EUROPEAN QUALIFYING EXAMINATION 2006

PAPER C

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Ghent, 01.03.2006

Livenbroy Enterprise
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9000 Ghent
BELGIUM

European Patent Attorney
Mr Ken Heine
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GERMANY

Dear Mr Heine,

We, Livenbroy Enterprise, wish to file opposition against the European patent of Stelam Factories published under no EP-B- 1200300 (Annex 1).

This patent results from the divisional application of a parent application EP-A-1100100, the granted patent of which we have opposed. Despite our solid argumentation based on extremely relevant prior art, the patent from the parent application was maintained in amended form. We suspect the opposition division of partiality. Therefore we would like to request that we do not have the same opposition division in this opposition procedure. Is this possible?

After the issue of the interlocutory decision on the patent from the parent application, Stelam Factories sued us for infringement in Belgium. It is therefore urgent for us to reach a decision rapidly on the opposition of the patent from the divisional application in order to establish a common strategy for both patents. How can we achieve this?

Please note that the subject-matter of granted claim 1 of the divisional application is broader than the granted subject-matter of the parent application. Is this allowable?

File inspection revealed that during the examination before the EPO of the pate application of Annex 2 its applicant submitted additional technical information. Anne contains this additional technical information. Can this document be of any use?

We would like to give you the following information concerning the granted claims of Annex 1:

Claims 1 to 4 find support in the priority document, the originally filed parent application and the originally filed divisional application.

Claims 6 and 7 find support in the originally filed parent application and the originally filed divisional application.

Claim 5 and its support in the description, paragraph [011], were added during prosecution of the divisional application before the examining division. Support for this amendment derives only from the abstract of this application.

With our best regards,

Åsa Hi
(Director)

Enclosures:
Annex 1: Description and claims
Annex 2: EP-A-0453584
Annex 3: fax of 30.10.2000
Annex 4: DE-A-19920627
Annex 5: Technology Today, 68 (1999)
Annex 6: WPI/Derwent abstract

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(22) Date of filing: **11.12.2000**

(54) **Electrorheological fluids**

Fluides électrorhéologiques

Elektrorheologische Flüssigkeiten

(84) Designated Contracting States:

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00876543.2 / 1 100 100

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[001] The present application concerns electrorheological fluids (ERFs). Such a fluid undergoes rapid, reversible change in its viscosity through application of an electric field. Before applying the electric field the fluid flows freely like a liquid. With the application of the electric field the viscosity of the fluid is greatly increased. When the field is removed the fluid flows again freely like a liquid. The great strength of ERFs is their speed of response. ERFs change from liquid to solid in approximately 1 millisecond. A known ERF consists of an electric insulating oily medium, typically called in this art “base oil”, with solid particles dispersed therein.

[002] Silica gel, starch or metal compounds can be used as particles in ERFs.

[003] Starch is the most used in the art since it is well-known that an ERF comprising starch particles displays a satisfactory electrorheological effect.
Starch is commonly produced from potatoes or corn, these being widely available and cheap. The types of starch from potatoes and corn are similar and can be used with equal effect in ERFs. However, the dispersion stability of starch particles in ERFs is not satisfactory since they tend to sediment on storage.

[004] The present inventors have now found that if starch is combined with another natural polymer, the particles formed show enhanced dispersion stability in ERFs compared to the particles made out of starch alone.

[005] A first aspect of the present invention is therefore an ERF comprising a major amount of a base oil and a minor amount of dispersed particles, each particle consisting of a first natural polymer which is mixed with a second, different, natural polymer. In a preferred embodiment of the present invention the first natural polymer is starch and the second natural polymer is acacia gum. In another preferred embodiment of the present invention the starch is obtained from corn.

[006] The base oil is usually selected from the group consisting of silicone oil, m… oil, crude oil, olive oil, and their mixtures. The preferred base oil is crude oil.

[007] A further aspect of the present invention is an ERF for use in pipelines, which comprises (i) a major amount of crude oil, (ii) a minor amount of dispersed particles and (iii) an additive useful for the protection of the pipeline from interaction with the dispersed particles. Each dispersed particle comprises starch and a second natural polymer as a core and a metallic coating, which covers the mixture of starch and the second polymer. The metallic layer enhances the electrorheological effect. It has surprisingly been found that these metal coated particles of a mixture of starch and a second natural polymer allow the ERF to perform within a broad temperature range. This allows the particles to be used in various environments where an ERF is needed.

[008] The most appropriate particles are spherical or almost spherical and have an average particle diameter of about 10 to about 100 micrometers, more preferably of about 20 to about 30 micrometers.

[009] The metal-coated particles show satisfactory dispersion stability. We consider that this is due to the low density of the core material, which counterbalances the higher density of the metallic coating layer.

[010] A particularly interesting use of an ERF containing metal-coated particles is the repair of leaking crude oil pipelines by dispersing metal-coated particles in the crude oil at a point upstream of the leakage to form an ERF and applying an electric field to solidify the ERF until the pipeline is repaired.

[011] The electrorheological effect achieves a maximum when the metal of the coating layer is nickel.

Claims

1. An electrorheological fluid (ERF) comprising a major amount of a base oil and a minor amount of dispersed particles, each particle consisting of a first natural polymer which is mixed with a second, different, natural polymer.

2. The ERF of claim 1 wherein the base oil is crude oil and the mixed natural polymers are starch and acacia gum.

3. The ERF of claim 2 wherein the starch is obtainable from corn.

4. An ERF for use in pipelines comprising (i) a major amount of crude oil, (ii) a minor amount of dispersed particles, each particle comprising a mixture of starch and a second natural polymer as a core, which core is coated with a metallic layer, and (iii) an additive useful for the protection of the pipeline.

5. The ERF of claim 4 wherein the metallic layer is made of nickel.

6. The ERF of claims 1 or 4 wherein the average particle diameter is of about 20 to about 30 micrometers.

7. A method of repairing leakages of crude oil pipelines by dispersing metal-coated particles into the crude oil upstream of the point of leakage to form an ERF and applying an electric field to solidify the ERF until the pipeline is repaired.

EP 0 453 584 A1

Date de publication :	**12.04.1998 Bulletin 1998/15**
Int. Cl.[6] :	**C10M171/00**
Numéro de dépôt :	**97107222.2**
Date de dépôt :	**22.10.1997**
Etats contractant désignés :	**AT BE CH CY DE DK ES FR GB IT LI LU NL**
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Inventeur :	**Aimé Gniole** **5, rue de la Forêt** **50300 Avranches (FR)**
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Méthode de transport de fluides électrorhéologiques

[001] La présente invention concerne une méthode de transport d'un fluide électrorhéologique (FER).

[002] L'effet électrorhéologique est la propriété observée dans certains fluides lorsqu'un champ électrique est généré à l'intérieur du fluide, ce qui entraîne un épaississement rapide du liquide ou, avec un champ suffisamment fort, sa solidification.

[003] Un aspect de la présente invention concerne une méthode pour transporter un fluide, comprenant: la transformation du fluide en un FER, la formation à l'intérieur du fluide d'un champ électrique entre deux plaques espacées à l'intérieur du fluide, le déplacement des plaques et du FER solidifié, et ensuite la reduction du champ électrique pour permettre au FER de s'écouler à partir des plaques. Cette méthode peut être utilisée avantageusement pour séparer le pétrole brut de l'eau de mer en cas de déversement accidentel.

[004] Le pétrole brut est transformé en un FER par addition d'une substance po
La substance peut se présenter sous la forme de particules, telles que du sable, du graphite, des oxydes métalliques et divers polymères.

[005] La substance polarisable préférée est l'amidon, car il forme un FER particulièrement efficace. Une propriété intéressante de l'amidon est sa faible capacité de gonflement, ce qui rend les dispersions d'amidon stables dans le pétrole brut. Il est possible d'utiliser de l'amidon de diverses origines, même si de petites différences de structure ont été observées. L'amidon de pomme de terre est l'un des amidons les plus couramment utilisés.

[006] Plutôt que d'ajouter l'amidon au pétrole brut après un déversement accidentel, cette substance peut être ajoutée au pétrole avant son transport par pétrolier. Pour empêcher que la substance particulaire ne se dépose pendant le transport, une pompe ou un agitateur peuvent être nécessaires dans le navire qui la transporte.

[007] Pour avoir un équipement de transport plus simple et éviter pompes et agitateurs, d'autres particules ont été proposées, qui associent un effet électrorhéologique amélioré et une stabilité de dispersion accrue. Elles ont été utilisées avec succès comme alternatives aux particules d'amidon. Ces alternatives sont des particules de résine synthétique ou des particules faites de mélanges d'amidon et d'au moins un autre polymère sélectionné parmi le groupe des gommes, telles que la gomme guar, la gomme arabique et la gomme karaya.

[008] Un avantage particulier des particules faites de mélanges d'amidon et d'une gomme réside dans le fait qu'elles procurent des dispersions stables même à de très faibles concentrations dans le pétrole, ce qui est économiquement avantageux. Sans vouloir être lié à telle ou telle théorie, on pense que le polymère additionnel modifie la surface extérieure de la particule d'amidon et améliore les propriétés de dispersion. Il convient donc de veiller, pendant la préparation de ces particules, à ce que d'autres constituants ne se déposent pas sur la surface extérieure.

Revendication

Méthode de transport d'un fluide électrorhéologique (FER), comprenant la formation à l'intérieur du fluide d'un champ électrique entre deux plaques espacées à l'intérieur dudit fluide afin d'épaissir le fluide entre les plaques, le transport des plaques et du FER épaissi, et ensuite la réduction du champ électrique afin de laisser le FER s'écouler à partir desdites plaques.

TELECOPIE REÇUE PAR L'OEB LE 30.10.2000

Strasbourg, 30.10.2000

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Office européen des brevets
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ALLEMAGNE

Demande de brevet européen No. 97107222.2 (EP 0453584)
Guy Nesse et Cie
Notre référence : P8516EP/BW

Messieurs,

Nous produisons ci-après de nouvelles données expérimentales dans le cadre de la requête de la division d'examen relative à la demande européenne 97107222.2 (EP 0453584) déposée au nom de Guy Nesse et Cie. Ces données montrent que des particules polarisables comprenant un mélange de deux polymères naturels améliorent la stabilité de dispersion dans du pétrole brut.

Quatre expériences (E-1, E-2, E-3 et E-4) ont été menées, chacune avec des particules de composition différente. Le temps de décantation des particules dispersées à partir des compositions de fluide électrorhéologique testées a été mesuré. Plus le temps de décantation est long, plus la dispersion est stable. Chaque composition de fluide électrorhéologique a été préparée en dispersant 5 grammes de particules d'un diamètre moyen de particule d'environ 32 micromètres dans 1 litre de pétrole brut d'une densité de 0,89 g/ml.

Dans E-1, les particules étaient faites d'amidon commercial. Dans E-2, les partic étaient faites d'un mélange d'amidon commercial et de gomme arabique (également appelée gomme acacia). Dans E-3, les particules étaient faites d'un mélange d'amidon commercial et de gomme guar. Dans E-4, les particules étaient faites d'un mélange d'amidon commercial et de gomme karaya. Les résultats figurent dans le tableau 1.

Tableau 1

Test	polymère(s) naturel(s)	temps de décantation
E-1	amidon	2 mois
E-2	amidon + gomme arabique	25 mois
E-3	amidon + gomme guar	17 mois
E-4	amidon + gomme karaya	23 mois

Les données techniques ci-dessus montrent que lorsque de l'amidon est dispersé dans du pétrole brut, la dispersion présente une stabilité satisfaisante. Cette stabilité est en outre améliorée lorsque l'amidon est mélangé à un autre composé polymérique naturel bien connu. La résistance à la décantation est la plus longue lorsque la particule est un mélange d'amidon et de gomme arabique.

L'amidon utilisé dans les expériences ci-dessus a été obtenu à partir de pomme de terre puisqu'il était immédiatement disponible pour expérimentation dans notre laboratoire. Il est à noter que la ressemblance entre la structure chimique et les propriétés de l'amidon de pomme de terre, et celles de l'amidon de maïs, fait partie des connaissances techniques de base de l'homme du métier dans le domaine de la chimie alimentaire depuis le début des années 20. Néanmoins, si la division d'examen a des doutes, nous pouvons fournir d'autres exemples comparatifs avec de l'amidon de maïs.

Veuillez agréer, Messieurs, l'expression de nos salutations distinguées.

Bade Waisère
Mandataire en brevets européen

DE 199 20 627 A1

Offenlegungsschrift

Anmeldetag:	**21.01.1998**
Offenlegungsdatum:	**15.06.1999**
Bezeichnung des Gegenstands:	**Elektrorheologische Flüssigkeit**
Name und Wohnsitz des Patentanmelders:	**Ona Corr** **Acapulcostrasse 11** **68000 Mannheim**

Elektrorheologische Flüssigkeit

[001] Die vorliegende Erfindung betrifft elektrorheologische Flüssigkeiten (ERF). Diese Flüssigkeiten enthalten Partikel, die durch Anlegen eines elektrischen Feldes schnell und reversibel angeregt werden können, und lassen sich daher im Vergleich zu bekannten Verfestigungs-/Verflüssigungsmethoden schnell verfestigen und ebenso schnell verflüssigen. Als ERF vorgeschlagen werden Dispersionen verschiedener Partikel in einer elektrisch isolierenden Flüssigkeit. Von den für die Partikel verwendeten Materialien weiss man, dass Metalle einen starken elektrorheologischen Effekt haben, während natürliche Polymere eine zufrieden stellende Dispergierbarkeit aufweisen.

[002] Ein Gegenstand der vorliegenden Erfindung ist die Bereitstellung einer ERF mit verbessertem elektrorheologischem Effekt.

[003] Die Erfinder im vorliegenden Fall haben herausgefunden, dass sich das obige Ziel erreichen lässt, indem (i) kugelförmige Partikel mit einem Kern und einer Metallschicht um diesen Kern hergestellt und (ii) kleine Mengen der kugelförmigen Partikel zur Erzeugung einer ERF in der Flüssigkeit dispergiert werden.

[004] Beispiele geeigneter Flüssigkeiten, in denen die umhüllten Partikel dispergiert werden können, sind Wasser, organische Lösungsmittel, Kohlenwasserstoffe und Rohöle. Die Wahl der jeweiligen Flüssigkeit hängt hauptsächlich von der Verwendung der endgültigen Dispersion ab. Wenn die Flüssigkeit durch eine Pipeline transportiert werden soll, sind oft Additive erforderlich, um zu verhindern, dass das Pipelinematerial mit den Flüssigkeitsbestandteilen interagiert.

[005] In die Flüssigkeit wird normalerweise vorab ein Tensid eingebracht, um die Dispersion der kugelförmigen Partikel zu erleichtern und die Dispersionsstabilität zu verbessern.

[006] Beispiele für Materialien, die als Kern der kugelförmigen Partikel verwendet werden können, sind Kunstharze, Wachse, Metalloxide und Metalllegierungen.

[007] Kunstharze geringer Dichte werden als Kernmaterial besonders bevorzugt, weil die kugelförmigen Partikel, die diese enthalten, weniger zur Sedimentation neigen. Auf diese Weise wird die Verwendung von Tensiden im Flüssigkeitsmedium vermieden. Offenbar ist die Dispersionsstabilität der Partikel, die diese speziellen Kunstharze enthalten, auf deren geringe Dichte zurückzuführen, die durch den Auftrieb die Dichte der Metallschicht ausgleicht. Das Kunstharz als Kernmaterial steuert also den Auftrieb des Verbundpartikels.

[008] Es wird mindestens eine Metallschicht auf der Oberfläche des Kernmaterials ausgebildet. Die zur Verdickung der ERF erforderliche Spannung hängt von der Art des Metalls ab. Flüssigkeiten mit Partikeln mit einer Kupfer-, Aluminium- oder Nickelschicht verdicken bei viel geringeren Spannungen als Flüssigkeiten, deren Partikel andere Metalle aufweisen, und sind daher vorzuziehen. Partikel mit einer Nickelschicht, die eine besondere mechanische Festigkeit besitzen, werden am meisten bevorzugt.

[009] Die übliche Partikelgrösse beträgt weniger als 100 Mikrometer. Es wurde festgestellt, dass die Grösse der Partikel die Zeit beeinflusst, die für die Verdickung der Flüssigkeit erforderlich ist. Je kleiner die Partikel, umso weniger Zeit wird für die Verfestigung benötigt. Derzeit gibt es kein zuverlässiges Herstellungsverfahren für umhüllte Partikel mit einer Grösse von weniger als 15 Mikrometern, was eine Herausforderung für künftige Entwicklungen ist.

Anspruch

Elektrorheologische Flüssigkeit (ERF), welche eine Flüssigkeit beinhaltet, in der kugelförmige mehrschichtige Partikel dispergiert sind, wobei mindestens eine Schicht der Partikel ein Metall aufweist.

Technology Today, 68 (1999), May, No.5, page 87

Smart Fluids (Part III)

Recently developed composite particles for electrorheological fluids (ERFs) allow the ERF to perform within a broader temperature range than when using the conventional particles. These new particles consist of a core based on a mixture of starch and guar gum, which core is covered by an aluminum coating.

Two known particles of similar construction were compared to the newly-developed particles in order to check the behaviour of ERFs under broad temperature ranges. Both known particles have an aluminum coating, but differ in that one has a latex core and the other has a synthetic resin core. These known particles were chosen on the basis of the nature of the core material used. These core materials have low density, similar to that of the mixture of starch and guar gum and do not affect the dispersibility of the particles in the fluid. The operational temperature range of ERFs containing the new particles is much broader than any other known ERF of similar composition.

WPI / DERWENT

Publication number:	**SU1702066 A**
Publication date:	**19861124**
Title:	**DEVICE FOR REPAIR OF PIPELINES TRANSPORTING CRUDE OIL**
EC:	**F16L55/10**
Patent applicant:	**NEFTYANOJ NII TEKHN (SU)**
Inventor:	**STRYMONOVA KATIA (SU)**
Filing number and date:	**SU19854466641 19851206**
Priority number and date:	**SU19854466641 19851206**

Emergency repair work on pipelines for transportation of petroleum products includes stopping the flow inside the pipeline, formation of plugs at either side of the damaged section, cutting out the damaged section, replacing the damaged section, melting the plugs and restarting the pipeline operation.

Two pairs of removable cooling chambers are used to form the plugs by freezing the crude oil. A first pair of removable cooling chambers is placed before the damaged section and a second pair is placed after it. Clamps fix each pair.

During operation a refrigerant flows through the cooling chambers and freezes the crude oil within the specific pipe section forming a plug. When both plugs are formed repair work can start at the damaged part of the pipeline. Once repair has finished, the valves controlling the inlet of the refrigerant stop its flow and the cooling chambers are removed. The frozen plugs thaw and the crude oil is allowed to flow freely in the repaired pipeline. For security reasons, no heating should be used to enhance thawing. Nevertheless, thawing can be completed within a couple of hours.

The above method has the advantage that the length of pipeline needing drainage before repair is significantly reduced.

ÜBERSETZUNG DER ANLAGEN 2 BIS 6

Anlage 2:	**in Englisch**
Anlage 3:	**in Deutsch**
Anlage 4:	**in Englisch**
Anlage 5:	**in Französisch**
Anlage 6:	**in Deutsch**

TRANSLATION OF ANNEXES 2 TO 6

Annex 2:	**into English**
Annex 3:	**into German**
Annex 4:	**into English**
Annex 5:	**into French**
Annex 6:	**into German**

TRADUCTION DES ANNEXES 2 À 6

Annexe 2 :	**en anglais**
Annexe 3 :	**en allemand**
Annexe 4 :	**en anglais**
Annexe 5 :	**en français**
Annexe 6 :	**en allemand**

EP 0 453 584 A1

Date of publication:	**12.04.1998 Bulletin 1998/15**
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Application number:	**97107222.2**
Date of filing:	**22.10.1997**
Designated Contracting States:	**AT BE CH CY DE DK ES FR GB IT LI LU NL**
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A method for the transportation of electrorheological fluids

[001] This invention relates to a method of transporting an electrorheological fluid (ERF).

[002] The electrorheological effect is the property observed in certain fluids when an electric field is generated within the fluid, which causes the liquid to thicken rapidly or, with a sufficient strong field, to solidify.

[003] According to an aspect of the present invention there is provided a method of transporting a fluid comprising: converting the fluid into an ERF, forming within the fluid an electric field between two plates spaced within the fluid, moving the plates and the solidified ERF, and then reducing the electric field to permit the ERF to flow from the plates. This method may be advantageously used to separate crude oil from seawater in the event of an accidental spillage.

[004] The crude oil is converted into an ERF by the addition of a polarizable sub
The substance may be in the form of particles such as sand, graphite, metal oxides
various polymers.

[005] The most preferred polarizable substance is starch, because it forms a particularly effective ERF. An interesting property of starch is its low swelling capacity, which renders the starch dispersions stable in crude oil. Starch of various origins can be used although small structural differences have been detected. Starch from potato is one of most commonly used starches.

[006] Instead of adding the starch to the crude oil after an accidental release has occurred, this substance may be added to the oil before its transportation by tanker. In order to prevent the particulate material from settling out during transportation, a pump or agitator may be required in the vessel in which it is carried.

[007] In order to simplify the transportation equipment and avoid pumps and agitators some other particles have been proposed which combine improved electrorheological effect and enhanced dispersion stability. They have been successfully used as alternatives to starch particles. These alternatives are synthetic resin particles or particles made of mixtures of starch and at least another polymer selected from the group of gums such as guar gum**,** arabic gum and karaya gum.

[008] A particular advantage of the particles made of mixtures of starch and a gum is that they provide stable dispersions even at very low concentrations in the oil, which is an economical benefit. Without wishing to be bound to any theory, it is believed that the additional polymer modifies the outer surface of the starch particle and enhances the dispersion properties. As a consequence attention is to be paid during the preparation of such particles in order to avoid deposition of other constituents on their outer surface.

Claim

A method of transporting an electrorheological fluid (ERF) comprising forming within the fluid an electric field between two plates spaced within said fluid in order to thicken the fluid between the plates, transporting the plates and the thickened ERF, and then reducing the electric field in order to release the ERF from said plates.

PER FAX EINGEGANGEN BEIM EPA AM 30.10.2000

Strassburg, 30.10.2000

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Patentanmeldung Nr. 97107222.2 (EP 0453584)
Guy Nesse et Cie
Unser Zeichen : P8516EP/BW

Sehr geehrte Damen und Herren,

gemäss der Aufforderung der Prüfungsabteilung im Fall der im Namen von Guy Nesse et Cie eingereichten europäischen Patentanmeldung Nr. 97107222.2 (EP 0453584) legen wir hiermit zusätzliche Versuchsdaten vor. Sie zeigen, dass polarisierbare Partikel, die eine Mischung von zwei natürlichen Polymeren enthalten, die Dispersionsstabilisierung in Rohöl verbessern.

Es wurden vier Versuche, E-1, E-2, E-3 und E-4, mit Partikeln durchgeführt, die jeweils eine andere Zusammensetzung hatten. Die Absetzzeit der dispergierten Partikel aus den untersuchten elektrorheologischen Flüssigkeitszusammensetzungen wurde gemessen. Je länger die Absetzzeit, umso stabiler die Dispersion. Jede der elektrorheologischen Flüssigkeitszusammensetzungen wurde hergestellt, indem 5 Gramm Partikel mit einem durchschnittlichen Partikeldurchmesser von ca. 32 Mikrometern in 1 Liter Rohöl (Öldichte 0,89 g/ml) dispergiert wurden.

In E-1 bestanden die Partikel aus handelsüblicher Stärke. In E-2 bestanden die Partikel aus einer Mischung von handelsüblicher Stärke und Gummi arabicum (andere Bezeichnung für Akaziengummi). In E-3 bestanden die Partikel aus einer Mischung von handelsüblicher Stärke und Guar-Gummi. In E-4 bestanden die Partikel aus einer Mischung von handelsüblicher Stärke und Karaya-Gummi. Die Ergebnisse sind Tabelle 1 zu entnehmen.

Tabelle 1

Versuch	natürliche(s) Polymer(e)	Absetzzeit
E-1	Stärke	2 Monate
E-2	Stärke + Gummi arabicum	25 Monate
E-3	Stärke + Guar-Gummi	17 Monate
E-4	Stärke + Karaya-Gummi	23 Monate

Das obige technische Beweismaterial zeigt, dass die Dispersion eine zufrieden stellende Stabilität hat, wenn Stärke in Rohöl dispergiert wird. Diese Stabilität wird weiter verbessert, wenn Stärke mit einer anderen allgemein bekannten natürlichen Polymerverbindung gemischt wird. Die längste Absetzverzögerung wird erreicht, wenn das Partikel aus einer Mischung von Stärke und Gummi arabicum besteht.

Die Stärke in den obigen Versuchen wurde aus Kartoffeln gewonnen, weil diese für Versuche in unserem Labor leicht zu beschaffen war. Es wird darauf hingewiesen, dass die Ähnlichkeit der chemischen Struktur und der Eigenschaften von Kartoffelstärke und Maisstärke seit den frühen 1920er Jahren zum technischen Grundwissen des Fachmanns auf dem Gebiet der Lebensmittelchemie gehört. Dennoch können, wenn die Prüfungsabteilung Zweifel hat, weitere Vergleichsbeispiele auch für Maisstärke vorgelegt werden.

Mit freundlichen Grüssen

Bade Waisère
Zugelassener Vertreter vor dem EPA

DE 199 20 627 A1

German patent application

Date of filing: **21.01.1998**

Date of publication: **15.06.1999**

Title: **Electrorheological fluid**

Name and address of the applicant: **Ona Corr**

Acapulcostrasse 11

68000 Mannheim

Electrorheological fluid

[001] The present invention relates to electrorheological fluids (ERFs). These fluids contain particles capable of being quickly and reversibly actuated by the application of an electrical field thereto and can therefore be swiftly solidified and equally swiftly fluidized compared to known solidification/fluidization techniques. Proposed as ERFs are dispersions of various particles in an electric insulating fluid. Among the materials used for the particles, metals are known for their high electrorheological effect, while natural polymers are known for their satisfactory dispersibility.

[002] An object of the present invention is to provide an ERF with an improved electrorheological effect.

[003] The present inventors have found that the above object can be achieved by (i) manufacturing spherical particles having a core and a metallic layer around the core and (ii) dispersing small amounts of the spherical particles into the fluid to obtain an ERF.

[004] Examples of suitable fluids in which the coated particles can be dispersed water, organic solvents, hydrocarbons and crude oils. The selection of the appropria fluid mainly depends on the application of the final dispersion.
When the fluid is going to be transported through a pipeline, additives are often required in order to prevent the pipeline material from interacting with the fluid components.

[005] A surfactant is usually incorporated in the fluid beforehand in order to facilitate the dispersion of the spherical particles and to enhance the dispersion stability.

[006] Examples of materials to be used as the core of the spherical particles are synthetic resins, waxes, metal oxides or metal alloys.

[007] Synthetic resins of low density are particularly preferred as the core material because the spherical particles containing them are less apt to sediment. In this way the use of surfactants in the fluid medium is avoided.
It seems that the dispersion stability of the particles comprising these particular synthetic resins is due to their low density, which provides a buoyant counterbalance to the metal layer density. The synthetic resin core material thus controls the buoyancy of the composite particle.

[008] At least one metallic layer is formed on the surface of the core material. The voltage necessary for thickening the ERF depends on the type of metal. Fluids having particles with a copper, an aluminum or a nickel layer thicken at much lower voltages than fluids having particles comprised of other metals and are therefore preferred. Particles with a nickel layer, which show a particular mechanical strength, are the most preferred.

[009] The usual particle size is less than 100 micrometers. It has been found that the size of the particles influences the time required for the thickening of the fluid. The smaller the particles the less time required for the solidification. At present there is no reliable preparation method for coated particles with a size less than 15 micrometers, which is a challenge for future development.

Claim

An electrorheological fluid (ERF) comprising a fluid in which spherical multi-layer particles are dispersed, wherein at least one layer of the particles comprises a metal.

Technology Today, 68 (1999), mai, n° 5, page 87

Les fluides intelligents (partie III)

Des particules composites récemment développées pour des fluides électrorhéologiques (FER) permettent d'utiliser les FER dans une gamme de températures plus large qu'avec les particules traditionnelles. Ces nouvelles particules sont constituées d'un noyau à base d'un mélange d'amidon et de gomme guar, le noyau étant recouvert d'une couche en aluminium.

Deux particules connues, de construction similaire, ont été comparées aux particules récemment développées afin de tester le comportement des FER dans de larges gammes de températures. Les deux particules connues sont dotées d'une couche en aluminium mais sont différentes en ce que l'une a un noyau en latex et l'autre un noyau en résine synthétique. Ces particules connues ont été choisies en fonction de la nature du matériau utilisé comme noyau. Ces matériaux utilisés comme noyau ont une faible densité, similaire à celle du mélange d'amidon et de gomme guar, et n'agissent pas sur la dispersibilité des particules dans le fluide. La gamme de températures opérationnelles des FER contenant les nouvelles particules est beaucoup plus large que celle de tout autre FER connu de composition similaire.

WPI/DERWENT

Veröffentlichungsnummer:	**SU1702066 A**
Veröffentlichungstag:	**19861124**
Bezeichnung:	**VORRICHTUNG ZUR REPARATUR EINER ROHÖLTRANSPORTIERENDEN PIPELINE**
EC:	**F16L55/10**
Patentanmelder:	**NEFTYANOJ NII TEKHN (SU)**
Erfinder:	**STRYMONOVA KATIA (SU)**
Anmeldenummer und -tag:	**SU19854466641 19851206**
Prioritätsnummer und -tag:	**SU19854466641 19851206**

Notreparaturen an Pipelines für den Transport von Erdölprodukten umfassen die Unterbrechung des Flusses in der Pipeline, die Bildung von Verschlusspfropfen auf beiden Seiten des beschädigten Abschnitts, das Herausschneiden des beschädigten Abschnitts, das Ersetzen des beschädigten Abschnitts, das Schmelzen der Verschlusspfropfen und die Wiederaufnahme des Pipelinebetriebs.

Es werden zwei Paar abnehmbarer Kühlkammern verwendet, um durch Gefrieren des Rohöls die Verschlusspfropfen zu bilden. Ein erstes Paar abnehmbarer Kühlkammern wird vor dem beschädigten Abschnitt angebracht und ein zweites Paar dahinter. Beide Paare werden durch Klemmen fixiert.

Bei Betrieb fliesst ein Kühlmittel durch die Kühlkammern und lässt das Rohöl in dem betroffenen Leitungsabschnitt gefrieren, so dass sich ein Verschlusspfropfen bildet. Wenn beide Verschlusspfropfen ausgebildet sind, kann die Reparaturarbeit am beschädigten Teil der Pipeline beginnen. Wenn die Reparaturarbeiten beendet sind, unterbrechen die Ventile, die die Einlassöffnung des Kühlmittels kontrollieren, dessen Zufluss, und die Kühlkammern werden abgenommen. Die gefrorenen Verschlusspfropfen tauen auf, und das Rohöl kann frei durch die reparierte Pipeline fliessen. Aus Sicherheitsgründen sollte der Auftauprozess nicht durch Heizen verstärkt werden. Dennoch kann der Auftauprozess innerhalb einiger Stunden abgeschlossen sein.

Das oben beschriebene Verfahren hat den Vorteil, dass sich die Länge der Pipeline, die vor der Reparatur entleert werden muss, erheblich verringert.

Brief des Einsprechenden / Opponent's letter / Lettre de l'opposant								
DE	**EN**	**FR**	**DK**	**ES**	**FI**	**IT**	**NL**	**SE**
verklagen	to sue	introduire une action	anklage	puner un pleito	haastaa oikeuteen	querelare	procederen tegen	åtala

Anlage 1 / Annex 1 / Annexe 1								
DE	**EN**	**FR**	**DK**	**ES**	**FI**	**IT**	**NL**	**SE**
Elektrorheologische Flüssigkeit	electrorheological fluid	fluide électrorhéologique	elektrorheologisk fluidum	fluido electroreológico	elektroreologinen neste	fluido elettroreologico	electrorheologische vloeistof	elektroreologisk vätska
Isolierendes Medium	insulating medium	milieu isolant	isolerende materiale	medio aislante	eristävä aine	mezzo isolante	isolierend medium	isolerande medium
Stärke	starch	amidon	stivelse	almidón	tärkkelys	amido	zetmeel	stärkelse
Basisöl	base oil	huile de base	basisolie	aceite base	perusöljy	olio base	basis olie	basisolja
Sedimentieren	to sediment	sédimenter	sedimenter	sedimentar	sakkautua	sedimentare	sedimenteren	sedimentera
Mais	corn	maïs	majs	maíz	maissi	granturco	mais	majs
Rohöl	crude oil	pétrole brut	Råolie	crudo	raakaöljy	petrolio greggio	ruwe olie	råolja
Kern	core	noyau	kerne	núcleo	ydin	nocciolo	kern	kärna
Hülle	coating	couche	balægning	cobertura	pinnoitus	rivestimento	coating	överdrag
metallumhüllte Partikel	metal-coated particles	particules recouvertes de métal	metalbelagte partikler	partículas recubiertas de metal	metallipintaiset partikkelit	particelle ricoperte di metallo	met een metaallag bedekte deeltjes	metallbelagda partiklar

Anlage 2 / Annex 2 / Annexe 2								
DE	**EN**	**FR**	**DK**	**ES**	**FI**	**IT**	**NL**	**SE**
Platte	plate	plaque	plade	placa	laatta	piastra	plaat	platta
Ölunfall	oil spillage	déversement d'huile	olieudslip	vertido de aceite	öljyvahinko	fuoriuscita d'olio	olie verlies	oljespill
Quellfähigkeit	swelling capacity	capacité de gonflement	kvældkapacitet	capacidad de hincharse	turpoamiskyky	capacità di rigonfiarsi	zwelvemogen	svällningsförmåga
Freisetzung	release	déversement	afgive	vertido	vapautuminen	perdita	vrijkomen	utsläpp
absetzen	to settle	se deposer	sætte sig	depositarse	laskeutua	depositarsi	bezinken	sedimentera
Harz	resin	résine	polymere	resina	hartsi	resina	hars	harts

Anlage 3 / Annex 3 / Annexe 3								
DE	**EN**	**FR**	**DK**	**ES**	**FI**	**IT**	**NL**	**SE**
Absetzzeit	settling time	délai de décantation	sedimentationstid	tiempo de sedimentación	laskeutumisaika	tempo di decantazione	bezinktijd	sedimenteringstid
Anlage 4 / Annex 4 / Annexe 4								
DE	**EN**	**FR**	**DK**	**ES**	**FI**	**IT**	**NL**	**SE**
angeregt werden	to be actuated	réagir	blive aktiveret	responder	käynnistyä	venire azionato	geactiveerd worden	påverkade
zur Sedimentation neigen	apt to sediment	apte à se deposer	tendens til at sedimentere	capaz de sedimentar	taipua sakkaantumaan	capace di sedimentare	sedimentatie neigen	benägna att sedimentera
Tensid	surfactant	agent tensio-actif	tensid	agente tenso-activo	pinta-aktiivinen aine	agente tensioattivo	oppervlakte	ytaktivt ämne
Auftriebsaugleich	buoyant counterbalance	compensation de l'effet de poussée	opdriftsudligning	compensación al efecto de empuje	kelluva vastapaino	compensazione di galleggiamento	compensatie van de opwaartse druk	bärande motverkan
Auftrieb	buoyancy	flottabilité	opdrift	flotabilidad	kelluvuus	galleggiamento	opwaartse druk	bärighet
Spannung	voltage	voltage	spænding	voltaje	jännite	voltaggio	spanning	spänning
Partikelgrösse	particle size	taille de particule	partikelstørrelse	tamaño de una partícula	partikkelikoko	dimensione delle particelle	deeltejsgrootte	kornstorlek
Anlage 5 / Annex 5 / Annexe 5								
DE	**EN**	**FR**	**DK**	**ES**	**FI**	**IT**	**NL**	**SE**
Verbundpartikel	composite particles	particules composites	kompositpartikler	partícula composite	komposiitti-partikkelit	particelle composite	samengestelde deeltjes	kompositpartiklar
Dispergierbarkeit	dispersibility	dispersibilité	evne til at blive dispergeret	dispersibilidad	hajontakyky	capacità di dispersione	dispersievermogen	dispersionsförmåga
Anlage 6 / Annex 6 / Annexe 6								
DE	**EN**	**FR**	**DK**	**ES**	**FI**	**IT**	**NL**	**SE**
Verschlusspropfen	plug	bouchon	prop	tapón	tulppa	tappo	prop	plugg
Kühlkammer	cooling chamber	chambre de refroidissement	kølekammer	cámara de enfriamiento	jäähdytyskammio	camera di raffreddamento	koelkamer	kylkammare
Kühlmittel	refrigerant	réfrigérant	kølemiddel	refrigerante	jäähdytysaine	refrigerante	koelmiddel	köldmedel
Entleeren	drainage	assèchement	dræning	drenaje	tyhjennys	drenaggio	drainage	dränering

NOTES

to the Notice of Opposition (EPO Form 2300)

Although the opposition form is **not** mandatory for the purpose of filing a notice of opposition, it specifies all the info required for such a notice to be admissible and hence facilitates the formulation and processing of the opposition. In the **statement of grounds** itself the opponent is free to comment as he wishes.

Explanatory notes to the various sections:

I. Patent opposed

Under **Patent No.** the number of the European patent against which opposition is filed (Rule 55(b) EPC) must be given.

If known, the **application number** and **the date on which the Patent Bulletin mentions the grant** (Art. 97(4) EPC) should also be given. The latter makes it easier to monitor compliance with the opposition period.

The **title of the invention** must be given (Rule 55(b) EPC); it should be indicated under item 54 **as shown on the cover page of the printed patent specification**.

II. Proprietor of the patent:

Where there are **several** patent proprietors it is sufficient for the proprietor first named in the patent specification (under 74) to be given.

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III. Opponent

The **name** and **address** of the opponent and the **State** in which his residence or principal place of business is located must be given, in accordance with Rule 26(2)(c) EPC (Rule 55(a) EPC). If the identity of the opponent has not been established by expiry of the opposition period, such deficiency can no longer be remedied (decision of the Technical Board of Appeal T 25/85, OJ EPO 1986, 81).

IV. Authorisation:

If the opponent has appointed a **representative**, his name and the address of his place ot business must be given, in accordance with Rule 26(2)(c) EPC (Rule 55(d) EPC). If **several** professional representatives are appointed, only one representative to whom notification is to be made should be named. Any further representatives must be given in an annex (put a cross in the box).

An opponent who has neither a residence nor his principal place of business within the territory of one of the EPC Contracting States must be represented and act through his representative (Art.133(2) EPC). Professional representation before the EPO may only be undertaken by professional representatives (Art.134(1) EPC) or legal practitioners entitled to act as professional representatives (Art. 134(7) EPC).

Natural or legal persons having their residence or principal place of business within the territory of one of the EPC Contracting States may also be represented in opposition proceedings by **an employee**, who must however be authorised (Art. 133(3), first sentence, EPC). In this case notification will be made to the opponent (not the employee) unless a professional representative has also been authorised.

To avoid delaying the proceedings, any authorisation which has to be filed should if possible be enclosed with the opposition. Under Rule 101(1) EPC in conjunction with the decision of the President of the EPO dated 19 July 1991, listed professional representatives identifying themselves as such normally no longer need to file signed authorisations (cf. OJ EPO 1991, 421 and 489). These are however required from legal practitioners and employees who are not professional representatives and are acting for the opponent under Article 134(7) and 133(3), 1st sentence, EPC respectively. If they do not file one, the EPO will ask them to do so within a specified period. Failure to comply will result in any procedural steps performed by the practitioner or employee being deemed not to have been taken (Rule 101(4) EPC) – which means that the notice of opposition will be considered not to have been filed.

V. Statement of the extent to which the patent is opposed

The notice of opposition must contain a statement of the extent to which the European patent is opposed (Rule 55(c) EPC). If the opposition is not filed against the patent as a whole (place a cross in the appropriate box), the number(s) of the claims (as in the patent specification) which the opponent considers to be affected by one more of the grounds for opposition must be given.

VI. Grounds for opposition

The alleged grounds for opposition (Art. 100 EPC) must be indicated by a cross placed in the appropriate box(es).

Under the heading of non-patentability (Art. 100(a) EPC) the most frequently cited grounds for opposition are lack of novelty and lack of inventive step, for which separate boxes are therefore provided. The form otherwise gives the opponent ample scope for indicating other possible grounds for opposition. Under the heading "other grounds" the

.93 (reprint 02.00)

A full list ot grounds for opposition is given in Article 100 EPC. The following in particular are not ad[illegible]nds: lack of unity of invention (Art. 82 EPC), lack of clarity in the claims (Art. 84 EPC) and prior national righ[illegible] EPC).

For general information on grounds for opposition see Guidelines for Examination in the EPO, D-III, 5.

VII. Facts and arguments presented in support of the opposition

The notice of opposition must contain an indication of the facts, evidence and arguments presented in support of the opposition (Rule 55(c) EPC) and, where documents are cited, an indication of the relevant part(s) (Guidelines, D-IV, 1.2.2.1).

The facts, evidence and arguments in support of the opposition **must be presented on a separate sheet** enclosed as an annex to the Form (indicated by a pre-printed cross in the box).

The fact that the **evidence is indicated** separately in Section IX does not anticipate the presentation of facts, evidence and arguments but merely makes for greater clarity and simplifies processing of the dossier. Section IX of the Form (Evidence presented) may of course always be referred to in this presentation.

Where documents are **cited** in shortened form the rules set out in the Guidelines B-X, 9.1 should be followed.

VIII. Other requests

This section may be used for example to request oral proceedings or a file inspection.

IX. Evidence

Published documents cited as evidence (e.g. patent specifications) must be entered under "Publications" in the spaces provided – preferably in order of importance. They should be **cited** in the manner described in Guidelines B-X, 9.1.

Opponents should also indicate the **parts** of the document on which the opposition is based (this information has to be given anyway in the statement of grounds – see notes to Section VII above).

Other **evidence** (e.g. witnesses, affidavits, company brochures, test or expert reports) must be cited under "Other evidence" (for manifest prior use: place, time, nature – see Guidelines D-V, III; for witnesses: first name and surname, full address, relationship to opponent, etc.). If there is not enough room, the evidence can simply be listed, with an indication of where in the statement of grounds the relevant particulars appear (e.g. "Witness ..., page 5").

Documents cited by a party to opposition proceedings must be filed in **duplicate** (including publications already cited in the European patent specification) with the notice of opposition or other written submission. This will avoid an invitation from the EPO for subsequent filing thereof. If they are neither enclosed nor filed in due time on invitation, the EPO may ignore any arguments based on them (Rule 59 EPC).

X. Payment of opposition fee

The opposition fee must be paid within the opposition period. Notice of opposition is not deemed to have been filed until the opposition fee has been paid (Art. 99(1) EPC). With regard to what constitutes the date to be considered as the date on which payment is made, see Article 8 of the Rules relating to Fees and the guidance on payment methods in the Official Journal.

XI. List of documents enclosed

All documents, including annexes (but excluding the authorisation or items relating to payment of the opposition fee), must be filed **at least in duplicate**, as specified in the form. If further opponents are known – or likely – it is a good idea to file sufficient extra copies. This will save the EPO having to request them later or prepare them itself (Rule 36(4) EPC), and so minimise delay and costs.

XII. Signature

If the opponent is a legal person other than an individual and the notice of opposition is not signed by the representative it must be signed

(a) either by a person entitled to sign under the law or the opponent's statute, articles of association or the like, with an **indication of the capacity of the person doing so**, e.g. Geschäftsführer, Prokurist, Handlungsbevollmächtigter; chairman, director, company secretary; directeur, fondé de pouvoir (Art. 133(1) EPC), in which case no authorisation need be filed;

(b) or by another employee of the opponent, provided the latter's principal place of business is in a Contracting State (Art. 133(3), first sentence, Rule 101(1) EPC), in which case an authorisation must be filed.

Notice of Opposition to a European Patent

E… t Office

Tabulation marks

for EP…

I. Patent opposed

Opp. No. OPPO (1)

Patent No.

Application No.

Date of mention of the grant in the European Patent Bulletin (Art. 97(4), 99(1) EPC)

Title of the invention:

II. Proprietor of the Patent

first named in the patent specification

Opponent's or representative's reference (max. 15 spaces) OREF

III. Opponent

OPPO (2)

Name

Address

State of residence or of principal place of business

Telephone/Telex/Fax

Multiple opponents ☐ further opponents see additional sheet

IV. Authorisation

OPPO (9)

1. **Representative**
(Name only one representative to whom notification is to be made)

Name

Address of place of business

Telephone/Telex/Fax

Additional representative(s) ☐ (on additional sheet/see authorisation) OPPO (5)

2. **Employee(s)** of the opponent authorised for these opposition proceedings under Art. 133(3) EPC

Name(s):

Authorisation(s) ☐ not considered necessary

EPO use only

V. Opposition is filed against

— the patent as a whole ☐

— claim(s) No(s).

VI. Grounds for opposition:

Opposition is based on the following grounds:

(a) the subject-matter of the European patent opposed is not patentable (Art. 100(a) EPC) because:

— it is not new (Art. 52(1); 54 EPC) ☐

— it does not involve an inventive step (Art. 52(1); 56 EPC) ☐

— patentability is excluded on other grounds, i. e. Art. ☐

(b) the patent opposed does not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Art. 100(b) EPC; see Art. 83 EPC). ☐

(c) the subject-matter of the patent opposed extends beyond the content of the application/ of the earlier application as filed (Art. 100(c) EPC, see Art. 123(2) EPC). ☐

VII. Facts and arguments

(Rule 55(c) EPC)
presented in support of the opposition are submitted herewith on a separate sheet (annex 1) ☒

VIII. Other requests:

IX. Evidence presented

EPO use only

Enclosed = ☐

will be filed at a later date = ☐

A. **Publications:**

Publication date

1

Particular relevance (page, column, line, fig.):

2

Particular relevance (page, column, line, fig.):

3

Particular relevance (page, column, line, fig.):

4

Particular relevance (page, column, line, fig.):

5

Particular relevance (page, column, line, fig.):

6

Particular relevance (page, column, line, fig.):

7

Particular relevance (page, column, line, fig.):

Continued on additional sheet ☐

B. **Other evidence**

EPO use only

X. Payment of the opposition fee is made

☐ as indicated in the enclosed voucher for payment of fees and costs (EPO Form 1010)

☐

XI. List of documents

Enclosure No.			No. of copies	
0	☒	Form for notice of opposition	☐ (min. 2)	
1	☒	Facts and arguments (see VII.)	☐ (min. 2)	
2		Copies of documents presented as evidence (see IX.)		
2a	☐	— Publications	☐ (min. 2 of each)	
2b	☐	— Other documents	☐ (min. 2 of each)	
3	☐	Signed authorisation(s) (see IV.)	☐	
4	☐	Voucher for payment of fees and costs (see X.)	☐	
5	☐	Cheque	☐	
6	☐	Additional sheet(s)	☐ (min. 2 of each)	
7	☐	Other (please specify here):	☐	

XII. Signature of opponent or representative

Place

Date