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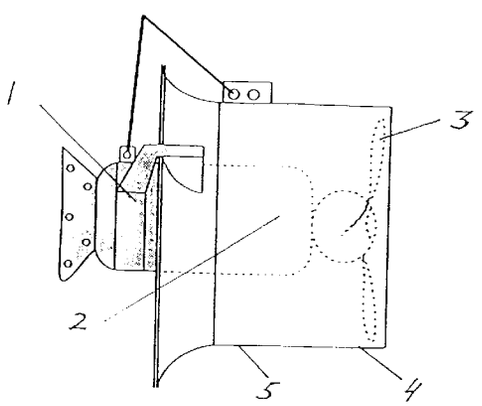
(54) A cooling device for mixers

(57) The invention concerns a cooling device for the electric motor in a submersible mixer. In order to increase the media exchange at the mantle surface of said motor (2) , the jet ring (4, 5) surrounding the propeller (3) is extended in such a way that the flow created by the propeller is partly forced to pass through the slot between the motor (2) and the ring (5).



Figur 1

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The invention concerns a cooling device for a mixer for operation in viscous liquids where amounts of solid bodies are frequent.

Mixers of this type comprise a driving unit such as an electric motor, a propeller and a driving shaft there between. The propeller may be designed with two or more vanes and to be driven with various speeds depending on type of use.

Mixers are used within different fields for homogenizing and to keep particles in suspension in liquids for different industrial processes, in farming, for treatment of sewage water etc. The mixer may be arranged horizontally or vertically or in different angle positions there between. It can also be arranged to move in such a way that the flow from the mixer is caused to sweep over larger areas or being directed towards certain spots within the liquid tank.

In order to obtain an effective mixing or flow a jet ring is often arranged around the propeller having a diameter somewhat exceeding that of the propeller and a normally relatively limited axial extension. With no jet ring present a dominating radial flow is obtained which means that the axial flow through the machine becomes very limited as the same amount of liquid is rapidly sucked back to the propeller. In addition there is a leakage between the pressure and the suction side of the propeller which further decreases the axial flow. According to known practice the jet ring is normally designed as a cylinder having a somewhat expanding collar at its inlet to facilitate the inflow. Such jet rings are shown in the Swedish Design Registrations No:s 34601 and 39392.

The electric motor is cooled by the surrounding medium which calls for a certain flow around the motor, which flow normally is obtained by the mixer itself. When mixing liquids that demand a certain shear stress to be exceeded before any movement is created, Bingham liquids, problems may occur to obtain a flow strong enough. This might cause the motor to be overheated.

The invention concerns a device for solving the problem mentioned above. The invention is described more clearly below with reference to the enclosed drawings.

Fig 1 shows a mixer provided with a cooling device according to the invention, while Figs 2 and 3 show flows around a mixer not provided with a cooling device, Fig 2, and with a cooling device, Fig 3.

In the drawings 1 stand for a mixer with a driving unit, electric motor 2 and a propeller 3. 4 stands for a jet ring and 5 an extension of this.

With reference to Fig 2 the conditions when mixing Bingham liquids are discussed. The mixer here creates a flow symbolized by the arrows in the light part of the drawing. The area close to the electric motor is not included in the flow which means an insufficient heat exchange between the motor housing and the surroundings.

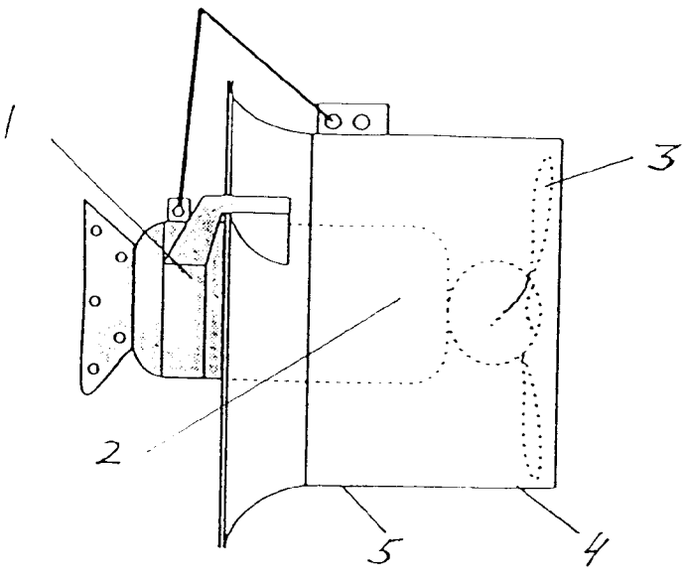
In Fig 3 is shown the flow increase or the extension of the area where flow takes place, which is obtained by help of the invention. The propeller creates an under pressure at its inlet side, inside of the jet ring, which means that critical shear stress is exceeded and a flow is obtained through the jet ring along the wall of the motor housing which thus is given an effective cooling.

In the example above an extended jet ring has been used to obtain an effective cooling of the motor housing. It is however possible, according to the inventor, to arrange one or several means around the motor, parted from the jet ring, which obtain the necessary flow.

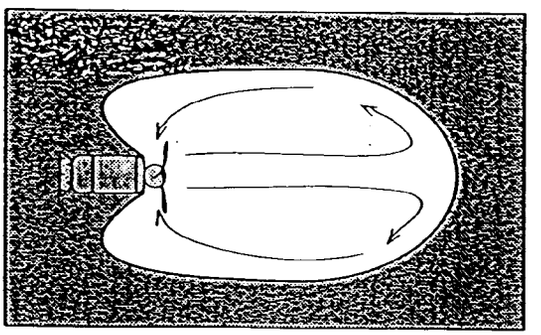
Claims

1 A cooling device for mixers comprising an electric motor and a propeller with a driving shaft there between, said mixer, including the electric motor, being meant to operate submersed in the mixed medium, characterized in that the mantel surface of the electric motor (2) is partly or entirely surrounded by a cylindrical wall (5) for intensifying the media exchange at said surface.

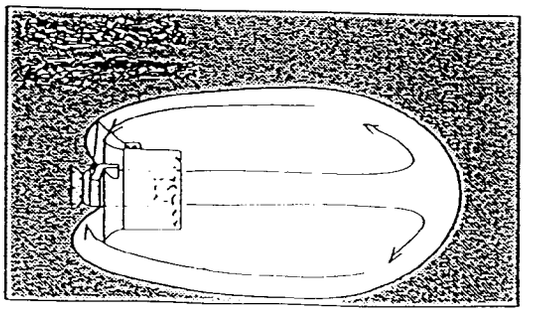
2 A cooling device according to claim 1, characterized in that the wall (5) is an extended part of a jet ring (4, 5) surrounding the propeller.



Figur 1



Figur 2



Figur 3

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EUROPEAN SEARCH REPORT

Application Number
EP 95 85 0101

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.6)
X	PATENT ABSTRACTS OF JAPAN vol. 6, no. 49 (C-96) (927) 31 March 1982 & JP-A-56 161 893 (KURIMOTO TEKKOSHO) 12 December 1981 * abstract *	1,2	B01F7/06 B01F3/04
X	EP-A-0 286 611 (FLYGT AB) * figure 1 *	2	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B01F
C02F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	17 July 1995	Cordero Alvarez, M

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

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