Commonwealth of Australia
The Patents Act 1952

DECLARATION IN SUPPORT

In support of the (Convention) Application made by:

GUT Gesellschaft für umweltschonende Technik mbH
of Unterer Markt 6, D-4530 Ibbenbüren 1
Federal Republic of Germany

for a patent for an invention entitled:

Method and Device for Processing Hydroxide Sludges

~~I~~ (We) Franz-Josef Overmeyer and Rolf Reuter

of and care of the applicant company do solemnly and sincerely declare as follows:

~~a) I am (We are) the applicant(s) for the patent~~
or
b) I am (We are) authorised by the applicant(s) for the patent to make this declaration on its behalf.

Delete the following if not a Convention Application.

The basic application(s) as defined by section 141 (142) of the Act was (were) made

on 7 September 1987 in Federal Republic of Germany

~~on~~ ~~in~~

~~on~~ ~~in~~

by RRM Energy GmbH

The basic application(~~s~~) referred to in this paragraph is (~~are~~) the first application(~~s~~) made in a Convention country in respect of the invention the subject of the application.

~~a) I am (We are) the actual inventor(s) of the invention.~~

or

b) Rolf Reuter of Am Stadtbad 9,
4300 Essen 18, Federal Republic of Germany

is (~~are~~) the actual inventor(~~s~~) of the invention and the facts upon which the applicant company

is (~~are~~) entitled to make the application are as follows:

The applicant company is the assignee of RRM Energy Gmbh in respect of the invention and RRM Energy GmbH is the assignee of said actual inventor in respect of the invention.

Declared at Ibbenbüren 1 this 10th day of December 1989

Signed Status Managing Director

(Franz-Josef Overmeyer) (Rolf Reuter)

Declarant's Name

F. B. RICE & CO PATENT ATTORNEYS

This form is suitable for any type of Patent Application. No legalisation required.

(12) PATENT ABRIDGMENT (11) Document No. AU-B-23214/88
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 609191

(54) Title
PROCESS AND DEVICE FOR PROCESSING HYDROXIDE SLUDGES

International Patent Classification(s)
(51)⁴ C22B 007/00 C02F 009/00

(21) Application No. : 23214/88 (22) Application Date : 02.09.88

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(30) Priority Data

(31) Number	(32) Date	(33) Country
3729913	07.09.87	DE FEDERAL REPUBLIC OF GERMANY

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(71) Applicant(s)
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(56) Prior Art Documents
US 4680126
US 4105243
US 4579721

(57) Claim

1. A method of processing hydroxide sludges which comprises hydroxides of chromium, iron, copper, nickel and optionally zinc, characterized in that, if zinc is present, the zinc hydroxide is dissolved from the sludge by alkali; that, the chromium hydroxide in the residue of the alkali treatment or the hydroxide sludge respectively is oxidized to chromate in a weakly alkaline medium· that copper and nickel are dissolved by acid treatment from the residue of the oxidation that the residual sludge comprising iron hydroxide is separated from the solution containing copper and nickel; that copper oxide is precipitated from the solution containing copper and nickel; and that the precipitated copper oxide is separated from the nickel containing solution.

13. A device for carrying out the method as set forth in any one of the preceding claims, characterized by a

.../2

reaction vessel provided with a filling device and connected through a filter to a recipient vessel, a reagent dosing device connected to the reaction vessel, a circulation system with a circulation conduit containing a circulation pump and connecting the recipient vessel with the reaction vessel, a discharge device which connects the filter with a collecting vessel for the residual sludge containing substantially iron hydroxide, and collecting vessels for zincate solution if present, chromate solution, nickel solution and copper solution, respectively, which collecting vessels are each connectable at their input side through at least one controlled valve to the recipient vessel and at their output side through respective controlled valves selectively to the circulation system or a further processing system.

AU-AI-23214/88

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Internationales Büro

INTERNATIONALE ANMELDUNG VERÖFFENTLICHT NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS (PCT)

(51) Internationale Patentklassifikation ^{4} **:** **C22B 7/00, C02F 9/00**	**A1**	**(11) Internationale Veröffentlichungsnummer:** **WO 89/ 02481** **(43) Internationales Veröffentlichungsdatum:** 23. März 1989 (23.03.89)

(21) Internationales Aktenzeichen: PCT/EP88/00799

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(32) Prioritätsdatum: 7. September 1987 (07.09.87)

(33) ~~Prioritätsland:~~ DE

SECTION 34(4)(a) DIRECTION SEE FOLIO 10
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AUSTRALIAN PATENT OFFICE
Sec. 34(4)

(71)

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(74) Anwälte: WEISSE, Jürgen usw.; Bökenbusch 41, D-5620 Velbert 11 (DE).

(81) Bestimmungsstaaten: AT (europäisches Patent), AU, BE (europäisches Patent), BR, CH (europäisches Patent), DE (europäisches Patent), DK, FI, FR (europäisches Patent), GB (europäisches Patent), IT (europäisches Patent), JP, KR, LU (europäisches Patent), NL (europäisches Patent), SE (europäisches Patent), SU, US.

Veröffentlicht
~~*Mit internationalem Recherchenbericht.*~~

A.O.J.P. 25 MAY 1989

AUSTRALIAN
17 APR 1989
PATENT OFFICE

(54) Title: PROCESS AND DEVICE FOR PROCESSING HYDROXIDE SLUDGES

(54) Bezeichnung: VERFAHREN UND VORRICHTUNG ZUR AUFARBEITUNG VON HYDROXIDSCHLÄMMEN

(57) Abstract

Batches of hydroxide sludges are successively converted with various reagents in a reaction container, thus transforming by oxidation the chrome hydroxide into chromate. The zinc hydroxide is extracted by alkalis. The chrome hydroxide in the residue of the alkali processing is oxidized into chromate. Copper and nickel are extracted with acids from the oxidation residues. The remaining residual sludge contains essentially iron hydroxide. Copper oxide is precipitated from the solution, separated from the nickel solution and finally dissolved in acid. The separation can be carried out in a single container and supplies the separated components of the hydroxide sludge in a form that allows these components to be recuperated as useful materials.

(57) Zusammenfassung

Die Hydroxidschlämme werden chargenweise in einem Reaktionsbehälter nacheinander mit verschiedenen Reagentien umgesetzt. Dabei wird Chromhydroxid zu Chromat oxidiert. Zinkhydroxid wird durch Alkali herausgelöst. Chromhydroxid in den Rückstand der Alkalibehandlung wird zu Chromat oxidiert. Aus dem Rückstand von der Oxidation werden Kupfer und Nickel mit Säure gelöst. Der zurückbleibende Restschlamm enthält im wesentlichen Eisenhydroxid. Aus der Lösung wird Kupferoxid ausgefällt, von der Nickellösung getrennt und anschliessend in Säure gelöst. Die Auftrennung kann im Eintopfverfahren durchgeführt werden und liefert die getrennten Bestandteile des Hydroxidschlamms in einer Form, in der diese Bestandteile als Wertstoffe zurückgewonnen werden können.

Technical Field

The present invention relates to a method and a device for processing hydroxide sludges. Such hydroxide sludges primarily result from galvanic processes and because of their relatively high proportions of heavy metals such as chromium, iron, copper, nickel and perhaps zinc, are a considerable environmental problem.

Disclosure of the Invention

Accordingly, the object of the present invention is to provide a method and a device which allow the processing of such hydroxide sludges, particularly those hydroxide sludges which contain chromium, iron, copper, nickel and perhaps zinc, so that these hydroxide sludges cause either negligible or no environmental loads.

According to the method of the invention, this object is achieved in that, if zinc is present, the zinc hydroxide is dissolved from the sludge by alkali, that, the chromium hydroxide in the residue of the alkali treatment or hydroxide sludge respectively, is oxidized to chromate in a weakly alkaline medium, that copper and nickel are dissolved by acid treatment from the residue of the oxidation, that the residual sludge substantially consisting of iron hydroxide is separated from the solution containing copper and nickel, that copper oxide is precipitated from the solution containing copper and nickel, and that the precipitated copper oxide is separated from the solution containing nickel.

The device according to the invention for achieving the object is characterized by: a reaction vessel provided with a filling device and connected through a filter to a recipient vessel, a reagent dosing device connected to the reaction vessel, a circulation system with a circulation conduit which comprises a circulation pump and connects the recipient vessel with the reaction vessel, a discharge device which connects the filter with a collecting vessel for the residual sludge containing substantially iron hydroxide, and collecting vessels for zincate solution if present, chromate solution, nickel solution and copper solution, respectively. These collecting vessels are respectively connectable at their input side through at least one controlled valve to the recipient vessel and at their output side through respective controlled valves selectively to the circulation system or a further processing system.

Thus, the method according to the invention and the device according to the invention permit complete processing of the hydroxide sludge with separation into its individual components. The processing is accomplished by using method steps which as such do not cause any environmental load worth mentioning. In this way, the necessity for deposition of the hydroxide sludge is eliminated. A particular advantage is achieved in that the processing is carried out using a single vessel technique and the solutions of the separated components are circulated. This has the result that the solutions of the individual components can be enriched to such degree that further processing, i.e. the recovery of the valuable substances, is profitable.

Brief Description of the Drawings

The drawing illustrates schematically a device for processing hydroxide sludges.

Preferred Embodiments of the Invention

The device described below is a preferred embodiment which is suitable for processing the hydroxide sludge in batches, particularly hydroxide sludge of the kind resulting from galvanic processes. However, the processing method can also be carried out as efficiently in reaction vessels connected in series where the individual processing steps are carried out separately.

As a central component of the installation, the device comprises a reaction vessel 1 provided with a filling device 2 which is connected through a controlled valve 3 to the input side of the reaction vessel 1. At its input side, the reaction vessel 1 is furthermore provided with a reagent dosing device 4 containing reservoirs 4A, 4B and 4C respectively connected through controlled valves 5 to the reaction vessel 1. A stirrer 6 of a conventional stirring device projects into the interior of the reaction vessel 1.

A filter 7 is located at the output side of the reaction vessel 1 and is connected to a recipient vessel 10. A discharge device 8 of conventional construction is connected to the filter 7 and serves to convey the filtering residue of filter 7 to a collecting vessel 9. The recipient vessel 10 is connected through a controlled valve 14 and a circulation system 11 consisting of a circulation conduit 12 and a circulation pump 13, to the input side of the reaction vessel 1.

Furthermore, the reaction vessel 10 is connected through a controlled valve 15 to collecting vessels 16, 17, 18 and 19 which receive respective solutions of the separated components of the hydroxide sludge. The collecting vessels 16 to 19 are selectively connectable on their output sides through controlled valves 20 to further processing systems (not illustrated in detail), for example, electrolysis installations or through a conduit 21 to the input side of the circulation pump 13 of the circulation system 11.

For controlling the processing method a conventional programmable control device 25 is provided to which the controlled valves 3, 5, 14, 15 and 20, the circulation pump 13, the discharge device 8 and a pH-sensor 26 arranged in the interior of the reaction vessel 1, are connected and which controls the method described according to a given program course.

In particular, the above described installation for processing a hydroxide sludge containing iron, chromium, nickel and perhaps zinc operates as described below. The reaction steps for separating zinc can be omitted when the hydroxide sludge does not contain zinc hydroxide. In the subsequent description it is assumed that the collecting vessels 16 to 19 contain zincate solution, chromate solution, nickel solution, and copper solution, respectively. The first reservoir 4A contains aqueous alkali,for example, sodium hydroxide solution,the second reservoir 4B contains an aqueous hydrogen peroxide solution, and the third reservoir 4C contains an aqueous acid, for example, hydrochloric acid. As far as required, the respective residues can be washed with water between the individual separation steps.

In the first method step, by opening the controlled valve 3, the reaction vessel 1 is charged with a predetermined amount of the hydroxide sludge from the filling device 2. Thereafter, zinc is dissolved by circulating the zincate solution from the collecting vessel 16. If required, aqueous alkali can be added from the first reservoir 4A of the reagent dosing device 4 in order to adjust the pH-value of the sludge to a value in the range of 12. Thereafter, the circulation system 11 is operated and the alkaline solution is circulated for a predetermined time until all of the zinc hydroxide from the hydroxide sludge is dissolved. Then, the alkaline solution is returned through the filter 7 and the recipient vessel 10 into the collecting vessel 16.

Thereafter the residue from the alkali treatment in the reaction vessel 1 is oxidized by taking chromate solution from the collecting vessel 17 and introducing the same into the reaction vessel 1. Depending on the requirements, acid or alkali is added, whereby a pH-value in the range of 8 to 11 is adjusted in the reaction vessel 1. After adjustment of the desired pH-value in the range of 8 to 11, a sufficient amount of hydrogen peroxide is added in metered quantities from the second reservoir 4B. Then the sludge is stirred, and, at the same time, the circulation system 11 is activated.

After a predetermined reaction time, the circulation is stopped. The chromate containing solution is filtered through the filter 7 into the recipient vessel 10 and the filtrate from the recipient vessel 10 is passed into the collecting vessel 17.

Then the sludge which remained in the reaction vessel is dispersed in acid nickel solution from the collecting vessel 18, the pH-value being adjusted to a value in the range of 3.5 by adding acid from the third reservoir 4C. Under these conditions, copper and nickel are dissolved while a residual sludge remains which contains substantially iron hydroxide. The obtained solution of copper and nickel is filtered through the filter 7 into the recipient vessel 10. The residual sludge remaining on the filter 7 is discharged by means of the discharge device 8 and is collected in the collecting vessel 9. From this collecting vessel 9 the residual sludge can be removed and can be further processed to iron oxide, for example.

Thereafter, the solution is returned from the recipient vessel 10 to the reaction vessel 1 and is adjusted to a pH-value in the range of 4 to 6 by adding aqueous alkali from the first reservoir 4A. Thereafter, hydrogen peroxide from the second reservoir 4E is added whereby the copper contained in the solution is precipitated as copper oxide. After a predetermined period of time, the copper oxide is filtered through the filter 7 and the solution containing nickel is passed into the collecting vessel 18.

The residue of copper oxide remaining on the filter 7 is dissolved in the acid copper solution which is taken from the collecting vessel 19 and, if required, is adjusted to the desired acid degree with acid from the third reservoir 4C. Thereafter, the solution containing copper is returned to the collecting vessel 19.

After the method steps described above, a further charge of the hydroxide sludge from the filling device 2 can be introduced into the reaction vessel 1. Then this further batch is separated into its components in the same way.

After a certain number of circulations of the solutions contained in the collecting vessels 16 to 19, the metal concentration in these solutions is enriched to such values that the processing of these solutions with respect to the valuable materials contained therein is possible and is economically reasonable. For this purpose, conventional methods, e.g. electrolytic methods, can be used which are known to a person skilled in the art.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A method of processing hydroxide sludges which comprises hydroxides of chromium, iron, copper, nickel and optionally zinc, characterized in that, if zinc is present, the zinc hydroxide is dissolved from the sludge by alkali; that, the chromium hydroxide in the residue of the alkali treatment or the hydroxide sludge respectively is oxidized to chromate in a weakly alkaline medium; that copper and nickel are dissolved by acid treatment from the residue of the oxidation that the residual sludge comprising iron hydroxide is separated from the solution containing copper and nickel; that copper oxide is precipitated from the solution containing copper and nickel; and that the precipitated copper oxide is separated from the nickel containing solution.

2. The method as set forth in claim 1, characterized in that the zinc hydroxide, if present, is dissolved from the hydroxide sludge at a pH-value of 12.

3. The method as set forth in claim 1 or 2, characterized in that the chromium hydroxide is oxidized to chromate using hydrogen peroxide at a pH-value in the range of 8 to 11.

4. The method as set forth in any one of claims 1 to 3, characterized in that copper and nickel are dissolved from the oxidation residue at a pH-value of 3.5.

5. The method as set forth in any one of claims 1 to 4, characterized in that the copper oxide is precipitated from the solution containing copper and nickel at a pH-value in the range of 4-6 by adding hydrogen peroxide.

6. The method as set forth in any one of the preceding claims, characterized in that the solutions containing chromate, zincate, if present, copper and nickel are each collected in individual collecting vessels and that these solutions are circulated for dissolving the respective metals from the hydroxide sludge.

7. The method as set forth in claim 6, characterized in that each solution is circulated through an interposed filter until a predetermined enrichment concentration is obtained.

8. The method as set forth in any one of claims 1 to 7, characterized in that the hydroxide sludge is reacted in batches in a reaction vessel using the single vessel technique.

9. The method as set forth in claim 8, characterized in that, after discharge of the residual sludge comprising iron hydroxide, the solution containing copper and nickel is returned into the reaction vessel.

10. The method as set forth in claim 9, characterized in that the precipitated copper oxide is dissolved by aqueous acid and the aqueous acid solution is passed from the reaction vessel into the collecting vessel for the solution containing copper.

11. The method as set forth in claim 9, characterized in that the residual sludge comprising iron hydroxide is further processed to iron oxide.

12. The method as set forth in claim 1, characterized in that copper, nickel and optionally zinc are electrolytically recovered after the respective solutions contain predetermined enrichment concentrations of these metals.

13. A device for carrying out the method as set forth in any one of the preceding claims, characterized by a reaction vessel provided with a filling device and connected through a filter to a recipient vessel, a reagent dosing device connected to the reaction vessel, a circulation system with a circulation conduit containing a circulation pump and connecting the recipient vessel with the reaction vessel, a discharge device which connects the filter with a collecting vessel for the residual sludge containing substantially iron hydroxide, and collecting vessels for zincate solution if present, chromate solution, nickel solution and copper solution,

respectively, which collecting vessels are each connectable at their input side through at least one controlled valve to the recipient vessel and at their output side through respective controlled valves selectively to the circulation system or a further processing system.

14. The device as set forth in claim 13, characterized in that the reagent dosing device has a first reservoir for an aqueous alkali solution, a second reservoir for an aqueous hydrogen peroxide solution, and a third reservoir for aqueous acid, and that each reservoir is connected to the reaction vessel through a controlled dosing valve.

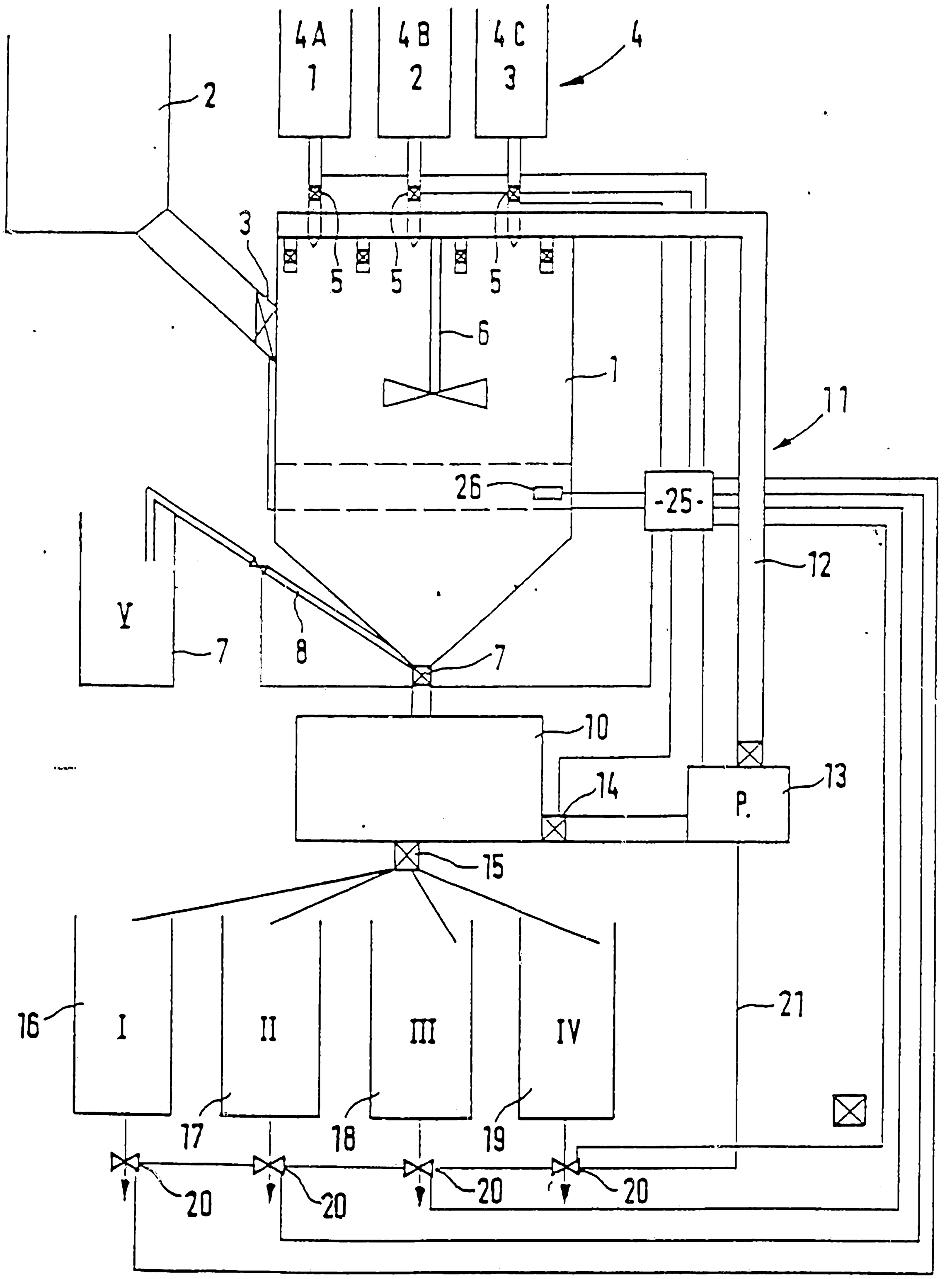
15. The device as set forth in claim 13 or 14, characterized in that a programmable control device is provided and that the reaction vessel contains a pH-sensor connected to the programmable control device.

16. The device as set forth in any one of claims 13 to 15, characterized in that the further processing system for further processing of the solutions containing copper, nickel and possibly zinc is an installation for electrolytic deposition of the respective metals.

DATED this 21 day of January 1991

RRM ENERGY GMBH
Patent Attorneys for the
Applicant:

F.B. RICE & CO.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INTERNATIONAL SEARCH REPORT

International Application No PCT/EP 88/00799

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [6]

According to International Patent Classification (IPC) or to both National Classification and IPC

Int.Cl.^4: C 22 B 7/00; C 02 F 9/00

II. FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
Int.Cl.^4:	C 22 B 7/00; C 02 F 9/00

Documentation Searched other than Minimum Documentation
to the Extent that such Documents are Included in the Fields Searched [8]

III. DOCUMENTS CONSIDERED TO BE RELEVANT [9]

Category *	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No. [13]
X	US, A, 4680126 (J.M. FRANKARD) 14 July 1987, see claims -.-	1-12
X	US, A, 4105743 (H. REINHARDT) 8 August 1978, see claims -.-	1-12
X	US, A, 4579721 (R.H. FRIEDMAN) 1 April 1986, see claims -.-	1,4
X	US, A, 4318788 (J.G. DUFFEY) 9 March 1982, see claims -.-	1,3,6-8,11
X	Chemical Abstracts, vol. 94, 1981, (Columbus, Ohio, US), see page 244, abstract 87847u, & JP, A, 80107742 (MIURA ENGINEERING INTERNATIONAL CO., LTD) 19 August 1980 -.-	1,4-6
A	Chemical Abstracts, vol. 94, 1981, (Columbus, Ohio, US), M. Tels et al.: "Recovery of pure metal salts from mixed metal hydroxide sludges", see page 222, abstract 50795z, & Proc.Natl. Waste Process. Conf. 1980, 9th, 109-19 -.-	1,6
A	Chemical Abstracts, vol. 92, 1980, (Columbus, Ohio, US), see page 239, abstract 132677k, & JP, A, 79138801 (KITA-OSAKA SEISO K.K.), 27 October 1979 -.-	1,6,12

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* Special categories of cited documents: [10]

"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)

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

"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

IV. CERTIFICATION

Date of the Actual Completion of the International Search 8 December 1988 (08.12.88)	Date of Mailing of this International Search Report 29 December 1988 (29.12.88)
International Searching Authority European Patent Office	Signature of Authorized Officer

International Application No. PCT/EP 88/00799

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
A	US, A, 4465593 (M.F. WEMHOFF) 14 August 1984, see claims -.-	13
A	DE, A, 3308179 (ARGENTUM BECK UND GEBHART OHG) 29 November 1984, see claims -.-	13
A	US, A, 3816306 (C.H. ROY) 11 June 1974, see claims -.-	4-6
A	DE, A, 2023410 (M & T CHEMICALS INC.) 19 November 1970, see claims -.-	4,6
A	US, A, 4162294 (L. WITZKE) 24 July 1979 -.-	
A	FR, A, 2436821 (FIRMA TH. GOLDSCHMIDT AG) 18 April 1980 -.-	
A	Chemical Abstracts, vol. 105, 1986, (Columbus, Ohio, US), see page 255, abstract 82955p, & RO, A, 88174 (IREMOAS) 30 December 1985	

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ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO. EP 8800799

SA 23934

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
The members are as contained in the European Patent Office EDP file on 20/12/88
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A- 4680126	14-07-87	EP-A- 0234827	02-09-87
US-A- 4105743	08-08-78	DE-A- 2726783 JP-A- 53014103 SE-A- 7606818 SE-B- 399719	29-12-77 08-02-78 16-12-77 27-02-78
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

INTERNATIONALER RECHERCHENBERICHT

Internationales Aktenzeichen PCT/EP 88/00799

I. KLASSIFIKATION DES ANMELDUNGSGEGENSTANDS (bei mehreren Klassifikationssymbolen sind alle anzugeben)[6]

Nach der Internationalen Patentklassifikation (IPC) oder nach der nationalen Klassifikation und der IPC

Int. Cl.^{4} - C 22 B 7/00; C 02 F 9/00

II. RECHERCHIERTE SACHGEBIETE

Recherchierter Mindestprüfstoff[7]

Klassifikationssystem	Klassifikationssymbole
Int. Cl.^{4}	C 22 B 7/00; C 02 F 9/00

Recherchierte nicht zum Mindestprüfstoff gehörende Veröffentlichungen, soweit diese unter die recherchierten Sachgebiete fallen[8]

III. EINSCHLÄGIGE VERÖFFENTLICHUNGEN[9]

Art*	Kennzeichnung der Veröffentlichung[11], soweit erforderlich unter Angabe der maßgeblichen Teile[12]	Betr. Anspruch Nr.[13]
X	US, A, 4680126 (J.M. FRANKARD) 14. Juli 1987 siehe Ansprüche --	1-12
X	US, A, 4105743 (H. REINHARDT) 8. August 1978 siehe Ansprüche --	1-12
X	US, A, 4579721 (R.H. FRIEDMAN) 1. April 1986 siehe Ansprüche --	1,4
X	US, A, 4318788 (J.G. DUFFEY) 9. März 1982 siehe Ansprüche --	1,3,6-8, 11
X	Chemical Abstracts, Band 94, 1981, (Columbus, Ohio, US), siehe Seite 244, Zusammenfassung 87847u, & JP, A, 80107742 (MIURA ENGINEERING INTERNATIONAL CO., LTD) 19. August 1980 --	1,4-6
A	Chemical Abstracts, Band 94, 1981, ./.	1,6

* Besondere Kategorien von angegebenen Veröffentlichungen[10]:

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"&" Veröffentlichung, die Mitglied derselben Patentfamilie ist

IV. BESCHEINIGUNG

Datum des Abschlusses der internationalen Recherche 8. Dezember 1988	Absendedatum des internationalen Recherchenberichts 29.12.88
Internationale Recherchenbehörde **Europäisches Patentamt**	Unterschrift des ~~bevollmächtigten~~ Bediensteten T.K. WILLIS

Formblatt PCT/ISA/210 (Blatt 2) (Januar 1985)

Internationales Aktenzeichen PCT/EP 88/00799

III.EINSCHLÄGIGE VERÖFFENTLICHUNGEN (Fortsetzung von Blatt 2)

Art *	Kennzeichnung der Veröffentlichung, soweit erforderlich unter Angabe der maßgeblichen Teile	Betr. Anspruch Nr.
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Für nähere Einzelheiten zu diesem Anhang : siehe Amtsblatt des Europäischen Patentamts, Nr.12/82