible physical embodiments of our inventive concepts:

Example A.—50% vinylite resin type AYAA is slowly added to 50% ethyl acetate at room temperature and mixed until solution is effected. The cloth is then dipped into said solution. The excess solution is permitted to drain away. The cloth is then placed in a convenient position for drying. After the cloth has dried cushions of the desired shape are stamped, cut or otherwise formed from said dried cloth. The resulting cushions are comparatively heavy and difficultly pliable.

Example B.—To 10% vinylite resin type AYAT one slowly adds 4% Santicizer M-17 and 86% ethyl alcohol at room temperature with stirring until complete solution is effected. One then dips the cloth into this solution and proceeds as in Example A. The resulting cushions are comparatively soft and very pliable.

Example C.—To 10% vinylite resin type AYAF one adds 90% carbon tetrachloride at room temperature and stirs until the solution is complete. Then one dips the cloth into this mixture and proceeds as in Example A. The resulting cushion is comparatively soft and pliable.

Example D.—To 78.5% acetone one adds 20% vinylite resin type AYAT and 1.5% tricresyl phosphate at room temperature and stirs until solution is complete. Thereafter one dips the cloth into this mixture and proceeds as in Example A. The cushions so produced are comparatively heavy, soft and pliable.

The dental cushions shown in Figs. 1 to 12 inclusive are illustrative of the products made in proceeding in accordance with each of the foregoing examples and they consist of a fabric impregnated or coated with a resin 2.

Particular attention is called to the fact that the body and thickness of each of the dental cushions made in accordance with our invention will increase with an increase in the percentage of resin and that the softness and pliability will increase with an increase of the percentage of plasticizer. By varying the percentage of the resin and plasticizer one can produce the cushion which one considers most desirable.

Attention is also called to the fact that the stamping, cutting or otherwise fashioning of the cushions from the cloth may be done either before or after the impregnating or coating.

As has been previously stated the solvent may be hot or cold. Therefore if desired the solvents used in Examples A to D may be above room temperatures. In such cases we prefer to permit the solution to cool before the dipping operation.

Further the solvent in Examples A to D may be placed in a suitable container equipped with a reflux condenser, brought to boiling, the required amount of plasticizer and/or resin added, and the heating continued until the solution is complete.

As has been previously stated the order in which the ingredients are added is unimportant. Therefore one may place the plasticizer and/or

6

resin in Examples A to D in the container with the solvent before the heating and refluxing is begun.

As we have previously stated wherever solution is effected while one or more of the ingredients are hot the solution is preferably but need not necessarily be allowed to cool before the dipping operation.

We prefer to use a soft napped cloth in making our cushions but any suitable type of cloth may be used. At present we are using cloth commonly known as outing flannel weighing from three and one-half (3½) pounds to five (5) pounds per square yard. We use cloth of different weights in order to secure cushions of different thicknesses or gage. The greater the weight of the cloth per square yard the heavier the gage or thickness of the resultant cushion. This thickness of course can further be varied by thickness of the resin coating which is given to the cloth. We prefer, however, to control thickness or gage of our cushions primarily by the thickness or weight of the cloth used. We therefore deposit on the cloth only as much resin as it will absorb and which will adhere to it when dipped into the solution containing the resin, removed therefrom and permitted to drain and dry.

We also prefer to stamp the cushions from the cloth after the cloth has been impregnated with the materials herein specified. But, as has been stated hereinabove, said cushions may first be stamped, cut or otherwise fashioned from the cloth. The cloth may be either in the piece as shown in Figs. 9 and 11 or in strips as shown in Figs. 11 and 12.

Definition

We believe that the resin whether plasticized or unplasticized both covers and impregnates the cloth base. The extent of impregnation depends among other things on the type of cloth used and the manner in which the chemicals are applied. For this reason the term "impregnated or covered" when used in the claims and the specification are to be interpreted as broadly covering the product resulting when cloth is treated with the chemicals herein specified.

Having described our invention what we claim as new and useful is:

1. A cushion for an artificial denture consisting of a relatively thin layer of cloth of substantially U-shape impregnated with a thermoplastic resin selected from the group consisting of vinyl acetate resins, styrene resins and methacrylate resins.

2. A cushion for an artificial denture consisting of a relatively thin layer of cloth of substantially U-shape impregnated with a plasticized thermoplastic resin selected from the group consisting of vinyl acetate resins, styrene resins and methacrylate resins.

3. A cushion for an artificial denture consisting of a relatively thin layer of cloth of substantially U-shape impregnated with a composition consisting of a thermoplastic resin selected from the group consisting of vinyl acetate resins, styrene resins and methacrylate resins and a plasticizer, the resin being present in the proportion of about 90% of the composition.

4. A cushion for an artificial denture consisting of a relatively thin layer of cloth of substantially U-shape impregnated with a vinyl acetate resin.

5. A cushion for an artificial denture consist-

7

ing of a relatively thin layer of cloth of substantially U-shape impregnated with a plasticized vinyl acetate resin.

6. A cushion for an artificial denture consisting of a relatively thin layer of cloth of substantially U-shape impregnated with a composition containing a vinyl acetate resin and a plasticizer, the resin being present in about 90% of the composition.

7. A cushion for an artificial denture consisting of a relatively thin layer of cloth of substantially U-shape impregnated with a vinyl acetate resin plasticized with butyl phthalyl butyl glycollate.

JULIUS HOLLANDER.
BERNARD S. SABREEN.

8

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,785,391	Russell	Dec. 16, 1930
1,950,430	Calcott et al.	Mar. 13, 1934
2,021,121	Dykstra et al.	Nov. 12, 1935
2,057,689	Moss	Oct. 20, 1936
2,169,558	Dittmar	Aug. 15, 1939
2,373,954	Frankfurther	Apr. 17, 1945
2,392,513	Town	Jan. 8, 1943
2,418,833	Harris et al.	Apr. 15, 1947

OTHER REFERENCES

- 15 "Vinylite Resins": Carbide and Chemicals Corp., 1942, pages 4-11 and 16-20.
"Polyvinyl Acetate," E. I. du Pont (3 pp.)