

(43) International Publication Date
14 August 2003 (14.08.2003)

PCT

(10) International Publication Number
WO 03/067380 A3

- (31) **International Patent Classification⁷:** **G06F 17/50**

(21) **International Application Number:** PCT/US03/03266

(22) **International Filing Date:** 4 February 2003 (04.02.2003)

(25) **Filing Language:** English

(26) **Publication Language:** English

(30) **Priority Data:**
10/072,664 5 February 2002 (05.02.2002) US

(71) **Applicant** (*for all designated States except US*): **GCC, INC.** [US/US]; 1383 Edmonton Drive, Lewisville, TX 75077 (US).

(72) **Inventors; and**

(75) **Inventors/Applicants** (*for US only*): **GREEN, Gary, L** [US/US]; 1383 Edmonton Drive, Lewisville, TX 75077 (US). **MACK, John, D.** [US/US]; 537 Prospect Street, San Carlos, CA 94070 (US).

(74) **Agent:** **HENNEMAN, Larry, E., Jr.**; Henneman & Saunders, 714 W. Michigan Avenue, Three Rivers, MI 49093 (US).

(81) **Designated States** (*national*): AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) **Designated States** (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

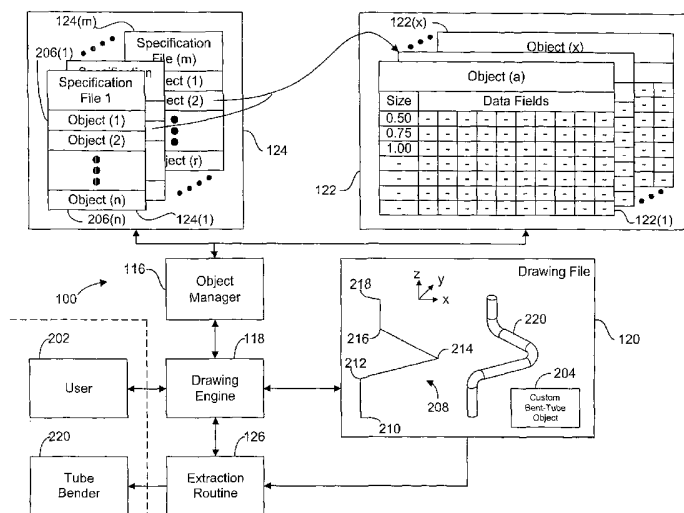
Published:

 - *with international search report*
 - *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

(88) **Date of publication of the international search report:**
24 December 2003

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.

(54) Title: SYSTEM AND METHOD FOR DRAWING AND MANUFACTURING BENT PIPES



(57) Abstract: A novel method of using a bent-tube object in a drawing file includes entering a custom bent-tube object (204) in a drawing file (120) and using the bent tube object to generate bender driver data. In a particular method, the step of entering the custom bent-tube object (204) in the drawing file (120) includes entering a multi-segmented line (208) in the drawing file (120), and generating the custom bent-tube object (204) based at least in part on the lengths of and angles between the segments of the multi-segmented line. Novel systems for using a bent-tube object in a drawing file (120) are also described which includes an object manager (116) responsive to input from a user (202) and operative to generate a bent-tube object, and a drawing engine (118) responsive to the object manager (116) and operative to enter the bent-tube object in a drawing file (120). An extraction module (126) is operative to generate/extract bender driver data from the custom bent-tube object (204).

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/03266

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G06F 17/50

US CL : 700/97, 182; 703/1

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)

U.S. : 700/86, 97, 103, 104, 117, 160, 182,; 703/1; 706/919; 345/964

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 practicable, search terms used)

Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6,230,066 B1 (SFERRO et al) 08 May 2001 (08.05.2001), abstract, column 1, line 45 - column 5, line 33; figures 1-8.	21-25
---		-----
Y		1-6,9,11- 16,19,26,29,31-36
Y	US 4,947,666 A (HAMETNER et al) 14 August 1990 (14.08.1990), abstract, figure 1, 10, 13, 14, column 2, line 9 - column 5 lines 12.	1-6,9,11- 16,19,26,29,31-36
A	US 5,768,149 A (UMNEY et al) 16 June 1998 (16.06.1998), all.	1-36
A	US 5,517,428 A (WILLIAMS) 14 May 1996 (14.06.1996), all.	1-36

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:	"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
"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"E" earlier application or patent published on or after the international filing date	"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
"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)	"&" document member of the same patent family
"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	

Date of the actual completion of the international search 03 September 2003 (03.09.2003)	Date of mailing of the international search report 07 NOV 2003
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703)305-3230	Authorized officer Leo P Picard <i>Leo P Picard</i> Telephone No. (703) 305-9600

INTERNATIONAL SEARCH REPORT

PCT/US03/03266

Continuation of Item 4 of the first sheet:

Exceeds 7 words

NEW TITLE: SYSTEM FOR DRAWING AND MANUFACTURING BENT PIPES

Continuation of B. FIELDS SEARCHED Item 3:

EAST search terms:

((bent bend\$4) adj tube) same drawing, ((bent bend\$4) adj tube) and (CAD CAM), (computer adj aid\$4) and bend\$4 and tube and file, (computer adj aid\$4) and bend\$4 and tube and drawing, ((bent bend\$4) adj tube) with draw\$4), (bent adj tube) with drawing, (design\$5 with bend\$5 with (tube pipe), (computer adj aid\$5) same bend\$5 same tube