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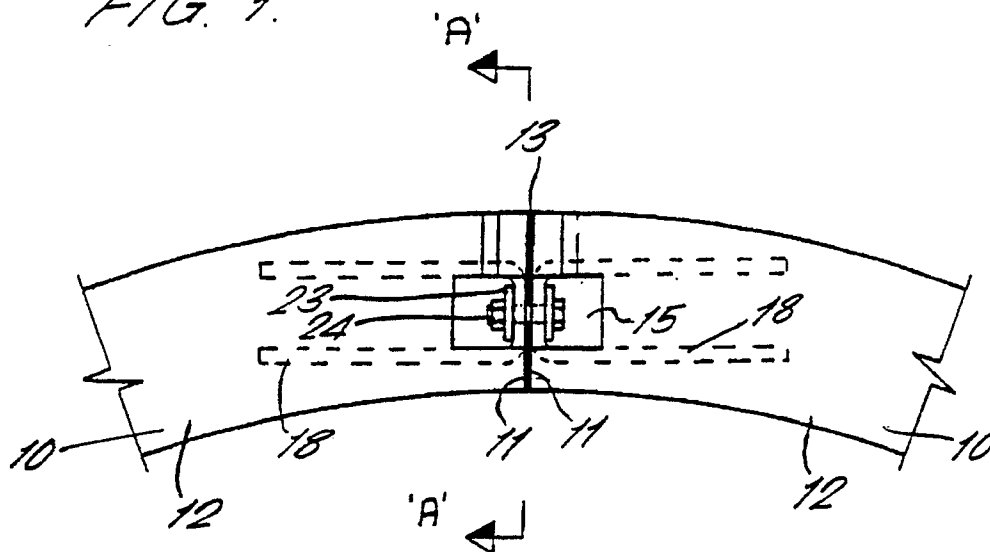
EUROPEAN PATENT APPLICATION(21) Application number: **89311627.7**(51) Int. Cl.⁵: **E21D 11/08**(22) Date of filing: **09.11.89**(30) Priority: **07.03.89 GB 8905225**(43) Date of publication of application:
12.09.90 Bulletin 90/37(84) Designated Contracting States:
BE GB(88) Date of deferred publication of the search report:
26.06.91 Bulletin 91/26(71) Applicant: **CHARCON TUNNELS LIMITED**
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BOULT, WADE & TENNANT 27 Farnival Street
London EC4A 1PQ(GB)(54) **Improvements in or relating to joining concrete elements.**

(57) The disclosure relates to a concrete element (10) having a corner (14) between a side face (12) and an end face (11) in which a box shaped cavity (15) is formed. A pair of U-shaped loops (18) is cast in the segment at the corner with base members (19) of the loops extending parallel to one another across the cavity to receive a fixing bolt (12) which has a head (21) and washer brackets (22) engaging behind the loops and a shank extending from the

end of the element to engage in a nut similarly held in a recess of a corresponding segment for securing the segment ends together.

The arrangement permits the bolt to be tightened through the cavities at the sides of the segments.

The arrangement is particularly suitable for securing arcuate concrete tunnel lining segments together.

FIG. 1.**EP 0 386 368 A3**



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EUROPEAN SEARCH REPORT

Application Number

EP 89 31 1627

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	GB-A-2 092 644 (FAIRCLOUGH CIVIL ENGINEERING) * whole document *	1-6	E 21 D 11/08
A	FR-A-2 375 438 (CHARCON TUNNELS) * page 1, line 37 - page 3, line 5; figures 1-3 *	1	
A	GB-A-2 124 682 (JUNICHI TSUZUKI) * abstract; figures 12, 13 *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			E 21 D E 04 B
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 03-04-1991	Examiner BLURTON M D
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			