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[Continued on next page]

(54) Title: HIGH RETENTION MAGNETIC COUPLING DEVICE FOR CONDUIT ATTACHMENT

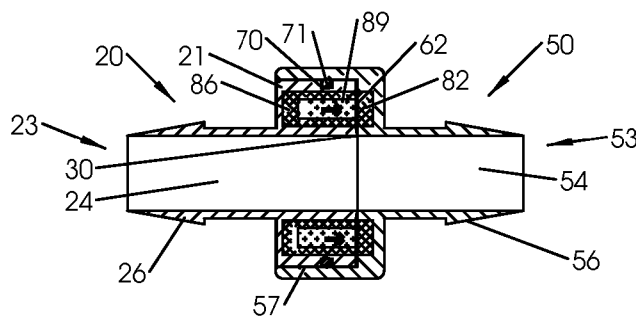


FIG. 3B

(57) Abstract: A magnetic coupling having two or more elements for providing a conduit. The coupling provides high retention of conduit elements with minimum size magnetic components, while also providing for intentional detachment of the magnetically coupled elements. The coupling is configured to facilitate detachment with applied loads that are substantially less than operational retention force (i.e., breakaway force) of the magnetically coupled elements. The magnetic coupling device includes a connecting male element and a female element and at least one internal conduit integral to at least one of the connecting male and female elements. Magnetic attraction is accomplished via a magnetic circuit where the magnetic circuit includes ferromagnetic material and at least one permanent magnet.



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## INTERNATIONAL SEARCH REPORT

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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)

F16L 37/00; F16L 19/03; F16L 21/00; F16L 21/08; F16L 33/00; F16L 33/28; F16L 55/00

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)

eKOMPASS(KIPO internal) &amp; Keywords : 'magnetic' &amp; 'coupling'

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4049295 A1 ( E UGENE PIERS ) 20 September 1977 See fig. 1.	1-34
A	JP 06-037686 U ( HITACHI METALS CO., LTD. ) 20 May 1994 See fig. 4.	1-34
A	JP 04-054394 A ( KUBOTA CORP. ) 21 February 1992 See fig. 1.	1-34
A	JP 03-211096 B2 ( KIYOHARA MASAKO ) 25 September 2001 See fig. 1 & 2.	1-34

 Further documents are listed in the continuation of Box C. See patent family annex.

\* Special categories of cited documents:

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

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

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"&amp;" document member of the same patent family

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**INTERNATIONAL SEARCH REPORT**

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4049295 A1	20.09.1977	None	
JP 06-037686 U	20.05.1994	None	
JP 04-054394 A	21.02.1992	None	
JP 03-211096 B2	25.09.2001	JP 5079584 A	30.03.1993