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Machine to wash metal and non-metal pieces, such as small items and mechanical components.

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Description

The present invention relates to a machine to wash metal and non-metal pieces, such as small items and mechanical components, of the type essentially designed to wash the pieces hermetically sealed in a washing chamber or tank, from which solvent is recovered and regenerated and where pieces are dried inside the washing tank itself through the forced endless circulation of a hot-air stream.

Such machines essentially comprise a hermetically sealed washing tank within which a rotating element or rotor provided with a basket to contain the pieces to be washed is moved.

A machine of the type mentioned above is described in GB-A-2 113 719 in the name of the same inventor designated as per this patent application and it provides a closed impervious washing chamber with an access door to permit entry and exit of the metal parts to be washed. Within the washing chamber washing means are provided comprising a basket for containing the metal articles to be washed. Said basket is removably supported within the chamber by a movable carrier adapted to move the basket and the contained metal parts for immersion in a solvent bath and/or past at least one nozzle adapted to deliver a pressurized jet of solvent against the basket and the contained metal parts.

Said machine also comprises : a solvent-recovery circuit connected to the washing chamber, including a solvent storage tank and means for distilling solvent vapour also connected to the chamber ; and a closed-circuit forced-circulation hot air drying circuit with means for condensing the solvent vapours carried by the hot air and for returning the condensed solvent to the storage tank.

While using said machines the applicant has noticed that some pieces devoid of holes, undercuts or the like can be washed by merely immersing them into the solvent and, above all, they can be dried irrespective of their position inside the basket, so that the use of baskets supported by the rotating element in a hanging relationship is allowed. Other pieces, instead, especially if small-sized and flattened, can adhere to each other if the flat surfaces thereof come into contact, which involves the necessity of moving them inside the containing baskets in order to avoid the above mentioned drawback which is very detrimental to such a washing and to a complete drying of the pieces. For the above reason it is necessary to provide for the use of baskets supported by the rotating element so that they rotate about the axis thereof.

Obviously two washing tanks would be necessary for the use of the two different types of baskets mentioned above. Actually, as shown in Fig. 1, in the case of hanging baskets the overall dimensions of the rotating element or rotor together with the respective baskets (shown in full line in Fig. 1 where the diameter

thereof is identified by ϕb) would be much smaller than the overall dimensions of the same rotor when provided with baskets designed to rotate about the axis of the rotor (shown in interrupted line in Fig. 1 where the diameter thereof is identified by ϕr).

Therefore, from a manufacturing point of view two different types of washing tanks having different sizes should have to be made in order to meet the different operational requirements.

The object of the present invention is to provide a machine of the above specified type having reduced sizes and being capable of allowing the use of both hanging and rotating baskets and in which the two above mentioned operating conditions can be achieved without carrying out any modifications to the main structure and the rotating element supporting the two types of baskets.

The invention, as defined in the claims, allows the above specified object to be reached by providing a washing tank equipped with a rotor-supporting flange that can be fastened to the tank so that it may take two possible and different positions, in one of them the axis of the rotor is coaxial with the axis of the tank and in the other the axis of the rotor is eccentric relative to the axis of the tank for the use of hanging baskets.

Advantageously, in order to promote standardization, the machine in question provides for the hanging baskets to be supported by a frame swinging about a pivot carried by the rotating element or by a second rotating element supported by said swinging frame. In the last mentioned case the machine provides the use of a kinematic mechanism adapted to make the second rotating element rotate depending upon the movement of the main rotating element, so that the basket supported thereby rotates too and the products contained therein undergo a sort of mixing.

The invention is described in greater detail hereinafter with reference to the accompanying drawings showing some embodiments thereof by way of non-limiting examples.

In the drawings :

– Fig. 1 diagrammatically shows the overall dimensions that a washing tank provided with hanging baskets and rotating baskets respectively should have, which overall dimensions are defined by diameter ϕr ;

– Fig. 2 is a diagrammatic rear view of the washing tank of a machine according to the present invention when the overall dimensions thereof are according to diameter ϕb in Fig. 1 ;

– Fig. 3 is a diagrammatic view, on an enlarged scale relative to Figs. 1 and 2, of the upper part of the machine shown in Fig. 2 in which some portions have been removed in order that others may be rendered more prominent and in which a basket of the swinging type is visible ;

– Fig. 4 is a diagrammatic front view, to an enlarged scale relative to Figs. 1 and 2 and diffe-

rent from Fig. 3, of the rotating element of the machine shown in Fig. 2 supporting two baskets only of different types, both hanging from the rotating element, where the basket shown on the right-hand side is of the rotating type ;

– Fig. 5 is a diagrammatic view out of scale with respect to the other figures, of the upper part of the machine shown in Fig. 2 where some parts have been removed in order that others may be rendered more prominent and in which a basket of the rotating type is visible.

Referring to Figs. 2, 3, 4, the washing machine according to the present invention substantially consists of a washing tank 1 within which a rotating element or rotor 2 rotates, which rotor is provided with a number of arms 34 from the free ends of which as many supporting rods or pivots 3 lead off that are adapted to support a plurality of baskets 4-4a designed to contain the pieces to be washed. The washing tank 1 is provided, in the region of its charging mouth, with a structure 36 slidably supporting baskets 4-4a to be brought into the washing tank 1.

According to a solution of the present invention, the washing tank 1 is provided, in an eccentric position with respect to its axis 9, with an opening 10 (see Fig. 3) which can be closed by a flange 6 in turn provided with an eccentric hole adapted to be passed through (see Fig. 2) by a hub 7 of the rotating element 2. For reasons to be clarified in the following the eccentricity E of opening 10 with respect to the axis of the washing tank 1 is identical with the eccentricity D of hole 11 to the axis of flange 6 (see detail shown in Figs. 2 and 3). Flange 6 can take, relative to the washing tank 1, two different configurations rotated through 180° with respect to each other and corresponding the former to the maximum eccentricity (equal to E + D) of the hole 11 of flange 6 relative to the axis 9 of the washing tank 1 (see detail shown in Fig. 2 in full line and in Fig. 3), the latter corresponding to the coaxial relationship between said hole and axis (see detail shown in Fig. 2 in interrupted line).

Still according to a solution of the present invention, each rod 3 of the rotating element 2 supports a swinging frame 15 (see Figs. 3, 4 and 5).

Each frame 15 consists of two rocker arms 35 articulated to the respective rod 3 at a central point thereof and without any possibility of sliding. They are connected to each other by two parallel substantially L-shaped guides 16, integral to their free ends. A gear wheel 23 is keyed on rod 3 in the vicinity of the rocker arm 35 which is closer to the respective arm 34, for the purposes to be clarified in the following.

Guides 16 are disposed in faced relationship and they are capable of slidably supporting sliding elements 17 associated with the supporting structure 18 of the containing baskets 4.

Structure 18, in the case of hanging and non-rotating containing baskets 4 (see Figs. 3 and 4) con-

sists of two channel sections engaged to the longitudinal side walls of the containing baskets 4. To said channel sections are integral the stems 17a of rollers constituting said sliding elements 17 of basket 4 as well as one or more locking members 24 consisting for example of a spring pin 25a adapted to enter a corresponding hole in guides 16 (see Figs. 3, 4 and 5) in order to prevent basket 4 from sliding relative to guides 16 when the machine is running.

The containing baskets 4 are of the drawer type (see Figs. 3 and 4) and the channel sections 18 are integral thereto in the region of their upper edges. In this way, the weight of each containing basket 4 added to that of the pieces contained therein, generates a torque in the respective frame 15, which torque during the rotation of the rotating element 2 causes the same to rotate about the corresponding rod 3 so as to maintain the inclination of the containing basket 4 unchanged with respect to tank 1, said basket, for example, always having its bottom in a horizontal position.

In the case of containing baskets of the rotating type 4a (see Figs. 4 and 5), the supporting structure 18 thereof consists, according to the present invention, of a T-shaped element 19 from the ends of the horizontal arms of which sliding elements 17 similar to those already described with reference to baskets 4 lead off, at right angles to the plane of said T-shaped element 19. One end of a pivot 20 parallel to rod 3 is applied to the vertical arm 22 of the T-shaped element 19. A second rotating element or rotor 21 is fitted on pivot 20 which rotating element is provided with a number of arms 21a (three in the example shown in Fig. 4) from the free ends of which respective supporting rods 26 lead off ; they are parallel to pivot 20 and hold a containing basket 4a therebetween. The free ends of the supporting rods 26 are connected to each other by an annular element 37 so that the same are not allowed to diverge due to the weight of the containing basket 4a and of the pieces contained therein.

The second rotating element 21 is integral to pivot 20 and it can freely rotate about its axis and a toothed or runged structure 24 is associated therewith so that it meshes with a gear wheel 23 keyed on the respective rod 3 of the first rotating element 2.

Each of said rotating containing baskets 4a is preferably of cylindrical form and is open at one of its ends where a closing cover 27 is provided. At least two locking elements 28 and 29 are associated with cover 27 ; they may for example be latches engaged into a hole 30a of a reinforcing rim 30 provided on basket 4a and into a hole 26a of one of the supporting rods 26, respectively.

In this way basket 4a is engaged with rotor 21 both axially and rotatably and, by effect of the rotation of the main rotor 2 and of the gear wheel 23 meshing with the toothed structure 24, it is caused to rotate about its own axis at a speed which is directly depen-

dent on the rotation speed of the main rotor 2 and on the ratio between the number of teeth of the gear wheel 23 and the number of teeth of the toothed structure 24. By the rotation of basket 4a it is possible to cause the items contained therein to be submitted to a sort of mixing, which is also promoted by a series of longitudinal ribs or raised portions formed inside the baskets and against which said items temporarily bear during rotation of baskets 4a.

According to a possible solution offered by the machine of the present invention, the second rotating element or rotor 21 can be rigidly carried at the ends of arms 34 belonging to the first rotating element 2 if it is not wished to have baskets 4 or 4a supported in a hanging relationship while needing the baskets to rotate for the purpose of mixing the items contained therein.

In this case, after eliminating frames 15 it is possible to key the second rotor 21 on a pivot (which can be the same rod or pivot 3 carried by arms 34).

As basket 4a is locked by means of latches 28 and 29 as above specified, during the rotation of rotor 2 it is possible to have a corresponding rotation of basket 4a about the axis of said rotor which results in the items being mixed therein. In order to make the locking of basket 4a to the second rotor 21 easier, the bottom of said basket 4a can be provided with a number of housings 31 being each adapted to receive one of the arms 21a of the second rotor 21 in a restrained fixing relationship.

When baskets 4a are supported in this manner it is convenient that the axis of the first rotor 2 be coaxial with axis 9 of tank 1. In order to achieve this condition it is sufficient to rotate the flange 6 through 180° so as to eliminate the eccentricity given by the sum of E + D (see Fig. 2). In this way baskets 4a can be plunged into the same amount of solvent as in the case in which hanging baskets 4 are used since the distance L existing in the previous case between the axis of the main rotor 2 and the solvent level is now reduced to a value of L1.

By the use of a machine structured in the way described above it is therefore possible to produce a single washing tank 1 having a reduced bulkiness, that is according to the diameter ϕb shown in Fig. 1, which can be used either for hanging containing baskets 4 or for containing baskets 4a directly carried by the main rotor, all that being achieved by merely positioning flange 6 in the described ways.

The system adopted for the hanging support of baskets 4 and 4a is particularly interesting as regards the problem of standardization and the greater production and operation economy. In fact, through a single swinging frame 15 it is possible to use containing baskets both of the drawer type 4 and of the rotating type 4a either simultaneously or at different moments but anyway without modifying the washing tank.

The invention as conceived is susceptible of many modifications and variations. For example opening 10 in the washing tank 1 instead of being eccentric and closed by flange 6, could have bigger sizes relative to the ones shown and be coaxial with the axis 9 of the washing tank 1 and in this case two closing flanges would be provided in place of flange 6, one having a passage hole for hub 7 which is coaxial with axis 9 of the washing tank 1 and the second having a passage hole for hub 7 which is eccentric enough to allow hanging baskets such as 4 and 4a to be used.

According to another possible alternate embodiment, opening 10 could be coaxial with axis 9 of the washing tank 1 and could have sizes allowing it to be closed in two stages either by a flange adapted to support hub 7 coaxially to tank 1 or by a flange adapted to support hub 7 eccentrically as hereinbefore described for the use of hanging baskets.

All of the details can be replaced by technically equivalent element falling within the scope of the appended claims.

Claims

1. A machine to wash metal and non-metal pieces such as small items and metal components comprising a washing tank (1) inside which a rotating element or rotor (2) can rotate about a horizontal axis (8), said rotor being provided with at least a rod or pivot (3) mounted parallel to the axis of rotation (8) of, and connected in cantilevered fashion to, said tank and adapted to support a basket (4, 4a) containing the pieces to be washed; said washing tank (1) having at least an opening at the front which can be temporarily sealingly closed, for charging and discharging baskets (4, 4a) and a second opening (10) at the rear which can be permanently sealingly closed by a flange supporting the rotor hub, characterized in that the washing tank (1) is substantially cylindrical and that the second opening (10) is coaxial or eccentric in an upward direction with respect to the axis (9) of tank (1) in such a way that it always contains said axis in its section, and is closed by at least a flange (6) supporting the hub (7) of rotor (2) coaxially or eccentrically with respect to the axis of said flange (6), said flange being adapted to be fastened to tank (1) in two possible positions so as to have hub (7) of rotor (2) on the axis (9) of tank (1) or eccentric in an upward direction with respect to said axis.

2. A machine to wash metal and non-metal pieces according to claim 1, characterized in that said opening (10) that can be permanently sealingly closed by flange (6) supporting the rotor hub (7) is eccentric in an upward direction with respect to the axis (9) of the washing tank (1) and in that said flange (6) is provided with a hole (11) for the passage of the rotor hub (7) which is eccentric with respect to the axis of said

flange (6) by an amount corresponding to the eccentricity of said opening (10) with respect to the axis (9) of tank (1); said flange (6) being adapted to be fastened to tank (1) according to two permanent positions, in one of which the hub (7) or support for rotor (2) is eccentric with respect to the axis (9) of tank (1) and in the other said hub (7) is coaxial with the axis (9) of tank (1).

3. A machine to wash metal and non-metal pieces according to claim 1, characterized in that each rod (3) carried by the rotating element (2) supports a frame (15) freely swinging about said rod and provided with supporting guides (16) for the basket (4, 4a).

4. A machine to wash metal and non-metal pieces according to claim 3, using baskets (4) of the drawer type, rotatably and slidably movable relative to the rotating element (2) without altering their position with respect to the washing tank (1), characterized in that each basket (4) is provided with a structure (18) engaging it with said swinging frame (15) and comprising, on both sides thereof (4), sliding means (17) adapted to come into engagement with guides (16) provided on frame (15) and locking means (25) adapted to be fitted into at least a housing exhibited by at least one of said guides (16) when the basket (4) is coupled to frame (15).

5. A machine to wash metal and non-metal pieces according to claim 3, preferably using cylindrical and closed baskets (4a), movable about said rotating element (2) by varying their inclination relative to the washing tank (1), characterized in that, relative to each swinging frame (15), it comprises a support structure for the basket (4a) consisting of a second frame (19) provided with sliding means adapted to be engaged with the guides of the swinging frame (15) and with locking means (25) adapted to be fitted into at least a housing exhibited by at least one of said guides (16) when the second frame (19) is coupled to the swinging one (15); and a support element (20) of a second rotating element (21) provided with arms (21a) parallel to the rod (3) carried by the first rotating element (2) and angularly spaced apart from each other so that they may hold a basket (4a) therebetween; said second rotating element (21) being provided with a toothed or runged structure (24) meshing with a gear wheel (23) steadily keyed on rod (3) carried by the first rotating element (2).

6. A machine to wash metal and non-metal pieces according to claim 3, characterized in that each of said containing baskets (4a) is closed at the front by a cover (27) provided with at least a closing element (28, 29) elastically movable along diametrically opposed directions; one of said closing elements (28) engaging into a hole (30a) located on the circumferential reinforcing rim (30) of the respective containing basket (4) and the other (29) engaging into a hole (26a) located in one of said support rods (26) of the second rotating element (21).

7. A machine to wash metal and non-metal pieces according to claim 5, characterized in that the bottom of said containing basket (4) has a projecting rim provided with housings (31) to accommodate said arms (21a) of the second rotating element (21).

8. A machine to wash metal and non-metal pieces according to claim 5, characterized in that each of said containing baskets (4a) has a number of ribs (38) inside it which are adapted to enhance the mixing of the pieces to be washed.

9. A machine to wash metal and non-metal pieces according to claim 1, characterized in that the second opening (10) is coaxial with the axis (9) of tank (1) and in that it is provided with two interchangeable flanges for the closure of said opening, one of them is adapted to support hub (7) of the rotating element (2) coaxially with the axis of tank (1) and the other is adapted to support said hub (7) eccentrically in an upward direction with respect to the axis (9) of tank (1).

10. A machine to wash metal and non-metal pieces according to claim 1, characterized in that said opening (10) of tank (1) is eccentric in an upward direction with respect to the axis (9) of tank (1), said axis being contained in the section of said opening (10), and in that it is provided with two interchangeable flanges for the closure of said opening (10), one of them is adapted to support hub (7) of rotor (2) coaxially with said opening and the other is adapted to support said hub (7) coaxially with the axis (9) of tank (1).

Ansprüche

1. Vorrichtung zum Reinigen von Metall- und Nichtmetallteilen, wie kleinen Gegenständen und mechanischen Bestandteilen, enthaltend einen Waschbehälter (1), in welchem ein rotierendes Element oder Rotor (2) sich um eine horizontale Achse (8) drehen kann, wobei der genannte Rotor mit wenigstens einer Stange oder einem Zapfen (3) versehen ist, der parallel zu der Drehachse (8) des genannten Behälters montiert und auf auslegende Weise an diesem befestigt und dazu geeignet ist, einen Korb (4, 4a) zu tragen, der die zu waschenden Teile enthält, wobei der genannte Waschbehälter (1) wenigstens frontale eine Öffnung aufweist, welche kurzzeitig abdichtend geschlossen werden kann, um die Körbe (4, 4a) laden und entladen zu können, sowie eine zweite Öffnung (10) auf der Rückseite, die ständig abdichtend verschlossen werden kann, und zwar durch einen die Rotornabe tragenden Flansch, **dadurch gekennzeichnet**, dass der Waschbehälter (1) im wesentlichen zylindrisch ist, und dass die zweite Öffnung im Verhältnis zu der Achse (9) des Waschbehälters (1) coaxial oder exzentrisch in einer nach oben gehenden Richtung angeordnet ist, und zwar auf solche Weise, dass sie die genannte Achse stets innerhalb ihres Querschnittes enthält, und dass sie

durch wenigstens einen Flansch (6) verschlossen wird, der die Nabe (7) des Rotors (2) koaxial oder exzentrisch im Verhältnis zu der Achse des genannten Flansches (6) trägt, und wobei der genannte Flansch an dem Behälter (1) in zwei möglichen Positionen befestigt werden kann, so dass sich die Nabe (7) des Rotors (2) entweder auf der Achse (9) des Behälters (1) befindet oder exzentrisch nach oben versetzt im Verhältnis zu der genannten Achse.

2. Vorrichtung zum Reinigen von Metall- und Nichtmetallteilen nach Patentanspruch 1, **dadurch gekennzeichnet**, dass die genannte Öffnung (10), die durch den die Rotornabe (7) tragenden Flansch (6) fest abdichtend verschlossen werden kann, exzentrisch in einer nach oben verlaufenden Richtung im Verhältnis zu der Achse (9) des Waschbehälters (1) angeordnet ist, und dass der genannte Flansch (6) eine Bohrung (11) zum Durchlass der Rotornabe (7) aufweist, ebenfalls exzentrisch im Verhältnis zu der Achse des genannten Flansches (6), und zwar um eine Abmessung, welche der Exzentrizität der genannten Öffnung (10) im Verhältnis zu der Achse (9) des Behälters (1) entspricht, wobei der genannte Flansch (6) geeignet ist, nach zwei festen Positionen befestigt zu werden, in deren einer die Nabe (7) oder Halter für den Rotor (2) im Verhältnis zu der Achse (9) des Behälters (1) exzentrisch ist und in der anderen die genannte Nabe (7) koaxial zu der Achse (9) des Behälters (1) verläuft.

3. Vorrichtung zum Reinigen von Metall- und Nichtmetallteilen nach Patentanspruch 1, **dadurch gekennzeichnet**, dass jede von dem rotierenden Element (2) getragene Stange (3) einen frei um die genannte Stange schwingenden Rahmen (15) trägt, der mit Halteschienen (16) für den Korb (4, 4a) versehen ist.

4. Vorrichtung zum Reinigen von Metall- und Nichtmetallteilen nach Patentanspruch 3, die kastenförmige Körbe (4) verwendet, welche entsprechend zu dem rotierenden Element (2) drehbar und gleitbar beweglich sind, ohne dabei ihre Position im Verhältnis zu dem Waschbehälter (1) zu verändern, **dadurch gekennzeichnet**, dass jeder Korb (4) mit einer Struktur (18) versehen ist, die sich mit dem genannten schwingenden Rahmen (15) verbindet und auf beiden Seiten des Korbes (4) Gleitelemente (17) enthält, die dazu geeignet sind, in die an dem Rahmen (15) vorgesehenen Halteschienen (16) eingeschoben zu werden, sowie Blockiermittel (25), geeignet, in wenigstens einem Sitz einzurasten, der sich an wenigstens einer der genannten Halteschienen (16) befindet, wenn der Korb (4) an den Rahmen (15) angehängt wird.

5. Vorrichtung zum Reinigen von Metall- und Nichtmetallteilen nach Patentanspruch 3, die vorzugsweise zylindrische und geschlossene Körbe (4a) verwendet, welche durch Verändern ihrer Schrägstellung um Verhältnis zu dem Waschbehälter (1) um das

genannte rotierende Element (2) beweglich sind, **dadurch gekennzeichnet**, dass sie entsprechend zu jedem schwingenden Rahmen (15) eine Trägerstruktur für den Korb (4a) enthält, der aus einem zweiten Rahmen (19) besteht und mit Gleitelementen versehen ist, die geeignet sind, mit den Halteschienen des schwingenden Rahmens (15) verbunden zu werden, sowie mit Blockiermitteln (25), die in wenigstens einen Sitz einrasten können, der sich an wenigstens einer der genannten Halteschienen (16) befindet, wenn der zweite Rahmen (19) mit dem schwingenden Rahmen (15) verbunden wird; sowie ein Tragelement (20) für ein zweites rotierendes Element (21), das mit parallel zu der von dem ersten rotierenden Element (2) getragenen Stange (3) angeordneten Armen (21a) versehen ist, die einen winkelmässigen Abstand voneinander haben, so dass sie zwischen sich einen Korb (4a) halten können, wobei das zweite rotierende Element (21) mit einer verzahnten oder gestuften Struktur (24) versehen ist, die in ein Zahnrad (23) greift, das fest auf die von dem ersten rotierenden Element getragene Stange (3) aufgezogen ist.

6. Vorrichtung zum Reinigen von Metall- und Nichtmetallteilen nach Patentanspruch 3, **dadurch gekennzeichnet**, dass jeder der Aufnahmekörbe (4a) frontal durch einen Deckel (27) verschlossen wird, der mit wenigstens einem elastisch in diametral entgegengesetzte Richtungen beweglichen Schliesselement (28, 29) versehen ist, wobei eins der genannten Schliesselemente (28) in eine Bohrung (30a) greift, die sich in dem umlaufenden, verstärkenden Rand (30) des jeweiligen Aufnahmekorbes (4) befindet, und das andere (29) sich in eine Bohrung (26a) schiebt, die in einer der genannten Trägerstangen (26) des zweiten rotierenden Elementes (21) angeordnet ist.

7. Vorrichtung zum Reinigen von Metall- und Nichtmetallteilen nach Patentanspruch 5, **dadurch gekennzeichnet**, dass der Boden des genannten Aufnahmekorbes (4) einen hervorstehenden Rand aufweist, der mit Sitzen (31) zur Aufnahme der genannten Arme (21a) des zweiten rotierenden Elementes (21) versehen ist.

8. Vorrichtung zum Reinigen von Metall- und Nichtmetallteilen nach Patentanspruch 5, **dadurch gekennzeichnet**, dass jeder der genannten Aufnahmekörbe (4a) mit einer Anzahl von Rippen (38) versehen ist, deren Innenräume dazu geeignet sind, das Mischen der zu waschenden Teile zu begünstigen.

9. Vorrichtung zum Reinigen von Metall- und Nichtmetallteilen nach Patentanspruch 1, **dadurch gekennzeichnet**, dass die zweite Öffnung (10) koaxial zu der Achse (9) des Behälters (1) ausgerichtet ist, und **dadurch**, dass dieser mit zwei austauschbaren Flanschen zum Verschliessen der genannten Öffnung versehen ist, von denen einer zum Tragen der Nabe (7) des rotierenden Elementes (2) koaxial zu der Achse des Behälters (1) dient und der

andere geeignet ist, die genannte Nabe (7) exzentrisch in einer nach oben verlaufenden Richtung im Verhältnis zu der Achse (9) des Behälters (1) zu tragen.

10. Vorrichtung zum Reinigen von Metall- und Nichtmetallteilen nach Patentanspruch 1, dadurch gekennzeichnet, dass die genannte Öffnung (10) des Behälters (1) exzentrisch in einer nach oben verlaufenden Richtung im Verhältnis zu der Achse (9) des Behälters (1) angeordnet ist, wobei die genannte Achse innerhalb des Querschnitts der genannten Öffnung (10) enthalten ist, und dadurch, dass zwei austauschbare Flanschen zum Verschliessen der genannten Öffnung (10) vorhanden sind, von denen einer dazu geeignet ist, die Nabe (7) des Rotors (2) koaxial zu der genannten Öffnung zu tragen, und der andere geeignet ist, die genannte Nabe (7) koaxial zu der Achse (9) des Behälters (1) zu tragen.

Revendications

1. Machine pour laver des pièces métalliques et non-métalliques telles que des petits objets et des composants mécaniques comprenant un récipient de lavage (1) à l'intérieur duquel un élément en rotation ou rotor (2) est en mesure de tourner autour d'un axe horizontal (8), ledit rotor étant pourvu d'au moins une tige ou un pivot (3) monté parallèle à l'axe de rotation (8) dudit récipient et relié en porte-à-faux à celui-ci, destiné à supporter un panier contenant les pièces à laver ; ledit récipient de lavage (1) ayant au moins une ouverture à l'avant qui peut être temporairement fermée de manière étanche, pour charger et décharger les paniers (4, 4a) et une deuxième ouverture (10) à l'arrière qui peut être fermée d'une façon permanente et étanche par une bride supportant le moyeu du rotor, caractérisée en ce que le récipient de lavage (1) est sensiblement cylindrique et que la deuxième ouverture (10) est coaxiale ou excentrique avec déplacement vers le haut, par rapport à l'axe (9) du récipient (1) de telle sorte qu'elle contient toujours ledit axe dans sa coupe et est fermée par au moins une bride (6) supportant le moyeu (7) du rotor (2) de manière coaxiale ou excentrique par rapport à l'axe de ladite bride (6), ladite bride pouvant être fixée au récipient (1) suivant deux positions possibles de manière à avoir le moyeu (7) du rotor (2) dans l'axe (9) du récipient (1) ou excentrique avec déplacement vers le haut, par rapport audit axe.

2. Machine pour laver des pièces métalliques et non-métalliques selon la revendication 1, caractérisée en ce que ladite ouverture (10) qui peut être fermée d'une façon permanente et étanche par la bride (6) supportant le moyeu (7) du rotor est excentrique avec déplacement vers le haut, par rapport à l'axe (9) du récipient de lavage (1) et en ce que ladite bride (6) est pourvue d'un trou (11) pour le passage du moyeu

(7) du rotor qui est excentrique par rapport à l'axe de ladite bride (6) d'une quantité correspondant à l'excentricité de ladite ouverture (10) par rapport à l'axe (9) du récipient (1) ; ladite bride (6) étant destinée à être fixée au récipient (1) suivant deux positions permanentes, dans l'une desquelles le moyeu (7) ou élément de support du rotor (2) est excentrique par rapport à l'axe (9) du récipient (1), alors que dans la seconde position ledit moyeu (7) est coaxial avec l'axe (9) du récipient (1).

3. Machine pour laver des pièces métalliques et non-métalliques selon la revendication 1, caractérisée en ce que chaque tige (3) portée par l'élément en rotation (2) supporte un bâti oscillant librement autour de ladite tige et pourvu de guidages de support (16) du panier (4, 4a).

4. Machine pour laver des pièces métalliques et non-métalliques selon la revendication 3, utilisant des paniers (4) à tiroir, mobiles à la rotation et par coulissement par rapport à l'élément en rotation (2) sans modifier leur position par rapport au récipient de lavage (1), caractérisée en ce que chaque panier (4) est pourvu d'une structure (18) d'engagement avec ledit bâti oscillant (15) et comprenant, sur ses deux côtés (4), des moyens de coulissement (17) destinés à s'engager avec les guidages (16) prévus sur le bâti (15) et des moyens de verrouillage (25) destinés à s'emboîter dans au moins un logement présenté par l'un au moins desdits guidages (16) quand le panier (4) est associé au bâti (15).

5. Machine pour laver des pièces métalliques et non-métalliques selon la revendication 3, utilisant de préférence des paniers (4a) cylindriques et bouchés, mobiles autour dudit élément en rotation (2) de manière à varier leur rotation par rapport audit récipient de lavage (1), caractérisée en ce que, relativement à chaque bâti oscillant (15), elle comporte une structure support du panier (4a) comprenant un deuxième bâti (19) pourvu de moyens de coulissement susceptibles de s'engager avec les guidages du bâti oscillant (15) et avec les moyens de verrouillage (25) destinés à s'emboîter au moins dans un logement présenté par l'un au moins desdits guidages (16) quand le deuxième bâti (19) est associé au bâti oscillant (15) ; et un élément de support (20) d'un deuxième élément en rotation (21) pourvu de bras (21a) parallèles à la tige (3) portée par le premier élément en rotation (2) et espacés l'un de l'autre de manière angulaire pour qu'ils puissent contenir un panier (4a) entre eux ; ledit deuxième élément en rotation (21) étant pourvu d'une structure dentée ou formée d'échelons (24) s'engrenant avec un rochet (23) claveté de manière fixe sur la tige (3) portée par le premier élément en rotation (2).

6. Machine pour laver des pièces métalliques et non-métalliques selon la revendication 3, caractérisée en ce que chacun desdits paniers (4a) est bouché au devant par un couvercle (27) pourvu d'au moins un

élément de fermeture (28, 29) mobile élastiquement le long de directions diamétralement opposées ; l'un desdits éléments de fermeture (28) s'engageant dans un trou (39a) situé sur le rebord circonférentiel de renforcement (30) du panier respectif (4) et l'autre (29) s'engageant dans un trou (26a) situé dans l'une desdites tiges de support (26) du deuxième élément en rotation (21). 5

7. Machine pour laver des pièces métalliques et non-métalliques selon la revendication 5, caractérisée en ce que le fond dudit panier (4) a un rebord saillant pourvu de logements (11) destinés à recevoir lesdits bras (21a) du deuxième élément en rotation (21). 10

8. Machine pour laver des pièces métalliques et non-métalliques selon la revendication 5, caractérisée en ce que chacun desdits paniers (4a) est pourvu à son intérieur d'une pluralité de nervures (38), destinées à augmenter le remuage des pièces à laver. 15

9. Machine pour laver des pièces métalliques et non-métalliques selon la revendication 1, caractérisée en ce que la deuxième ouverture (10) est coaxiale avec l'axe (9) du récipient (1) et en ce qu'elle est pourvue de deux brides interchangeables de fermeture de ladite ouverture, dont l'une est destinée à supporter le moyeu (7) de l'élément en rotation (2) de manière coaxiale avec l'axe du récipient (1) et l'autre est destinée à supporter ledit moyeu (7) de manière excentrique avec déplacement vers le haut, par rapport à l'axe (9) du récipient (1). 20 25 30

10. Machine pour laver des pièces métalliques et non-métalliques selon la revendication 1, caractérisée en ce que ladite deuxième ouverture (10) du récipient (1) est excentrique avec déplacement vers le haut, par rapport à l'axe (9) du récipient (1), ledit axe étant contenu dans la coupe de ladite ouverture (10), et en ce qu'elle est pourvue de deux brides interchangeables de fermeture de ladite ouverture (10), dont l'une est destinée à supporter le moyeu (7) du rotor (2) de manière coaxiale avec ladite ouverture et l'autre est destinée à supporter ledit moyeu (7) de manière coaxiale avec l'axe (9) du récipient (1). 35 40

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FIG 4

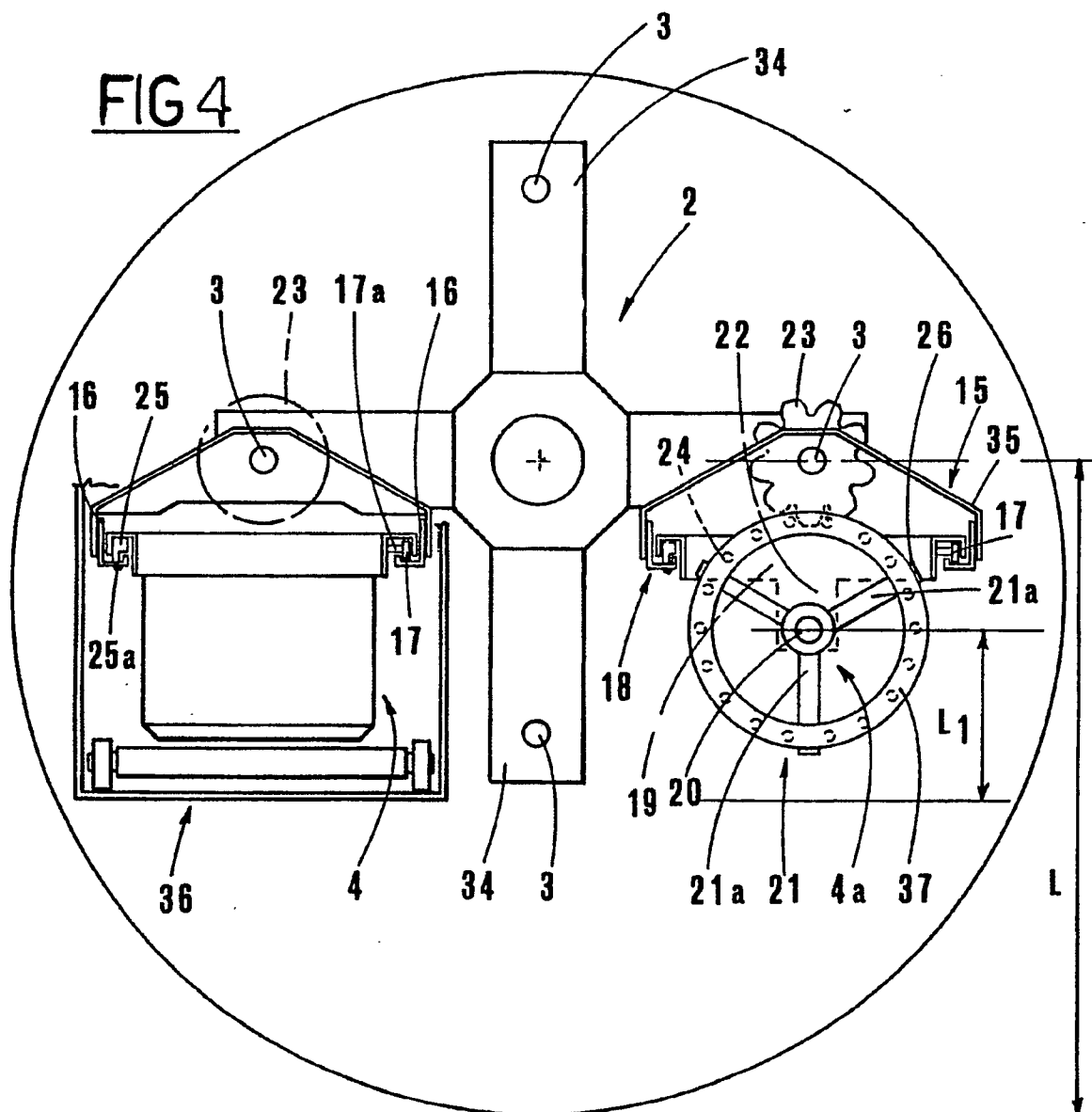


FIG1

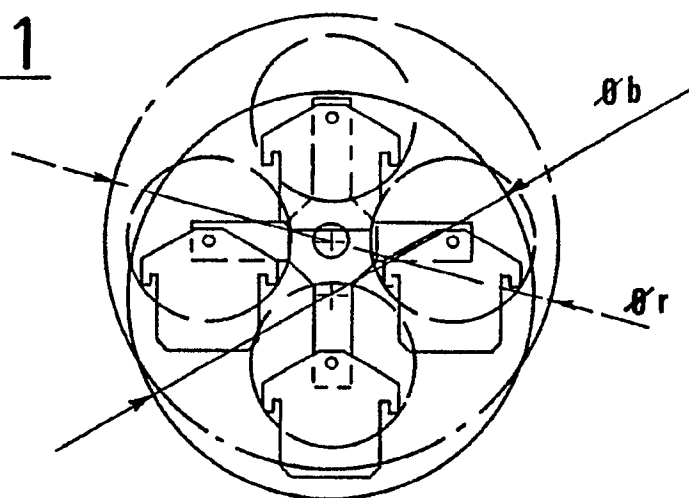


FIG 2

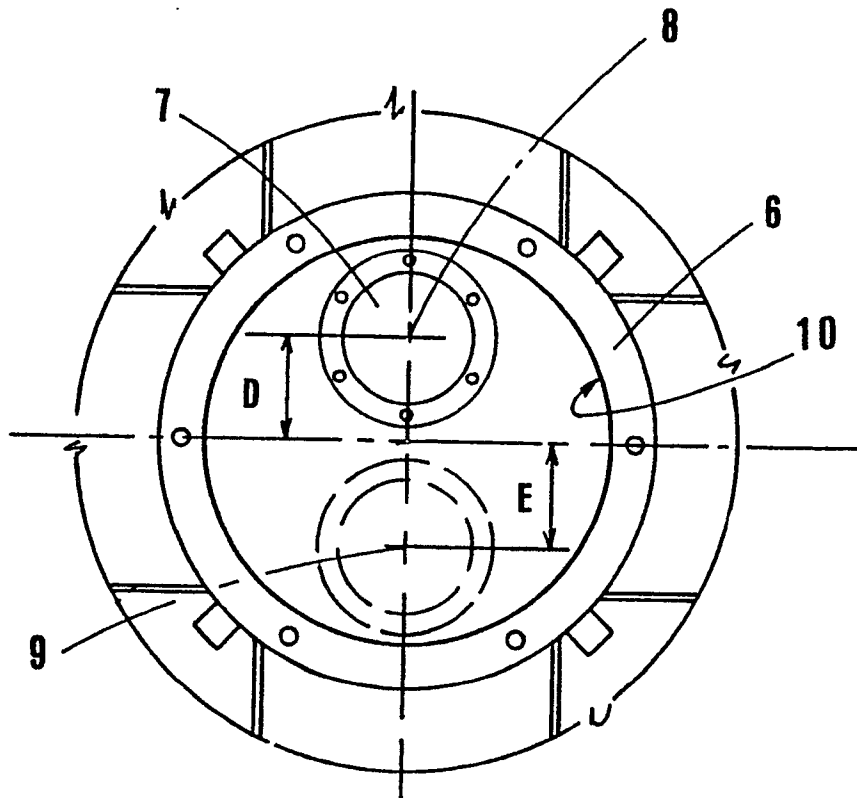
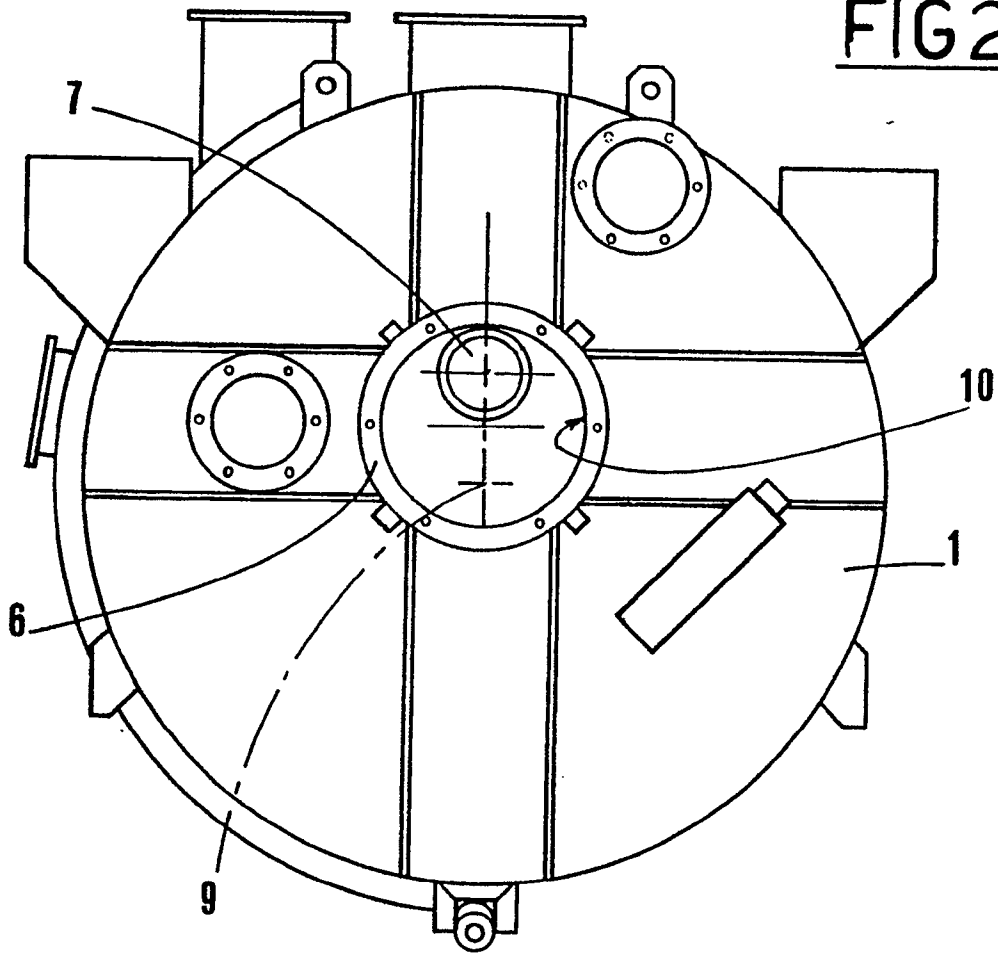


FIG3

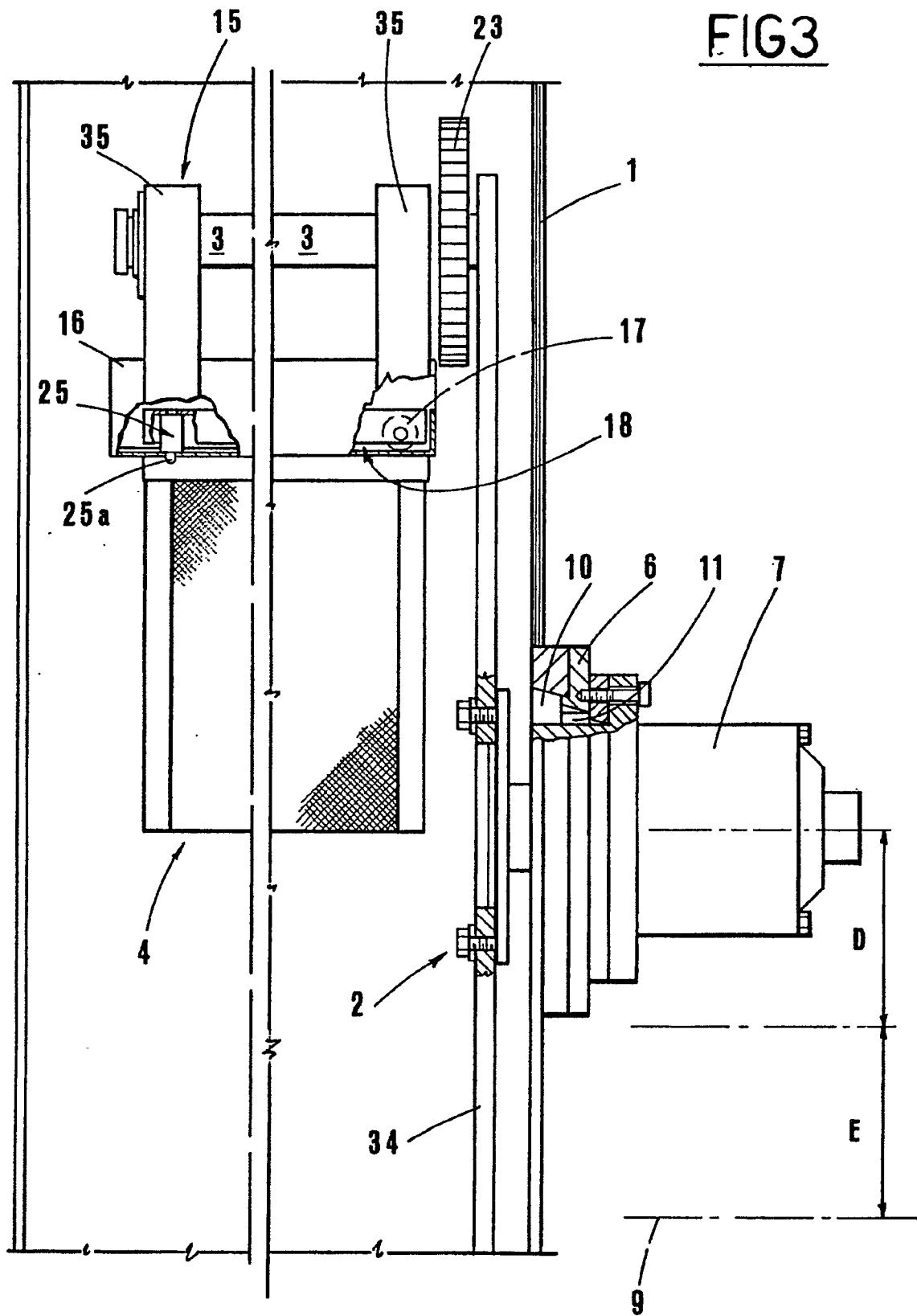


FIG 5

