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(71) Applicant: **Erretre S.p.A.**
36071 Arzignano (Vicenza) (IT)

(72) Inventor: **Galiotto, Antonio**
36071 Arzignano (VI) (IT)

(74) Representative: **Iannone, Carlo Luigi et al**
Barzanò & Zanardo Roma S.p.A.
Via Piemonte 26
00187 Roma (IT)

(54) **Equipment for treating leather and corresponding working method**

(57) An improved equipment for working flexible laminar surfaces, such as, notably, tannery leathers, comprising a spray booth (30), within which the working of the aforesaid leathers takes place, which are placed on at least one conveyor belt (11) sliding below a series of devices (15A, 15B), suitable to apply one or more cover products, according to predetermined modes, on a prefixed portions of the leathers; in particular, according to the invention, it is provided to perform the cleaning of the aforesaid devices (15A, 15B) used for applying the cover products and the relative plants in hidden time, i.e. in time intervals during which at least one of these devices (15A, 15B) is at rest, significantly reducing machine shutdown. The invention also concerns a related method of working the leathers inside the spray booth (30).

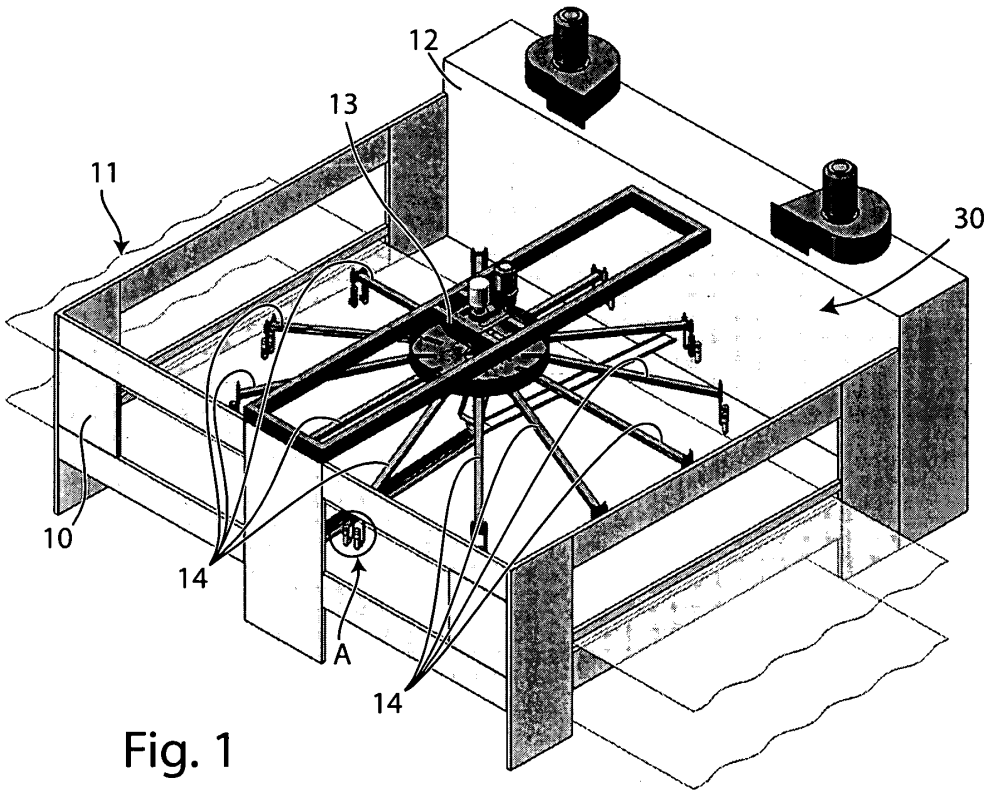

Fig. 1

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Description

[0001] The present invention relates generally to an improved equipment for working flexible laminar surfaces, such as tannery leathers, and in particular relates to a leathers spraying equipment and a related working method.

[0002] More specifically, the invention relates to a fully automated mode of cleaning the equipment and spray guns which can be performed simultaneously with the operation of paint spraying, thereby drastically reducing the shutdown of the entire equipment.

[0003] Spraying apparatuses or equipment for tannery leathers, suitable to spray on the leathers several covering products such as paints, pigments, resins, oils, paraffin waxes, glues, etc., are currently known.

[0004] They essentially comprise a conveyor belt, which allows the progress of the leathers, a closed spray booth, where, by means of spray guns, the deposition of the covering products occurs, and a suction and fumes damping system, placed laterally the spray booth, through which the fumes of the covering products which are deposited on the lathers are sucked and filtered.

[0005] In particular, in case of a leather spraying equipment, the suction system allows to damp the fumes coming from the paint resulting in air suspension, while the spray booth can be of rotating type (where a rotating body, commonly called turntable, supports, through respective arms, a series of automatic spray guns), of reciprocating or elliptic type (which presents, as an alternative to the rotating body, a guide on which some trucks flow and support the spray guns).

[0006] The spraying of the leathers consists of covering the grain side with one or more layers of coating and dyeing material, in the form of elastic, thin and uniform and in a more or less high quantity film, depending on the coating level which is desired to achieve.

[0007] Moreover, the spraying process normally takes place through rotating bodies which usually include a set of arms, commonly eight or twelve, more or less long and sloped, on which the spray guns are mounted.

[0008] Two spray guns are usually mounted on each arm, working with respective independent and opposite each other plants, so that if one of the two plants operates and, therefore, the correspondent spray gun performs the spraying, the other plant is stationary and so the other gun is in rest position.

[0009] In particular, a rotating spray booth of conventional type is shown with 30 in the attached figure 1, while figure 2 shows an enlargement of the detail indicated with A in figure 1.

[0010] The spray booth 30 essentially comprises a main outer paneling 10, one or more conveyor belts of the leathers 11, a suction and fumes damping system 12 and a rotating body 13, which supports a series of more or less long and sloped arms 14, usually provided in a number of eight or twelve and radially arranged inside the spray booth 30, at the ends of which the automatic spray guns 15A, 15B are installed, usually provided in a number of two, working with two independent and opposite plants (i.e. either the plant associated with the gun 15A or that one associated with the gun 15B works).

[0011] In this type of spray booth 30, the diameter around which the automatic spray guns 15A, 15B rotate is greater than the width of the conveyor belt 11, usually in a ratio equal to 1.41.

[0012] Therefore, as shown in detail in the attached figures 3 and 4, the duty cycle of each spray gun 15A, 15B, starting from the inlet I of the leather on the conveyor belt 11 until the outlet U and assuming S the sense of rotation of the body 13 (similarly, the body or turntable 13 can rotate in the opposite direction), corresponds, in the order, to a first area or work period 16 (during which the spraying of the guns 15A, 15B occurs), a first area of rest of the guns 15A, 15B, indicated with 17 in figure 3, during which the washing of the guns 15A, 15B occurs and the spraying circuit is inactive or at rest, a second area or work period 18 (during which the guns 15A, 15B restart working) and finally a second area of rest 19 of both the plants of activation of the guns 15A, 15B, which corresponds to operator's access side in order to perform the scheduled maintenance operations.

[0013] Each of the work areas 16, 18 and the rest areas 17, 19 presents an amplitude of approximately 90°.

[0014] Similarly, the elliptic spray boots of the known type present, as an alternative to rotating body 13, a guide on which some trucks flow and which support the automatic spray guns 15A, 15B.

[0015] In this case, the guide does not always remain in position above the conveyor belt 11 because, at the points of reversal of the transverse motion, the trucks tend to stay too long on the leather in progress, creating spraying unhomogeneity; therefore, also in case of use of elliptical spray booths, areas of rest of the spray guns 15A, 15B are highlighted.

[0016] Whether in case of use of rotating spray booths or in case of use of elliptical spray booths, therefore, the process of depositing covering products in general on the tannery leathers and, in particular, the spraying process of the leathers mentioned above, comprises the following steps, which follow one another during the daily working:

- preparing the covering product (i.e. the paint to be used) and starting the equipment with relative speed, plants and sediment and/or spray guns adjustment;
- depositing and/or spraying the covering product itself (or the paint itself or the colour itself) on the various prefixed lots of the tannery leathers and contemporaneously preparing the next product and/or colour for the following lot;
- cleaning up the sediment and/or spraying plant used (that one connected with the gun 15A or that one connected with the gun 15B) and the guns 15A and 15B;
- setting again speed, plants and sediment and/or

spray of the guns;

- repeating the phases of depositing and/or spraying of the covering product (paint and/or colour) and cleaning of the sediment and/or spraying plants as previously done, until the end of the working.

[0017] It is clear from what described that it would be desirable to reduce the shutdown of the spraying plant of the traditional type, times which mainly correspond to the passage zones of the spray guns in the stretches in which there isn't below the leathers conveyor belt.

[0018] The present invention seeks, therefore, to overcome the drawbacks mentioned above.

[0019] In particular, main purpose of the invention is to provide an improved equipment for working flexible laminar surfaces, such as tannery leathers, and to indicate a relative working method, which effectively allow to reduce the shutdown of the equipment, exploiting the rest areas of the sediment and/or spraying devices of the covering products.

[0020] It is another purpose of the present invention to achieve an improved equipment for working flexible laminar surfaces, such as tannery leathers, and, in particular, to provide a leathers spraying plant inside rotating or elliptical spray booths which uses rotating or translating bodies, on which automatic spray guns are installed.

[0021] It is a further purpose of the present invention to provide an improved equipment for working flexible laminar surfaces, such as tannery leathers, which allows to carry out maintenance and cleaning operations of the working plants simultaneously with the processing phases of the equipment.

[0022] A last but not least purpose of the invention is to implement an improved equipment for working flexible laminar surfaces, such as tannery leathers, which assures high operation reliability, compliance with the operating procedures and safety in general, compared to the traditional solutions.

[0023] The aforesaid purposes are achieved by an improved equipment for working flexible laminar surfaces, such as tannery leathers, according to the attached claim 1, and a related working method according to the attached claim 11, to which they refer for the sake of brevity.

[0024] Other technical features of detail of the improved equipment and the related method are shown in the corresponding dependent claims.

[0025] In advantageous way, according to the invention, the shutdown of the equipment is drastically reduced, making simultaneous the phases related to the sediment of the product on some lots of leathers to be treated in reciprocally similar way and to the preparation of the covering product for other lots of leathers with the cleaning phase of the sediment plant and the spray guns used, thus being able to carry out equipment and spray guns cleaning in hidden time.

[0026] In order to achieve this, one or both the areas of rest of the spray guns are exploited, i.e. the passage zones of the spray guns which are not above the conveyor belt of the leathers inside the treatment spray booth, working with one of the treatment plants of the leathers and proceeding, at the same time, with the cleaning of the other plant.

[0027] All this is achieved by acting on the modes of working of the automatic spray guns.

[0028] Further purposes and advantages of the invention will result more from the description that follows relating to a preferred embodiment given by indicative, but not limiting, way of the improved equipment for working flexible laminar surfaces, such as tannery leathers, with reference to the attached drawings where:

- figure 1 is a top perspective view of a rotating spray booth of flexible laminar surfaces, such as tannery leathers, of traditional type;
- figure 2 shows an enlargement of the constructive detail indicated with A in figure 1;
- figure 3 is a schematic top view of a mode of working and, in particular, spraying of flexible laminar surfaces coating, such as tannery leathers, inside the rotating spray booth of figure 1;
- figure 4 shows an enlargement of the constructive detail indicated with B in figure 3;
- figures 5, 6 and 7 show as many schematic perspective views as various traditional embodiments of spray gun which can be used in the spray booth of figure 1;
- figure 8 shows a first circuit solution of a pneumatic and hydraulic plant used in the improved equipment for working flexible laminar surfaces, such as tannery leathers, according to the invention;
- figure 9 shows a variant of the circuit solution of the pneumatic and hydraulic plant used in the improved equipment for working flexible laminar surfaces, such as tannery leathers, according to the invention.

[0029] It is immediately stressed that even if the attached figures refer to a specific type of spray booth for spraying covering products on tannery leathers, and in particular to a paint booth, suitable to use rotating bodies with radially arranged spraying arms, the innovative concept described in the invention can be easily extended to any other type of equipment for the sediment in general of covering products on flexible laminar surfaces, such as tannery leathers, including a spray booth where the operations of depositing covering products on the leathers are performed, through systems whose operation inherently involves dead times and/or zones during leathers working.

[0030] In order to explain how to overcome such a problem of the dead times and/or zones during leathers working from the plant point of view, it is necessary to make some preliminary remarks about the so-called automatic spray guns, with particular reference to figures 5, 6 and 7.

[0031] Spray guns are currently known in some forms of various kinds, which are divided, however, in few types:

standard or traditional guns, high pressure guns, HVLP ("High Volume - Low Pressure") guns, "Airless" guns and "Airmix" (or "Air-combi") guns.

[0032] These categories of guns differ each other for the passage sections, the finishing degree and other aspects related to the working quality; in any case, the spray guns present a support rod 20, a colour input 21, needed for the adduction of the solution to be sprayed, a pilot air inlet (or needle air) 22, representing the pneumatic control which opens and closes the nozzle through which the colour is sprayed, and an inlet of atomizing air 23, i.e. the air which, through Venturi's effect, drags and nebulizes the colour (such an inlet 23 is present in all the guns except "Airless" or without air guns).

[0033] Standard guns, those ones at high pressure and HVLP ("High Volume - Low Pressure"), whose principle scheme is illustrated in figure 5, work with colour pressures lower than five bars and therefore need atomizing air; "Airless" guns work instead with colour pressure between sixty and eighty bars, so, as soon as the colour reaches the lower outlet nozzle, it nebulizes without the use of proper air, while the "Airmix" guns present a mixed functioning, since they work both with the colour above thirty bars and with atomizing air.

[0034] Additional types of guns use a return plant, intercepted or not by centralized or independent valves.

[0035] The return plant, not present in the "Airless" guns, consists of a second colour pipe, indicated with 25 in figures 6 and 7, which works in parallel with the pipe 26 and the inlet 21 and, should the need arise and depending on the choices made, can also become a second inlet 24 (as shown in detail in figure 6); this second plant can always be left open, in order to allow the continuous supply of colour to the gun, or closed and used as a washing plant.

[0036] When necessary, a colour flow regulator pneumatically controlled, similar to an on-off valve 27, can be mounted on the inlet colour pipe 25 (as shown in detail in figure 7).

[0037] Considering, as previously said, that the spray booth 30 presents some areas of rest (the arcs indicated with 17 and 19 in the appended figure 3), at the sides of the spray booth 30 where the conveyor belt 11 of the lathers does not flow below, the present invention provides for the aim to exploit the use of two spray guns 15A, 15B, mounted on each arm 14 of the body 13 (as shown in the attached figures 1, 2, 3 and 4), in such a way as, at each rotation or translation of the body 13 which supports the spray guns 15A, 15B, it is possible to perform the spraying of the leathers using, alternately, only one of the spray guns 15A, 15B, using the other one to automatically wash its own plant of colour adduction, at predetermined area indicated with 17 in figure 3, while at the area indicated with 19 in figure 3 both plants of the spray guns 15A, 15B are at rest.

[0038] In such a way, it is possible to optimize the working times and perform the workings on due time, without having to stop the equipment for a certain period of time (usually 15-20 minutes), in case it is necessary to change the paint colour, in order to clean the spray guns previously used, empty the entire equipment and introduce the new colour of adduction to the guns.

[0039] The invention allows indeed to prepare and load a second colour plant (i.e. a colour plant matched, for example, to the spray gun 15B), while the first plant is still working (matched, for example, to the spray gun 15A).

[0040] All this can be achieved by means of the pneumatic and hydraulic equipment schematized in the attached figure 8, in case spray guns 15A, 15B of HVLP ("High Volume - Low Pressure", shown in figure 5) type or standard type with return plant (like those ones shown schematically in figures 6 and 7) are used, or through the pneumatic and hydraulic equipment schematized in the attached figure 9, in case a spray gun 15A of standard or HVLP ("High Volume - Low Pressure") type without return plant and a spray gun 15B of "Airless" type (i.e. a gun similar to the HVLP gun of figure 5, but lacking of the inlet of atomizing air 23), are mounted on each arm 14. With particular reference to the attached figure 8, a source of input compressed air AI is indicated with 31, a ball valve of the main duct is indicated with 32, a pressure reducer of the pilot air AP is indicated with 33, a pressure reducer of the servo pilot air is indicated with 34, a pressure reducer of the pulverization air APL to be conveyed to the spray guns 15A, 15B (flows indicated respectively with APLA and APLB) is indicated with 35, a pressure regulator of air for the adjustment of the flow ARP is indicated with 36, a ball valve of the pump or membrane 39 for delivering colour to the related plants 28, 29, associated respectively with the standard or HVLP type spray guns 15A and 15B of each working arm 14, is indicated with 37, a pressure reducer filter of the pump 39 is indicated with 38, a colour tank is specified with 40, a tank of colour under pressure is denoted with 41, a ball valve of blowdown of the tank 41 is indicated with 42, a ball valve (optional) of blowdown for the return of the colour RCA, RCB, respectively, from the spray guns 15A, 15B is indicated with 43, a ball valve for delivering the colour MCA, MCB intended to, respectively, the spray guns 15A, 15B, is indicated with 44, a colour double delivery ball valve (optional) is indicated with 45, a distribution shaft of colour and air is marked with 46, a general solenoid valve of the pilot air is denoted with 47, a solenoid valve of selection of the pulverization plant is indicated with 48, a solenoid valve of consent to the operation of the spray guns 15A, 15B is specified with 49, a pneumatic flow regulator is indicated with 50, while a solenoid valve of consent to the return pipe for the double delivery of the spray guns 15A, 15B is indicated with 51.

[0041] The number of spray guns 15A, 15B can vary depending on the number of arms 14 present in the spray booth 30 and depending on the quantity of spray guns themselves required for each arm 14, while each solenoid valve 49 is controlled by an electronic gearcase which recognizes it individually and manages its position.

[0042] Always with reference to the attached figure 8 and assuming that the spray guns 15A are used and the plant connected with them operates (with the spray guns 15B and the plant connected with them at rest), the process for changing colour occurs according to the following stages:

- preparation of the colour for the plant connected with the spray guns 15B;
- exchange of the pulverization airflow APL, which passes from the line of the spray guns 15A (flow APLA) to the line of the spray guns 15B (flow APLB) through the solenoid valve 48;
- regulation of the pressures suitable for the circuit of the spray guns 15B, by means of reduction gears 33, 34, 36, 38;
- starting of the working through the spray guns 15B and the plant connected with them;
- opening of the return line connected with the spray guns 15A (section RCA), through the solenoid valves 51;
- replacement, within the tank 40 of the plant of the spray guns 15A, of the colour with a solution for cleaning the plant (generally composed of water if water paint is used and thinner if nitro paint is used);
- pumping of the cleaning solution inside the plant of the spray guns 15A, so as to clean the full plant until the spray guns 15A (which are at rest);
- opening of the spray guns 15A without pulverization air APLA, after such a cleaning stage, so that the aforesaid spray guns 15A have a concentrated and not sprayed jet, at the area indicated with 17 in figure 3 (acting on the pressure of the product to be deposited on the leathers, the spray guns 15A cannot thereby atomize, creating a catch area of the air stained with paint);
- deactivation of the plant of the spray guns 15A and return to the first stage of preparation of the colour for the plant connected with the spray guns 15B.

[0043] With particular reference to the attached figure 9, the equal components having the same function as those ones shown in the corresponding figure 8 are indicated with the same reference number, while a solenoid valve of selection of the pumping pressure of the "Airless" spray guns 15B is indicate with 55, a reducer filter of the pumping pressure of the operating "Airless" spray guns 15B is indicated with 56, a reducer filter of the pumping pressure of the "Airless" spray guns 15B being cleaned is denoted with 57 and the standard or HVLP ("High Volume - Low Pressure") spray guns are indicated with 15A.

[0044] Also in this case, the number of spray guns 15A, 15B can vary depending on the number of arms 14 present in the spray booth 30 and depending on the quantity of spray guns themselves required for each arm 14, while each solenoid valve 49 is controlled by an electronic gearcase which recognizes it individually and manages its position.

[0045] Still referring to the appended figure 9 and assuming that the standard or HVLP spray guns 15A are used and the plant connected with them operates and the "Airless" spray guns 15B and the plant connected with them at rest, the process for changing colour occurs according to the following stages:

- preparation of the colour for the plant connected with the spray guns 15B;
- closure of the pulverization solenoid valve 48 and interruption of the pulverization airflow APL to the spray guns 15A, 15B;
- regulation of the pressures suitable for the plant of the spray guns 15B, by means of reduction gears 33, 56;
- starting of the working of the leathers, using the plant of the spray guns 15B;
- replacement within the tank 40 of the colour used in the spray guns 15A with a liquid solution for cleaning the plant (generally composed of water if water paint is used and thinner if nitro paint is used);
- pumping of the cleaning liquid solution inside the plant of the spray guns 15A, in order to clean the entire plant, including the spray guns 15A (which are at rest);
- opening of the spray guns 15A without pulverization air APL, after such a cleaning stage, so that the aforesaid spray guns 15A have a concentrated and not sprayed jet, at the area indicated with 17 in figure 3 (acting on the pressure of the product to be deposited on the leathers, the spray guns 15A cannot thereby atomize, creating a catch area of the air stained with paint);
- deactivation of the plant of the spray guns 15A and return to the first stage of preparation of the colour for the plant connected with the spray guns 15B.

[0046] Making further reference to figure 9 and assuming now that the "Airless" spray guns 15B are used and the plant connected with them operates and the standard or HVLP spray guns 15A and the circuit connected with them at rest, the process for changing colour occurs according to the following stages:

- preparation of the colour for the plant connected with the spray guns 15A;
- opening of the pulverization solenoid valve 48 and activation of the pulverization airflow APL to the spray guns 15A, 15B;
- regulation of the pressure suitable for the plant of the spray guns 15A, by means of reduction gears 33, 34, 36, 38;
- starting of the working of the leathers, using the plant of the spray guns 15A;
- replacement within the tank 40 of the colour used in the spray guns 15B with a liquid solution for cleaning the plant (generally composed of water if water paint is used and thinner if nitro paint is used);

- exchanging of the delivery air AP intended to the "Airless" spray guns 15B, through the solenoid valve 55, going from the pressure reducer 56 to the pressure reducer 57, keeping a washing pressure low enough in order to prevent atomization;
- pumping of the cleaning liquid solution inside the plant of the spray guns 15B, in order to clean the entire plant, including the spray guns 15B (which are at rest);
- opening of the spray guns 15B, after such a cleaning stage, so that the aforesaid spray guns 15B operate at the area indicated with 17 in figure 3;
- deactivation of the plant of the spray guns 15B and return to the first stage of preparation of the colour for the plant connected with the spray guns 15A.

[0047] It, thus, appears from what just described that the processes for cleaning and colour change are highly efficient and quick, according to the present invention, since only the phases of opening/closing or exchange between the plants of the spray guns 15A, 15B of the spraying air, adjustment of the pressures suitable to the spray guns 15A or 15B plants and beginning of working with the spray guns 15A or 15B provide for the machine shutdown.

[0048] All the other steps take place with the equipment always in operation and, in particular, by using the specific types of equipment described, the process of cleaning the various plants communicating with the spray guns 15A or 15B, required for changing colour during leathers working, is performed while the machine is operating (and thus in hidden time).

[0049] From the description made are, therefore, the technical features of the improved equipment for working flexible laminar surfaces, such as in particular tannery leathers, object of the present invention, as well as the resulting benefits, are clear.

[0050] In execution phase, changes could be made to the improved equipment of the invention consisting, for example, in a number of sediment devices which differs from that one described and illustrated in the drawings that follow, which does not affect the advantages of the present invention.

[0051] It is clear that several other changes could be made to the improved equipment in exam, without for this reason going out of the novelty principles inherent to the inventive idea, as it is clear that, in the practical implementation of the invention, materials, shapes and sizes of the illustrated details could be any, according to the needs, and could be replaced with other ones technically equivalent.

Claims

1. Improved equipment for working flexible laminar surfaces, such as, in particular, tannery leathers, including a spray booth (30), within which the working of said laminar surfaces takes place, said laminar surfaces being placed on at least a conveyor belt (11) sliding below at least one pair of sediment devices (15A, 15B), suitable to apply one or more cover products on prefixed portions of said laminar surfaces, **characterized in that** within at least a first of said sediment devices (15A, 15B) and within a first plant of adduction of said cover products, connected with said first device, one or more washing products circulate in order to clean said first device and said first plant in prefixed time intervals, during which said at least first device and said first plant are inactive and, at the same time, at least a second of said sediment devices (15A, 15B) and at least a second plant of adduction of said cover products, connected with said second device, are active and in working conditions.

2. Equipment as claim 1) **characterized in that** said spray booth (30) is a rotating spray booth, composed by a closed environment, a particulates suction and damp system (12) and at least one rotating body or turntable (13) which supports, through relative arms (14), said sediment devices (15A, 15B) of said cover products.

3. Equipment as claim 2) **characterized in that** each of said arms (14) of said rotating body or turntable (13) supports at least a couple of said sediment devices (15A, 15B) of said cover products.

4. Equipment as claim 2) **characterized in that** said arms (14) are arcoverd radially with respect to said rotating body or turntable (13) and present a length greater than the width of said conveyor belt (11).

5. Equipment as claim 1) **characterized in that** said spray booth (30) is elliptical spray booth, including at least one guide on which a plurality of saddles which support said sediment devices (15A, 15B) of said cover products translate in cross direction with respect to the spray booth (30).

6. Equipment as claim 1) **characterized in that** said first and second plant of adduction of said products are independent and can be alternately activated one from each other.

7. Equipment as claim 1) **characterized in that** said prefixed time intervals correspond to at least one first area (17) of said spray booth (30) where said first device and said plant are inactive and, at the same time, said second device and said second plant are active in working conditions, while in other predetermined time intervals, corresponding to certain second areas (16, 18, 19) of said spray booth (30), said first and second devices and said first and second plants are both active and in working conditions or

are simultaneously inactive.

8. Equipment as claim 7) **characterized in that** said at least one first area (17) and at least one of said second areas (16, 18, 19) correspond to portions of said spray booth (30), where said first and second sediment devices, below which said conveyor belt (11) lacks, translate.

9. Equipment as claim 1) **characterized in that** said sediment devices (15A, 15B) comprise a plurality of automatic spray guns, in particular, HVLP type and/or standard type with or without return plant and/or "Airless" type spraying guns.

10. Equipment as claim 9) **characterized in that** said first and second plant of adduction of said cover products include at least one source (31) of compressed air (AI), at least one pressure reducer (33) of pilot air (AP) to be sent to said automatic spray guns, at least one pressure reducer (35) of pulverization air (APL, APLA, APLB) to be sent to said automatic spray guns, at least one pressure regulator (36) of air for the adjustment of the flow (ARP) to be sent to said automatic spray guns, at least one pump or membrane (39) of adduction of said cover products, at least one tank (40, 41) of containment of said cover products, at least one delivery line (MCA, MCB) of said cover products to said automatic automatic spray guns, at least one return line (RCA, RCB) of said cover products from said automatic spray guns, at least one distribution shaft (46) of said cover products and pilot air (AP), pulverized air (APL) and air for the adjustment of the flow (ARP), at least one solenoid valve (49), controlled by an electronic gearcase of individual identification and positioning, suitable to control the operation of each of said automatic spray guns and at least one flow regulator (50) connected with each of said automatic spray guns, at least one pump (39), said tank (40, 41), said delivery line (MCA, MCB) and said return line (RCA, RCB) being included inside at least one hydro-pneumatic circuit (28, 29) belonging to said first or second plant of adduction of said cover products.

11. Method for working flexible laminar surfaces, such as, in particular, tannery leathers, **characterized in that** it comprises at least the following steps:

- preparation of one or more cover products to be deposited on prefixed portions of said laminar surfaces;
- driving of at least one first sediment device, belonging to at least one pair of sediment devices (15A, 15B), suitable to apply at least one first cover product, coming from a first plant, on a first series of said laminar surfaces, contemporary preparation of at least one second cover product, coming from a second plant, to be deposited on a second series of said laminar surfaces, and contemporary cleaning, through at least one specific compound, of at least one second sediment device belonging to said pair of sediment devices (15A, 15B), and of said second plant;
- adjustment of the moving velocity of said sediment devices (15A, 15B) and of the flow of said cover products;
- repetition of the contemporary phases of driving of said first device, preparation of said second cover product and cleaning of said second device and of said second plant, until the end of working.

12. Method for working flexible laminar surfaces, such as, in particular, tannery leathers, carried out through an improved equipment according to claim 10, where a series of first automatic spray guns and a first plant of adduction of the cover products, connected with said first automatic spray guns, are active and in working conditions, while a series of second automatic spray guns and a second plant of adduction of the cover products, connected with said second automatic spray guns, are inactive, **characterized in that** it includes at least the following steps:

- preparation of one or more of said cover products for said second plant;
- exchange of the flow of said pulverization air (APL, APLA, APLB), which passes from said first plant to said second plant;
- regulation of the pressures suitable for said second plant;
- activation of said second plant and said second automatic spray guns;
- opening of a return line (RCA), which is connected with said first automatic spray guns;
- replacement, within said tank (40) belonging to said first plant, of said cover products with a solution suitable to the cleaning of said first plant;
- pumping of said solution inside said first plant so as to fully clean said first plant and first automatic spray guns, said first automatic spray guns being inactive;
- driving of said first automatic spray guns, without adduction of said pulverization air (APLA), so that said first automatic spray guns have a concentrated and not sprayed jet, in correspondence of at least one prefixed area (17) of said spray booth (30);
- deactivation of said first plant and return to said preparation phase of one or more of said cover products for said second plant.

13. Method for working flexible laminar surfaces, such

as, in particular, tannery leathers, carried out through an improved equipment according to claim 10, where a series of first automatic spray guns and a first plant of adduction of cover products, connected with said first automatic spray guns, are active and in working conditions, while a series of second automatic spray guns and a second plant of adduction of cover products, connected with said second automatic spray guns, are inactive, **characterized in that** it includes at least the following steps:

- preparation of one or more of said cover products for said second plant;
- interruption of the flow of said pulverization air (APL) to said first and second automatic spray guns;
- regulation of the pressures suitable for said second plant;
- driving of said second automatic spray guns;
- replacement, within said tank (40) belonging to said first plant, of said cover products with a solution suitable to the cleaning of said first plant;
- pumping said cleaning solution inside said first plant so as to fully clean said first plant and said first automatic spray guns, said first automatic spray guns being inactive;
- driving of said first automatic spray guns, without said pulverization air (APL), so that said first automatic spray guns have a concentrated and not sprayed jet, in correspondence of at least One prefixed area (17) of said spray booth (30);
- deactivating of said first plant and return to said preparation phase of said cover products for said second plant.

14. Method for working flexible laminar surfaces, such as, in particular, tannery leathers, carried out through an improved equipment according to claim 10, where a series of first automatic spray guns and a first plant of adduction of cover products, connected with said first automatic spray guns, are inactive, while a series of second automatic spray guns and a second plant of adduction of cover products, connected with said second automatic spray guns, are active and in working conditions, **characterized in that** it comprises at least the following steps:

- preparation of one or more of said cover products for said first circuit;
- driving of the flow of pulverization air (APL) to the said first and second automatic spray guns;
- regulation of the pressures suitable for said first plant;
- driving of said first plant and said first automatic spray guns;
- replacement, within said containment tank (40) belonging to said second plant, of said cover products with a solution suitable to the cleaning of said second plant and said second automatic spray guns;
- exchange of the flow of supply air (AP) direct towards said second automatic spray guns, at low pressures, so as to avoid pulverization of said cover products;
- pumping said cleaning solution inside said second plant, so as to fully clean said second plant and said second automatic spray guns, said second automatic spray guns being inactive;
- driving of said second automatic spray guns, in correspondence of at least one prefixed area (17) of said spray booth (30);
- deactivation of said second plant and return to said first phase of preparation of said cover products for said first plant.

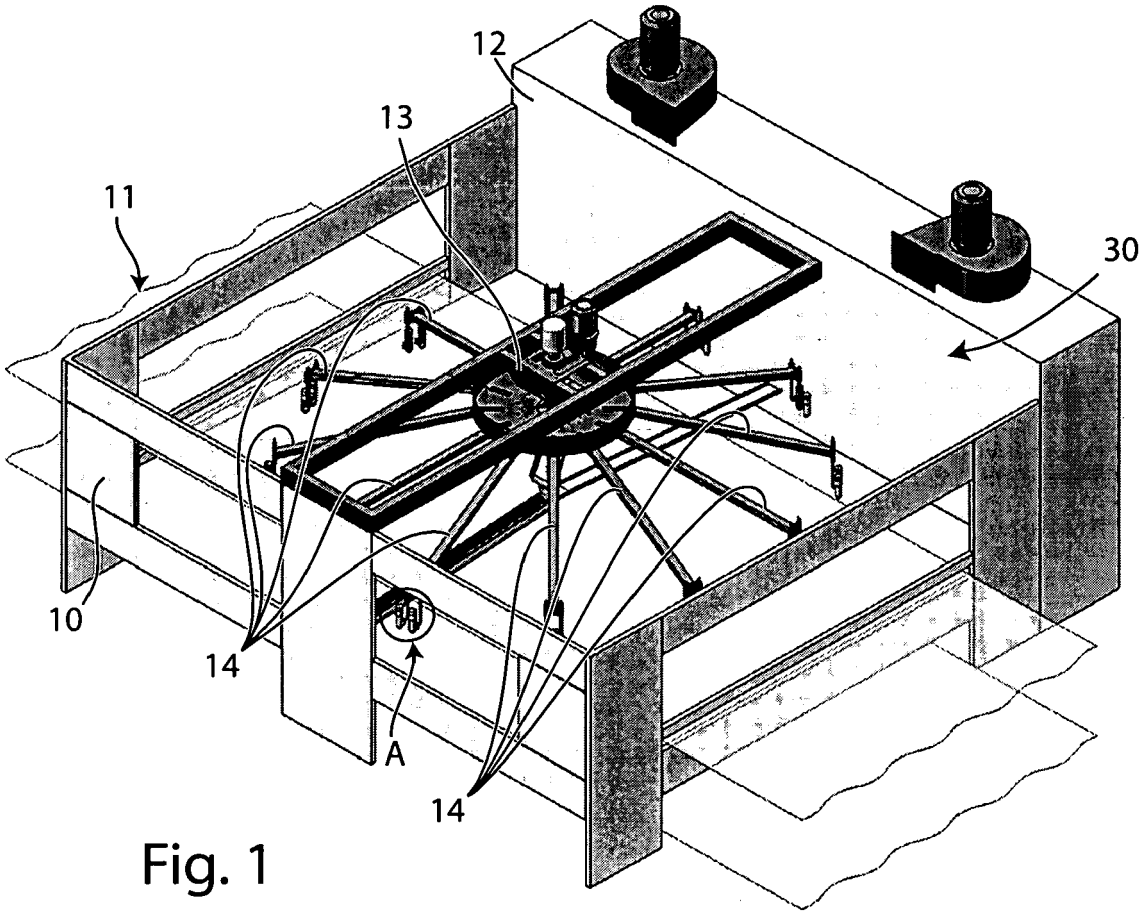


Fig. 1

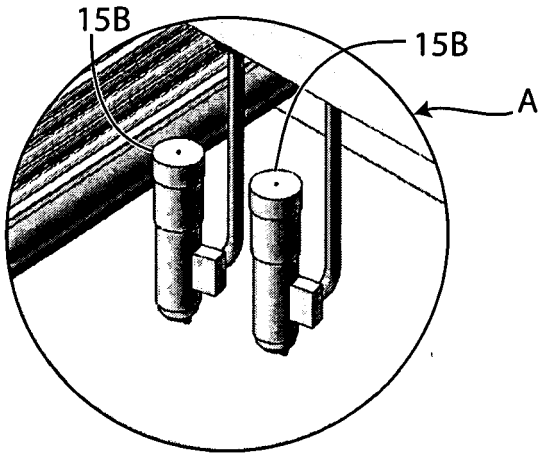


Fig. 2

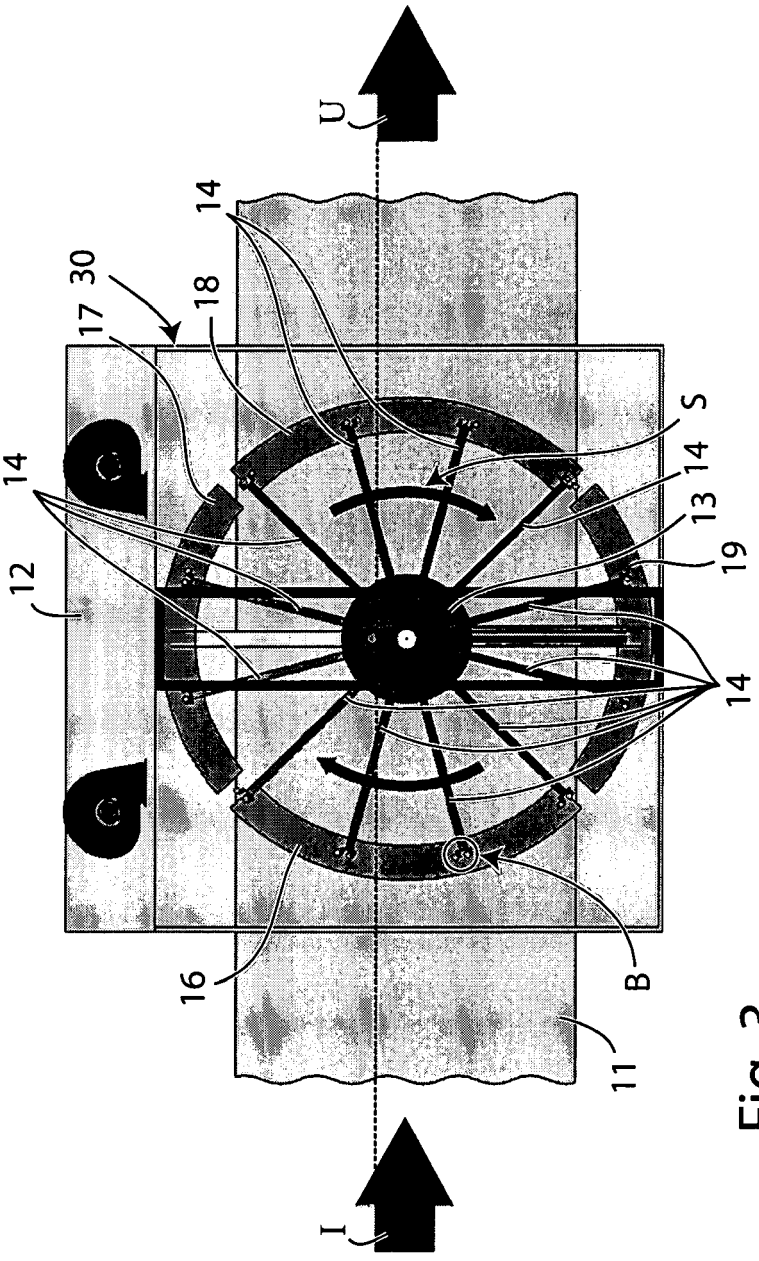


Fig. 3

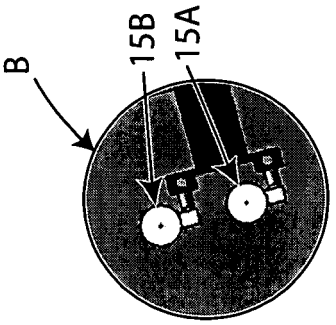


Fig. 4

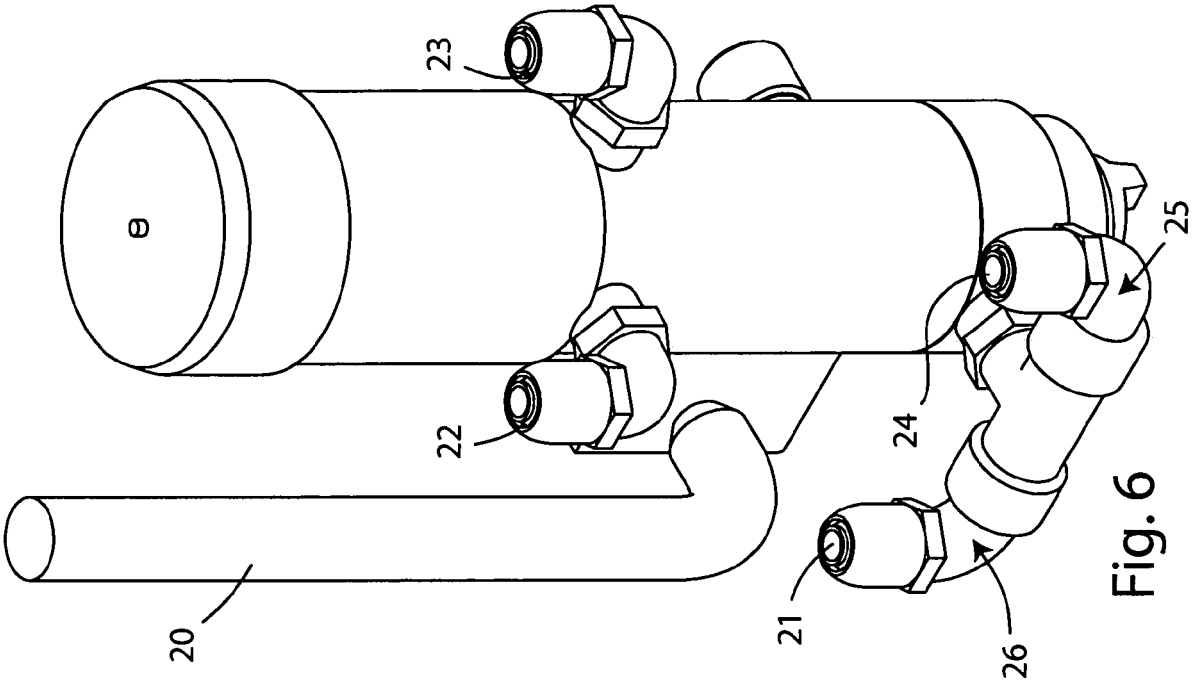


Fig. 6

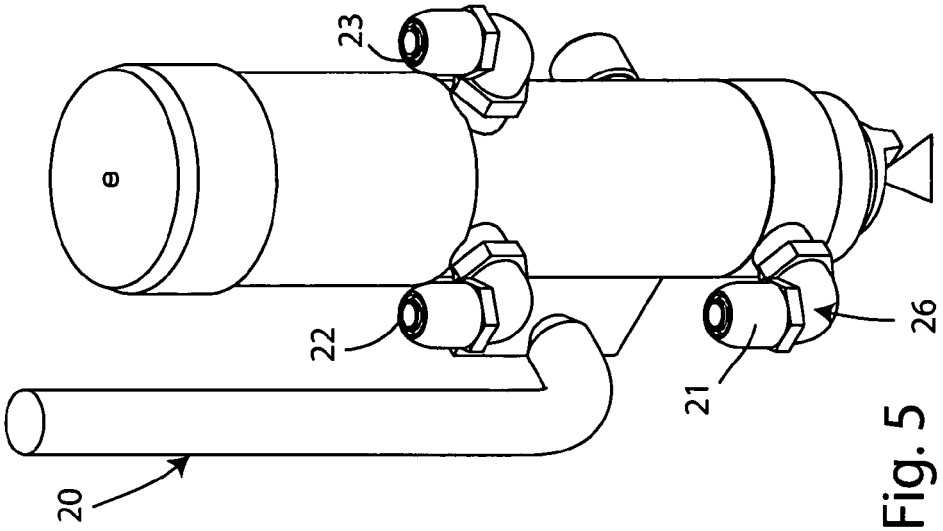


Fig. 5

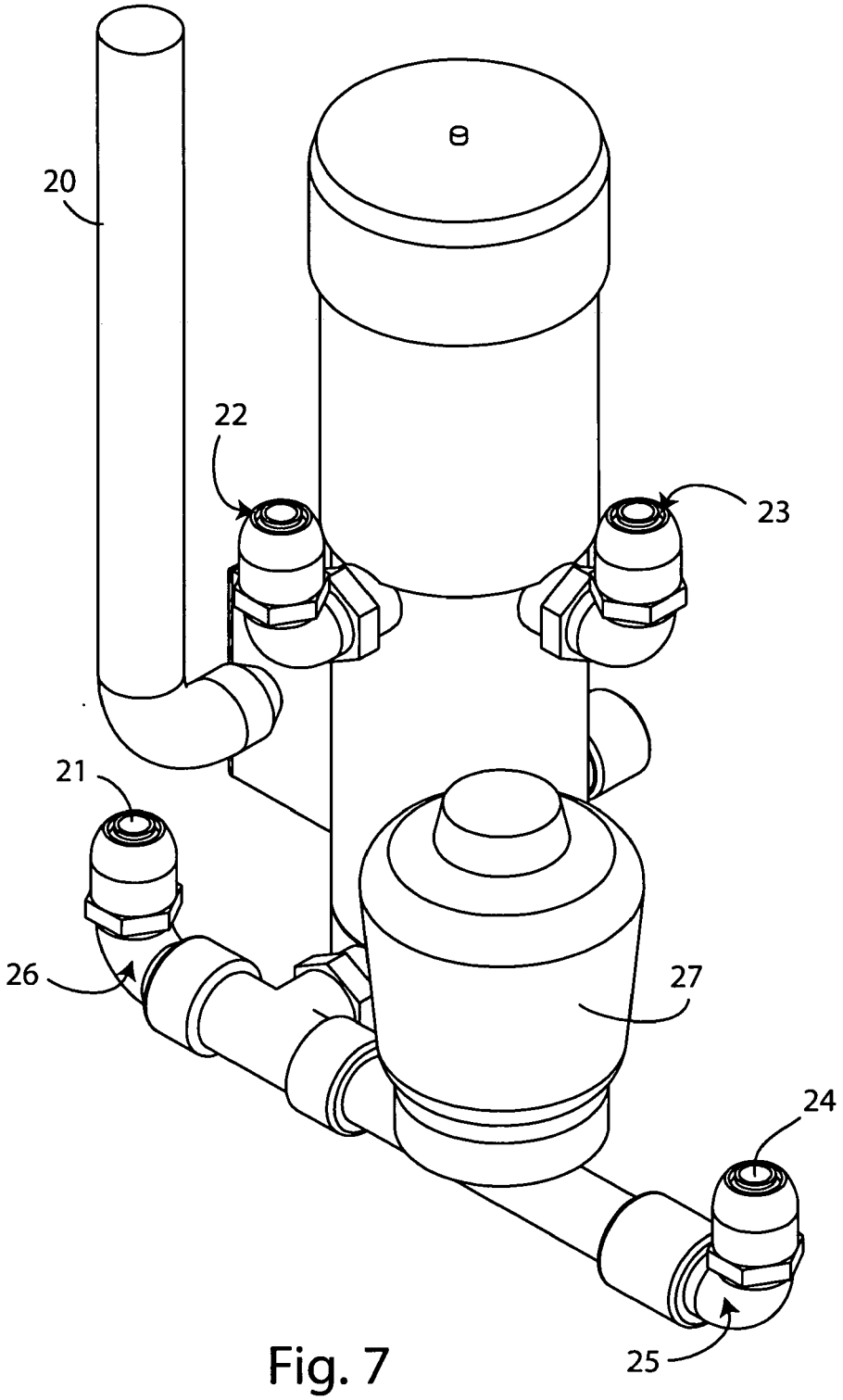
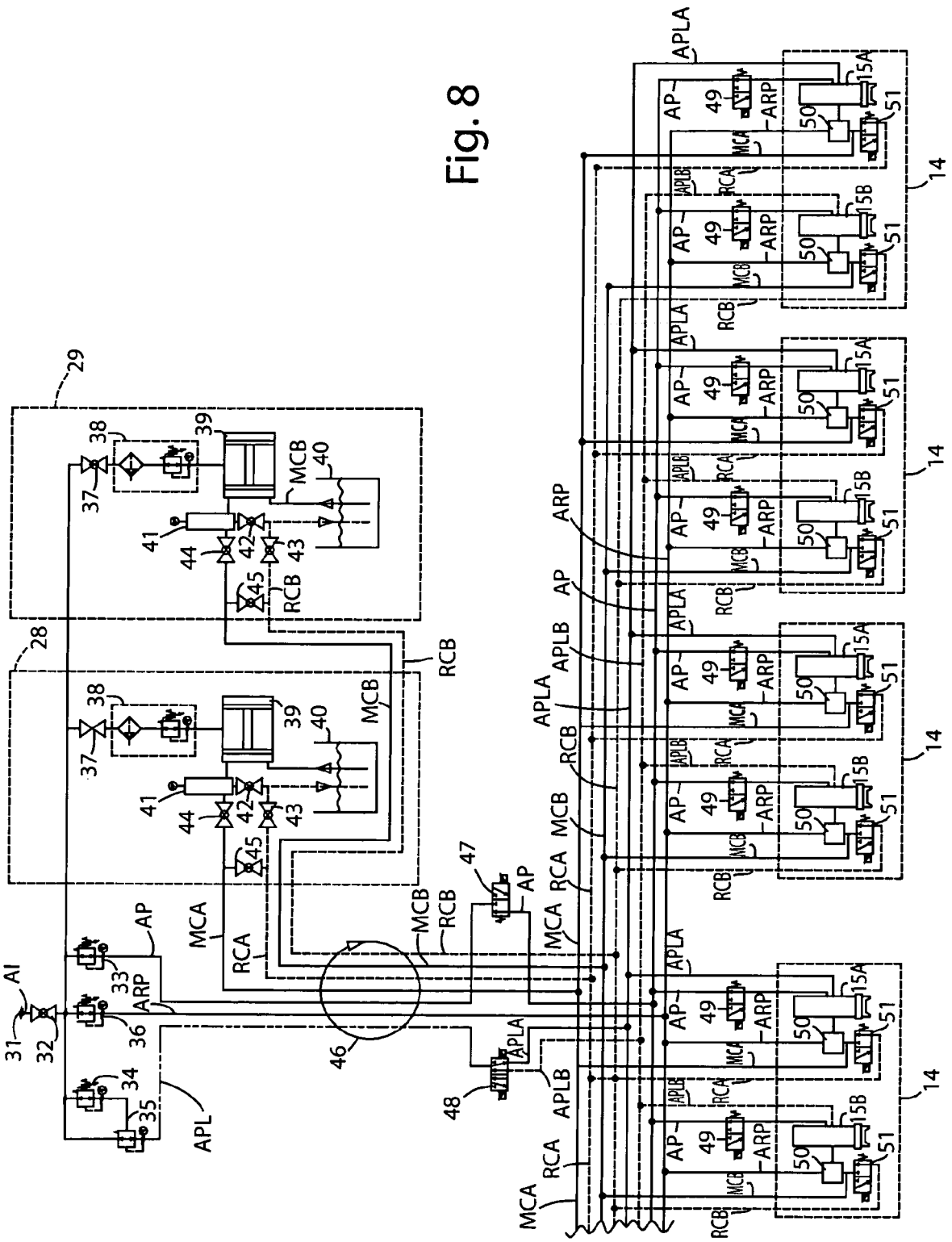


Fig. 7

Fig. 8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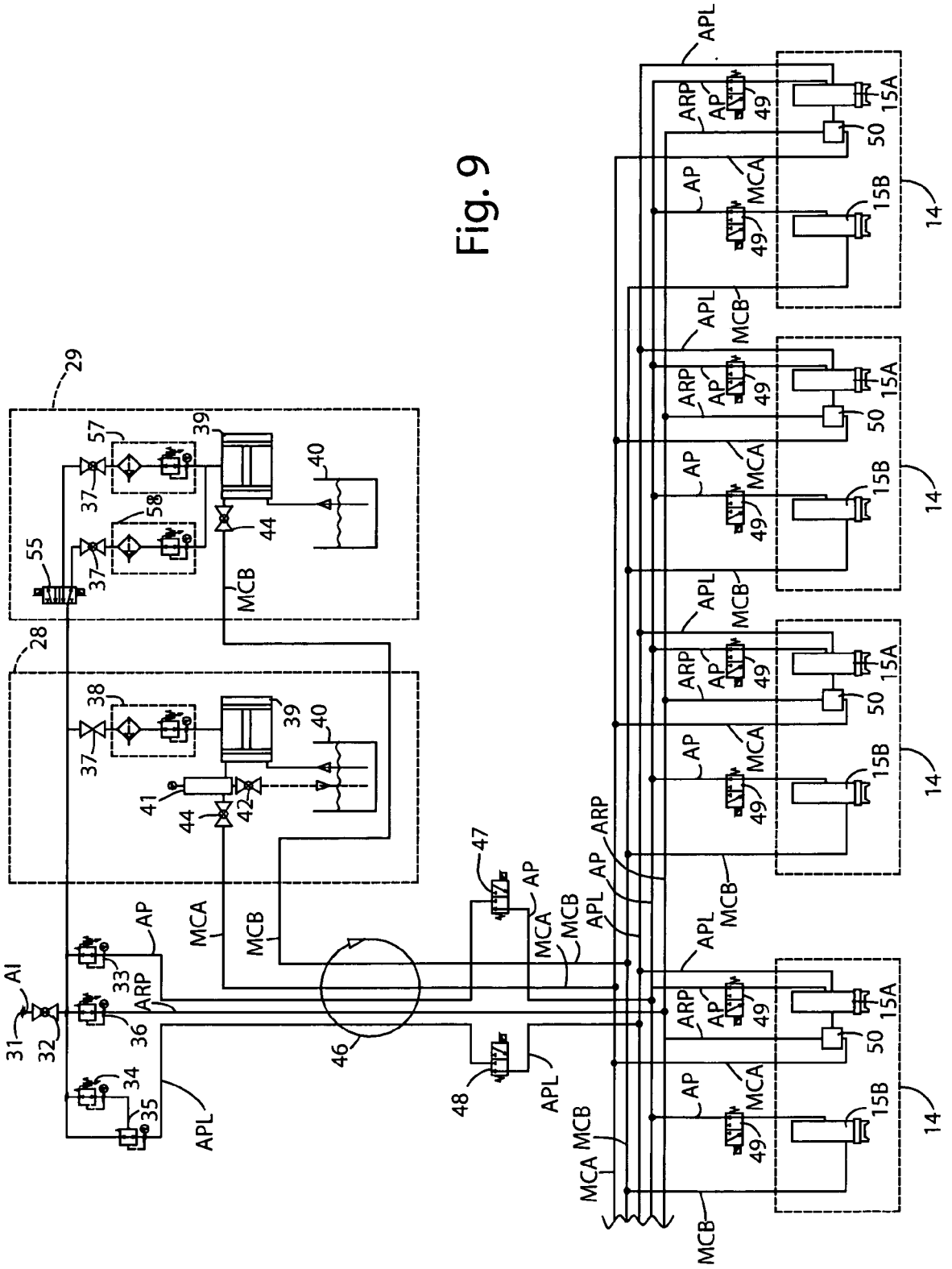
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Fig. 9

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EUROPEAN SEARCH REPORT

Application Number
EP 09 42 5477

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 1 586 362 A2 (BERGI S P A [IT]) 19 October 2005 (2005-10-19) * paragraph [0025] - paragraph [0028] * * figures *	1-14	INV. C14B17/14 C14C15/00
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TECHNICAL FIELDS SEARCHED (IPC)

C14B
C14C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	10 February 2010	Pregetter, Mario

CATEGORY OF CITED DOCUMENTS

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