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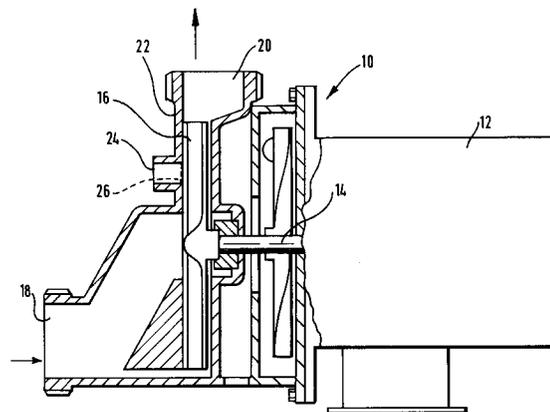
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54 **Pump protection system.**

57 A pump (10) includes a protection device incorporating a water detecting sensor (24) wherein the sensor is located in, or communicating with, the interior of the pump. Preferably, the pump has a pump back plate (22) and the latter includes an orifice (24) therein within which to locate the water detecting sensor.



**FIG.1.**

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This invention relates to a pump protection system especially for use with hydrotherapy baths or pools.

Hydrotherapy baths, pools or tubs have one or more nozzles positioned below the water line in which air and water are mixed and forced into the bath producing a jet of foaming water which is said to give a therapeutic effect for persons bathing therein. The water circulation is effected by means of a pump, usually electrically driven, and it is desirable that the pump should not be run when the system has been drained of water. To this end, it has been proposed to provide a sensor on the bath so that when the water level drops below a predetermined point the sensor is actuated and the pump disabled preventing dry running. However, this requires special fixing and the necessity to drill the bath which is especially undesirable where the bath is cast-iron or steel. It has been proposed to use a "stick-on" version of the this sensor but once again this is not completely satisfactory in that it does not sense accurately when used on the different materials normally employed in the construction of baths, for example glass reinforced plastics, acrylics, cast-iron, and the like.

An internal sensor in the pipework has also been proposed but this also can give false readings owing to droplets of water adhering to the sensing surface even when the system has been emptied.

A simple float switch has also been proposed but once again has proved unreliable in practice owing to the propensity of the float to stick and prevent the pump being disabled on emptying of water from the system.

The invention seeks to provide a pump protection device improved in the above respects.

In its broadest aspect, the invention comprises locating a sensor in, or communicating with, the interior of the pump.

According to one embodiment the present invention there is provided a pump protection device which comprises a pump back plate having an orifice therein within which to locate a water detecting sensor.

The pump back plate is preferably a modified form of the conventional pump back plate which it replaces. By locating the sensor actually on the pump itself, drilling of the bath or associated pipe work is obviated. Moreover, the sensor acts directly in that it will turn off the pump when the pump is emptied irrespective of the state of the rest of the system. The sensor may be of a variety of types, e.g. pressure, vacuum, electronic, or the like. The sensor is also protected from extraneous light which can have an adverse effect on certain systems, and by positioning the sensor horizontally within the orifice droplets of water run off the

sensing face so that droplets of water do not collect thereon to give erroneous signals.

The invention will be described further, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a partial sectional view of a pump modified in accordance with the invention; and

Figure 2 is a rear view corresponding to Figure 1.

Referring to the drawings, the pump generally designated 10 for use with a hydrotherapy bath or pool comprises an electric motor 12 driving an axle 14 on which is mounted an impellor 16. Inlet 18 and outlet 20 ports are provided. The pump 10 has a back plate 22 which, in accordance with the invention, is provided with an orifice 24 formed therein. The orifice 24 contains a sensor (not shown in the drawings) which, depending on the exact type employed, may communicate directly with the impellor chamber or may operate through the portion 26 of the impellor chamber wall within the orifice 24, i.e. the "orifice" 24 may in fact be blind. In this case, for example, a capacitive sensor may be employed. In any event the orifice 24 will be sealed against egress of water from the pump interior.

In operation, positioning the sensor directly on the back plate 22 of the pump 10, particularly towards the upper portion thereof, enables a direct control to be kept of the water level within the pump. Should this drop below the height of the orifice (and therefore the sensor) 24 a signal is sent to suitable control means whereby to disable the pump electrically and prevent it from running dry.

However, in other circumstances, for example employing pressure/vacuum sensors, the sensor may advantageously be located towards the bottom of the pump body. While location on the back plate is convenient, and is currently preferred, the pump body could be drilled to accept the sensor at any desired position.

The system of the invention is considerably more reliable than the systems hitherto employed and, moreover, is easier to install and service since the pump is usually located in an accessible position.

## Claims

1. A pump including a protection device incorporating a water detecting sensor wherein the sensor is located in, or communicating with, the interior of the pump.
2. A pump as claimed in claim 1 having a pump back plate, the latter including an orifice therein within which to locate the water detecting sensor.

3. A pump as claimed in claim 2 in which the pump back plate is a modified form of the conventional pump back plate which it replaces.  
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  4. A pump as claimed in any of claims 1 to 3 in which the sensor is selected from pressure, vacuum, electronic, or capacitance sensors.  
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  5. A pump as claimed in any of claims 1 to 4 in which the sensor is positioned horizontally within horizontally within its orifice so that droplets of water run off the sensing face and do not collect thereon to give erroneous signals.  
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  6. A pump as claimed in any of claims 2 to 5 in which the orifice is sealed against egress of water.  
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  7. A pump as claimed in any of claims 1 to 6 in which the sensor is positioned towards the top of the pump.  
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  8. A pump as claimed in any of claims 1 to 6 in which the sensor is a pressure or vacuum sensor and is located towards the bottom of the pump body.  
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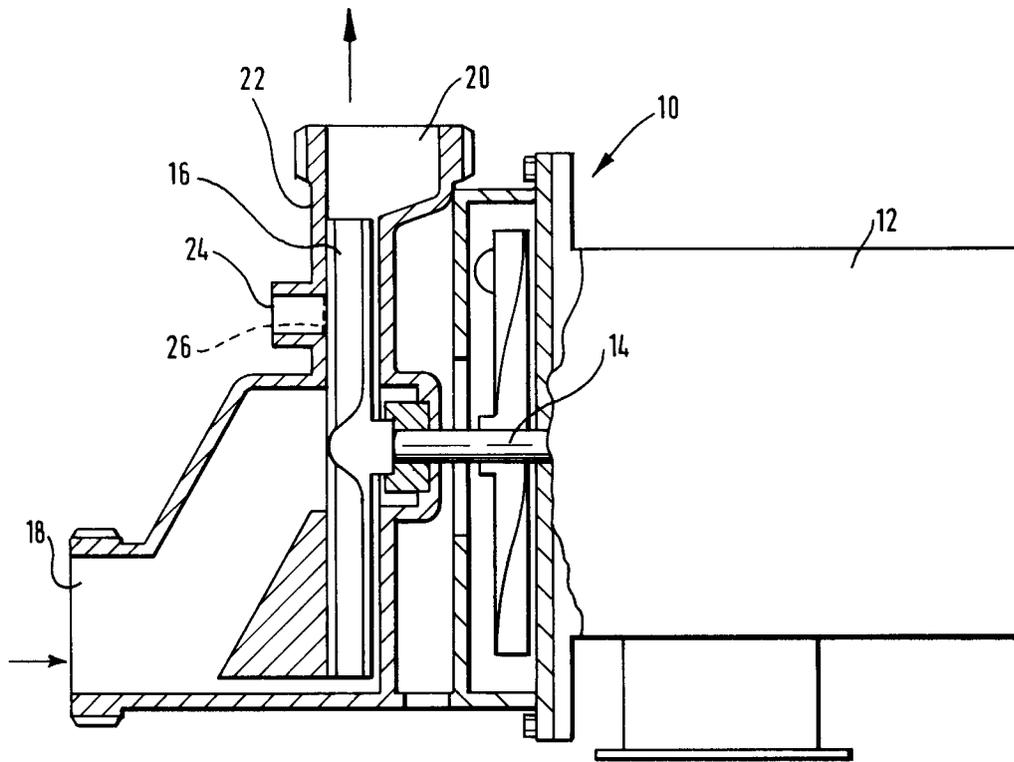


FIG. 1.

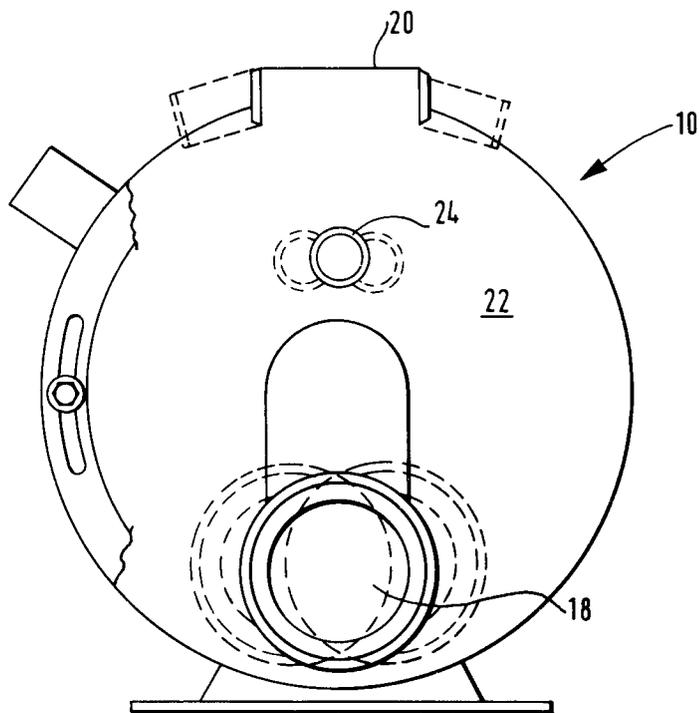


FIG. 2.



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.5)
X	DE-A-3 640 252 (SCHILLER ET AL.) * column 2, line 59 - column 3, line 2; figure 2A * * column 3, line 31 - line 36 * ---	1, 5, 7	A61H33/00 F04D15/02
X	DE-A-3 408 218 (LAHME) * page 10, paragraph 3; figures * ---	1	
X	US-A-4 396 353 (MACDONALD) * abstract * ---	1, 4, 7	
X	US-A-4 645 426 (HARTLEY ET AL.) * column 5, line 28 - line 52; figure 1 * ---	1, 4	
A	DE-U-8 616 503 (LÜCKOFF) * abstract * -----	4, 8	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			A61H F04D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 11 JUNE 1992	Examiner JONES M.
CATEGORY OF CITED DOCUMENTS		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	
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