



(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
18.10.2000 Bulletin 2000/42

(51) Int Cl.7: **B65H 59/38**

(43) Date of publication A2:
30.06.1999 Bulletin 1999/26

(21) Application number: **98309668.6**

(22) Date of filing: **25.11.1998**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **05.12.1997 JP 33566597**
09.02.1998 JP 2751898

(71) Applicant: **Nittoku Engineering Kabushiki Kaisha**
Urawa City, Saitama (JP)

(72) Inventor: **Higeta, Yuji, Nittoku Eng.,
K.K. Fukushima Fac.
Date-gun, Fukushima (JP)**

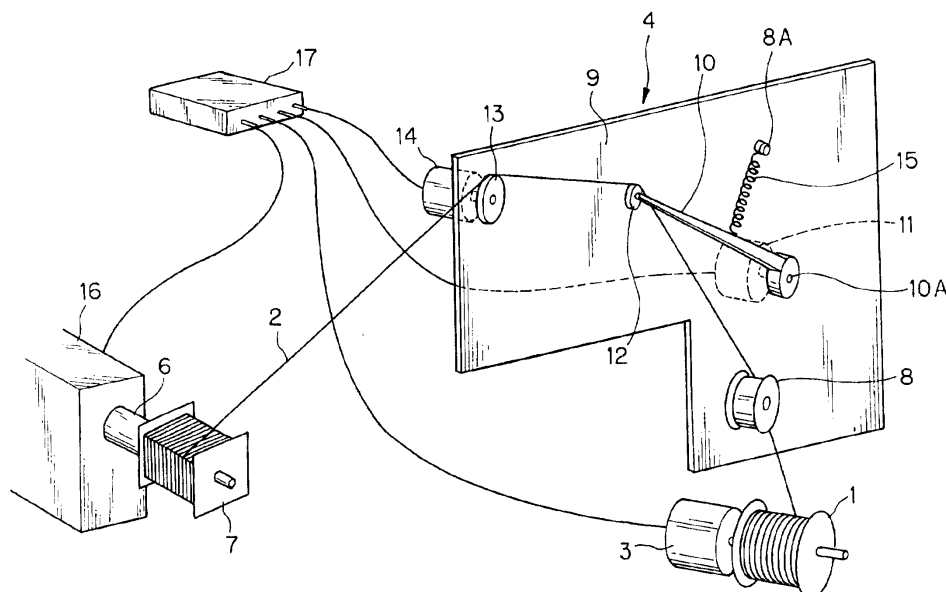
(74) Representative: **Stonehouse, Sidney William
Barker Brettell
138 Hagley Road
Edgbaston
Birmingham B16 9PW (GB)**

(54) **Winding device and method of winding**

(57) Wire (2) is fed from a spool (1) which is rotated by a feeding motor (3). Then the wire is led to a bobbin (7) on the tip of a spindle (6) via a pulley (12) on the tip of a tension arm (10) and a pulley (13) fixed on a rotational axis of an encoder (14). The rotational speed of the feeding motor (3) is controlled depending on winding

speed of the wire (1) onto the bobbin (7) detected by the encoder (14). Furthermore, variations in the tension of the wire are detected by a potentiometer (11) as rotations of the tension arm (10). The rotational speed of the feeding motor (3) is regulated depending on such variations in tension.

FIG.1





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 30 9668

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.6)
X	US 5 240 194 A (J.G.P. NOIROT; P. BULTEL) 31 August 1993 (1993-08-31) * column 2, line 22 - line 28 * * column 3, line 39 - column 5, line 53 * ---	1,2,4-6, 9,10	B65H59/38
A	EP 0 478 153 A (GENERAL ATOMICS) 1 April 1992 (1992-04-01) * column 4, line 13 - column 6, line 30 * ---	1,3,4,9	
D,A	PATENT ABSTRACTS OF JAPAN vol. 15, no. 397, 8 October 1991 (1991-10-08) -& JP 03 159541 A (TOSHIBA CORP.), 9 July 1991 (1991-07-09) * abstract * ---	1,9	
A	FR 2 571 034 A (ÉTABLISSEMENTS POURTIER PÈRE & FILS) 4 April 1986 (1986-04-04) * page 2, line 36 - page 4, line 31 * -----	3,5,6,10	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.6) B65H H01F
Place of search THE HAGUE		Date of completion of the search 24 August 2000	Examiner Goodall, C
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			

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 98 30 9668

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

24-08-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5240194 A	31-08-1993	FR 2655888 A	21-06-1991
		CH 684245 A	15-08-1994
		DE 4035862 A	27-06-1991
		JP 2890210 B	10-05-1999
		JP 5105328 A	27-04-1993
EP 0478153 A	01-04-1992	US 5080296 A	14-01-1992
		CA 2049755 A	25-03-1992
		JP 2865461 B	08-03-1999
		JP 4246067 A	02-09-1992
JP 03159541 A	09-07-1991	JP 2660073 B	08-10-1997
FR 2571034 A	04-04-1986	NONE	