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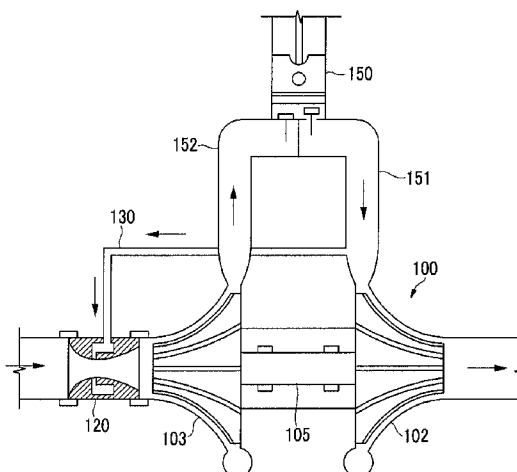
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(54) Title: **TURBO CHARGER**

FIG. 1



(57) **Abstract:** A turbocharger that can enhance output by increasing an intake amount of air is provided. The turbocharger includes a turbine having a turbine wheel rotating by exhaust gases from an internal combustion engine, a driving shaft rotatably connected to the turbine wheel, a compressor connected to the driving shaft and having a compressor wheel rotating by rotational force of the turbine wheel, an air charger that is connected to the compressor to amplify air introduced into the compressor, and a gas supply tube having a first end connected to the air charger and a second end that is installed near a turbine inlet or a turbine outlet to supply the exhaust gases to the air charger. The air charger is formed in a tube shape and includes a convex portion protruding toward a central axis of the air charger and an amplification portion having a passage communicating the gas supply tube with an inside of the convex portion.



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A. CLASSIFICATION OF SUBJECT MATTER**F02B 37/02(2006.01)i**

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 F02B 37/02

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

Korean utility models and applications for utility models since 1975

Japanese utility models and applications for utility models since 1975

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

eKIPASS(KIPO) & Keyword: turbocharger, venturi, cleaning, and similar terms

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	JP 10-131742 A (YANMAR DIESEL ENGINE CO.) 19 May 1998 See paragraphs 12, 15, 20 and 22; claim 2; figures 1 and 4.	1,4 2-3,5-7,9-13,15-17, 19-20
Y	US 5402938 A (ROY O. SWEENEY) 04 April 1995 See column 3, line 29 - column 9, line 18; claims 1-32; figures 1-9.	2-3,5-7,9-13,15-17, 19-20
A	JP 2002-155751 A (CATERPILLAR INC.) 31 May 2002 See paragraphs 16 and 18-19; claims 9 and 23; figure 1.	8,18
A	JP 55-091722 A (OO EMU TEI CO.) 11 July 1980 See page 2, lower left column, line 3 - page 3, upper right column, line 1; claims 1-3; figures 1-3.	8,18
A	JP 04-074577 A (MITSUBISHI HEAVY IND. LTD.) 09 March 1992 See page 2, lower left column, line 18 - page 3, lower left column, line 16; claim 1; figures 1-5.	8,18
A	JP 01-159134 U (MITSUBISHI HEAVY IND. LTD.) 02 November 1989 See claim 1; figures 1-4.	8,18
X A	US 4461150 A (MICHAEL GROHN) 24 July 1984 See column 2, line 43 - column 3, line 35; claims 1-6; figures 1-3.	1,9 14



Further documents are listed in the continuation of Box C.



See patent family 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 application or patent 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 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

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2008/004433

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	JP 2003-003910 A (HOLSET ENG CO. LTD.) 08 January 2003 See paragraphs 17-31; claims 1-17; figures 1-8.	1,9 14
X	JP 2001-165002 A (CATERPILLAR INC.) 19 June 2001 See paragraphs 9-15; claims 1-23; figures 1-3.	1,9
X	JP 2007-092592 A (HINO MOTORS LTD.) 12 April 2007 See paragraphs 6-10 and 16-20; claim 1; figures 1-4.	1,9

INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2008/004433**Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)**

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

See the supplemental sheet.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

The continuation of Box IV

The only common technical feature between claims 1-8 (group 1) and claims 9-20 (group 2) is a turbocharger comprising: a turbine having a turbine wheel rotating by exhaust gases from an internal combustion engine; a driving shaft rotatably connected to the turbine wheel; a compressor connected to the driving shaft and having a compressor wheel rotating by rotational force of the turbine wheel; an air charger that is connected to the compressor to amplify air introduced into the compressor; and a gas supply tube having a first end connected to the air charger and a second end that is installed near a turbine inlet or a turbine outlet to supply the exhaust gases to the air charger. This feature lacks an inventive step with respect to the following documents: JP 10-131742 A, US 4461150 A, JP 2003-003910 A, JP 2001-165002 A and JP 2007-092592 A.

Thus, there is no technical relationship left over the prior art among the claimed inventions, leaving the claims without a single general inventive concept. Hence, there is lack of unity "a posteriori" (PCT Rules 13.1 and 13.2).

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2008/004433

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