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(71) Applicant: **Valpaint S.r.l.**
60020 Polverigi (Ancona) (IT)

(72) Inventor: **Sarti, Ferdinando**
60035 Jesi (Ancona) (IT)

(74) Representative: **Dall'Olio, Giancarlo**
INVENTION s.a.s.,
Via delle Armi, 1
40137 Bologna (IT)

(54) Apparatus for dosing colored pigments in a container for paint or neutral enamel and a container usable with this apparatus

(57) Apparatus includes a self-service color metering device for introducing dosed colored pigments into a neutral product contained in a container (5). The color metering device (100) includes a plurality of tanks (1) containing the colored pigments, connected to a corresponding number of delivery needles (3), situated in a coloring chamber (4). The container (5) has a cover (50), with a window (15) made therein, closed by a membrane (150) of elastomeric material. The container (5), together with . the cover (5), is placed on the plate (80) of a weighing machine (8), situated inside the coloring chamber (4).

After the user has entered necessary data and has prepaid the operation by suitable means of the color metering device (100), the raising means (18) raise the weighing machine (8) and the container (5), so that the delivery needles (3) pierces the membrane (150) and enter the container (5), to deliver said colored pigments. Afterwards, the container (5) is lowered, the holes of the membrane (15) close spontaneously, and the user can withdraw the container (5) with the product colored as required.

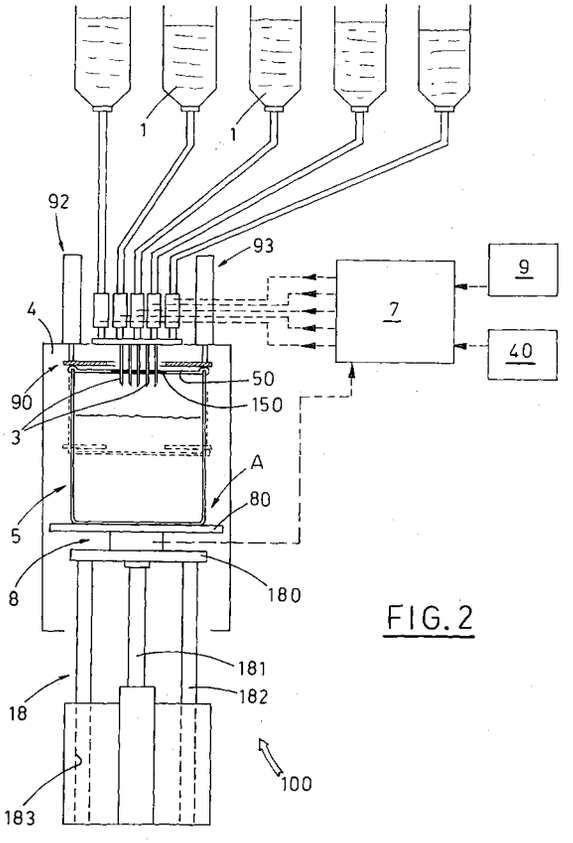

FIG. 2

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Description

[0001] The present invention relates to the technical field concerning the production of paints or enamels with a selected color.

[0002] In particular, the invention relates to an apparatus for coloring predetermined quantities of paints, enamels or similar products by using mixtures of colored pigments, in order to give the above mentioned products a selected color. The invention relates also to a particular container for these products, which can be advantageously used with the above mentioned apparatus.

[0003] The fact that paints, enamels or other similar products can be supplied in ranges of colors obtained during their production, is well known.

[0004] Usually, each color is indicated with a unique code, which identifies the kinds and proportions of pigments used for coloring.

[0005] Otherwise, the products are supplied in neutral colors, for example white, and the colored pigments are supplied separately, according to a standard range of basic colors.

[0006] The final color of the product is obtained by adding one or more of the pigments to the neutral product in suitable proportions.

[0007] A selected color tonality is obtained by a perfect dosage of the pigments composing it.

[0008] Obviously, when a precise color tonality is to be obtained, the dosing cannot be performed manually, even if the kinds of pigments necessary to obtain the desired color are known.

[0009] Therefore, there are apparatuses, commonly known pigment metering devices, which precisely dose and mix the pigments of the right basic color, and are controlled by a suitably skilled operator.

[0010] The mixing is performed depending on the type and quantity of the neutral product to be colored, so as to obtain the desired color tonality.

[0011] Known pigment metering devices usually include a plurality of tanks for as many pigments as different colors are required and each of the tanks has a control unit for controlling the pigments flow, connected to a processing unit.

[0012] Downstream of the flow control unit, there are a corresponding number of delivering nozzles, which open in a coloring chamber, housing a container with a neutral product to be colored.

[0013] The processing unit has a suitable program for dosing and controlling the above mentioned flow control units, and communicates with an operator by means of a monitor and a keyboard.

[0014] A spectrophotometer can also be connected to the processing unit for picking up the color tonality of a sample, to send corresponding data to the processing unit.

[0015] The above described metering devices are installed not only in assisted shops selling coloring products, but also in many cash and carry wholesaler and self-service retail sale centers, even not exclusively for paint products sale.

[0016] In order to color a known quantity of product, the user must introduce the product container into the coloring chamber of the color metering device, after weighing it, in such a way that the container mouth (open) is situated under the delivering nozzles.

[0017] Then, the user must enter data into the processing unit through the monitor and keyboard in order to set the records concerning the product weight and type, and the code of the desired color to be obtained.

[0018] Otherwise, if there is the above mentioned spectrophotometer, the information about the desired color is entered into the processor by scanning with the spectrophotometer a sample of this color, after having suitably instructed the control program.

[0019] A first disadvantage derives from the fact that the user must remove the cover of the neutral product before introducing the container into the coloring chamber and, obviously, he must replace it after the pigment has been delivered.

[0020] The cover removal and replacing operations are not always easy and during their performing, the user can dirt himself, or even worse, with a clumsy movement, he can overturn the container, which causes easily imaginable consequences.

[0021] Some color metering devices, for example the one described in the Patent Application No. BO2002A 000774 filed on 7/12/2002 by the same Applicant, are advantageously equipped with automated prepayment systems, which are connected to the color metering device control unit, and which avoid a series of disadvantages deriving from another bar code being printed on the external part of the container, to be used for a postponed payment at the cash desk.

[0022] The main object of the present invention is to propose an apparatus for coloring paints, enamels and similar products, which avoids the above mentioned drawbacks, in particular prevents the user from removing and replacing the container cover.

[0023] Another object of the present invention is to propose an apparatus, which is easy and immediate to use also by unskilled users.

[0024] The above mentioned objects are wholly obtained in accordance with the contents of the claims.

[0025] The characteristic features of the invention, as they will result from the claims, are pointed out in the following detailed description with reference to the drawings, in which:

Figure 1 is a schematic view of the configuration, in its principal parts, of an apparatus for dosing colored pigments, and for mixing them to a prefixed quantity of a product to be colored (color metering device), obtained according to the present invention;

Figure 2 is a schematic view of the above men-

tioned color metering device, being in working condition;

Figure 3 is a top view of the cover of a container, prepared to be used with the apparatus shown in Figures 1 and 2;

Figure 4 is an enlarged section view taken along the plane IV-IV of Figure 3.

[0026] With reference to the above figures 1 and 2, the apparatus in question (color metering device), indicated as a whole with the reference numeral 100, has been divided in different functional blocks, for better clarity; actually, the mechanisms composing the color metering device are normally contained in a single containing structure, having suitable openings, which allow the access to different controls and devices.

[0027] In a known way, the color metering device includes a plurality of tanks 1, containing the above mentioned colored pigments, which are to be delivered in suitable proportions and mixed to a neutral product to give to the latter a predetermined color tonality.

[0028] There is also a coloring chamber 4, accessible from outside of the color metering device 100, aimed at housing containers 5 of the product to be colored, which can be for example: washable, transpiring, peeled paints, enamels, anti-rust paints and the like.

[0029] A plurality of delivery nozzles, each of which connected to a respective tank 1, are situated in the upper part of the coloring chamber 4.

[0030] According to the invention, the delivery nozzles are formed by hollow needles 3, arranged vertically and with the tip turned downwards. The needles 3, as will become clear from the following part of the description, are aimed at penetrating in a suitable window 15 made in the cover 50 of the container 5, in order to introduce the predetermined quantities of the colored pigments into the latter.

[0031] Flow adjustment means 6 are situated between the tanks 1 and the corresponding delivery needles 3 for adjusting the flow of colored pigments leaving the tanks 1.

[0032] The flow adjustment means 6 are for example formed by high precision dosing pumps of known type and commonly used in the traditional color metering devices.

[0033] The pumps 6 are operated by a processing unit 7, which is connected to the pumps by suitable and known interfaces and is aimed at running a program for creating prefixed colors, according to techniques for combination and dosing of two or more basic colors, from among the colors contained in the tanks 1 and in relation to the data previously entered into the unit.

[0034] Mass measuring means 8, situated inside the coloring chamber 4, below the delivery needles 3, are advantageously composed of a weighing machine, of the type equipped with a load cell.

[0035] The weighing machine 8 is equipped with a plate 80, on which the container 5 with the product to be colored is placed, and weighs the latter before the introduction of the above mentioned colored pigments, and finally, it sends picked up information to the processing unit 7.

[0036] According to the invention, the weighing machine 8 is operated by elevating means 18, situated therebelow, for moving vertically between two extreme positions, lowered B and raised A, respectively, in a way better described later on.

[0037] The elevating means 18 are formed, as in the shown not limiting example, by a plate 180, which carries the weighing machine 8 and which is connected to an actuator 181, for example a pneumatic or electric one, aimed at imposing the above mentioned vertical movement.

[0038] The actuator 181 is suitably guided by sliding pistons 182, engaged with relative sheaths 183, making part of the structure of the color metering device 100.

[0039] In the upper part of the coloring chamber 4, there are means 90 for disengaging the container 5, which facilitate the leaving of the delivery needles 3, after the colored pigments have been injected into the container 5.

[0040] The disengaging means 90 can also constitute an abutment for the container 5, to define its raised position A.

[0041] For this purpose, the disengaging means 90 include a plate 91, having a ring-like shape, so as not to interfere with the needles 3, carried in a substantially horizontal position by a plurality of actuators 92, 93, preferably consisting of a corresponding number of pneumatic cylinders, fastened to the structure of the color metering device 100, above the coloring chamber 4.

[0042] The plate 91 is fastened to the free ends of the above mentioned cylinders.

[0043] The cylinders are extendable, so as to carry the ring-like plate 91, in step relation with the raising and lowering of the container 5, between an abutment position, indicated with continuous line in Figure 2, and a disengaged position, indicated with broken line in the same Figure.

[0044] The above described conformation of the plate 91 is not compulsory for a correct operation of the disengaging means 90.

[0045] A different conformation could include, for example, a plurality of small plates, fastened to the free ends of the cylinders.

[0046] The above mentioned containers 5, closed hermetically by a cover 50, are sold pre-packed in different shapes, and each of them contains a predetermined quantity in weight of product.

[0047] According to the invention, the body of the cover 50 features, made therein, a window 15, for example circular, situated preferably in the center of the cover 50 and closed by a membrane of elastomeric material (Figure 3).

[0048] In the shown, not limiting example, the membrane 150 is supported, in its lower part, by a ring-like shoulder, formed by the window 15, and is fastened, in its upper part, to a ring 152, having teeth 153, aimed at snap fitting in corresponding recesses 154 made in the edge of the window 15 (Figure 4).

[0049] According to a preferred constructive embodiment of the invention, the window 15 is further sealed with two films 155, 156 of aluminium or similar material, applied respectively to the inner and outer side of the cover 50; according to one variant, only one film is applied.

[0050] The films 155, 156 ensure the integrity of the window 15, and, consequently, prevent tampering of the product protected by the cover 50 through the window.

[0051] A container 5, featuring the just described cover 50, is suitable for being introduced into the coloring chamber 4 without being opened, that is without removing the cover 50. (Figure 1)

[0052] When the container 5 is introduced, the weighing machine 8 is in its lowered position B; the container 5 is placed in the center of the plate 80, so that the membrane 150 of the cover 50 is, in its turn, centered with respect to the group of delivery needles 3.

[0053] The correct placing of the container 5 can be facilitated by suitable graphic references, not shown, made on the plate 80.

[0054] Otherwise, the plate 8 can have suitable concentric seats of different depth and diameters corresponding to those of the standard dimensions of the mostly used containers.

[0055] Afterwards, the user acts on known data entering means 9, provided in the color metering device 100 and connected to the processing unit 7, to communicate thereto the characteristics of the neutral product to be colored and those of the desired color to be obtained; at the same time, the information about the weight, picked up by the weighing machine 8, will be received by the processing unit 7.

[0056] At this point, the user pays the sum indicated on a suitable display, using automatic collecting means 40 associated to the color metering device 100 and connected to the processing unit 7.

[0057] The means 40 include for example, a token acceptor and/or a paper currency validator, and/or credit card reader.

[0058] After the payment operation has been completed, the color metering device 100 is activated to perform its working cycle.

[0059] The elevating means 18 are activated to bring the weighing machine 8 to its raised position A; consequently, the container 5 is raised, until its cover 50 goes in abutment against the above mentioned ring-like plate 91, which is in its abutment position.

[0060] In this way, the delivery needles 3 perforate first the external film 156, than the membrane 150 and finally the internal film 155 (Figure 2).

[0061] In this situation, the delivery needles 3 are inside the container 5 and thus, the processing unit 7 can activate the delivery of the colored pigments, according to the prefixed program, to color the neutral products contained in the container 5.

[0062] After this operation has been completed, the elevating means 18 are operated to bring the weighing machine 8 and the container 5 back to the lowered position B, disengaging the delivery needles 3 from the membrane 150.

[0063] The disengagement of the needles 3 is facilitated by the contemporary displacement of the ring-like plate 91 from the abutment position up to the disengagement position (in broken line in Figure 2). The above mentioned ring-like plate 91 is then immediately brought back to the abutment position.

[0064] It is to be pointed out that the holes made by the needles 3 on the membrane 150 close spontaneously, due to the elastic return of the membrane material.

[0065] In this way, the hermetic closure of the container 5 is protected and consequently, the colored product contained therein does not desiccate.

[0066] At this point, the user can remove the container 5 from the coloring chamber 4 and go to the cash desk to pay only for the neutral product, thus avoiding errors, mistakes and possible illicit actions.

[0067] However, the main advantage of the proposed invention results from the fact that the user does not have to remove the cover 50 before introducing the container 5 into the coloring chamber 4 and does not have to replace it after having removed the container 5 therefrom, thus avoiding all the problems deriving from the above operations.

[0068] The only thing to take care about is the centering of the container on the weighing machine plate, which anyway allows a large margin of tolerance, since the area of the membrane is suitably bigger with respect to the area of the delivery needles group.

[0069] Moreover, this operation is yet more secure, if the plate 80 features the above mentioned seats, whose diameter corresponds to the one of the standard package of the product to color.

[0070] Consequently, the above described invention, formed by the combination of a container and a pigment metering device, set up so as to reciprocally match, makes it much easier for an even not particularly skilled user to use a self-service apparatus.

Claims

1. Apparatus for dosing colored pigments and for adding them to a predetermined quantity of a product to color, including:

   a plurality of delivery nozzles (3), connected to respective tanks (1) containing said colored pigments, with flow adjustment means (6), dis-

posed between said tanks (1) and said delivery nozzles (3), said delivery nozzles opening into a coloring chamber (5), where a container (5) with a .neutral product to be colored is introduced, so that the container (5) is situated below the delivery nozzles (3);

a processing unit (7), connected with said flow adjustment means (6) for operating the latter selectively, so as to adjust the flow of said colored pigments toward said delivery nozzles (3) in relation to data, which has been previously stored in the processing unit (7);

with said apparatus (100) being **characterized in that** said delivery nozzles (3) include corresponding hollow needles for perforating a prepared portion (150) of a cover (50), associated to said container (5), and **in that** it includes means (18) aimed at determining a mutual approach of said needles (3) and said container (5), in step relation with the above described delivery of colored pigments.

2. Apparatus, according to claim 1, **characterized in that** said delivery needles (3) are arranged vertically and with the tips turned downward.

3. Apparatus, according to claim 1, **characterized in that** mass measuring means (8) are situated in said coloring chamber (4), for receiving said container (5) and measuring the weight of the neutral product contained therein, and **in that** said means (18) are associated to said mass measuring means (8).

4. Apparatus, according to claim 3, **characterized in that** said mass measuring means (8) have graphic references, which visualize the correct positioning of said container (5) thereon.

5. Apparatus, according to claim 3, **characterized in that** said mass measuring means (8) have a plurality of substantially concentric seats of different depths and diameters corresponding to those standardized of said container (5).

6. Apparatus, according to claim 3, **characterized in that** said means (18) are aimed at moving vertically said mass measuring means (8) and said container (5) supported thereon, between two extreme positions, respectively a lowered one (B), with said apparatus (100) in rest configuration, and a raised one (A), with said apparatus in working configuration.

7. Apparatus, according to claim 6, **characterized in that** said means (18) include a plate (180), associated below said mass measuring means (8) and connected to an actuator (181), which imposes said vertical movement, together with sliding guiding pistons (182).

8. Apparatus, according to claim 1, **characterized in that** it includes also disengaging means (90), situated in the upper part of said coloring chamber (4) and moving in step relation with the operation of said means (18), in a direction, in which said container (5) moves away from said delivery needles (3), to facilitate said delivery needles to leave after the colored pigments have been delivered.

9. Apparatus, according to claim 8, **characterized in that** said disengaging means (90) include a substantially ring-like plate (91), and at least one actuator (92,93), supporting said plate (91) and aimed at extending and withdrawing the latter to bring it respectively away and toward said delivery needles (3).

10. Apparatus, according to claim 9, **characterized in that** said actuator includes a plurality of pneumatic cylinders (92,93), whose pistons are connected to said plate (91) with their free ends.

11. Container for neutral article to be colored, of the type aimed at being introduced into a coloring chamber (4) of an apparatus (100) for dosing colored pigments, with said container (5) **characterized in that** it includes a cover (50), with a window (15) made therein and closed by a membrane (150) of elastomeric material, the latter being perforated by delivery needles (3), associated to said apparatus (100) to inject prefixed quantities of said colored pigments to said neutral product.

12. Container, according to claim 11, **characterized in that** said window (15) forms a ring-like shoulder (151), supporting the lower part of said membrane (150), and **in that** the upper part of the latter is fastened to a ring (152) having teeth (153), aimed at snap fitting in corresponding recesses (154) made in the edge of the window (15).

13. Container, according to claim 11, **characterized in that**, besides said membrane (150), at least one film (155,156) of sealing material is applied to said window (15).

14. Container, according to claim 13, **characterized in that** two films (155,156) are applied respectively to the inner and outer side of the cover (50), in which said window (15) is made.

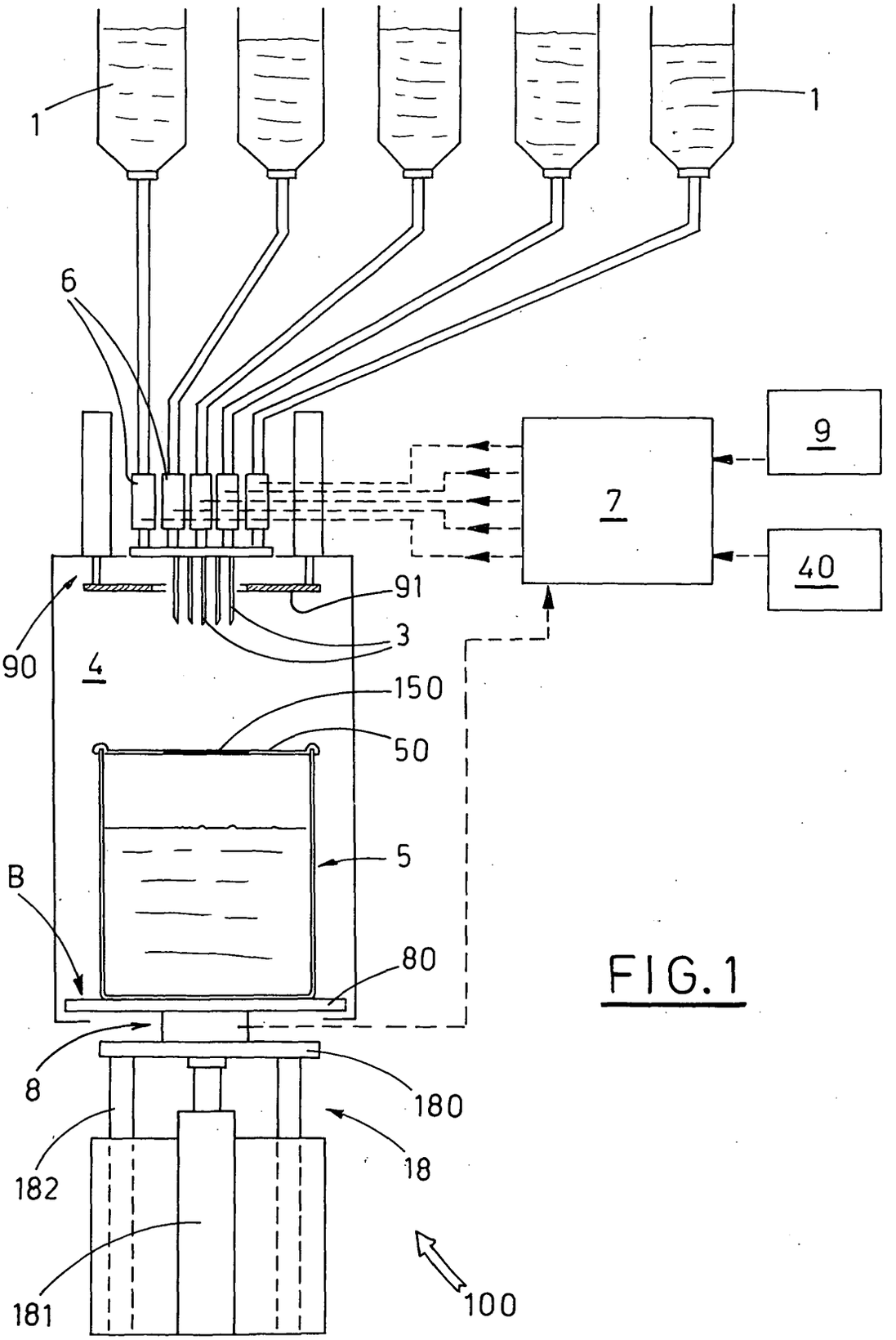


FIG.1

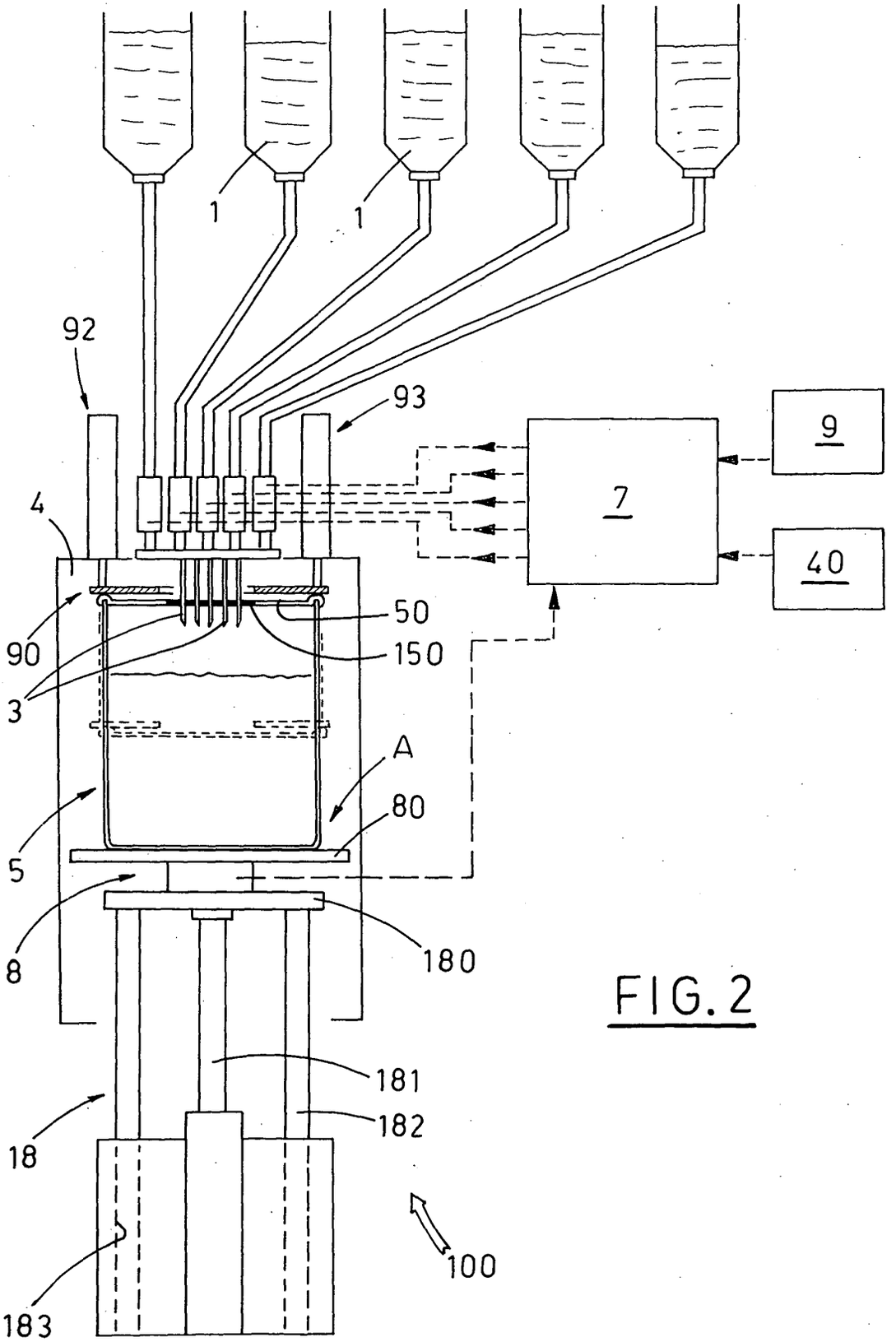
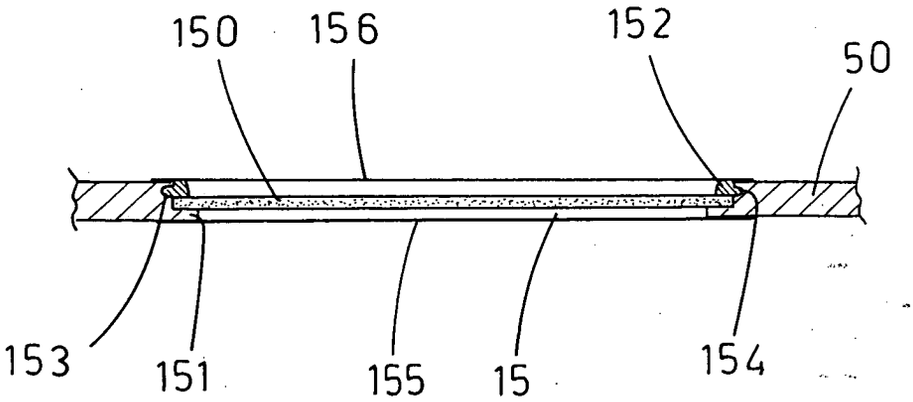


FIG. 2

FIG.4



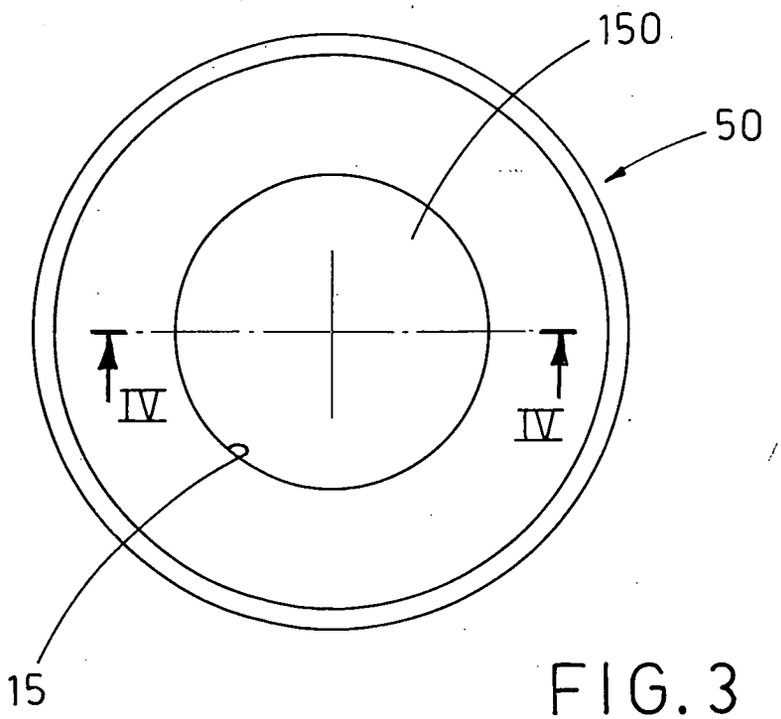


FIG.3