AUSTRALIA Form 8

Patents Act 1952

DECLARATION IN SUPPORT OF A CONVENTION APPLICATION FOR A PATENT

In support of the Convention application made for a patent for an invention entitled:

PROCESS AND MEANS FOR REPAIRING PIPES BY REMOTE-CONTROLLED INSERTION OF A LINING

I, K. Schmidt of
X, RSS Rohr-Sanierungs-Service AG
Russenweg 7
of 8008 Zürich (Switzerland)

do solemnly and sincerely declare as follows:

1. ~~I am the applicant for the patent "Method and means for remote-controlled sheathing when renovating pipelines"~~ *(or, in the case of an application by a body corporate)*

1. I am authorized by RSS Rohr-Sanierungs-Service AG , the applicant for the patent to make this declaration on its behalf.

2. The basic application as defined by section 141 of the Act was made in Switzerland on the 30th day of September , 1987 , by ~~ABATRON-PATENTBUERO, Diggelmann-str. 22, CH-8047 Zurich (Switzerl.)~~

day of , 19 , by ALWIN SIGEL

3. ~~I am the actual inventor of the invention referred to in the basic application.~~

(or, where a person other than the inventor is the applicant)

3. ALWIN SIGEL

of Nussberg, CH-8418 Schlatt, Switzerland

is the actual inventor of the invention and the facts upon which ~~I am entitled~~ the applicant is entitled to make the application are as follows: The Applicant is the Assignee of Alwin Sigel who is the actual Inventor.

4. The basic application referred to in paragraph 2 of this Declaration was the first application made in a Convention country in respect of the invention the subject of the application.

(or where a request is made under section 142AA of the Patents Act 1952, for an earlier application made in a Convention country to be disregarded)

~~4. (1.) The basic application referred to in paragraph 2 of this Declaration was not the first application made in a Convention country in respect of the invention the subject of the application.~~

~~(2.) An earlier application in respect of the invention the subject of the application was made in~~

~~or~~

~~(3.) A request has been made to you under section 142AA of the *Patents Act* 1952 to disregard that earlier application.~~

~~*(Here set out in succeeding sub-paragraphs the facts that show that section 142AA is applicable)*~~

~~Except as stated in this paragraph, the basic application referred to in paragraph 2 of this Declaration was the first application made in a Convention country in respect of the invention the subject of the application.~~

Declared at Switzerland this day of 12. April , 19 89

Rohr Sanierungs Service
RSS AG
Russenweg 7
8008 Zürich 01/53 02 66

(Signature of Declarant)
K. Schmidt

TO:
THE COMMISSIONER OF PATENTS.

(IMPORTANT – Cross out inapplicable words in above Form.)

*0/4524

(12) PATENT ABRIDGMENT (11) Document No. AU-B-82330/87
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 618519

(54) Title
PROCESS AND MEANS FOR REPAIRING PIPES BY REMOTE-CONTROLLED INSERTION OF A LINING

International Patent Classification(s)
(51)[4] **F16L 055/16** **E04F 017/10** **E04F 017/12** **F16L 055/18**

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3808/87	**30.09.87**	**CH SWITZERLAND**

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(71) Applicant(s)
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(56) Prior Art Documents
US 1514062
US 4109684

(57) Claim

1. An insertion device for the repair of an inaccessible pipeline, the device having a casing about which a sheet of metal may be bent, the casing including at least one projection for engagement with apertures in opposite edges of the sheet of metal retain it in the bent state, wherein the projection comprises a pine extending from the casing and includes a disengageable locking element to lock the sheet of metal onto the pin, and the casing also including an ejection element which can be extended out of the casing to remove the sheet of metal from the pin after disengagement of the locking element, whereby to release the sheet of metal from the projection so that the sheet of metal may spring out and engage a wall of the pipeline whereby to internally sheath the pipeline.

4. Insertion device in accordance with claim 3, wherein the lever bearing the locking element is a two-armed lever which bears the locking element on one arm and the other arm of which is forked and accommodates a pin fitted on the second lever between the two prongs of the fork.

AU-AI-82330/87

PCT WELTORGANISATION FÜR GEISTIGES EIGENTUM
Internationales Büro

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

(51) Internationale Patentklassifikation 4 : F16L 55/16, 55/18, E04F 17/12 — A1

(11) Internationale Veröffentlichungsnummer: WO 89/ 03003

(43) Internationales Veröffentlichungsdatum: 6 April 1989 (06.04.89)

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(32) Prioritätsdatum: 30. September 1987 (30.09.87)

(33) Prioritätsland: CH

(71)(72) Anmelder und Erfinder: SECTION 34(4)(a) DIRECTION SEE FOLIO 13
NAME DIRECTED—RSS Rohr-Sanierungs-Service AG—Russenweg 7, CH-8052 Zurich, Switzerland—

(74) Anwalt: SIKA Robotics AG, cf. Tousstrasse, CH-8021, Geschäftsleitung, Switzerland

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

Veröffentlicht
Mit internationalem Recherchenbericht.
Mit geänderten Ansprüchen.

(54) Title: PROCESS AND MEANS FOR REPAIRING PIPES BY REMOTE-CONTROLLED INSERTION OF A LINING

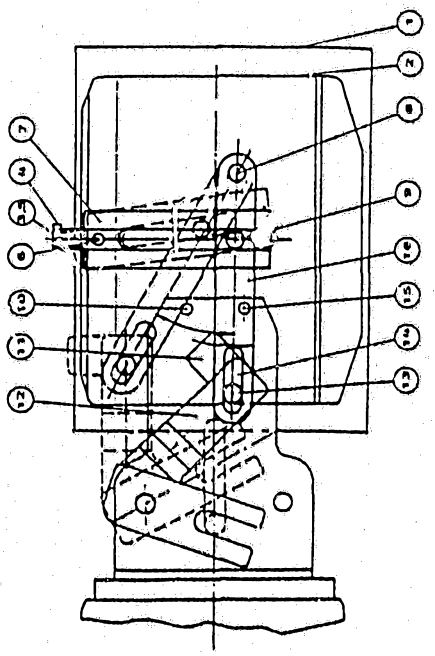
(54) Bezeichnung: VERFAHREN UND MITTEL ZUM FERNGESTEUERTEN SCHALUNGSEINBAU BEI DER SANIERUNG VON ROHRLEITUNGEN

(57) Abstract

A new process and new device permit the repair of damaged pipes in which debris formation occurs or in which pipe sections are completely destroyed. The device can be mounted on a pipe-repair robot or on a conventional chariot and remote-controlled by a television camera. A noble metal lining (1) is introduced into the pipe interior by the device, which is equipped with a simple locking mechanism (4). The lining is then pushed to the site of damage or of a missing pipe section and a sealant is forced through holes in the lining toward the exterior.

(57) Zusammenfassung

Bei der vorliegenden Erfindung handelt es sich um ein neuartiges Verfahren und gleichzeitig auch um ein neuartiges Gerät zur Sanierung schadhafter Rohrleitungen, bei welchen Scherbenbildung entstand oder die Leitungen teilweise vollkommen zerstört wurden. Das Gerät kann an einen Kanalsanierungsroboter oder an einen gewöhnlichen Schlitten montiert und mit Fernsehunterstützung ferngesteuert werden. Mit dem Gerät, welches über einen einfachen Verriegelungsmechanismus (4) verfügt, wird eine Edelmetall-Verschalung (1) ins Rohrinnere eingeführt. Die Verschalung wird dort zur Instandstellung einer schadhaften Stelle oder eines fehlenden Rohrleitungsstückes abgestoßen, worauf eine Abdichtungsmasse durch die in der Verschalung angebrachten Löcher auf die Aussenseite gepreßt wird.



METHOD AND MEANS FOR REMOTE-CONTROLLED SHEATHING INSTALLATION WHEN RENOVATING PIPELINES

This invention is to do with a new method and new kind of equipment for the remote-controlled installation of sheathing for the renovation of pipelines.

Problem

The problem which has been in existence up to now and which can be solved with this invention is the renovation of pipelines damaged by the formation of fragments, if the diameter of the pipe is small and the pipe cannot be entered for the purpose of repair. The repair equipment must therefore be able to be inserted into a pipeline of small diameter, be remote-controlled and also have the advantage over known methods so that severely damaged pipes with fragments can be repaired. The conventional methods (summarized below) only offer an unsatisfactory solution, because they involve washing out which removes the fragments and thus a larger leak is formed, which then can no longer be repaired.

State of technology

The current state of technology means that renovations of slightly damaged pipes are carried out in two steps:

1. Preparation of the renovation:
   Treatment and cleaning of the damaged parts (drilling, washing, suction etc.)

2. Actual renovation:
   Application of filling material (plastics, adhesives, products from cement chemistry etc.).

As already mentioned, only slight damage can be repaired with this traditional procedure, but not cases in which fragments or even entire parts of pipes are missing. This invention now promises the long sought after solution.

The Invention

In one form the invention can be said to reside in claim 1 wherein an insertion device for the repair of an inaccessible pipeline, the device having a casing about which a sheet of metal may be bent, the casing including at least one projection for engagement with apertures in opposite edges of the sheet of metal to retain it in the bent state, wherein the projection comprises a pin extending from the casing and includes a disengageable locking element to lock the sheet of metal onto the pin, and the casing also including an ejection element which can be extended out of the casing to remove the sheet of metal from the pin after disengagement of the locking element, whereby to release the sheet of metal from the projection so that the sheet of metal may spring out and engage a wall of the pipeline whereby to internally sheath the pipeline.

In an alternative form the invention resides in a method of repairing a damaged inaccessible pipe comprising the steps of;

bending a metal sheet into a cylindrical form of a diameter less than the diameter of the pipe to be repaired,

holding the metal sheet in the cylindrical form by means of an insertion device as defined in claim 1, including means to hold the metal sheet,

placing the metal sheet into the place in the pipe to be repaired,

releasing the metal sheet from the means to hold the metal sheet, and allowing the sheet to spring out to engage the wall of the pipe whereby to internally sheath the pipe,

and placing a sealing material between the pipe and the metal sheet wherein the means to hold the metal sheet comprises a projection extending from the insertion device, the projection having a pin and a locking element, wherein the pin engages apertures in opposite edges of the metal sheet and the step of releasing the metal sheet includes the step of disengaging the locking element and extending an ejection element.

It will be seen that the invention consists of both a method and the accompanying insertion apparatus. The method preferably consists of a corrugated metal sheet being inserted into the damaged pipe with an apparatus by the metal sheet being bent in such a way that it also forms a pipe, only with a smaller diameter. This compressed sheet is then placed in the position in the pipe to be repaired and in which the pipe fragments have possibly already been washed away. Here the compression with which the sheet has been pushed together is released, whereupon it opens like a spring and forms a pipe with a larger diameter. This sheet is prevented from opening further by the existing pipe and thus forms the sheathing of the defective pipe at the point of damage. The sealing mass is now pressed through the holes in _____

the metal sheet and fills the space between the earth and the sheathing. The sheathing, which consists of the bent metal sheet, can now be left in the pipe without any difficulties, because the metal chosen is completely rustproof. For this reason it is termed lost sheathing.

In extreme cases, in which whole parts of a pipe have been washed away, more than one metal sheathing can be inserted, which then overlap like roof slates and can thus form a complete pipe.

In order to use this method, an application apparatus is necessary, with the help of which the metal sheet is firstly inserted into the pipe and then put into the correct position.

This apparatus is thus for insertion, positioning and application of the metal sheathing. It consists of a casing 2 (Fig. 1) and a mechanism to hold the sheet. The casing has two pins 3 and 5 on top (Fig. 2) with a semi-circular cross-section, which are a part of the locking mechanism. The application apparatus is attached by means of the holes 15 and 10 to a channel renovation robot, but can also be used in combination with conventional sleds or operated by hand. For control and supervision purposes, extension arms can be fixed to the front of the application apparatus (in Fig. 1 on the right) and a television camera is then fitted to them. This camera looks into the application apparatus, which is opened at the base, in the opposite direction, which means that the metal sheathing wound around it becomes visible. The latter is fitted with holes, which are used later for the pressing of the sealing mass. It is through precisely these holes that we can see with the help of the camera whether the damaged part of the pipe has been reached and thus have the possibility to stop at the correct place and eject the metal sheathing.

Thus, the sheathing consists of a metal sheet 1 (Fig. 1), which is wound around the application apparatus. This flexible sheet has at least one hold at each end, so that it can be placed over the pin 3, 4, 5, which is on the back of the application apparatus. Independent re-coiling, which the swelling sheet aims at, is prevented by a small bar 4 which can be removed from the pin. In order to facilitate the bending of the metal sheet, it is pre-bent to start with and put into a fixed curvature. Attention should be paid to the fact that this curvature is not too strong, so that the sheathing, once it is inside the pipe, still has the necessary tension and can push against the outside of the existing pipe. Thus, strength must still be used in order to bring the sheet down to such a small radius and to coil it around the application apparatus. With a pipe diameter of about 200mm, the diameter of the sheathing for insertion into the inside of the pipe is reduced to about 160mm. After the ejection, the diameter of the sheathing increases again due to the tension, and ti sticks to the place of ejection in the damaged pipe. The ejection of the sheathing is achieved by the locking element 4 (Fig. 2) in the pin 3, 5 on the back of the application apparatus being retracted, after which the sheet, which had been placed over this pin at both ends by its holes, is able to uncoil again through its own spring energy and release itself from the application apparatus. The work material hastelloy, a nickel alloy, was used for the production of the sheathing. The use of this work material for pipe renovation is new. Up to now, it has been used for example for flue gas cleaning plants due to its high acid-resistance. This hastelloy is preferred to chrome steel, PVC or polyethylene due to the special material features.

Hastelloy has practically the same coefficient of expansion as concrete and is highly superior to the materials mentioned as regards tension, space resistance, pressure-resistance, coefficient of temperature expansion, cleaning resistance ("resistance to cleaning jets"), acid-resistance and non-decaying. The service life of hastelloy is accordingly about 20 to 25 years. (As a comparison: the service life of chrome steel is about 5 years).

As regards the mechanism in the inside of the application apparatus, the following must be said: its purpose is the pushing forwards and backwards of the locking element 4 (Fig. 1 and 2) int eh pin 3 and 5. For this, a pivotable lever 16 is positioned on the axis 8 in such a way that the cam 9 on it can make a circular movement. This lever 16 is put into motion by a T-shaped control head 12, which for its part is controlled by the renovating machine mentioned above.

The higher end 11 of the control head 12 is to eject the sheathing when opening the locking mechanism. That is to say that the T-shaped piece 12 must go up when releasing the locking, in order to be able to retract the locking element 4. Thus the T-shaped piece 12 with its higher end 11 pushes the two ends of the coiled sheet upwards over the pin 3, 5 so that it can jump off. From T-shaped piece 12, the motion is transmitted by means of the connection point 13 to the lever arm 16. The T-shaped piece 12 is fastened to the lever arm 16 at the connection point 13 in such a way that it is freely movable within the recess 14, which permits a circular movement of the lever arm 16. The force transmission is then carried out with cam 9 from the lever arm 16 onto the tuning fork-shaped locking mechanism 7, whereby the locking element 4 (cf. also Fig. 2) opens or closes the locking through the movement of the "tuning fork". The two conditions of the locking mechanism are shown in Fig. 1:

The thick lines show the closed state and the dotted lines the open state. The tuning fork-shaped locking part is merely attached pivoted on the casing at point 6 and is open at the bottom. The simple mode of construction with the "tuning fork" which is open to the bottom facilitates any replacement of this part of the equipment by it simply being screwed off and pulled upwards.

The application apparatus described here is, as already mentioned, either attached to a channel renovation robot (or a conventional sled and opened or closed by the latter by the robot pushing the T-shaped piece 12 up or down. In Fig. 1, parts of the robot mentioned are visible on the left-hand side of the application apparatus described. The robot is inserted into the pipe to be repaired with the application apparatus fitted and is moved to the defective point by remote control. In a further step, the sealing mass, e.g. a two pack epoxy resin is applied after the ejection of the metal sheet. This takes place by the sealing mass being pressed through holes in the sheathing and expanding between the sheathing and the surroundings. In this way, permanent sealing is obtained.

This invention has thus made it possible to solve an old, almost insoluble problem. Whereas up to now, the whole pipe had to be dug up with the long ditch in cases of formation of fragments in pipelines, in order to replace it with a new one, it can now be elegantly renovated with the help of this sophisticated invention. In this way, immense costs can also be saved. This is especially the case if, for example, the defective pipe goes under a building, where it cannot be laid open.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. An insertion device for the repair of an inaccessible pipeline, the device having a casing about which a sheet of metal may be bent, the casing including at least one projection for engagement with apertures in opposite edges of the sheet of metal retain it in the bent state, wherein the projection comprises a pine extending from the casing and includes a disengageable locking element to lock the sheet of metal onto the pin, and the casing also including an ejection element which can be extended out of the casing to remove the sheet of metal from the pin after disengagement of the locking element, whereby to release the sheet of metal from the projection so that the sheet of metal may spring out and engage a wall of the pipeline whereby to internally sheath the pipeline.

2. Insertion device in accordance with claim 1, wherein the locking element is fitted on a lever which is pivoted around an axis fixed to the casing and the lever being moved by a shaft which in turn is moved by a limb bearing the ejection element.

3. Insertion device in accordance with claim 2, wherein the arm is a second lever, which can be pivoted around a second axis fixed to the casing and which is coupled with the lever bearing the locking element by a pin/slit combination.

4. Insertion device in accordance with claim 3, wherein the lever bearing the locking element is a two-armed lever which bears the locking element on one arm and the other arm of which is forked and accommodates a pin fitted on the second lever between the two prongs of the fork.

5. Insertion device in accordance with claim 2 or 3, wherein the limb bearing the ejection element is a third pivoting lever with which the second lever is coupled by a second pin/slot combination.

6. Insertion device in accordance with any one of the claims 1 to 3, wherein the casing can be fitted to a pipeline renovating vehicle and that the limb bearing the ejection element can be coupled with a movable torque bar fitted in the vehicle.

7. Insertion device in accordance with any one of the claims 1 to 6, wherein the casing carries a television camera on one side.

8. A method or repairing a damaged inaccessible pipe comprising the steps of;

bending a metal sheet into a cylindrical form of a diameter less than the diameter of the pipe to be repaired,

holding the metal sheet in the cylindrical form by means of an insertion device as defined in claim 1, including means to hold the metal sheet,

placing the metal sheet into the place in the pipe to be repaired,

releasing the metal sheet from the means to hold the metal sheet, and allowing the sheet to spring out to engage the wall of the pipe whereby to internally sheath the pipe,

and placing a sealing material between the pipe and the metal sheet, wherein the means to hold the metal sheet comprises a projection extending from the insertion device, the projection having a pin and a locking element, wherein the pin engages apertures in opposite edges of the metal sheet and the step of releasing the metal sheet includes the step of disengaging the locking element and extending an ejection element.

9. A method as in claim 8, wherein the metal sheet includes a plurality of holes and the step of placing a sealing material includes pressing the sealing material through the holes.

Dated this 25th day of September 1991

SIKA ROBOTICS AG
By their Patent Attorneys
COLLISON & CO.

Fig. 1

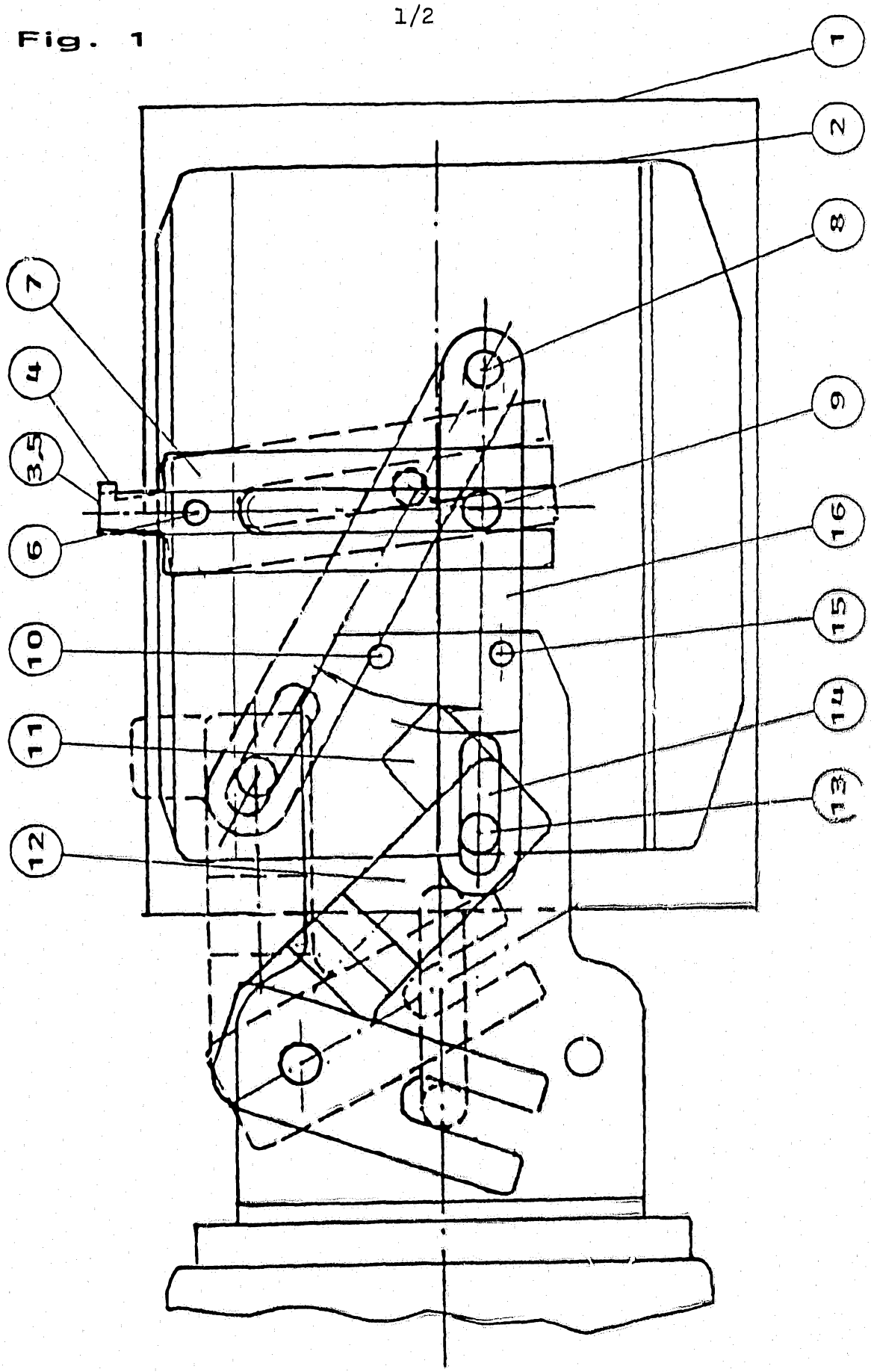
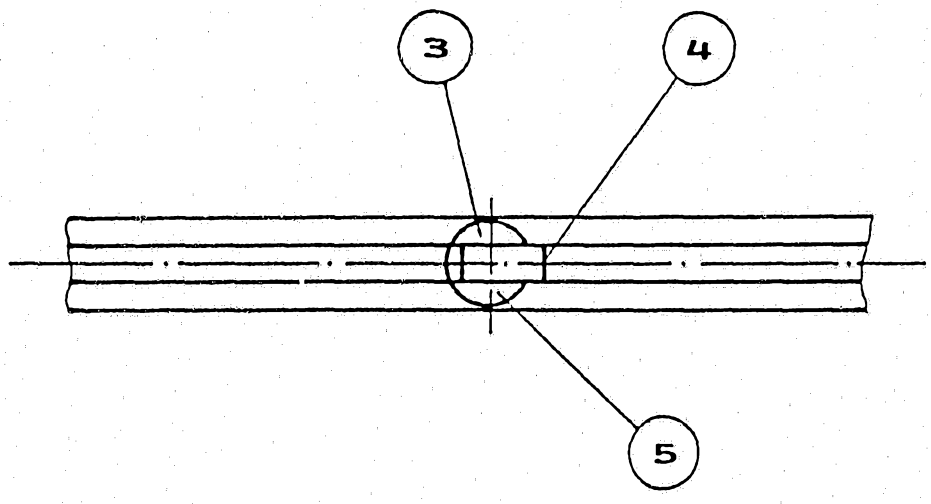


Fig. 2



INTERNATIONAL SEARCH REPORT

International Application No PCT/CH 87/00160

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] F16L 55/16;F16L 55/18;E04F 17/12

II. FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
Int.Cl.[4]	F16L

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 [10]	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No. [13]
X	US, A, 1514062 (ROBERT M. McLAIN) 4 November 1924 see the whole document	1,4,6
A	EP, A, 0159300 (STIG WESTMANN) 23 October 1985 see abstract;figures	1,4
A	DE, A, 3504935 (DOI, KOHICHIRO, NARA) 31 October 1985 see abstract;figures	1,4
A	WO, A, 86/04975 (KUNSTSTOFFTECHNIK AG HIMMLER) 28 August 1986 see page 6,lines 14-20	11

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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)

"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

"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	Date of Mailing of this International Search Report
20 May 1988 (20.05.88)	23 June 1988 (23.06.88)
International Searching Authority	**Signature of Authorized Officer**
EUROPEAN PATENT OFFICE	

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO. CH 8700160

SA 19474

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 10/06/88
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- 1514062		Keine	
EP-A- 0159300	23-10-85	SE-A- 8403320	01-10-85
		JP-A- 60222688	07-11-85
		AU-A- 4053485	02-10-86
		US-A- 4647072	03-03-87
DE-A- 3504935	31-10-85	JP-A- 60172798	06-09-85
		SE-A- 8500717	18-08-85
WO-A- 8604975	28-08-86	EP-A,B 0211825	04-03-87

INTERNATIONALER RECHERCHENBERICHT

Internationales Aktenzeichen PCT/CH 87/00160

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 F 16 L 55/16; F 16 L 55/18; E 04 F 17/12

II. RECHERCHIERTE SACHGEBIETE

Recherchierter Mindestprüfstoff[7]

Klassifikationssystem	Klassifikationssymbole
Int. Cl 4	F 16 L

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, 1514062 (ROBERT M. McLAIN) 4. November 1924 siehe das ganze Dokument	1,4,6
A	EP, A, 0159300 (STIG WESTMANN) 23. Oktober 1985 siehe Zusammenfassung; Figuren	1,4
A	DE, A, 3504935 (DOI, KOHICHIRO, NARA) 31. Oktober 1985 siehe Zusammenfassung; Figuren	1,4
A	WO, A, 86/04975 (KUNSTSTOFFTECHNIK AG HIMMLER) 28. August 1986 siehe Seite 6, Zeilen 14-20	11

* Besondere Kategorien von angegebenen Veröffentlichungen[10]:

"A" Veröffentlichung, die den allgemeinen Stand der Technik definiert, aber nicht als besonders bedeutsam anzusehen ist

"E" älteres Dokument, das jedoch erst am oder nach dem internationalen Anmeldedatum veröffentlicht worden ist

"L" Veröffentlichung, die geeignet ist, einen Prioritätsanspruch zweifelhaft erscheinen zu lassen, oder durch die das Veröffentlichungsdatum einer anderen im Recherchenbericht genannten Veröffentlichung belegt werden soll oder die aus einem anderen besonderen Grund angegeben ist (wie ausgeführt)

"O" Veröffentlichung, die sich auf eine mündliche Offenbarung, eine Benutzung, eine Ausstellung oder andere Maßnahmen bezieht

"P" Veröffentlichung, die vor dem internationalen Anmeldedatum, aber nach dem beanspruchten Prioritätsdatum veröffentlicht worden ist

"T" Spätere Veröffentlichung, die nach dem internationalen Anmeldedatum oder dem Prioritätsdatum veröffentlicht worden ist und mit der Anmeldung nicht kollidiert, sondern nur zum Verständnis des der Erfindung zugrundeliegenden Prinzips oder der ihr zugrundeliegenden Theorie angegeben ist

"X" Veröffentlichung von besonderer Bedeutung; die beanspruchte Erfindung kann nicht als neu oder auf erfinderischer Tätigkeit beruhend betrachtet werden

"Y" Veröffentlichung von besonderer Bedeutung; die beanspruchte Erfindung kann nicht als auf erfinderischer Tätigkeit beruhend betrachtet werden, wenn die Veröffentlichung mit einer oder mehreren anderen Veröffentlichungen dieser Kategorie in Verbindung gebracht wird und diese Verbindung für einen Fachmann naheliegend ist

"&" Veröffentlichung, die Mitglied derselben Patentfamilie ist

IV. BESCHEINIGUNG

Datum des Abschlusses der internationalen Recherche	Absendedatum des internationalen Recherchenberichts
20. Mai 1988	23 JUN 1988
Internationale Recherchenbehörde	Unterschrift des bevollmächtigten Bediensteten
Europäisches Patentamt	P.C.G. VAN DER PUTTEN

ANHANG ZUM INTERNATIONALEN RECHERCHENBERICHT ÜBER DIE INTERNATIONALE PATENTANMELDUNG NR.

CH 8700160
SA 19474

In diesem Anhang sind die Mitglieder der Patentfamilien der im obengenannten internationalen Recherchenbericht angeführten Patentdokumente angegeben.
Die Angaben über die Familienmitglieder entsprechen dem Stand der Datei des Europäischen Patentamts am 10/06/88
Diese Angaben dienen nur zur Unterrichtung und erfolgen ohne Gewähr.

Im Recherchenbericht angeführtes Patentdokument	Datum der Veröffentlichung	Mitglied(er) der Patentfamilie		Datum der Veröffentlichung
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Für nähere Einzelheiten zu diesem Anhang : siehe Amtsblatt des Europäischen Patentamts, Nr.12/82