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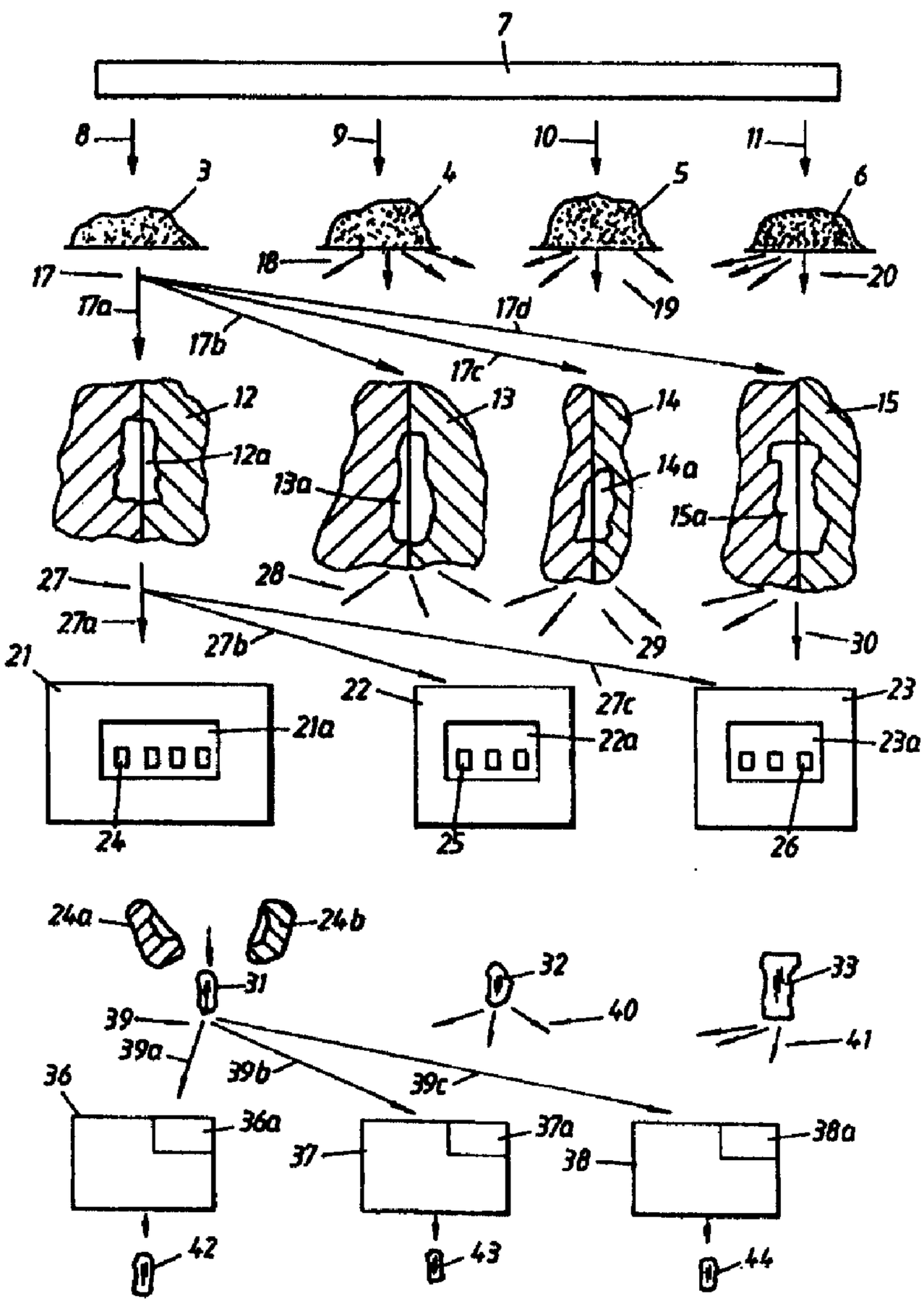
(54) **DISPOSITIFS POUR CALES D'IMPLANTS, PROCEDES, ET UTILISATION**

(54) **METHOD, ARRANGEMENT AND USE OF SPACERS FOR IMPLANTS**



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(57) La présente invention concerne un procédé permettant de disposer d'un vaste éventail de cales (42 - 44) d'implants. Ce procédé se décompose en quatre opérations convenant pour la plupart des cales de la gamme. La première opération consiste à sélectionner des préparations de poudres (3 - 6), et notamment de la poudre de titane ou d'autres métaux, des poudres de céramiques, des poudres de plastiques et des poudres d'alliages. La deuxième opération consiste à placer les préparations de poudres dans des outils (12 - 15) pourvus de cavités de moulage pour la production de blocs (31 - 33) intermédiaires. La troisième opération consiste à prendre les outils, les cavités de moulage remplies de poudre, et à les placer dans un dispositif haute pression (21 - 23) où les blocs subissent une compression leur donnant une consistance solide. L'opération finale consiste à fatiguer mécaniquement les blocs pour leur donner leurs formes définitives de cales, éventuellement après un passage intermédiaire au four.

(57) In a method for making available a selection of spacers (42-44) for implants, four production stages are used for the greater part of the spacer selection. First, powder preparations (3-6) are chosen from among a number of possible powder preparations comprising titanium or metal powder, ceramic powder, plastic powder and/or alloy powder. In a second stage, the chosen powder preparations are placed in tools (12-15) with mould cavities for units (31-33) forming semi-finished products. In a third stage, the tools, with their powder-filled mould cavities, are placed in high-pressure-generating arrangements (21-23) in which the powders are compressed so that units with solid consistencies are formed. Finally, the units are mechanically worked to give the final shapes of the spacers, if appropriate after an intermediate stage of heat treatment in an oven (ovens).

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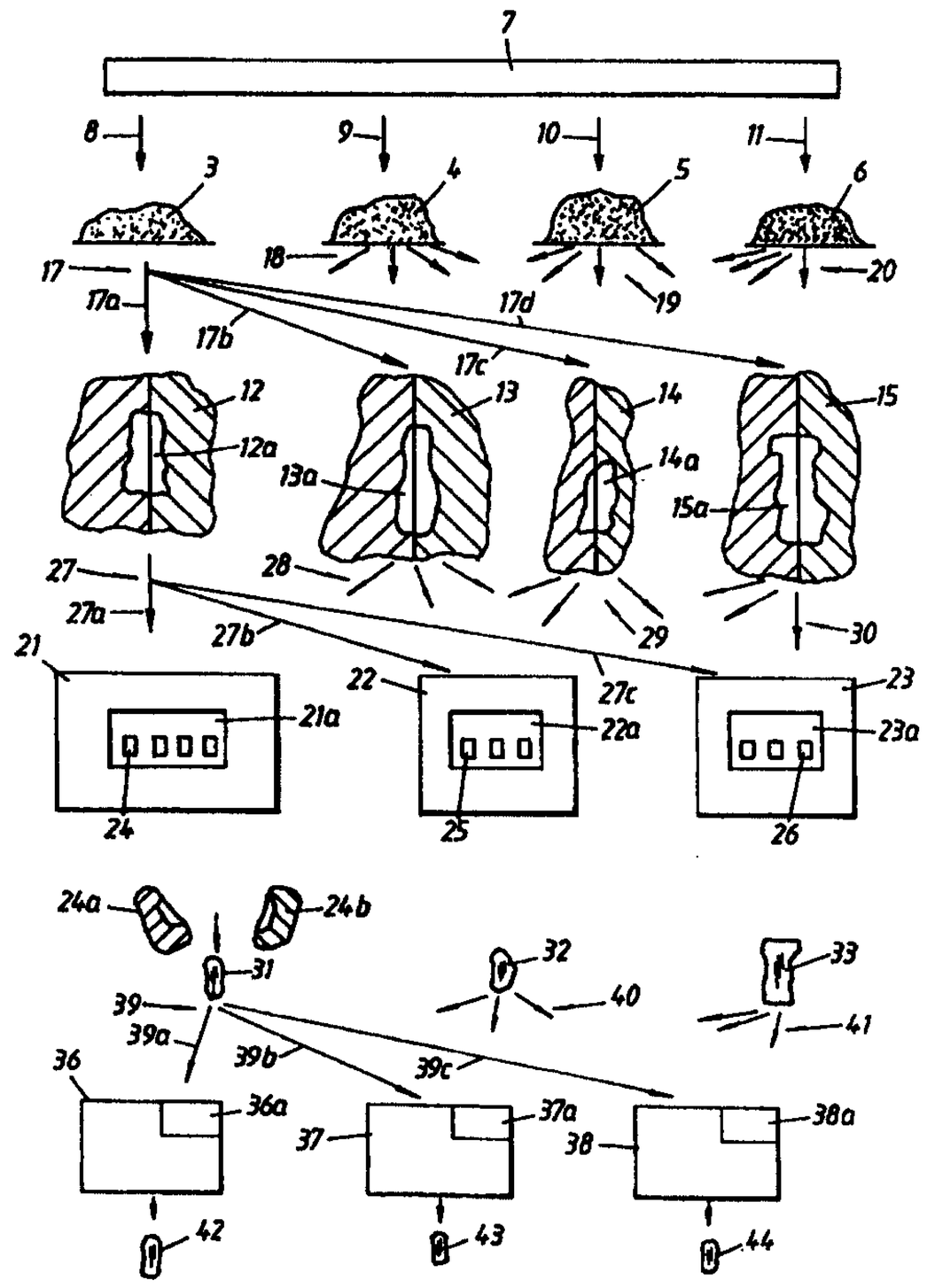
(57) Abstract

In a method for making available a selection of spacers (42–44) for implants, four production stages are used for the greater part of the spacer selection. First, powder preparations (3–6) are chosen from among a number of possible powder preparations comprising titanium or metal powder, ceramic powder, plastic powder and/or alloy powder. In a second stage, the chosen powder preparations are placed in tools (12–15) with mould cavities for units (31–33) forming semi–finished products. In a third stage, the tools, with their powder–filled mould cavities, are placed in high–pressure–generating arrangements (21–23) in which the powders are compressed so that units with solid consistencies are formed. Finally, the units are mechanically worked to give the final shapes of the spacers, if appropriate after an intermediate stage of heat treatment in an oven (ovens).



TITLE

Method, arrangement and use of spacers for implants.

TECHNICAL FIELD

The present invention relates to a method for making available a selection of spacers which are intended to be applied on or near finished and generally standardized implant surfaces in the jaw/dentine. The spacers are distinguished by small external dimensions. In this connection, reference is made to the BRÅNEMARK "Standard Abutment System" which is sold on the open market, including ESTHETI CONE, MIRUS CONE and CERA CONE. By way of example, the diameters in these cases can be of the order of 4 - 5 mm.

The invention also relates to a method for producing different types of spacers which can be applied on implants with finished and generally standardized attachment surfaces in the dentine of one or more patients. One or more test arrangements for the different shapes and/or material compositions of the spacers are in this case arranged at a test location, for example at a dentist's surgery, at a hospital, at a dental technician's, etc.

The invention also relates to an arrangement for ordering, from a test location of the type mentioned, a selection of spacers which can be applied on implant surfaces on the dentine of one or more patients. The test location can in this case comprise one or more test arrangements for the design, assembly and/or material composition of the spacers. The test location can have members for collating the test results and sending these to a production site. They are sent preferably via the telecommunications and/or computer network (which can include the Internet). The invention also relates to an arrangement for producing spacers included in a selection of spacers which are applied on

or near the said implant surfaces of one or more patients. There are different requirements placed on the spacers from the point of view of strength and aesthetics, etc.

The invention also relates to an arrangement for a selection of spacers which are intended to be applied to implant surfaces in the said dentine. The invention also concerns the use of units which consist of powder compositions or powder preparations that can be compressed by means of high pressure and that comprise titanium or metal particles, ceramic particles, plastic particles and/or alloy particles.

PRIOR ART

It is already known to make spacers from metal blanks which are worked (milled) mechanically, and a large number of spacers are available on the market and can be bought by the users (dentists, dental technicians, etc.). Each user in this way procures a set of spacers which he/she uses in his/her daily work. The spacers can be made of alloys and metals, for example titanium, plastic and ceramics. It is known per se to make a spacer of the said type from powder particles of the said type that are compressed by high pressure. For example, spacers of compressed ceramic powder and plastic powder are already known.

It is also already known to centralize the production and to send orders from different test locations or treatment locations to a central production unit via the public telecommunications and computer networks. Reference is made here, by way of example, to Swedish Patent Application 9701309-8 which was filed 09.04.1997 by the same Applicant and which relates to advanced ordering and production arrangements and methods involving a high degree of computerization of the PROCERA type. By means of this arrangement and other

advanced equipment of the PROCERA type, it is possible to achieve a highly efficient production of dental products.

In this connection, it is already known to provide the test location or ordering location with computerized testing arrangements in conjunction with which models, implant positionings, detection arrangements, etc., can be made. The computer equipment at the ordering location can be coupled to the production site's computer equipment, and ordering and query procedures, even interactive ones, can be realized.

DESCRIPTION OF THE INVENTION

PRIOR ART

There is a need to be able to improve the availability of a large choice of spacers on the open market. The ordering functions for the users must be refined. The invention aims to solve these problems, among others.

It is also important that the improved availability should be able to be incorporated in the handling and production of already existing dental products (such as caps, bridges, implants, etc.). The invention solves this problem too.

To obtain a high degree of production freedom, it is essential to be able to use pressing techniques and pressing arrangements in which different powder preparations or powder compositions are used. Thus, it must be possible to use and to compress titanium or other metal powders at high pressure by means of pressure-generating arrangements which are known per se. It must be possible for the powder preparations intended for the different dental situations to be chosen or designated in a simple and efficient manner. The invention solves these problems too.

In this connection, it is important that the spacers, despite their small external dimensions, can be produced with the necessary high degree of precision (0.02 mm tolerances). The invention solves this problem too.

There is also a requirement for the dentist/dental technician to be able to individually adapt each spacer function or spacer construction and to send orders for the spacers adapted to the dental situations in question, i.e. the said piece by piece spacer selection must be able to be reduced or entirely eliminated. The invention also solves this problem and thus gives the dentist/dental technician the option of choosing to make up the spacer function from existing basic spacer elements or, on each occasion, to form the individually adapted spacer with the aid of his test arrangements. The invention solves this problem too.

SOLUTION

The feature which can principally be regarded as characterizing a method for making available a selection of spacers is that the greater part of the spacer selection or spacer selections is produced in essentially four production stages. In a first stage, powder preparations (powder compositions) are chosen from among a number of possible powder preparations consisting of or comprising titanium or metal powder, ceramic powder, plastic powder and/or alloy powder. In a second stage, the chosen powder preparations (powder compositions) are placed in tools with mould cavities for units forming semi-finished products. In a third stage, the tools, with their powder-filled mould cavities, are placed in one or more high-pressure-generating arrangements in which the powders in the said cavities are compressed so that units with solid consistencies (mechanically workable) are formed when the tools are separated after the compression stage has

been carried out. In a fourth stage, the units are mechanically worked/milled/ground, etc., to give the final shapes of the spacers.

A method for producing different types of spacers can principally be regarded as being characterized by the fact that units forming semi-finished products based on the different shapes of the spacers are ordered from a production site serving several test locations. The production site has the powder preparations (powder compositions) ordered or designated by the respective test location and consisting of titanium or metal powder, ceramic powder, plastic powder and/or alloy powder. Tools with mould cavities having the shapes of the units are placed in one or more high-pressure-generating arrangements which, in the activated state, compress the powders in the mould cavities and permit semi-finished product units with solid consistencies (i.e. they can be mechanically worked) when the tools are removed from the arrangement or arrangements and opened. The semi-finished product units are then worked mechanically/milled in machining equipment (for example milling equipment). The machining equipment can be located, for example, at the production site and/or at the test location in question. By means of the machining equipment, the semi-finished product units are given the final shape of the spacers. The spacers are thus formed from compressed powder preparations. In one embodiment, sintering is included as a subsidiary stage in the method.

An arrangement for ordering spacers included in a section is essentially characterized in that the production site has powder compositions meeting the requirements which are placed on the spacers in the different dental situations, mainly with regard to strength and/or aesthetics. Further characteristics are that the production site has tool sets and/or production means for tools with mould cavities which

correspond to units which form semi-finished products based on the final or desired shapes of the spacers. The production also has an arrangement or arrangements which operate at high pressure and which are intended to receive the said tools with powder-filled cavities and to subject the powders to such high pressures that units with solid consistencies (mechanically workable) can be formed after the application of the pressure and the separation of the tools. Also included is machining equipment which can be situated at the production site or at some other location and which is arranged to mechanically work the semi-finished product units to give the final shapes of the spacers. An example of the said machining equipment that may be mentioned here is the PROCERA type. The semi-finished product units can be subjected to heat treatment in an intermediate stage.

An arrangement for production of spacers included in a selection of spacers can principally be regarded as being characterized in that a number of high-pressure-generating arrangements are arranged to accommodate their respective powder preparation (powder composition) from among powder compositions which consist of metal or titanium powder, ceramic powder, plastic powder and alloy powder. The receiving members are arranged to receive information concerning the powder compositions or powder preparations and the shapes of units forming semi-finished products based on the shapes of the spacers. The members are arranged to designate or choose the powder compositions as a function of the received information, and to designate or indicate tools with mould cavities corresponding to the shapes of the units. Machining equipment is also arranged to mechanically work the units to give the final shapes of the spacers after the tools with their powder-filled mould cavities have been subjected to the said high pressure and have been separated.

Arrangements (ovens) for sintering can also be included (metal products).

An arrangement for a selection of spacers is essentially characterized in that the greater part of the spacer selection consists of spacers with through-holes for screws which secure the spacers to the implants. The spacers further consist of powder particles of titanium, ceramic, plastic and/or alloys which have been compressed by high pressure. The spacers are arranged with shapes which permit production by means of divisible tools.

Use of units which consist of powder preparations that can be compressed by means of high pressure is essentially characterized in that the units are used as mechanically workable (for example millable) semi-finished products with shapes which are based on spacers for application to implant surfaces in the jaw/jaws/dentine of one or more patients.

Use of units which consist of powder compositions that can be compressed by means of high pressure can essentially be characterized in that the units, after mechanical working/milling/grinding, are used to form selections of spacers intended for application to (generally standardized) implant surfaces in the jaw/jaws/dentine of one or more patients.

ADVANTAGES

By means of what has been proposed above, it is possible to achieve substantially less expensive handling of spacers that are intended to be made available on the open market. The dentist/dental technician/doctor, etc., has a wide freedom of choice as regards the procurement of spacers for different dental situations, which can vary greatly from each other. Existing equipment and principles which are used

for other dental products can be applied and incorporated in the handling of spacers which have been produced with the aid of pressing techniques.

DESCRIPTION OF THE FIGURES

A presently proposed embodiment of a method, arrangement and use of the present invention will be described below with reference to the attached drawings, in which:

Figures 1 to 11 show, in side views, different types of spacers which are dealt with in the given context,

Figure 2 shows, in a block diagram, the different production stages for the selection of spacers which can be used for attachments to implant surfaces in dentine,

Figure 3 shows, in a block diagram, an arrangement for production of a selection of spacers,

Figure 4 shows, in vertical section, a type of spacer produced using the methods and arrangements indicated in Figures 2 and 3, and

Figure 5 shows, in a perspective view, the attachment surfaces of implants in the dentine of two patients.

DETAILED ILLUSTRATIVE EMBODIMENT

Figures 1 to 11 show examples of spacers and accessories which can be produced in accordance with the methods and arrangements which are described below. Concerning the types of spacers and the types of accessories, reference may be made, inter alia, to the BRÅNEMARK system mentioned above. In accordance with the figures, the spacers can be present in various basic designs whose measurements can be varied. Thus,

Figure 1 shows a spacer with an essentially cylindrical shape 1 which has a conical part 2 at the bottom. The cylindrical part has a height H and the conical part 2 has a height h. The spacer additionally has a diameter D. The diameter can be of the order of 4 - 5 mm, for example 4.5 mm. The heights H and h can be varied, and in the case shown the height H is about 6 mm and the height h 1 mm. Figure 1a shows another embodiment in which the diameter is indicated by D' and the height of a cone-shaped part is indicated by H'. The diameter D' can have a value of 4.5 mm. Since the spacers and accessories are very well known per se, they will not be described in detail here.

In Figure 2, reference numbers 3, 4, 5 and 6 indicate different powder preparations (here also called powder compositions). A mechanism for choosing the powder preparations for the dental spacers in question which are relevant to the different dental situations is indicated by 7 and arrows 8, 9, 10 and 11. In the illustrative embodiment, the powder preparations consist of titanium or metal powder 3, ceramic powder 4, plastic powder 5 and alloy powder 6.

The powder preparations are to be assigned to tools 12, 13, 14 and 15 with different mould cavities 12a, 13a, 14a and 15a. The tools are produced or designated from a stock by means of a function symbolized by arrow groups 17, 18, 19 and 20. Each arrow group comprises a number of alternative options which are indicated by 17a, 17b, 17c and 17d. Corresponding alternative options exist for the other arrow groups 18, 19 and 20. By means of these options, each powder preparation 3, 4, 5, 6 can be assigned different or desired shapes 12a, 13a, 14a, 15a, i.e. a shape/a spacer blank can be designed with any chosen powder composition.

The mould cavities 12a, 13a, 14a, 15a of the tools are thus filled with the powder in question from the chosen

powder preparations. Each tool can be placed in high-pressure-generating arrangements 21, 22, 23 which are provided with spaces 21a, 22a, 23a in which a number of tools can be placed for powder compression. The high-pressure-generating arrangements are known per se and can operate according to principles which are known per se. The arrangements 21, 22 and 23 can generate pressures of between 1000 and 10000 bar. The different arrangements can be assigned different powder preparations, can operate at different pressures, etc. A number of tools 24, 25 and 26 are fitted in the spaces 21a, 22a and 23a. The mechanism for choosing which tool is placed in the spaces 21a, 22a and 23a is symbolized by arrow groups 27, 28, 29 and 30. Each arrow group has a choice mechanism which is symbolized by 27a, 27b and 27c. The actual compression procedure is well known per se and takes place in a manner known per se.

After the treatment in the respective arrangement 21, 22 and 23, the respective tool is removed and opened so that the parts 24a and 24b of the tool permit release of the compressed unit 31. The shape of the unit 31 is based on the basic design of the spacer in question. The compression is in this case of such an order that the unit 31 has a solid consistency, so that it can be mechanically worked (milled or ground, etc.) in a manner known per se. The units from the other tools in the other pressure ovens are symbolized by 32 and 33. It should be noted here that titanium and metal powders require considerably higher compression pressures, in order to be able to form a mechanically workable unit, compared to the formation of corresponding solid consistencies for units made of ceramic or plastic powder. The compression pressure for titanium or metal powder lies in the upper region of the stated pressure range. The compression pressure for plastic powder particles, for example, lies in the lower region of the stated range for the compression pressure.

The units of different compressed powder preparations which have thus been released can thereafter be worked in machining equipment 36, 37 and 38. For example, in the case of powder preparations comprising metal or titanium powder, the main type of machining takes the form of mechanical milling. The ceramic units are worked, for example, by grinding. The plastic units can be mechanically worked/milled, and this also applies to the alloy powder compositions. Ovens 36a, 37a and 38a can be integrated in the machining equipment or used separately. The ovens can operate at temperatures of 1600 - 1800°C. The semi-finished products are sintered/ homogenized/heat-treated in the said ovens. It should be noted here that not all types of semi-finished products need to be sintered. In sintering, pressure resistance levels of 900 MPa and densities of 91% can be achieved in the metal material according to the above. Arrangements and systems for designating the ovens as a function of the actual products, temperatures, material choice, etc., can be provided in the same way as described above. Known sintering methods can be used.

The machining equipment 36, 37 and 38 is specialized for each respective function and thus, for example, the equipment 36 can consist of milling equipment, the equipment 37 can consist of grinding equipment, and the equipment 38 can consist of another type of machining equipment. The machining equipment stations 36, 37 and 38 can also be divided up in other ways. Thus, for example, the machining equipment 36 can execute all the treatment of units with powder compositions consisting of titanium or metal powder, the machining equipment can execute all the treatment of units made of ceramic powder, etc. The options for choosing the different treatments of the units are symbolized by arrow groups 39, 40 and 41. Each arrow group in this case has its own different options 39a, 39b and 39c. The treatment

or the machining in the machining equipment 36, 37 and 38 results in finished spacers 42, 43 and 44 which thus consist of compressed powder particles of the chosen material in accordance with the above.

Figure 3 shows a number of testing or treatment locations 45, 46 and 47. Each location can be more or less advanced and, for example, can be provided with computer-assisted testing and detection equipment 48. The said computer equipment can be coupled by means of a modem 48a to a telecommunications or computer network 49, which can consist of the public telecommunications or computer network. This can also include the Internet. The testing or treatment location can be more or less advanced also with respect to the ordered product. In accordance with the above, the units 31, 32 and 33 (see Figure 2) consist of semi-finished products which are to be worked in the machining equipment 36, 37 and 38 (see Figure 2) for obtaining the final product, i.e. the spacer 42, 43 or 44. The testing or treatment location can in this case order a finished spacer or a unit which constitutes a semi-finished product for the spacer. The testing location can in this case have access to its own machining equipment station 50.

The said testing or treatment location 45, 46 and 47 is served by a production site 51 for spacers and/or units (i.e. semi-finished products). The production site 51 can be provided with its own computer equipment 52, to which the computer equipment 48 of the said testing or treatment location can be coupled. Order and inquiry forms can be sent from the testing or treatment locations and are received and answered from the production site in a manner known per se. The production site can in this case comprise the said powder preparations 53, tools 54 and machining or treatment equipment 55. In addition, the said high-pressure-generating arrangements 56 can also be

included. In one embodiment, heat treatment ovens 56a can also be arranged in connection with or separate from the pressure-generating members 56. Order or inquiry information i1 is thus sent out from the respective testing or treatment location and is received in receiving members 57 at the production site. As a function of the received information i1, the receiving members 57 initiate the mechanisms for choosing the powder preparations and the tools in accordance with the above. Thus, the powder preparations are chosen with information i2′ and the tools are chosen with information i2′′. The choice of high-pressure-generating arrangement or arrangements is initiated with i2′′′, and the choice of the machining equipment with information i2′′′′. There can also be a direct connection 58 between the equipment stations 55 and 56 (and possibly 56a). The information i2 is thus divided into or comprises the information items i2′ - i2′′′′. Depending on the received information i1, the product made at the production site will result in a unit/semi-finished product or a finished spacer. The finished spacer or unit is supplied in a manner known per se to the testing or treatment location in question.

In accordance with Figure 4, the respective spacer or unit can consist of a powder compression of the type indicated above. The configuration is also preferably such that the production can take place using a divisible tool 59 with tool parts 59a and 59b which can be separated in order to release the compressed unit 60. The unit or spacer is preferably of the type which has a through-opening 61 for securing the finished spacer in the implant in question.

The finished spacers are to be applied in implants 62 or 63 in the dentine 64, 65 of one or more patients. The finished spacers will in this case be applied via attachment surfaces 62a, 63a which are preferably of a

standardized type. A characteristic feature of the invention is that the entire selection of spacers can be produced by means of the technique described above, irrespective of whether the powder composition consists of titanium, ceramic, plastic or alloy. One use of units made of powder compositions which can be compressed by means of high pressure is that the units are used as mechanically workable, for example millable, semi-finished products with shapes which are based on the final shapes of the spacers. After the mechanical working, for example milling, grinding, etc., the units are used to form the said selection of spacers. The uses can also be characterized by the fact that it is heat-treated products which are to be worked.

The invention is not limited to the embodiment shown above by way of example, but can be modified within the scope of the attached patent claims and the inventive concept.

PATENT CLAIMS

1. Method for making available a selection of spacers (42 - 44) which are intended to be applied on or near finished and generally standardized implant surfaces (62a, 63a) in the jaw/dentine (64, 65) and which are distinguished by their small external dimensions, characterized in that the greater part of the spacer selection(s) is produced by means of the following production stages:

a) in a first stage, powder preparations (3 - 6) are chosen from among a number of possible powder preparations consisting of or comprising titanium or metal powder, ceramic powder, plastic powder and/or alloy powder,

b) in a second stage, the chosen powder preparations are placed in tools (12 - 15) with mould cavities (12a, 13a, 14a, 15a) for units (31 - 33) forming semi-finished products,

c) in a third stage, the tools, with their powder-filled mould cavities, are placed in one or more high-pressure-generating arrangements (21 - 23) in which the powders in the said cavities are compressed so that units with solid consistencies are formed when the tools are separated after the said compression stage, and

d) in a fourth stage, the units are mechanically worked (milled, ground, etc.) to give the final shapes of the spacers (42 - 44).

2. Method according to Patent Claim 1, characterized in that the units are heat-treated (sintered) after the mechanical working.

3. Method for producing different types of spacers (42 - 44) which can be applied on implants with finished and generally standardized attachment surfaces (62a, 63a) in the dentine/jaw(s) (64, 65) of one or

more patients, with one or more test arrangements for the different shapes and/or compositions of the spacers being arranged at a test location (45), for example at a dentist's surgery, at a hospital, etc., characterized in that units (31 - 33) forming semi-finished products based on the different shapes of the spacers, or finished spacers (42 - 44), are ordered from a production site serving several test locations, in that the production site has the powder compositions (3 - 6) ordered or singled out by the respective test location and consisting of titanium or metal powder, ceramic powder, plastic powder and/or alloy powder, in that tools (12 - 15) with mould cavities having the shapes of the units are placed in one or more high-pressure-generating arrangements (21 - 23) which, in the activated state, compress the powders in the mould cavities and permit semi-finished product units with solid consistencies (i.e. they can be mechanically worked) when the tools are removed from the arrangement(s) and opened, and in that the semi-finished product units are worked mechanically (milled, ground, etc.) in machining equipment (36 - 37) located, for example, at the production site and/or at the test location in question, for production of the final or desired shapes of the spacers.

4. Method according to Patent Claim 3, characterized in that the semi-finished product units are placed in heat treatment ovens for heat treatment.

5. Method according to Patent Claim 3 or 4, characterized in that the powder preparations (3 - 6) and/or the shapes of the units (31 - 33) or of the spacers (42 - 44) are ordered over the public telecommunications network and/or computer network (49) by means of order forms.

6. Method according to Patent Claim 3, 4 or 5, characterized in that when ordering the powder

preparations and/or the shapes of the units or of the spacers, first computerized equipment (48a) at the test location (45) is activated for contact with second computerized equipment (52) at the production site (51) or the machining equipment (55) via the telecommunications and/or computer network (Internet), and in that the order is made through the established contact, for example through an interactive dialogue via the first and second computer equipment (48 and 52).

7. Arrangement for ordering from a test location (45), for example a dentist's surgery, a hospital, university, etc., a selection of spacers (42 - 44) which can be applied on implant surfaces (62a, 63a) on the dentine/jaw bone(s) of one or more patients, the test location comprising one or more test arrangements (48) for the design, assembly and/or material composition of the spacers, and the test location having members (48) for collating the test results and sending these, preferably via the telecommunications and/or computer network (49), to a production site (51), characterized in that the production site has powder preparations (53) meeting the requirements which are placed on the spacers in the different dental situations, mainly with regard to strength and/or aesthetics, in that the production site (51) has tool sets (54) and/or production means for tools with mould cavities (12a, 13a, 14a, 15a) which correspond to units (31 - 33) which form semi-finished products based on the final or desired shapes of the spacers (42 - 44), in that the production site has arrangements (56) which operate at high pressure and which are intended to receive the said tools with powder-filled cavities and subject the powders to such high pressures that units with solid consistency are obtained after the application of the pressure and the separation of the tools, and in that machining equipment (55), preferably situated at the production site and/or the test

location in question, is arranged to mechanically work the semi-finished product units to give the final shapes of the spacers, if appropriate after sintering or heat treatment in the heating oven or ovens.

8. Arrangement according to Patent Claim 7, characterized in that the production site (51) has first members (57) for designating or initiating the powder composition from the test location (45), which preferably has first computer equipment (48) which can be coupled to second computer equipment (52) situated at the production site or machining equipment, it being possible to designate or initiate the composition by preferably interactive cooperation between the computer equipments.

9. Arrangement according to Patent Claim 7 or 8, characterized in that the said first members are arranged for choosing or ordering the shapes of the semi-finished product units from the designating site.

10. Arrangement for production of spacers included in a selection of spacers which can be applied on or near implant surfaces (62a, 63a) in the jaw(s)/dentine (64, 65) of one or more patients, different requirements being placed on the spacers from the point of view of strength, aesthetics, etc., characterized in that a number of high-pressure-generating arrangements (21, 23) are arranged to accommodate their respective powder composition from among the powder compositions which consist of metal or titanium powder, ceramic powder, plastic powder and alloy powder, in that receiving members are arranged to receive information (i1) concerning the powder preparations and the shapes of units, forming the semi-finished products based on the shapes of the spacers, or of the actual shapes of the spacers, and in that the members (57) are arranged to designate or choose powder preparations as a function of the received information (i1), and to designate or

indicate tools with mould cavities corresponding to the shapes of the units, and in that machining equipment (55) is arranged to mechanically work the units to give the final shapes of the spacers after the tools (54) with their powder-filled mould cavities have been subjected to the said high pressure and have been separated, and, if appropriate, have been heat-treated/sintered.

11. Arrangement for a selection of spacers (42 - 44) intended to be applied to implant surfaces (62a, 63a) in the jaw(s)/dentine of one or more patients, characterized in that the greater part of the spacer selection consists of spacers with through-holes (61) for screws which secure the spacers to the implants (62, 63), in that the spacers consist of powder particles of titanium, ceramic, plastic and/or alloys which have been compressed by high pressure, and in that the spacers are arranged with shapes which permit production by means of divisible tools (59).

12. Arrangement according to Patent Claim 11, characterized in that the powder particle preparations are chosen as a function of the requirements which are placed on the spacers in terms of strength and aesthetics.

13. Arrangement according to Patent Claim 11 or 12, characterized in that the selection of spacers consists of a number of unique spacers consisting of a number of basic designs with different measurement variants which function separately and/or in assembled configurations.

14. Arrangement according to any of Patent Claims 11 to 13, characterized in that the selection of spacers consists of individual spacer configurations produced in different dental situations.

15. Use of units (31 - 33) which consist of powder preparations that can be compressed by means of high pressure and comprise titanium or metal particles, ceramic particles, plastic particles and/or alloy particles, characterized in that the units are used as mechanically workable (millable, grindable, etc.) and, if appropriate, sintered semi-finished products with shapes which are placed on spacers (42 - 44) for application to implant surfaces (62a, 63a) in the jaw(s)/dentine of one or more patients.

16. Use of units which consist of powder compositions (53) that can be compressed by means of high pressure and comprise titanium or metal particles, ceramic particles, plastic particles and/or alloy particles, characterized in that the units, after mechanical working (milling, grinding, etc.) and, if appropriate, heat treatment (sintering), are used to form selections of spacers intended for application to (generally standardized) implant surfaces in the jaw(s)/dentine of one or more patients.

Fig.1

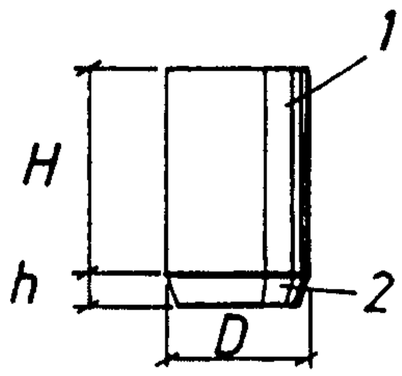


Fig.1a

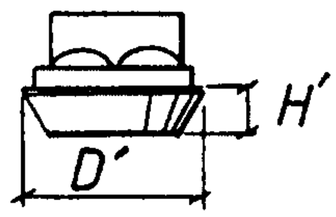


Fig.1b

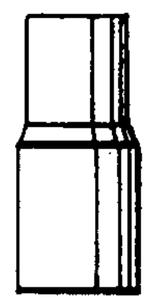


Fig.1c

Fig.1d

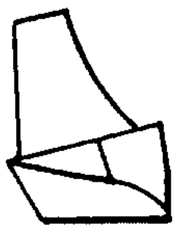


Fig.1e

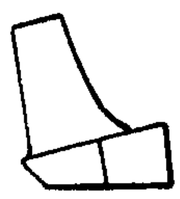


Fig.1f

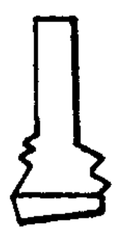


Fig.1g

Fig.1h

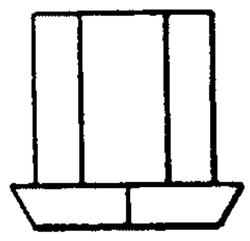


Fig.1i

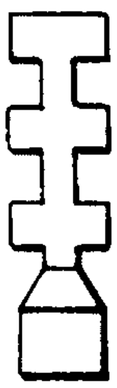


Fig.1j

Fig.1k

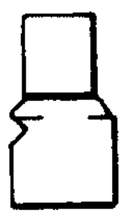


Fig.1l

Fig. 2

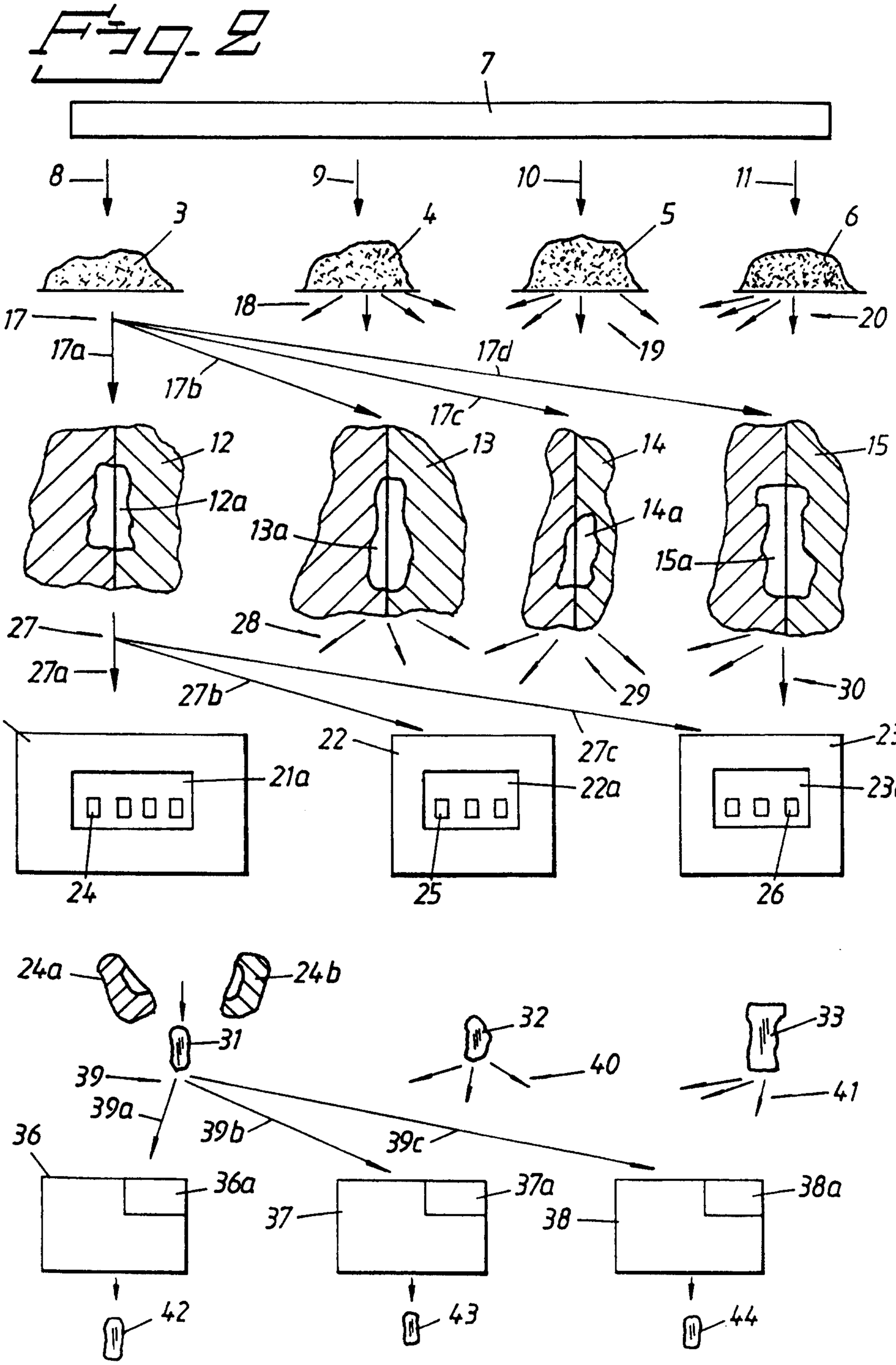

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Fig. 3

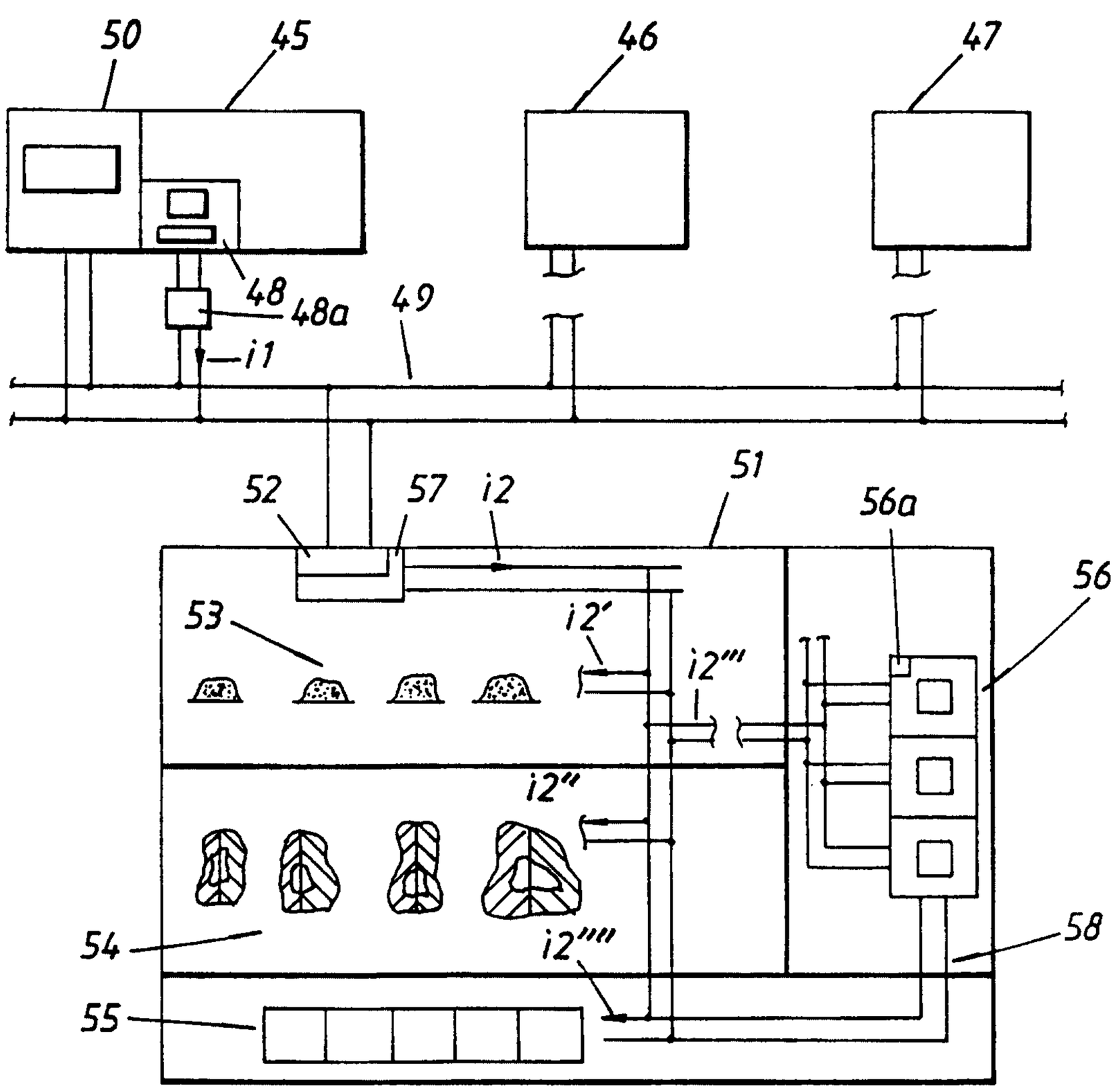

Fig. 4

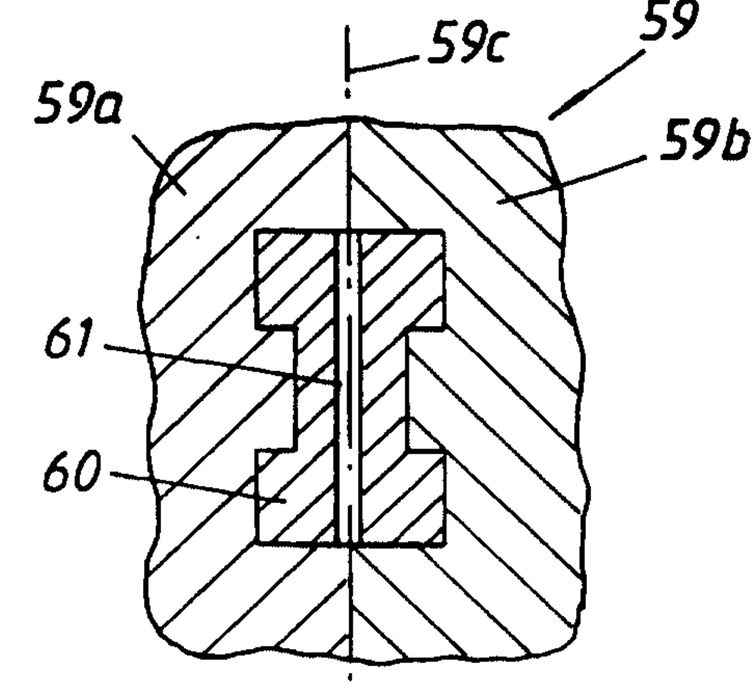

Fig. 5