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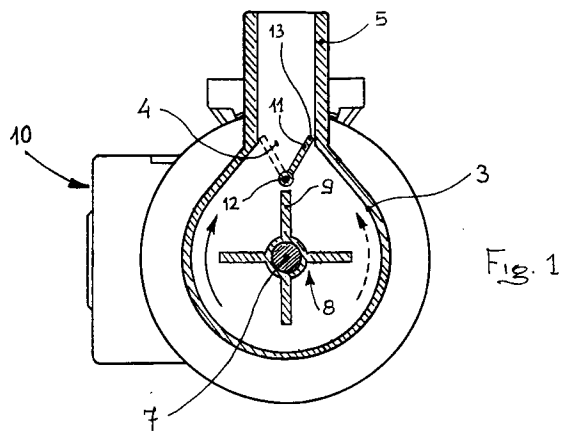
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Centrifugal pump driven by a synchronous motor.

Centrifugal pump driven by a synchronous motor and comprising a pressure chamber (3) having a circular cross-section and provided with a peripheral outlet (4) from which a delivery pipe (5) branches off radially. In said pressure chamber (3) is provided a baffle (11) which is freely hinged on an axis parallel to the drive shaft (7) of an impeller (8) formed with radial blades (9). Depending on the direction of rotation of the impeller (8), the baffle (11) is moved to either of two operative positions in which a free end portion (13) thereof abuts against the edge of the outlet (4).



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The present invention relates to a centrifugal pump driven by a synchronous motor which - as is known - may indifferently be started in either of two opposite directions of rotation.

Accordingly, centrifugal pumps driven by a synchronous motor are arranged substantially as described in EP-A-0 207 430. More particularly, these pumps comprise a pressure chamber, having a substantially circular cross-section, from which a delivery pipe branches off radially; furthermore, an impeller having radial blades is provided in the pressure chamber. Such a symmetrical structure is necessary in a centrifugal pump driven by a synchronous motor, unless special uni-directional starting devices are undesirably provided, in order to obtain equal hydraulic performances in both directions of rotation of the impeller.

The performance of the pump is however reduced, mainly because of the incorrect alignment of the delivery pipe with respect to the virtual direction of the fluid outflow, which is substantially tangential to the inner periphery of the pressure chamber. As a consequence, a portion of the pressurized fluid in the pump chamber tends to be recirculated within the chamber, instead of being delivered through the radial delivery pipe.

It is the scope of the present invention to provide a centrifugal pump driven by a synchronous motor having simple construction and improved performances in both directions of rotation of the impeller.

According to the present invention, this scope is attained in a centrifugal pump driven by a synchronous motor embodying the features recited in the appended claims.

The characteristics and advantages of the invention will become more apparent from the following description, given only by way of non-limiting example, with reference to the accompanying drawings, in which:

- Figure 1 diagrammatically shows a cross-section of the centrifugal pump according to the invention, in a preferred embodiment;
- Figure 2 diagrammatically shows a top view of the pump as in Figure 1.

With reference to the drawings, the centrifugal pump basically comprises a pressure chamber 3 having a substantially circular cross-section and tapered towards a peripheral outlet 4 from which a delivery pipe 5 branches off substantially radially. In addition, the pressure chamber 3 is provided with a central suction inlet 6 which is substantially concentric with respect to the drive shaft 7 of an impeller 8. The impeller 8 is formed with substantially rectilinear radial blades 9 and the shaft 7 is rotatably driven by a synchronous electric motor 10.

A baffle 11 is provided in the pressure cham-

ber 3, adjacent to the outlet 4. Preferably, the baffle 11 has a regular flat configuration, its width being just narrower than the inner axial length of chamber 3, and in correspondence of its innermost end portion 12 is freely hinged on the side walls of the chamber along an axis which is substantially parallel to the drive shaft 7. Furthermore, the end portion 12 of the baffle 11 is disposed in the chamber 3 at a radial distance from the axis of the drive shaft 7 which is just longer than the radius of the impeller 8. The free end portion 13 of baffle 11 is capable of abutting against the edge of outlet 4, such that the baffle may freely pivot about its hinge axis between two angularly opposite operative positions. In this connection, the edge of outlet 4 is preferably shaped accordingly, that is, with at least two diametrically opposite rectilinear portions 14, 15 (Figure 2) against which the baffle 11 can stop; for instance, the outlet 4 and at least a portion of the delivery pipe 5 have a substantially square cross-section.

When the impeller 8 is driven by the motor to rotate in either a clockwise or anti-clockwise direction, respectively, the fluid pressure inside the pressure chamber 3 causes the baffle to abut against the outlet 4 in the position which in Figure 1 is shown with continuous and dotted lines, respectively. In any case, the baffle 11 effectively diverts towards the outlet 4 the fluid which in the chamber 3 is pressurized by the impeller 8, with the result that the pump has an improved performance, substantially equal in both directions of rotation.

It should be noticed, in addition, that the negligible gap provided between the baffle 11 and the periphery of the impeller 8 prevents possible solid foreign bodies from getting stuck between the said two elements, where they could block the impeller 8.

The structural simplicity of the pump according to the invention should be apparent; of course, a number of modifications may be provided without departing from the scope of the invention. For example, the two operative positions of the baffle 11 may be defined by respective projections (not shown), instead of the edge of the outlet 4, which are preferably formed integrally with the pressure chamber 3.

Claims

1. Centrifugal pump comprising a pressure chamber having a substantially circular cross-section and provided with a peripheral outlet from which a substantially radial delivery pipe branches off, an impeller driven by a synchronous motor and formed with radial blades being provided in the pressure chamber, **char-**

- acterized in that** in the pressure chamber (3) are further provided, freely hinged on an axis substantially parallel to the drive shaft (7) of the impeller (8), baffle means (11) capable of moving between two angularly opposed operative positions in which a free end portion (13) of the baffle means is adjacent to the edge of said outlet (4). 5
2. Centrifugal pump according to claim 1, **characterized in that** in said operative positions the baffle means (11) abut against the edge of said outlet (4). 10
3. Centrifugal pump according to claim 2, **characterized in that** said baffle means (11) have a flat configuration and the edge of said outlet (4) is formed with at least two substantially rectilinear portions (14, 15) against which said baffle means (11) abut in said operative positions, respectively. 15
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4. Centrifugal pump according to claim 1, **characterized in that** said baffle means (11) are hinged in correspondence of an end portion (12) thereof which is disposed at a radial distance, from the axis of said drive shaft (7), just longer than the radius of said impeller (8). 25
5. Centrifugal pump according to claim 1, **characterized in that** said baffle means (11) have a width that is just narrower than the inner axial length of said pressure chamber (3), on the walls of which the baffle means are hinged. 30

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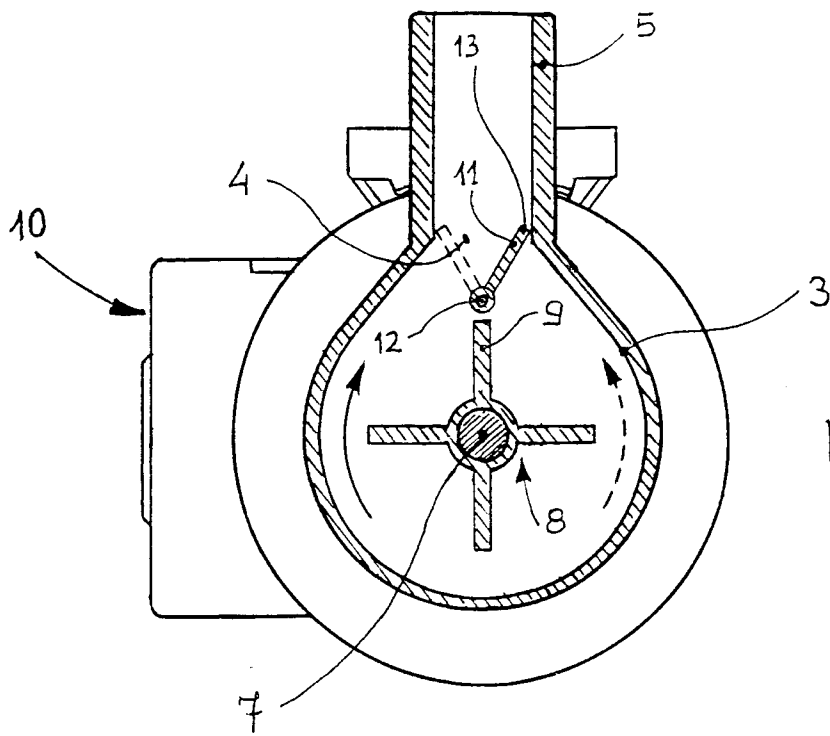


Fig. 1

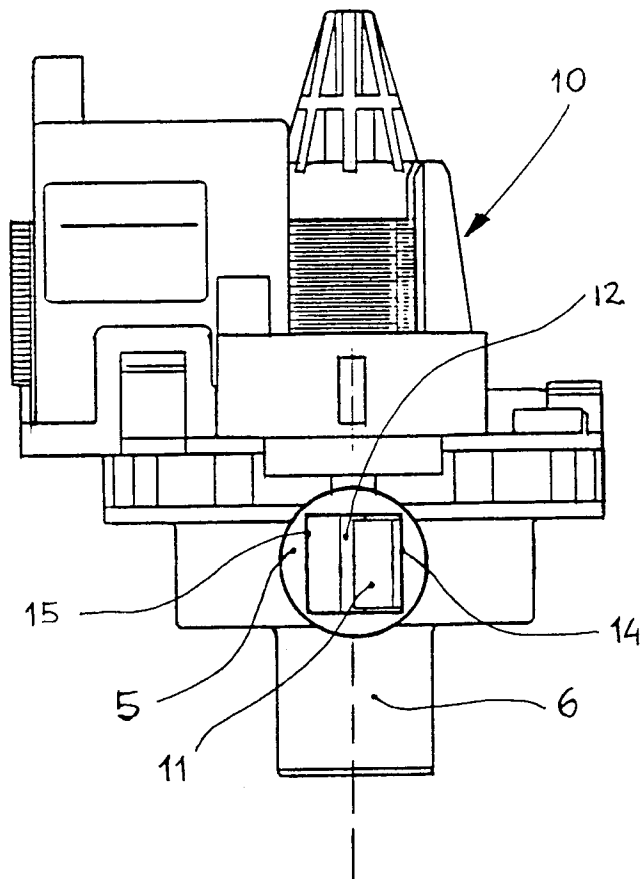


Fig. 2



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-3 830 542 (LICENTIA PATENT-VERWALTUNG) * abstract * * column 1, line 15 - line 19 * * column 1, line 23 - line 32 * * column 1, line 65 - column 3, line 8; figure * ---	1-4	F04D29/48 F04D13/06 F04D15/00
X	FR-A-1 049 066 (FAUQUE) * page 1, left column, line 1 - line 19 * * page 1, left column, line 31 - right column, line 33; figures * ---	1-5	
X	DE-A-3 442 907 (BOSCH) * abstract * * page 6, line 7 - page 7, line 29 * * page 8, line 16 - line 34; figures 1-3,6,7 * -----	1,2,4	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			F04D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 26 MAY 1992	Examiner ZIDI K.
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	