(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 213 385**
B1

(12) # EUROPEAN PATENT SPECIFICATION

(45) Date of publication of patent specification: **20.12.89**

(51) Int. Cl.[4]: **D 06 F 39/02,** D 06 F 39/08

(21) Application number: **86110320.8**

(22) Date of filing: **25.07.86**

(54) **Laundry washing machine of the top-loading type.**

(30) Priority: **29.07.85 IT 4573085**

(43) Date of publication of application:
11.03.87 Bulletin 87/11

(45) Publication of the grant of the patent:
20.12.89 Bulletin 89/51

(84) Designated Contracting States:
AT BE CH DE FR GB IT LI LU NL SE

(56) References cited:
EP-A-0 083 532
DE-A-2 115 341
DE-A-2 134 689
FR-A-2 503 744

(73) Proprietor: **INDUSTRIE ZANUSSI S.p.A.**
Via Giardini Cattaneo 3
I-33170 Pordenone (IT)

(72) Inventor: **Regazzo, Olindo**
Via Gasparinetti 5
I-31100 Treviso (IT)

(74) Representative: **Patentanwälte Grünecker, Kinkeldey, Stockmair & Partner**
Maximilianstrasse 58
D-8000 München 22 (DE)

EP 0 213 385 B1

Courier Press, Leamington Spa, England.

Description

The present invention relates to a laundry washing machine of the top-loading type as set forth in the preamble of claim 1. A laundry washing machine of this type is known from EP—A—0 083 532.

Laundry washing machines of the top-loading type are generally provided with a detergent and additives distributor supported in an upper portion of the machine and having a lid which is separate from the cover plate of the machine as a whole. This solution appears technically disadvantageous and uneconomical in that it requires a great number of separate parts and a corresponding number of operations for its assembly. In addition, this type of laundry washing machines being by its nature of a very compact construction, particularly in the case of models of reduced height and width, the available space therein is thus very restricted, in comparison to which a conventional detergent distributor is undesirably bulky.

Known from FR—A—2,455,113 is a laundry washing machine provided with a composite cover formed of an inner cover plate provided with receptacles for containing detergents, and an outer cover plate. The cover as a whole is hinged on the housing of the machine, while the outer cover plate is hinged on the inner cover plate. The withdrawal of the detergents from the receptacles of the inner cover plate is accomplished by means of a ring of water produced by the rotation of the drum containing the laundry. Part of this water enters the receptacles through suitable openings in the inner cover plate and is discharged towards the drum and the tub through a siphon formed in each receptacle.

This solution has serious shortcomings in that the selective withdrawal of detergents from the individual receptacles requires the employ of a program control unit which has to accurately determine the timing, the speed and the sense of rotation of the drum for producing a ring of water of the proper configuration whenever needed during each phase of the washing cycle. This means that the drum has to be rotated also during the water and detergent supply phases for producing the required ring of water. This again requires an overdimensioned electric motor with the resultant increase in energy consumption. The water ring system finally does not ensure complete withdrawal of the detergents, which may result in the receptacles and their outlets becoming clogged by residual detergents, particularly when granular detergents are used.

In another known solution described in aforementioned EP—A—0083532, the detergent distributor comprises two universal receptacles removably mounted immediately below a closure cover of the machine, from which the withdrawal of the detergents is accomplished by means of tangential water jets with respect to the circular sidewalls of the receptacles. In addition the detergent distributor comprises two further receptacles fixedly mounted in the housing and supplied with water by a further jet, respectively, and by a flow of water resulting from the confluence of the two jets provided for the circular receptacles adjacent the cover. It is evident that this solution, which may be referred to as a "mixed system" including receptacles associated with the cover and receptacles associated with the housing, is a rather bulky and complicated structure to which is added the difficulty of controlling, individually and in combination, the various water jets for accomplishing the selective withdrawal of the detergents. This solution, finally, is questionable from the technical, economical and ecological viewpoints by reason of the absence or the insufficiency of means for limiting losses of water and detergents and for preventing the escape of vapours.

It is therefore an object of the invention to provide a laundry washing machine of the top-loading type provided with a working table top comprising a detergents and additives distributor; this distributor should have the smallest possible dimensions, ensure the highest possible efficiency with regard to the withdrawal of the substances contained in the individual receptacles, and should satisfy the highest requirements with regard to the recovery of detergents, the control of water losses and the condensation of vapours.

This is achieved through the features as defined in the characterizing part of claim 1.

The characteristics of the invention will become more clearly evident from the following description, given by way of example with reference to the accompanying drawings, wherein:

Fig. 1 shows a perspective view of a laundry washing machine according to the invention,

Figs. 2 and 3 show a sectional top plan view respectively and a sectional lateral view of a detail of the machine of Fig. 1, and

Fig. 4 shows a diagrammatic longitudinal section of a modified embodiment of the invention.

As shown in Fig. 1, a laundry washing machine of the top-loading type according to the invention comprises a housing 11 provided with a laundry loading opening 12 formed in the top wall of the housing and adapted to be closed by a cover 13 hinged to the working table top. Provided at the interior wall surface of cover 13 and preferably integrally connected thereto is a container-distributor 14 for liquid and/or granular detergents and additives comprising a plurality of compartments 15. The laundry washing machine is in the usual manner provided with a drum 16 mounted for rotation about a horizontal axis within a tub 17, the latter being connected to the working table top by a bellows-type sealing sleeve 18 peripherally surrounding a loading opening 19 of tub 17 (Fig. 2).

At the rear of the working table top there is provided a chamber 20 containing a water supply nozzle 21 having a pipe socket 22 for connection to the water supply of the machine (Fig. 3). Nozzle 21 is mounted for pivotal movement about a

horizontal axis under the control of a program control unit (not shown) of the machine, and is provided with an internal seal 41 for maintaining constant the water pressure within the nozzle.

A conduit 23 connects chamber 20 to the conventional filtering and discharge pump unit (not shown) of the machine. Conduit 23 is supplied with water from an orifice 40 connected to nozzle 21 for the purpose of recovering detergents which would otherwise be lost from the filtering and discharge pump unit. A further conduit 24 connects chamber 20 to tub 17 for the supply thereto of any water possibly escaping from the water supply system due to the presence of a free jet arrangement to be described below. Chamber 20 is finally provided with a conventional overflow passage 25.

Fixedly mounted at the rim 26 delimiting the loading opening in the working table top in front of nozzle 21 is a horizontal conduit member 27 extending through bellows-type sealing sleeve 18 and formed with a protective lip 28 and optionally with a baffle member 29. Conduit member 27 contains a number of passages 30 corresponding to the compartments 15 of container-distributor 14 (Fig. 1), each passage 30 having an enlarged inlet opening and a convergent inlet end portion for receiving the water jet produced by nozzle 21 with the highest possible hydraulic efficiency. The free jet arrangement between nozzle 21 and passages 30 of conduit member 27 serves as a supply circuit separator as demanded by safety regulations for the water supply of laundry washing machines.

In the closed position of cover 13 as shown in Figs. 2 and 3, the outlet openings of passages 30 are directly aligned and in contact with the inlet openings of corresponding passages 31 for directing the water to respective compartments 15 of detergent distributor 14.

Passages 31 each have an inlet end portion 32 extending in an ascending direction (Fig. 2) and being of divergent configuration (Fig. 3) adapted to produce a venturi effect for converting the flow velocity of the water to hydraulic pressure and for ensuring the correct water supply to compartments 15 of distributor 14. In addition, passages 31 are effective to recover vapours produced during the laundering operation and to direct them into chamber 20, in which they are condensed for return to tub 17 through conduit 24.

The invention may be modified within the range of the described structural and functional characteristics. In a modified embodiment shown in Fig. 4, for instance, nozzle 21 is mounted for pivotal movement about a vertical axis and provided at its top with an adjustment screw 35 for the adjustment of the mechanical play in the vertical direction, said adjustment screw being accessible after removing a cover plate 36 releasably secured to the working table top. On the other hand, compartments 15 are each provided with a hinged hopper 37 for facilitating the introduction thereinto of detergents, and a microsiphon 38 for the discharge of water, but not of viscous liquid detergents, into the tub therebelow.

The invention thus provides for improved utilization of the available internal space of a laundry washing machine and permits the replenishment of detergents and additives with the cover in its open position directly above the loading opening of the tub while reliably complying with all safety regulations.

Claims

1. Top-loading laundry washing machine comprising a rotatable drum (16) mounted within a tub (17) having a loading opening (12) connected, by a sealing sleeve (18), to a correspondent loading opening (19) formed in the top wall of the machine housing (11) and adapted to be closed by a cover (13), hinged to the back side of said top wall and movable between two different positions, namely a first raised position and a second closing position in which the cover (13) is disposed horizontally and the upper surface thereof forms a working table top with the upper surface of said top wall, said cover (13) being provided in its lower surface with a distributor (14) for detergents and additives, including a plurality of compartments (15) each provided with passages (31, 32) for the supply of water, characterized in that said top wall is provided at its lower surface with a fixed chamber (20), containing water supply means (21), said water supply means (21) being connected to conduit means (23, 24, 25) for the recovery of detergents and the reduction of water losses, a conduit member (27) being mounted in said chamber (20) to extend through said sealing sleeve (18) for directing the water towards the correspondent passages (31, 32) of the compartments (15) of said detergent distributor (14), when said cover (13) is moved in its second closing position, said sealing sleeve (18) being of bellows-type configuration.

2. A washing machine according to claim 1, characterized in that said conduit member (27) comprises a plurality of passages (30) each having an enlarged inlet opening and at least an inlet end portion of convergent cross-section.

3. A washing machine according to claim 1, characterized in that said passages (31, 32) have an inlet end portion (32) communicating with the outlet end portion of a corresponding passage (30) of said conduit member (27) and extending in an ascending direction with a divergent configuration so as to form a venturi-type passage in cooperation with said conduit member passage (30).

4. A washing machine according to claim 3, characterized in that the zone of communication between the outlet openings of said passages (30) of said conduit member (27) and the inlet openings of said passages (31, 32) is located below an upper sealing lip (28) which may be integrally connected to said bellows-type sealing sleeve (18).

5. A washing machine according to claim 3,

characterized in that each compartment (15) of said detergent distributor (14) is provided with a hopper (37) hinged to the opening of the respective compartment (15).

6. A washing machine according to claim 1, characterized in that said water supply means comprise a rotatable nozzle (21) for selectively supplying water to said passages (30) of said conduit member (27), said nozzle (21) being provided with an auxiliary orifice (40) for supplying water to said detergent recovery conduit (23).

Patentansprüche

1. Waschmaschine der von oben zu beschickenden Art, enthaltend eine drehbare Trommel (16), die in einem Bottich (17) gelagert ist, der eine Beschickungsöffnung (12) aufweist, die über eine Dichtungsmanschette (18) mit einer zugehörigen Beschickungsöffnung (18) verbunden ist, die in der oberen Wand des Maschinengehäuses (11) ausgebildet und dazu eingerichtet ist, von einem Deckel (13) verschlossen zu werden, der an der Rückseite der genannten oberen Wand angelenkt ist und zwischen zwei verschiedenen Stellungen beweglich ist, nämlich einer ersten, angehobenen Stellung und einer zweiten, schließenden Stellung, in der der Deckel (13) horizontal angeordnet ist und seine Oberseite eine Arbeitsdeckplatte mit der Oberseite der genannten oberen Wand bildet, welcher Deckel (13) an seiner Unterseite mit einem Spender (14) für Maschmittel und Waschzusätze versehen ist, enthaltend mehrere Abteile (15), die jeweils mit Kanälen (31, 32) für die Zuführung von Wasser versehen sind, dadurch gekennzeichnet, daß die genannte obere Wand an ihrer Unterseite mit einer festen Kammer (20) versehen ist, die eine Wasserzuführeinrichtung (21) enthält, die mit Leitungseinrichtungen (23, 24, 25) für das Auffangen von Waschmitteln und die Verminderung von Wasserverlusten verbunden ist, wobei ein Leitungselement (27) in der genannten Kammer (20) so montiert ist, daß es sich durch die Dichtungsmanschette (18) erstreckt, um das Wasser gegen die entsprechenden Kanäle (31, 32) der Abteile (15) des Waschmittelspenders (14) zu richten, wenn der Deckel (13) in seine zweite, schließende Stellung bewegt ist, wobei die Dichtungsmanschette (18) eine balgenartige Gestalt hat.

2. Waschmaschine nach Anspruch 1, dadurch gekennzeichnet, daß das genannte Leitungselement (17) mehrere Kanäle (30) enthält, die jeweils eine vergrößerte Einlaßöffnung und wenigstens einen Einlaßendabschnitt von konvergierendem Querschnitt aufweisen.

3. Waschmaschine nach Anspruch 1, dadurch gekennzeichnet, daß die genannten Kanäle (31, 32) einen Einlaßendabschnitt (32) aufweisen, der mit dem Auslaßendabschnitt eines zugehörigen Kanals (30) des genannten Leitungselementes (27) in Verbindung steht und sich in aufsteigender Richtung mit divergenter Gestalt erstreckt, um einen venturiartigen Kanal zusammen mit dem genannten Leitungselementkanal (30) zu bilden.

4. Waschmaschine nach Anspruch 3, dadurch gekennzeichnet, daß die Verbindungszone zwischen den Auslaßöffnungen der genannten Kanäle (30) des Leitungselementes (27) und den Einlaßöffnungen der genannten Kanäle (31, 32) unter einer oberen Dichtungslippe (28) liegt, die integral mit der balgenartigen Dichtungsmanschette (18) verbunden sein kann.

5. Waschmaschine nach Anspruch 3, dadurch gekennzeichnet, daß jedes Abteil (15) des Waschmittelspenders (14) mit einem Trichter (37) versehen ist, der an der öffnung des entsprechenden Abteils (15) angelenkt ist.

6. Waschmaschine nach Anspruch 1, dadurch gekennzeichnet, daß die Wasserzuführeinrichtung eine drehbare Düse (21) enthält, um selektiv Wasser den Kanälen (30) des Leitungselementes (27) zuzuführen, welche Düse (21) mit einer Hilfsöffnung (40) versehen ist, um der genannten Waschmittelauffangleitung (23) Wasser zuzuführen.

Revendications

1. Machine à laver le linge à chargement par le haut, comprenant un tambour rotatif (16) monté à l'intérieur d'une cuve (17) ayant une ouverture de chargement (12) raccordée par un manchon d'étanchéité (18) à l'ouverture de chargement correspondant (19) formée dans la paroi supérieure du carter de la machine (11) et adaptée pour être fermée par un couvercle (13) articulé à l'arrière de cette paroi supérieure et mobile entre deux positions différentes, à savoir: une première position soulevée et une deuxième position rabattue, dans laquelle le couvercle (13) est disposé horizontalement et la surface supérieure du couvercle forme un plateau de travail avec la surface supérieure de cette paroi supérieure, le couvercle (13) comportant dans sa surface inférieure un distributeur (14) pour des détergents et des additifs, comportant une multiplicité de compartiments (15) dont chacun comporte des passages (31, 32) pour l'alimentation en eau, caractérisée en ce que la paroi supérieure est équipée sur sa surface inférieure d'une chambre fixe (20), contenant des moyens d'alimentation en eau (21), ces moyens d'alimentation en eau (21) étant raccordés à des moyens de conduits (23, 24, 25) pour la récupération des détergents et la réduction des pertes d'eau, un élément de conduit (27) étant monté dans la chambre (20) et s'étendant à travers le manchon d'étanchéité (18) pour diriger l'eau en direction des passages correspondants (31, 32) des compartiments (15) du distributeur de détergents (14), lorsque le couvercle (13) est rabattu dans sa deuxième position de fermeture, de manchon d'étanchéité (18) ayant la forme d'un soufflet.

2. Machine à laver selon la revendication 1, caractérisée en ce que l'élément de conduit (27) comprend une multiplicité de passages (20) ayant chacun une ouverture d'entrée agrandie et au moins une portion terminale d'entrée de section transversale convergente.

3. Machine à laver selon la revendication 1, caractérisée en ce que les passages (31, 32) ont une portion terminale d'entrée (32) communiquant avec la portion terminale de sortie d'un passage correspondant (30) de l'élément de conduit (27) et s'étendant vers le haut avec une configuration divergente de façon à former un passage de type venturi en coopération avec le passage (30) de l'élément de conduit.

4. Machine à laver selon la revendication 3, caractérisée en ce que la zone de communication entre les ouvertures de sortie des passages (30) de l'élément de conduit (27) et les ouvertures d'entrée des passages (31, 32) est située en-dessous d'une lèvre d'étanchéité supérieure (28) qui peut être solidaire du manchon d'étanchéité à soufflet (18).

5. Machine à laver selon la revendication 3, caractérisée en ce que chaque compartiment (15) du distributeur de détergents (14) comporte une trémie (37) articulée à l'ouverture du compartiment correspondant (15).

6. Machine à laver selon la revendication 1, caractérisée en ce que les moyens d'alimentation en eau comportent un ajutage tournant (21) pour fournir sélectivement de l'eau aux passages (30) de l'élément de conduit (27), cet ajutage (21) comportant un orifice auxiliaire (40) pour amener de l'eau au conduit de récupération des détergents (23).

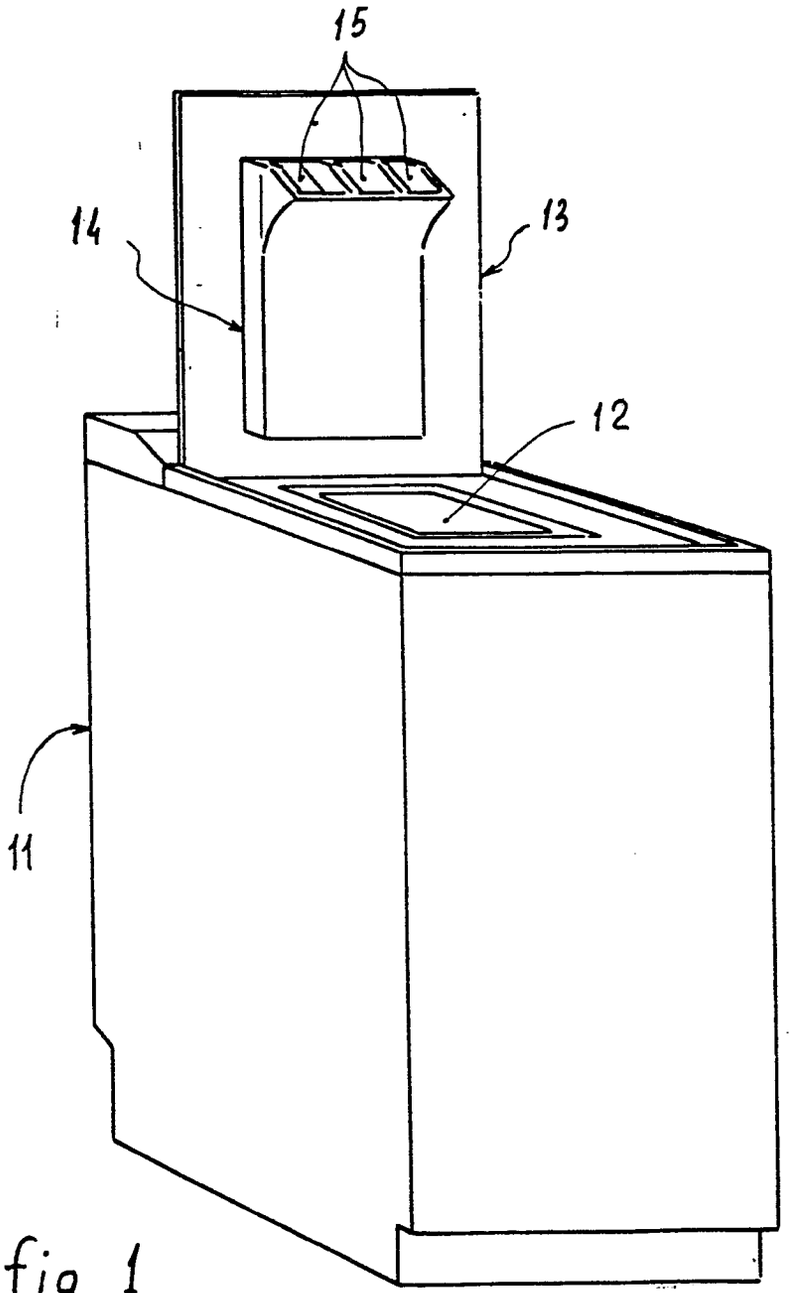

fig 1

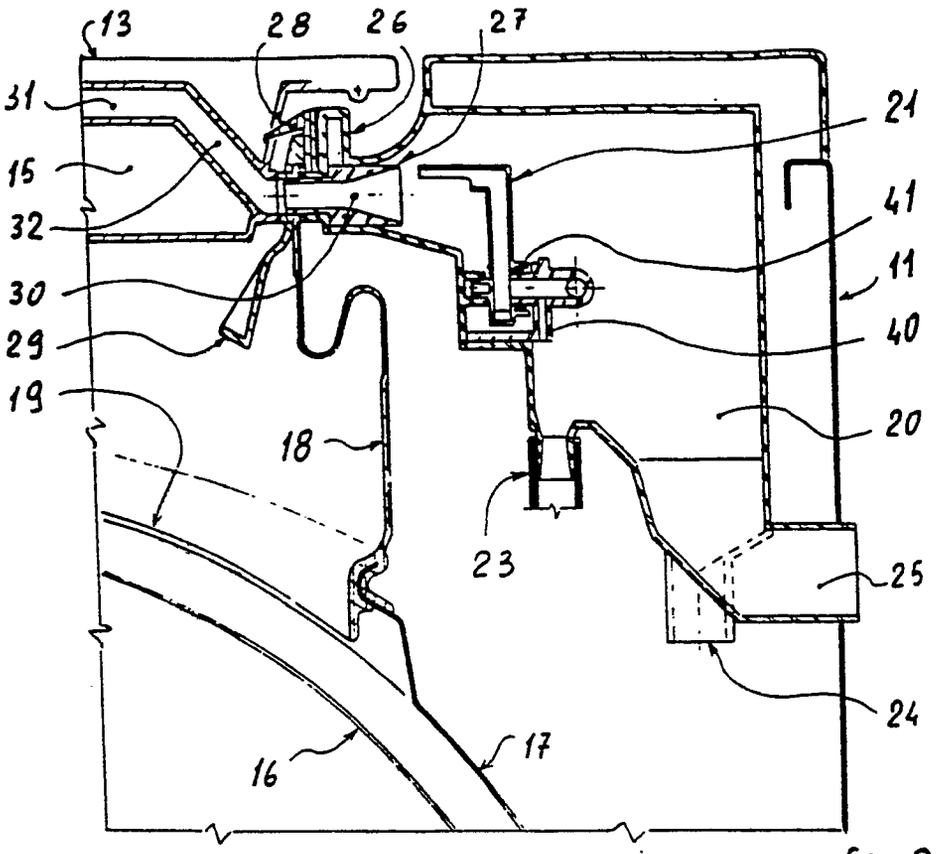
13
28
26
27
31
21
15
41
32
11
30
40
29
20
19
18
23
25
24
16
17

Fig.2

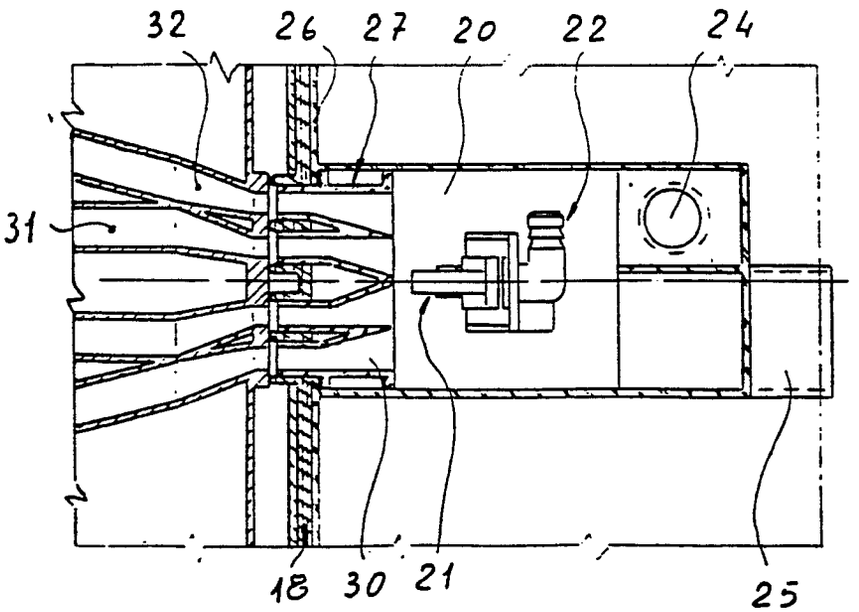
32
26
27
20
22
24
31
18
30
21
25

Fig.3

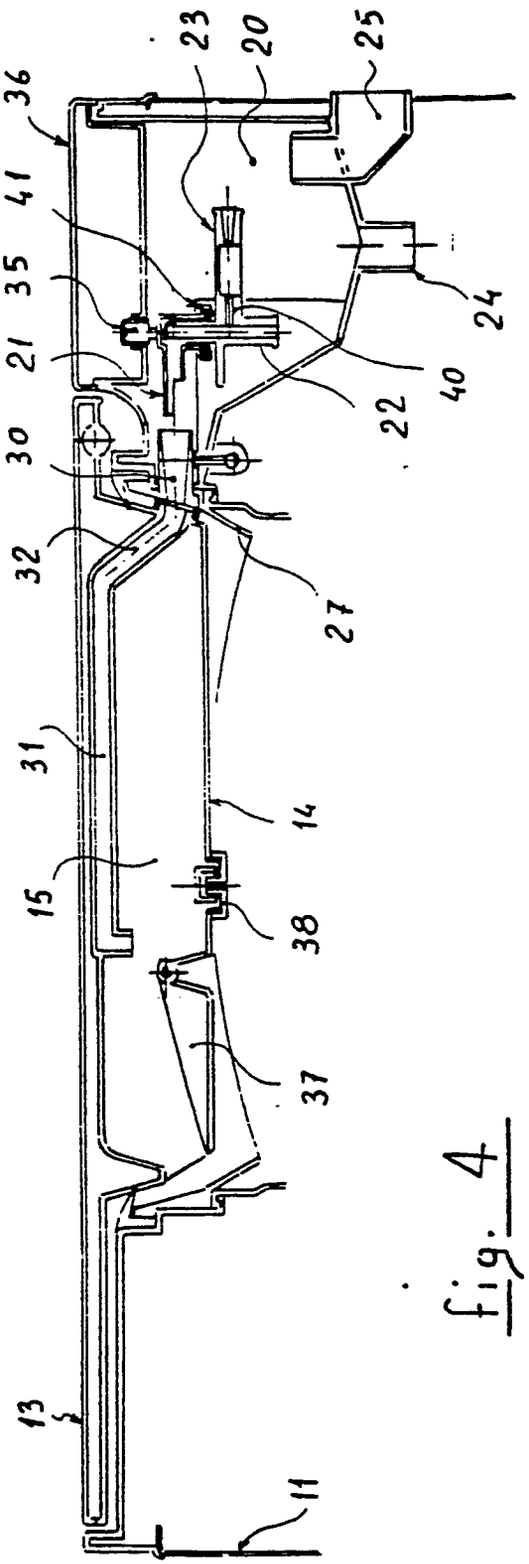

fig. 4