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Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

[Continued on next page]

(54) Title: HORIZONTAL MIXER WITH CENTER - ANGLED BLADES, FLUID SYSTEM AND METHOD OF PROVIDING SLURRY

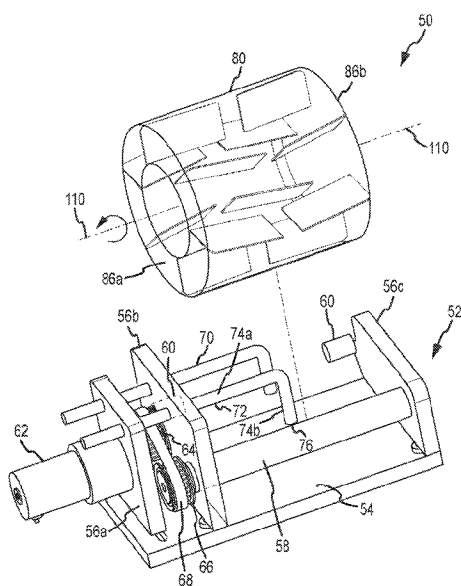


FIG. 2

(57) Abstract: A horizontal mixer (50) is disclosed. Multiple blades (92) are affixed to and rotate with a tumbler (80) of the mixer (50). These blades (92) extend within an interior mixing chamber (90) and are center-angled so as to promote a desirable mixing action within this chamber (90) (e.g. so as to fold a slurry within the chamber (90) onto itself). One characterization is that the blades (92) are oriented so as to direct a flow toward a common outlet region (78) within the tumbler (80) throughout at least a certain rotational angle. The mixer (50) is particularly suited for realizing a desirable homogeneity of particles within a slurry from which radioisotopes may be produced.



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12 April 2012

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2011/043112

A. CLASSIFICATION OF SUBJECT MATTER

INV. B01F9/06

ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B01F B28C E01C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2009/073798 A1 (WALLGREN MARK E [CA]) 19 March 2009 (2009-03-19)	1,23-28, 30,31
Y	paragraph [0001]	8-11,13,
A	paragraph [0005] - paragraph [0019] paragraph [0065] - paragraph [0069] figure 2	14,22 2-7,12, 15-21
X	----- US 1 093 723 A (J. S. OWENS) 21 April 1914 (1914-04-21) page 1, line 8 - line 17 page 1, line 91 - page 2, line 7 page 2, line 31 - line 67 figures ----- -/--	1-19, 22-25



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

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INTERNATIONAL SEARCH REPORT

International application No

PCT/US2011/043112

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 973 167 A (ZMARLICKI HIERONIM [US]) 27 November 1990 (1990-11-27)	1-5,7,9, 13,14, 22-28, 30,31
A	column 1, line 44 - line 64 column 2, line 36 - line 47 column 2, line 61 - column 3, line 7 figures 1,4 -----	6,8, 10-12, 15-21
Y	WO 2004/103540 A1 (UNILEVER PLC [GB]; UNILEVER NV [NL]; LEVER HINDUSTAN LTD [IN]; BALLUS) 2 December 2004 (2004-12-02)	8-11,13, 14,22
A	page 1, line 7 - line 8 page 3, line 14 - page 4, line 3 figure 1 -----	1-7,12, 15-21, 24-28, 30,31

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2011/043112

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-28, 30, 31

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International Application No. PCT/ US2011/ 043112

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-28, 30, 31

Horizontal mixer comprising a plurality of first blades and a plurality of second blades.

2. claim: 29

Fluid system comprising a feed source fluidly connected with a horizontal mixer comprising a rotational axis, said feed source comprising a first source for particles and a feed source for fluid.

3. claim: 32

Fluid system comprising a horizontal mixer comprising a rotational axis and a recirculation loop.

4. claims: 33-42

Method of providing slurry using a mixer comprising first and second mixer ends wherein a first flow is directed from a first mixer end toward a first location within the mixer and a second flow is directed from a second mixer end toward a first location within the mixer.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2011/043112

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2009073798	A1	19-03-2009	NONE
US 1093723	A	21-04-1914	NONE
US 4973167	A	27-11-1990	NONE
WO 2004103540	A1	02-12-2004	AR 044393 A1 14-09-2005 WO 2004103540 A1 02-12-2004