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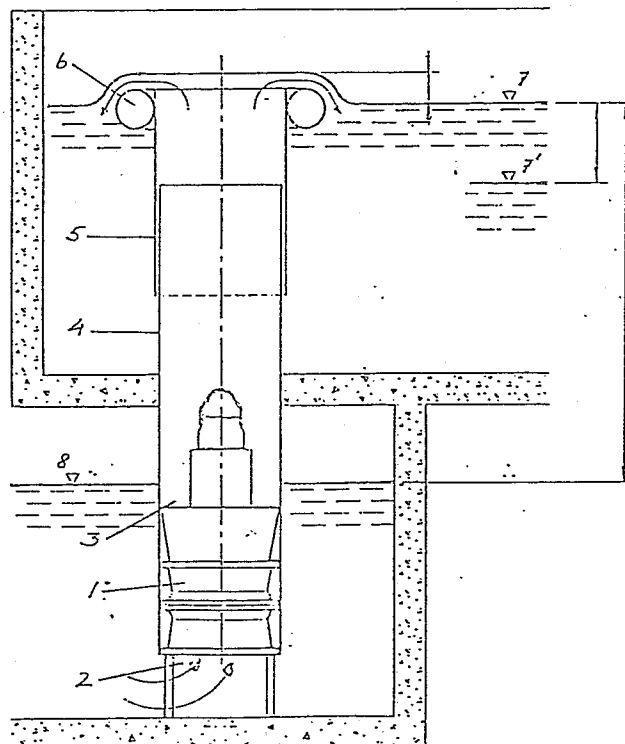
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54 Back flow preventing device in the outlet pipe of a pump.

57 The invention concerns a device which prevents back-flow of liquid into a pump unit.

The outlet pipe (4) from a pump (1) is provided with a telescopic extension (5) supported by a float (6) on the surface of the receiver. The static head may then be minimized, independent of the liquid level in the receiver.



A CHECK VALVE

TITLE SUMMARY
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This invention concerns a check valve for controlling the fluid flow from a pump and specifically a float supported device which controls the pump outlet with reference to the receiver.

When pumping of a liquid into a receiver having a changing liquid level, the outlet pipe from the pumps must end on a level which is somewhat higher than the maximum level of the receiver to ascertain that the liquid does not flow backwards through the pump when the latter is not working. A disadvantage is that the static head then is higher, sometimes much higher, than the difference between the levels of the pump inlet and the receiver respectively, thus causing considerable energy losses.

Another method is to provide the outlet pipe with a check valve which prevents the liquid from flowing back. Such a valve is however very sensitive to strokes and also demands an essentially horizontal outlet pipe having additional tube losses.

A third possibility is to arrange the outlet pipe bent in such a way, that its upper part always is above the liquid level in the receiver, a so-called siphon. Such a device has however considerable losses and in addition there may be problems at pump start if the liquid level in the receiver goes below the outlet of the siphon.

The problem to arrange the outlet from a pump at an optimum level is solved by help of a device according to the following claims.

The invention is described more closely below with reference to the enclosed drawing.

In the drawing 1 stands for a submersible pump unit having an inlet 2 and an outlet 3. 4 stands for the outlet pipe and 5 an outer telescopic pipe axially movable on the first pipe. 6 stands for a float and 7 and 8 different liquid levels.

The submersible pump unit 1 transports the liquid through the pipes 4 and 5. The buoyancy of the float 6 is so chosen, that the upper end of the pipe 5 is at a suitable height above the surface 7 to prevent backflow when no pumping takes place. If the liquid level changes (7'), the end of the pipe 5 is automatically adjusted, as the pipe may be moved along the rigid pipe 4.

During pumping the downhead force from the pumped liquid lowers the float 6 so that the static head is minimized for each level of the receiver. This means of course also that the energy losses are minimized which is also accentuated by the fact that the liquid flows out around the entire periphery of the pipe.

The advantages of the invention are above all the following:

The static head, that is the distance between the levels 7 (7') and 8, is always minimized.

The width of the outlet is maximized as the liquid flows out around the entire periphery of the pipe.

No outer controlling means are needed.

The control forces are balanced and independant of the water depth of the receiver.

All forces from the liquid are taken up radially.

The closing time is almost zero.

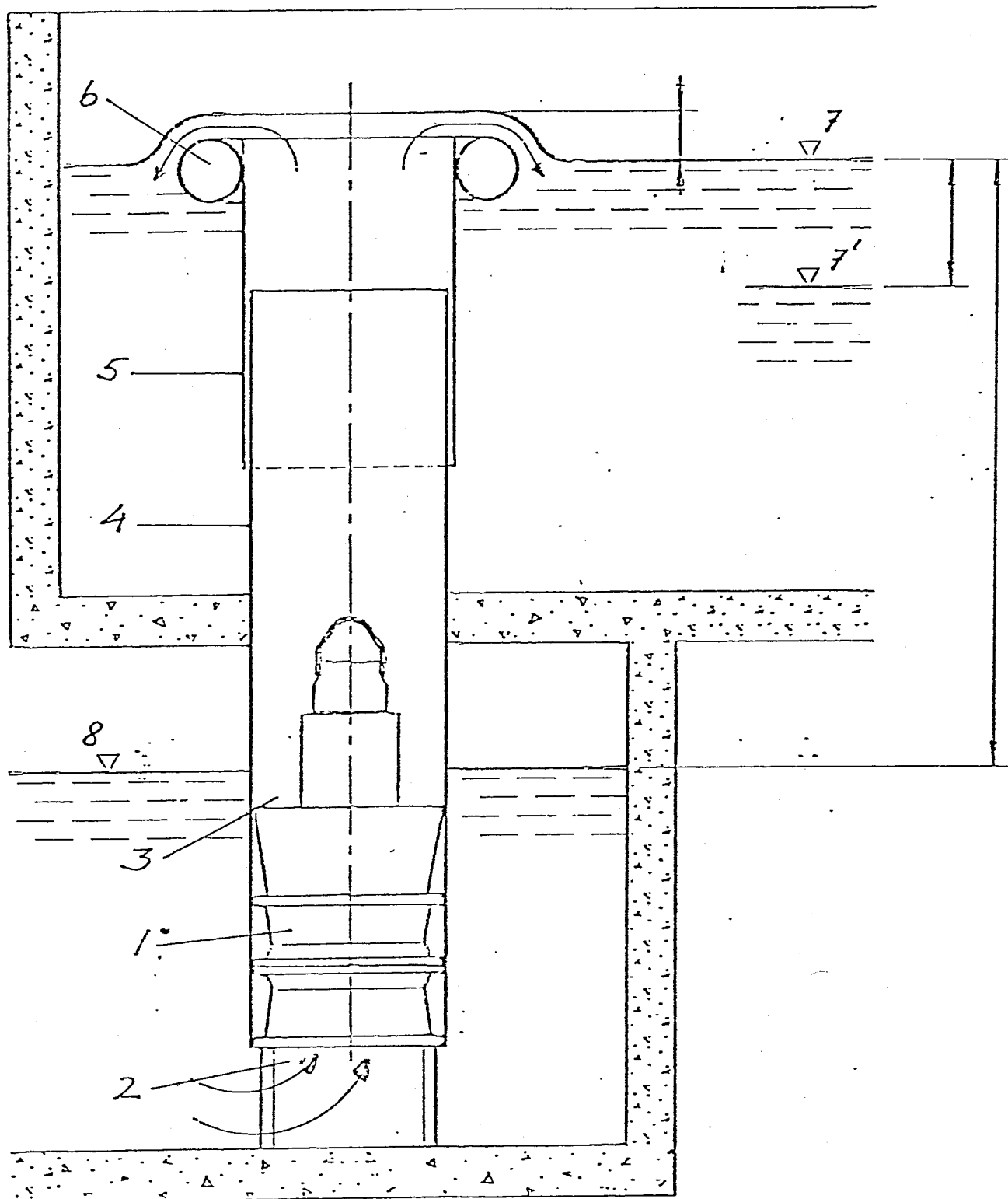
No pressure strokes occur.

The energy losses are minimum.

In the drawings a submersible, so-called propeller pump is shown. The invention is however possible to use also in connection with other types of pumps within the scope of the invention.

CLAIMS

- 1 A device for preventing back flow through the outlet pipe of a pump which pipe ends in a receiver for pumped medium, characterized in, that it comprises a telescopically movable pipe (5) on the essentially vertical outlet pipe (4), which pipe (5) is connected to a float (6) which keeps the upper end of the pipe at a suitable height above the liquid level of the receiver.
- 2 A device according to claim 1, characterized in, that the float (6) is so dimensioned that the force from the outgoing liquid influences on the level of the float such, that the static head, that is the difference between the levels (7) or (7') and (8), is minimized.





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EUROPEAN SEARCH REPORT

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Application number

EP 84 85 0036

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. ³)
A	US-A-4 030 859 (HENEGAR) * Column 1, lines 34-45; figure 1 *	1	F 04 D 13/06 F 04 D 15/00 F 04 D 29/40
A	DE-A-1 528 665 (BURGER) -----		
			TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
			F 04 D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 17-05-1984	Examiner WOOD R.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	