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Device provided with a reservoir receiving a liquid and a rotor arranged inside the reservoir.

The invention relates to a device provided with a reservoir (1) receiving a liquid and with a rotor (3) arranged in said reservoir, which rotor can be rotated about its central axis. The rotor is provided with a few blades distributed over its circumference, said blades being shaped such that when the rotor is rotated a liquid is sucked in in a direction extending transversely to the axis of rotation of the rotor. Near the outer circumference of the rotor there is arranged the outer end of a pipe (10) being in communication with at least one other reservoir (2), all this such that during rotation of the rotor material can be sucked in from said other reservoir.

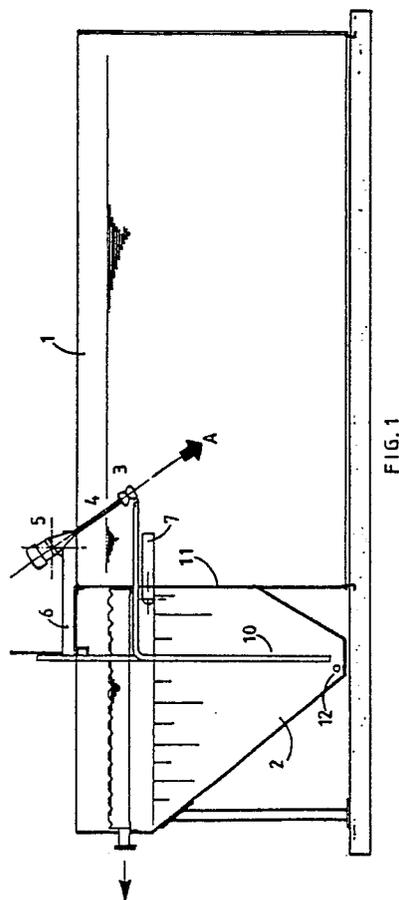


FIG. 1

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### Device provided with a reservoir receiving a liquid and a rotor arranged inside the reservoir.

The invention relates to a device provided with a reservoir receiving a liquid and a rotor arranged in said reservoir, which rotor can be rotated about its central axis and is provided with a few blades distributed over its circumference, said blades being shaped such that when the rotor is rotated a liquid is sucked in in a direction extending transversely to the axis of rotation of the rotor.

Such a device is i.a. known from the Dutch patent application 7311537, whilst the Dutch patent application 7807073 also describes rotors which, when rotated, exert a strong sucking force, transversely to the axis of rotation of the rotor, on the liquid surrounding the rotor.

The purpose of the invention is to obtain a device of the above kind whereby it is possible that the liquid present in the reservoir, at the same time as it is being agitated by means of the rotating rotor, can be mixed in a simple manner with a material to be drawn from one or more other reservoirs, such as liquid or gaseous substances, which may also contain solid substances.

According to the invention this can be achieved in that near the outer circumference of the rotor there is arranged the outer end of a pipe being in communication with at least one other reservoir, all this in such a manner that during rotation of the rotor material can be sucked in from said other reservoir.

By using the construction according to the invention it will also be possible that a further material is sucked in effectively, by means of the rotor which agitates the liquid present in the reservoir, from an other reservoir and is at the same time mixed thoroughly with the liquid present in the former reservoir.

Surprisingly it has become apparent that when the end of a pipe is arranged near the circumference of the rotor a very strong sucking force is produced in the pipe.

The invention will be further explained hereinafter with reference to an embodiment of the construction according to the invention illustrated in the accompanying figures.

Fig 1 is a diagrammatic side view of a device according to the invention.

Fig 2 is a top view of the device illustrated in fig 2, whereby the rotor has been left out.

Fig 3 shows on a larger scale a part of the device illustrated in fig. 1.

The device illustrated in fig 1 comprises a first reservoir 1 and a reservoir 2 arranged therebeside. In the illustrated embodiment the reservoir 1 is intended for being used as an aerating basin of a water purification device, whilst the reservoir 2 is

intended to act as a settling basin. In the reservoir 1 there is arranged a rotor 3, e.g. of the type described in the Dutch patent application 7311537 or 7807073, for agitating the liquid present in the reservoir 1. The rotor 3 is fixed to a hollow shaft 4, which is mounted on a motor 5, by means of which the shaft 4 with the rotor 3 can be rotated. The motor 5 is adjustably supported by a frame part 6 having a fixed connection to the reservoir 1. In the part of the hollow shaft 4 located above the liquid level in the reservoir 1 there are provided one or more holes, via which holes air can be sucked in during rotation of the rotor 3, which air will be led into the liquid in the direction according to arrow A, all this in a manner similar to the one described in the above-mentioned Dutch patent application 7311537. It will be apparent that by thus rotating the rotor 3 the contents of the reservoir 1 can be agitated, whilst simultaneously air is led into the liquid present in the reservoir 1. For purifying the liquid present in the reservoir 1, such as sewage water, use is being made of a biologically active silt, i.e. the decomposition of organic material from water to be purified is done by bacteria here, for which process it is also necessary that air is led into the liquid, which can be effected in a simple manner as described above.

The liquid to be purified can be supplied to the reservoir 1 via a supply pipe 7.

On one side of the reservoir 2 there is arranged a gutter 8 extending along one side of said reservoir and parallel to the longitudinal direction of the reservoir 1, said gutter being in communication with the reservoir 1 at one end, at a point located under the liquid level of the reservoir 1.

Liquid can thus flow from the basin 1 into the gutter 8. In the bottom of the gutter 8 there are provided a number of regularly spaced holes 8', so that the liquid, with the silt present therein, can flow into the reservoir 2, whereby the silt will settle in said reservoir. Purified water can be discharged from the reservoir 2 through a discharge pipe 9 arranged in the reservoir 2.

Of course it will also be possible to use other means for leading in and distributing and/or discharging the water.

A pipe 10 extends along part of its length into the reservoir 2, whereby the open lower end of said pipe is located at some distance from the bottom of the reservoir 2. From said lower end the pipe is led upwards and with one bent end through or over the partition wall 11 separating the two reservoirs 1 and 2. The arrangement is thereby such that the open end of the part of the pipe 10 passed through the wall is located near the side of the rotor.

As is e.g. disclosed in the above-mentioned Dutch patent application 7311537 the rotor constructed according to said patent application exerts a strong sucking action on the surrounding liquid in a direction transverse to the axis of rotation of the rotor. It will be apparent that consequently, when the rotor is rotated, it is not only achieved that the contents of the reservoir 1 are agitated as well as mixed with air, but also that the silt settled in the reservoir 2 is sucked in from said reservoir 2 via the pipe 10 again and mixed with the liquid present in the reservoir 1.

In this manner a very simple device has been obtained, therefore, in particular suited for being used as a water purification device, whereby the liquid to be purified is agitated and mixed with air by means of a single rotor, whilst by means of said rotor also the silt settled in a settling basin is sucked in and mixed again with the water to be purified.

Any surplus of silt can be discharged from the reservoir 2 by means of a drain pipe 12.

As is furthermore illustrated in fig 3 an extension piece 13 may be movably provided on the end of the pipe 10 located near the rotor 3, which extension piece can be fixed to the pipe 10 in any position desired by means of clamping means 14. Thus the distance between the outer circumference of the rotor and the mouth of the pipe 10 can be adjusted in order to be able to regulate the degree of suction of silt from the settling reservoir 2 therewith.

Possibly a shut-off valve may be mounted in the pipe 10, for interrupting the passage of material through the pipe 10. In order to make this shut-off valve easily operable the pipe 10 may be constructed with a bend above the liquid level in the reservoir 2, whereby the relevant shut-off valve or the like can be incorporated, easily operable, in the part of the pipe 10 located above the liquid level.

Of course variations and/or additions to the embodiment described above will be conceivable within the spirit and scope of the invention.

Thus the end of the pipe, fitted with a flexible part in that case, may have a fixed connection to the motor, so that when the motor with the shaft and the rotor are pivoted the distance between the end of the pipe 10 and the rotor 3 remains unchanged.

Also it is conceivable to supply the air via one or more pipes opening near the rotor 3, instead of through the hollow shaft 4.

The shaft 4 may be solid in that case.

When the pipe 10 is led above the liquid level the flow of material through the pipe 10 may also be interrupted by admitting air to said highest part of the pipe 10.

## Claims

1. Device provided with a reservoir receiving a liquid and a rotor arranged in said reservoir, which rotor can be rotated about its central axis and is provided with a few blades distributed over its circumference, said blades being shaped such that when the rotor is rotated a liquid is sucked in in a direction extending transversely to the axis of rotation of the rotor, characterized in that near the outer circumference of the rotor there is arranged the outer end of a pipe being in communication with at least one other reservoir, all this in such a manner that during rotation of the rotor material can be sucked in from said other reservoir.

2. Device according to claim 1, characterized in that the rotor is fitted to a hollow shaft, which is provided with an air inlet opening located above the liquid level in the reservoir, and with an outlet opening opening near one end of the rotor.

3. Device according to claim 1, characterized in that the first reservoir is an aerating basin and the second reservoir a settling basin, whereby the pipe extends from a point located at some distance from the bottom of the settling basin to a point near the rotor.

4. Device according to any one of the preceding claims, characterized in that the pipe is led above the liquid level in the second reservoir along part of its length.

5. Device according to any one of the preceding claims, characterized in that the distance between the rotor and the end of the pipe is adjustable in a direction transverse to the axis of rotation of the rotor.

6. Device according to any one of the preceding claims, characterized in that the position of the axis of rotation of the rotor is adjustable.

7. Device according to claim 6, characterized in that the end of the pipe opening near the rotor is adjustable together with the rotor.

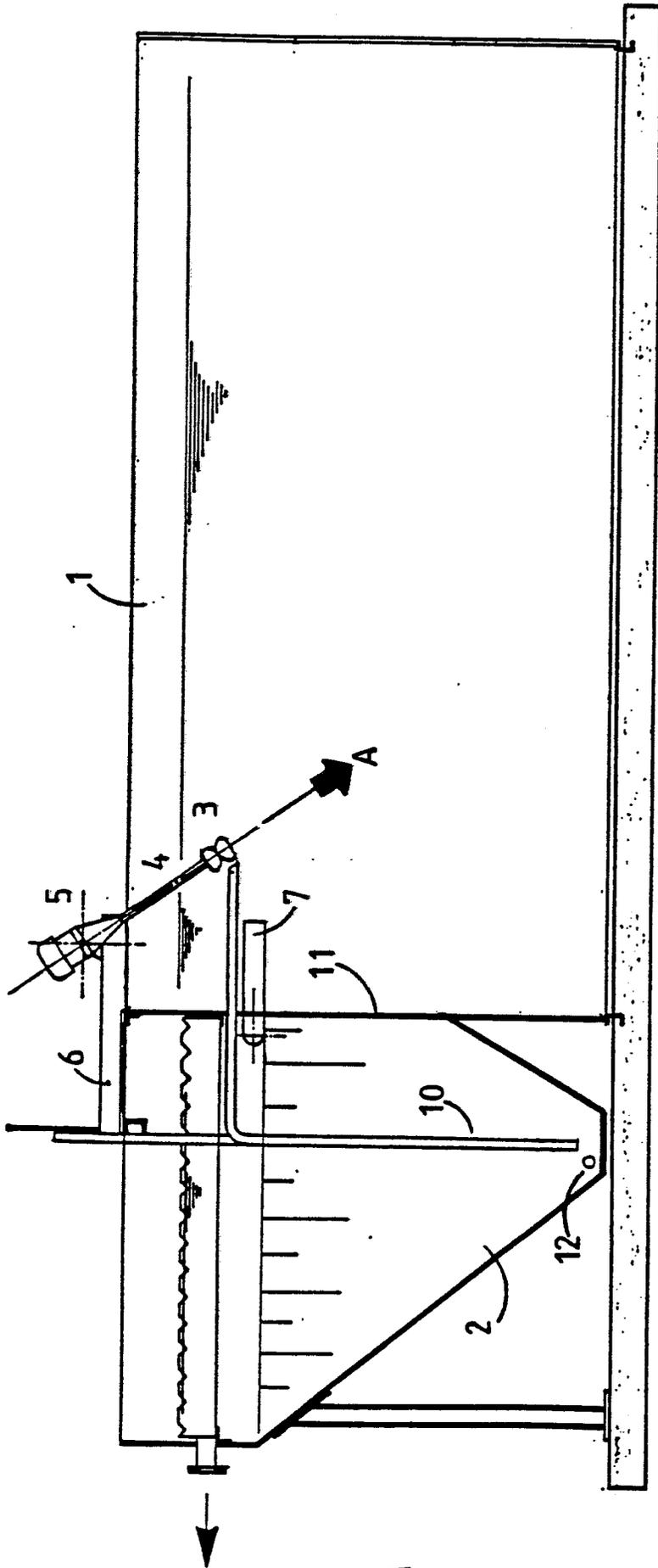


FIG. 1

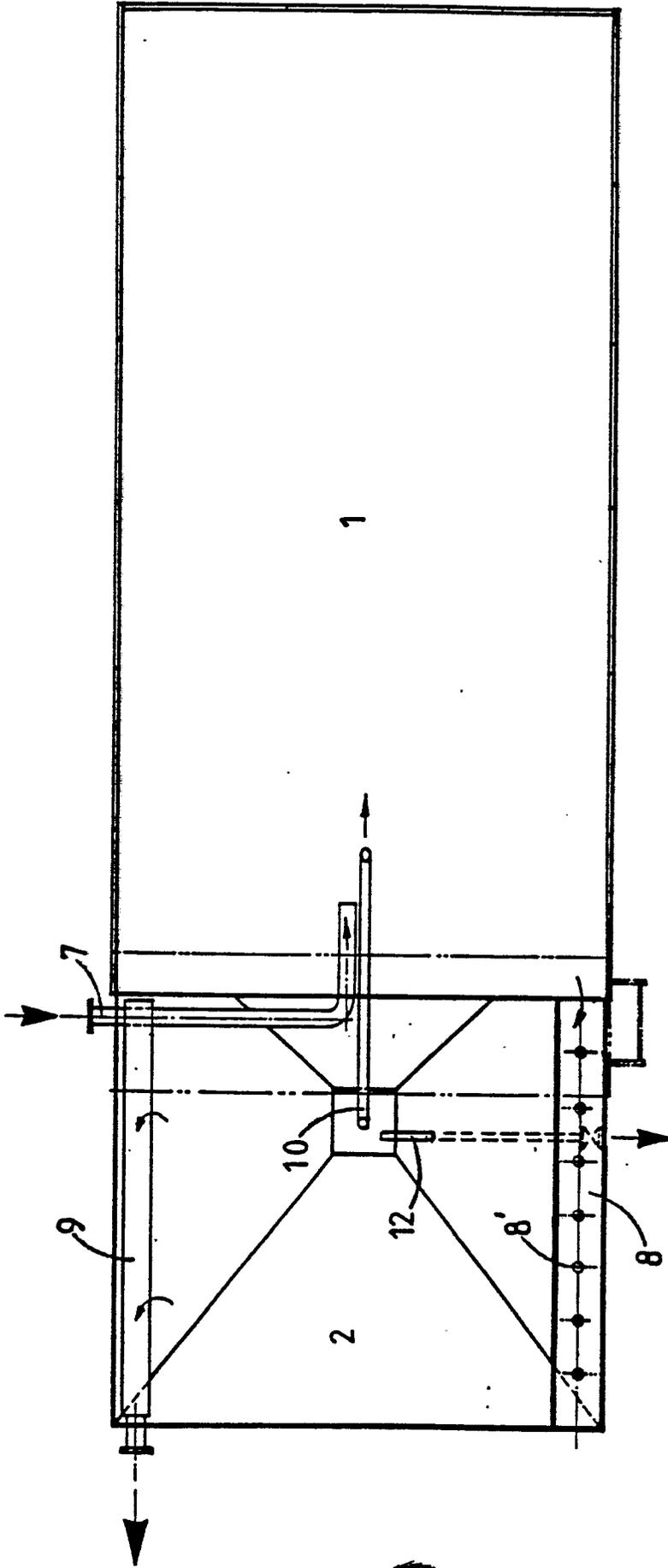


FIG. 2

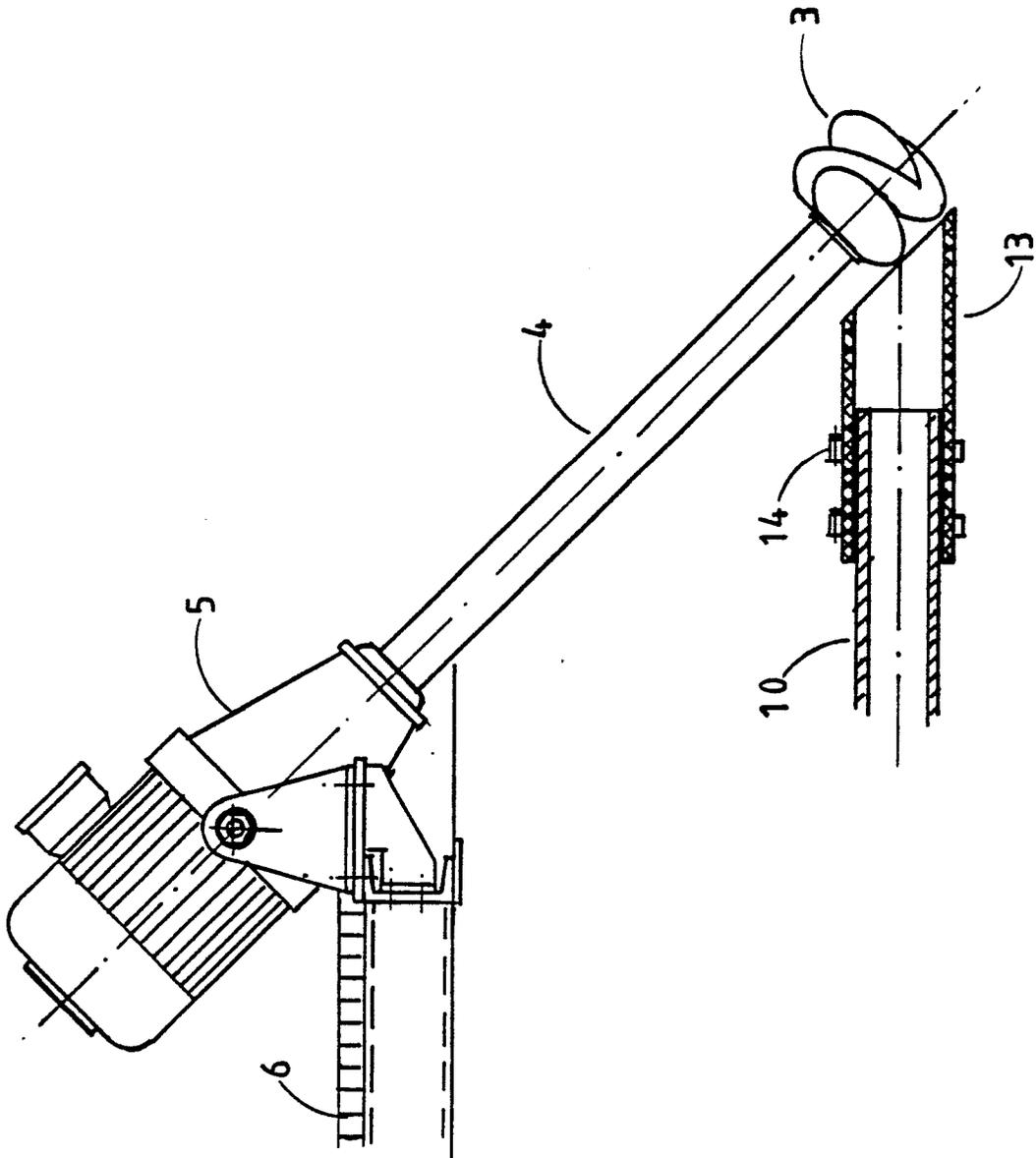


FIG. 3



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.4)
X	US-A-3 773 302 (JOHNSON) * Column 4, lines 20-34; figures * ---	1	B 01 F 3/08
A	US-A-4 308 221 (AERATION INDUSTRIES) * Abstract; figures * ---	2,6	
A	DE-A-1 557 024 (BIETHINGER) * Page 4, paragraph 1 * ---	6	
A	GB-A-2 174 012 (EKATO) ---		
A	FR-A- 938 347 (MORIZE) ---		
A	FR-A- 872 399 (BRUKNER) ---		
A	GB-A-1 117 959 (ISRAEL MINING) ---		
A	GB-A- 950 214 (U.K. ATOMIC ENERGY) ---		
A	GB-A- 781 224 (U.K. ATOMIC ENERGY) -----		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			B 01 F
Place of search	Date of completion of the search	Examiner	
THE HAGUE	08-09-1988	PEETERS S.	
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	