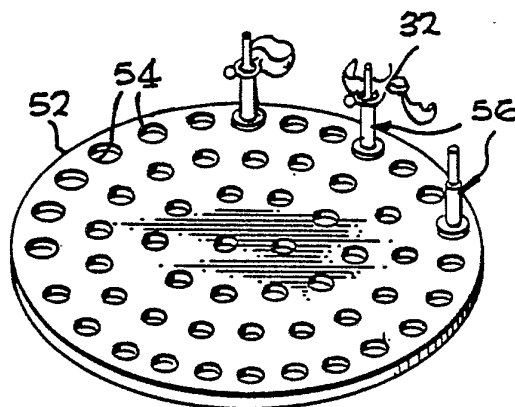




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/US85/01222 (22) International Filing Date: 24 June 1985 (24.06.85) (31) Priority Application Number: 625,302 (32) Priority Date: 27 June 1984 (27.06.84) (33) Priority Country: US (71)(72) Applicant and Inventor: BERGER, Robert, P. [US/US]; 4421 Rochelle Place, Encino, CA 91316 (US). (74) Agents: BERG, Richard, P. et al.; Ladas & Parry, 3600 Wilshire Boulevard, Los Angeles, CA 90010 (US). (81) Designated States: AT (European patent), BE (European patent), CH, CH (European patent), DE, DE (European patent), FR (European patent), GB, GB (European patent), IT (European patent), JP, LU (European patent), NL (European patent), SE (European patent).</p>		<p>Published <i>With international search report.</i></p>

(54) Title: PROSTHESIS HANDLING SYSTEM



(57) Abstract

A prosthesis handling system and method. A handle (10) is formed with a dental prosthesis so that the handle can be used for supporting and handling the prosthesis through to final finishing, when the handle is cut off. The handle preferably has both a ring (22, 38) for supporting the structure on a post (64, 48) and a ball (24, 40) for grasping the resulting structure.

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PROSTHESIS HANDLING SYSTEM

1

BACKGROUND OF THE INVENTION

This invention is directed to a handling system, and particularly a system for handling the metallic portion of a dental prosthesis from the molding of the metal portion, through to intermediate and finishing work on the metal structure, until the cutting off of the handle as the last step.

10

Dental prostheses are often partially or completely cast of metal in an investment casting lost wax molding process. These prostheses must be handled through the intermediate and finishing processes subsequent to the molding. In some cases, a metallic substructure is cast of metal, and subsequent thereto a ceramic is selectively placed thereon. When suitably positioned and configured, the ceramic is baked on the substructure. In order for the ceramic to properly adhere to the substructure, the metallic substructure must be absolutely clean. Handling such a substructure with the fingers places skin oils thereon, which prevents proper ceramic adhesion. The handling of such a substructure even with gloves can cause contamination of the surface and subsequent poor adhesion. The ideal clean surface is the untouched surface as it comes from the investment casting mold. Cleanliness and convenience in handling are also necessary or helpful in the handling of other dental prosthetic devices. In the past, there has been no handling system by which such can be accomplished.

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SUMMARY OF THE INVENTION

Briefly, and in general terms, the invention provides a prosthesis handling system comprising an investment cast metal dental prosthesis structure and a metal handle attached to the cast metal dental prosthesis structure for handling and supporting the cast metal dental prosthesis structure. The handle has an engagement device thereon for engagement by a support for supporting the metal dental prosthesis structure.

In another aspect, the invention provides a prosthesis handling system comprising a wax master handle for attachment to a wax master prosthesis for investment. The handle has an engagement device thereon for engagement by a support for supporting the prosthesis.

The features of the present invention which are believed to be novel are set forth with particularity in the appended claims. The present invention, both as to its organization and manner of operation, together with further objects and advantages thereof, may be best

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1 understood by reference to the following description,
taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

5

FIGURE 1 is a perspective view of several different prostheses either in wax form or in cast form showing the handle attached to the dental prostheses and also showing the handle alone, for use in the prostheses handling system
10 of this invention.

FIGURE 2 shows a special clamp hand tool used for engaging a portion of the handle, for use in handling the investment cast metal prosthesis structure.

15

FIGURE 3 is an enlarged view, with parts broken away and parts taken in section, showing the engagement of the hand tool on a portion of the handle.

20

FIGURE 4 shows a group of the handles in wax form, whereby one or more of the handles can be removed from the group and attached to the wax master prosthesis for use in molding.

25

FIGURE 5 shows a firing tray with a plurality of posts thereon for the support of prostheses in one step of the prosthesis handling system of this invention.

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1 FIGURE 6 is an enlarged view of one of the support
pins shown in FIGURE 5.

5 FIGURE 7 is an enlarged view of an alternate
support pin which can be used in conjunction with a firing
tray or another tray.

10 FIGURE 8 is a perspective view of an instrument
for manipulating the handle when it is in wax form.

15 FIGURE 9 is an enlarged view, with parts broken
away, showing the instrument of FIGURE 8 manipulating a wax
handle and holding it for attachment to another wax structure.

20 DESCRIPTION OF THE PREFERRED EMBODIMENT

In FIGURE 1, dental prostheses 12, 14 and 16 have
attached thereto a handle 10 which is an essential portion of
the prosthesis handling system of this invention. In the
25 manufacture of the prosthesis, a wax master is provided,
and the wax master is employed to provide a cavity in the
molding material in the investment casting lost wax molding
process. After the molding material is hardened, the wax
is melted out and metal is poured therein. This metal may
be a substructure which will receive a ceramic coating
over a portion thereof, or may be a metal structure such
as a crown. During the processing of the metal structure
or substructure cast in the investment mold, the handle 10

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1 is employed to support the metal structure during the
intermediate processing from the investment casting step
to the final finishing step where the handle is removed.

5 FIGURE 4 shows a plurality of the handles 10,
each identical to the other, on a common bar 18. The entire
structure in FIGURE 4 is of wax. Each handle has a neck
20, ring 22 and sphere 24. Stick 25, see FIGURES 8 and 9,
has a resilient nose piece 26 which is formed with resilient
10 jaw opening 28. The jaw opening is engaged over the ball 22
of one of the wax handles 10 and the stick is used to bring
the wax handle 10 adjacent a wax master prosthesis 30, see
FIGURE 9. The wax handle 10 is attached to the prosthesis
by the application of limited heat so that it is adjoined
15 as generally indicated in FIGURE 1. For a long prosthesis
with a substantial metal structure or substructure spanning
several tooth widths, two or more handles 10 can be attached.
As is seen in FIGURE 9, the jaw opening 28 of the soft
nose piece 26 grasps ball 24. Even though ball 24 is a
20 wax structure at this point, the jaw opening 28 can hold
and control handle 10 to hold it in position for attachment
as shown in FIGURE 9.

25 The wax master of the prosthesis, including
handle 10, is completed, attached to appropriate sprue and
gates, and is placed in a mold for investment casting.
The molding compound is poured around the wax master and,
after the molding compound is hardened, the wax master is

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1 melted out. Next, metal is poured into the mold cavity to
form a metal structure of a prosthesis or a metal substructure
of a ceramo-metal prosthesis.

5 The prosthesis handling system of this invention
is particularly useful in the handling of the metal
substructure which is to become a part of a ceramo-metal
prosthesis. The surface of the substructure must be clean
for the ceramic to bond to the investment cast metallic
10 substructure. This precludes handling of the metallic
substructure, even handling by gloves. If conventional
tools are used in handling such a substructure, the
serrated jaws of the conventional tools can cause damage
to critical surfaces. However, in accordance with this
15 invention, the investment cast metal structure carries
thereon the handle 10 in metallic form. It has been
investment cast into metal, along with the rest of the
metal structure. FIGURES 2 and 3 illustrate prosthesis
32, which is an investment cast metallic prosthesis or
20 prosthesis substructure and compares with the wax master
prosthesis 30 shown in FIGURE 9. The metal prosthesis
substructure 32 carries thereon metal handle 34, which
is the same as handle 10. Metal handle 34 has a
neck 36, ring 38 and ball 40. As is seen in FIGURE 3,
25 the ball 40 is substantially spherical and is grasped
within the cavities 42 and 44 respectively in jaws 46 and
48 in instrument 50. Instrument 50 is similar in structure
to the conventional surgical clamp, but instead of having

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1 serrated jaws, has the cavities 42 and 44 adjacent the
tip thereof. The cavities 42 and 44 are preferably shaped
so that they are part of the surface of the sphere of the
same diameter as ball 40. Thus, the ball 40 can be clamped
5 therein. When clamped in that manner, the instrument 50
can be used as a manual support for the handle 34 and the
metal prosthesis structure 32 which is cast with the handle.
Thus, the metal prosthesis can be engaged, supported,
positioned and moved through the manual control of instrument
10 50 without touching any of the surfaces on the metal
structure 32 which will require work prior to finishing.
Thus, the other surfaces of the metal prosthesis are unmarked
and uncontaminated by touching.

15 It is particularly important to note that the
jaws of instrument 50 do not extend past the ring 38. In
this way, the entire opening in the ring is available when
the substructure is being handled by instrument 50 so that
the ring may be placed over support pins of the type shown
20 in FIGURES 5, 6 and 7. In this way, a prosthesis can be
handled without manual or instrument engagement on the
prosthesis metal structure or substructure from the moment
it is divested from the mold to the final removal of the
handle.

25

Particularly in the case of a metal substructure
of a ceramo-metal prosthesis, the substructure must be
supported during the placement thereon of the ceramic

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1 material and must be supported during firing of the ceramic material. FIGURE 5 shows firing tray 52, preferably of ceramic structure and capable of withstanding firing heat. Firing tray 52 has a plurality of openings 54 therein with
5 the openings extending generally upright with respect to the plane of the firing tray. Supporting pins 56 and 58, respectively shown in FIGURES 6 and 7, can be inserted into selected openings 54 to carry thereon the substructure for firing. Pin 56 has a body 60 which carries a stop 62 in
10 the form of a circular ring. The lower part of the body inserts into the opening 54 and stop 62 engages against the top surface of tray 52. Tapered pin 64 ends in shoulder 66 which is the top of body 60. The entire structure is of a suitable material to withstand firing temperatures.

15 Tapered pin 64 and shoulder 66 are dimensioned so that ring 38 can be received thereover, with the ring engaging against shoulder 66. In this way, the metal substructure, carrying its ceramic coat, can be positioned upon the tray, as shown in FIGURE 5. The entire tray carrying
20 several of such substructures is placed in the furnace for firing of the ceramic. To aid in spacing of the various substructures on tray 52, the support pin 58 is provided. Support pin 58 is the same as support pin 56 except that tapered pin 68 and shoulder 70 are offset from the lower
25 part of the body 72 so that the support pin can be offset from the openings 54 in the firing tray. In this way, infinite adjustment between adjacent tapered pins 68 is possible. This is particularly useful when there are two handles 34 on a metallic substructure which is to be fired.

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1 After firing, the ceramic is hard and, if no
further ceramic work is contemplated, the ceramo-metallic
prosthesis can be handled by gloves. As part of the final
finishing of the prosthesis, the handle 34 is cut off and
5 the place where the neck 38 was attached is polished.

This invention has been described in its
presently contemplated best mode, and it is clear that
it is susceptible to numerous modifications, modes and
10 embodiments within the ability of those skilled in the
art and without the exercise of the inventive faculty.
Accordingly, the scope of this invention is defined by
the scope of the following claims.

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WHAT IS CLAIMED IS:

1. A prosthesis handling system comprising:
an investment cast metal dental prosthesis
structure;
metal handle means attached to said cast metal
5 dental prosthesis structure for handling and supporting
said cast metal dental prosthesis structure, said handle
having engagement means thereon for engagement by a
support for supporting the metal dental prosthesis
structure.
- 10 2. A prosthesis handling system comprising:
a wax master handle for attachment to a wax master
prosthesis for investment, said handle having engagement
means thereon for engagement by a support for supporting
the prosthesis.
- 15 3. The prosthesis handling system of Claims 1 or
2 wherein said engagement means is a ball of substantially
spherical configuration on said handle.
4. The prosthesis handling system of Claim 3
further including a manually operable instrument
20 associated with said ball for engaging on said ball for
supporting and positioning said prosthesis.
5. The prosthesis handling system of Claim 4
wherein said instrument has a resilient nose piece
having a jaw opening therein for engagement on said ball.
- 25 6. The prosthesis handling system of Claim 3
wherein there is a ring on said support means in

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addition to said ball.

7. The prosthesis handling system of Claim 6 wherein said ring is attached adjacent said prosthesis and said ball is attached to said ring.

5 8. The prosthesis handling system of Claim 7 wherein said ball is positioned sufficiently away from said ring so that a manually operable instrument having jaws with cavities therein can engage on said ball for handling said prosthesis without covering the opening
10 in said ring.

9. The prosthesis handling system of Claim 7 wherein said ball is mounted on said ring and said ring is mounted on a neck which connects to the prosthesis.

10. The prosthesis handling system of Claims 1
15 or 2 wherein said engagement means is a ring on said handle and having an opening therethrough for positioning over a support pin.

11. A firing tray having a plurality of openings
20 in the top thereof, a plurality of pins, each of said pins having a body having a lower end sized to fit into said openings in said tray so that said pins are supported by said tray and are forwardly directed with respect to said tray, said pins having an upward facing shoulder thereon, said pins and said firing tray being
25 made of material which withstands ceramic firing temperature;

a dental prosthesis having a handle thereon, said

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handle having a ring therein, said ring being engaged over one of said pins in said tray so that said dental prosthesis is supported for firing.

12. The firing tray of Claim 11 wherein said
5 handle also has a ball thereon adjacent said ring so that said ball can be engaged by a manual instrument for placement and removal of said dental prosthesis from said firing tray without contact with said dental prosthesis.

10 13. The method of handling a dental prosthesis comprising the steps of:

attaching a wax handle to a wax master of a dental prosthesis;

15 investing the wax handle and wax master dental prosthesis in an investment compound;

pouring metal into the cavity produced by the wax handle and wax master dental prosthesis to form a metallic dental prosthesis with a handle integrally molded thereon;

20 divesting the metal dental prosthesis with its metal handle; and

acting upon the dental prosthesis while holding the dental prosthesis by means of its handle.

14. The method of Claim 13 wherein the holding
25 step comprises holding the handle by means of an instrument which grasps a convex portion on the handle.

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15. The method of Claim 13 wherein the dental prosthesis is held by mounting the handle on a post which extends through an opening in the handle.

16. The method of Claim 15 wherein the handle
5 is moved with its opening with respect to the pin by the step of engaging a convex portion of the handle away from the opening by means of an instrument so that the instrument can move the dental prosthesis to and away from support on the pin without touching the dental
10 prosthesis.

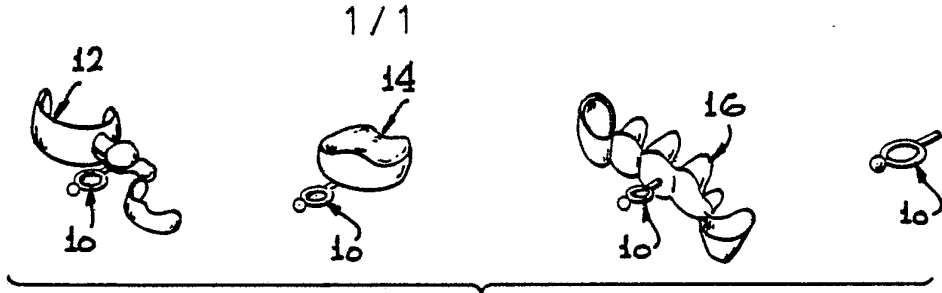


FIG. 1

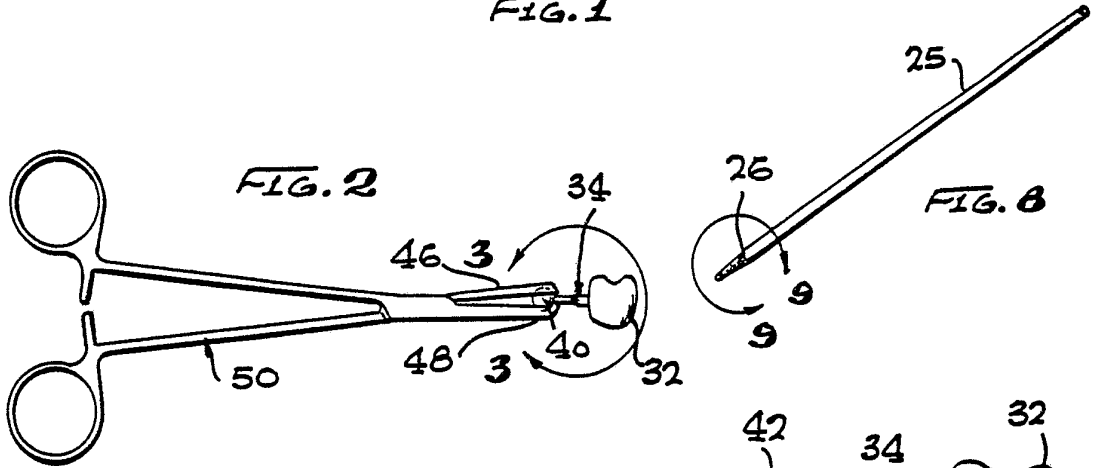


FIG. 2

FIG. 6

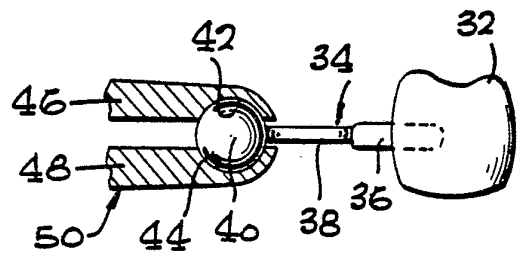


FIG. 3

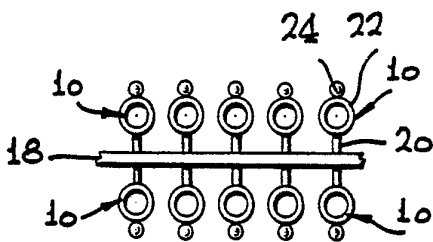


FIG. 4

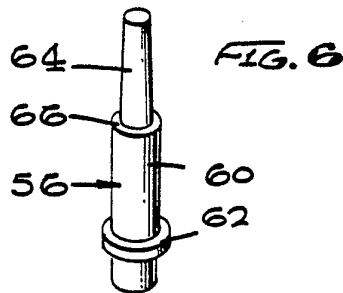


FIG. 6

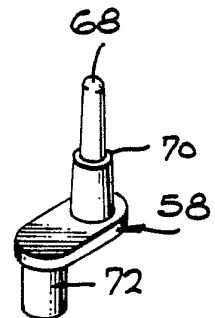


FIG. 7

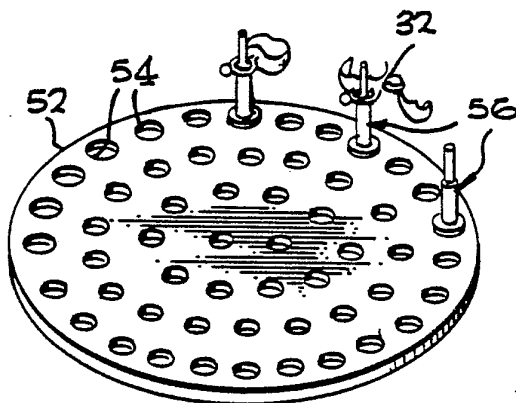


FIG. 5

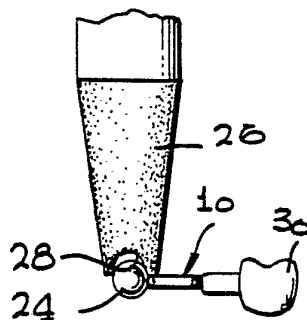
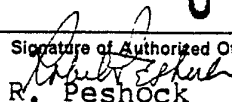


FIG. 9

INTERNATIONAL SEARCH REPORT

International Application No PCT/US85/01222

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ³		
According to International Patent Classification (IPC) or to both National Classification and IPC		
INT. Cl. ⁴ A61C 3/00		
U.S. Cl. 433/141		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁴		
Classification System	Classification Symbols	
U.S.	433/141, 11, 2.8, 201, 213 148/149	
Documentation Searched other than Minimum Documentation to the extent that such Documents are included in the Fields Searched ⁵		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ¹⁴		
Category [*]	Citation of Document, ¹⁶ with indication, where appropriate, of the relevant passages ¹⁷	Relevant to Claim No. ¹⁸
X	US, A, 3,748,741 31 July 1973 YERKES	1-10
A	US, A, 2,219,058 22 October 1940 STREIM	
A	US, A, 2,318,402 4 May 1943 KARLSTROM	
A	US, A, 3,058,216 16 October 1962 COHEN	
A	US, A, 4,038,753 02 August 1977 KLEIN	
X	US, A, 1,925,116 8 September 1933 SPENCE et al	11-16
X	US, A, 3,615,927 26 October 1971 PAULSON	11-16
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>[*] Special categories of cited documents: ¹⁵</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 45%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&" document member of the same patent family</p> </div> </div>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search ³	Date of Mailing of this International Search Report ³	
17 September 1985	07 OCT 1985	
International Searching Authority ¹	Signature of Authorized Officer ²⁰	
ISA/US	 R. Peshock	