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(11) **EP 1 094 138 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
25.04.2001 Bulletin 2001/17

(51) Int. Cl.⁷: **D03D 47/34**, B65H 51/22,
B65H 57/22, B65H 54/72

(21) Application number: **00121294.3**

(22) Date of filing: **06.10.2000**

(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: **22.10.1999 IT TO990915**

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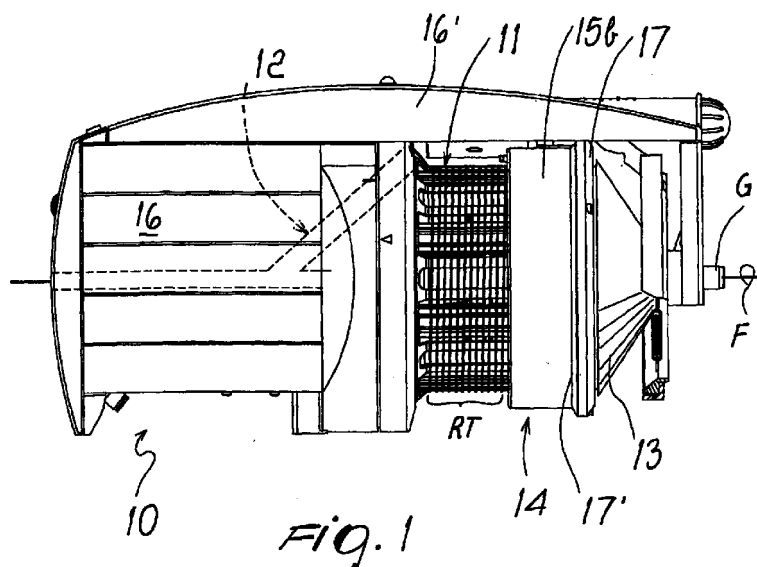
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(54) **Anti-balloon device for textile loom weft feeders**

(57) An anti-balloon device (14) constituted by a continuous shield (15-24-115) which is rigidly coupled to the body (16) of the feeder and has at least one detachable portion (15b-26-126-126') which, once

removed from its active position, allows access to a corresponding and underlying portion of the feeder and/or to the yarn (F) that unwinds from the feeder.



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Description

[0001] The present invention relates to weft feeders for textile looms of the gripper or projectile type and of the air-jet type, and regards the anti-balloon devices which are fitted to such feeders.

[0002] As it is known, weft feeders for current weaving looms are devices which comprise a fixed drum having a constant or variable diameter and on which a weft winding arm, which revolves around the drum, winds in a fishing-reel fashion onto the drum a plurality of turns of yarn which constitute a weft reserve.

[0003] When requested by the loom, at each weft insertion, the turns of the reserve unwind from the drum, passing through a final yarn guiding ring and under the control of a braking means designed to keep substantially constant the mechanical tension of the yarn being unwound.

[0004] A supervisor microprocessor, which receives the signals of a sensor suitable to detect the passage of the unwinding turns, moves the weft winding arm in order to restore the weft reserve as its turns unwind in order to feed the loom.

[0005] As it is well-known to the skilled in the art, due to the speed with which the turns of the reserve unwind, the yarn, affected by centrifugal force, is arranged along the surface of a solid of revolution, commonly known as "balloon", which becomes larger as the speed of the weaving process increases and becomes smaller as the mechanical tension of the yarn decreases. Moreover, this solid of revolution or balloon, which forms at the drum directly upstream of the braking means, causes severe drawbacks in the operation of the weft feeder, since it facilitates the entanglement of the yarn and accordingly facilitates formation of knots or other non-uniformities which, when they reach the braking means, produce sudden and significant increases in the mechanical tension of the yarn, with consequent breakages thereof and interruption of the weaving process.

[0006] In order to avoid this severe drawback, devices designed to prevent, or at least contain within narrow limits, the formation of the balloon, are conventionally used.

[0007] Conventional anti-balloon devices having various structures are substantially constituted by conical shields associated or not with cylindrical surfaces.

[0008] For example, US-3,971,522 discloses an anti-balloon device of the first type, which comprises a conical shield protruding from the delivery edge of the drum of the feeder up to the final guiding ring of the feeder.

[0009] Devices of the second type, constituted by conical shields associated with portions of cylindrical surface, are also described in US-4,349,161, 3,834,635, 4,753,274, and 5,769,132.

[0010] The main drawback of anti-balloon devices of both of the above specified types consists in that if

the weft feeder requires any maintenance or repair in regions concealed by the cylindrical surface and/or by the conical shield of the anti-balloon device, such anti-balloon device and/or part of the weft feeder must be disassembled and removed.

[0011] In order to avoid this drawback, it has already been suggested to provide a more easily removable anti-balloon device.

[0012] For this purpose, in the above-cited US-4,349,161 the entire conical-cylindrical shield constituting the anti-balloon device is hinged to the fixed body of the feeder and can swing from the operating or closed position, which is aligned with the drum of the feeder, to an open position, hereinafter concisely termed access position, which allows access to the drum and in general to the front end portion of the feeder. The conical shield of the anti-balloon device disclosed in US-4,753,274 also is rigidly coupled to a supporting arm which can swing in order to pass from the active position to the access position and vice versa.

[0013] These conventional systems for moving the anti-balloon device, however, have proved to be scarcely practical due to the sometimes unacceptable bulk caused by the space occupied by the device in the access configuration, and therefore swinging devices of the above-cited conventional type cannot, for example, be used in batteries of feeders arranged on stacked rows, this being a very common arrangement which is widely adopted in textile production.

[0014] As an alternative to these systems, the prior art offers only the disassembly of the shield and/or of the surface of the device, which are long and troublesome operations requiring corresponding long machine downtimes which are economically very disadvantageous.

[0015] The aim of the present invention is essentially to eliminate the above-cited drawbacks of conventional types of anti-balloon device.

[0016] Within the scope of this aim, an object of the present invention is to provide an anti-balloon device which is structured so as to allow easier and rapid access to the yarn and to the underlying mechanical parts or portions of the weft feeder, but at the same time does not increase at all the bulk of the feeder neither in the active configuration nor in the access configuration.

[0017] Another important object of the present invention is to provide an anti-balloon device which is structured so as to ensure perfect control of the balloon of yarn, but at the same time does not interfere at all with the action of the braking means, which can thus be installed or not in combination with the anti-balloon device according to the present invention and, if installed, can be of any type, e.g. of the brush, lamina, self-modulating or electrically-actuated types.

[0018] Another important object of the present invention is to provide an anti-balloon device which is improved from the point of view of structural simplification, can be easily applied to any type of feeder, is func-

tionally efficient and economically very advantageous.

[0019] According to the present invention, this aim and these and other objects which will become better apparent from the following detailed description are achieved with an anti-balloon device having the specific characteristics stated in the appended claims.

[0020] Substantially, the invention is based on the concept of providing the device in the form of a continuous cylindrical or conical shield rigidly coupled to the body of the feeder and of providing the shield with at least one removable portion which, when removed from its active position, allows access to the corresponding and underlying portion of the feeder and/or to the yarn that is unwinding from said feeder.

[0021] In a preferred embodiment, adapted for fixed-drum feeders for gripper or projectile looms, the device is constituted by a cylindrical surface surrounding the drum of the feeder upstream of the braking means and comprising one semi-cylindrical portion which is stably coupled to the body of the feeder and another semi-cylindrical portion which is detachably coupled to the first one with rapid-removal connecting means.

[0022] According to a second embodiment of the invention, the surface is continuous, is axially shorter than the drum, and is rigidly coupled to the body of the feeder by means of sliders and guides which cooperate and are adapted to allow a translatory motion of the surface from an active position, adjacent to the braking means, to an access position, in which the surface is moved to the base of the fixed drum and vice versa.

[0023] According to further embodiments of the invention, the cylindrical or conical shield constituting the device is provided with at least one window-like opening for accessing a corresponding portion of the feeder and/or yarn arranged below, and such opening is provided with a swinging or removable closure door.

[0024] The characteristics, purposes and advantages of the improved device according to the present invention will become better apparent from the following detailed description and with reference to the accompanying drawings, given by way of non-limitative example, wherein:

Figure 1 is a lateral elevation view of a weft feeder for gripper or projectile looms with the anti-balloon device according to a first embodiment of the invention, the device being shown in the closed or active configuration;

Figure 1a is a partial view, similar to Figure 1, of such device in the open or access configuration;

Figures 2, 2a and 2b are similar perspective views, illustrating respective constructive variations of the device of Figure 1;

Figures 3 and 3a are partial elevation views of a weft feeder for gripper or projectile looms with the anti-balloon device according to a second embodiment of the invention, illustrated respectively in the

active position and in the access position;

Figure 4 is a partial side elevation view of a weft feeder for gripper or projectile looms with the anti-balloon device according to a third embodiment of the invention;

Figures 5 and 5a are partial views of a weft feeder for air-jet looms with the anti-balloon device according to respective and further embodiments of the invention.

[0025] Initially with reference to Figures 1 and 2, the reference numeral 10 generally designates a weft feeder for gripper or projectile looms, which comprises a fixed drum 11 on which a hollow weft winding arm 12, which revolves around the drum, winds like in a fishing-reel fashion a plurality of turns of yarn which constitute a weft reserve RT. When requested by the loom (not shown), at each weft insertion the turns of the reserve unwind from the drum, passing through a final yarn guiding ring G under the control of a braking means 13 designed to keep substantially constant the mechanical tension of the yarn F being unwound.

[0026] Directly upstream of the braking means 13 there is provided an anti-balloon device, generally designated by the reference numeral 14, which due to the above reasons, is designed to prevent the yarn, by forming the balloon, from generating tangles, knots and non-uniformities which cause the breakage of the yarn in passing through the braking means 13.

[0027] The anti-balloon device 14 of Figures 1 and 2 is formed by a cylindrical surface, which is rigidly coupled to a rigid arm 16' of the body 16 of the feeder, surrounds the drum 11 and has an axial extension equal to approximately 40% of the overall axial extension of the drum.

[0028] According to the present invention, the cylindrical surface is constituted by two semicylindrical portions 15a and 15b: the first portion is fixed and non-detachably coupled to the arm 16', while the second portion is movable and detachably coupled to the first portion by rapid-removal connection means. For this purpose, the fixed semicylindrical portion 15a of the surface has a fixed front ring 17 which is rigidly coupled thereto and acts as front abutment for the movable semicylindrical portion 15b provided with a corresponding abutment half-ring 17' and acts as rigid contrast support for the connecting means of the movable semicylindrical portion.

[0029] In the embodiment of Figure 2, such means are constituted by permanent magnets 18 which are embedded flush in corresponding seats provided in the half-ring 17' of the movable portion 15b and cooperate with respective permanent magnets 18' of opposite polarity which are embedded flush in corresponding facing seats of the front ring 17.

[0030] In the embodiment of Figure 2a, the connection means are constituted by knobs with a threaded stem 19 which passes through through holes 20 of the

front ring 17 of the fixed semicylindrical portion 15b in order to engage in corresponding threaded holes 19' provided in the half-ring 17' of the movable semicylindrical portion 15b and with a knurled head 19" which allows to grip the knob and manually tighten and loosen it rapidly.

[0031] Figure 2b illustrates another constructive variation, in which the movable semicylindrical portion 15b is detachably connected to the fixed one 15a by means of flexible U-shaped brackets 21 which engage, in a straddling configuration, the front ring 17 and the front abutment half-ring 17' provided on the portion 15b.

[0032] The embodiment of Figure 3 illustrates an anti-balloon device 14' constituted by a continuous cylindrical surface 15 which surrounds the drum 11 and also has an axial length equal to 40-50% of the axial length of the drum.

[0033] According to the invention, the cylindrical surface 15 is supported by the arm 16' of the body of the feeder by means of sliders 22 which are slidingly mounted on longitudinal guides 23 rigidly coupled to the arm. The ring 15 can thus perform a translatory motion from an active position (Figure 3), in which it is adjacent to the braking means 13, to an access position (Figure 3a), in which it is moved at the base of the drum 11, and vice versa.

[0034] Figure 4 illustrates another embodiment, in which the anti-balloon device 14" is formed by a fixed cylindrical shield 24 which substantially has the same axial length as the drum 11, is non-detachably coupled to the arm 16' of the body 16 and is provided with a window-like opening 25 which allows access to a corresponding underlying portion of the feeder; the opening 25 is provided with a closure door 26 which can swing about a hinge 27 and is provided with snap-acting retention means (not shown).

[0035] Figures 5 and 5a relate to constructive variations related to anti-balloon devices 114 which are adapted for weft feeders 100 for air-jet looms.

[0036] In Figure 5, the device is constituted by a conical shield 115 which is stably and frontally rigidly coupled to the drum 110 of the feeder 100 by means of a rigid bracket 117 which is non-detachably connected, by means of bolts 117', to the arm 116' of the body 116 of the feeder.

[0037] An inspection port 125 is provided on the conical shield 115 and is closed by a swinging door 126 connected to the shield by means of a hinge 127.

[0038] In Figure 5a, the inspection port 125, provided on the conical surface 115, is closed by a removable door 126' retained in the active position on the shield by the action of permanent magnets 118 provided on the edges of the door 125 and/or of permanent magnets of opposite polarity (not shown) correspondingly provided on the edges of the door 126'.

[0039] Without altering the principle of the invention, the details of execution and the embodiments may of course be altered extensively with respect to what

has been described and illustrated by way of non-limitative example without thereby abandoning the scope of the invention.

[0040] The disclosures in Italian Patent Application No. TO99A000915 from which this application claims priority are incorporated herein by reference.

[0041] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

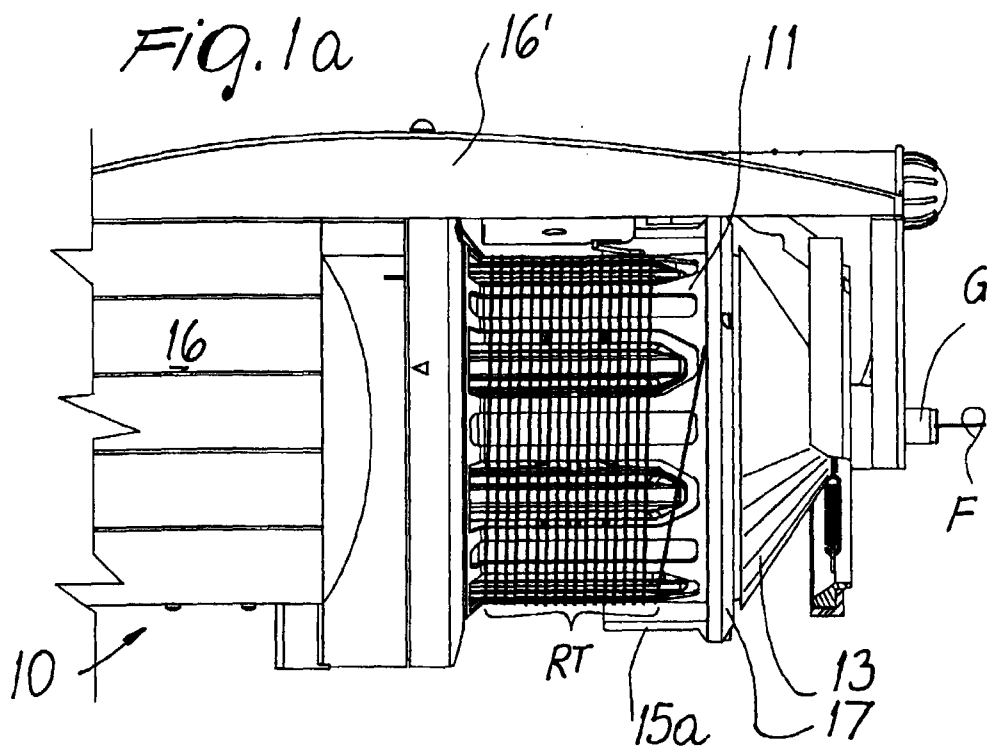
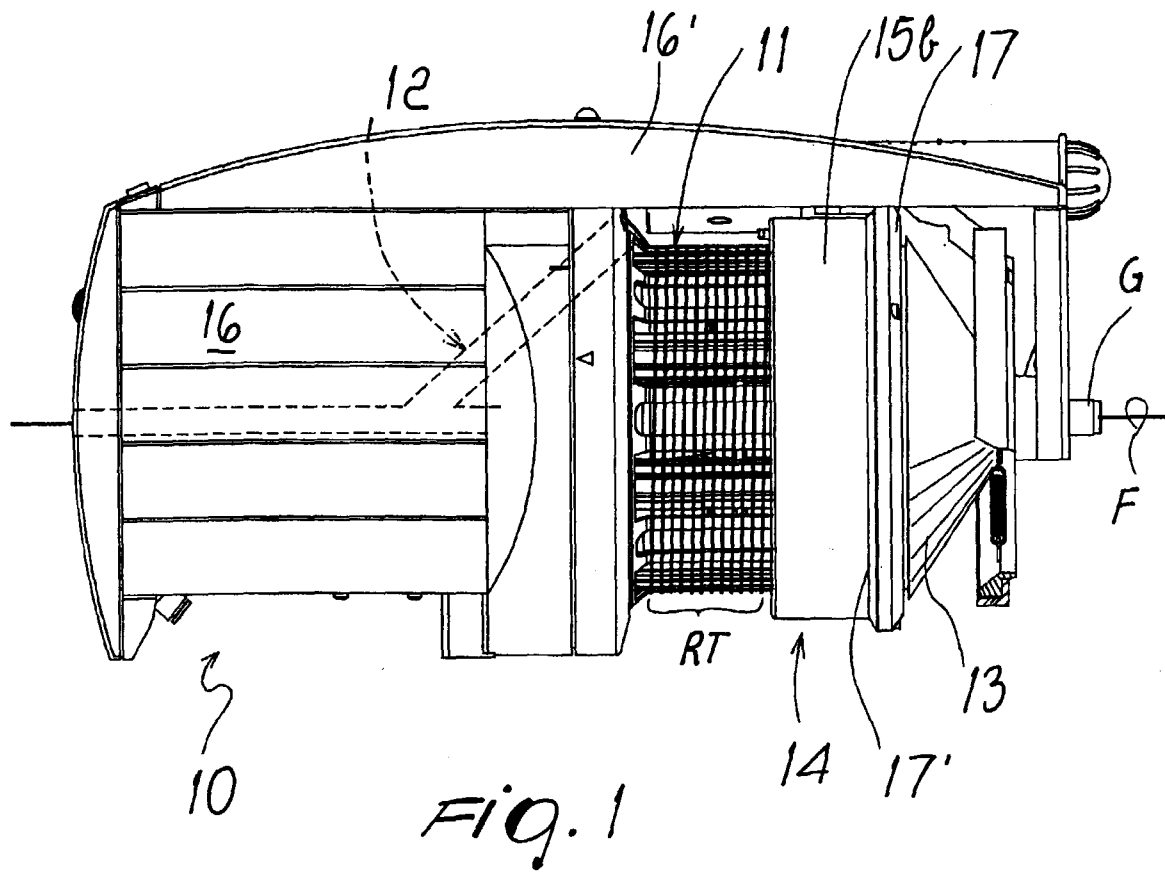
1. An anti-balloon device (14-14'-14"-114) for weft feeders (10-100) for gripper, projectile and air-jet weaving looms, characterized in that it is constituted by a continuous shield (15-24-115) rigidly coupled to the body (16) of the feeder and provided with at least one detachable portion (15b-26-126-126') which, once removed from its active position, allows access to a corresponding and underlying portion of feeder and/or to the yarn (F) that unwinds from said feeder.
2. The device (14-14') according to claim 1, characterized in that it is constituted by a cylindrical surface which surrounds the drum (11) of the feeder (10), which is arranged ahead of braking means (13) provided on said feeder in order to control the mechanical tension of the yarn being unwound, and has a maximum axial extension which is shorter than the axial extension of said drum (11).
3. The device (14) according to claims 1 and 2, characterized in that said cylindrical surface comprises a fixed semicylindrical portion (15a) stably coupled to the body (16') of the feeder and another semicylindrical portion (15b) which is movable and is detachably coupled to the fixed one by means of rapid-removal connecting means (18-19-21).
4. The device (14) according to claims 2 and 3, characterized in that said fixed semicylindrical portion (15a) of the cylindrical surface is provided with a fixed front ring (17) which acts as front abutment for a corresponding abutment half-ring (17') supported by the movable semicylindrical portion, and acts as rigid contrast support for the connecting means of said movable portion (15b).
5. The device (14) according to claim 4, characterized in that said connecting means are constituted by permanent magnets (18) which are embedded in corresponding seats of the abutment half-ring (17') of the movable semicylindrical portion (15b) of the

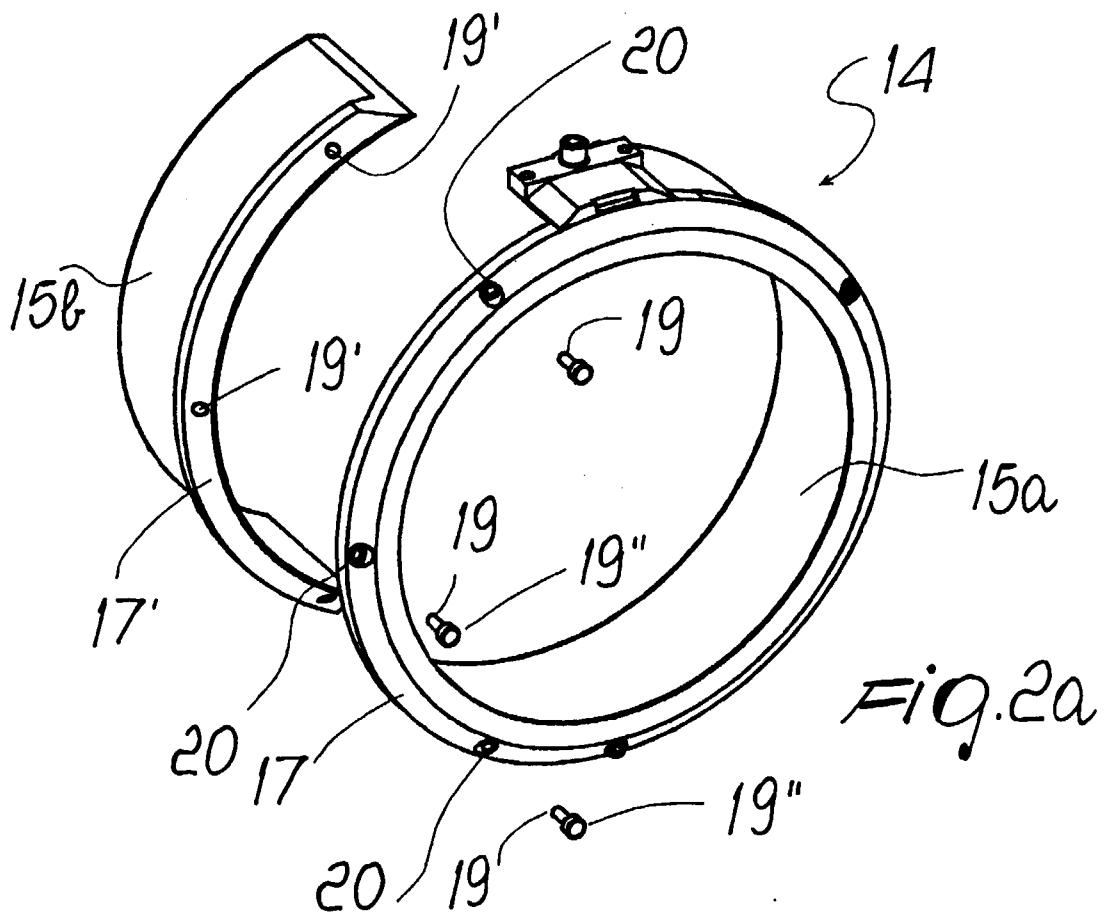
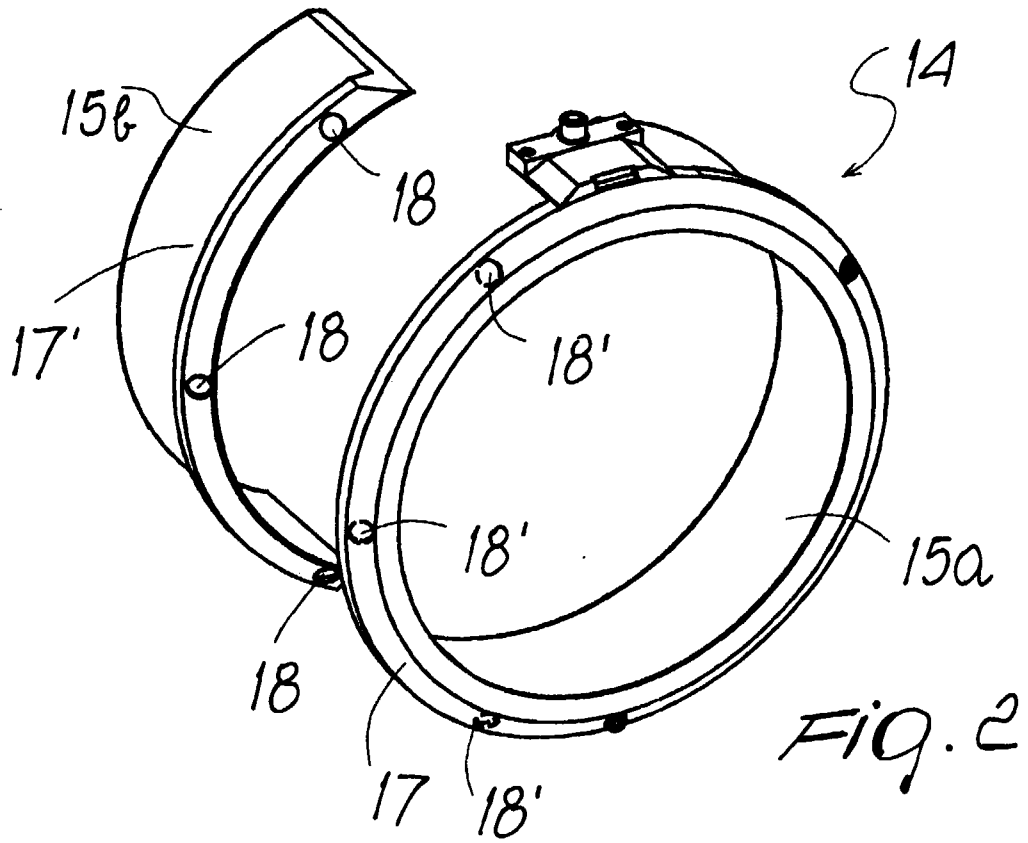
surface of the device, and in that said magnets (18) cooperate with permanent magnets of opposite polarity (18') which are embedded in respective facing seats of said fixed front ring (17) of the fixed semicylindrical portion (15a) of said surface.

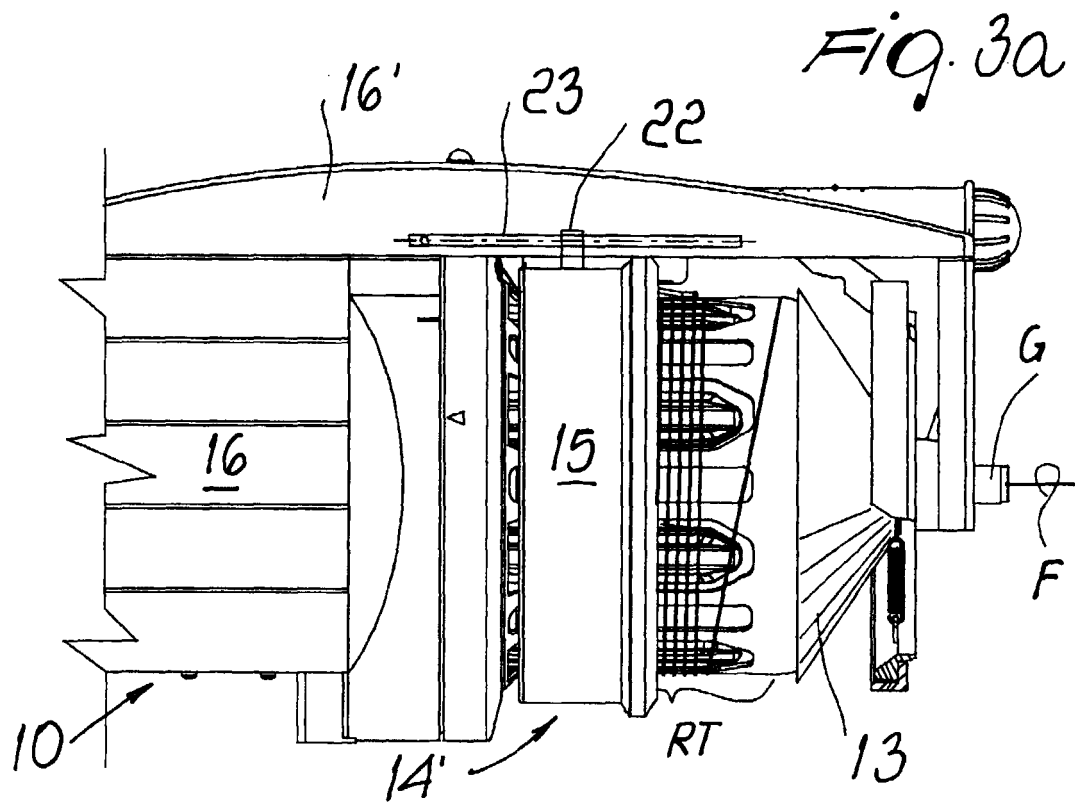
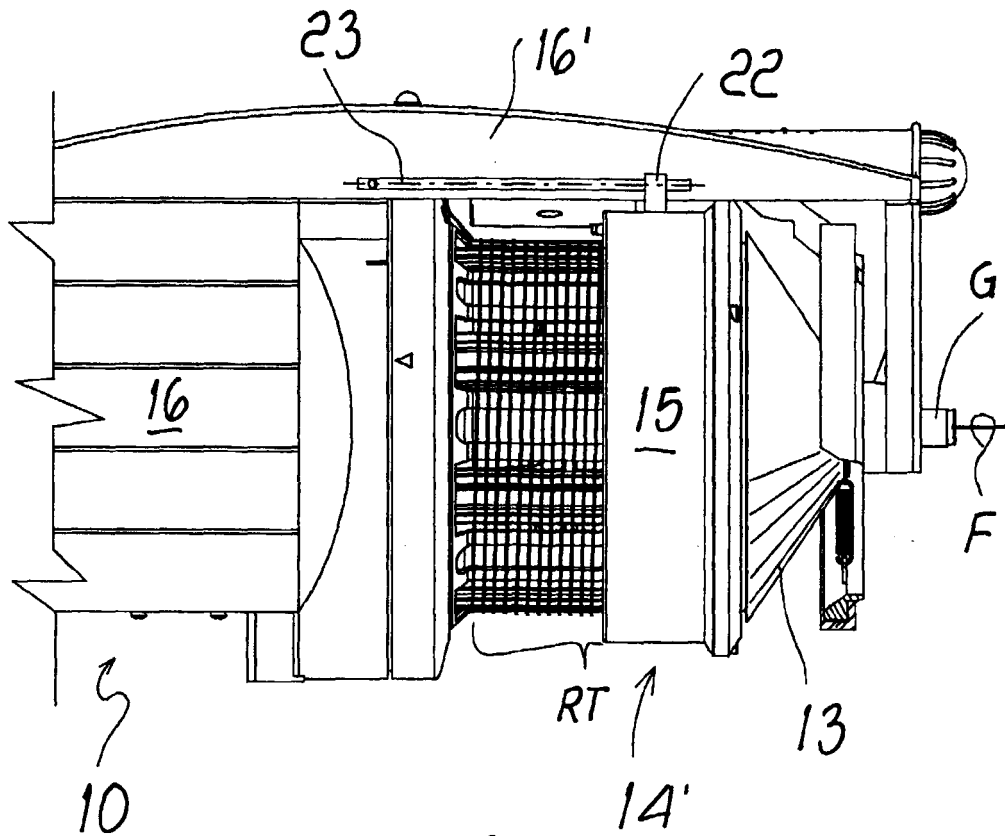
6. The device (14) according to claim 4, characterized in that said connecting means are constituted by knobs with respective threaded stems (19) which pass through through holes (20) of the front ring (17) of the fixed portion (15a) of the surface in order to engage in corresponding threaded holes (19') formed in the abutment half-ring (17') of the movable portion (15b) of the surface, said knobs being provided with knurled heads (19'') which allow to grip said knobs and rapidly manually tighten and loosen them. 10
7. The device (14) according to claim 4, characterized in that said connecting means are constituted by flexible U-shaped brackets (21) which engage, in a straddling configuration, said front ring (17) of the fixed semicylindrical portion (15a) of the surface and said abutment half-ring (17') of the movable semicylindrical portion (15b) of said surface. 15 20 25
8. The device (14') according to claims 1 and 2, characterized in that said cylindrical surface that surrounds the drum (11) is constituted by a continuous cylindrical ring (15) which is rigidly coupled to the body (16') of the feeder (10) by means of sliders (22) and cooperating longitudinal guides (23) which allow the translatory motion of the surface (15) parallel to the axis of the drum (11) and its movement from an active position, adjacent to said braking means (13), to an access position, which is adjacent to the base of the drum, and vice versa. 30 35
9. The device (14'') according to claim 1, characterized in that said continuous shield is a fixed cylindrical shield (24) which surrounds the drum (11) of the feeder and has an axial extension which is substantially equal to the axial extension of said drum, and in that said cylindrical shield is non-detachably coupled to the body (16) of the feeder (10) and is provided with an opening (25) which allows access to said corresponding underlying portion of the feeder; the opening (25) being provided with a closure door (26) which can swing about a retaining hinge (27). 40 45 50
10. The device (114) according to claim 1, characterized in that said shield is a conical shield (115) which is stably and frontally rigidly coupled to the drum (110) of a weft feeder (100) for air-jet looms, and in that said conical shield (115) is provided with an opening (125) which is closed by a swinging door (126) rigidly coupled to the shield by means of 55

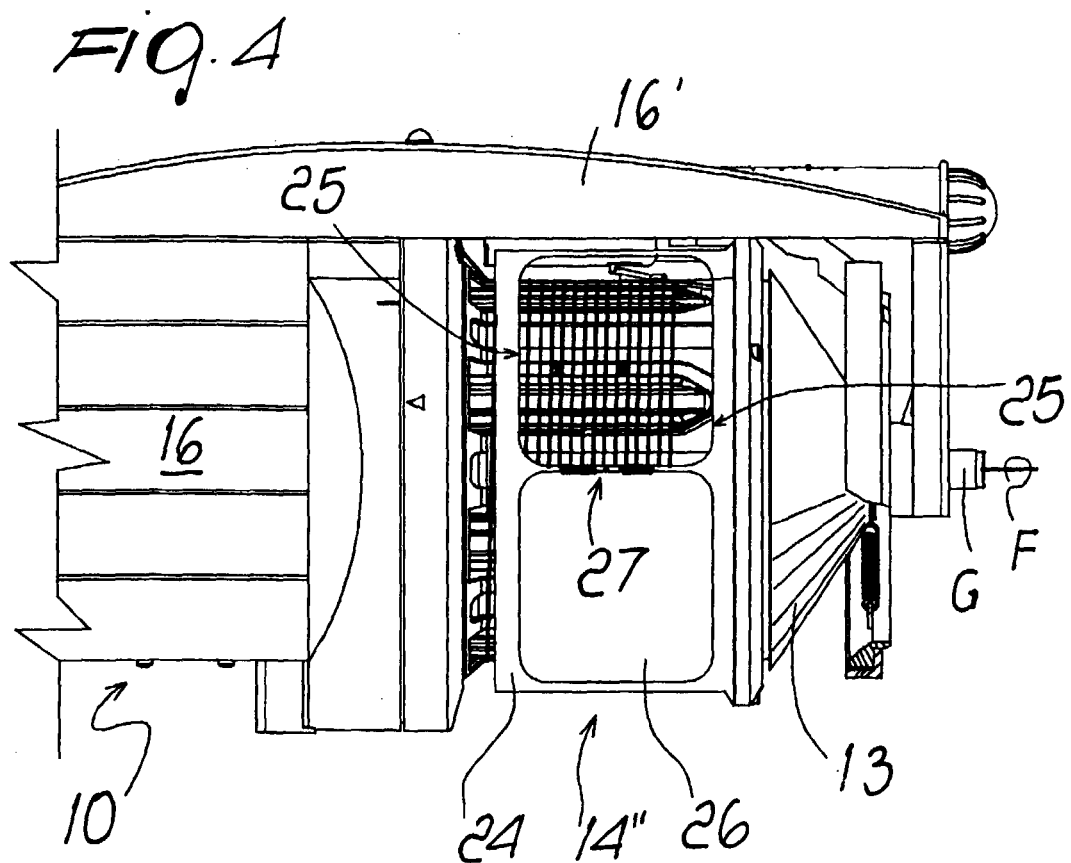
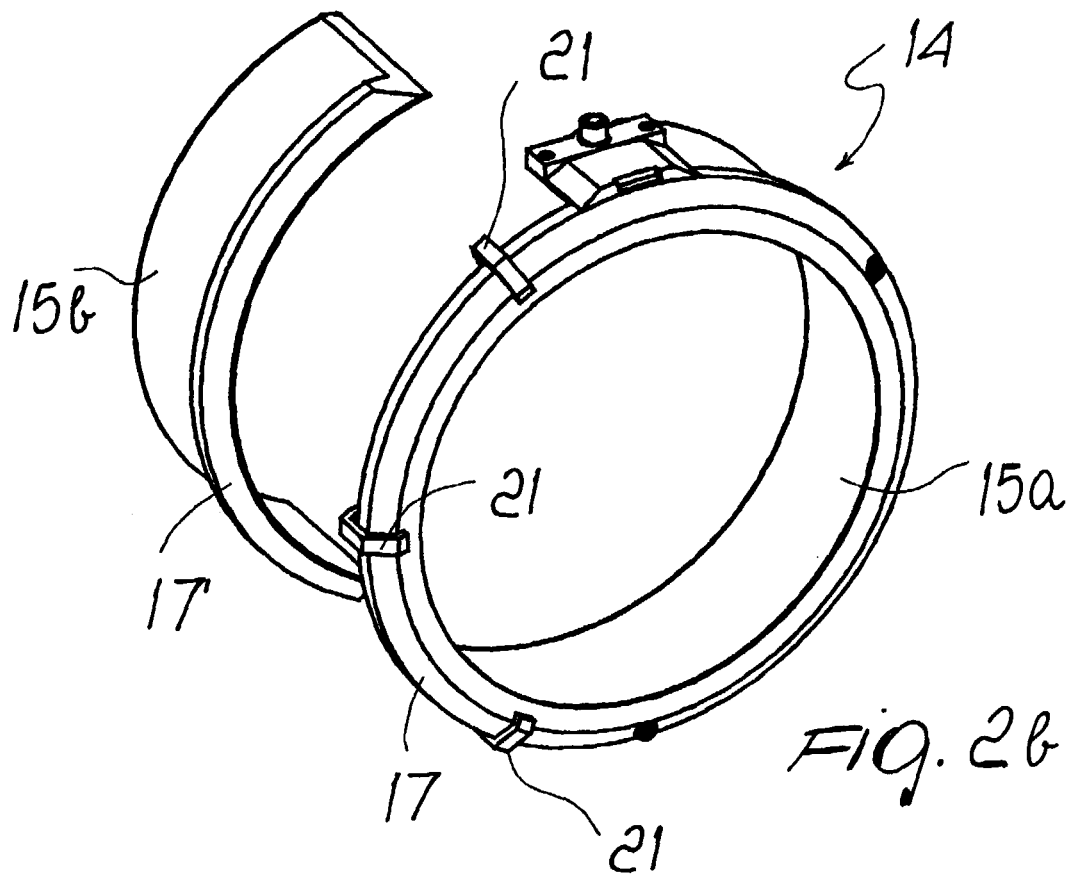
a hinge (127).

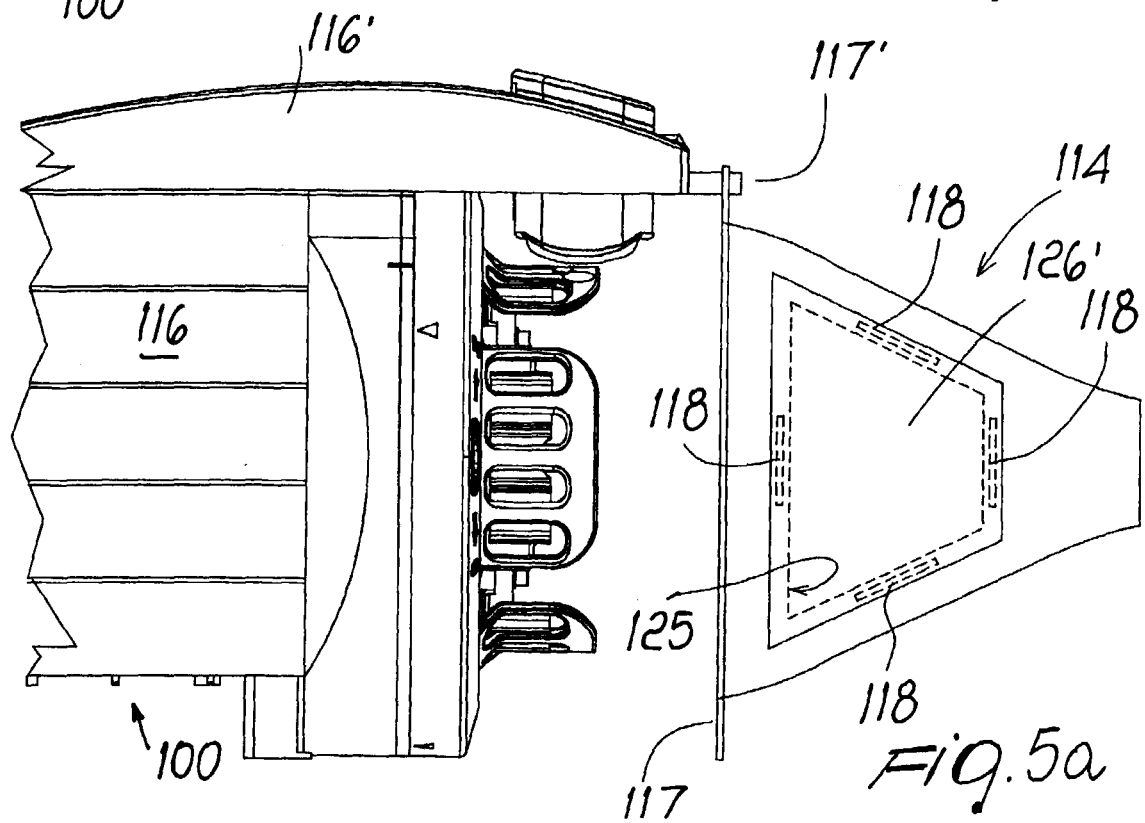
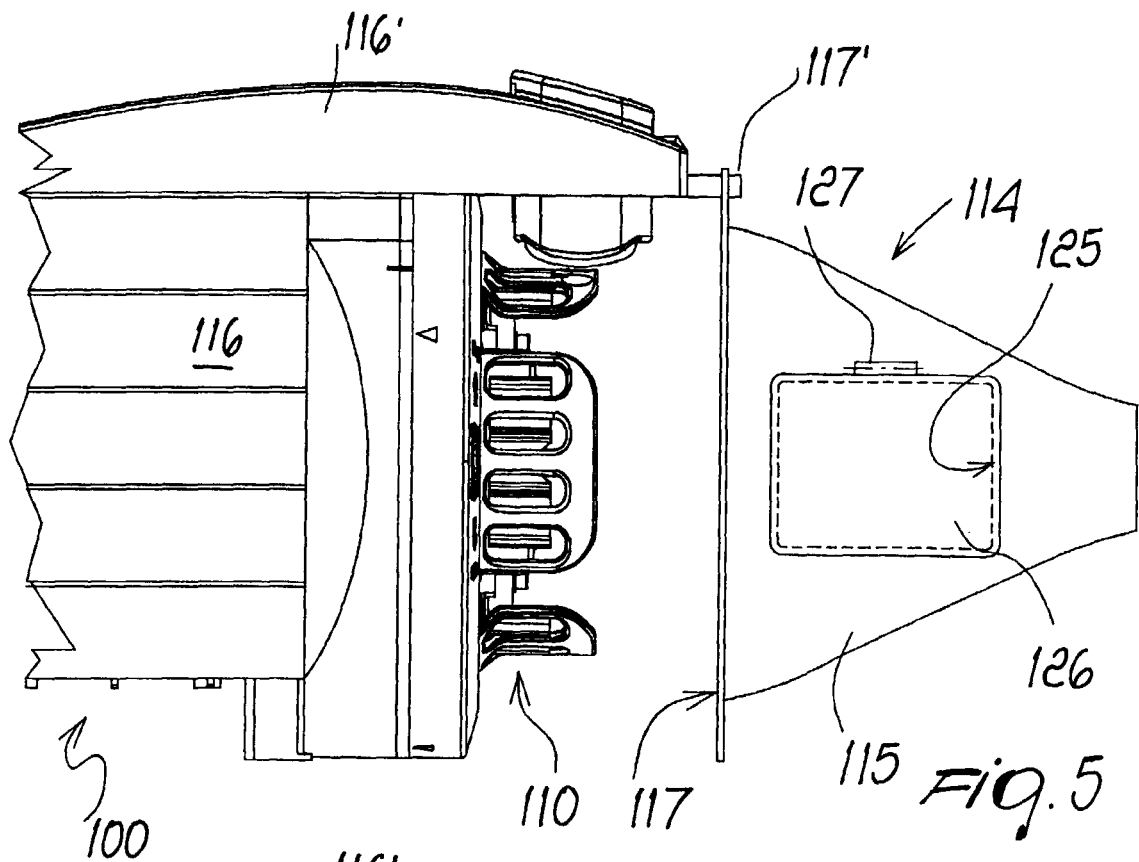
11. The device according to claim 9, characterized in that said opening (125) is closed by a removable door (126) which is kept in the active position on said conical shield (115) by the action of permanent magnets (118-118') arranged on the edges of said opening and/or on the edges of said door.













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EUROPEAN SEARCH REPORT

Application Number
EP 00 12 1294

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.CI.7)
A	FR 2 416 187 A (SULZER) 31 August 1979 (1979-08-31) * page 2, line 25 - line 27; figures 1,2 *	1,2	D03D47/34 B65H51/22 B65H57/22 B65H54/72
A,D	DE 28 42 115 A (IRO) 10 April 1980 (1980-04-10) * figure 1 *	1,2	
A,D	GB 2 163 782 A (ELITEX) 5 March 1986 (1986-03-05) * figure 1 *	1,2	
A,D	DE 22 25 918 A (SULZER) 31 October 1973 (1973-10-31)		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.CI.7) D03D B65H
Place of search THE HAGUE		Date of completion of the search 25 January 2001	Examiner Boutelegier, 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			

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

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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
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25-01-2001

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR 2416187 A	31-08-1979	CH 624645 A	14-08-1981
		CS 215009 B	25-06-1982
		DE 7902821 U	12-07-1979
		GB 2016412 A, B	26-09-1979
		IT 1110969 B	13-01-1986
DE 2842115 A	10-04-1980	IT 1119179 B	03-03-1986
		US 4349161 A	14-09-1982
GB 2163782 A	05-03-1986	CS 249155 B	12-03-1987
		CH 667115 A	15-09-1988
		DE 3527750 A	06-03-1986
		JP 61089354 A	07-05-1986
		US 4753274 A	28-06-1988
DE 2225918 A	31-10-1973	CH 550730 A	28-06-1974
		AT 321839 B	25-04-1975
		CA 1008837 A	19-04-1977
		CS 182786 B	31-05-1978
		DD 103210 A	12-01-1974
		FR 2182554 A	07-12-1973
		GB 1425900 A	18-02-1976
		HU 170639 B	28-07-1977
		IT 984208 B	20-11-1974
		JP 49047658 A	08-05-1974
		SU 597344 A	05-03-1978
		US 3834635 A	10-09-1974