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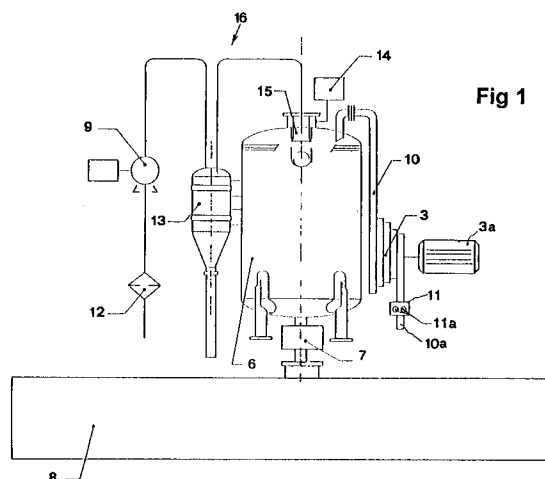
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(54) **Apparatus for sucking from small and medium water crafts and storing liquid such as bilge-waters, oily waters and other dirty liquids.**

(57) The apparatus comprises a decompression device (9) in communication with sucking means (3,10) which can be unrolled, an intermediate vessel (6) for the provisional storing of the waste liquids sucked during a single sucking phase and a final storage vessel (8) for the storage of the waste liquids sucked during a plurality of sucking phases. The sucking method comprises a first phase of payment in advance, a sucking phase of the liquids from said watercrafts into said intermediate vessel started by said payment phase and a storing phase at the end of said sucking phase.

The apparatus has a reduced encumbrance and costs and it allows the payment in advance of the sucking operations.

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The present invention relates to an apparatus for the semi-automatic sucking of oily bilge-waters and other waste liquids from small and medium watercrafts. The present invention further relates to the sucking method used by said apparatus.

It is well known that the discharge of the bilge waters and other oily waters or waste liquids from the ships is a problem that has already been overcome and every harbour is provided with means such as lighters, auto drainage apparatuses or the like, which such an important facility is provided for.

Thanks to such systems, the oily waters discharged from the ships are collected and sent to conditioning centres wherein oils are regenerated so that they can be used again, whereas the water, without any oily substances, is discharged into the sea after being purified according to the law.

However, waters trading doesn't comprise only big ships, because there are also a lot of small or medium sized boats and other watercrafts, both touristic and commercial, such as fishing-boats, yachts, small ferry-boats, patrol motorboats etc., which have the same problem of the discharge of the bilge-waters even though in a smaller way.

The present means mentioned above is sized for the needs of big ships and therefore is not suitable to be used by medium and small watercrafts, because of the high costs involved.

In fact, it is difficult to think that the shipowner or the proprietor of a fishing boat or a yacht can afford the use of big auto drainage apparatuses or a lighter for discharging just a few hundreds litres of oily liquids.

For these reasons, the users of medium and small watercrafts normally discharge their dirty bilge waters into the sea, thus infringing the severe environmental laws and above all creating serious pollution problems. In fact such behaviour, if followed by only a part of the circulating watercrafts, and although the amount of oils discharged every day in the sea by each of them is little, would cause high polluting levels able to threaten the sea's already weak environmental balance.

Therefore, the problem of extending the sucking facilities of the dirty bilge waters to pleasure boats and other small watercrafts is more and more felt.

In order to overcome these problems, a dock-side system for the collection and disposal of bilge waters and waste oils is known, as disclosed in US patent 4623452.

This system, however, is not able to solve two further problems which are in connection with the above needs.

A first problem is linked to the fact that said dockside system requires that a continuous vacuum is made in a storage vessel even when no

sucking operations have to be performed.

The second problem is due to the need of a payment in advance by each user of the costs corresponding to the volume of the liquids to be sucked and treated. In particular, the problem due to the costs is important when such sucking apparatuses have to be placed either in different points of touristic harbours or in small touristic harbours.

Two other further problems, although less important, are the following. One is linked to the inspections concerning the respect of environmental laws. In fact it is necessary that users have documents certifying that the bilge waters and the waste oils were really discharged at authorized facilities. The other further problem is that it is necessary for the waste oils to be checked by customs in case they were discharged from dutiable watercrafts.

Nevertheless, the available systems according to the prior art, are not able to solve the above listed problems.

It is therefore an object of the present invention to provide an apparatus for the semi-automatic sucking of bilge-waters and other waste liquids from small and medium sized watercrafts which is cheap and of low encumbrance and that allows to overcome the above described drawbacks.

It is another object of the present invention to provide a method for the semi-automatic sucking of bilge-waters, which in particular is suitable to limit the operating time of the pump to the sole sucking phase and at the same time allows the payment for the sucking that has been performed.

According to the present invention these objects are reached with the apparatus, comprising a flexible tube having an end which is suitable for being plunged into a liquid to be sucked, collecting means of said liquid communicating with said flexible tube, sucking means creating vacuum conditions in the collecting means. The characteristic of such an apparatus is that said collecting means includes:

- an intermediate vessel of fixed capacity in which vacuum conditions are created by said sucking means during a single sucking phase;
- a storage vessel receiving the liquid sucked into said intermediate vessel at the end of each sucking phase.

The sucking means creates the vacuum conditions only during the sucking phase. Monetary means to start said sucking phase are provided.

Also according to the invention a method for the semi-automatic sucking of oily bilge-waters and other waste liquids from small and medium watercrafts is characterised in that it includes the following phases:

- a payment phase;
- a sucking phase started by said payment phase and during which said liquids are transferred from said watercrafts into an intermediate vessel through a flexible tube;
- a storing phase at the end of the sucking phase during which said liquids sucked from said intermediate vessel are transferred into a storage vessel.

Further features and advantages of the apparatus and of the method of sucking liquids according to the present invention will be made more apparent from the following description made with reference to the attached drawings wherein:

- Figure 1 is a diagrammatic internal view of the apparatus according to the invention for sucking and storing bilge-waters and other liquids;
- Figure 2 is a perspective external view of a possible embodiment of the apparatus according to the invention;
- Figure 3 is a partial perspective view of the apparatus of figure 2;
- Figure 4 is a different embodiment of the apparatus according to figure 1.

With reference to figure 1, an apparatus for sucking and storing liquids according to the invention comprises a flexible tube 10 having an end 10a which is suitable for being plunged in a liquid to be sucked. Tube 10 can be rolled up on winding means 3 and is in communication with an intermediate vessel 6 wherein vacuum conditions are created by sucking means such as a pump 9. Intermediate vessel 6 is in communication with a storage vessel 8 through an exhaust electrovalve 7. Intermediate vessel 6 comprises a sensor 15 to control the liquid level inside it. Sucking pump 9 is in communication with intermediate vessel 6 through a circuit 16 comprising a safety valve 12 and a filter 13 protecting pump 9.

At the user's end 10a of flexible tube 10 a push-button panel 11 having control keys 11a is provided.

A processing unit 4, shown only in figure 3, is connected with a not shown electric power supply and acts as remote control of the apparatus shown in figure 1 and in particular controls valve 7 and pump 9. Processing unit 4 is mounted on a support cover 1 of the apparatus and is also electrically connected with sensor 15 and push-button panel 11. In the latter case the connection being possible through electrical wires fixed along tube 10 and not shown.

With reference to figures 2 and 3, in cover support 1 of the apparatus according to the invention a first opening is provided through which the access to a screen 5 and a keyboard 2 is possible with a not shown printer able to issue receipts

through a slot 2a. When a corresponding gate is open, a second opening 1b allows access to flexible tube 10, shown in figure 1. Between openings 1a and 1b a monetary means for payment for example by credit cards, tokens, bank notes and so on is advantageously provided for, not described in details because already known to a person skilled in the art.

A user who needs to discharge the oily waters from the bilge of his watercraft must initially be able to take end 10a of flexible tube 10 and unroll it. This is possible only after having opened opening 1b after the input of the watercraft's data, after having chosen a discharging program by means of keyboard 2 and after having paid in advance the amount displayed on screen 5. For instance, the user can choose a program either for sucking a fixed amount of liquid or for sucking during a fixed period of time. The payment is referred to the maximum volume which can be sucked during a single sucking phase.

After flexible tube 10 has been unrolled and the user has reached the bilge of the watercraft, or another place from where dirty liquids must be removed, end 10a is plunged into the liquid and the sucking is started by means of one of keys 11a of push-button panel 11.

The sucking can be either stopped or re-started at any time by the user. In addition, the sucking stops in one of the following cases:

- a fixed volume corresponding to the maximum capacity of intermediate vessel 6 has been sucked;
- the programmed time finished or the maximum allowed time elapsed.

In both cases, however, the sucking phase is considered ended by processing unit 4, which operates the opening of electrovalve 7 which is placed at the bottom of intermediate vessel 6 so that the discharging of the liquid sucked into storage vessel 8 is allowed. The capacity of the latter is defined according to the size of the whole apparatus. For instance, the capacity of storage vessel 8 is comprised between 2000 and 3000 litres.

At the end of the sucking operations, the user can select the rolling of tube 10 by one of keys 11a which powers engine 3a of tube winder 3 (figure 1). Afterwards, when opening 1b is shut, the user can get a document from slot 2b which certifies the discharge and points out the data put in at the moment of the choice of the sucking programme, comprising the data of the watercraft and of its owner. In the meanwhile, processing unit 4, has stored such data so that the legal customs controls can be done when emptying storage vessel 8.

The method which is at the basis of the apparatus according to the invention includes the phases of payment as above illustrated, of the

sucking started by the payment and of storing at the end of the sucking.

Therefore, with reference to figure 1, the presence of an intermediate vessel 6 and of a separate storage vessel 8, allows for the payment in advance of the sucking operations referred to a fixed amount of liquid. In addition, the storage vessel should not be brought under vacuum conditions, thus allowing to save on the size of the pump. This saving is even greater because pump 9 works only during the sucking phase.

The liquid's discharge from vessel 6 to vessel 8 occurs by gravity. Nevertheless, with reference to figure 4, if it is necessary to increase the capacity of vessel 8 even if it is impossible to increase the size of the whole apparatus, vessel 8 can be extended above intermediate vessel 6. In this case, at the level of electrovalve 7 a pump can be provided which pushes the liquid from vessel 6 to vessel 8 when the level L or the latter is higher than the level of electrovalve 7.

The invention as above described has the following further advantages:

- a reduced encumbrance and an easy dock-side mounting of the apparatus, which can be provided for and used even in small harbours;
- its easy manoeuvrability by the user with resulting reduced operative costs because no personnel is required;
- the possibility of storing the users' data in order to allow the legal customs controls at the moment of emptying the storage vessel and the collection of the liquids;
- the issue to the user of a document certifying that the discharge of the dirty waters from the watercraft has occurred in case of inspections by harbour authorities.

The apparatus and the corresponding method according to the present invention, finally, can also be used for emptying WC reservoirs provided on watercrafts. An apparatus for discharging black liquor could then be placed near an apparatus for discharging oily waters.

Claims

1. Apparatus for the semi-automatic sucking of oily bilge-waters and other waste liquids from small and medium watercrafts without the presence of operative personnel, comprising a flexible tube (10) having an end (10a) which is suitable for being plunged in a liquid to be sucked, collecting means (6,8) of said liquid communicating with said flexible tube (10), sucking means (9) creating vacuum conditions in said collecting means (6), characterised in that said collecting means comprises an inter-

mediate vessel (6) of fixed capacity in which vacuum conditions are created by said sucking means (9) during a single sucking phase, a storage vessel (8) receiving the liquid sucked into said intermediate vessel at the end of each sucking phase, said sucking means (9) creating said vacuum conditions only during said sucking phase.

2. Apparatus according to claim 1 wherein monetary means (17) to start said sucking phase are provided.
3. Apparatus according to claim 1, wherein said intermediate vessel (6) communicates with said storage vessel (8) by means of an electrovalve (7) controlled by a processing unit (4), the latter being in connection with a timer and with a sensor (15) of the liquid level present in said intermediate vessel (6).
4. Apparatus according to the previous claims, wherein said sucking means comprises a pump (9) included in a circuit (16) provided with a filter (13), and a safety valve (12).
5. Apparatus according to the previous claims, wherein a support cover (1) is provided on which said processing unit (4), a screen (5) with printer and a keyboard (2) for the input of the users' data and for choosing sucking programmes are mounted, said support cover (1) comprises also said means for blocking the access to said tube and for stopping the power supply to said winding (3) and sucking means (9).
6. Apparatus according to claim 5, wherein said means for blocking comprises said monetary means (17) electrically connected with said processing unit and an opening (1b) of approach to said flexible tube (10) which can be shut by a gate operated by said processing unit (4).
7. Apparatus according to the previous claims, wherein said storage vessel (8) extends above said electrovalve (7) and an auxiliary pump (18) is provided to push the liquid from said intermediate vessel (6) to said storage vessel (8), when the level (L) of the liquid is higher than the position of said electrovalve (7).
8. A method for the semi-automatic sucking of oily bilge-waters and other waste liquids from small and medium watercrafts characterised in that it comprises the following phases:
 - a payment phase;

- a sucking phase started by said payment phase and during which said liquids are transferred from said watercrafts into said intermediate vessel (6) through a flexible tube; 5
- a storing phase at the end of said sucking phase during which said liquids sucked from said intermediate vessel (6) are transferred into said storage vessel (8). 10

9. Method according to claim 8 wherein said sucking phase stops in one of the following cases:

- a volume of liquid corresponding to the capacity of said intermediate vessel (6) has been sucked; 15
- the programmed time has finished or the maximum allowed time has elapsed. 20

10. Method according to claim 9 wherein at the end of said storing phase documents certifying that a fixed amount of liquid has been discharged are printed. 25

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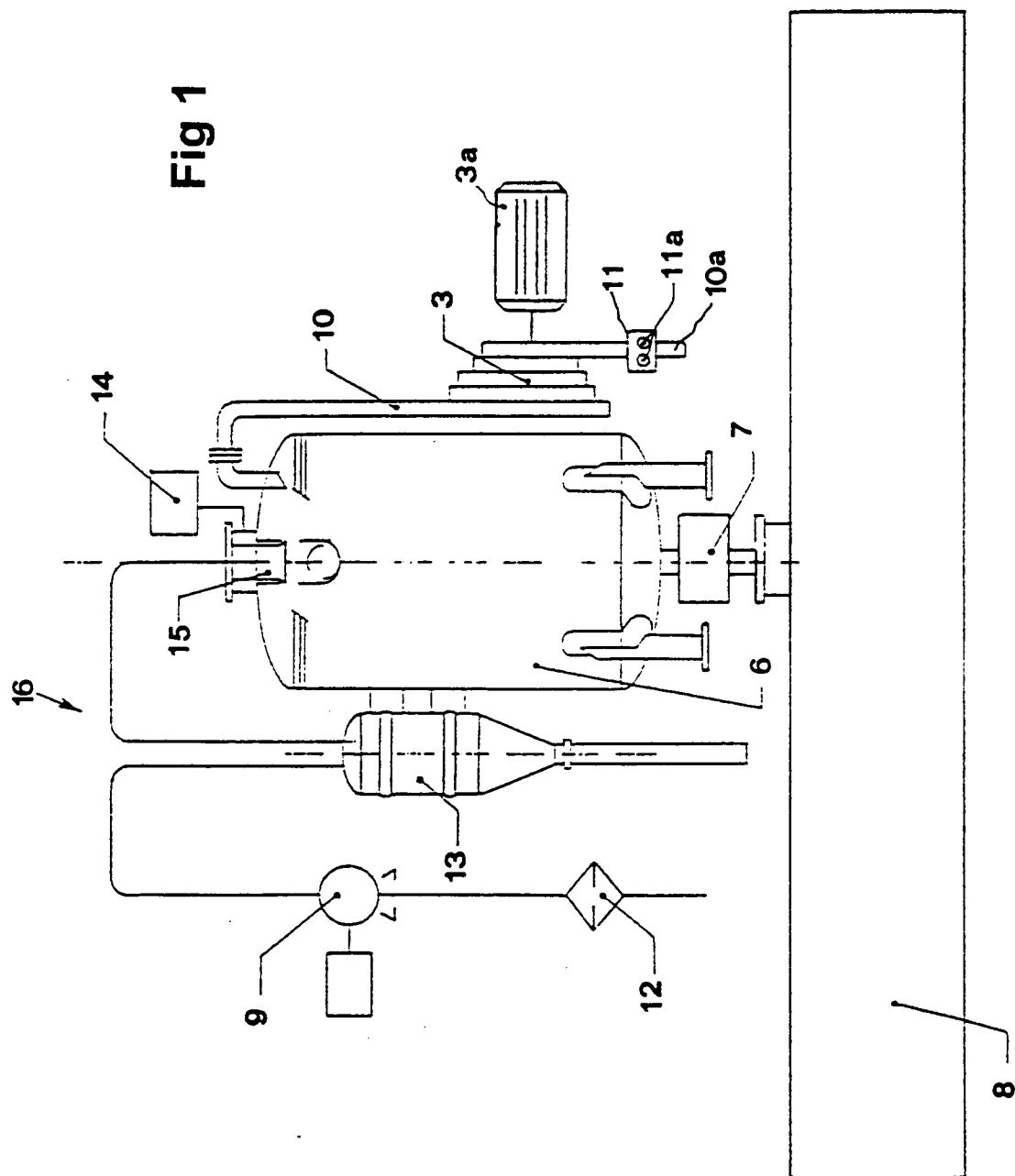


Fig. 2

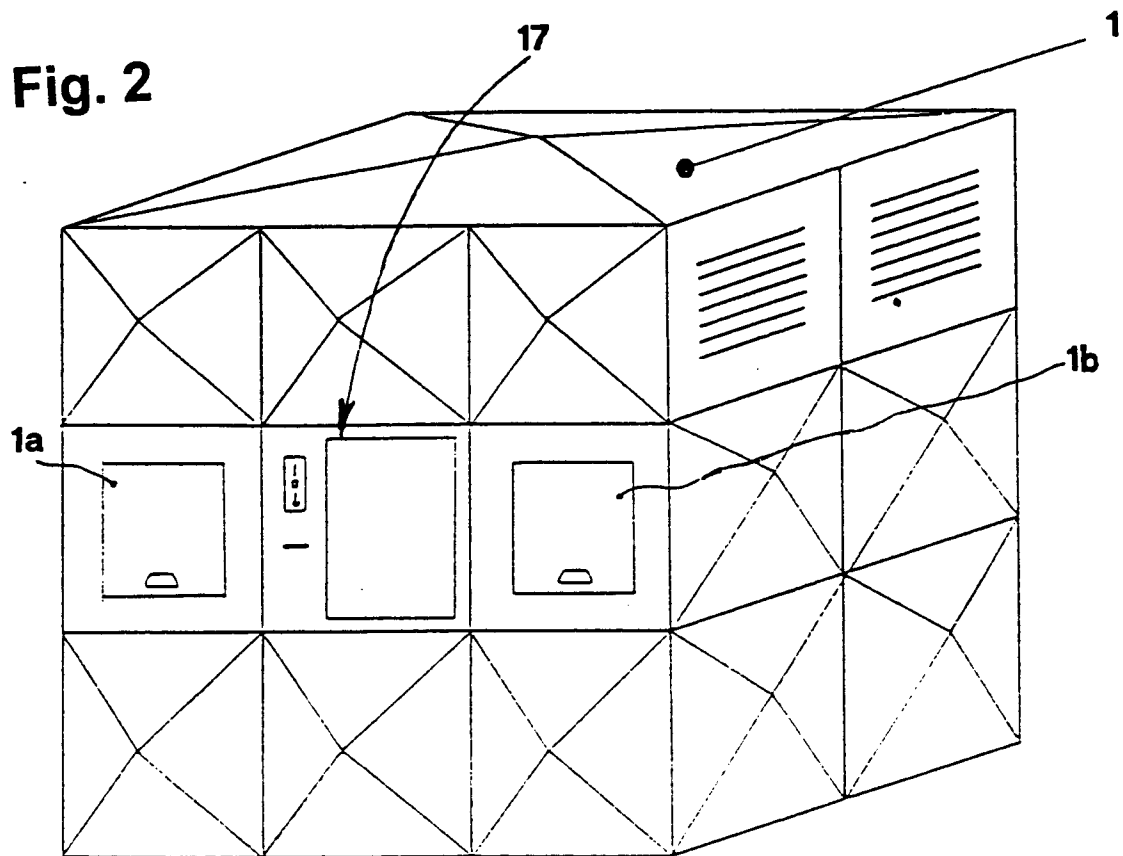
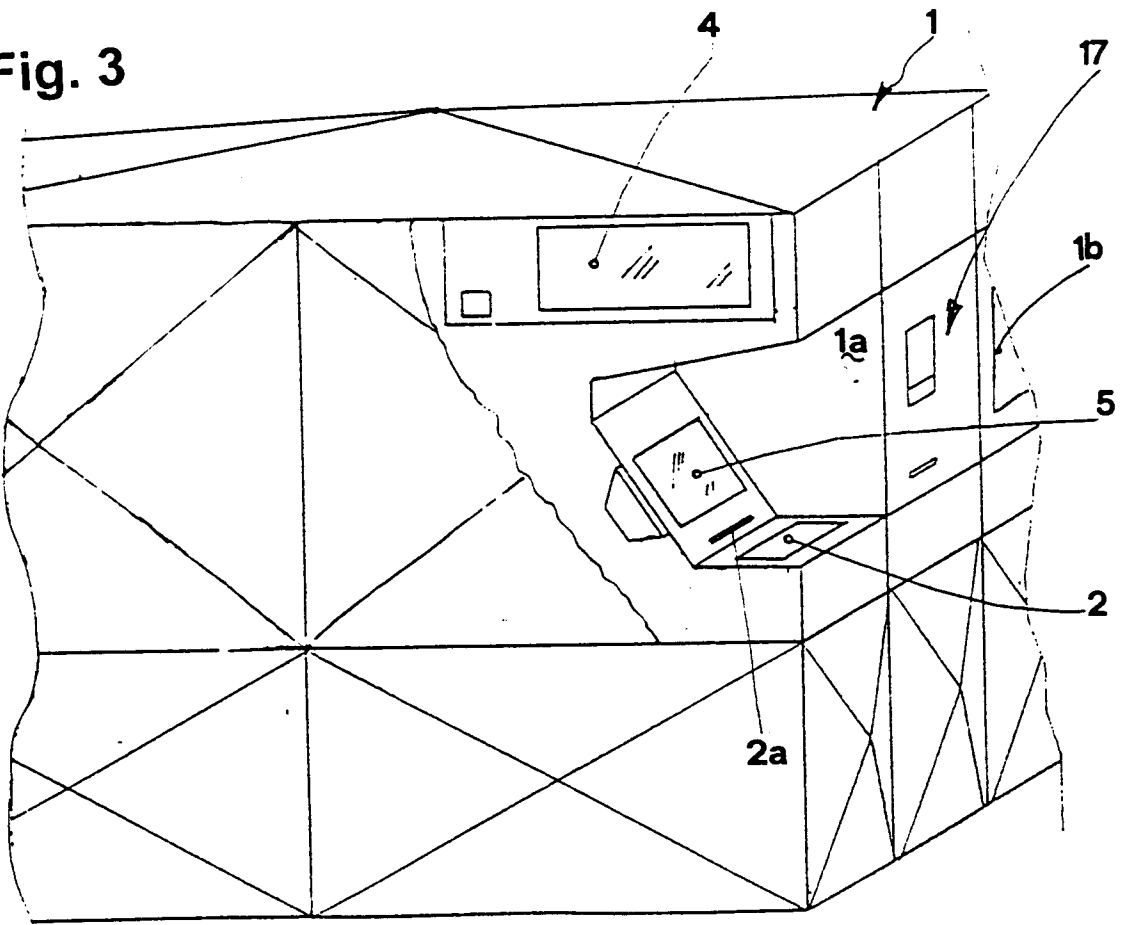
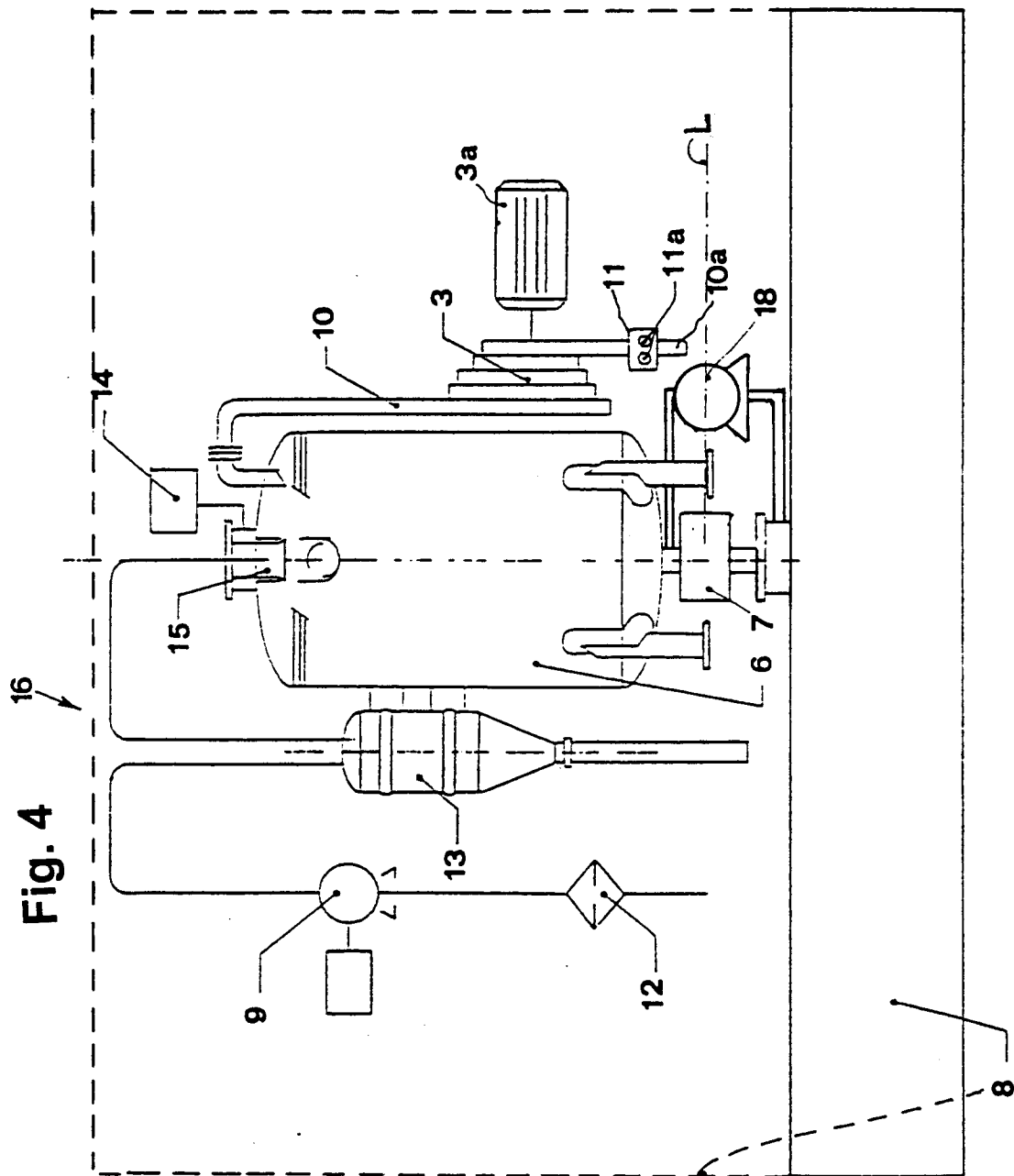


Fig. 3







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EUROPEAN SEARCH REPORT

Application Number
EP 94 11 4084

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Y A	US-A-4 623 452 (PETERSEN) * the whole document * ---	1-5,7 8	B63B1/00 B63B17/00
Y A	DE-A-32 06 253 (MARINETECHNIK PLANUNGSGESELLSCHAFT M.B.H.) * page 13, paragraph 1 -paragraph 2 * ---	1-5,7 8	
Y A	US-A-4 893 229 (DETRICK) * column 3, line 43 - line 45 * * column 7, line 24 - line 31; figures 1-6 * ---	5 10	
A	US-A-3 780 757 (JORDAN) * the whole document * ---	1-4	
A	DE-U-90 04 783 (ELOSGE) * the whole document * ---	4-6	
A	FR-A-2 673 417 (CAUVIN) * page 4, line 74 - line 82; figures 1-5 * -----	4-6	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B63B B60F B60S
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 20 December 1994	Examiner DE SENA, A
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			