No. 866,305. PATENTED SEPT. 17, 1907.

F. E. ROACH.

FUSIBLE PORCELAIN CEMENT AND STRENGTHENING BACKING FOR ARTIFICIAL DENTURES.

APPLICATION FILED JULY 29, 1904.

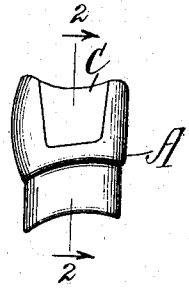


Fig. 1.

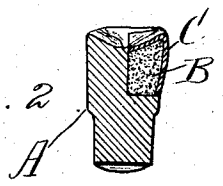


Fig. 2.

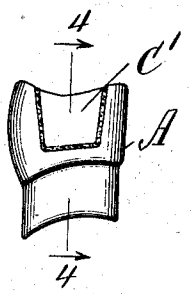


Fig. 3.

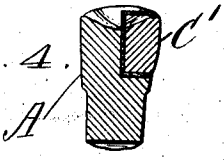


Fig. 4.

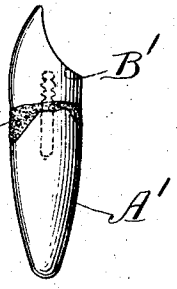


Fig. 5.

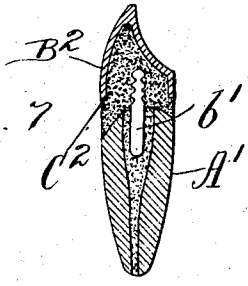


Fig. 7.

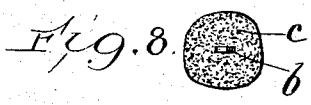


Fig. 8.

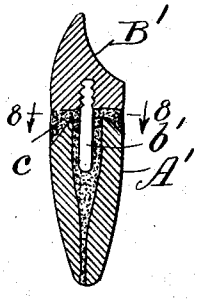


Fig. 6.

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UNITED STATES PATENT OFFICE.

FINIS E. ROACH, OF CHICAGO, ILLINOIS.

FUSIBLE PORCELAIN CEMENT AND STRENGTHENING-BACKING FOR ARTIFICIAL DENTURES.

No. 866,305. Specification of Letters Patent. Patented Sept. 17, 1907.

Application filed July 29, 1904. Serial No. 218,668.

To all whom it may concern:

Be it known that I, FINIS E. ROACH, a citizen of the United States, and a resident of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Fusible Porcelain Cement and Strengthening-Backings for Artificial Dentures; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

Heretofore in constructing and attaching various porcelain dentures particularly artificial inlays or fillings for teeth, of porcelain or similar material, difficulty has been experienced in securing a close fit owing to the porcelain shrinking or becoming more or less distorted during the baking process. With inlays it has been a serious objection that though fitted with the utmost care the baking so distorts and shrinks the material and the stripping of the matrix therefrom leaves a sufficient space around the inlay to permit the fluids of the mouth to attack the cement whereby the inlay is secured in place. It is also difficult to secure a satisfactory union between the porcelain and the cement. These causes frequently result in the inlay falling out. Porcelain being translucent, the cement behind an inlay frequently kills the coloring of the inlay, thus causing the artificial to be differently colored from the natural dentures. So also in securing a porcelain dowel crown upon a root, it has heretofore been necessary to exactly face the coronal end of the root to the base of the crown so that when the crown is secured in place, lateral stresses applied in mastication will not break the structure. It is a matter of considerable difficulty to accurately fit said parts together and should the dentist trust to cement to fill spaces afforded by bad fitting, the cement is not always effective.

The object of this invention is to afford a fusible cement of great strength adapted for use in molding inlays and all structures which it is desirable to afterward render vitreous or more particularly of a porcelain character.

It is also an object of the invention to afford a molding material of a cementitious or crystallizable character adapted to retain the shape and size of the mold without material variation during and after firing.

It is also an object of the invention to afford a material of a crystallizable or a cementitious nature adapted when baked to be opaque and capable of use in lieu of or in connection with ordinary porcelain body for all purposes for which the latter is adaptable and also to afford means whereby porcelain crowns may be accurately fitted to a root as for instance in constructing a pivot tooth or crown and independent of the conformation of the coronal end of the root.

The invention consists in the matters hereinafter described and more fully pointed out and defined in the appended claims.

In the drawings: Figure 1 is a view in elevation and somewhat diagrammatic of a tooth having a cavity therein shaped to receive a porcelain insert. Fig. 2 is a section taken on line 2—2 of Fig. 1. Fig. 3 is a view of the same or a similar tooth, having a porcelain and fusible cement inlay therein embodying my invention. Fig. 4 is a section taken on line 4—4 of Fig. 1. Fig. 5 is a side elevation of a dowel porcelain crown constructed and fitted by my improved method. Fig. 6 is a vertical section of the same. Fig. 7 is a similar section showing the crown constructed of fusible cement faced with porcelain. Fig. 8 is a section taken on line 8—8 of Fig. 6.

As shown in said drawings: Referring first to Figs. 1 to 4 inclusive, A indicates somewhat diagrammatically, the crown of a tooth having a cavity therein in which it is desired to secure a porcelain inlay or filling B which may, of course, be of any desired size or shape. As shown, in Fig. 2, said inlay is constructed of a fusible cement capable of being molded into shape and adapted to set or crystallize during molding and when set to be fused by baking to a vitreous condition resembling, and fusing on to porcelain, but of a slightly granular and opaque nature. Said fusible cement comprises a powdered cement or crystallizable material intermixed with porcelain body in the proper proportions and moistened with a fluid capable of causing the same to set or crystallize in molding. Said porcelain body is the same as that usually used in the construction of inlays and crowns and comprises a mixture of kaolin, feldspar and silex, the proportions of which will vary dependent upon the degree of heat to be attained in fusing and which controls the fusing point of the composition. One such composition of matter may be afforded by mixing oxid of zinc with the porcelain body in about the proportion of one to four and moistening the same with glacial phosphoric acid and water, though obviously the proportions and ingredients will, of necessity, vary dependent upon the fusing point to be attained and the use to which the fused structure is to be applied. The object to be attained is to afford cement capable for use in molding and adapted to fuse to porcelain affording an integral structure.

As shown in Figs. 1 and 2, the molded material B is coated on the exposed faces indicated by C with porcelain body to afford a veneer or glazed finish and is baked in the usual manner and secured in the cavity

by any suitable cement. The inner faces of the inlay thus formed, owing to the granular nature of the fusible cement affords an etched surface providing a desirable bonding surface for the cement whereby the same is secured in place. Should the cement entering into the composition of the inlay contain zinc or any other suitable metallic oxid as it usually will, a corresponding oxid in the attaching cement chemically unites therewith affording an integral connection. The exterior coating or veneer has the usual porcelain structure which, owing to the opaqueness of the inlay retains its color unaffected by the color of the cement whereby the inlay is secured in place.

If preferred, the inlay may be constructed wholly of porcelain body indicated by C′ in Figs. 3 and 4 and after the same has been baked, may be provided with a coating of fusible cement on its inner sides, again fitted to the cavity after which the inlay is baked sufficiently to harden the fusible cement, which, inasmuch as the same does not shrink greatly or become much distorted in baking, fits perfectly in the cavity and may be secured in place in the usual manner.

In the construction illustrated in Figs. 5 to 8 inclusive, in which a dowel crown is shown attached to a fractured root, the fractured portion of the root is removed and the coronal end of the root is cleaned in the usual manner with the exception that no attention whatever is paid to shaping the coronal end of the same to fit the base of the porcelain crown. Instead, after the end of the root A′ is thoroughly cleaned, the fusible cement *c* in a plastic state, is applied to the base of the crown surrounding the dowel *b′* and is pressed into position upon the root so that the said fusible cement fills all spaces left by the fractured parts or lost structure caused by decay or otherwise thereby affording impression of the coronal end of the root. The crown with the impression of the coronal end of the root thereon is then placed in the oven and baked and when again applied to the root, exactly fits the same so that when the dowel is secured in place in the root and the crown cemented in place, the crown has an exact fit and a firm bearing upon the root and a better union with the crown by means of the fusible cement than can be attained by any other material.

If preferred, after the root has been suitably prepared, a crown may be shaped to fit thereto composed wholly of the fusible cement C^2 which may be coated on the outer surface thereof with a thin layer of porcelain body B^2 and baked. When baked, the exterior surfaces of the crown are perfectly glazed while the base of the crown remains of a granular nature adapted to afford an integral union with the cement whereby the dowel *b′* is secured in and to the root A′. This is particularly important for the reason that the coronal end of the root is frequently broken away to such an extent that it has heretofore been impracticable to attempt to dowel a crown thereto especially where the root is too low to band. By my process and the use of a fusible cement such roots can be readily crowned owing to the fusible cement molding perfectly to the root.

If preferred, a small quantity of powdered talc may be incorporated in the cement, this prevents the cement adhering in taking impressions.

While I have described my invention and process as applicable to inlays and the construction of dowel crowns, it is obvious that the same, owing to its greater strength, may be used to advantage for all purposes for which porcelain has heretofore been employed. Obviously, also the invention may be applied in any of the arts in which porcelain, glass or like material are employed.

I do not desire to be limited in the scope of this application, otherwise than necessitated by the prior art and stated in the claims as obviously, the ingredients, the proportion and character of the construction may be varied without departing from the principles of my invention.

I claim as my invention:

1. A composition of matter comprising a fusible mixture of cement and porcelain body capable when mixed with a suitable liquid to be molded into a desired form and to set or crystallize and adapted for baking thereafter.

2. A composition of matter comprising a cement and porcelain body in proper proportions adapted for molding and to quickly set or crystallize and capable of fusing on porcelain and uniting chemically with setting cement.

3. A composition of matter comprising kaolin, feldspar, silex and cement, in proportion adapting the same for molding and fusible to a homogeneous vitreous mass without shrinkage or distortion.

4. A composition of matter comprising fusible cement mixed with porcelain body and having a crystalline texture.

5. A composition of matter comprising a metal oxid, glacial phosphoric acid and porcelain body fused together and affording an etched surface for attaching cement.

6. A fusible opaque backing for porcelain comprising a metal oxid, glacial phosphoric acid and water, said backing being integrally united with the porcelain in fusing.

7. A composition of matter comprising a fusible cement containing a metal oxid and porcelain body comprising kaolin, feldspar and silex and fusing to a homogeneous opaque vitreous mass.

8. A fusible opaque backing for porcelain, comprising a cement of zinc oxid and glacial phosphoric acid, integrally united with porcelain and having a crystalline fracture.

9. A composition of matter comprising a metal oxid glacial phosphoric acid, and porcelain body molded to the desired form and fused to an integral mass.

10. The combination with a porcelain body comprising kaolin, feldspar, and silex, of a crystallizable and fusible cement, integrally connected therewith and comprising a metallic oxid and a liquid mixed therewith affording an opaque structure.

11. A composition of matter comprising a moldable and crystallizable cement containing zinc oxid and a porcelain body of feldspar, kaolin and silex, said ingredients being molded to the desired form and fused to an integral mass.

12. A composition of matter comprising a moldable and crystallizable cement adapted to fuse to a porcelain consistency and containing oxid of zinc whereby zinc oxid cement used in attaching the same in place unites integrally therewith.

13. A fusible molding cement containing zinc oxid and talc adapted for taking impressions without adhesion.

14. A fusible molding cement containing zinc oxid, porcelain body and talc.

15. A fusible porcelain cement containing zinc oxid and porcelain body.

16. A composition of matter for dentures containing a metal oxid and a porcelain body.

17. A composition of matter affording a fusible dental cement and comprising a metal oxid of a crystallizable nature adapted to form an etched bonding surface and a porcelain mixed therewith.

18. A composition of matter comprising a fusible cement and a quantity of the material with which the cement is fused.

19. A composition of matter for dentures containing a metal oxid, material for varying the fusing point of the cement and material adapted to prevent adhesion when making impressions.

20. A composition of matter adapted to be fused to porcelain comprising porcelain and a crystallizable material intermixed therewith.

21. A composition of matter comprising a metal oxid, materials varying the moldability of the cement and material varying the fusing point of the cement.

22. A composition of matter for dentures comprising zinc oxid and a quantity of the material to which the same is adapted to be fused.

23. A composition of matter for dentures comprising a metal oxid, material adapted to vary the fusing point and glacial phosphoric acid.

24. A composition of matter for dentures containing oxid of zinc, material varying the fusing point and material adapted to prevent surface adhesion when taking impressions.

25. A composition of matter containing metal oxids, a porcelain body, glacial phosphoric acid and talc.

26. A composition of matter for dentures comprising a metal oxid and a material to change the fusing point, said compound affording an opaque outer surface when fused.

27. A composition of matter affording a fusible cement for dentures containing a metal oxid and a porcelain coating for said cement adapted when fused to unite integrally therewith and affording opaqueness.

In testimony whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

FINIS E. ROACH.

Witnesses:
C. W. HILLS,
HJALMAR S. RUDD.