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(54) TANK FOR FLUIDS FOR USE IN URBAN CLEANSING VEHICLES

FLÜSSIGKEITSBEHÄLTER ZUR VERWENDUNG IN MÜLLTONNEN-WASCHFAHRZEUGEN

CITERNES POUR LIQUIDES, UTILISABLES DANS DES VEHICULES D'ASSAINISSEMENT URBAIN

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a tank for fluids and, in particular, to a tank for fluids mounted on vehicles equipped to wash out the dustbins used for urban waste disposal.

2. Disclosure of the correlated art

[0002] Currently, the vehicles used for this purpose are made up of trucks of various sizes, fitted with specific equipment consisting of:

a washing system;
a washing chamber within which the dustbin is washed;
equipment for moving the dustbin, that is to say for picking up the dustbin from the ground and introducing it into the washing chamber, and for returning it to the ground once the washing process has been completed; and
a tank containing, in separate areas, the clean water and the waste water resulting from the washing operation.
Said tank is therefore divided into two parts having an equal volume, as the maximum amount of waste water resulting from the dustbin washing operations that it can hold is equal, in volume, to the amount of clean water provided.

[0003] As a result of this, for example at the start of washing operations, when the clean water tank is full, the tank holding the waste water is empty; and vice versa at the end of the washing cycle.

[0004] Given that the tank is installed on a vehicle, it is necessary to maintain the centre of gravity of said tank unchanged, as otherwise the stability of the vehicle itself would be compromised, especially when moving.

[0005] As an example, FR-A-1.136.294 discloses a cleaning device mounted on a truck for the cleaning of urban dustbins. Such device comprises a first tank which has a second tank inside thereof and smaller than the former. The second tank is positioned in the upper side of the first tank and contains clean water whilst the first one is apted to receive the waste water. The position of one tank respect to the other guarantees an almost fixed centre of gravity to the truck. Anyway, a problem arises when the truck moves due to the presence of empty spaces inside both tanks, which results in uncontrolled movements of the liquid masses during the motion, causing variations in the centre of gravity and giving rise to anomalous pressure on the walls of the tank and, consequently, on the vehicle, thus jeopardising its stability.

[0006] In other embodiments, to guarantee a fixed centre of gravity, one of the two internal tanks is made of two hydraulically connected compartments positioned symmetrically with respect to the other tank.

[0007] In this way the tank, which is made up of three compartments with rigid walls and separators having a fixed configuration, must have an overall capacity equivalent to twice the operational volume, that is to say the volume of water that can be used for washing operations.

[0008] At any time during the washing operations, the total volume occupied by the water (clean + waste) is equivalent to 50% of the total capacity of the tank, while the remaining half of the tank is empty (passive volume).

[0009] In order to attempt to solve this problem, breakwater walls have been installed inside the compartments, which obviously reduce the problem, but do not eliminate it.

[0010] Another embodiment of a two fluids container in a sole tank is disclosed in DE-U-87 16 514.7. This document discloses a water tank for vehicles such caravans, travel trailers, etc. which has a dividing flexible wall inside thereof. The embodiment is such to allow the containing of waste water in the same tank in the meanwhile clean water flows out without contacting the clean water with the waste water.

[0011] This embodiment combines the advantageous solution of keeping the same volume for both the clean and the waste water and eliminating at the same time the empty spaces due to the consumption of clean water.

SUMMARY OF THE INVENTION

[0012] The object of the present invention is therefore to provide a tank for fluids for urban hygiene vehicles, in particular suitable for use on dustbin washing vehicles, which, while having the same overall capacity and therefore external working dimensions, has an operational volume double to that of traditional tanks, thus also doubling the performance of said tank.

[0013] A further object of the present invention is to provide a tank that is capable of guaranteeing an unchanging centre of gravity during the whole washing cycle, including those stages during which the vehicle is in movement, and

thus in no way compromising the stability of the vehicle.

[0014] A further object is to provide a tank that is equally strong and reliable, simple to use and requiring a minimum amount of maintenance without causing problems in its use.

[0015] According to the present invention, a tank is provided that is characterised by the fact that it can contain, simultaneously, in a single volume and in a separate manner, both the amount of clean water required for the dustbin washing operations and the amount of waste water resulting from said washing operations, in such a way that at all times and during the whole operating process:

Volume of water + Volume of waste water = constant

with reciprocal and simultaneous compensation of the volumes of clean and waste water.

[0016] The present invention will be illustrated in greater detail by description of a preferred embodiment thereof, given as a non-limiting example, with reference to the enclosed drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017]

figure 1 is a plan illustrating the principle of operation of the tank according to the present invention;
figure 2 is a perspective view of the form taken by the separator element inside the tank according to the present invention;
figures 3a and 3b are side views, in cross section, of the form taken by the separator element in the two conditions of maximum load of the tank according to the present invention, of clean water and waste water, respectively;
figure 4 is a perspective view of a pair of separator elements and of a wall supporting said elements according to an alternative embodiment of the present invention;
figures 5a and 5b are two side views, in cross section, of the forms taken by the element in conditions of maximum clean water load and of maximum waste water load, according to an alternative embodiment of the invention;
figure 6 is a side view in cross section of a further embodiment of the separator element and tank, according to the present invention;
figure 7 is a side view in cross section of a further embodiment of the separator element and tank, according to the present invention;
figures 8a and 8b are two side views, in cross section, representing the forms taken by the separator elements inside a tank, in the conditions of maximum clean water load and of maximum waste water load, according to a further embodiment; and
figure 9 is a chart illustrating the operating principle of a tank for dustbin washing vehicles according to the prior art.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0018] With reference to figure 9, a clear illustration is given of how the volumes of clean and waste water distribute themselves during all the stages of the washing process in a tank according to the prior art, in which the overall volume (V) is divided into three volumes, by means of two compartments, in such a way that the central volume is equal to the sum of the two side volumes, and is therefore equal to half of the overall volume (V), that is to say equal to (V:2).

[0019] Said side volumes are hydraulically in communication with each other, so as to distribute the fluid they contain inn an equal manner.

[0020] In the example illustrated in the figure, the central volume is occupied by the clean water, indicated with (Va), and when it is totally occupied, it is indicated as (Va.max). In a similar manner the volume occupied by the waste water, indicated with (Vb), when it occupies the whole of the side volume is indicated as (Vb.max).

[0021] In this way, each decrease in the volume of liquid in Va corresponds to an equivalent increase in the volume of liquid in Vb. This continues until the washing process has been completed, when Va = 0 and Vb is equal to Vb.max.

[0022] This allows the position of the centre of gravity to be kept approximately constant, in order not to influence the stability of the vehicle, at least while the latter is stopped. The problem arises, however, when the vehicle is in movement, as the presence of empty spaces in Va and Vb (during the intermediate stages of the washing process) causes uncontrolled movement of the fluid masses, resulting in anomalous thrustes on the vehicle, decreasing its stability when in movement.

[0023] With reference now to figure 1, the operating principle of the tank according to the invention is shown, during the various stages. It is evident that, according to the invention, while the overall volume (V) of the tank remains the same, the operational volume containing the fluids, that is to say the maximum volume that can be used, indicated with

(Va.max) for the clean water and (Vb.max) for the waste water, is double to the operational volume in tanks according to the prior art, because it is equal to (V).

[0024] Insertion of a separator element made up of a deformable membrane, indicated with (S), enables the sum of the volumes occupied by the clean and waste water, that is to say (Va) and (Vb), to remain constant at all times during the washing process, that is to say:

$$(Va) + (Vb) = \text{constant} = (V)$$

[0025] Firstly, this allows the two fluids, clean and waste water, to occupy the same operational volume without coming into contact with each other; secondly, it enables the two fluids to occupy the maximum available volume, thus optimising performance of the tank; finally, by doing this, there is a total elimination of the formation of empty spaces during the process, due to emptying of one part and filling of the other, thus avoiding the above mentioned problems of stability of the vehicle when in motion, due to the uncontrolled movement of the fluid masses.

[0026] With reference now to figure 2, the form taken by the deformable separator element when it is installed inside the tank according to the invention. This form is given by the tank in which it is installed, which, for preference, has the shape of a parallelogram, as this is the shape that gives the largest amount of useful space within equivalent external dimensions, when installed on the vehicle; the dashed line represents the walls of the tank in reference.

[0027] With reference to figures 3a and 3b, these show the configuration of the separator element (S) and its arrangement inside the tank, indicated with (T), according to a preferred embodiment of the invention.

[0028] The tank (T) has an overall nominal capacity of volume (V), which is equal to the operational volume (Va.max) increased by the volume required for installation of additional components, which will be described in the following.

[0029] Said tank has at the top, on one side, a port 1 for the input of clean water and, on the opposite side, a port 2 for the input of waste water resulting from washing operations. In a similar way, at the bottom it has a port 3 for extraction of the clean water and, on the opposite side, a port 4 for extraction of the waste water.

[0030] In correspondence with one of the side walls and of the bottom wall of the tank are respective perforated counterwalls 5 and 6, fixed at a distance from said walls, to prevent the membrane of the separator element (S) from obstructing the fluid input and extraction ports when at maximum extension.

[0031] The bottom wall and the related perforated counterwall 6 are fixed in an inclined position to encourage spontaneous flow of the water; the side counterwall 5 likewise has the object of immediately directing downwards any particulate and sludge that may have escaped the external filter system.

[0032] The separator element (S) is made up of flexible and impermeable material, in such a way that it can take on a variety of configurations, shapes and positions during the simultaneous operations of emptying and filling the tank; the material must also be capable of resisting the aggressive components present in the waste water.

[0033] The element has the shape of a semi-parallelogram divided by a plane passing along the diagonal of two opposite sides and containing the diagonals joining the corner of one side of a surface to the opposite corner of the opposite surface; two of the four free edges of the element (only one of which is shown in the figure as a dashed line) are connected to the side of the tank in correspondence with the diagonals of two opposite side walls, while the other two edges are fixed one to the top along the top edge of one of the other two walls and the other to the bottom along the bottom edge of the remaining opposite wall.

[0034] The size of the separator element is such that it adheres perfectly to the inner walls of the tank and/or to the support counterwalls, both in a condition of maximum clean water load, that is to say (Va.max), and in a condition of maximum waste water load, that is to say (Vb.max). In this way, during operation and also in limit conditions, the element is not subjected to mechanical traction stress by the fluids, with consequent advantages in terms of working life.

[0035] The following additional components are provided in the tank:

- a fully removable top cover wall 7 provided with inspection ports (not shown in the figure), in order to access the inside of the tank and carry out the necessary maintenance, and a fluid seal, (not shown in the figure) along the whole of the edge in contact with the walls of the tank;
- check valves and gate valves (not shown in the figures) in correspondence with the fluid input and extraction ports;
- level indicators, cleaning ports, overflow valves and assorted accessories, etc. (not shown in the figures).

[0036] In operation of the tank according to the present invention, said tank is initially empty. In this condition, the separator element is in the rest position, completely resting on the bottom counterwall 6 and adhering to the vertical side wall of the clean water input side. During filling with clean water, that is to say (Va), the water begins to raise the membrane, altering its configuration and position according to the system of intrinsic connections until, when the tank is full, that is to say in the condition (Va.max), the respective walls of the element will adhere to the top wall of the tank and to the perforated counterwall 5.

[0037] Then, during the subsequent washing stage, the clean water is extracted from the relative port 3 in a variable

amount (according to the amount of dirt); the volume left free by the outgoing clean water is occupied by the waste water, an equal amount of which is input through the port 2.

[0038] As the volume of clean water (Va) decreases and the volume of waste water (Vb) increases by a reciprocal amount, the configuration of the element will gradually change, while the sum of the two volumes (Va) and (Vb) will remain constant and equal to the overall volume (V) of the tank, so that no empty spaces are formed between the surfaces of the liquids.

[0039] Extraction of the waste water is spontaneous upon opening of the valve on the respective port 4, until the tank is returned to the starting condition ready to commence another working cycle.

[0040] With reference to figure 4, this shows another embodiment of the tank according to the invention. In this embodiment the tank has inside it two separator elements in place of the single element, as described above.

[0041] According to this embodiment, the tank has a perforated internal semiwall 8, which is rigidly fixed, to act as a support on which to fix the intermediate edge of the two separator elements (S') and (S"), respectively.

[0042] With reference now to figures 5a and 5b, these show a third embodiment of the tank according to the present invention. According to this embodiment, the separator element is connected on the vertical plane with respect to the side walls of the tank, thus taking on a different shape, while at the same time maintaining the same operating principle.

[0043] This tank has at the top, arranged in a manner similar to that seen in the tank of the first embodiment, the waste and clean water input ports 9 and 10, respectively. The fluid extraction ports are arranged on the bottom of the tank, 11 being the waste water port and 12 the clean water port. Thus the perforated counterwall 13 on the bottom of the tank takes on a different position compared with that seen in the previous embodiment. In this embodiment also there is a perforated counterwall 14 on the waste water side, the function of which is the same as that of the embodiment described above.

[0044] This embodiment also comprises the components and accessories, not shown in the figures, that form part of the preceding embodiment.

[0045] With reference now to figure 6, this shows a fourth embodiment of the tank according to the present invention. The arrangement of the input and extraction ports is identical to that of the first embodiment. Inside the tank there are two elements S' and S" in the shape of a tube with one end closed, connected to the tank T at the intersection of respective vertical planes with the walls of the tank, symmetrically and in such a way as to give a contact surface common to both. Two perforated support counterwalls 15 and 16 are fixed in correspondence with each port side of the tank, respectively, with a function similar to that of the counterwalls in the embodiments described above.

[0046] In this embodiment also there are the same accessories found in the other embodiments.

[0047] With reference to figure 7, this shows a further embodiment of the tank according to the invention, which uses the same operating principle as the tank according to the embodiment of figure 6, although with a rigid wall 17, not connected to the container but to the pair of elements S' and S", having the job of a divider between the two volumes of clean and waste water, respectively, in place of the two contacting walls of the embodiment of figure 6.

[0048] With reference now to figures 8a and 8b, a further embodiment of the tank according to the invention is shown. This is formed internally by two dividing elements (S') and (S"), respectively, with the same operating principles summarised in figure 3. The arrangement is such that the two elements face each other, in a symmetrical manner, being in contact on perforated counterwalls 18 and 19 according to whether there is a maximum load of clean water, that is to say (Va.max) or a maximum load of waste water, that is to say (Vb.max), respectively.

[0049] The input and extraction ports for the respective fluids are advantageously arranged in a vertical direction, that is to say with loading and emptying of clean water at the top and bottom of the tank, and horizontally at the top for loading of waste water, and vertically at the side and at the bottom for emptying thereof.

[0050] With reference now to figure 9, this shows a chart summarising the operating principle of the tank for washing dustbins according to the prior art.

[0051] According to the present invention, application of the operating principle is not limited by the size of the tank proposed, which can vary to adapt to the shape and maximum size allowed by the various types of truck to be equipped.

[0052] Again according to the invention, the tank carries out with advantage the operations it is required to perform, giving, for an operational volume (Va.max) equivalent to those of the state of the art, dimensions that are reduced by 50%.

[0053] Furthermore, according to the invention, the invariability of the centre of gravity is guaranteed during the whole of the washing cycle, including the times during which the vehicle is in movement.

[0054] The present invention is not limited to the embodiments described, but includes any variation thereof, included in the scope of the following claims.

Claims

1. A tank for fluids, in particular for dustbin washing vehicles, comprising:

a tank (T) apted to contain both clean water and waste water resulting from dustbin washing operations;
input means for introducing clean or waste water into the tank (T) through respective input ports (1,2);
output means for extracting the waste water or clean water contained in the tank (T) through respective output ports (3,4);
at least one flexible separator element (S) arranged inside said tank (T) for dividing the tank (T) into at least two separate volumes;
the tank (T) being characterised in that it comprises support means (5, 6) for supporting said flexible separator element (S) including at least two perforated counterwalls arranged inside said tank (T), each one of said perforated counterwalls being arranged in one of said two separate volumes.

2. A tank for fluids according to claim 1, in which said input means comprises a check valve and a gate valve connected at the respective fluid input ports (1,2).

3. A tank for fluids according to claim 1, in which said output means comprises a check valve and a gate valve connected at the respective fluid output ports (3, 4).

4. A tank for fluids according to anyone of the preceding claims, further comprising a removable wall (7) connected to the tank (T) for the access to the inside of said tank (T) for maintenance and inspection thereof.

5. A tank for fluids according to anyone of the preceding claims, wherein said tank (T) is substantially in the shape of a parallelepiped with an inclined base.

6. A tank for fluids according to anyone of the preceding claims, wherein said tank (T) is substantially in the shape of a parallelepiped with doubly inclined base.

7. A tank for fluids according to anyone of the preceding claims, in which said flexible separator element (S) is constituted of at least one membrane having the shape of a semi-parallelepiped showing an open face thereof and arranged inside said tank (T) such as to diagonally divide the tank (T) into two separate volumes (Va, Vb).

8. A tank according to anyone of the preceding claims, wherein said flexible separator element (S) is constituted of at least one membrane with the shape of a parallelepiped showing an open face thereof and connected to the tank (T) at a vertical cross section thereof.

9. A tank according to anyone of the preceding claims, in which said flexible separator element (S) is constituted of a tubular membrane (S',S") connected at its two free ends to respective support counterwalls (15,16) and having a dividing wall (17) arranged therein.

10. A tank for fluids according to anyone of the preceding claims, in which said separator element (S) is constituted of a pair of flexible tubular membranes (S',S") closed at one end thereof and connected to the tank at their opposite ends to respective support counterwalls (15, 16).

11. A tank for fluids according to claim 1, in which at least one of said perforated counterwalls (5,6,13,14,15,16,18,19) is eventually mounted in an inclined position inside said tank (T) and toward the respective output port (3,4) in order to encourage spontaneous flow of fluid to the respective output port (3,4).

Patentansprüche

1. Flüssigkeitstank, im speziellen für Mülltonnen-Waschfahrzeuge mit folgendem:

einem Tank (T), der geeignet ist, sowohl sauberes, als auch verschmutztes Wasser, das sich aus Waschvorgängen der Mülltonnen ergibt, zu enthalten;
einer Einlaßvorrichtung zum Einfüllen von sauberem oder verschmutztem Wasser in den Tank (T) durch jeweilige Einlaßanschlüsse (1,2);
einer Auslaßvorrichtung zum Ablassen des im Tank (T) enthaltenen verschmutzten oder sauberen Wassers durch jeweilige Auslaßanschlüsse (3,4);
mindestens ein innerhalb des Tanks (T) angeordnetes flexibles Trennelement (S) zum Teilen des Tanks in mindestens zwei getrennte Volumina;
wobei der Tank **dadurch gekennzeichnet ist, daß** er Stützvorrichtungen (5, 6) hat, zum Stützen des flexiblen

Trennelements (S) mit mindestens zwei innerhalb des Tanks (T) angeordneten perforierten Gegenwänden, wobei jede der perforierten Gegenwände in einem der beiden Volumina angeordnet ist.

2. Flüssigkeitstank nach Anspruch 1, wobei die Einlaßvorrichtung ein Rückschlagventil und ein Absperrventil hat, die an die jeweiligen Flüssigkeitseinlaßanschlüsse (1,2) angeschlossen sind.

3. Flüssigkeitstank nach Anspruch 1, wobei die Auslaßvorrichtung ein Rückschlagventil und ein Absperrventil hat, die an die jeweiligen Flüssigkeitsauslaßanschlüsse (3,4) angeschlossen sind.

4. Flüssigkeitstank nach einem der vorangehenden Ansprüche mit weiterhin einer mit dem Tank (T) entfernbar verbundenen Wand (7) für den Zugang zum Inneren des Tanks (T) zu dessen Wartung und Inspektion.

5. Flüssigkeitstank nach einem der vorangehenden Ansprüche, wobei der Tank (T) im wesentlichen die Gestalt eines Parallelepipeds mit geneigter Grundfläche hat.

6. Flüssigkeitstank nach einem der vorangehenden Ansprüche, wobei der Tank (7) im wesentlichen die Gestalt eines Parallelepipeds mit doppelt geneigter Grundfläche hat.

7. Flüssigkeitstank nach einem der vorangehenden Ansprüche, in dem das flexible Trennelement (S) aus mindestens einer Membran mit der Gestalt eines halben Parallelepipeds besteht, wobei sie davon eine offene Fläche zeigt und innerhalb des Tanks so angeordnet ist, daß sie den Tank (T) diagonal in zwei getrennte Volumina (Va, Vb) teilt.

8. Tank nach einem der vorangehenden Ansprüche, wobei das flexible Trennelement (S) aus mindestens einer Membran mit der Gestalt eines Parallelepipeds besteht, wobei sie davon eine offene Fläche zeigt und mit dem Tank (T) an einem vertikalen Schnitt von ihm befestigt ist.

9. Tank nach einem der vorangehenden Ansprüche, in dem das flexible Trennelement (S) aus einer schlauchförmigen Membran (S', S") besteht, die an ihren beiden freien Enden mit jeweiligen Stützgegenwänden (15,16) verbunden ist und eine darin angeordnete Trennwand (17) hat.

10. Flüssigkeitstank nach einem der vorangehenden Ansprüche, in dem das Trennelement (S) aus einem paar von schlauchförmigen Membranen (S', S") besteht, die an einem ihrer Enden geschlossen sind und an ihren gegenüberliegenden Enden mit jeweiligen Stützgegenwänden (15, 16) mit dem Tank (T) verbunden sind.

11. Flüssigkeitstank nach Anspruch 1, in dem mindestens eine der perforierten Gegenwände (5, 6, 13, 14, 15, 16, 18, 19) schließlich in geneigter Position innerhalb des Tanks (T) und in Richtung auf den jeweiligen Auslaßanschluß (3,4) montiert ist, um selbsttätige Flüssigkeitsströmung zum jeweiligen Auslaßanschluß (3,4) zu fördern.

Revendications

1. Réservoir pour fluides, en particulier pour véhicules de lavage de poubelle, comportant :

un réservoir (T) adapté pour contenir à la fois de l'eau propre et de l'eau de rejet résultant des opérations de lavage de poubelle,
des moyens d'entrée pour introduire de l'eau propre ou de l'eau de rejet dans le réservoir (T) à travers des orifices d'entrée respectifs (1, 2),
des moyens de sortie pour extraire l'eau de rejet ou l'eau propre contenue dans le réservoir (T) à travers des orifices de sortie respectifs (3, 4),
au moins un élément séparateur souple (S) agencé à l'intérieur dudit réservoir (T) pour séparer le réservoir (T) en au moins deux volumes séparés,
le réservoir (T) étant caractérisé en ce qu'il comporte des moyens de support (5, 6) pour supporter ledit élément séparateur souple (S), comportant au moins deux contre-parois perforées agencées à l'intérieur dudit réservoir (T), chacune desdites contre-parois perforées étant agencée dans l'un desdits deux volumes séparés.

2. Réservoir pour fluides selon la revendication 1, dans lequel lesdits moyens d'entrée comportent un clapet anti-retour et un robinet-vanne relié aux orifices d'entrée de fluide respectifs (1, 2).

3. Réservoir pour fluide selon la revendication 1, dans lequel lesdits moyens de sortie comportent un clapet anti-retour et un robinet-vanne relié aux orifices de sortie de fluide respectifs (3, 4).

4. Réservoir pour fluides selon l'une quelconque des revendications précédentes, comportant de plus une paroi amovible (7) reliée au réservoir (T) pour accéder à l'intérieur dudit réservoir (T) pour son entretien et son inspection.

5. Réservoir pour fluides selon l'une quelconque des revendications précédentes, dans lequel ledit réservoir (T) a sensiblement la forme d'un parallélépipède ayant une base inclinée.

6. Réservoir pour fluides selon l'une quelconque des revendications précédentes, dans lequel ledit réservoir (T) a sensiblement la forme d'un parallélépipède ayant une base doublement inclinée.

7. Réservoir pour fluides selon l'une quelconque des revendications précédentes, dans lequel ledit élément séparateur souple (S) est constitué d'au moins une membrane ayant la forme d'un demi-parallélépipède présentant une face ouverte de celui-ci et est agencé à l'intérieur dudit réservoir (T) de manière à séparer en diagonale le réservoir (T) en deux volumes séparés (Va, Vb).

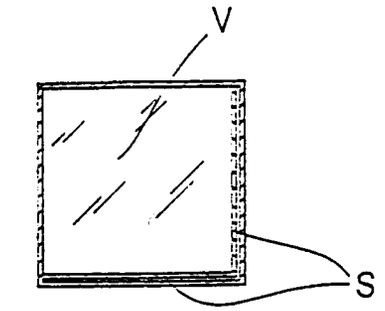
8. Réservoir selon l'une quelconque des revendications précédentes, dans lequel ledit élément séparateur souple (S) est constitué d'au moins une membrane ayant la forme d'un parallélépipède présentant une face ouverte et relié au réservoir (T) au niveau de sa section transversale verticale.

9. Réservoir selon l'une quelconque des revendications précédentes, dans lequel ledit élément séparateur souple (S) est constitué d'une membrane tubulaire (S', S") connectée à ses deux extrémités libres à des contre-parois de support respectives (15, 16) et ayant une paroi de séparation (17) agencée dans celles-ci.

10. Réservoir pour fluides selon l'une quelconque des revendications précédentes, dans lequel ledit élément séparateur (S) est constitué d'une paire de membranes tubulaires souples (S', S") fermées au niveau d'une première extrémité de celles-ci et reliées au réservoir à leurs extrémités opposées, aux contre-parois de support respectives (15, 16).

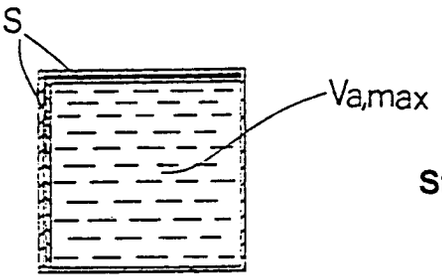
11. Réservoir pour fluides selon la revendication 1, dans lequel au moins une desdites contre-parois perforées (5, 6, 13, 14, 15, 16, 18, 19) est éventuellement montée dans une position inclinée à l'intérieur dudit réservoir (T) et en direction de l'orifice de sortie respectif (3, 4) afin de favoriser un écoulement spontané de fluide vers l'orifice de sortie respectif (3, 4).

FIG.1



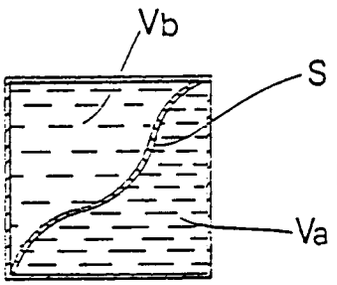
Empty Tank

V= Total Capacity



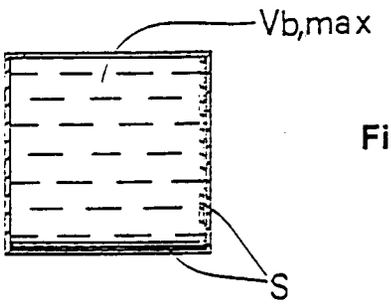
Starting Process

$$\begin{cases} Va = Va,max = V \\ Vb = 0 \end{cases}$$



Intermediate Phase

$$\begin{cases} Va,max > Va > 0 \\ 0 < Vb < Vb,\ max \\ Va + Vb = V \end{cases}$$



Final Process

$$\begin{cases} Vb = Vb,max = V \\ Va = 0 \end{cases}$$

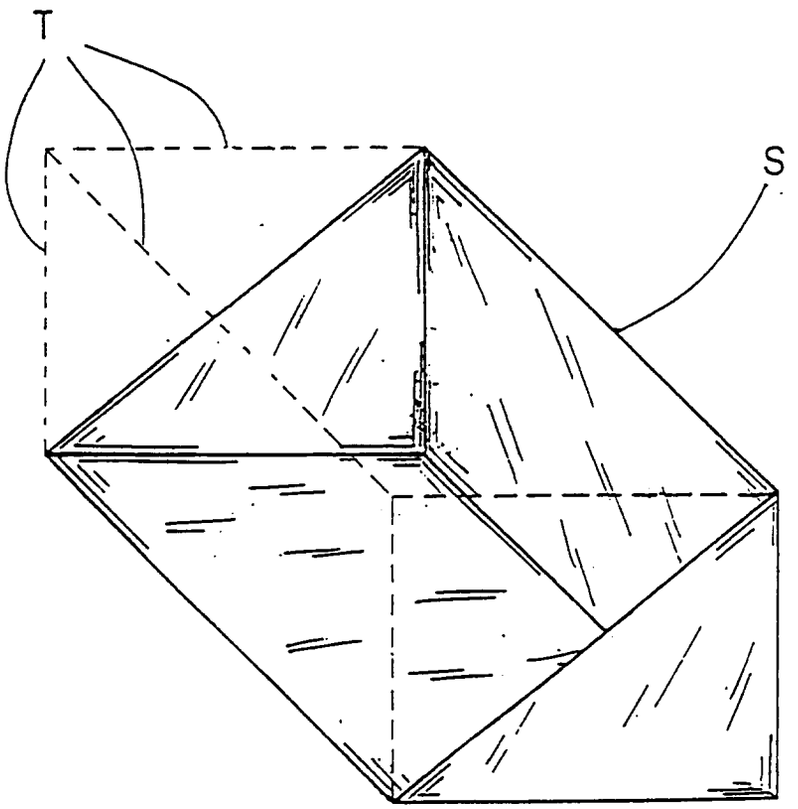


FIG.2

FIG.3A

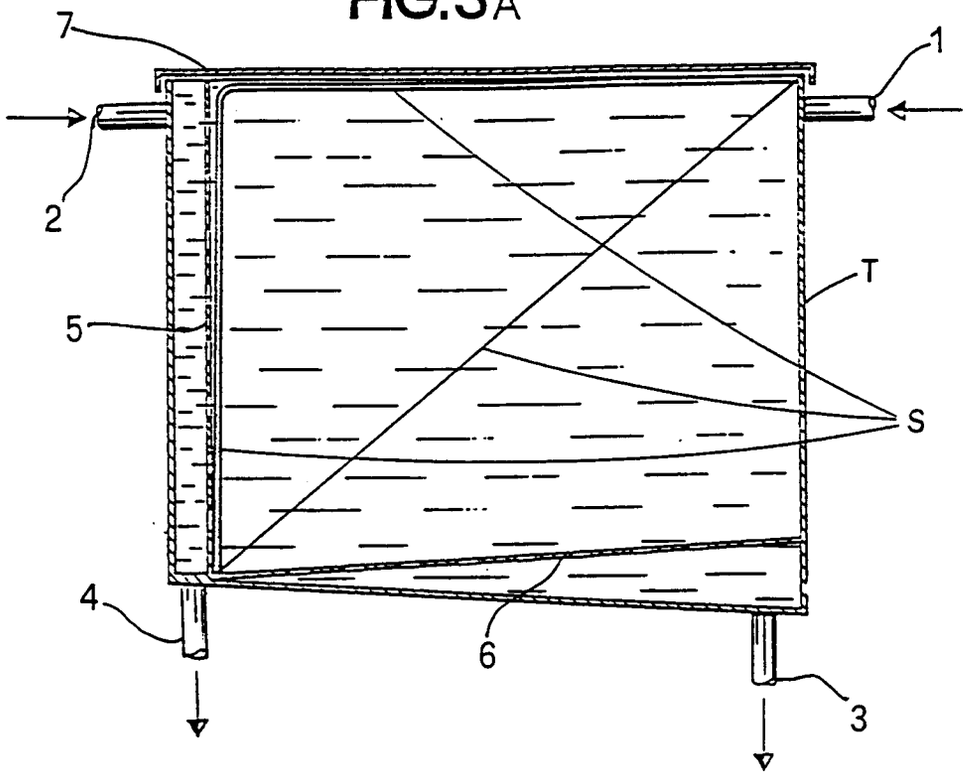
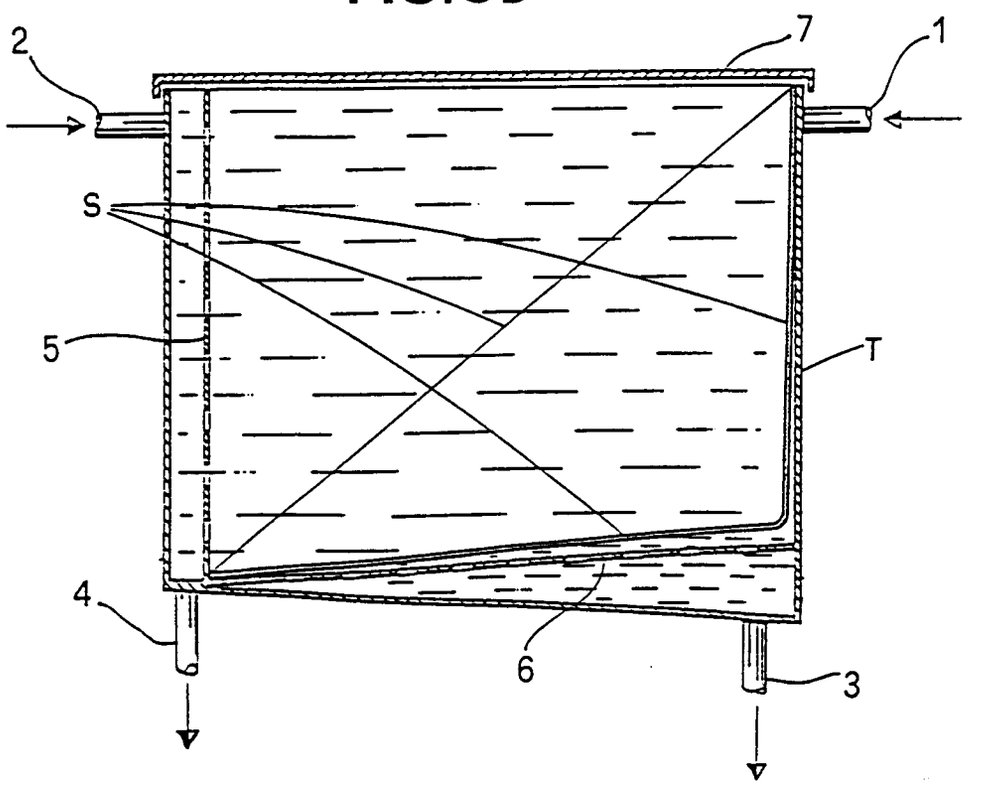


FIG.3B



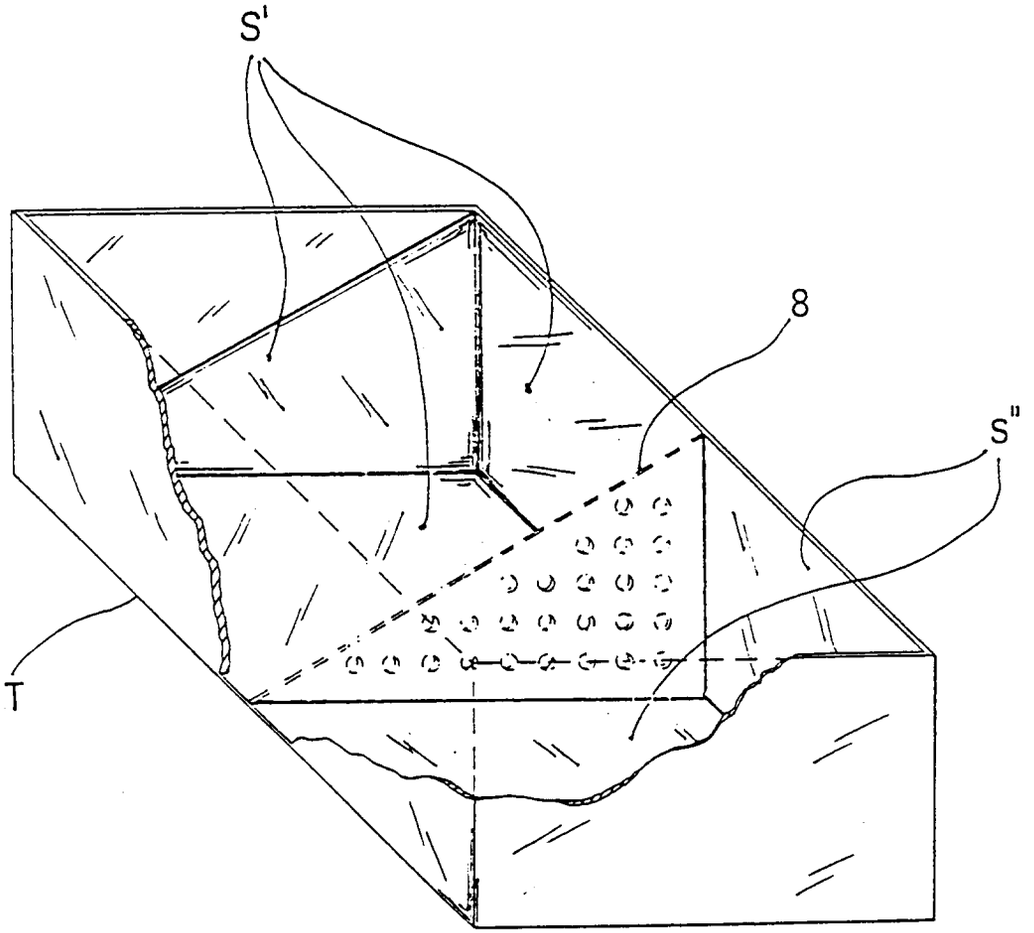


FIG. 4

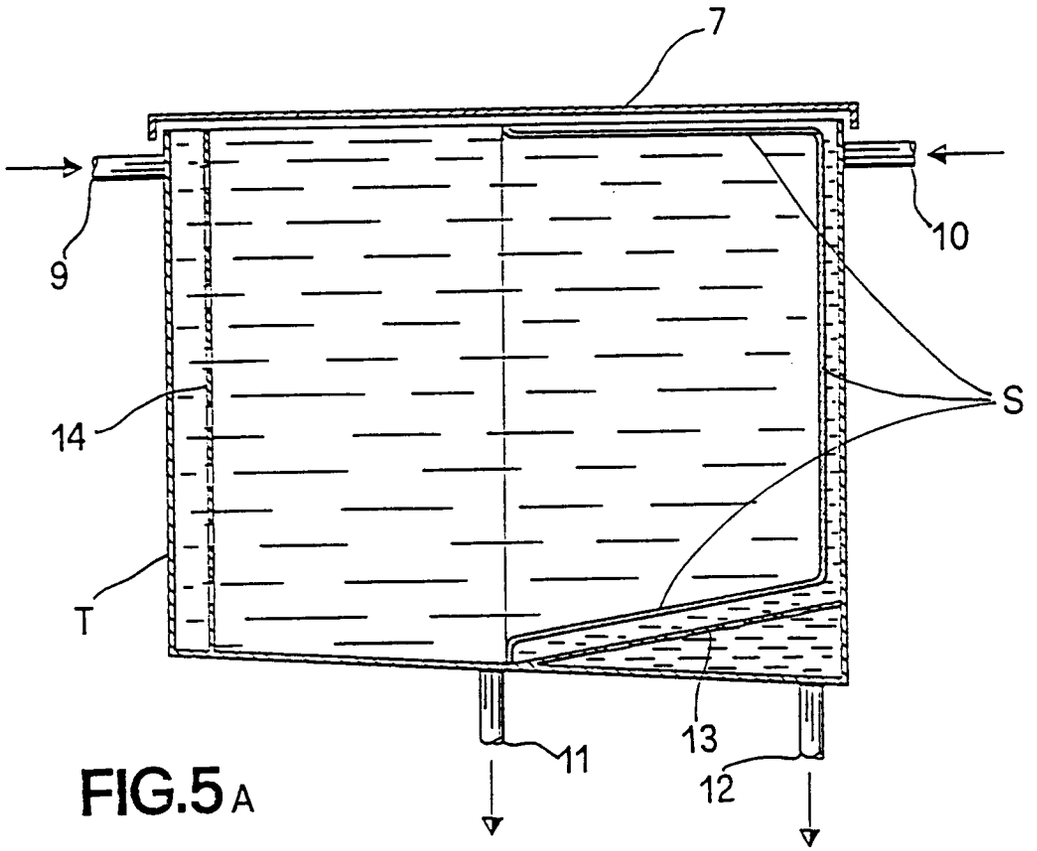


FIG.5 A

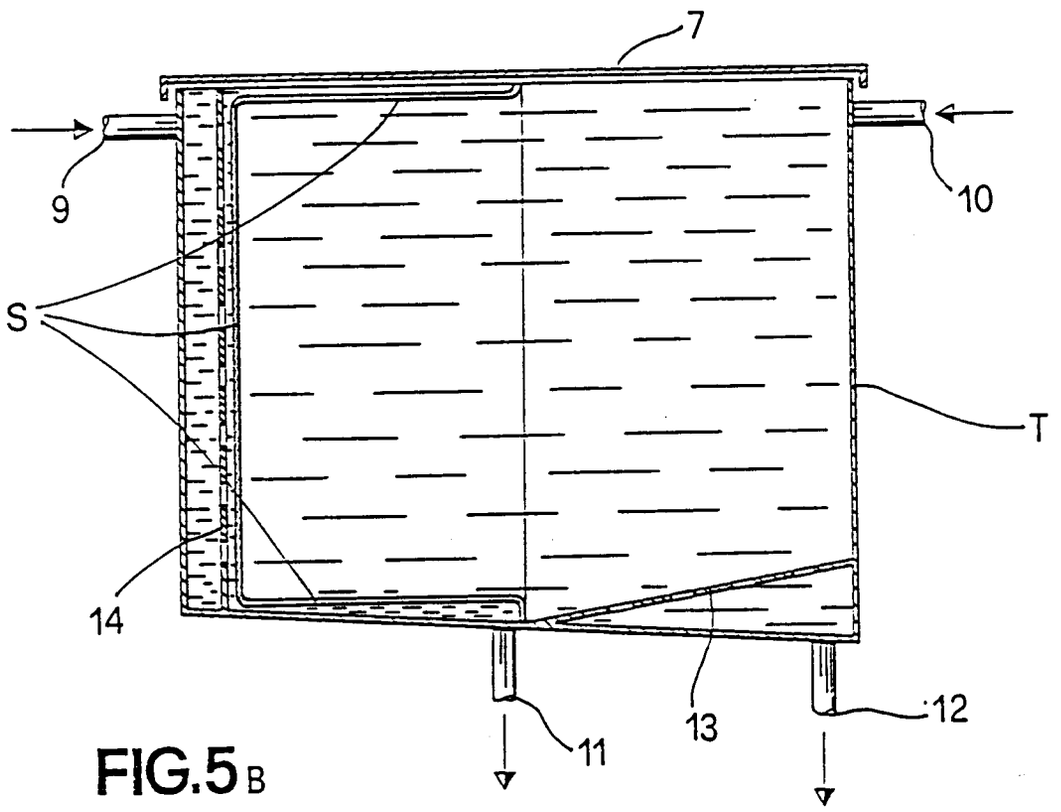


FIG.5 B

FIG.6

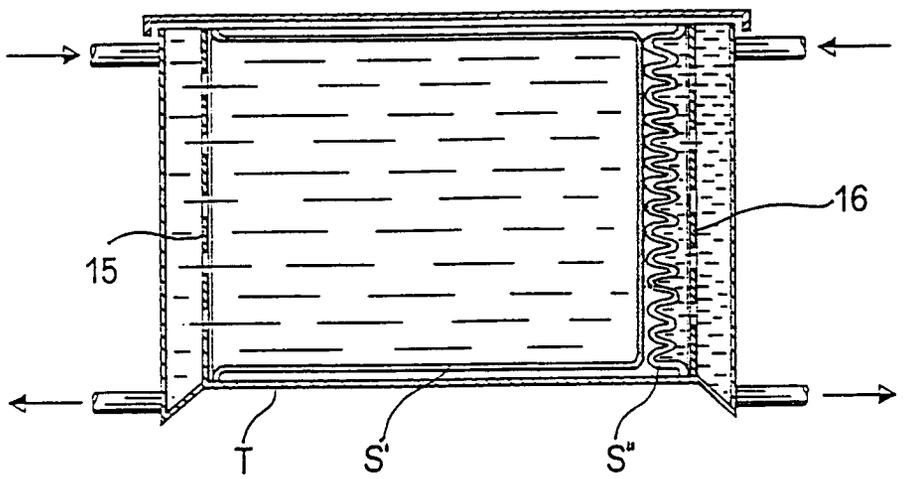


FIG.7

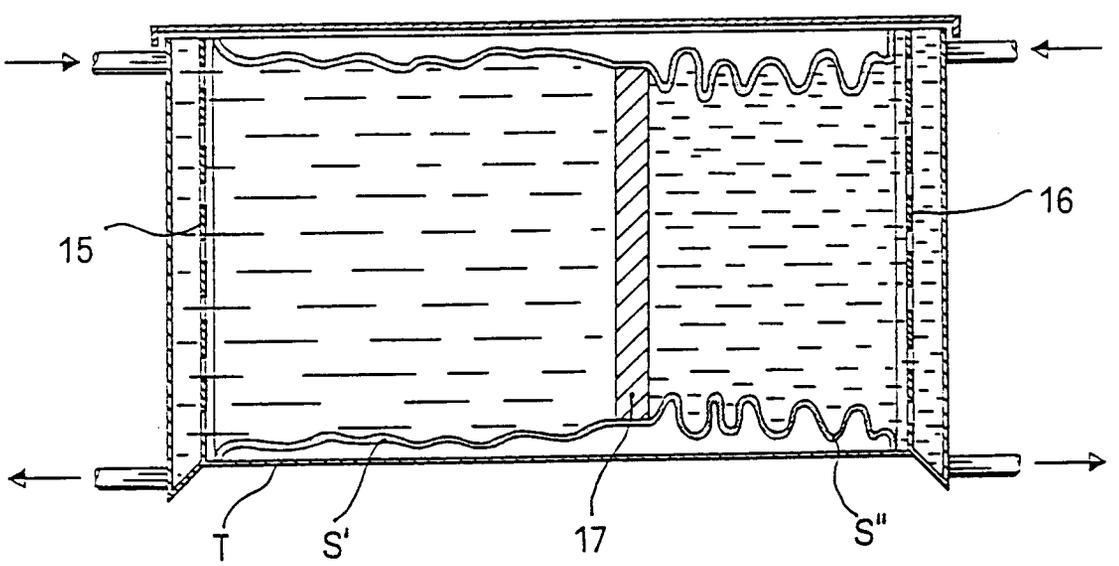


FIG.8 A

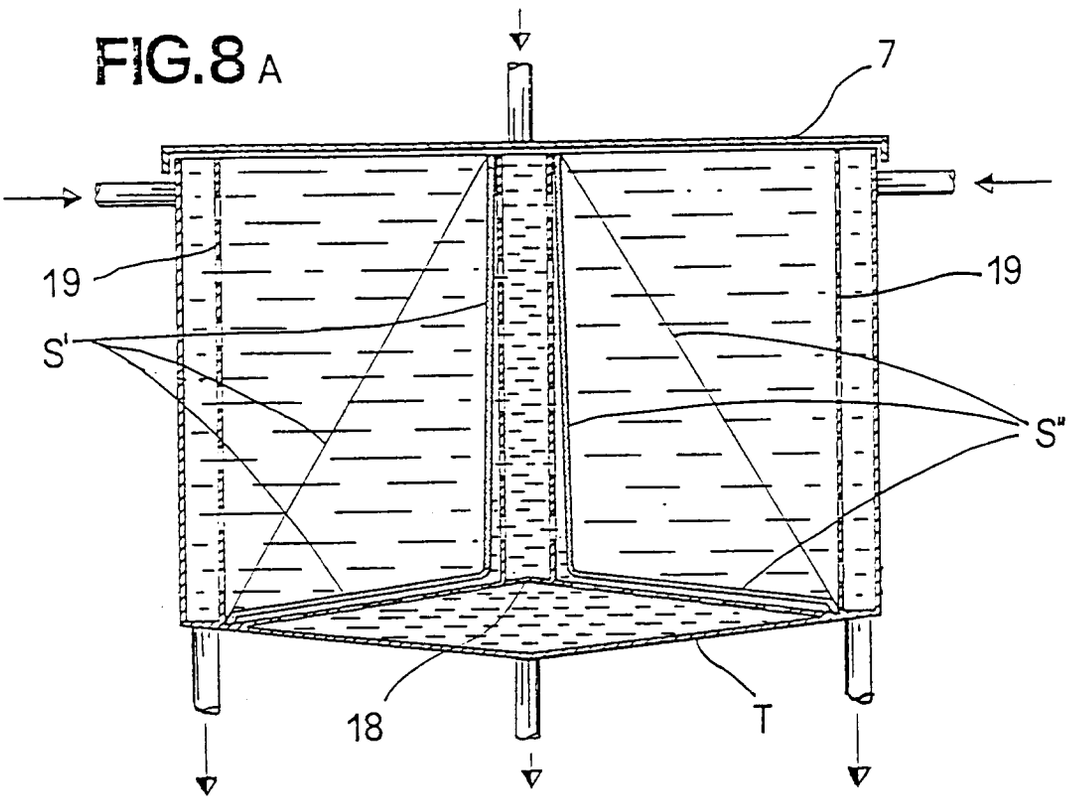


FIG.8 B

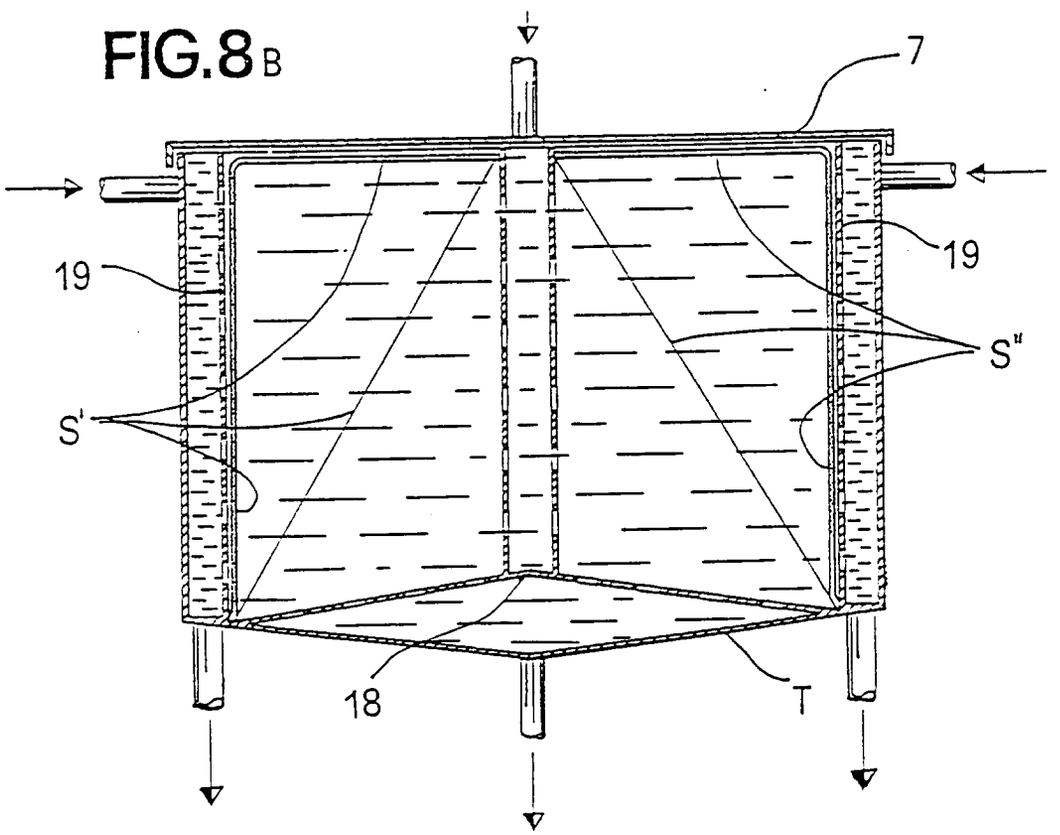
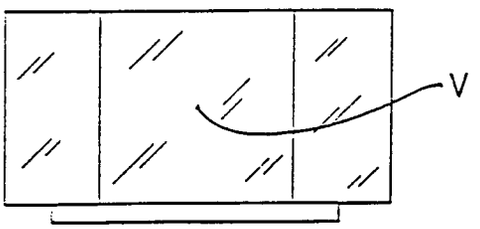
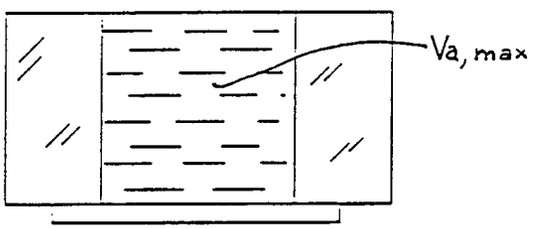


FIG.9



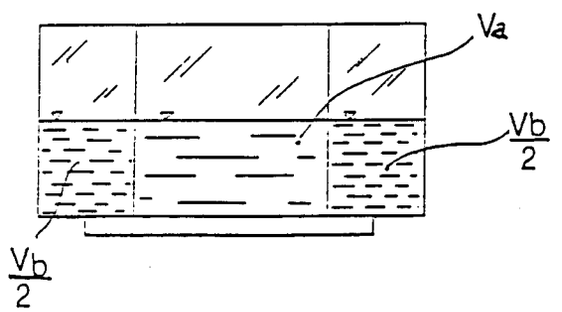
Empty Tank With Capacity "V"



Starting Process

Va = Va,max = V/2

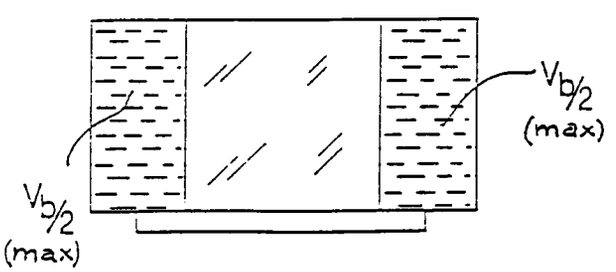
Vb = 0



Intermediate Phase

Va,max > Va > 0

0 < Vb < Vb,max



Final Process

Va = 0

Vb = Vb,max = V