May 26, 1936. D. N. BRADLEY, JR 2,042,330

METHOD OF INVESTING PATTERNS FOR DENTAL PIECES

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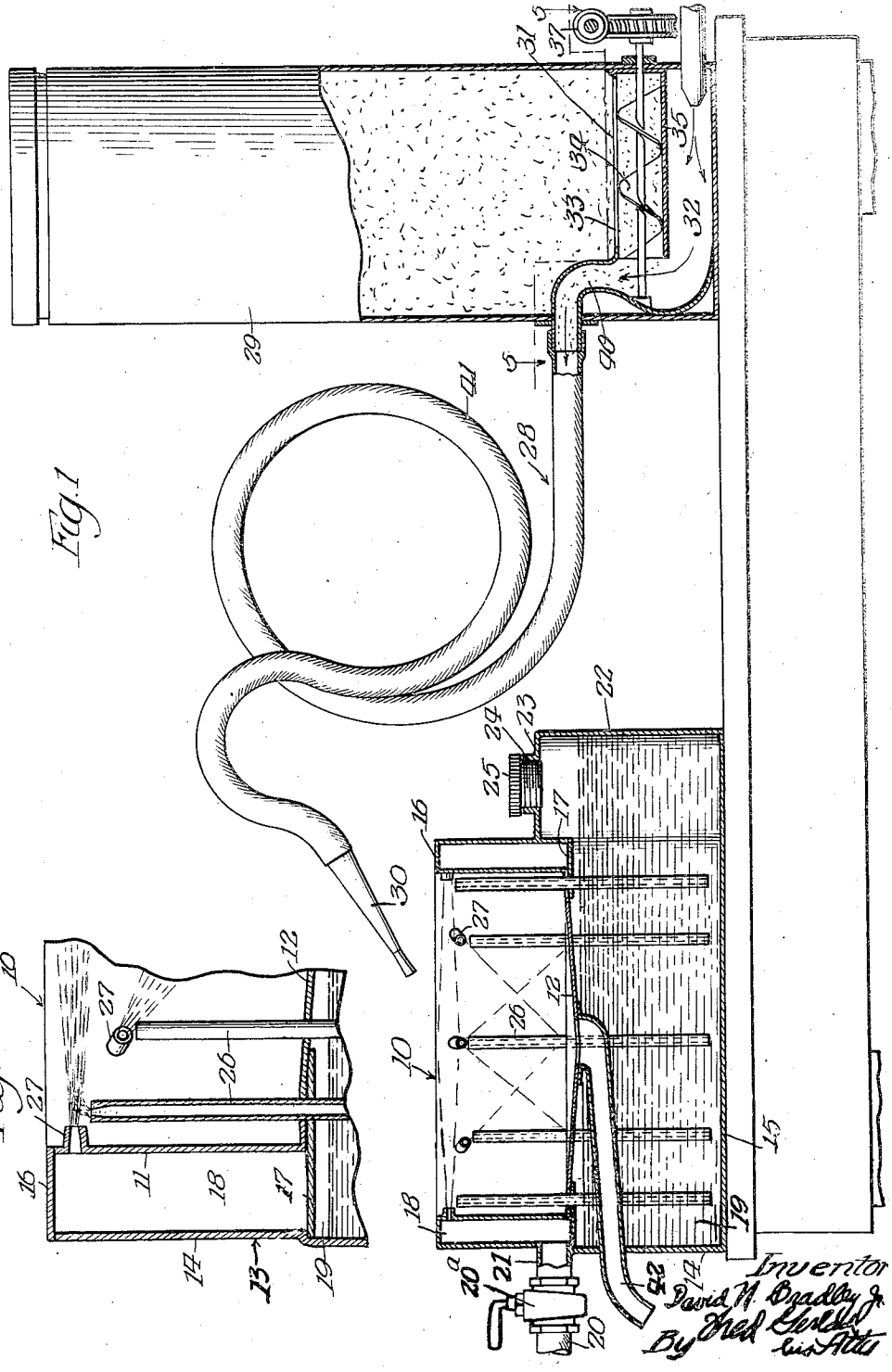


Fig. 1

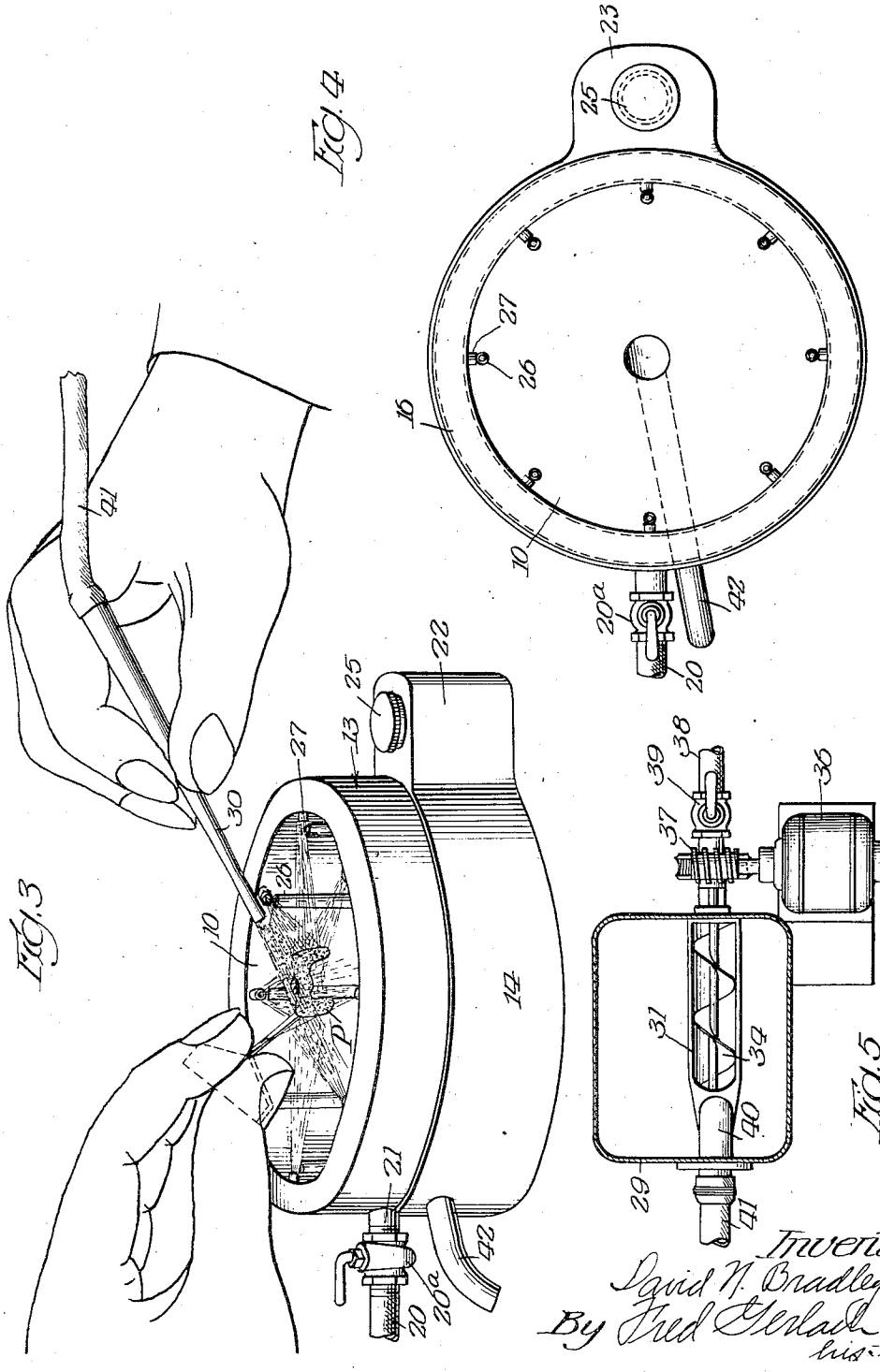
Fig. 2

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METHOD OF INVESTING PATTERNS FOR DENTAL PIECES

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METHOD OF INVESTING PATTERNS FOR DENTAL PIECES

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3 Claims. (Cl. 22—190.1)

The present invention has reference to a method of applying investment material to wax patterns for inlays, crowns, bridge attachments, clasps, bridge pontics, partial or full dentures and other dental pieces.

Heretofore, it has been customary in connection with the casting of dental pieces to apply the investment material to the wax patterns for the pieces either by painting a coating of the material on the patterns by way of a brush and while the patterns are mounted on sprue formers and then positioning the coated patterns in casting rings and pouring additional investment material into the rings and around the patterns or by placing the wax patterns on sprue formers and in casting rings and mounting the rings on a vibrating mechanism and then pouring the investment material into the rings while the latter are vibrated by the mechanism. In practice it has been found that both of these methods of applying investment material to wax patterns are defective in that they do not contemplate the elimination of air bubbles or trapped air around the wax patterns and as a result, the castings which are made from the patterns are imperfect and do not seat or fit properly. When the investment material is applied to the wax patterns by way of a brush, it has been found that the patterns are sometimes distorted as the result of contact with the bristles of the brush, especially in instances where the patterns are made of comparatively soft wax and that air is sometimes trapped in the crevices into which the brush cannot penetrate. When the material is applied to the patterns by way of a vibrating mechanism, air bubbles and trapped air are often encountered on the under faces of the patterns because the investment material will not flow readily into the various irregular surfaces and crevices at the bottom parts of the patterns.

The primary object of the present invention is to provide an improved method of applying investment material to wax patterns for inlays, crowns, bridge attachments and pontics, clasps, dentures and other dental pieces which effectively eliminates distortion of the patterns as well as the formation of air bubbles or trapping of air on the patterns. In general this method comprehends first placing the pattern to be invested on a sprue former and then inserting the pattern into a well or other receptacle having a mist of water therein, in order to moisten all portions of the pattern. After insertion of the pattern into the well investment material in powdered form is jetted by way of compressed air into the mist and against the pattern in order to form a perfect coating around the pattern. The powdered investment material, upon striking the mist, becomes semi-liquid and coats the pattern in such a manner that the latter is in no way distorted and is entirely free from air bubbles and trapped air in the crevices or irregular external surfaces.

Another object of the invention is to provide a method of investing patterns for dental pieces which is less tedious and results in better castings than methods which have heretofore been employed.

Other objects of the invention and the various advantages and characteristics of the present method will be apparent from a consideration of the following detailed description.

The invention consists in the several novel features which are hereinafter set forth and are more particularly defined by claims at the conclusion hereof.

In the drawings which accompany and form a part of this specification or disclosure and in which like numerals of reference denote corresponding parts throughout the several views:

Figure 1 is a vertical longitudinal section of an apparatus for carrying out the improved method;

Figure 2 is an enlarged sectional view of the well of the apparatus, illustrating in detail the means for forming a mist therein;

Figure 3 is a perspective of the well, exhibiting the manner in which the powdered investment material is jetted into the mist in the well for pattern-investing purposes;

Figure 4 is a plan view of the well; and

Figure 5 is a section on the line 5—5 of Figure 1.

The improved method of applying investment material to wax patterns for inlays, crowns, bridge attachments and pontics, clasps, partial or full dentures and other dental pieces, is adapted to be carried out in an apparatus of the type shown in the drawings. This apparatus comprises a well 10. For purposes of illustration, a wax pattern P for an inlay is shown in connection with the apparatus. The well 10 is adapted to have the pattern P disposed therein for purposes of investment material application and consists of a cylindrical side wall 11 and a circular bottom 12. A jacket 13 surrounds the well and holds the latter in an elevated position. This jacket comprises a cylindrical side wall 14 and a bottom wall 15. The side wall 14 surrounds the side wall 11 of the well 10 and is spaced from the latter as shown in the drawings. In addition to the side wall 14 and the bottom wall 15, the jacket 13 comprises a ring-shaped top 16 and a partition 17. The partition

extends horizontally across the central portion of the side wall 14 and serves to support the well 10 and to divide the jacket into an upper chamber 18 and a lower chamber 19. The ring-shaped top 16 extends between and is secured to the upper edges of the side walls of the well in the jacket and closes the upper compartment 18. The latter is connected by a hose 20 to receive air under pressure from any suitable source of supply. The hose 20, as shown in the drawings, is connected to a nipple 21 on the side wall 14 of the jacket 13 and includes a valve 20a whereby the supply of compressed air to the chamber 18 may be controlled. The lower chamber 19 is adapted to retain a column of water and extends under the well 10. The jacket is extended at one side thereof to form a laterally extending leg 22 for the chamber 19. This leg embodies at the top thereof a cross wall 23 which has an opening 24 whereby water may be introduced into the chamber 19. A plug 25 fits removably in the opening 24 and serves normally to close the latter.

The water in the lower chamber 19 is adapted to be formed into mist in the well 10 and for this purpose vertically extending tubes 26 are provided. These tubes, as shown particularly in Figure 2 of the drawings, extend through the partition 17 and the bottom 12 of the well and are arranged in an annular series around the side wall 11 of the well. The lower ends of the tubes are spaced upwardly a slight distance from the bottom wall 15 of the jacket so that water from the chamber 19 may flow into the tubes. The upper ends of the tubes extend alongside of the side wall 11 of the well. They terminate at different elevations and are associated with jets 27. These jets are secured to and extend inwardly from the side wall 11 of the well and receive air under pressure from the upper chamber 18 in the jacket 13. They are arranged so as to direct streams of air across the upper ends of the tubes 26 and, as shown in the drawings, extend at different angles. The streams of air emanating from the jets operate to draw water from the lower chamber 19 in the jacket 13 upwardly through the tubes 26 and disperse the water in mist form in the well 10. By terminating the upper ends of the tubes at different elevations and having the jets 27 extend at different angles, a water mist is formed substantially throughout the entire well. The intensity of the mist in the well may be controlled by adjusting the valve 20a and thus controlling the amount of air under pressure that is supplied to or delivered into the chamber 18. The tubes 26 and the jets 27 exemplify simple means for forming a water mist in the well 10.

It is contemplated that investment material in powdered form be jetted into the mist in the well by air under pressure and for this purpose the apparatus includes a jetting device 28. This device includes a bin 29 and a nozzle 30. The bin is adapted to be filled with a supply of the powdered investment material and embodies a cross wall 31 which serves as a bottom for the supply of investment material and forms an air compartment 32 in the bottom of the bin. The cross wall 31 extends upwardly and outwardly at the marginal part thereof so that the material tends to work towards the center, and the center of the cross wall is provided with a discharge opening 33. A screw conveyor 34 is located under the discharge opening 33 and serves to feed the powdered investment material into the compartment 32. This screw conveyor is mounted in an elongated open-ended casing 35 under the cross wall 31 and is driven by an electric motor 36 at one side of the bin 29 through the medium of a speed reducing gearing 37. Air under pressure is delivered into the compartment 32 by a hose 38 which embodies a control valve 39 and is connected to any suitable source of air supply. The compartment communicates with the nozzle 30 by way of a mouthpiece 40 and a hose 41. The mouthpiece is located in the compartment 32 beneath the cross wall 31 and is arranged so as to receive the investment material which is discharged from the bin by the screw conveyor 34. The hose 41 extends between the mouthpiece 40 and the nozzle 30 and permits the nozzle to be manipulated by hand over the well 10. When the motor 36 is driven so as to actuate the screw conveyor 34 and the valve 39 is opened so as to permit air under pressure to flow into the compartment 32, the material discharged from the screw conveyor is picked up by the air travelling through the chamber 32 and is carried via the hose 41 through the mouthpiece 40 to the nozzle 30. By manipulating the nozzle 30, the powdered investment material may be directed into the well 10 for contact with the mist which is produced by the tubes 26 and the jets 27.

When the apparatus is to be used to apply a coating of investment material to the wax pattern P, the valve 21 is first opened so as to cause air under pressure to flow into the chamber 18 and through the jets 27. The streams of air under pressure emanating from the jets 27 flow across the upper ends of the tubes 26 and draw water from the chamber 19 through the tubes and disperse it in mist form in the well. After formation of the mist in the well, the wax patterns P are mounted on sprue formers and positioned in the well, as shown in Figure 3 of the drawings. While the pattern is so positioned, the device 28 is started by opening the valve 39 and starting the electric motor 36 and the nozzle 30 is manipulated so that the powdered investment material discharged therefrom is directed into the well and against the pattern. As soon as the powdered investment material strikes the mist and the pattern, it becomes semi-liquid and coats the pattern. By manipulating the nozzle 30 and the wax pattern, the pattern may be coated completely with investment material. When the device 28 is in operation, the investment material is discharged from the bin into the mouthpiece 40 by means of the screw conveyor 34 and is carried by the air under pressure flowing through the chamber 32 through the hose 40 to the nozzle 30, as previously pointed out. By immersing or positioning the wax pattern P in a water mist and spraying or jetting the investment material in powdered form into the mist and against the pattern, the coating which is formed around the pattern is entirely free from air bubbles and there is no likelihood whatsoever of air being trapped in the crevices. Furthermore, the pattern is in no way distorted and as a result, produces a perfect and smooth casting. After coating with the investment material in the well 10, the pattern is placed in a casting ring and is surrounded with additional investment material. Thereafter, the sprue former is withdrawn, the pattern melted out and molten metal poured into the cavity as well understood in the art. The intensity of the mist in the well may be controlled, as previously pointed out, by regulating the valve 21 and the jetting of the powdered investment material from the nozzle 30 may be controlled by adjusting the

valve 39 and controlling the speed of the electric motor 36 for driving the screw conveyor 34.

The well 10 is drained by means of a pipe 42 which leads from the bottom 12 of the well and out through the jacket 13.

The method as carried out or practiced with the hereinbefore described apparatus results in the wax pattern being evenly coated with the investment material and entirely eleminates distortion of the pattern and the formation of air bubbles which would result in a faulty casting and an imperfect fit of the piece.

Whereas the method has been described in connection with the investment of a wax pattern, it is to be understood that it may be used to coat with investment material impressions for models or casts or plasters and other forms of dental pieces. It is also to be understood that the invention is not restricted to the details set forth, since these may be modified within the scope of the appended claims, without departing from the spirit and scope of the invention.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent, is:

1. That improvement in investing a destructible pattern for an inlay or other dental piece which consists in mounting the pattern on a sprue former, then delivering water in atomized form around the pattern while the latter is on the sprue former and at the same time jetting with air under pressure and from different angles powdered investment material into the water and against the pattern in order completely to coat the latter with the material, then placing the sprue former and coated pattern in a casting ring and finally filling the ring with moist investment material in order to complete the investment of the pattern.

2. That improvement in investing a destructible pattern for an inlay or other dental piece which consists in mounting the pattern on a sprue former, then delivering water in atomized form around the pattern while the latter is on the sprue former and at the same time jetting powdered investment material from different angles into the water and against all portions of the pattern in order to apply a preliminary coating of the material entirely around the pattern, then placing the sprue former and coated pattern in a casting ring, and finally pouring moist investment material into the ring until the coated pattern is completely invested and the ring is filled.

3. That improvement in investing a destructible pattern for an inlay or other dental piece which consists in mounting the pattern on one end of a sprue former, then forming a mist around the pattern while the latter is on the sprue former and simultaneously delivering powdered investment material into the mist from different angles so as completely to coat the pattern, then placing the sprue former and coated pattern in a casting ring, and finally pouring moist investment material into the ring until the coated pattern is completely covered and the ring is filled.

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