

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL PRELIMINARY
REPORT ON PATENTABILITY

(PCT Rule 71.1)

To:

BABELUK, Michael
Mariahilfer Gürtel 39/17
A-1150 WIEN
AUTRICHE

EINGEGANGEN AM:

17. Mai 2006

Patentanwalt
Dipl.-Ing. Mag. Michael Babeluk

Date of mailing
(day/month/year)

15.05.2006

Applicant's or agent's file reference
11213

IMPORTANT NOTIFICATION

International application No.
PCT/EP2004/005815

International filing date (day/month/year)
28.05.2004

Priority date (day/month/year)
28.05.2004

Applicant
INTERNATIONAL INNOVATIONS LIMITED et al

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary report on patentability and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed inventions is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the international preliminary examining authority:



European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized Officer

Diebold, N
Tel. +49 89 2399-2961




PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 11213		FOR FURTHER ACTION	See Form PCT/PEA/416
International application No. PCT/EP2004/005815	International filing date (day/month/year) 28.05.2004	Priority date (day/month/year) 28.05.2004	
International Patent Classification (IPC) or national classification and IPC INV. F16D13/28 F16D23/12 F16D27/00			
Applicant INTERNATIONAL INNOVATIONS LIMITED et al			
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau) a total of 4 sheets, as follows:</p> <p style="margin-left: 20px;"><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p style="margin-left: 20px;"><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>			
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>			
Date of submission of the demand 19.12.2005		Date of completion of this report 15.05.2006	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized officer Foulger, M Telephone No. +49 89 2399-2960	



Box No. I Basis of the report

1. With regard to the **language**, this report is based on
- the international application in the language in which it was filed
 - a translation of the international application into , which is the language of a translation furnished for the purposes of:
 - international search (under Rules 12.3(a) and 23.1(b))
 - publication of the international application (under Rule 12.4(a))
 - international preliminary examination (under Rules 55.2(a) and/or 55.3(a))
2. With regard to the **elements*** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

Description, Pages

1-7 as originally filed

Claims, Numbers

1-19 received on 23.12.2005 with letter of 19.12.2005

Drawings, Sheets

1/6-6/6 as originally filed

- a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. The amendments have resulted in the cancellation of:
- the description, pages
 - the claims, Nos.
 - the drawings, sheets/figs
 - the sequence listing (*specify*):
 - any table(s) related to sequence listing (*specify*):
4. This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- the description, pages
 - the claims, Nos.
 - the drawings, sheets/figs
 - the sequence listing (*specify*):
 - any table(s) related to sequence listing (*specify*):

* *If item 4 applies, some or all of these sheets may be marked "superseded."*

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-19
	No: Claims	
Inventive step (IS)	Yes: Claims	1-19
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-19
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Reference is made to the following document/s/:

- D1: US-A-6 006 883 (LEIMBACH LUTZ ET AL) 28 December 1999 (1999-12-28)
- D2: US 2003/114264 A1 (DUAN XIAOHONG N) 19 June 2003 (2003-06-19) cited in the application
- D3: US 2004/099500 A1 (CAREY CLINTON E ET AL) 27 May 2004 (2004-05-27)
- D4: US-B2-6 578 693 (MAYR NIKOLAUS) 17 June 2003 (2003-06-17)

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Independent Claims 1-3

1.1 Closest Prior Art

The nearest prior art is considered to be D2 (cited in the description) which shows a clutch according to the preambles of claims 1-3. D2, fig. 8 further discloses that the clutch is configured as a cone clutch with two clutch units with each clutch unit comprising a clutch device which may be actuated via an actuating means, and with a ring gear with a ramp mechanism (124) being provided for said clutch devices.

1.2 Problem To Be Solved

The problem to be solved may therefore be regarded as to provide a clutch which allows high clutch forces and is more compact than the known device.

1.3 Solution

The problem is solved by the double cone construction which allows higher forces to be transmitted and that the ramp mechanisms are arranged in a reciprocal way relative to one another and that the actuator is configured as a linear motor and acts substantially in a tangential way on the ring gear. These latter features have the technical effect of allowing a more compact construction. Although double cone

clutches are generally known and tangential actuation of a ring gear is known from D1, D3 and D4, to arrive at the claimed clutches the skilled person would have to use inventive skill because of the number of constructional modifications to the clutch of D2 that would be required.

2. Claims 4-19

Claims 4-19 concern further preferred embodiments of the invention.

(NEW) CLAIMS

1. A clutch (2), especially for motor vehicles, for the torque connection of at least two drive parts which are rotatable about a rotational axis (4), comprising at least one clutch device (6) with a first clutch body (8) with at least one first clutch surface (12) and a second clutch body (10) with at least one second clutch surface (14), with said first and second clutch body (8, 10) being coaxially displaceable relative to each other by means of an actuating means (24) and said first and second clutch surface (12, 24) being mutually connectable in a non-positive way in at least one clutch engagement position, with the actuating means (24) comprising at least one ring gear (26) which comprises a ramp mechanism (28) and is twistable about the rotational axis (4) by an actuator (40), which mechanism in the clutch engagement position presses the first clutch body (8) against the second clutch body (10), **characterized in that** the clutch (2) is configured as a double cone clutch with two clutch units (42, 44), with each clutch unit (42, 44) comprising a clutch device (6) which can be actuated via an actuating means (24), and with a ring gear (26) with a ramp mechanism (28) being provided for said clutch devices (6), said ramp mechanisms (28) of the two clutch devices (42, 44) being arranged in a reciprocal way relative to each other, and that the actuator (40) is configured as a linear motor (46) and acts substantially in a tangential direction on the ring gear (26).
2. A clutch (2), especially for motor vehicles, for the torque connection of at least two drive parts which are rotatable about a rotational axis (4), comprising at least one clutch device (6) with a first clutch body (8) with at least one first clutch surface (12) and a second clutch body (10) with at least one second clutch surface (14), with said first and second clutch body (8, 10) being coaxially displaceable relative to each other by means of an actuating means (24) and said first and second clutch surface (12, 24) being mutually connectable in a non-positive way in at least one clutch engagement position, with the actuating means (24) comprising at least one ring gear (26) which comprises a ramp mechanism (28) and is twistable about the rotational axis (4) by an actuator (40), which mechanism in the clutch engagement position presses the first clutch body (8) against the second clutch body (10), **characterized in that** the clutch (2) is configured as a double cone clutch with two clutch units (42, 44), with each clutch unit (42, 44) comprising a clutch device (6) which can be

- 2 -

actuated via an actuating means (24), and with a ring gear (26) with a ramp mechanism (28) being provided for said clutch devices (6), said ramp mechanisms (28) of the two clutch devices (42, 44) being arranged in a reciprocal way relative to each other, and that the actuator (40) acts in a substantially tangential way on the ring gear (26) via a worm gear (54).

3. A clutch (2), especially for motor vehicles, for the torque connection of at least two drive parts which are rotatable about a rotational axis (4), comprising at least one clutch device (6) with a first clutch body (8) with at least one first clutch surface (12) and a second clutch body (10) with at least one second clutch surface (14), with said first and second clutch body (8, 10) being coaxially displaceable relative to each other by means of an actuating means (24) and said first and second clutch surface (12, 14) being mutually connectable in a non-positive way in at least one clutch engagement position, with the actuating means (24) comprising at least one ring gear (26) which comprises a ramp mechanism (28) and is twistable about the rotational axis (4) by an actuator (40), which mechanism in the clutch engagement position presses the first clutch body (8) against the second clutch body (10), **characterized in that** the clutch (2) is configured as a double cone clutch with two clutch units (42, 44), with each clutch unit (42, 44) comprising a clutch device (6) which can be actuated via an actuating means (24), and with a ring gear (26) with a ramp mechanism (28) being provided for said clutch devices (6), said ramp mechanisms (28) of the two clutch devices (42, 44) being arranged in a reciprocal way relative to each other, and that the actuator (40) acts on the ring gear (26) in a substantially tangential way by means of a gearshift rod (58).
4. A clutch (2) according to one of the claims 1 to 3, **characterized in that** the ring gear (26) which can be turned by means of the actuator (40) comprises on at least one face side (32) at least one shifting ramp (34) which acts axially upon the first clutch body (8) via a torsionally rigid, but axially displaceably arranged engaging ring (30).
5. A clutch (2) according to claim 4, **characterized in that** the gear ring (26) acts through at least one shifting ramp (34) on at least one incline (37) of the engaging ring (30).
6. A clutch (2) according to claim 5, **characterized in that** the shifting ramp (34) of the ring gear (26) and the incline (37) of the engaging ring (30) are provided with an oppositely oriented configuration and can preferably have the same ascending slopes.

7. A clutch (2) according to one of the claims 4 to 6, **characterized in that** the shifting ramp (34) of the ring gear (26) and/or the incline (37) of the engaging ring (30) can each be arranged as at least one convolution, preferably as a trapezoid thread.
8. A clutch (2) according to one of the claims 1 to 7, **characterized in that** the gear ring (26) acts on the engaging ring (30) by means of roller bodies (38), preferably by means of balls.
9. A clutch (2) according to one of the claims 1 to 8, **characterized in that** the gear ring (26) can be fixed in at least one clutch engagement position by a locking mechanism (48).
10. A clutch (2) according to claim 6, **characterized in that** the locking mechanism (48) can be activated in an inductive, hydraulic or pneumatic way.
11. A clutch (2) according to one of the claims 1 to 7, **characterized in that** the actuator (40) can be driven in an electric, pneumatic or hydraulic way.
12. A clutch (2) according to one of the claims 3 to 11, **characterized in that** the gearshift rod (58) can be driven by means of an electromotor (56), preferably by means of a gear.
13. A clutch (2) according to one of the claims 1 to 12, **characterized in that** each clutch unit (42, 44) comprises a clutch device (6) which can be actuated via an actuating means (24), and with one ring gear (26) with a ramp mechanism (28) being provided for each clutch device (6).
14. A clutch (2) according to one of the claims 1 to 13, **characterized in that** the shifting ramps (34) of the gear rings (26) of the clutch units (42, 44) are shaped in a reciprocal way relative to each other.
15. A clutch (2) according to one of the claims 1 to 14, **characterized in that** the gear rings (26) are arranged to be rigidly connected with each other, preferably being of integral configuration.
16. A clutch (2) according to one of the claims 1 to 15, **characterized in that** the two clutch devices (6) of the two clutch units (42, 44) can be actuated through a single actuator (40).
17. A clutch (2) according to one of the claims 1 to 16, **characterized in that** the clutch (2) is arranged as a multi-cone clutch.

- 4 -

18. A clutch (2) according to one of the claims 1 to 17, **characterized in that** the clutch (2) is configured as a preferably wet-running disk clutch, especially preferably as a multiple-disk clutch.
19. A clutch (2) according to one of the claims 1 to 18, **characterized in that** each clutch device (6) of the two clutch units (42, 44) can be actuated through a separate actuator (40).

2005 12 19

Ba