

A. G. MEIER.
DENTAL FILLING MATERIAL.
APPLICATION FILED JUNE 12, 1911.

1,008,845.

Patented Nov. 14, 1911.

Fig. 1.

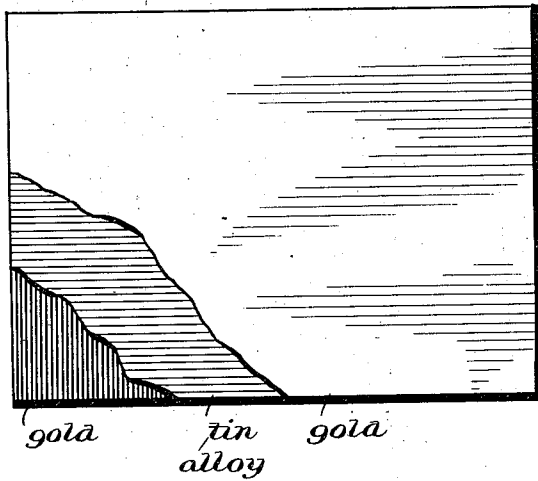
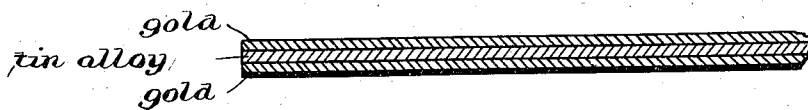


Fig. 2.



Witnesses
J. Adolph Bishop
C. S. Brown.

Inventor
Adolphus G. Meier,
By John H. Brunninga
Attorney

UNITED STATES PATENT OFFICE.

ADOLPHUS G. MEIER, OF ST. LOUIS, MISSOURI.

DENTAL FILLING MATERIAL.

1,008,845.

Specification of Letters Patent.

Patented Nov. 14, 1911.

Application filed June 12, 1911. Serial No. 632,803.

To all whom it may concern:

Be it known that I, ADOLPHUS G. MEIER, a citizen of the United States, and residing at St. Louis, State of Missouri, have invented certain new and useful Improvements in Dental Filling Materials, of which the following is a specification.

This invention relates to dental filling materials and more particularly to dental foils.

Dental filling materials are usually furnished to dentists in the form of foils, and in use pieces of foil are folded and plugged into the tooth cavity. One of the chief requirements of such a filling material is cohesiveness, for the pieces must when plugged into place cohere to form a solid and compact mass. The material most generally used is gold, since it possesses great cohesive properties. Due to the fact however that the gold must have a high purity in order to possess this desirable property, the filling is necessarily expensive. One of the disadvantages of a gold filling is its high thermal conductivity which causes discomfort.

Various attempts have been made to substitute for gold a cheaper material but without success, since few materials possess the desirable cohesive property and at the same time are suitable for a tooth filling. Among others tin has been tried, and since tin is not cohesive to any great extent it has been attempted to use it in combination with gold by placing a foil of tin between two foils of pure gold, cutting the layers into pieces and plugging the same into the tooth. Due to the fact however that tin lacks the necessary cohesive property it requires from five to six times the length of time to plug a tooth in order to obtain a coherent and compact filling that is required with gold. This material is therefore impractical on account of the length of time required for performing the filling operation, making the cost of the work not only excessive but also causing added discomfort to the patient. While therefore a filling material consisting of a combination of tin and gold is cheaper than gold and produces a better filling, the total cost of the finished filling is higher.

The object of this invention is therefore to produce a dental filling material which will possess all the desirable properties and characteristics of a gold filling and additional ones, and which will be cohesive,

thereby reducing the time of the filling operation to that required when pure gold is used.

In accordance with this invention a non-cohesive metal is combined with a cohesive metal to produce a resultant product which will be cohesive. More specifically stated a combination of a base metal such as tin, and gold is used in which the metals are so combined that the resultant product will possess all the desirable properties and characteristics that a tooth filling material should have.

The drawing represents the novel foil forming the subject matter of this invention, Figure 1 being a view showing the different component parts of the foil and Fig. 2 being a section.

The process of making this filling material will be first described. Tin in its pure state cannot be electroplated with gold, therefore it is alloyed with another metal which will make it electro-platable. As an example, an alloy of tin and silver (90% Sn, 10% Ag) is made in a crucible under a hydrogen atmosphere so as to prevent oxidation of the tin. This alloy is then cast in blocks about one inch wide and about one-fourth inch thick, and the blocks are then rolled and cut into pieces suitable for beating. These pieces are then annealed in a hydrogen atmosphere and cleaned in a weak solution of hydrochloric acid. The pieces are then beat out in the form of a foil between gold beaters' skins to nearly the finished product, or so as to require still another beating. The foil is then electroplated with pure gold so that the finished product will contain about 25% gold. In this electroplating operation the ordinary gold plating practice is followed, using the usual cyanid solution. The plated foil is then given a final beating between gold beaters' skins to produce a more even surface and to properly unite the particles of electroplated gold with the tin. This gives the finished product.

The finished product prepared as above will contain about 25% gold, 67.5% tin, and 7.5% silver. The surfaces of the foil will be pure gold, while the body will be an alloy of tin and silver. These different components of the product will be thoroughly united so as to form a coherent structure. Since the coating or surface is of pure gold, the resultant foil will possess the desirable cohesive prop-

erty of pure gold foil, and can therefore be plugged to make a compact and coherent filling with practically the same amount of labor as is required when pure gold is used.

5 The gold and tin combination is not in this case in the form of layers, which layers must be plugged and joined together in the tooth, but the plating of the gold on the platable tin alloy causes the different com-

10 ponents to become a coherent structure. Not only is this filling material much cheaper than a pure gold filling, but it is better and possesses more desirable properties and characteristics. The thermal conductivity

15 of tin is very much lower than that of gold, and therefore the resultant product will have a lower conductivity, thus causing less discomfort due to this fact. Tin and therefore this product is more tolerant to the tooth

20 structure itself than gold. A mixture of gold and tin in a tooth forms a peculiar oxid, changing the entire mass of gold and tin into a structure resembling a tooth structure. In making this change the filling ex-

25 pands slightly, driving it into and filling the smaller pores and cavities in the tooth.

In the specification certain proportions have been described and the steps of the process enumerated in a defined manner. It

will be understood however that these proportions and the series of steps have been used rather as illustrative, since various proportions may be used and the strict sequence of steps in the process deviated from within the scope of the appended claims without departing from the spirit of this invention.

Other metals than silver may be alloyed with tin to make it platable, for instance copper may be substituted for silver. Silver is however found to be more desirable. It will be understood therefore that this invention is not to be limited to the use of any specific alloying metal.

Having thus described the invention what is claimed is:

1. A composite dental foil comprising a body containing tin, and a plating of gold.
2. A composite dental foil comprising a tin alloy plated with gold.
3. A composite dental foil comprising a tin-silver alloy plated with gold.

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

ADOLPHUS G. MEIER.

Witnesses:

J. H. BRUNINGA,
GERTRUDE HESSING.