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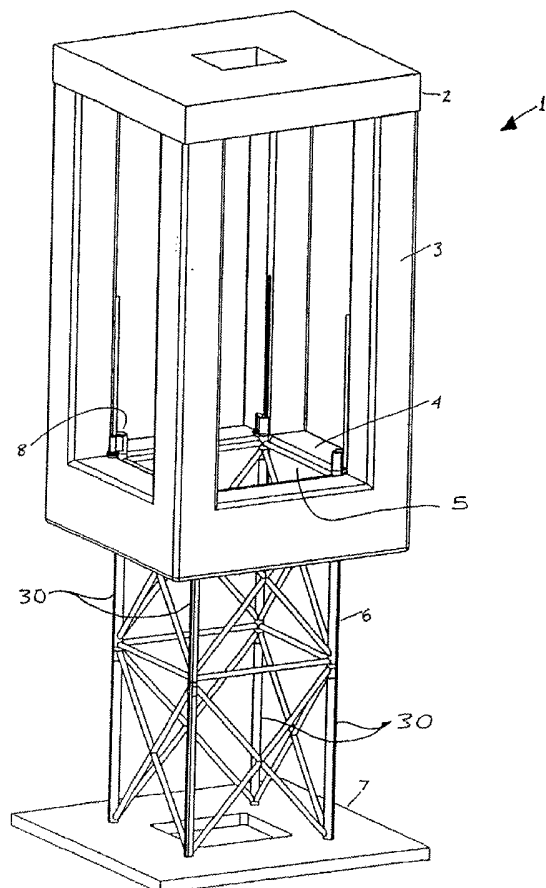
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[Continued on next page]

(54) Title: HIGH CAPACITY NONCONCENTRIC STRUCTURAL CONNECTORS



(57) Abstract: A connector is provided for removably attaching a space frame to the hull of a floating offshore platform. The connector comprises a socket attached to the hull of the platform. The socket has an open bore therein. A stabbing member is attached to the space frame. The stabbing member has a lower end insertable into the socket. An expandable locking ring is carried by the lower end of the stabbing member. The locking ring comprises a plurality of ring segments for removably seating within the socket bore. A backup ring is slidable along the stabbing member. The backup ring removably mates to the locking ring.

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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

INTERNATIONAL SEARCH REPORT

Inte Application No  
PCT/US 02/23729

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 B63B35/44

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 7 B63B F16B E04B

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)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 97/43171 A (HUANG YEN T ;SAN TAI INTERNATIONAL CORP (US)) 20 November 1997 (1997-11-20) page 5, line 29 - page 9, line 15; figures	1,13,15, 25,30, 34,39
A	US 5 421 676 A (DUNLOP DAVID N ET AL) 6 June 1995 (1995-06-06)  abstract; figures 1,3,8-10	1,2,7, 11,13, 15,25, 26,30, 34,39
A	EP 0 434 978 A (MULTI CONTACT AG) 3 July 1991 (1991-07-03) column 3, line 30 - column 7, line 55; figures	1-47

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.
- "R" document member of the same patent family

Date of the actual completion of the international search

8 November 2002

Date of mailing of the international search report

11.04.03

Name and mailing address of the ISA

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INTERNATIONAL SEARCH REPORT

Int. application No  
PCT/US 02/23729

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 971 494 A (GAUTHIER ALAIN ET AL) 20 November 1990 (1990-11-20) abstract; figures -----	1-47
A	US 4 118 135 A (COOPER ROY F) 3 October 1978 (1978-10-03) abstract; figures -----	1,2,25, 26,39,40

# INTERNATIONAL SEARCH REPORT

international application No.  
PCT/US 02/23729

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 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 II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

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

see additional 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.:

1-47

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-47

A connector for attaching a space frame to a hull of an offshore platform comprising a a socket and a stabbing member.

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2. claims: 48-53

Connection means for joining a space frame to a floating vessel hull having a plurality of connectors with offset vertical axes defining a plane between axis of connector and axis of its frame attachment member, the connectors having high strength and stiffness to resist horizontal loads acting parallel to the vertical midplane, having low strength and stiffness to resist horizontal loads acting transverse to the same plane, and each connector being oriented so that its vertical midplane is normal to the vertical midplane of an adjacent connector.

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

Inte	. plication No
PCT/US 02/23729	

Patent document cited in search report	A	Publication date	Patent family member(s)	Publication date
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