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(54) **APPARATUS FOR METERING AND DELIVERING PAINTING PRODUCTS**

VORRICHTUNG ZUR MESSUNG UND AUSGABE VON LACKIERPRODUKTEN

APPAREIL POUR LE DOSAGE ET LA DISTRIBUTION DE PRODUITS DE PEINTURE

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Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to an apparatus for metering and delivering painting products. An apparatus of that kind is described in US-A-4 585 148,

[0002] The subject matter of the present invention is an automatic metering apparatus delivering fluid products, in a sequential manner and by gravimetric control.

[0003] This operation is based on an interaction between data detected in a continuous manner by an electronic balance and the opening and closing of a sliding device.

[0004] The apparatus according to the present invention is adapted to deliver a lot of different painting products, either of an aqueous or other solvent type, and highly concentrated dyes or pigments, both in the automotive finishing field, and in decorating paintings application.

[0005] As is known, the paint material market is a quickly changing one, and this is due to the use of minimally noxious substances, in particular water based paints, and owing to a technology reducing as far as possible the paint amount to be used, by means of very concentrated painting products.

[0006] This requires increasingly accurate metering properties, in particular for metering very small paint amounts, up to 1/100 g, with products devoid of the typical flow properties supplied by previously used solvent materials.

[0007] In commercial fluid product delivery devices, one of the problems related to the product metering is due to a comparatively large distance between the storing place and the paint delivery place.

[0008] Actually, a comparatively large distance between the two above mentioned places, would cause high conveyed fluid dynamic losses, with variations of the delivery flow rate which are very difficult to compensate for.

[0009] Usually, the above mentioned dynamic losses are uncontrollable since they directly depend on the conveyed fluid physical nature (such as density, viscosity and so on) and on the geometric characteristics of the fluid flowing path (such as pipes, fittings, bends and so on).

[0010] Moreover, an excessive handling of the fluid within storing and transport places may negatively affect the molecular binding stability, thereby undesirably altering the characteristics of the prepared paint materials.

SUMMARY OF THE INVENTION

[0011] Accordingly, the aim of the present invention is to provide such an apparatus adapted to overcome the above mentioned prior art drawbacks.

[0012] Within the scope of the above mentioned aim, a main object of the invention is to provide such an apparatus assuring a very accurate metering, even for very small amounts of the metered painting product.

[0013] Another object of the present invention is to provide such an apparatus in which the painting products are not compelled to be driven through long conveying path lengths.

[0014] Another object of the present invention is to provide such an apparatus in which the painting products are not subjected to excessive handling operations, in order not to alter their molecular binding consistency.

[0015] Yet another object of the present invention is to provide such an apparatus which, owing to its specifically designed constructional features, is very reliable and safe in operation.

[0016] According to one aspect of the present invention, the above mentioned aim and objects, as well as yet other objects, which will become more apparent hereinafter, are achieved by an apparatus for metering and delivering painting products, characterized in that said apparatus comprises at least a delivery head comprising a plurality of basket assemblies, each holding a painting product and comprising a sliding metering valve, said basket assemblies being supported by a rotary supporting disc so as to be brought to an aligned relationship, one at a time, to a delivery point thereat a delivery unit designed for allowing the basket assembly contents to be delivered in a metered manner to a collecting vessel is provided, said collecting vessel being arranged on a balance coupled to a computer, controlling said delivery unit and basket assembly at said delivery point.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] Further characteristics and advantages of the present invention will become more apparent hereinafter from the following detailed disclosure of a preferred, though not exclusive, embodiment of the invention, which is illustrated, by way of an indicative, but not limitative, example in the accompanying drawings, where:

Figure 1 is a front elevation view of the paint products metering and delivering apparatus according to the present invention;

Figure 2 is a top plan view of the inventive apparatus;

Figure 3 is a perspective view of a side of the inventive apparatus showing a delivery head thereof;

Figure 4 is a perspective view of a delivery valve;

Figure 5 is a further perspective view, on an enlarged scale with respect to figure 4 showing a body of the delivery valve;

Figure 6 is a longitudinally cross-sectioned elevation view of a basket assembly;

Figure 7 is a top plan view of the above basket assembly;

Figure 8 is an elevation view of a basket assembly engaged in a delivery central point;

Figures 9-14 schematically show a basket assembly engaged at said delivery point during a sequence of painting product delivery operations.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0018] With reference to the number references of the above mentioned figures, the painting product metering and delivering apparatus according to the present invention, which has been generally indicated by the reference number 1, comprises two painting product delivery heads, respectively indicated by the reference numbers 101 and 102, which are arranged in a body 110 within spaces or chambers which are closed at a top thereof by a respective gate element 9, driven by a driving knob 10.

[0019] On said body 110 a personal computer (PC) 2 including a keyboard 3 for controlling the apparatus is arranged.

[0020] In said body 110 three delivery points are defined: a central delivery point 4 and two side delivery points respectively indicated by the reference numbers 4a and 4b.

[0021] Said delivery points 4, 4a and 4b are arranged at a central bench 5 supporting a motor driven carriage 6.

[0022] On said motor driven carriage 6 is arranged a balance 8 in turn supporting a vessel 7 formed by a tin for collecting the delivered paint.

[0023] With reference to figure 3, each said delivery head 101 and 102 comprises a turning or rotary disc 11 thereon are radially arranged basket assemblies 13, each of which comprises a respective metering valve 15.

[0024] The rotary disc 11 is rotatively driven by a rotary motor 12.

[0025] The rotary movement may be a bidirectional rotary movement, both in the clockwise and anticlockwise direction.

[0026] The rotary movement of the disc 11 is controlled by a controlling software through a locating sensor 16.

[0027] Said locating sensor 16 transmits to the software the positional information of each said basket assembly 13 with respect to a delivery central point 21.

[0028] Said delivery central point 21 is provided in each said delivery head 101 and 102 and controls the painting product amount to be delivered for each said basket assembly.

[0029] Said delivery central point 21 is controlled by software through a plurality of sensors.

[0030] Each delivery head further comprises a circular rack 14 engaging a pinion 41 provided in each said basket assembly.

[0031] According to the present invention, the apparatus further comprises a direct delivery device, including a metering valve 15 coupling, without any long fluid conveying path arrangements, the storing place or zone 21, that is the basket assembly, to the delivery place or zone.

[0032] This direct connection reduces to a minimum the path the fluid must be conveyed through, and accordingly greatly reduces dynamic losses with a consequent improved fluid metering precision.

[0033] The delivery occurs by a free fall phenomenon, due to the fluid gravity, through the operation, that is opening and closure, of the device.

[0034] Said metering valve 15 comprises a metering valve shaped body 34 thereon a slide member 33 is slidably driven.

[0035] The metering valve 15 is tightly coupled by a coupling template 30 formed in said body 34 and to which a sealing gasket is applied, said sealing gasket being in the form of a sealing paste having specifically designed physical and chemical characteristics.

[0036] Said template comprises two barriers defining a channel providing a third barrier between the metering valve body 34 and the flat surface of said slide 33.

[0037] Said gasket also allowing a lubricating operation to be performed between said slide 33 and body 34, as the painting product is delivered or stored for a long time.

[0038] Said slide 33 is rigid with a drawing element 35 and movable against a pair of pulling springs 38 fixed to said body 34.

[0039] A reed spring 32 is moreover threaded to said slide 33 by a self threading screw 31.

[0040] Said delivery valve 15 is rigid with the basket assembly 13 which comprises a basket element 36 closed by a closing cover 39 supporting a shaft 37 extending within said basket 36.

[0041] Said shaft 37 comprises one or more fans 43 and is driven by said pinion 41, which in turn is driven by the circular rack 14.

[0042] The delivery valve 15 of each said basket assembly 13 is susceptible to interact with the delivery central point 21 of each said delivery head 101, 102.

[0043] Said delivery central point 21 comprises a large solenoid element 51 fixed to a bracket 55 and controls the movement of a fork 52 supporting a small solenoid element 54.

[0044] The small solenoid element 54 controls in turn a latching pin 53, and is associated with a sensor 56.

[0045] Said delivery central point or unit 21 further comprises a bottom microswitch 57 and a top microswitch 58.

[0046] The basket assembly is made of plastics and metal material components.

[0047] The operation of the apparatus according to the present invention will be disclosed hereinafter with reference to the delivery procedure of the two delivery heads.

[0048] After a preliminary presetting of the apparatus, including the filling-in of the basket by the respective painting or die materials and the connection of the apparatus to the PC, the delivery operating sequence will be as follows.

[0049] Upon selecting the paint type or formula to be delivered, and a related painting product amount, an empty tin 7 is arranged on the balance 8 under the metering central point 4.

[0050] Simultaneously, the software will rotatively drive the disc 11 so as to bring, one after the other, to the metering points 4a and 4b the basket assemblies 13

related to the required formula.

[0051] While the disc 11 performs its rotary movement, the large solenoid element 51 of the delivery central point or unit 21 is electrically actuated by performing an upward directed linear movement of the fork element 52.

[0052] This movement will allow the drawer element 35 to freely slide, in order to prevent any mechanical interferences of the components.

[0053] At the same time as the above disclosed operating step, the motor driven carriage or slide 6 will drive or displace the tin 7 to the metering points 4a and 4b.

[0054] Upon detecting by the software the position required by the formula, the related basket assembly 13 will be located at the head delivery central point or unit 21.

[0055] The sequential locating of each basket assembly 13 is controlled by the locating sensor 16 which will also manage a "zero" point and the rotary direction of the rotary disc 11.

[0056] The "zero" point of the rotary disc 11 has been defined as a half of the angular distance between the two first basket assemblies 1 and 2, and represents a standby function or operation of the subject apparatus.

[0057] Said half angular distance has been selected at said delivery central point or unit 21.

[0058] During a full rotation of the rotary disc 11, the fluid in each basket assembly 13 is partially stirred.

[0059] This stirring is achieved by the fans 43 rigid with the shaft 37 of each basket 36.

[0060] Said shaft is rotatively driven by the respective driving pinion 41 meshing with the circular rack 14.

[0061] By the above driving mechanism, that same energy provided by the motor 12 to the rotary disc 11 is also used for performing the stirring operation.

[0062] The painting product delivery sequence is schematically shown in figures 9-14.

[0063] Figure 9: the basket assembly 13 is arranged at the delivery unit or central point 21, i.e. it is aligned therewith.

[0064] Figure 10: the large solenoid element 51 is downward driven.

[0065] Figure 11: the small solenoid element 54 is upward moved thereby engaging or latching the drawing or drawer element 35.

[0066] Figure 12: the large solenoid element 51 is upward driven; in this operating step, the fluid is metered by the opening movement of the slide 33 and body 34 of the valve 15.

[0067] Figure 13: the large solenoid element 51 is downward moved; this operating step is repeated for the necessary movements up to achieve the required amount in the related basket.

[0068] The opening and closing movements of the valve 15 are variable and modulated by the control software.

[0069] Such a modulation is carried out by using a specifically designed algorithm, which processes in a continuous manner the stabilized weight data transmitted by a serial communication by the balance 8 and transforming these data into opening signals of the drawer 35 of the valve 15 by a continuous type of self-calibrating process, thereby providing an optimum precision up to 0.01 grams.

[0070] If the formula to be made comprises dye or coloring materials arranged in both the delivery heads, then the software will determine an optimized metering sequence, to meter at first all the dye materials from the head 101 and then those from the head 102.

[0071] Figure 14: the small solenoid element 54 is downward driven, thereby unlatching the drawer 35; the peg 53 being removed thereby freeing the drawer 35 and thereby the delivery assembly is arranged at a stand-by position.

[0072] Thus, the rotary disc 11 will be ready for a subsequent locating of the basket assemblies.

[0073] If in the required or target formula one or more dye or coloring materials are present in the second delivery head, then the software will displace or drive the motor driven carriage 6 to the related delivery point.

[0074] After having completed the required formula, the motor driven carriage 6 will drive the tin 7 to the central region of the bench 5 and the software will visually confirm, through the PC screen 2, the end of the delivery procedure.

[0075] The apparatus is controlled through the personal computer 2 by a control software comprising two components: a driver software, on a host computer, and a firmware on the processor on board of the electronics.

[0076] The communication is of an opened and bidirectional serial type between the software and balance 8.

[0077] The driver will control all the aspect of the delivery and servicing logic and will use the balance 8 coupled to the computer host 2 for reading out the delivered amount weight.

[0078] The firmware will manage the electronics with respect to the sensor read-out and the actuator device driving.

[0079] The driver will receive from a software database, usually supplied by the painting product maker, the formulas disclosing the composition of the dye or color to be made.

[0080] Then, the driver and firmware, by communicating through a proprietary protocol, will manage each formula delivery operation.

[0081] The delivery of each formula, after having been transmitted from the software database to the driver, will require a vessel 7 to be located on the balance 8, under the metering point 4a, 4b.

[0082] In order to properly deliver each formula component, the software will cause the rotary disc 11 to rotate as to sequentially bring the basket assemblies 13 of the components to the delivery zone.

[0083] The locating sequence is so commanded as to reduce the handling time.

[0084] Since, after the metering operation, dye residues may remain on the outside of the valve 15, and since such a painting product will tend to dry very quickly,

in each delivery head 101, 102 a cleaning is carried out for properly cleaning this area.

[0085] At such a point, the dirty part of the valve is subjected to a washing operation by a Venturi washing system using air and water or other suitable liquid material, as suggested by the painting product maker.

[0086] The residues of the above washing operation are conveyed and channeled to a suitable disposal vessel.

[0087] In some cases, it would be also possible to regenerate, in said disposal vessel, the washing clean liquid, by a flocculating operation.

[0088] It has been found that the invention fully achieves the intended aim and objects.

[0089] In fact, the invention has provided a painting product metering and delivering apparatus including an automatic metering assembly delivering fluid products in a sequential manner and by a gravimetric control.

[0090] This action is based on an interaction between the data detected in a continuous mode of operation between an electronic balance and opening and closing movement of a sliding device.

[0091] The apparatus provides a direct delivery from the storing vessel to the finished product vessel, thereby reducing to a minimum the distance between the storing region and the delivery region.

[0092] Moreover, the direct delivery, aided by a specifically designed software, will assure a very accurate metering of minimum amount necessary for achieving a target chromatic accuracy of the required end dye or painting product.

[0093] Preferably, the apparatus comprises a plurality of plastic material baskets for pouring thereinto the painting materials to be sequentially metered, to provide the final coloring products as provided by the formulas processed by the painting material maker.

[0094] As shown, the apparatus comprises either one or preferably two delivery heads, to mate with a comparatively high number of system dye materials, up to 60 of said dye materials.

[0095] A main feature of the inventive metering system is that the latter comprises a continuous algorithm for controlling the dialogue between the balance electronics and the software which, depending on these data, will modulate the opening and closing of the sliding metering valve arranged on the base of bottom of each basket.

[0096] Such a modulation allows the valve to be sequentially opened and closed to achieve the required or target amount.

[0097] In order to actuate the opening/closing movements, the delivery point comprises a controlling system including two software driver controlled solenoid elements which have respectively a task of latching the valve sliding drawer and opening and closing it depending on the amount to be metered.

[0098] This operation may be repeated several times for each metering operation, depending on the data coming from the balance: as the precision level setting is increased, the number of possible solutions to achieve an accuracy of 1/100 g will be correspondingly increased.

[0099] The above mentioned procedures will be repeated for each coloring or dye material necessary to provide the required end formula.

[0100] In practicing the invention, the used materials, as well as the contingent size, can be any, depending on requirements.

Claims

1. An apparatus for metering and delivering painting products, said apparatus comprising at least a delivery head (101,102) comprising a plurality of basket assemblies (13), each holding a painting product and comprising a sliding metering valve (15), said basket assemblies being supported by a rotary supporting disc (11) so as to be brought to an aligned relationship, one at a time, to a delivery point (21) thereat a delivery unit designed for allowing the basket assembly (13) contents to be delivered in a metered manner to a collecting vessel (7) is provided, said collecting vessel being arranged on a balance (8) coupled to a computer (2), controlling said delivery unit and basket assembly at said delivery point, **characterized in that** said delivery head (101, 102) comprises a turning or rotary disc (11) thereon said basket assemblies are radially arranged, each of said basket (13) assembly (13) including a respective metering valve (15), said rotary disc being rotatively driven by a driving motor (12) in either a clockwise or anticlockwise direction, said rotary disc (11) being controlled through a dedicated software driven by a locating sensor (16) providing said software with positional information of each said basket (13) assembly with respect to said delivery unit (21), said delivery head further comprising a circular rack (14) engaging a pinion (41) of each said basket assembly (13) and operating a paint stirring fan (43).

2. An apparatus, according to claim 1, **characterized in that** said metering valve comprises a metering valve shaped body thereon a slide member is slidably driven, the metering valve being tightly coupled by a coupling template formed in said body and to which a sealing gasket is applied, said template including two barriers defining a channel providing a third barrier between the valve body and a flat surface of said slide member, said gasket also allowing a lubricating operation to be performed between said slide member and body, as the painting product is delivered or stored, said slide member being rigid with a drawer element and movable against a pair of pulling springs fixed to said body, a reed spring being threaded to said slide member by a self threading screw, said delivery valve being rigid with said basket assembly.

3. An apparatus, according to claim 1, **characterized in that** said basket assembly comprises a basket element closed by a closing cover supporting a shaft extending within said basket and supporting one or more fans and being driven by said pinion.

4. An apparatus, according to one or more of the preceding claims, **characterized in that** said delivery unit comprises a first solenoid element fixed to a bracket and controlling the movement of a fork supporting a second solenoid element, said second solenoid element controlling a latching pin and being associated with a sensor, said delivery unit comprising moreover a bottom microswitch and a top microswitch.

5. An apparatus, according to one or more of the preceding claims, **characterized in that** said metering valve may be opened and closed in a variable manner as controlled by said software for adjusting the delivered painting product amount, said adjusting being performed through an adjusting algorithm processing in a continuous manner stabilized painting product weight data, sent through a series communication by said balance and transformed into a driving signal for opening said valve through a continuous self calibrating process, to provide a precisely metered painting product delivery.

6. An apparatus, according to one or more of the preceding claims, **characterized in that** said apparatus is controlled by said personal computer controlled by a software including two software components; a software driver run on a host computer, and a firmware run on an electronic on-board processor, the communication between said software and balance being an open and bidirectional communication, said driver managing all the delivery and maintenance logic devices and using said balance coupled to said host computer for reading the delivered product weight and amount, said firmware managing the electronic part, with respect to the sensor readout and actuator device driving operations, said driver receiving from a database software, as provided by the paint product maker, the formulas of the colors to be prepared, said driver and firmware further communicating through a legacy protocol for managing the delivery of each formulated color, upon transmitting it from said database software to said driver, by arranging a color vessel on said balance, under said delivery point, and causing said rotary disc to be rotatively driven thereby sequentially quickly bringing said component basket assemblies to a delivery region.

7. An apparatus, according to one or more of the preceding claims, **characterized in that** said apparatus further comprises a cleaning device for cleaning the paint product delivery region, said cleaning device including a Venturi system for cleaning the contaminated parts of the valve by cleaning air and water or other cleaning liquid.

8. An apparatus, according to claim 7, **characterized in that** said the residue materials from the cleaning or washing operation are conveyed to a disposal of container where the cleaning liquid is regenerated by a flocculating process for providing a new washing operation.

9. An apparatus, according to claim 1, **characterized in that** said apparatus comprises two delivery heads, arranged in a body recesses which are closed at the top thereof by a respective closing gate, said body supporting a personal computer for controlling said apparatus and including three delivery points, a first central delivery point and two second and third side delivery points, said delivery points being arranged at a central bench supporting a motor driven carriage thereon said balance in turn supporting a vessel formed by a tin for collecting the delivered paint is arranged.

Patentansprüche

1. Vorrichtung zum Dosieren und Ausgeben von Lackierprodukten, wobei die Vorrichtung mindestens einen Ausgabekopf (101, 102) umfasst, der mehrere Korbeinheiten (13) umfasst, von denen jede ein Lackierprodukt enthält und ein Schiebedosierventil (15) umfasst, wobei die Korbeinheiten durch eine Drehträgerscheibe (11) derart getragen werden, dass sie, jeweils immer nur eine, in eine ausgerichtete Beziehung mit einem Ausgabepunkt (21) gebracht werden, an welchem eine Ausgabeeinheit, die dazu ausgebildet ist, zu ermöglichen, den Inhalt der Korbeinheit (13) auf dosierte Weise zu einem Sammelbehälter (7) auszugeben, vorgesehen ist, wobei der Sammelbehälter auf einer Wiegevorrichtung (8) angeordnet ist, die an einen Rechner (2) angebunden ist, welcher die Ausgabeeinheit und die Korbeinheit an dem Ausgabepunkt steuert, **dadurch gekennzeichnet, dass** der Ausgabekopf (101, 102) eine Dreh- oder Rotationsscheibe (11) umfasst, auf welcher die Korbeinheiten radial angeordnet sind, wobei jede der Korbeinheiten (13) ein entsprechendes Dosierventil (15) umfasst, wobei die Rotationsscheibe durch einen Antriebsmotor (12) entweder in einer Richtung im Uhrzeigersinn oder in einer Richtung gegen den Uhrzeigersinn drehend angetrieben wird, wobei die Rotationsscheibe (11) durch eine dedizierte Software gesteuert wird, die durch einen Lagebestimmungssensor (16) geführt wird, welcher die Software mit Lageinformationen von jeder der Korbeinheiten (13) in Bezug auf die Ausgabeeinheit (21)

versorgt, wobei der Ausgabekopf ferner eine kreisförmige Zahnstange (14) umfasst, die mit einem Ritzel (41) von jeder der Korbeinheiten (13) in Eingriff steht und einen Lackrührventilator (43) antreibt.

2. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** das Dosierventil einen Dosierventil-Formkörper umfasst, an welchem ein Schiebeglied verschiebbar angetrieben wird, wobei das Dosierventil durch eine Verbindungsschablone, die in dem Körper ausgebildet ist und auf welche eine Dichtung aufgebracht ist, eng verbunden ist, wobei die Schablone zwei Barrieren umfasst, die einen Kanal definieren, der eine dritte Barriere zwischen dem Ventilkörper und einer flachen Oberfläche des Schiebeglieds vorsieht, wobei die Dichtung auch ermöglicht, einen Schmiervorgang zwischen dem Schiebeglied und dem Körper durchzuführen, während das Lackierprodukt ausgegeben oder aufbewahrt wird, wobei das Schiebeglied mit einem Zugelement starr verbunden und gegen ein Paar von Zugfedern, die an dem Körper befestigt sind, beweglich ist, wobei eine Blattfeder durch eine selbstschneidende Schraube an das Schiebeglied geschraubt ist, wobei das Ausgabeventil mit der Korbeinheit starr verbunden ist.

3. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Korbeinheit ein Korbelement umfasst, welches durch eine Verschlussabdeckung verschlossen ist, die eine Welle lagert, welche sich in dem Korb erstreckt und einen oder mehrere Ventilatoren trägt und durch das Ritzel angetrieben wird.

4. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Ausgabeeinheit ein erstes Solenoidelement umfasst, das an einem Bügel befestigt ist und die Bewegung einer Gabel steuert, welche ein zweites Solenoidelement trägt, wobei das zweite Solenoidelement einen Arretierstift steuert und einem Sensor zugeordnet ist, wobei die Ausgabeeinheit darüber hinaus einen unteren Mikroschalter und einen oberen Mikroschalter umfasst.

5. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das Dosierventil durch die Software gesteuert zum Einstellen der zugeführten Lackierproduktmenge auf variable Weise geöffnet und geschlossen werden kann, wobei das Einstellen durch einen Einstellalgorithmus erfolgt, der stabilisierte Lackierproduktgewichtsdaten auf kontinuierliche Weise verarbeitet, die über eine serielle Kommunikation durch die Wiegevorrichtung übertragen werden und in ein Antriebssignal zum Öffnen des Ventils durch einen kontinuierlichen Selbstkalibrierungsvorgang umgewandelt werden, um für eine exakt dosierte Ausgabe des Lackierprodukts zu sorgen.

6. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Vorrichtung durch den Personalcomputer gesteuert wird, der durch eine Software gesteuert wird, welche zwei Softwarekomponenten umfasst; einen Softwaretreiber, der auf einem Hostrechner läuft, und eine Firmware, die auf einem elektronischen On-Board-Prozessor läuft, wobei die Kommunikation zwischen Software und Wiegevorrichtung eine offene und bidirektionale Kommunikation ist, wobei der Treiber alle Ausgabe- und Wartungs-Logikelemente verwaltet und zum Auslesen des Gewichts und der Menge des ausgegebenen Produkts die Wiegevorrichtung, die an den Host-Rechner angebunden ist, verwendet, wobei die Firmware die Elektronik in Bezug auf die Sensorauslese- und die Aktorvorrichtungsansteuer-Vorgänge verwaltet, wobei der Treiber von einer Datenbanksoftware, die von dem Lackierprodukthersteller bereitgestellt wird, die Formeln der herzustellenden Farben empfängt, wobei der Treiber und die Firmware ferner, nachdem diese von der Datenbanksoftware an den Treiber übertragen wurden, zum Verwalten der Ausgabe jeder formulierten Farbe über ein Altprotokoll kommunizieren, durch Anordnen eines Farbbehälters auf der Wiegevorrichtung unter dem Ausgabepunkt und Bewirken, dass die Rotationsscheibe drehend angetrieben wird, wodurch die Komponenten-Korbeinheiten rasch nacheinander zu einem Ausgabebereich gebracht werden.

7. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Vorrichtung ferner eine Reinigungsvorrichtung zum Reinigen des Lackierproduktausgabebereichs umfasst, wobei die Reinigungsvorrichtung ein Venturi-System zum Reinigen der verunreinigten Teile des Ventils durch Reinigungsluft und Wasser oder eine andere Reinigungsflüssigkeit umfasst.

8. Vorrichtung nach Anspruch 7, **dadurch gekennzeichnet, dass** die Restmaterialien aus dem Reinigungs- oder Waschvorgang zu einem Entsorgungsbehälter befördert werden, wo die Reinigungsflüssigkeit durch einen Flockungsprozess für einen erneuten Waschvorgang regeneriert wird.

9. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Vorrichtung zwei Ausgabeköpfe umfasst, die in Körperaussparungen angeordnet sind, welche an deren oberen Enden durch eine jeweilige Verschlusstür verschlossen sind, wobei der Körper einen Personalcomputer zum Steuern der Vorrichtung trägt und drei Ausgabepunkte umfasst, einen ersten mittigen Ausgabepunkt und zwei seitliche Ausgabepunkte, einen zweiten und einen drit-

ten, wobei die Ausgabepunkte an einer mittigen Bank angeordnet sind, welche einen motorbetriebenen Schlitten trägt, auf welchem die Wiegevorrichtung ihrerseits einen Behälter trägt, der durch eine Büchse zum Sammeln der zugeführten Farbe gebildet ist.

Revendications

1. Appareil pour le dosage et la distribution de produits de peinture, ledit appareil comprenant au moins une tête de distribution (101, 102) comprenant une pluralité d'ensembles de panier (13) contenant chacun un produit de peinture et comprenant une soupape de dosage coulissante (15), lesdits ensembles de panier étant supportés par un disque de support rotatif (11) de manière à être mis dans une relation alignée, un par un, jusqu'à un point de distribution (21) au niveau duquel est prévue une unité de distribution conçue pour permettre de distribuer le contenu de l'ensemble de panier (13) de façon dosée à un récipient de collecte (7), ledit récipient de collecte étant agencé sur une balance (8) couplée à un ordinateur (2), contrôlant ladite unité de distribution et ledit ensemble de panier audit point de distribution, **caractérisé en ce que** ladite tête de distribution (101, 102) comprennent un disque tournant ou rotatif (11) sur laquelle sont montés radialement les ensembles de panier, chacun desdits ensembles de panier (13) comprenant une soupape de dosage (15) respective, ledit disque rotatif étant entraîné de façon rotative par un moteur d'entraînement (12) dans le sens des aiguilles d'une montre ou dans le sens inverse des aiguilles d'une montre, ledit disque rotatif (11) étant contrôlé par un logiciel dédié piloté par un capteur de localisation (16) fournissant audit logiciel des informations de position pour chacun desdits ensembles de panier (13) par rapport à ladite unité de distribution (21), ladite tête de distribution comprenant en outre un portant circulaire (14) engageant un pignon (41) de chacun desdits ensembles de panier (13) et actionnant un ventilateur d'agitation de peinture (43).

2. Appareil selon la revendication 1, **caractérisé en ce que** ladite soupape de dosage comprend un corps de soupape de dosage sur lequel un élément coulissant est entraîné de façon coulissante, la soupape de dosage étant accouplée étroitement par un gabarit d'accouplement formé dans ledit corps et sur lequel est appliqué un joint d'étanchéité, ledit gabarit comprenant deux barrières définissant un canal fournissant une troisième barrière entre le corps de soupape et une surface plane dudit élément coulissant, ledit joint d'étanchéité permettant également de réaliser une opération de lubrification entre ledit élément coulissant et ledit corps pendant la distribution ou le stockage dudit produit de peinture, ledit élément coulissant étant rigide avec un élément de tiroir et déplaçable contre une paire de ressorts de traction fixés audit corps, un ressort à lame étant vissé sur ledit élément coulissant par une vis autotaraudeuse, ladite soupape de distribution étant rigide avec ledit ensemble de panier.

3. Appareil selon la revendication 1, **caractérisé en ce que** ledit ensemble de panier comprend un élément de panier fermé par un couvercle de fermeture supportant un axe s'étendant à l'intérieur dudit panier et supportant un ou plusieurs ventilateurs et étant entraîné par ledit pignon.

4. Appareil selon l'une ou plusieurs des revendications précédentes, **caractérisé en ce que** ladite unité de distribution comprend un premier élément solénoïde fixé à un support et contrôlant le mouvement d'une fourche supportant un deuxième élément solénoïde, ledit deuxième élément solénoïde contrôlant une broche d'encliquetage et étant associé à un capteur, ladite unité de distribution comprenant en outre un micro-interrupteur inférieur et un micro-interrupteur supérieur.

5. Appareil selon l'une ou plusieurs des revendications précédentes, **caractérisé en ce que** ladite soupape de dosage peut être ouverte et fermée de manière variable en étant contrôlée par ledit logiciel pour ajuster la quantité de produit de peinture distribuée, ledit ajustement étant réalisé par un algorithme d'ajustement traitant de façon continue des données de poids de produit de peinture stabilisées, envoyées par une communication de série par ladite balance et transformées en un signal d'entraînement pour ouvrir ladite soupape à l'aide d'un procédé d'auto-étalonnage continu, afin d'obtenir une distribution de produit de peinture dosée de façon précise.

6. Appareil selon l'une ou plusieurs des revendications précédentes, **caractérisé en ce que** ledit appareil est contrôlé par ledit ordinateur contrôlé par un logiciel comprenant deux composants logiciels ; un pilote logiciel exécuté sur un ordinateur hôte, et un microprogramme exécuté sur un processeur électronique intégré, la communication entre ledit logiciel et ladite balance étant une communication ouverte et bidirectionnelle, ledit pilote gérant tous les dispositifs logiques de distribution et de maintenance et utilisant ladite balance couplée audit ordinateur hôte pour lire le poids et la quantité du produit distribué, ledit microprogramme gérant la pièce électronique par rapport aux opérations de lecture de capteur et d'entraînement de dispositif d'actionnement, ledit pilote recevant les formules des couleurs à préparer de la part d'un logiciel de base de données, telles que fournies par le fabricant de produit de peinture,

ledit pilote et ledit microprogramme communiquant en outre par le biais d'un protocole existant pour gérer la distribution de chaque couleur formulée, lors de la transmission de celle-ci dudit logiciel de base de données audit pilote, en plaçant un récipient de couleur sur ladite balance, en-dessous dudit point de distribution, et en amenant ledit disque rotatif à être entraîné de façon rotative, transportant ainsi rapidement et séquentiellement lesdits ensembles de panier à composant vers une région de distribution.

7. Appareil selon l'une ou plusieurs des revendications précédentes, **caractérisé en ce que** ledit appareil comprend en outre un dispositif de nettoyage pour nettoyer la région de distribution de produit de peinture, ledit dispositif de nettoyage comprenant un système venturi pour nettoyer les pièces contaminées de la soupape avec de l'air de nettoyage et de l'eau ou un autre liquide de nettoyage.

8. Appareil selon la revendication 7, **caractérisé en ce que** lesdites matières résiduelles de l'opération de nettoyage ou de lavage sont transportés vers un conteneur à déchets où le liquide de nettoyage est régénéré par un procédé de floculation afin de fournir une nouvelle opération de lavage.

9. Appareil selon la revendication 1, **caractérisé en ce que** ledit appareil comprend deux têtes de distribution agencées dans des renfoncements de corps fermés sur le haut de celles-ci par une grille de fermeture respective, ledit corps supportant un ordinateur pour contrôler ledit appareil et comprenant trois points de distribution, un premier point de distribution central et deux deuxième et troisième points de distribution latéraux, lesdits points de distribution étant agencés sur un banc central supportant un chariot entraîné par un moteur, sur lequel est agencée la balance supportant à son tour un récipient formé par un pot pour collecter la peinture distribuée.

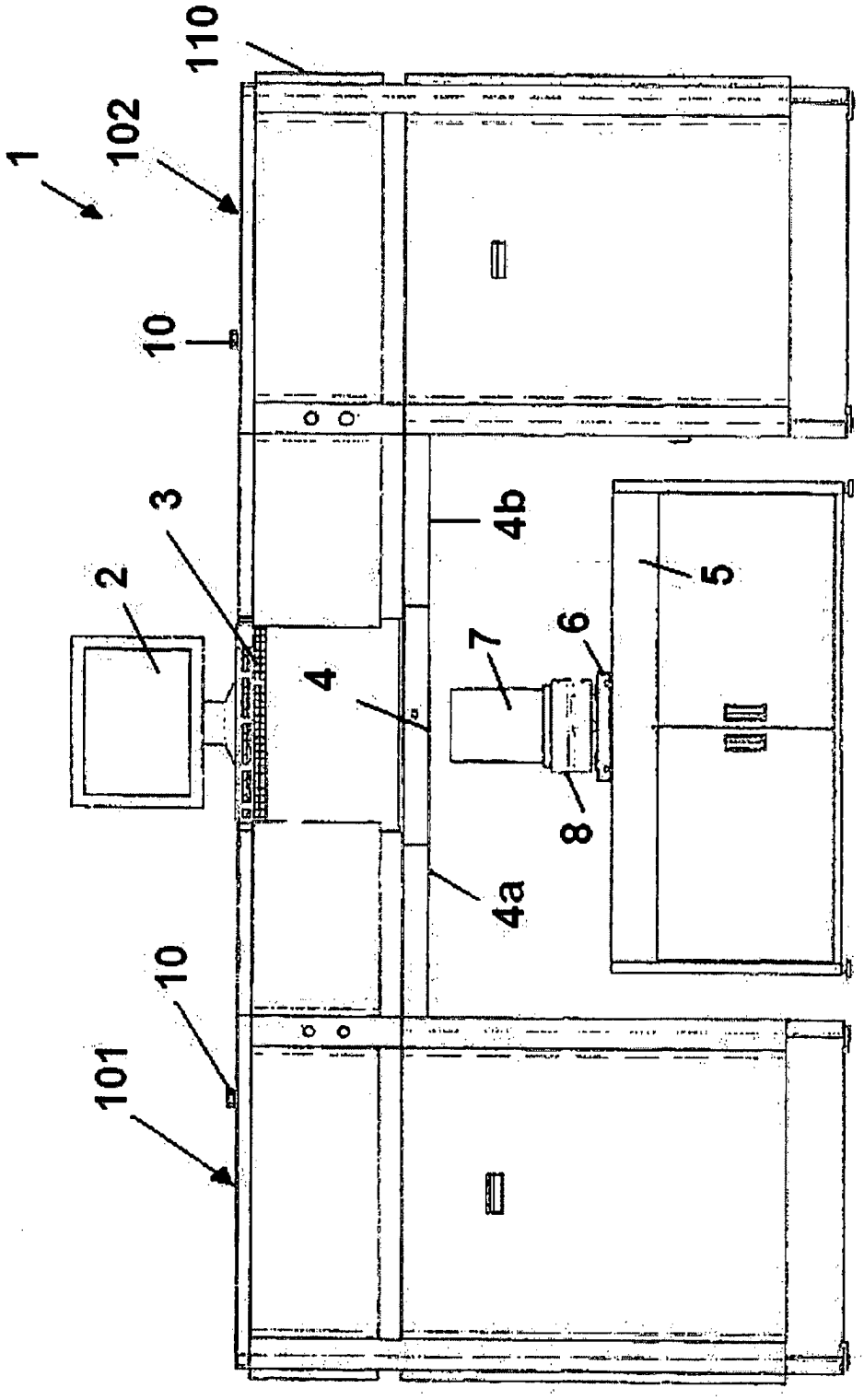


FIG. 1

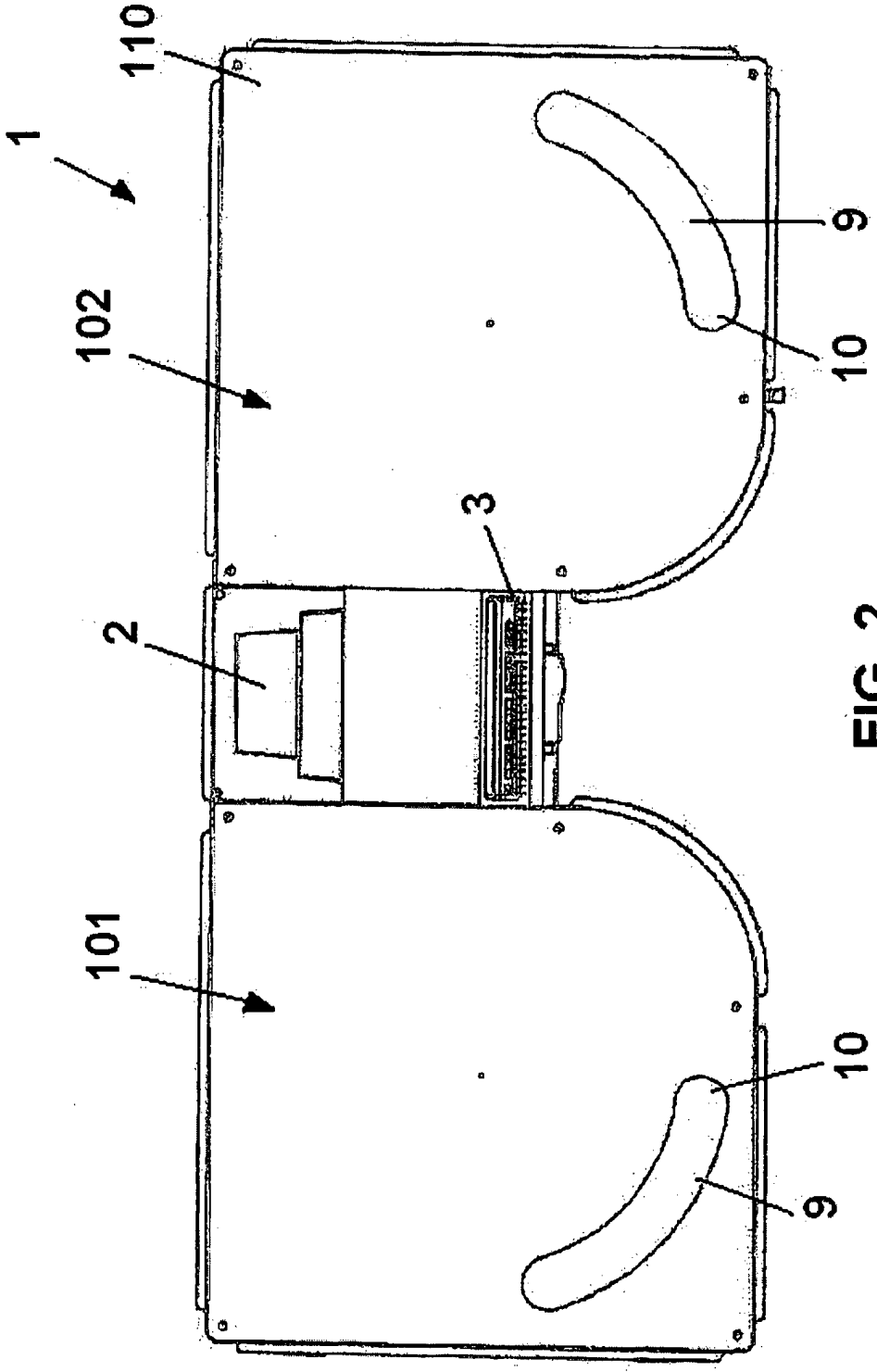


FIG. 2

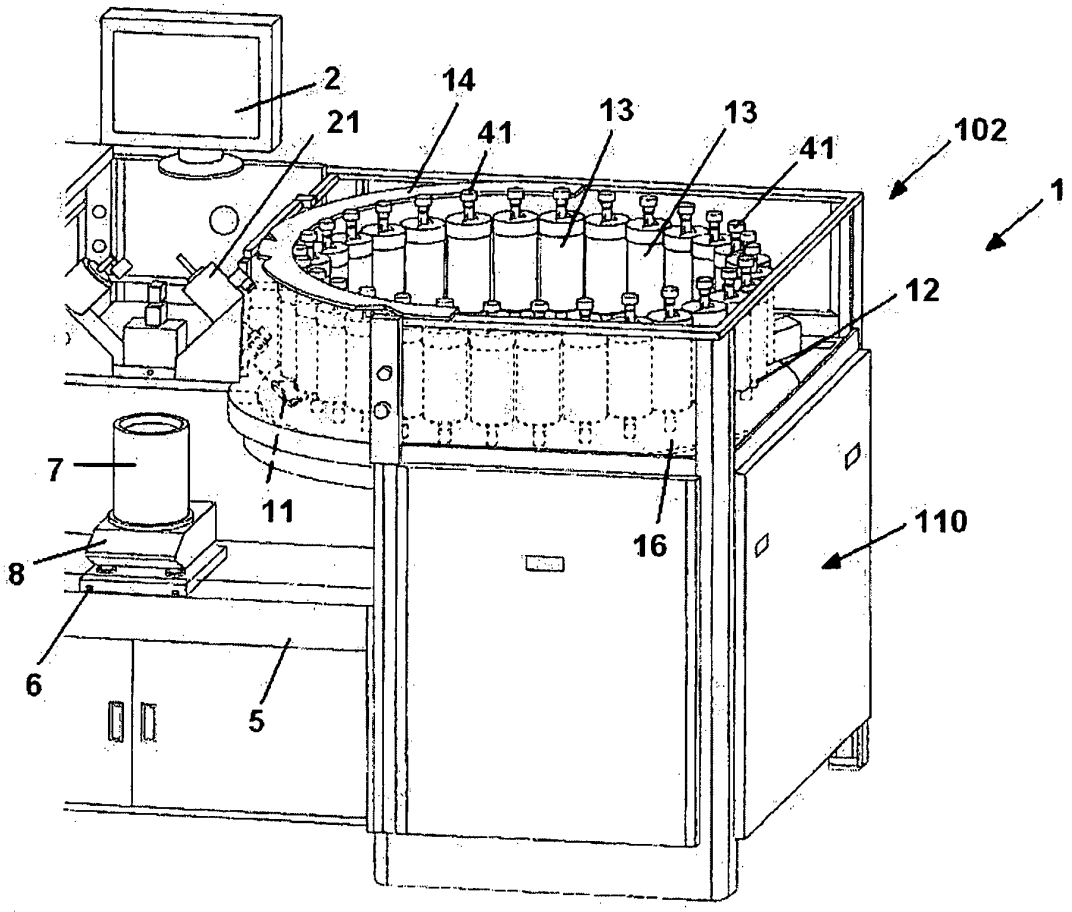


FIG. 3

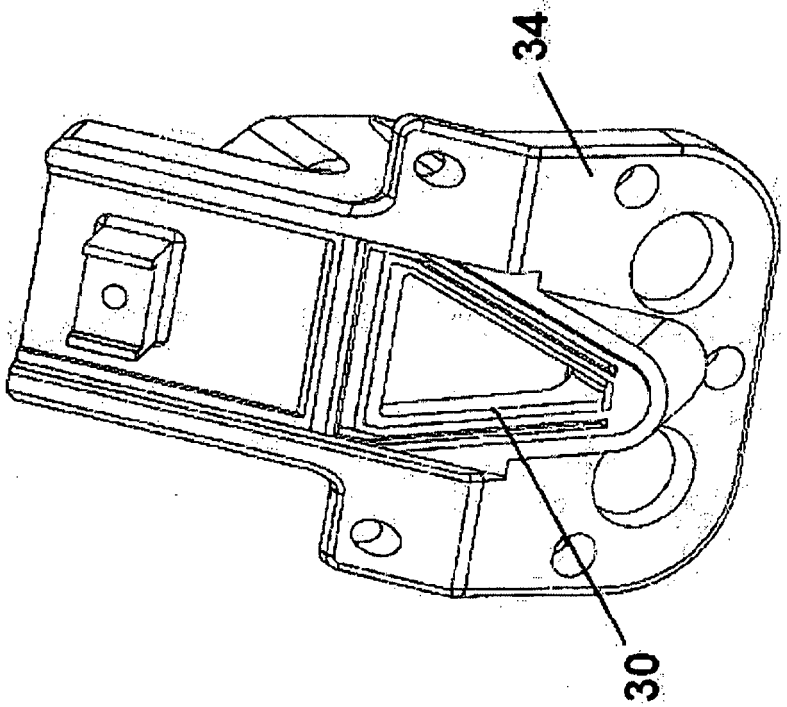


FIG. 5

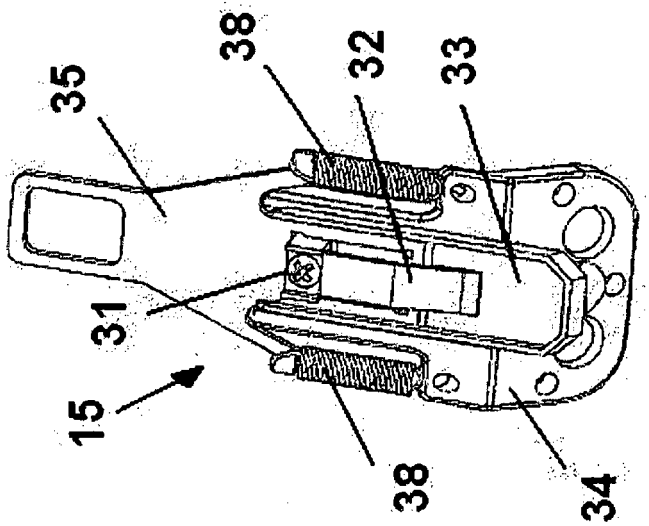


FIG. 4

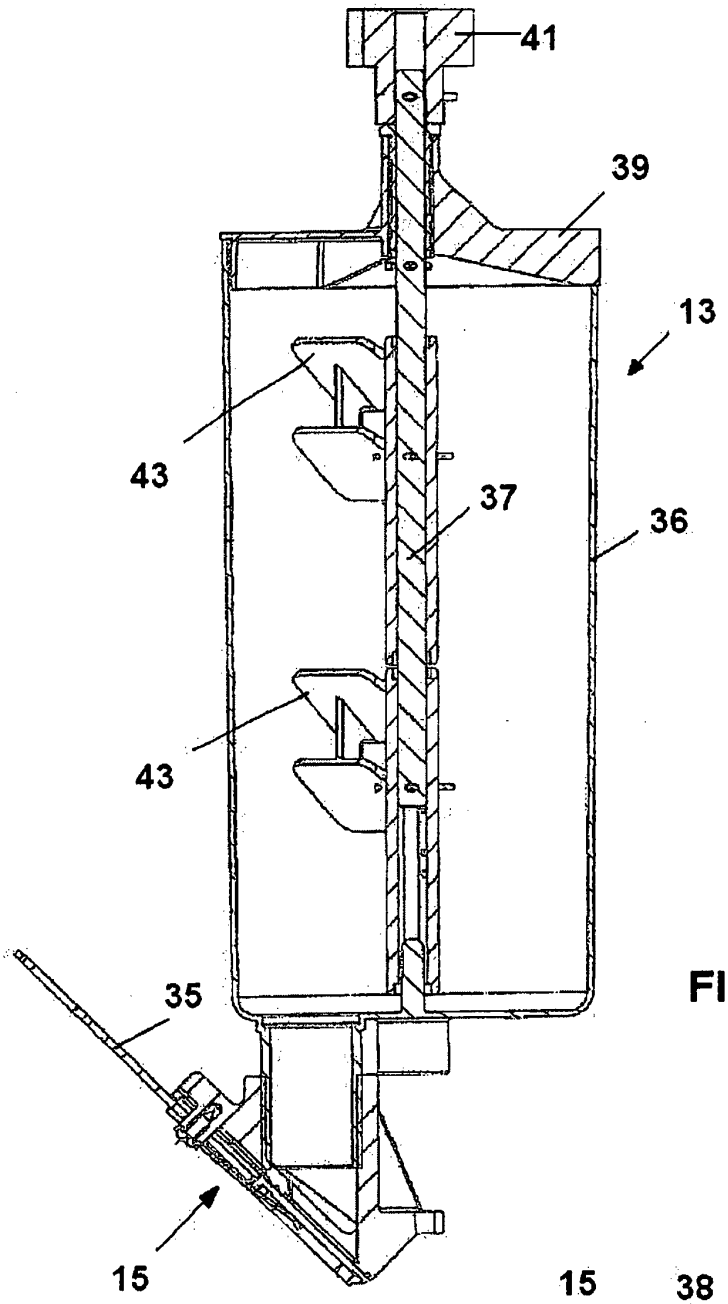


FIG. 6

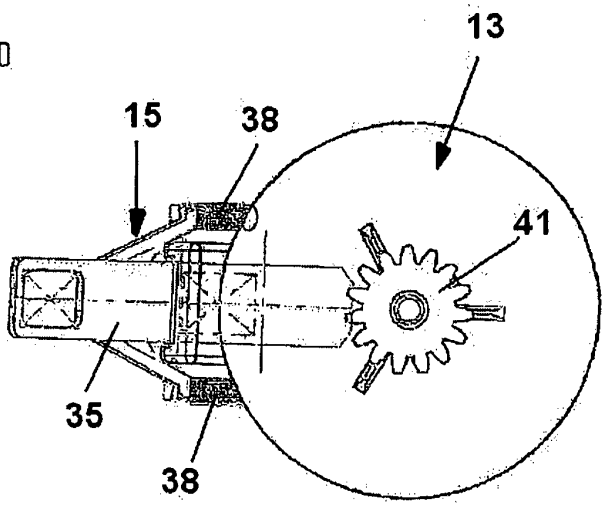


FIG. 7

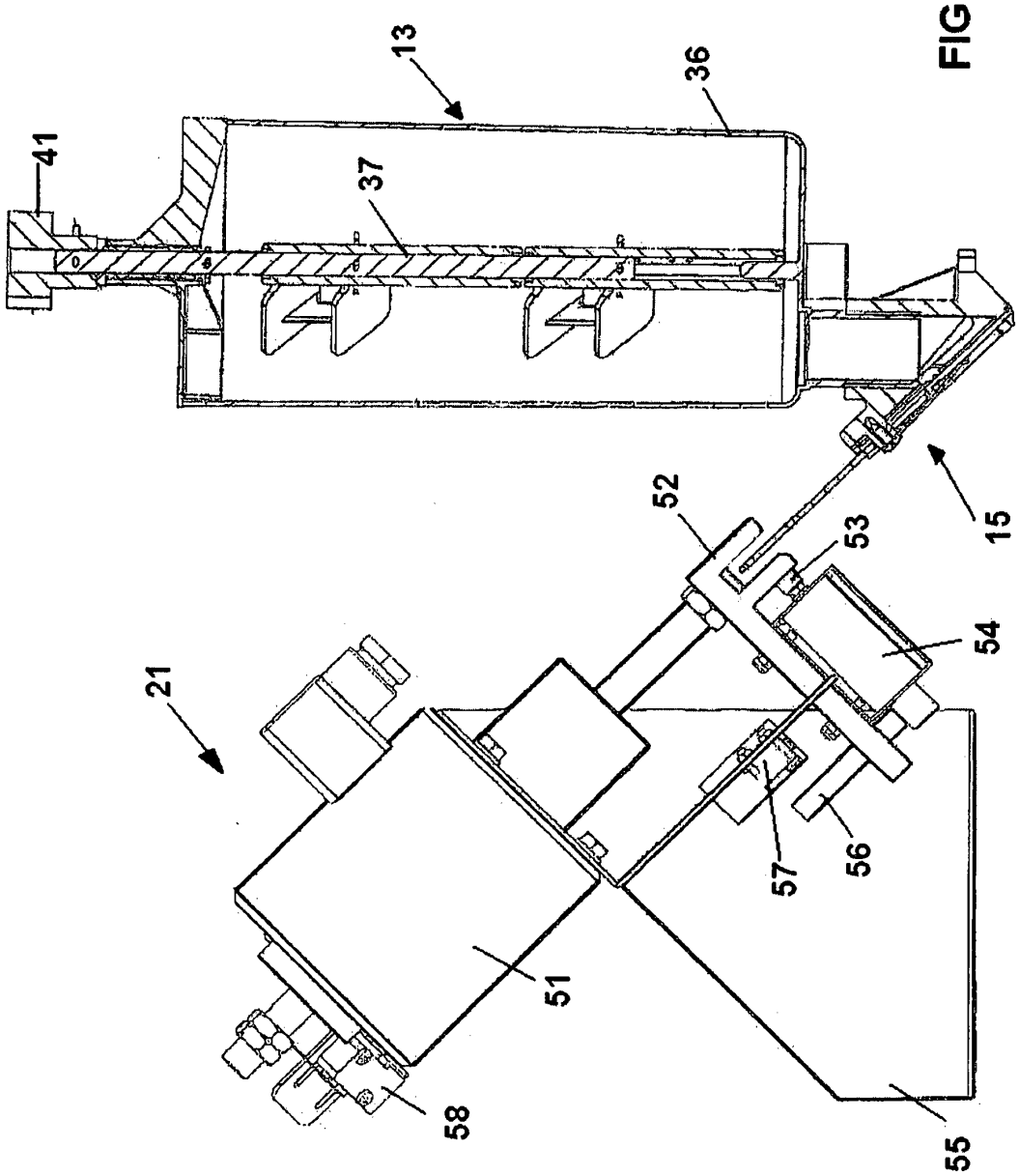


FIG. 8

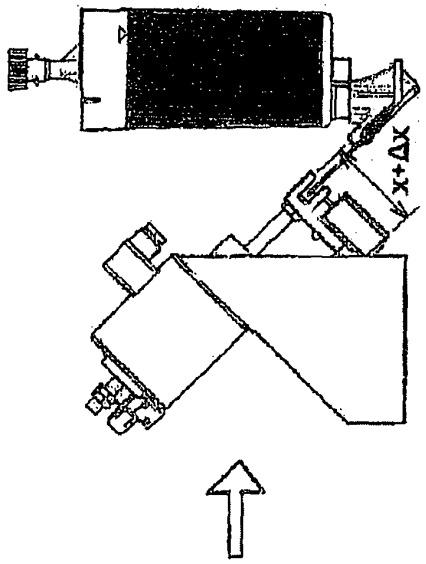


FIG. 11

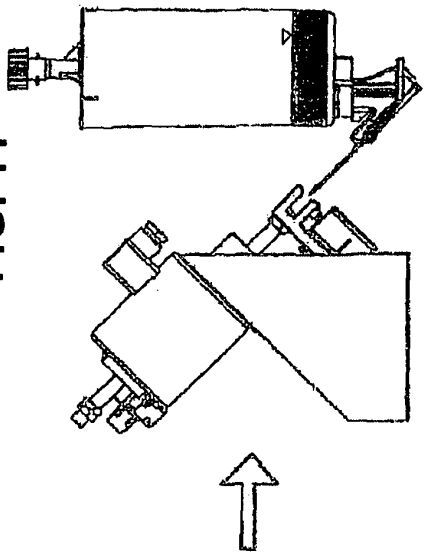


FIG. 14

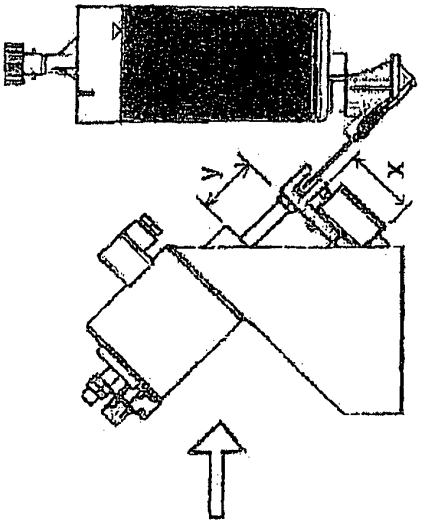


FIG. 10

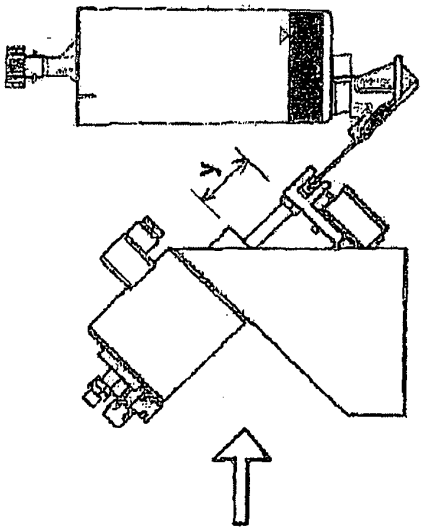


FIG. 13

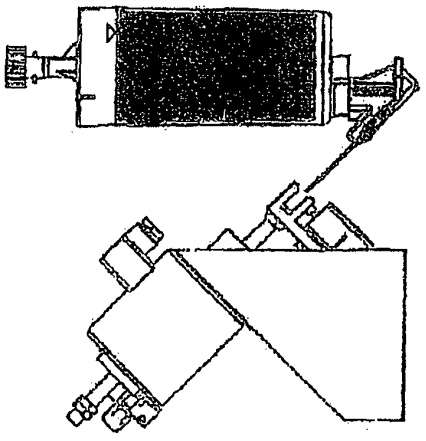


FIG. 9

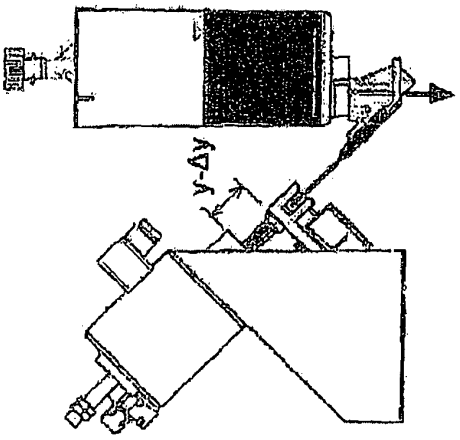


FIG. 12

REFERENCES CITED IN THE DESCRIPTION

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