(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 306 280 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **88308040.0**

(22) Date of filing: **31.08.88**

(51) Int. Cl.[4]: **B 01 F 7/22**
B 01 F 15/00

(30) Priority: **01.09.87 ZA 876513**

(43) Date of publication of application:
08.03.89 Bulletin 89/10

(84) Designated Contracting States:
AT BE CH DE ES FR GB GR IT LI LU NL SE

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(54) Impeller mixers.

(57) A mixer including a mixing tank (10) within which an axial flow impeller (12) is spaced above the base of the tank (10). The tank includes peripheral vertical baffles (11) against the tank wall above the impeller (12) and, below the impeller (12), a plurality of radial diffusion vanes (14) radiating from a mounting boss (15) located below the centre of the impeller (12).

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Description

IMPELLER MIXERS

BACKGROUND TO THE INVENTION

THIS invention relates to mixers in which an axial flow impeller is operated within a mixing tank to stir liquids, slurries or suspensions.

When used in relatively tall tanks, axial flow impellers are normally used in conjunction with draft tubes to augment the operation of the impeller.

Draft tubes have the advantage that they allow the impeller to be located in the upper portion of the tank, thereby reducing shaft length and whip as well as the mass of the system. In addition, in the upper portion of the tank, the impeller is generally free from settled solids so that starting of the impeller is facilitated.

However, draft tube circulators involve heavy and expensive equipment within the tank and it would obviously be advantageous to do away with the need for draft tubes.

SUMMARY OF THE INVENTION

A mixer including a mixing tank within which an axial flow impeller is spaced above the base of the tank, the tank including, below the impeller, a plurality of radial diffusion vanes radiating from a position below the centre of the impeller.

The diffusion vanes may be mounted within a centrally located mounting boss which is located below the impeller.

The mounting boss may be frusto-conical with the taper thereof reducing in a direction away from the impeller and the radial diffusion vanes may taper, at least along their upper edges, from the mounting boss to the tank wall.

Peripheral vertical baffles may be located on the tank wall to extend upwardly from the radial diffusion vanes, the vertically extending surfaces of the baffles being co-extensive with the vertically extending surfaces of the ends of the vanes adjacent the tank walls.

The angular orientation of the diffusion vanes may be substantially vertical, but this orientation will, eventually, depend on the application to which the mixer of the invention is to be put, since a mixing flow other than a purely axial flow may be required in certain applications.

Surprisingly it has been found that the radiating diffusion vanes serve the same purpose as a draft tube to ensure proper circulation of material in the tank.

DESCRIPTION OF THE DRAWINGS

In the drawings:

Figure 1 is a vertical section through a mixing tank: and

Figure 2 is a section on a line 2-2 in Figure 1.

DESCRIPTION OF AN EMBODIMENT OF THE INVENTION

A mixing tank 10 is fitted with vertical wall mounted baffles 11 in a conventional manner. An axial flow impeller 12 is provided and mounted for rotation within the tank on a drive shaft 13.

A plurality of vertically oriented diffusion vanes 14 radiating from a central mounting boss 15, are attached to the wall of the tank directly below the impeller 12. The boss 15 is frusto-conical in shape and tapers downwardly away from the impeller 12. The upper edges of the of the vanes 14 are tapered downwardly towards the tank wall. The vertical ends of the vanes adjacent the tank wall are co-extensive with the lower ends of the baffles 11.

The effect of the diffusion vanes 14 is to counteract the swirling effect of the impeller 12 and to smooth out vortices within the liquid. The result is that the liquid, pulp or slurry being mixed in the tank circulates smoothly and follows a fully axial flow path - down in the centre and up along the wall of the tank 10.

The boss 15 may be extended downwardly into a support column, the base of which may be provided with gusset plate supports which serve, in addition, as diffuser vanes adjacent the floor of the tank 10.

Claims

1. A mixer including a mixing tank within which an axial flow impeller is spaced above the base of the tank, characterised by the inclusion in the tank, below the impeller, a plurality of radial diffusion vanes radiating from a position below the centre of the impeller.

2. A mixer according to claim 1 characterised in that the diffusion vanes are mounted within a central mounting boss which is located below the impeller.

3. A mixer according to either of the preceding claims characterised in that the mounting boss is frustoconical with the taper thereof reducing in a direction away from the impeller.

4. A mixer according to any one of the preceding claims characterised in that the radial diffusion vanes taper from the mounting boss to the tank wall.

5. A mixer according to claim 4 characterised in that the radial diffusion vanes taper along their upper edges, from the mounting boss to the tank wall.

6. A mixer according to any one of the preceding claims characterised in that peripheral vertical baffles are located on the tank wall, the baffles extending upwardly from the radial diffusion vanes and the vertically extending surfaces of the baffles being co-extensive with the vertically extending surfaces of the ends of the vanes adjacent the tank walls.

7. A mixer according to claim 6 characterised in

that the angular orientation of the diffusion vanes is substantially vertical.

8. A mixer according to claim 6 characterised in that the angular orientation of the diffusion vanes is angled to the vertical.

9. A mixer substantially as described in this specification with reference to the accompanying drawings.

Fig. 1

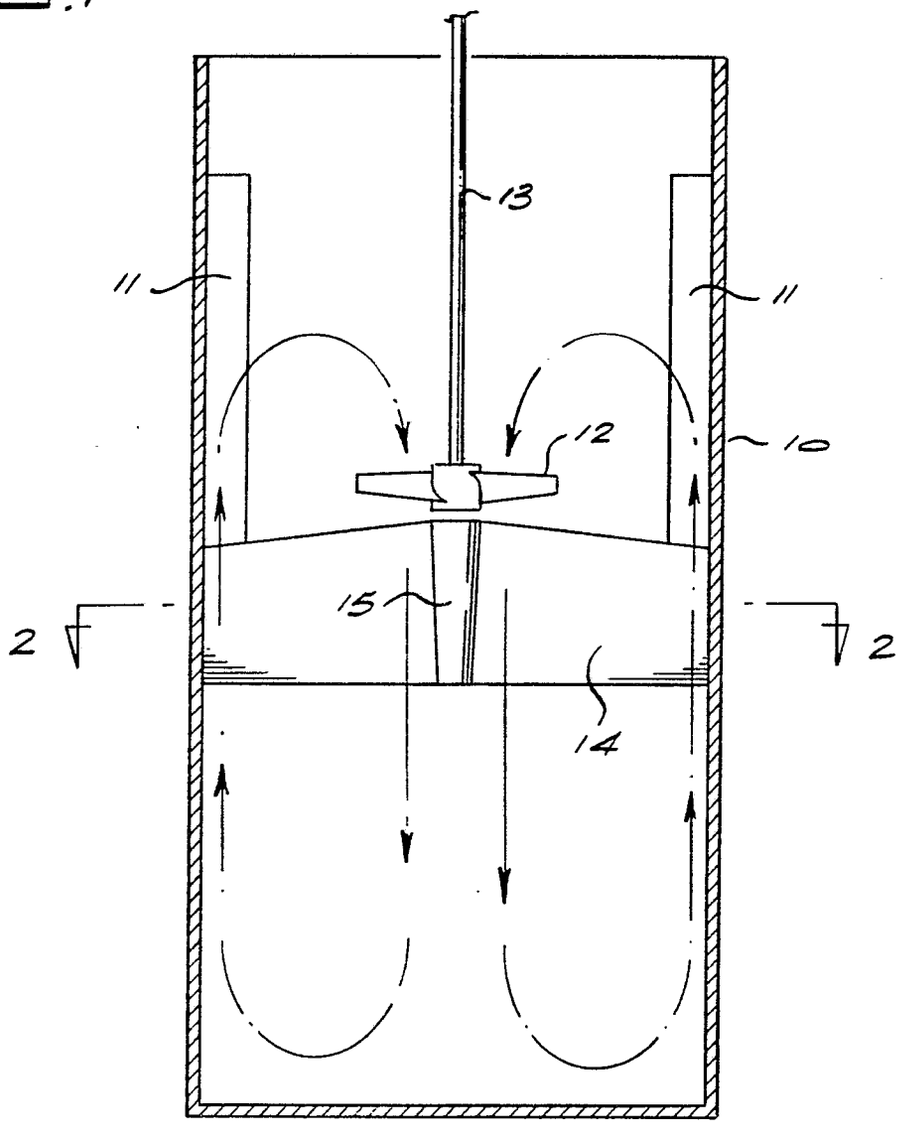
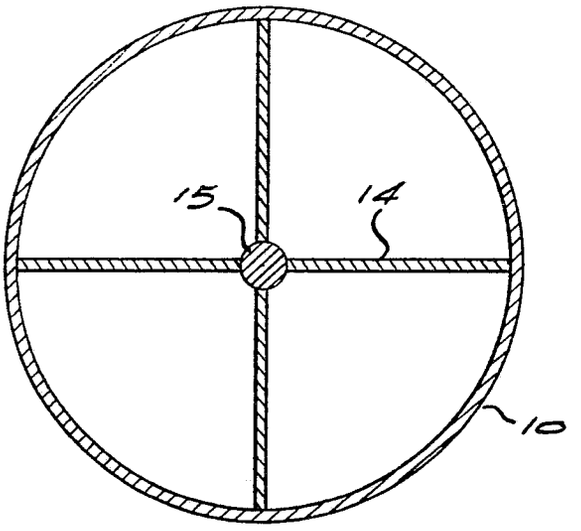


Fig. 2



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EUROPEAN SEARCH REPORT

Application Number

EP 88 30 8040

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.4)
X	EP-A-0 137 398 (E.I. DUPONT) * figures 3,4; page 8, line 24 - page 9, line 3 *	1,6,7	B 01 F 7/22 B 01 F 15/00
A	PATENT ABSTRACTS OF JAPAN volume 10, no. 269 (C-372) (2325) 12th September 1986; JP - A - 61 093 819 (TEIKOKU DENKI SEISAKUSHO K.K.) 12-05-1986	1	
A	DE-B-1 757 113 (G.A. STAAF) * figure 1; column 2, lines 29-36 *	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

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B 01 F 15/00

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	18-11-1988	KESTEN W.G.

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
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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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EPO FORM 1503 03.82 (P0401)