680942

AUSTRALIA

Patents Act 1990

NOTICE OF ENTITLEMENT

We, **Novopress GmbH Pressen und Presswerkzeuge & Co.KG**, the Applicant/Nominated Person in respect of Application No. 76536/94, state the following:-

The Nominated Person is entitled to the grant of the patent because the Nominated Person derives title to the invention from the inventor by assignment.

The Nominated Person is the applicant of the application listed in the declaration under Article 8 of the PCT.

7 May, 1997

(A member of the firm of Davies Collison Cave for
and on behalf of the applicant)

AU9476536

(12) PATENT ABRIDGMENT (11) Document No. AU-B-76536/94
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 680942

(54) Title
MEASUREMENT APPARATUS FOR DETECTING THE DEPTH OF PENETRATION INTO PIPE JOINTS

International Patent Classification(s)
(51)[6] G01B 017/00 B21D 039/04

(21) Application No. : 76536/94 (22) Application Date : 17.08.94

(87) PCT Publication Number : WO95/06232

(30) Priority Data

(31) Number	(32) Date	(33) Country
9312808	26.08.93	DE GERMANY

(43) Publication Date : 21.03.95

(44) Publication Date ccepted Application : 14.08.97

(71) Applicant(s)
NOVOPRESS GMBH PRESSEN UND PRESSWERKZEUGE & CO. KG

(72) Inventor(s)
GERT LOHMANN

(74) Attorney or Agent
DAVIES COLLISON CAVE , 1 Little Collins Street, MELBOURNE VIC 3000

(56) Prior Art Documents
US 4555665
US 4520672
JP 57-142507

(57) Claim

1. A pressing tool for radially compressing a pipe connection between a pipe end and a press fitting, wherein a measuring apparatus for measuring the insertion depth of the pipe end into the press fitting is provided, the measuring apparatus having a thickness sensor for measuring the material thickness of the pipe connection, and means for providing at least an indication of the measured material thickness.

2. A pressing tool according to claim 1, wherein the thickness sensor can be an ultrasound sensor, a magnetic field sensor, and/or an eddy current sensor.

OPI DATE 21/03/95 APPLN. ID 76536/94
AOJP DATE 04/05/95 PCT NUMBER PCT/EP94/02734
AU9476536

(51) Internationale Patentklassifikation 6 :
G01B 17/00, B21D 39/04

A1

(11) Internationale Veröffentlichungsnummer: WO 95/06232

(43) Internationales Veröffentlichungsdatum: 2. März 1995 (02.03.95)

(21) Internationales Aktenzeichen: PCT/EP94/02734

(22) Internationales Anmeldedatum: 17. August 1994 (17.08.94)

(30) Prioritätsdaten:
G 93 12 808.8 U 26. August 1993 (26.08.93) DE

(71) Anmelder *(für alle Bestimmungsstaaten ausser US)*: NOVO-PRESS GMBH PRESSEN UND PRESSWERKZEUGE & CO.KG [DE/DE]; Scharnhorststrasse 1, D-41460 Neuss (DE).

(72) Erfinder; und
(75) Erfinder/Anmelder *(nur für US)*: LOHMANN, Gert [DE/DE]; Am Bollenberg 35, D-41468 Neuss (DE).

(74) Anwalt: PAUL, Dieter-Alfred; Fichtestrasse 18, D-41464 Neuss (DE).

(81) Bestimmungsstaaten: AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, ES, FI, GB, GE, HU, JP, KG, KP, KR, KZ, LK, LU, LV, MD, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SI, SK, TJ, TT, UA, US, UZ, VN, europäisches Patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI Patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).

Veröffentlicht
Mit internationalem Recherchenbericht.
Vor Ablauf der für Änderungen der Ansprüche zugelassenen Frist. Veröffentlichung wird wiederholt falls Änderungen eintreffen.

680942

(54) Title: MEASUREMENT APPARATUS FOR DETECTING THE DEPTH OF PENETRATION INTO PIPE JOINTS

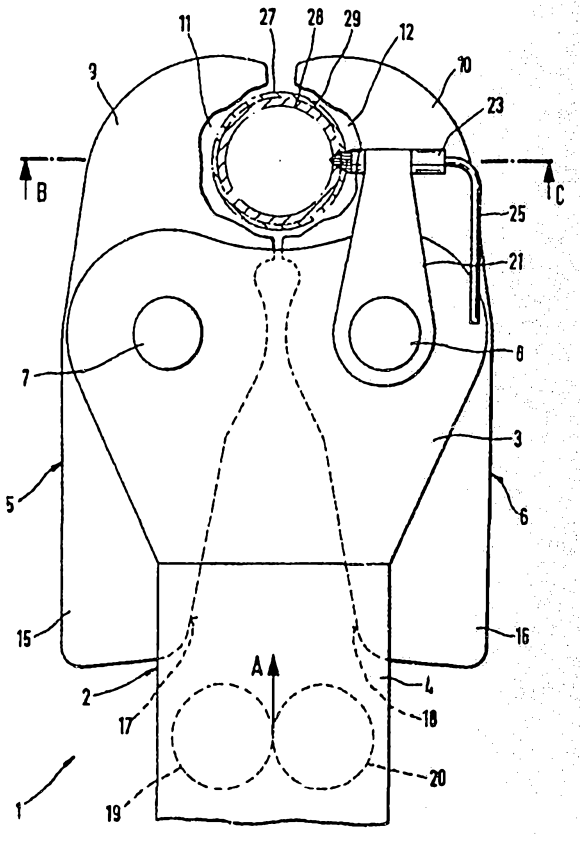
(54) Bezeichnung: MESSGERÄT ZUR ERFASSUNG DER EINSCHUBTIEFE BEI EINER ROHRVERBINDUNG

(57) Abstract

A measurement apparatus is disclosed for a pipe joint assembly (27, 63, 92, 103, 116) to detect the depth of penetration of a pipe end into a press fitting. The measurement apparatus is characterised in that it has an apparatus support (1, 42, 82, 102) that may be set on the outer side of the pipe joint assembly (27, 63, 92, 103, 116), a thickness sensor (23, 24, 74, 75, 90, 113) mounted thereon to detect the thickness of material in the pipe joint assembly (27, 63, 92, 103, 116), and an evaluation device to provide at least a qualitative indication of the detected thickness of material.

(57) Zusammenfassung

Ein Meßgerät zur Erfassung der Einschubtiefe bei einer Rohrverbindung (27, 63, 92, 103, 116) zwischen einem Rohrende und einem Preßfitting ist erfindungsgemäß durch einen auf die Außenseite der Rohrverbindung (27, 63, 92, 103, 116) aufsetzbaren Geräteträger (1, 42, 82, 102), durch einen an diesem angebrachten Dickensensor (23, 24, 74, 75, 90, 113) zur Erfassung der Materialstärke der Rohrverbindung (27, 63, 92, 103, 116) sowie durch eine Auswerteinrichtung für die zumindest qualitative Darstellung der erfaßten Materialstärke gekennzeichnet.



The invention relates to a pressing tool for radially compressing a pipe connection between a pipe end and a press fitting.

Sleeve-shaped press fittings are known to be used for pipe ends which are plastically deformable and are made of metal, preferably steel. Such pipe connections and the respective press fittings are described, for example, in DE-C-11 87 870 and DE-C-40 12 504. For the manufacture of the connection, the pipe end and the press fitting are pushed into each other axially and, thereafter, they are force- and form-tightly connected via a pressing tool which is mounted on the press fitting by pressing jaws which are movable toward each other.

The reliability of the connection between the pipe end and the press fitting depends, among other things, on the fact that the pipe end is pushed into the press fitting at a determined minimum insertion depth. The insertion depth is delimited by a constriction in the press fitting. Thereby, the axial distance from the constriction to the end into which the pipe end is to be pushed is greater, the greater the circumference of the pipe end or the press fitting is. The constriction forms, at the same time, a stop to prevent the further insertion of the pipe end.

AUSTRALIAN PATENT OFFICE

The arrival at the minimum insertion depth depends of the reliability and the feeling of the mounter. Especially under limited space conditions, the insertion of the pipe end into the press fitting can be impaired and, therefore, it can come to jamming before the constriction is reached, which has the consequence that the minimum depth is not reached and the mounter erroneously does not notice it. As an additional control, it has been suggested to provide markings for the minimum insertion depth on the outside of the pipe. Special measuring apparatus have been developed for this purpose (DE-GM 92 16 760.8). Even the use of marking apparatus does not provide an absolute security against incorrect manipulation. Furthermore, the markings can be inadvertently wiped off.

In DE-C-40 12 504, a process is proposed, which allows a compression only then, when an axial force is applied with the help of a device arranged on a pressing tool, whereby the compression is only then decoupled, when the axial force exceeds a determined threshold value. In this process, it is assumed that the threshold value is only exceeded when the pipe end collides with the constriction. Besides the fact that a correspondingly built arrangement for seizing the axial forces must be provided for this process, the process also does not sufficiently ensure that the threshold value for the axial force is only reached when the pipe end actually collides against the constriction.

A process is proposed in JP-A-57-142507, wherein the position of a rubber ring, which is arranged on the inside of a pipeline faucet and inverted over a pipe end, can be determined. For this purpose, an oscillation source is moved along a pipe axis inside the pipe. An oscillation sensor is placed in the front area of the pipe and measures the change in the oscillation behavior in dependence upon the movement of the oscillation source. The position of the rubber ring between pipeline faucet and pipe end can be determined based on these changes.

This process is not for determining the insertion depth of the pipe end and, additionally, presupposes that the measuring apparatus with the oscillation source and the oscillation sensor can be guided in from the inside. The process, therefore, is not useful for the measurement of the insertion depth in a pipe connection of the present art.

Therefore, the invention has as its object to provide a means for a secure control of the insertion depth between a pipe end and a press fitting in a pipe connection.

According to the present invention, there is provided a pressing tool for radially compressing a pipe connection between a pipe end and a press fitting, wherein a measuring apparatus for measuring the insertion depth of the pipe end into the press fitting is provided, the measuring apparatus having a thickness sensor for measuring the material thickness of the pipe connection, and means for providing at least an indication of the measured material thickness.

Advantageously, ultrasound sensors, magnetic field sensors and/or eddy current sensors can be especially taken into consideration for the thickness sensor. Also, thickness sensors

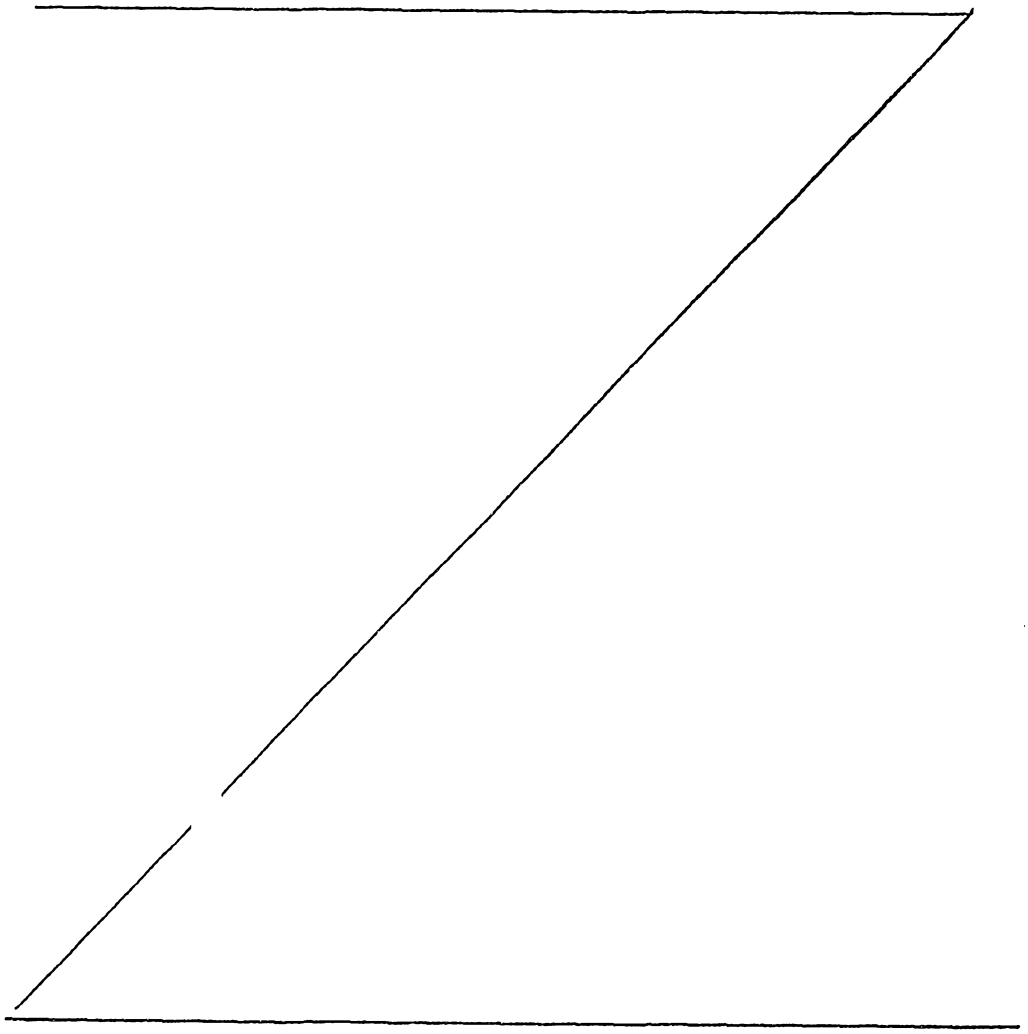
AUSTRALIAN PATENT OFFICE

based on other physical effects can be considered, which are able to measure the material thickness of the pipe connection.

The basic idea of the invention, therefore, relies on the measurement of the insertion depth with the help of the measuring apparatus which is able to measure the material thickness of the pipe connection. For this purpose, it is sufficient that the measuring apparatus can provide the qualitative difference between the material thickness of the press fitting alone and the material thickness which results from the combination of the material thickness of the press fitting and of the pipe end. The difference is prepared in an interpretation device in such a manner that the operator receives a corresponding optical and acoustic information. It can be presented as a warning information for the case in which a measuring apparatus measures only the material thickness of the press fitting. A quantitative indication of the corresponding measured material thicknesses is also pertinent.

AUSTRALIAN PATENT OFFICE

As a rule, a pressing tool equipped in this manner is used only for compressing pipe connections of a certain diameter, so that an immovable accommodation of the thickness sensor in a manner so that it lies over the provided insertion depth, is sufficient. Insofar as the pressing tool, or parts thereof, is for compressing pipe connections of various diameters, it is recommended that at least a radial displacement device - preferably even in combination with an axial displacement device - be



provided for adapting the thickness sensor according to its axial and radial position on the corresponding diameter of the pipe connection so that the control of the pipe end is possible when the preset insertion depth is reached.

Embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure (1) shows a pressing tool with thickness sensor in frontal view;

Figure (2) shows an axial section through a pipe connection with the pressing tool according to Figure 1 in the plane B-C;

Figure (3) shows the axial section according to Figure 2 with the pipe end inserted;

Figure (4) shows a front view of a pressing tool with thickness sensor;

The pressing tool (1) of Figure 1 shows a ground plate (2), which is comprised by an approximately heart-shaped end piece (3) and a holding plate (4) continued downwardly. Pressing levers (5, 6) are pivotally connected to the end piece (3) over joint bolts (7, 8).

The corresponding upper lever arms (9, 10) of the pressing lever (5, 6) have opposite lying grooves (11, 12). As can be seen in Figures 2 and 3 especially, the grooves (11, 12) are delimited by the pressing jaws (13, 14), which are located in the lever arms (9, 10) and held thereon.

AUSTRIAN PATENT OFFICE

The pressing levers (5, 6) have lower lever arms (15, 16), which have forking surfaces (17, 18) on their mutually opposite sides and which have a distance which diminishes conically in direction of the joint bolts (7, 8). On the holding plate (4), two forking surfaces (19, 20) are positioned one beside the other on a slide (not shown here). The slide can be moved in the direction of the arrow (A) by means of a mountable drive device. In this way, the forking rolls (19, 20) run against the forking surfaces (17, 18) and push the lower lever arms (15, 16) apart. This, further, has the result that the upper lever arms (9, 10) are moved toward each other.

On the end piece (3), and particularly on the right joint bolt (8), holders (21, 22) are provided on each side, which hold on each free end a respective horizontally extending ultrasound sensor (23, 24) of a known construction. Electrocables (25, 26) protrude out of the rear end of the ultrasound sensors (23, 24) and lead to a measuring apparatus (not shown here). Here also, the measuring apparatus is of a known type which is commonly available in the marketplace.

As can be seen especially in Figures 2 and 3, the pressing jaws (13, 14) encompass a pipe connection (27). The pipe connection consists of a pipe end (28) and a press fitting (29) known from the art. The press fitting (29) is only represented partially and has, on the end facing the pipe end, a ring-shaped bulge (30) on the

inner side of which a sealing ring (31) is placed which is made of elastomeric material. At a distance from the ring-shaped bulge (30), the press fitting (29) has a constriction (32) which forms a stop for the pipe end (28).

In Figure 2, the pipe end (28) is not inserted up to the constriction (32), but stops before the ultrasound sensor (23). The same measures thereby only the material thickness, ~~strength~~, that is, the wall ~~thickness~~ thickness of the press fittings (29). This is shown correspondingly on the interpretation device, for example, by a digital display or through a warning indication of an acoustic or optic kind. Thereby, the interpretation device with the drive device for the pressing tool (1) can be coupled in such a manner that the drive device cannot be operated as long as the ultrasound sensor only measures the wall thickness of the press fittings (29). In this way, a faulty manipulation of the pressing tool (1) is automatically avoided.

In Figure 3, the pipe end (28) is inserted into the insertion depth provided up to the constriction (32). The ultrasound sensor (23) measures now not only the wall thicknesses of both the press fittings (29) and the pipe end (28) but also the double material ~~strength~~ thickness. The interpretation device shows this correspondingly and sets the drive device for the pressing tool free, insofar a direct connection exists between both.

AUSTRALIAN PATENT OFFICE

The pressing effect per se can only begin by operation of the drive device. As described above, the forking rolls (19, 20) run between the lower lever arms (15, 16) and so pivot the upper lever arms (9, 10) against each other, whereby the press fitting (29) and the pipe end (28) are radially compressed. In this way, the ring-shaped bulge (30) is pushed against the pipe end (28) so that the sealing ring (31) is pressed or the pipe end (28) with the radial strength needed for a good seal.

As can be seen in Figures 2 and 3, the pressing jaws (13, 14) are shaped symmetrical. This means that the pressing tool (1) can be placed and operated on opposite sides. So as to be able to exert a control of the insertion depth of the pipe end (28) in this case also, the second ultrasound sensor (24) is attached on the other side of the pressing tool (28). The ultrasound sensor (24) is not necessary when the pressing jaws (13, 14) have an asymmetric shape, which allows a positioning of the pressing tool only in one position, or when other arrangements prevent the positioning in an erroneous position as described in DE-GM 92 16 369.6.

In Figure 4, a pressing tool (41) is provided, as seen in individual examples in DE-GM 92 16 369.6. The pressing tool (41) has a pressing ring (42) with five practically identically shaped pressing jaw elements (43, 44, 45, 46, 47). Therefore, each pressing jaw element is comprised of outer pressing jaw carriers (48, 49, 50, 41 [sic-51], 52) and an inner arc-shaped pressing jaw. All

except of the pressing jaw carriers (48, 49, 50, 51, 52) are joint-connected over the intermediate pieces (53, 54, 55, 56).

The lower pressing jaw elements (43, 47) in this view have a closing slit (57) between them. The free ends of these pressing jaw elements (43, 47) carry joint bolts (58, 59) on each of which a coupling latch (60, 61) is hung. When the coupling latches (60, 61) are placed in the position indicated by a line-and-dot line, so that they are not coupled together, the pressing ring (42) can by positioned over a pipe connection (63) which consists of a press fitting and a pipe end. This is shown in the drawing. Then, both lower pressing jaw elements (43, 47) are pivoted toward each other until the coupling holes (64, 65) provided on their free ends are aligned with each other. The coupling bolt (66), which is connected to an operating lever (67), is pushed through these coupling holes (64, 65). By moving the operating lever (67) by 180°, the connection between the two coupling latches (60, 61) can be shortened somewhat and the pressing ring (42) is thereby tightened in such a manner that it sits firmly on the pipe connection (63). For this purpose, the coupling bolt (66) is shaped as an acentric bolt as can be seen from DE-GM 92 16 369.6. Reference is made to this because it is not necessary for the function of the present invention.

A U-latch is fastened to the joint bolts (68, 69) of the upper pressing jaw elements (45). A U-handle is

attached to the left end in the axial middle plane of the pressing tool (41). The U-handle (71) is pivoted from the position represented as a line-and-dot line to the position represented as a solid line and is connected over the coupling elements (72, 73) to the U-latch (70). The inner edge of the U-latch (70) and the U-handle (71) forms a closed circle concentric with the pipe connection (63).

Semicircular induction spools (74, 75) are placed in the U-latch (70), on the one hand, and on the U-handle (71), on the other hand, and form a closed cylinder-shaped induction spool in the closed position shown. The induction spools (74, 75) can be provided with alternate current via a cable (76) and an entrance position (77). The has the consequence that an eddy current is originated, with an inductivity which depends on the material ~~strength~~ thickness of the pipe connection (63) in the region of the induction spools (74, 75).

The induction spools (74, 75) have an axial distance to the pressing ring (42) such that the pressing ring (42) is correctly set in place around the ring-shaped bulge (not shown here) or the press fittings are placed in a certain position which is comparable with the position of the ultrasound sensor (23) in the exemplary embodiment according to Figs. 1 to 3, that is, in the immediate vicinity of the constriction of the press fitting. In this way, the inductivity, when only a press fitting is present in this region because the

AUSTRALIAN PATENT OFFICE

corresponding pipe end is not inserted sufficiently deep into the press fitting, is different from the inductivity which is present when the pipe end is completely inserted. This can be measured with methods not represented herein and can be transmitted to the interpretation device (also not shown) for displaying the two situations.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A pressing tool for radially compressing a pipe connection between a pipe end and a press fitting, wherein a measuring apparatus for measuring the insertion depth of the pipe end into the press fitting is provided, the measuring apparatus having a thickness sensor for measuring the material thickness of the pipe connection, and means for providing at least an indication of the measured material thickness.

2. A pressing tool according to claim 1, wherein the thickness sensor can be an ultrasound sensor, a magnetic field sensor, and/or an eddy current sensor.

3. A pressing tool substantially as hereinbefore described with reference to the accompanying drawings.

DATED this 23rd day of May 1997

Novopress GmbH Pressen und Presswerkzeuge & Co.KG
DAVIES COLLISON CAVE
Patent Attorneys for the Applicants

AUSTRALIAN PATENT OFFICE

76536/94

Fig.1

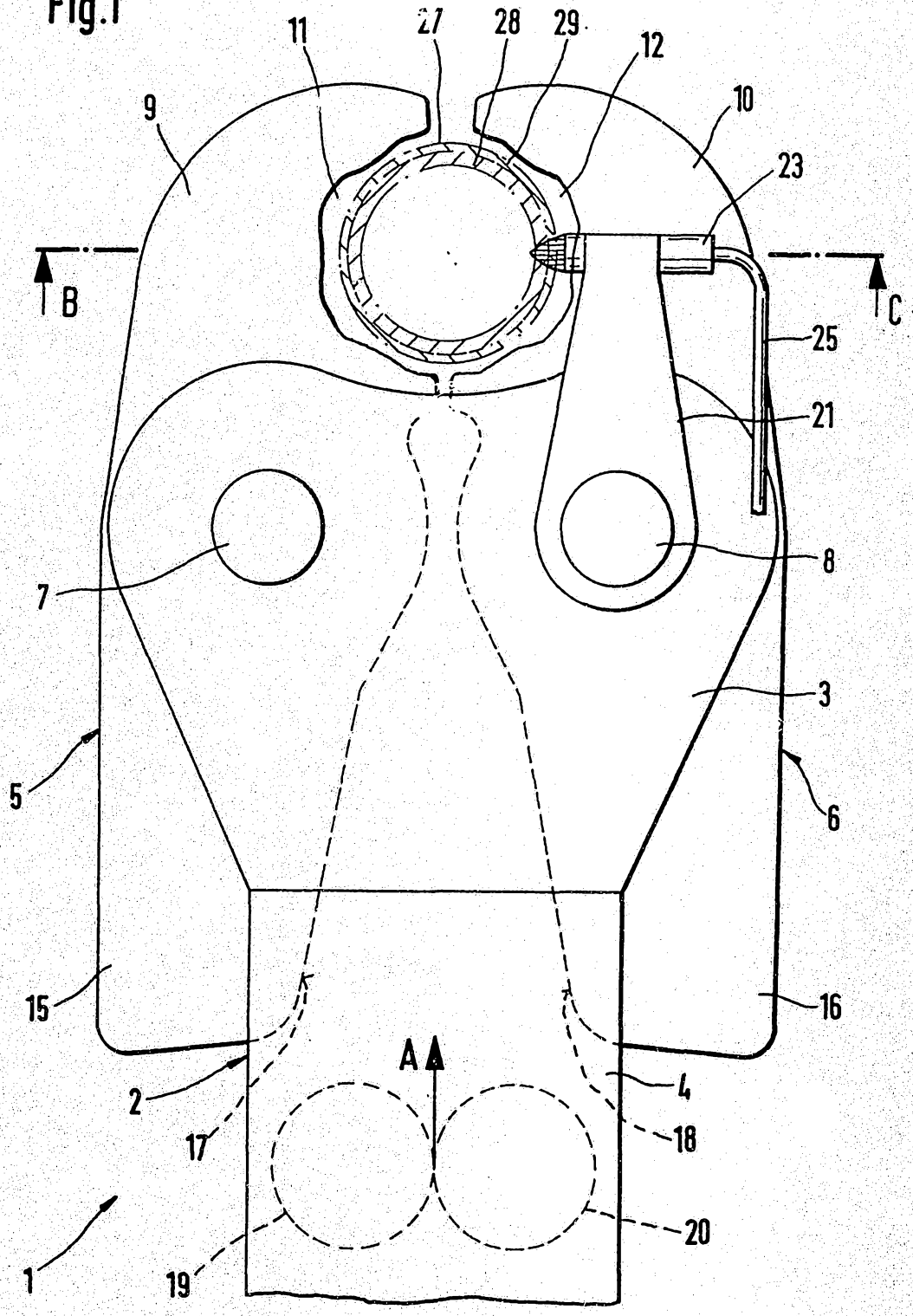


Fig.2

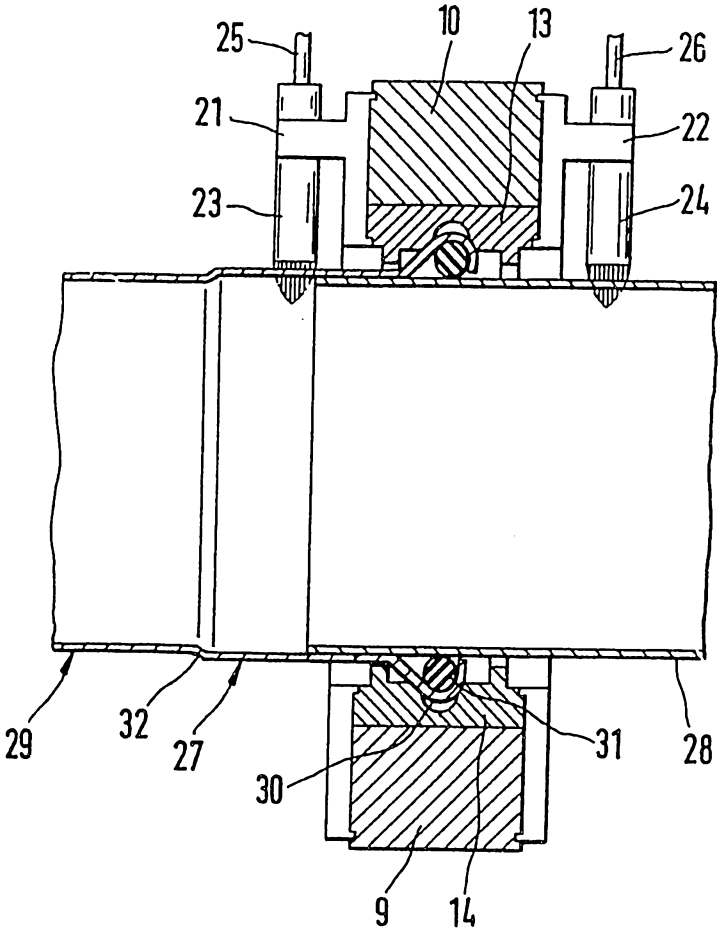

25
10
13
26
21
22
23
24
29
32
27
30
31
28
9
14

Fig.3

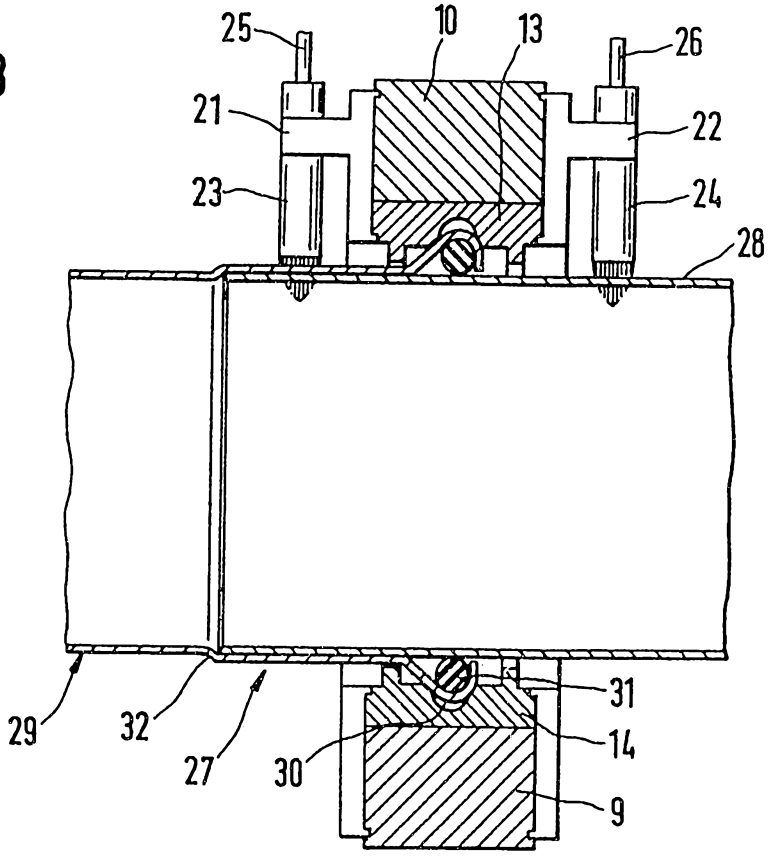
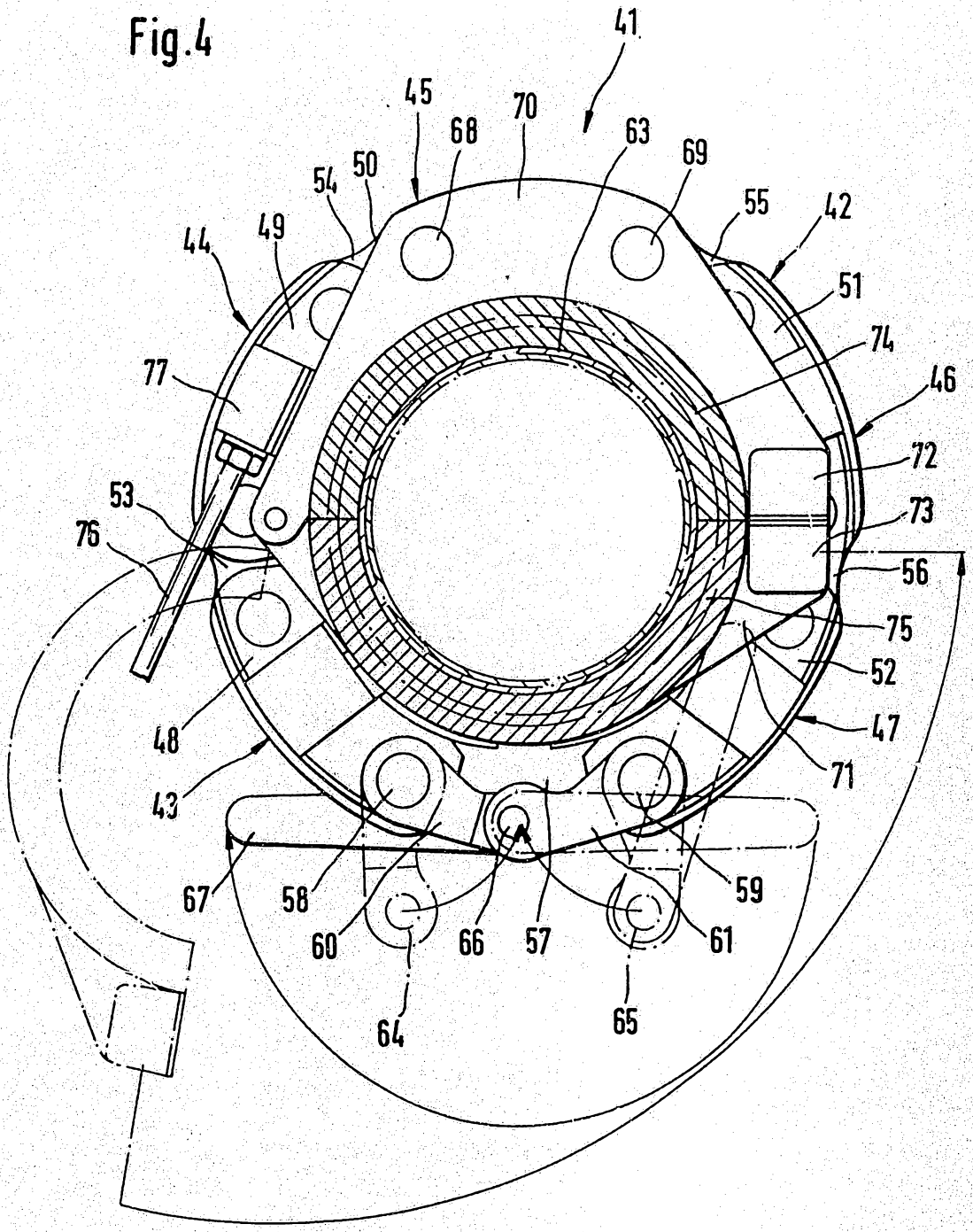

25
10
13
26
21
22
23
24
28
29
32
27
30
31
14
9

Fig.4


41
45
70
68
63
69
54
50
55
42
44
49
51
74
77
46
72
53
73
76
56
75
52
47
48
71
43
67
58
59
60
66
57
61
64
65

INTERNATIONAL SEARCH REPORT

Interna ıl Application No
PCT/EP 94/02734

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 G01B17/00 B21D39/04

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 G01B B21D

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	PATENT ABSTRACTS OF JAPAN vol. 6, no. 245 (P-159) (1123) 3 December 1982 & JP,A,57 142 507 (KUBOTA TEKKO K.K.) 3 September 1982 see abstract	1,2
A	DE,A,33 27 762 (PA INC.) 9 February 1984 Sehe das gesamte Druckschrift ;	1-3
A	US,A,4 520 672 (JOHN D. SAINT-AMOUR) 4 June 1985 Sehe das gesamte Druckschrift;	1,2,4

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

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

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

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

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

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

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

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

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

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
9 December 1994	10. 01. 95

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Visser, F

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

Interna al Application No
PCT/EP 94/02734

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
DE-A-3327762	09-02-84	US-A-	4555665	26-11-85
		CA-A-	1224249	14-07-87
		GB-A,B	2124778	22-02-84
		JP-A-	59058303	04-04-84
		NL-A-	8302755	01-03-84
		US-A-	4611170	09-09-86
US-A-4520672	04-06-85	NONE		

INTERNATIONALER RECHERCHENBERICHT

Interna ales Aktenzeichen
PCT/EP 94/02734

A. KLASSIFIZIERUNG DES ANMELDUNGSGEGENSTANDES
IPK 6 G01B17/00 B21D39/04

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

B. RECHERCHIERTE GEBIETE

Recherchierter Mindestprüfstoff (Klassifikationssystem und Klassifikationssymbole)
IPK 6 G01B B21D

Recherchierte aber nicht zum Mindestprüfstoff gehörende Veröffentlichungen, soweit diese unter die recherchierten Gebiete fallen

Während der internationalen Recherche konsultierte elektronische Datenbank (Name der Datenbank und evtl. verwendete Suchbegriffe)

C. ALS WESENTLICH ANGESEHENE UNTERLAGEN

Kategorie*	Bezeichnung der Veröffentlichung, soweit erforderlich unter Angabe der in Betracht kommenden Teile	Betr. Anspruch Nr.
A	PATENT ABSTRACTS OF JAPAN vol. 6, no. 245 (P-159) (1123) 3. Dezember 1982 & JP,A,57 142 507 (KUBOTA TEKKO K.K.) 3. September 1982 siehe Zusammenfassung ---	1,2
A	DE,A,33 27 762 (PA INC.) 9. Februar 1984 Sehe das gesamte Druckschrift ; ---	1-3
A	US,A,4 520 672 (JOHN D. SAINT-AMOUR) 4. Juni 1985 Sehe das gesamte Druckschrift; -----	1,2,4

☐ Weitere Veröffentlichungen sind der Fortsetzung von Feld C zu entnehmen

☒ Siehe Anhang Patentfamilie

* Besondere Kategorien von angegebenen Veröffentlichungen :

"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 allein aufgrund dieser Veröffentlichung 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

Datum des Abschlusses der internationalen Recherche	Absendedatum des internationalen Recherchenberichts
9. Dezember 1994	10. 01. 95

Name und Postanschrift der Internationale Recherchenbehörde	Bevollmächtigter Bediensteter
Europäisches Patentamt, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax (+31-70) 340-3016	Visser, F

Formblatt PCT/ISA/210 (Blatt 2) (Juli 1992)

INTERNATIONALER RECHERCHENBERICHT

Angaben zu Veröffentlichungen, die zur selben Patentfamilie gehören

Interna ...les Aktenzeichen
PCT/EP 94/02734

Im Recherchenbericht angeführtes Patentdokument	Datum der Veröffentlichung	Mitglied(er) der Patentfamilie		Datum der Veröffentlichung
DE-A-3327762	09-02-84	US-A-	4555665	26-11-85
		CA-A-	1224249	14-07-87
		GB-A,B	2124778	22-02-84
		JP-A-	59058303	04-04-84
		NL-A-	8302755	01-03-84
		US-A-	4611170	09-09-86
US-A-4520672	04-06-85	KEINE		