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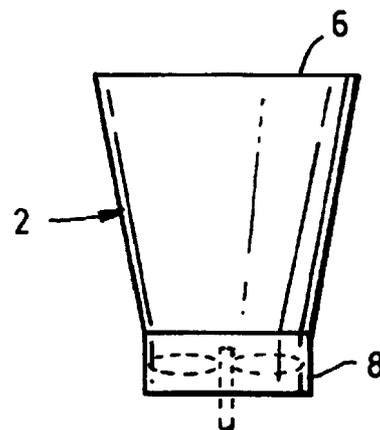
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(54) **Exit tube for rotary impeller**

(57) To overcome a problem of reduced efficiency caused by a spiralling flow vector within the exit tube of a rotary impeller the exit tube (2) for the rotary impeller comprises a tubular member having a substantially circular inlet opening (4) and an outlet opening (6) of an elongated shape such as an oval, ellipse or flattened circle which renders the flow vector substantially perpendicular to the plane of the exit tube outlet.

Fig. 1.



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Description

Field of the Invention

[0001] The present invention relates to an exit tube for a rotary impeller; in particular, for a rotary impeller drawing a solids-entraining fluid through a filter.

Background of the Invention

[0002] Rotary impellers drawing a fluid through a filter operate today with exit tubes, either cylindrical or conical, of a substantially circular cross-section. For optimal efficiency, the flow vector in the exit tube should be substantially parallel to the axis of the tube, i.e., perpendicular to the exit tube outlet. However, due to the rotary movement of the impeller, the flow vector proceeds in an upwardly spiraling fashion, which prevents the conversion of the kinetic energy of the swirling fluid into pressure energy and thus reduces the pressure difference Δp between the tube inlet and its outlet. To maximize this pressure difference, which is essential for efficient impeller action, the swirling movement imparted to the fluid by the impeller must be suppressed. In prior art impellers, this is done by a diffuser arrangement inside the tube, which consists of a number of baffles set at an angle opposing the lead angle of the spiraling flow. Such diffusers, however, greatly impair the efficiency of the impeller by absorbing some of the kinetic energy of the fluid, thus reducing the above-mentioned pressure difference. This is especially true with impellers that operate in both directions of rotation.

Summary of the Invention

[0003] It is thus the object of the present invention to provide an exit tube for a rotary impeller that will break the spiraling flow and render the flow vector substantially perpendicular to the exit tube outlet plane.

[0004] According to the invention, the above object is achieved by providing an exit tube for an impeller, comprising a tubular member having an inlet opening and an outlet opening, wherein said inlet opening is substantially circular and said outlet opening is of an elongated shape.

Brief Description of the Drawings

[0005] The invention will now be described in connection with certain preferred embodiments with reference to the following illustrative figures so that it may be more fully understood.

[0006] With specific reference now to the figures in detail, it is stressed that the particulars shown are by way of example and for purposes of illustrative discussion of the preferred embodiments of the present invention only, and are presented in the cause of providing

what is believed to be the most useful and readily understood description of the principles and conceptual aspects of the invention. In this regard, no attempt is made to show structural details of the invention in more detail than is necessary for a fundamental understanding of the invention, the description taken with the drawings making apparent to those skilled in the art how the several forms of the invention may be embodied in practice.

10 [0007] In the drawings:

Fig. 1 is a schematic elevational view of the exit tube of the present invention;

Fig. 2 is a schematic side view of the exit tube, and Fig. 3 is a schematic top view of the exit tube.

Detailed Description of Preferred Embodiment

[0008] Figs. 1, 2 and 3 illustrate the exit tube of the present invention as seen from the front, side and top, respectively. The characteristic shape of the exit tube according to the invention is best understood from the top view of Fig. 3, which clearly shows inlet opening 4 to be of a circular shape, while outlet opening 6 is of an elongated shape which can be produced by any closed curve, provided the length of the area enclosed by that curve substantially exceeds its width. Such curves are, e.g., an oval, an ellipse, a flattened circle, etc.

[0009] What is not immediately clear from Fig. 3 is that, for hydrodynamic reasons, another condition is essential for optimizing the efficiency of the exit tube: the respective areas defined by inlet opening 4 and outlet opening 6 must be of a substantially equal size.

[0010] Also seen in Figs. 1 and 2 is a short cylindrical section 8, contiguous and advantageously integral with exit tube 2, which accommodates the impeller that draws the solids-entraining fluid through the filter and pushes the cleaned fluid through exit tube 2.

[0011] Experiments have shown that a circular inlet opening having a diameter of 60.3 mm and an elliptical outlet opening having a length of 100 mm and a width of 40 mm, produces satisfactory results.

[0012] It will be evident to those skilled in the art that the invention is not limited to the details of the foregoing illustrated embodiment and that the present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof. The present embodiment is therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

Claims

1. An exit tube for an impeller, comprising a tubular

member having an inlet opening and an outlet opening, wherein said inlet opening is substantially circular and said outlet opening is of an elongated shape.

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2. The exit tube as claimed in claim 1, wherein the areas defined by said inlet opening and said outlet opening are of a substantially equal size.
3. The exit tube as claimed in claim 1, wherein said elongated shape is an oval. 10
4. The exit tube as claimed in claim 1, wherein said elongated shape is an ellipse. 15
5. The exit tube as claimed in claim 1, wherein said elongated shape is a flattened circle.
6. An exit tube for an impeller as claimed in claim 1, substantially as hereinbefore described and with reference to the accompanying drawings. 20

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Fig.1.

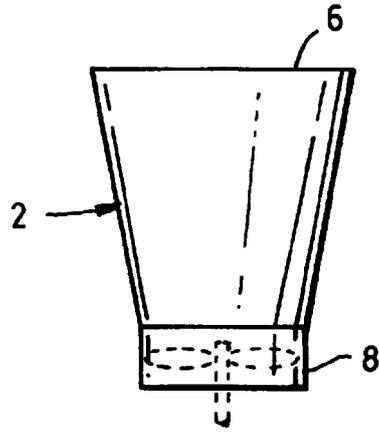


Fig.2.

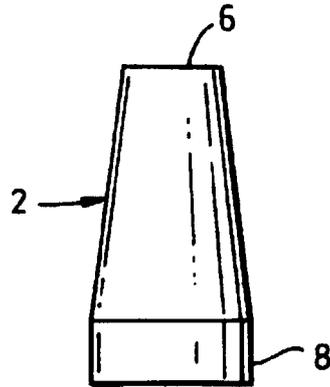
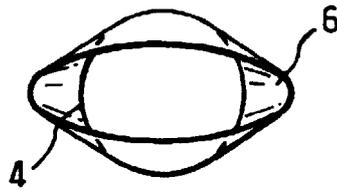


Fig.3.





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EUROPEAN SEARCH REPORT

Application Number
EP 00 20 0986

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			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			F04D F01N
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 21 July 2000	Examiner Teerling, J
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	
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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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