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(54) **LEATHER TANNING DRUM**

LEDERGERBTROMMEL

FOULON DE TANNAGE DU CUIR

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Description

[0001] The present invention concerns a leather tanning drum.

[0002] In the leather tanning process the drum, which, as it is known, is a big-sized, cylindrical-shaped machine rotating horizontally on its axle and large enough to contain several hundred kilos of skins, is generally used in at least three different phases of the aforesaid process, and more specifically in the soaking and liming, in the tanning and in the dyeing phase.

[0003] Each one of these phases has its own specific, indispensable function and implies the use of specific chemical solutions and compounds.

[0004] Drums currently used, which are in wood planking, often need massive and expensive washings as, though made of highly resistant wood, they undergo some degree of impregnation from the particularly aggressive chemical elements and compounds that are used in the tanning process.

[0005] The use of steel drums, also introduced on the market, failed to solve the problem, as the particular aggressiveness of the chemical agents causes a fast deterioration of this kind of drums, this deterioration being due to both a general and homogeneous attack to the material from the chrome tanning salts, with a consequent gradual reduction of the steel wall thickness, and to the widespread and localized attacks to the drum internal surface from the chlorides, or similar substances, used in some of the processes, like the bleaching of the skins.

[0006] It has to be noticed, furthermore, that the above-mentioned steel drums imply, for the performance of the process, a global energetic waste which results to be remarkably increased, due to the material high thermal conductivity.

[0007] So, few examples of steel drums are now used, only in connection with specific works, as those of the drum shown in US-A-4,441,342, i.e. laboratory dyeing tests or milling, but, also in these specific works, the use of steel material is not an optimal one; for instance, in milling operation, a problem arises from the low thickness of the steel surface of the treatment chamber, where the skins can be damaged by the edges of holes or other openings provided in said surface, said edges being increasingly sharpened during the use.

[0008] Another problem involved with current drums concerns the difficulties linked to the carrying out of the bath recycle.

[0009] Indeed, specific technical solutions have been developed in order to avoid the frequent interruption of the drum rotation to permit the removal of the waste substances produced during some phases of the process, as well as to carry out the filtering, checking and changing of the tanning bath chemical solution, these measures being based on the fact that the drum main rotation shaft is internally hollow so as to allow both the entering and exit of the substances composing the bath, or in-

cluded in it, during the drum rotation.

[0010] At the hollow shaft external end, a tank is generally placed where waste products deposit and from which cochlea devices, or similars, keep collecting them; it is from this same tank that the chemical solution, after having been cleaned up and regenerated, enter the drum again through the same hollow shaft.

[0011] Machines including this hollow shaft solution are disclosed, for example, in JP 62 020600, US-A-4,122,692 and again in US-A-4,441,342.

[0012] Just the two last cited documents constitute interesting cases to show how different solutions of the problem concerning the bath circulation inside the drum may strongly depend on particular operative contexts. In fact, the structural lay-out of US-A-4,441,342 drum is very simple in respect of the other one's, the simplicity deriving substantially from the fact that, in this case, the hollow shaft is not axially passing through the drum. The operative context of said drum (milling, laboratory dyeing tests) is different from that of the US-A-4,122,692, which concerns a general purpose drum.

[0013] So, in US-A-4,441,342, the bath circulation has not a relevant role; it only needs to assure the entering and exit of the bath liquor without stopping the drum rotation; in US-A-4,122,692, instead, the bath circulation must be done in such a way to assure, also, a good exchange of the liquor between the two ends of the internal volume of the drum, in order to achieve a bath as homogeneous as possible. The liquor exchange between the two internal ends is obtained just employing a hollow shaft, axially passing, which communicates with the treatment compartment by means of connecting ducts located at both front ends of the drum. Obviously, in this second solution, the presence of a shaft in the center of the drum would cause the winding of the skins around the same shaft during the rotation of the drum. Therefore, in order to avoid said handicap in such drums, radial partition walls are used, but this introduces other disadvantages, as, the drum unsuitableness to specific works, the necessity of separate charging openings for each treatment chamber, and the increasing, in general, of structural complexity and total costs.

[0014] From the above it is easily understandable the seeking of solutions regarding general purpose drums in which an efficacious bath circulation without the axially passing shaft drawback is assured.

[0015] About the recycle, we have to add that some solutions have been adopted involving blades arranged inside the drum, which are positioned both all along the cylindrical surface and in correspondence with the lateral surface whereto said hollow shaft is connected, these blades having been specifically designed in order to make the gathering of waste materials and their conveying outside together with the bath liquid solution as effective as possible.

[0016] Considering that the entering and the exit of the bath liquor and of the above waste substances is done by the same hollow shaft, it results evident that the

bath recycle efficacy is strictly linked to the internal shape of the drum; in other words we can say that the recycle action risks to be annulled unless the drum bath in and out fluxes are accurately kept apart.

[0017] Furthermore, as regards the global safety level associated with the drum operating phases, it has to be considered that during the carrying out of particular works requiring a high quantity of liquid mass inside the drum, there is a greater possibility for the internal pressure to raise up to dangerous levels.

[0018] It arises, so, the need of employing suitable automatic devices in order to avoid any of the related risks.

[0019] One of the most practicable way to achieve that may consist in intervening on the closing means of the charging openings, introducing convenient and innovative safeting devices.

[0020] The aim of the present invention is just to propose a drum provided with constructive and structural improvements which enable the getting over of all the aforementioned problems.

[0021] This aim is achieved with a leather tanning drum comprising a cylindrical main body rotatable on a horizontal axis, a hollow shaft communicating with the outside and located in correspondence to one of the cylindrical main body circular surfaces, wherein a plurality of cavities, or pockets, are longitudinally arranged along the internal circumferential surface of said main body, a plurality of radial cavities and an annular cavity are located in correspondence of the circular surface whereon said hollow shaft is located, said radial cavities connecting said longitudinal cavities and said annular cavity with said hollow shaft, said longitudinal cavities and said annular cavity being in communication with the internal volume of the drum through openings arranged in such a way to obtain, during the drum rotation, a continuous recycle and a continuous exchange of the chemical bath between the two ends of the internal volume of the drum.

[0022] The drum comprises exactly four longitudinal cavities, or pockets, placed in diametral opposed positions, and one radial cavity for each longitudinal cavity, the radial cavities being separately connected, at one of their ends, with sections of said hollow shaft.

[0023] The above annular cavity is located peripherally to the circular surface where the hollow shaft is located; it comprises peripheral cavities which are in communication with said longitudinal cavities and which are, further, in communication with the interior of said main body through openings provided in sectors of said peripheral cavities located in different radial positions in respect of said longitudinal cavities, or pockets.

[0024] The longitudinal pockets are in communication with the interior of said main body through openings placed in proximity of the circular surface facing the surface in correspondence of which said annular cavity is located

[0025] The drum cylindrical main body is in polymeric material; a metal framework with evident structural characteristics is externally connected to said main body,

said framework being specifically designed to allow the thermal dilatations of the polymeric material main body.

[0026] At least one door for the introduction and removal of leathers in and from the drum is kept closed by the help of elastic means regulated so as to assure a perfect seal under normal operating conditions and, at the same time, working as a safety-valve in the event of anomalous raisings of the drum internal pressure.

[0027] The drum of the present invention includes also other constructive improvements that fit with the above-mentioned innovative structural features and contribute to improve its general hardness and resistance in agreement with the special operating conditions.

[0028] The advantages deriving from the drum constructive and structural improvements are clearly evidently when we take into consideration the improved operative flexibility involving an easier passage from one phase of the tanning process to the next, due to the ineffective action of the various chemical agents on the drum material, to the excellent working performances linked to the bath re-circulation circuit new conformation, and, finally, to the high safety and durability levels attained.

[0029] However, for a better understanding of the above-mentioned advantages and the characteristics of the present invention, this will now be described by way of an embodiment example, with reference to the accompanying drawings, in which:

- figure 1 is a total view, in partial section, in which the structural scheme of the drum of the invention is shown;
- figures 2 and 3 are two views in transversal section obtained through the section line I-I of fig. 1, properly rotated, and referred to two different angular positions of the drum main body;
- figure 4 is a view in longitudinal section obtained through the section line IV-IV of fig. 2;
- figure 5 is another view in longitudinal section obtained following the section line V-V of fig. 2;
- figure 6 is a side view of the drum of the present invention;
- figure 7 and figure 8 are two detailed views of the closing device of the drum of fig. 1;
- figure 9 is a detailed view of a particular portion of the drum structure;
- figures 10 and 11 are two detailed views referred to a constructive feature of the drum of fig. 1.

[0030] Referring now to fig. 1, it is indicated with [10] a leather tanning drum according to the present invention.

[0031] It is composed of a main cylindrical body [11], in polymeric material, horizontally rotating on its axle by the help of a gearmotor unit [12] having an output pinion [13] engaging with a gear [14] directly coupled to said cylindrical body [11].

[0032] The partially sectioned view of fig. 1 shows that

the rotation shaft [15] of the drum [10] is internally hollow and divided in four sections separated by two orthogonal dividing plates [16, 17] which are more clearly illustrated in figures 2 and 3, said dividing plates being rotating together with the shaft [15] which is supported, free of rotating, on the structure [18].

[0033] Externally fixed to the main cylindrical body [11] there is a metal framework [19] composed of two 6-spoke structures placed in correspondence of the main body [11] circular surfaces [20, 21], and linked to one another by double C-shaped longitudinal bars [22], as it is clearly shown in fig.2 and 11.

[0034] The connection between the framework [19] and the drum main body [11] is obtained using both screw means [23] linking the lateral 6-spoke structures to the circular surfaces [20, 21] and other screw means [24] fastening the longitudinal bars [22] to the cylindrical body [11] side surface.

[0035] It is to be pointed out that the screw means [24] are useful also to fasten the so-called pegs [25] to the main body [11], said pegs being arranged on the inside of the drum so as to help the leathers dragging during the rotation; their fastening is obtained according to the connection scheme illustrated in fig.11. As regards the rows of pegs [25] which are not positioned in correspondence with the external bars [22], the fastening scheme is the one illustrated in fig.10.

[0036] In these last two figures we can see how, in correspondence with the drum areas which are subjected to high structural tensions, like the ones where the connection means [24, 24'] are positioned, the main body [11] thickness, which is significantly lower than that of the traditional wooden drums, is properly increased by reinforcement strips [26, 27], also in polymeric material, which can have a circular shape, as it is the case of fig.10, or a longitudinal one, as in fig.11.

[0037] Furthermore, in the case of fig.10 an auxiliary internal support [28] is used, of rectangular or similar shape, affecting the pegs fixing area only and also made in polymeric material; differently, we can see in fig. 11 how the peg is internally inserted on longitudinal supports [29] shaped so as to help supporting the side edges of the panels [30] which constitute the internal walls of the longitudinal cavities [31] dedicated to the recirculation of the liquid mass in which the leathers are soaking.

[0038] The above panels [30] are in fact provided with several holes [32], clearly shown in fig. 5, connecting the cavities [31] with the drum [10] internal space; said cavities [31] are also connected with other cavities [33], positioned in correspondence with the circular surface [20] of the main body [11], these cavities (33) being formed through side panels [34, 35, 36] fixed with said surface by heat seal, through a diametral panel [37], and through other closing panels [38] also fixed to said panels [34, 35, 36, 37] by heat seal. It is to be noticed that the closing panels [30] of the cavities [31] are fixed to the respective supports [29] by screw means, in order

to allow the inspection and cleaning of said cavities whenever necessary.

[0039] As regards the lateral cavities [33], there is no need of inspecting or cleaning them, as their specifically designed configuration facilitates the outflow of the chemical bath and all the substances contained in it.

[0040] Fig. 2 and 3 just show the shape of said lateral cavities [33], two of which, for comprehension purposes, are clearly illustrated in detail, without their closing panel, while the other two, symmetrical to the former ones in respect of the shaft [15] position, are illustrated with the closing panel [38] regularly closed.

[0041] As we can see, the cavity transversal section is gradually reducing as we proceed towards the shaft [15], with a consequent increase in the speed of the flux out-flowing; furthermore, each of the cavities [33] is independently connected with each one of the sections the hollow shaft [15] is divided into; this obviously facilitates the exchange of the liquid and the substances in it towards the external depuration tank, which has not been shown in the annexed drawings as being of known technique.

[0042] The connection between the lateral cavities [33] and the drum internal space is achieved not only through the longitudinal cavities [31], but also through the cavities with triangular section [39] positioned on the edge of the circular surface [20]; in fact, on the panel [40] delimitating these cavities [39] we can find two diametrically opposed areas [41] suitably provided with holes.

[0043] Also the area where the lateral cavities [33] are connected with the hollow shaft [15] is obviously protected by a closing panel similar to panel [38], which has not been shown in fig. 2 and 3 only for reasons of drawing simplicity.

[0044] The introduction and removal of the leathers in and from the drum are carried out, in this embodiment example, through a unique door [42]; this is translated from its closing position, showed in fig. 1, to its opening position, and vice-versa, through hydraulic actuators [43] engaging with toothed sliding seats [44], which are connected with a hatch [45] fixed to the main body [11] by screw means [46]. It has to be noticed that the cylindrical main body [11] has been suitably reinforced in its door area through an internal panel [47].

[0045] The door [42], when in its closing position, is kept pressured against the hatch [45] through helical springs [48] positioned at the four corners of the door. In particular, with the help of fig. 6 and 7, we can observe that the springs are compressed between caps [49], which are fixed, by screws [50], to grooved pieces [51] coupled to the hatch [45], and to the spring supporting brackets [52], which are connected to the door [42] by screw means [53].

[0046] The door opening is performed by translating it along the sliding seats [44] after having lifted the door up from the position shown in fig. 7 to the one of fig. 8; this lifting is made possible by the action of the small

hydraulic cylinders [54] fixed to the spring supporting brackets [52] by screws [55]. In fact, the pistons [56] of said small cylinders [54] act against the grooved pieces [51] causing the springs [48] to be more compressed and, consequently, the brackets [52] move from the hatch [45] to which the pieces [51] are radially coupled.

[0047] A rubber ring [57] is positioned all around the door edge [42] in order to assure a perfect seal between the door and the hatch. Suitable cylindrical pieces [58], fixed to the brackets [52], are positioned inside the springs [43], acting as guiding elements.

[0048] To complete the description of the drum [10] components, we can see longitudinal blades [59] fixed to the internal surface of the main body [11]; they are positioned alternatively to the pegs [25] and have the function of increasing the bath turbulence, said blades being suitably reinforced through side brackets [60], clearly shown in fig. 4 and 5.

[0049] As regards the metal framework [19], we have to notice that, in the enlarged view of fig. 9, the connection between the framework and the cylindrical main body [11] is designed so as to let some free space [61] between the framework itself and the drum main body in correspondence with the peripheral areas of the circular surfaces [20, 21]; this free space allows the necessary degree of dilatation of the main body [11], in polymeric material, due to the thermal excursions caused by the different treatments of the skins, which are being performed.

[0050] The drum of the present invention operates as follows.

[0051] After introducing the leathers and liquid mass containing the necessary chemical substances, the door [42] is moved to the closing position by sending the suitable input to the supplying hydraulic circuit of the actuators [43]; at this point, the hydraulic circuit of the small cylinders [54] is released, in order to let the drum door to be pressed against the hatch [45]. The drum is, then, ready to be started in its rotation movement by activating the motorgear unit [12].

[0052] With reference to fig. 3, given R as the drum rotation sense, we can see that cavities 33a and 33c are dedicated to the liquid and various substances outflow from inside the drum, while cavities 33b and 33d are intended to the re-entering of the liquid in the drum after it has been depurated in the external tank.

[0053] We must consider, in fact, that in the angular position shown in fig.3, and in those ones immediately following it, cavity 33a begins to be interested by the liquid, present inside the drum at about the level indicated in the figure, which reaches the cavity itself [33a] through the peripheral cavity [39], wherein the liquid has already flowing through the holes of area 41a; the same is not possible for the other cavity [33d], as it, in this moment, is not communicating with area 41a of cavity 39 but with area 41b, which, in that angular position, or in those ones immediately following int, is positioned on the drum upper part, not reached by the liquid. There-

fore, when the drum, in its rotation, reaches the angular position of fig. 2, the quantity of depurated liquid coming from the external tank, where the average level is higher than that of the hollow shaft [15], is almost entirely flown to cavity 33d, and only in a small amount to cavity 33a; so, in the continuing of the rotation, until the position symmetrical to that of fig.3 is reached, the liquid outflow from cavity 33d to the drum takes place through the communicating longitudinal cavity 31d, while, starting from this angular position, cavity 33a, now positioned on the superior half plane, starts pouring its content towards the outside through section 15c of the hollow shaft [15].

[0054] The same happens, obviously, during the successive half rotation for cavities 33c and 33b, which are exactly symmetrical to cavities 33a and 33d respectively.

[0055] When the rotation sense is inversed, cavities 33b and 33d become the ones dedicated to the liquid outflow towards the outside, while cavities 33a and 33c are intended to let the depurated liquid re-enter the drum.

[0056] It can be noticed that, indeed, the chemical bath re-circulation is homogeneous and involves the whole liquid mass, as, like we see in fig.5, while the liquid flowing from the drum to the outside comes from the drum right side, where we find areas 41 feeding the exit cavities 33a and 33c, the depurated liquid re-enters the drum through the holes 32, which are connected with the entering cavities 33b and 33d and which are positioned on the drum left side.

[0057] Obviously, in order to improve the bath re-circulation efficacy, various modifications to the described embodiment of the present invention will be envisaged.

[0058] The connection scheme among the different cavities might, for example, be varied, in particular between the exit lateral cavities and the drum areas from which the liquid is collected, or else, new unidirectional devices for the flux exiting or entering the lateral cavities [33] might be employed; further, both the lateral and longitudinal cavities shape might be modified; the latter might, for example, be positioned obliquely along the drum internal surface rather than longitudinally; these all represent modifications that might be easily carried out in the industry thanks to the material composing the drum main body and its various internal devices, it consisting, in particular, of polypropylene.

[0059] Further variations might involve, obviously, the external metal framework, both as a whole and in its specific components, but always respecting its structural coherence with the drum main body in polymeric material.

[0060] The closing door [42], too, might undergo constructive variations, as, in some cases, for example, its manual operation might be preferred; or else, the number of doors might vary, in case the drum, just thanks to the optimal re-circulation efficacy, is divided into two or more compartments by longitudinal perforat-

ed panels, which perforated panels being commonly used when, for example, the skins to be treated are particularly long, or the drum loading capacity has to be increased.

[0061] It is to be understood that the drawings show only an example provided solely as a practical demonstration of the invention, and that this invention may vary in its form and dispositions. Any reference numbers in the appended claims have the purpose of facilitating the reading of the claims with reference to the description and to the drawings.

Claims

1. Leather tanning drum (10) comprising a cylindrical main body (11) having an internal surface and circular surfaces (20, 21) and being rotatable on a horizontal axis about a hollow shaft (15), wherein the cylindrical main body (11) is provided with a plurality of cavities or pockets (31) longitudinally arranged along the internal surface of said main body, said longitudinal cavities (31) being connected with peripheral cavities (39) located peripherally to one of said circular surfaces (20, 21) and being further connected through lateral, radial cavities (33) with the hollow shaft (15) communicating with the outside, said cylindrical main body (11) being made of polymeric material, **characterized in that** a metal framework (19) embraces said main body (11).
2. Leather tanning drum as claimed in claim 1 **characterized in that** said longitudinal cavities (31) and said peripheral cavity (39) are in communication with the internal volume of the drum through openings, respectively (32) and (41), said openings being arranged respectively on the left side and on the right side of the drum in order to obtain, during the rotation, a continuous exchange of same bath between the above sides of the drum.
3. Leather tanning drum as claimed in claim 1 or 2, **characterized in that** it comprises four longitudinal cavities, or pockets, (31a, 31b, 31c, 31d) placed, two by two, in diametrical opposed positions, and one radial cavity for each of said longitudinal cavities, said radial cavities (33a, 33b, 33c, 33d) being separately connected, at one of their ends, with sections (15a, 15b, 15c, 15d) of said hollow shaft (15).
4. Leather tanning drum as claimed in claim 2, **characterized in that** said peripheral cavities located in correspondence of the circular surface (20) wherein the hollow shaft is located, consists of cavities (39) positioned on the edge of said circular surface and comprising two diametrically opposed areas (41) provided with openings, said peripheral cavities (39) being in communication with the interior of said main body (11) through said openings provided in said areas (41) arranged in different radial positions in respect of the positions of said longitudinal cavities (31).
5. Leather tanning drum as claimed in claim 4, **characterized in that** said longitudinal cavities (31) are in communication with the interior of said main body (11) through openings (32) placed in proximity of the circular surface (21) facing the surface (20) in correspondence of which said sectors (41) are located.
6. Leather tanning drum as claimed in claim 5, **characterized in that**, in each drum rotation sense, two diametrically positioned longitudinal cavities are mainly dedicated to the bath outflow from the drum, and other two diametrically positioned longitudinal cavities are mainly dedicated to the entering of the bath in the drum, the bath circulation involving the whole liquid mass as the exiting flow passes through said sectors (41) openings of the peripheral cavities (39) placed at one end of the drum and the entering flow passes through the longitudinal cavities openings (32) placed at the opposite end of the drum.
7. Leather tanning drum as claimed in claim 1 or 2, **characterized in that** said radial cavities (33) are shaped so as to have a cross-section area progressively reducing in direction of the hollow shaft (15).
8. Leather tanning drum as claimed in claim 1 **characterized in that** the connection between said framework (19) and said cylindrical main body (11) is designed so as to leave some free space (61) between the framework itself and the drum main body in correspondence with the peripheral areas of said circular surfaces (20, 21), said free space being such to allow the thermal dilatations of the polymeric material main body (11).
9. Leather tanning drum (10) as claimed in claim 2, wherein said metal framework (19) consist of two spoke-shaped structures, placed in correspondence of the main body circular surfaces (20, 21), and linked to one another by longitudinal bars (22), said spoke-shaped structures and said longitudinal bars being connected to the drum main body (11) by screw means (23, 24) according to a connecting lay-out useful to leave some free space (61) between said framework (19) and said drum main body (11) in correspondence with the peripheral areas of said circular surfaces (20, 21).
10. Leather tanning drum as claimed in claim 9, comprising internal longitudinal blades (59) and pegs (25), wherein said pegs are fastened to the internal circumferential surface of the drum by using same

screw means (24) used for fastening the longitudinal bars (22) of said metal framework (19) to said main body (11).

11. Leather tanning drum as claimed in claim 9, wherein in correspondence with the drum circumferential areas where said connection means [24, 24'] are positioned, the main body [11] thickness is properly increased by reinforcement strips [26, 27] in polymeric material, said strips having circular or longitudinal shape. 5
12. Leather tanning drum as claimed in claim 10, comprising longitudinal supports (29) whereinto said pegs (25) are inserted, said longitudinal supports [29] being shaped so as to help supporting the side edges of panels [30] which constitute the internal walls of said longitudinal cavities [31]. 10
13. Leather tanning drum as claimed in claim 1 or 2, comprising at least one sliding door (42) for the introduction and the removal of leathers into and from said drum, wherein said door is kept closed by elastic means (48). 15
14. Leather tanning drum as claimed in claim 13, wherein said sliding door (42) is kept in the closed position by said elastic means (48) regulated so as to assure a perfect seal under normal operating drum conditions and to allow the door to be lifted up from an hatch (45) when the drum internal pressure reaches a prefixed safety value, said value being related to the structural strength of said main body (11). 20
15. Leather tanning drum (10) as claimed in any preceding claim, wherein said polymeric material from which said main body (11) and related internal components (59, 25, 26, 27, 30, 37, 38) are made, consists of polypropylene. 25

Patentansprüche

1. Ledergerbtrommel (10), umfassend einen zylindrischen Hauptkörper (11) mit einer inneren Oberfläche und kreisförmigen Oberflächen (20, 21) und die auf einer horizontalen Achse um eine Hohlwelle (15) drehbar ist, wobei der zylindrische Hauptkörper (11) mit einer Mehrzahl von Hohlräumen oder Taschen (31) versehen ist, die entlang der inneren Oberfläche des Hauptkörpers in Längsrichtung angeordnet sind, wobei die Längshohlräume (31) mit peripheren Hohlräumen (39) verbunden sind, die zu einer der kreisförmigen Oberflächen (20, 21) peripher lokalisiert sind, und weiter durch laterale radiale Hohlräume (33) mit der Hohlwelle (15) verbunden sind, die mit der Außenseite in Verbindung steht, 45

wobei der zylindrische Hauptkörper (11) aus polymerem Material hergestellt ist, **dadurch gekennzeichnet, dass** ein Metallrahmentragwerk (19) den Hauptkörper (11) umschließt.

2. Ledergerbtrommel nach Anspruch 1, **dadurch gekennzeichnet, dass** die Längshohlräume (31) und der periphere Hohlraum (39) mit dem Innenvolumen der Trommel durch Öffnungen, respektive (32) und (41), in Verbindung stehen, wobei die Öffnungen respektive auf der linken Seite und auf der rechten Seite der Trommel angeordnet sind, um während der Drehung einen kontinuierlichen Austausch vom selben Bad zwischen den obigen Seiten der Trommel zu erhalten. 50
3. Ledergerbtrommel nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** sie umfasst: vier Längshohlräume oder Taschen (31a, 31b, 31c, 31d), die in diametral entgegengesetzten Positionen paarweise platziert sind, und einen radialen Hohlraum für jeden von den Längshohlräumen, wobei die radialen Hohlräume (33a, 33b, 33c, 33d) an einem von ihren Enden mit Abschnitten (15a, 15b, 15c, 15d) der Hohlwelle (15) separat verbunden sind. 55
4. Ledergerbtrommel nach Anspruch 2, **dadurch gekennzeichnet, dass** die peripheren Hohlräume, die in Entsprechung der kreisförmigen Oberfläche, (20) lokalisiert sind, worauf die Hohlwelle lokalisiert ist, aus Hohlräumen (39) bestehen, die auf dem Rand der kreisförmigen Oberfläche positioniert sind, und umfassend zwei diametral entgegengesetzte Bereiche (41), die mit Öffnungen versehen sind, wobei die peripheren Hohlräume (39) in Verbindung mit dem Innern des Hauptkörpers (11) durch die Öffnungen stehen, die in den Bereichen (41) vorgesehen sind, die in unterschiedlichen radialen Positionen in Bezug zu den Positionen der Längshohlräume (31) angeordnet sind. 60
5. Ledergerbtrommel nach Anspruch 4, **dadurch gekennzeichnet, dass** die Längshohlräume (31) in Verbindung mit dem Innern des Hauptkörpers (11) durch Öffnungen (32) stehen, die in der Nähe der kreisförmigen Oberfläche (21) platziert sind, die der Oberfläche (20) zugekehrt ist, in Entsprechung wovon die Sektoren (41) lokalisiert sind. 65
6. Ledergerbtrommel nach Anspruch 5, **dadurch gekennzeichnet, dass** in jedem Trommeldrehsinn zwei diametral positionierte Längshohlräume hauptsächlich dem Badausfluss aus der Trommel dediziert sind und andere zwei diametral positionierte Längshohlräume hauptsächlich dem Eintritt des Bads in die Trommel dediziert sind, wobei die Badzirkulation die gesamte flüssige Masse beinhaltet. 70

tet, wenn der austretende Strom durch die Sektor (41)öffnungen der peripheren Hohlräume (39) hindurchtritt, die an einem Ende der Trommel platziert sind, und der eintretende Strom durch die Längshohlraumöffnungen (32) hindurchtritt, die am entgegengesetzten Ende der Trommel platziert sind.

7. Ledergerbtrommel nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die radialen Hohlräume (33) so geformt sind, dass sie eine Querschnittsfläche aufweisen, die sich in Richtung der Hohlwelle (15) zunehmend verringert. 10
8. Ledergerbtrommel nach Anspruch 1 **dadurch gekennzeichnet, dass** die Verbindung zwischen dem Rahmentragwerk (19) und dem zylindrischen Hauptkörper (11) so konstruiert ist, dass ein gewisser freier Raum (61) zwischen dem Rahmentragwerk selbst und dem Trommelhauptkörper in Entsprechung mit den peripheren Bereichen der kreisförmigen Oberflächen (20, 21) gelassen wird, wobei der freie Raum so ist, dass die thermischen Dilatationen des Polymermaterial-Hauptkörpers (11) zugelassen werden. 20
9. Ledergerbtrommel (10) nach Anspruch 2, bei der das Metallrahmentragwerk (19) aus zwei speichenförmigen Strukturen besteht, die in Entsprechung der kreisförmigen Hauptkörperoberflächen (20, 21) platziert sind und durch Längsstäbe (22) miteinander verbunden sind, wobei die speichenförmigen Strukturen und die Längsstäbe mit dem Trommelhauptkörper (11) durch Schraubeneinrichtungen (23, 24) gemäß einem Verbindungsbauplan verbunden sind, der nützlich ist, um einen gewissen freien Raum (61) zwischen dem Rahmentragwerk (19) und dem Trommelhauptkörper (11) in Entsprechung mit den peripheren Bereichen der kreisförmigen Oberflächen (20, 21) zu lassen. 30
10. Ledergerbtrommel nach Anspruch 9, umfassend innere Längsblätter (59) und Zapfen (25), wobei die Zapfen an der inneren Umfangsoberfläche der Trommel befestigt sind, indem dieselben Schraubeneinrichtungen (24) verwendet werden, die zur Befestigung der Längsstäbe (22) des Metallrahmentragwerks (19) an dem Hauptkörper (11) verwendet werden. 40
11. Ledergerbtrommel nach Anspruch 9, bei der in Entsprechung mit den Trommelumfangsbereichen, wo die Verbindungseinrichtungen (24, 24') positioniert sind, die Hauptkörper(11)dicke durch Verstärkungstreifen (26, 27) in polymerem Material zweckmäßig erhöht ist, wobei die Streifen Kreis- oder Längsform aufweisen. 45
12. Ledergerbtrommel nach Anspruch 10, umfassend

Längsträger (29), zu denen die zapfen (25) eingesetzt sind, wobei die Längsträger (29) so geformt sind, dass dazu beigetragen wird, die Seitenränder von Tafeln (30) zu tragen, die die Innenwände der Längshohlräume (31) bilden.

13. Ledergerbtrommel nach Anspruch 1 oder 2, umfassend mindestens eine Schiebetüre (42) zur Einführung und zur Entfernung von Ledergegenständen in die und aus der Trommel, wobei die Türe durch elastische Einrichtungen (48) geschlossen gehalten wird.
14. Ledergerbtrommel nach Anspruch 13, bei der die Schiebetüre (42) in der Schließposition durch die elastischen Einrichtungen (48) gehalten wird, die so eingestellt sind, dass unter normalen Betriebsstrommelbedingungen eine perfekte Abdichtung sichergestellt ist und ermöglicht wird, dass sich die Türe von einer Luke (45) hochhebt, wenn der Trommelinnendruck einen zuvor festgesetzten Sicherheitswert erreicht, wobei der Wert zur Baufestigkeit des Hauptkörpers (11) in Beziehung steht.
15. Ledergerbtrommel (10) nach einem vorangehenden Anspruch, bei der das polymere Material, aus dem der Hauptkörper (11) und die in Beziehung stehenden inneren Bauteile (59, 25, 26, 27, 30, 37, 38) hergestellt sind, aus Polypropylen besteht. 25

Revendications

1. Tambour de tannage de cuirs (10) comprenant un corps principal cylindrique (11) ayant une surface interne et des surfaces circulaires (20, 21) et pouvant être tourné sur un axe horizontal autour d'un arbre creux (15), dans lequel le corps principal cylindrique (11) est muni d'une pluralité de cavités ou poches (31) agencées longitudinalement le long de la surface interne dudit corps principal, lesdites cavités longitudinales (31) étant raccordées à des cavités périphériques (39) situées en périphérie de l'une desdites surfaces circulaires (20, 21) et étant en outre raccordées par le biais de cavités latérales, radiales (33) à l'arbre creux (15) communiquant avec l'extérieur, ledit corps principal cylindrique (11) étant réalisé en une matière polymère, **caractérisé en ce qu'une** structure métallique (19) embrasse ledit corps principal (11). 40
2. Tambour de tannage de cuirs selon la revendication 1, **caractérisé en ce que** lesdites cavités longitudinales (31) et ladite cavité périphérique (39) communiquent avec le volume interne du tambour par le biais d'ouvertures, respectivement (32) et (41), lesdites ouvertures étant agencées respectivement sur le côté gauche et sur le côté droit du tambour 45

afin d'obtenir, durant la rotation, un échange continu du même bain entre les côtés ci-dessus du tambour.

3. Tambour de tannage de cuirs selon la revendication 1 ou 2, **caractérisé en ce qu'il** comprend quatre cavités, ou poches, longitudinales (31a, 31b, 31c, 31d) placées, deux par deux, à des positions diamétralement opposées, et une cavité radiale pour chacune desdites cavités longitudinales, lesdites cavités radiales (33a, 33b, 33c, 33d) étant raccordées séparément, à l'une de leurs extrémités, à des sections (15a, 15b, 15c, 15d) dudit arbre creux (15). 5
4. Tambour de tannage de cuirs selon la revendication 2, **caractérisé en ce que** lesdites cavités périphériques situées en correspondance avec la surface circulaire (20) sur laquelle est situé l'arbre creux, consistent en cavités (39) positionnées sur le bord de ladite surface circulaire et comprenant deux zones diamétralement opposées (41) munies d'ouvertures, lesdites cavités périphériques (39) étant en communication avec l'intérieur dudit corps principal (11) par le biais desdites ouvertures prévues dans lesdites zones (41) agencées à des positions radiales différentes relativement aux positions desdites cavités longitudinales (31). 10
5. Tambour de tannage de cuirs selon la revendication 4, **caractérisé en ce que** lesdites cavités longitudinales (31) communiquent avec l'intérieur dudit corps principal (11) par le biais d'ouvertures (32) placées à proximité de la surface circulaire (21) faisant face à la surface (20) en correspondance avec laquelle lesdits secteurs (41) sont placés. 20
6. Tambour de tannage de cuirs selon la revendication 5, **caractérisé en ce que**, dans chaque sens de rotation du tambour, deux cavités longitudinales diamétralement opposées sont principalement dédiées à l'écoulement du bain hors du tambour, et deux autres cavités longitudinales diamétralement opposées sont principalement dédiées à l'entrée du bain dans le tambour, la circulation du bain impliquant toute la masse liquide lorsque le flux sortant passe par les ouvertures desdits secteurs (41) des cavités périphériques (39) placées à une extrémité du tambour et le flux entrant passe à travers les ouvertures de cavités longitudinales (32) placées à l'extrémité opposée du tambour. 25
7. Tambour de tannage de cuirs selon la revendication 1 ou 2, **caractérisé en ce que** lesdites cavités radiales (33) sont conformées de manière à avoir une zone transversale se réduisant progressivement dans le sens de l'arbre creux (15). 30
8. Tambour de tannage de cuirs selon la revendication 1, **caractérisé en ce que** le raccordement entre ladite structure (19) et ledit corps principal cylindrique (11) est conçu de manière à laisser un certain espace libre (61) entre la structure proprement dite et le corps principal du tambour en correspondance avec les zones périphériques desdites surfaces circulaires (20, 21), ledit espace libre étant tel qu'il permet les dilatations thermiques du corps principal en matière polymère (11). 35
9. Tambour de tannage de cuirs (10) selon la revendication 2, dans lequel ladite structure métallique (19) consiste en deux structures en forme de rayons, placées en correspondance avec les surfaces circulaires de corps principal (20, 21), et reliées l'une à l'autre par des barres longitudinales (22), lesdites structures en forme de rayons et lesdites barres longitudinales étant raccordées au corps principal de tambour (11) par des moyens de vissage (23, 24) conformément à un agencement de raccordement servant à laisser un certain espace libre (61) entre ladite structure (19) et ledit corps principal de tambour (11) en correspondance avec les zones périphériques desdites surfaces circulaires (20, 21). 40
10. Tambour de tannage de cuirs selon la revendication 9, comprenant des lames longitudinales internes (59) et des chevilles (25), dans lequel lesdites chevilles sont fixées à la surface circonférentielle interne du tambour en utilisant les mêmes moyens de vissage (24) que ceux utilisés pour fixer les barres longitudinales (22) de ladite structure métallique (19) audit corps principal (11). 45
11. Tambour de tannage de cuirs selon la revendication 9, dans lequel en correspondance avec les zones circonférentielles de tambour où lesdits moyens de raccordement (24, 24') sont positionnés, l'épaisseur du corps principal (11) est convenablement accrue par des bandes de renforcement (26, 27) en matière polymère, lesdites bandes ayant une forme circulaire ou longitudinale. 50
12. Tambour de tannage de cuirs selon la revendication 10, comprenant des supports longitudinaux (29), dans lesquels sont insérées lesdites chevilles (25), lesdits supports longitudinaux (29) étant conformés de manière à aider à supporter les bords latéraux de panneaux (30) qui constituent les parois internes desdites cavités longitudinales (31). 55
13. Tambour de tannage de cuirs selon la revendication 1 ou 2, comprenant au moins une porte coulissante (42) pour l'introduction et le retrait des cuirs dans le et hors du tambour, dans lequel ladite porte est maintenue fermée par un moyen élastique (48).
14. Tambour de tannage de cuirs selon la revendication

13, dans lequel ladite porte coulissante (42) est maintenue en position fermée par ledit moyen élastique (48) ajusté pour garantir un joint étanche parfait dans des conditions normales de fonctionnement du tambour et permettre la levée de la porte à partir d'une trappe d'accès (45) quand la pression interne du tambour atteint une valeur de sécurité préfixée, ladite valeur étant liée à la résistance structurelle dudit corps principal (11).

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15. Tambour de tannage de cuirs (10) selon l'une .quelconque des revendications précédentes, dans lequel ladite matière polymère dans laquelle ledit corps principal (11) et les composants internes connexes (59, 25, 26, 27, 30, 37, 38) sont réalisés consiste en polypropylène.

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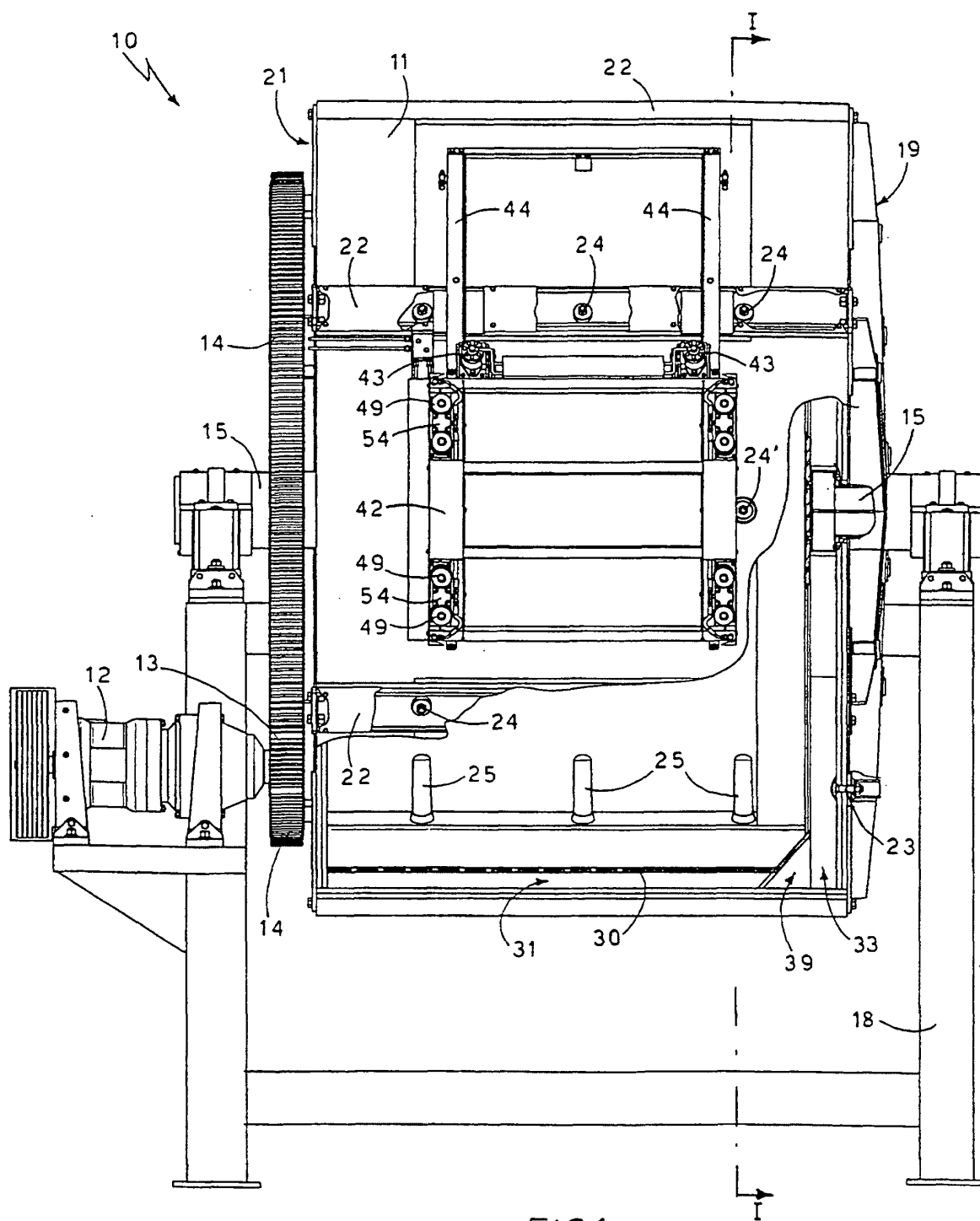
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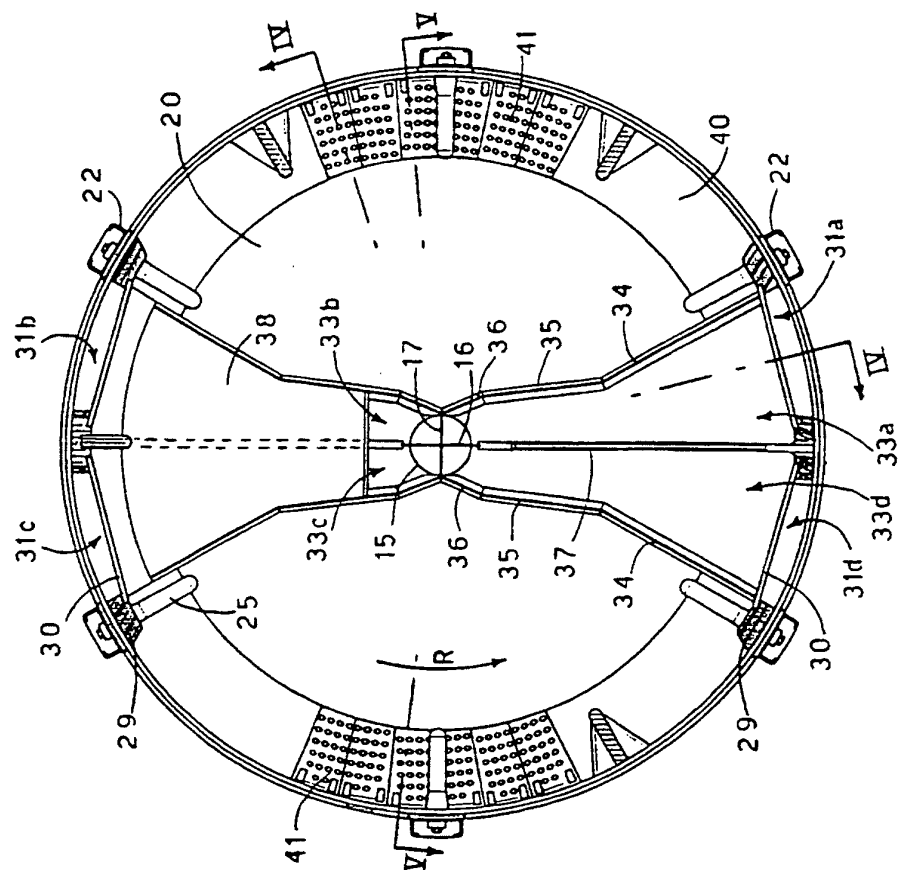


FIG. 2

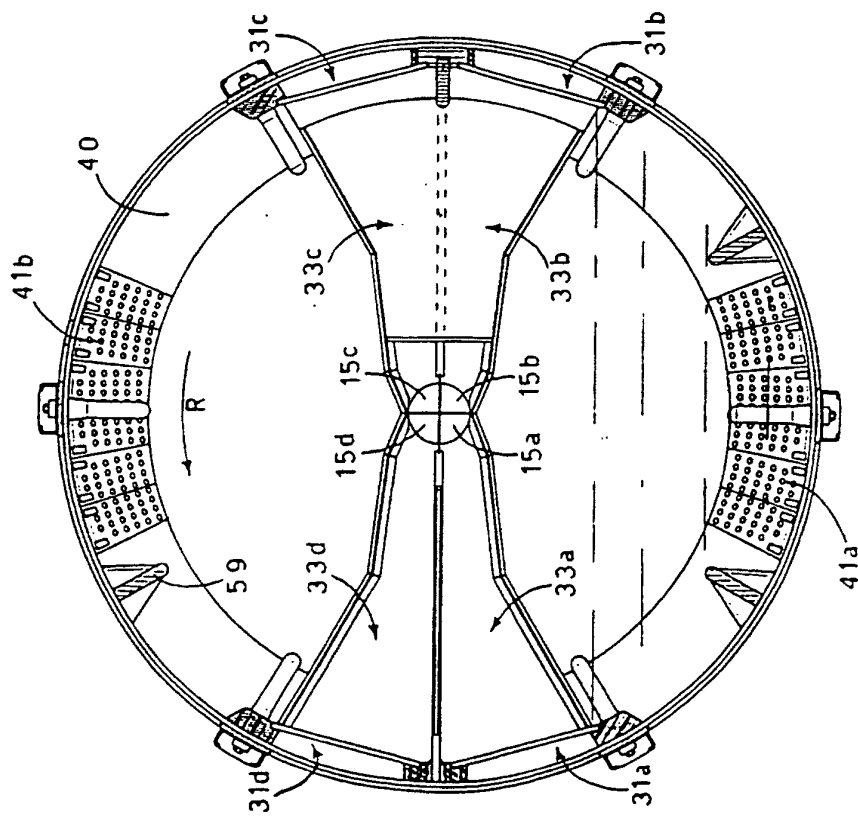


FIG. 3

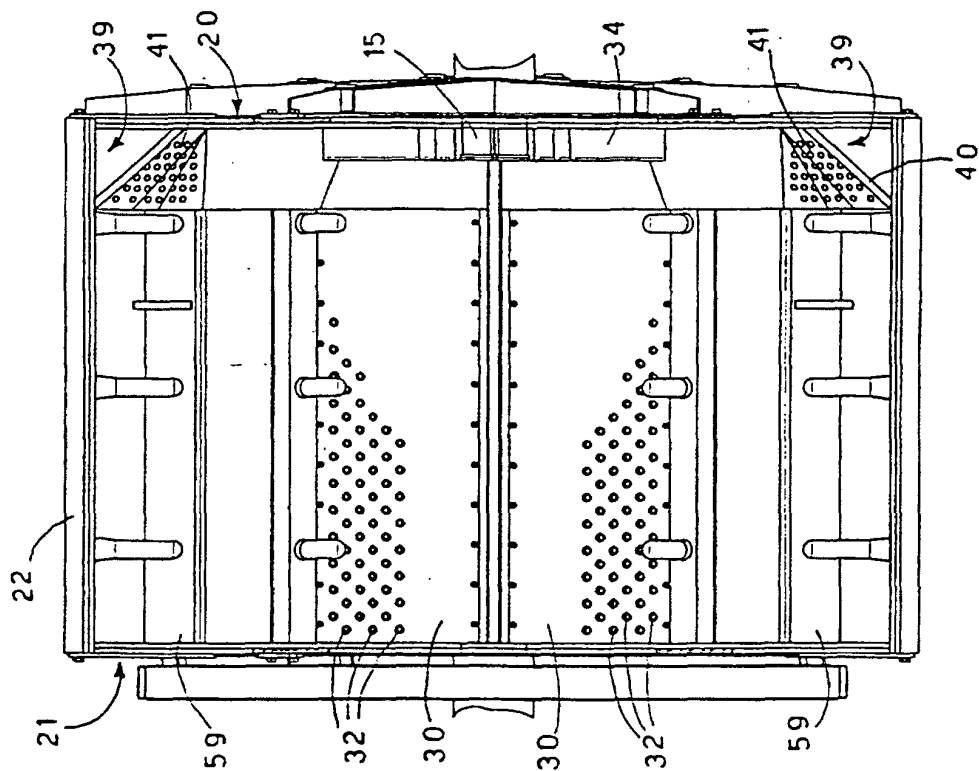


FIG. 5

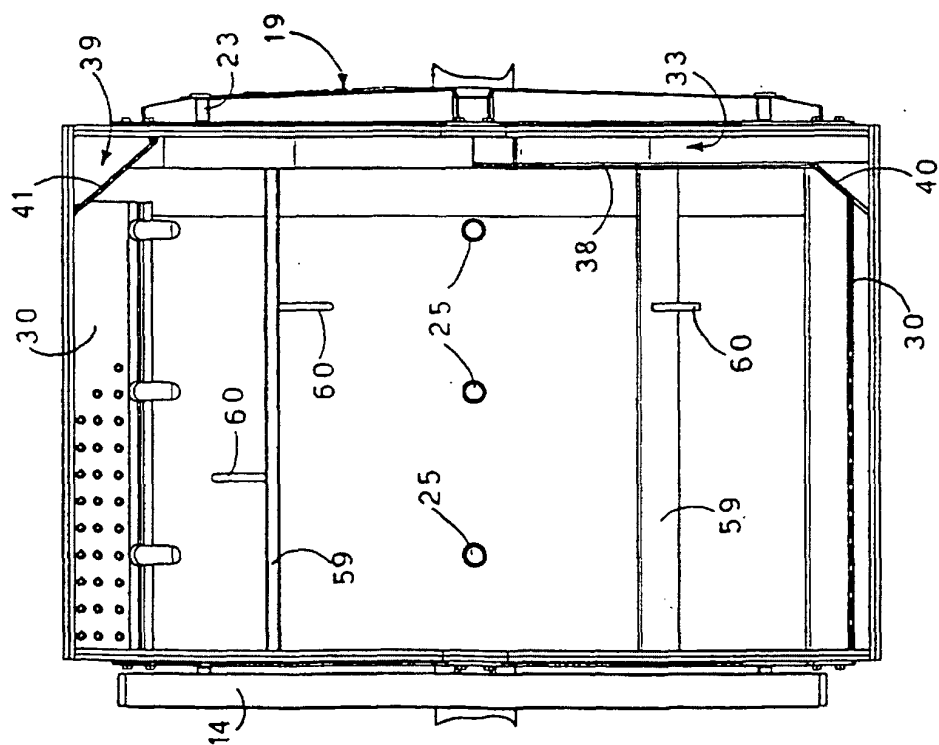


FIG. 4

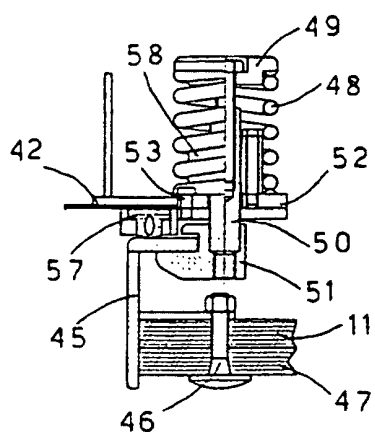


FIG. 7

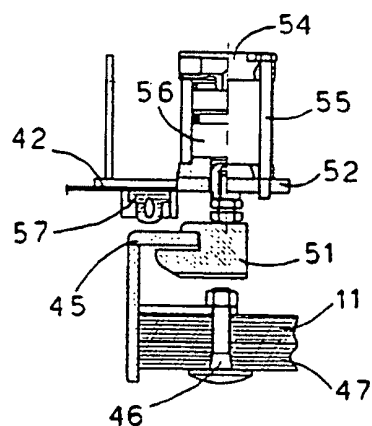


FIG. 8

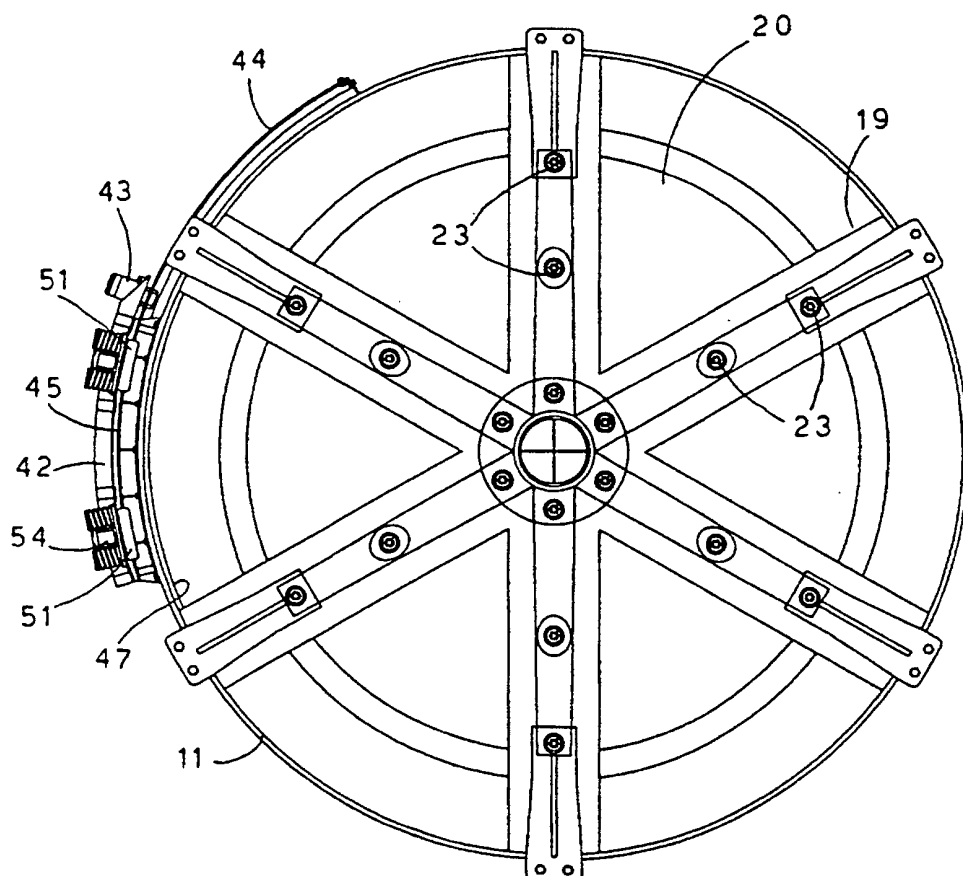


FIG. 6

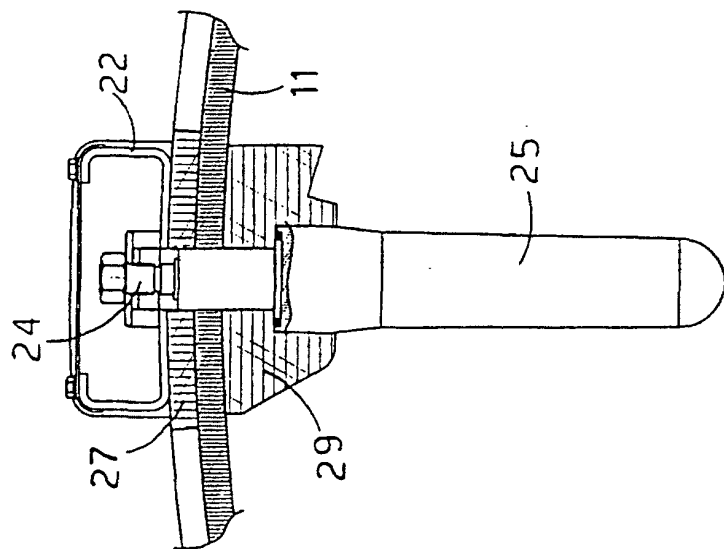


FIG. 11

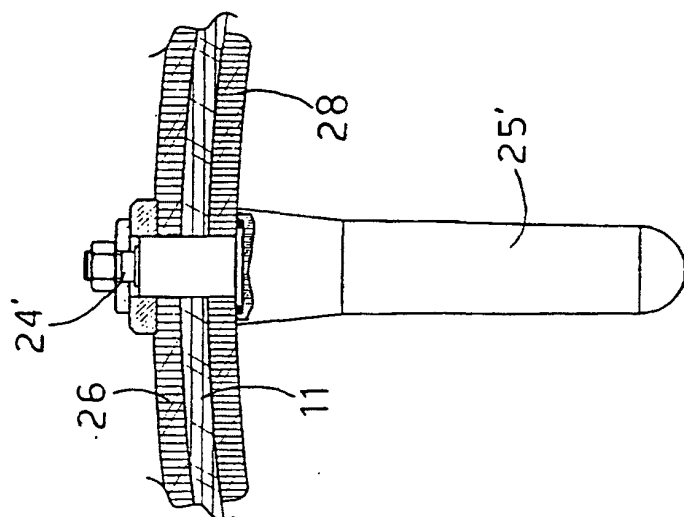


FIG. 10

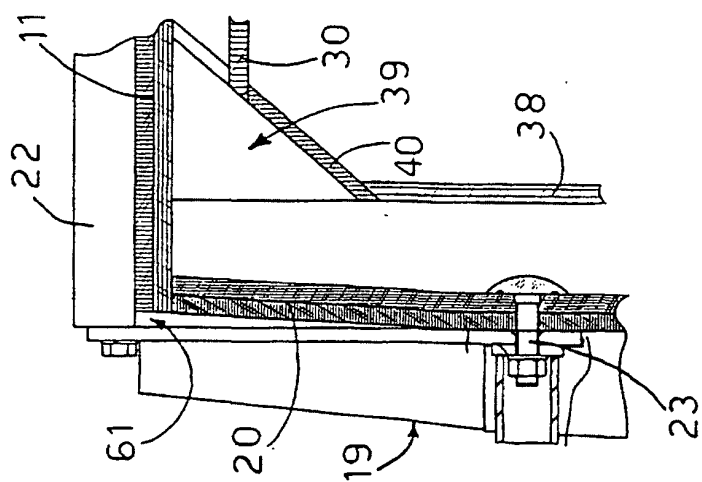


FIG. 9