



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**03.09.2008 Bulletin 2008/36**

(51) Int Cl.:  
**B21F 45/04<sup>(2006.01)</sup>**

(21) Application number: **08003415.0**

(22) Date of filing: **26.02.2008**

(84) Designated Contracting States:  
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR**  
 Designated Extension States:  
**AL BA MK RS**

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(30) Priority: **01.03.2007 IT TO20070153**

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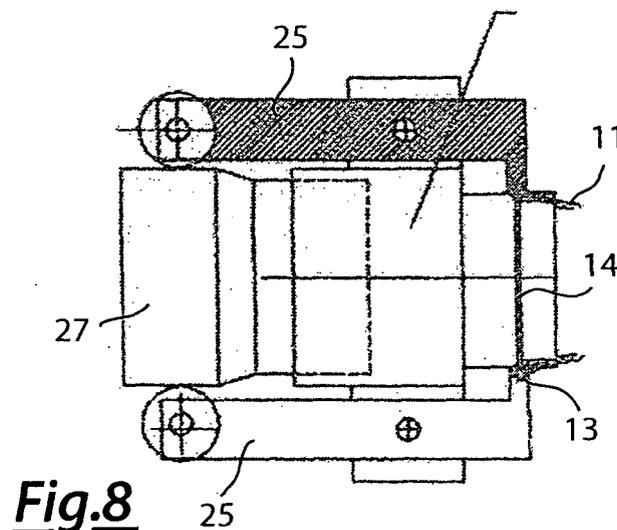
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(54) **Device for forming the girdle in metal cages for tops of bottles for sparkling drinks**

(57) Described herein is a device for forming the girdle in metal cages for tops of bottles for sparkling drinks, in which the cage (10) to which the girdle is to be applied proceeds along a production line withheld by a conveying cup (23); the device comprises a spindle (17), which sets itself facing said conveying cup (23); the spindle is provided with jaw means (25), which are designed to create with the spindle a substantially circular seat (20) for passage of the wire (16) for forming the girdle (14), and radial grooves (19, 31) that traverse said seat for housing the

eyelets (13) of the cage that are to be traversed by said wire (16); the jaws are mobile between:

- a first open position, designed to receive in the radial grooves (19, 31) the eyelets (13) of the cage, which is pushed partially outside of the cup (23) on the spindle;
- a closed position, in which the jaws form with the spindle (17) said circular seat (20) and said oblique grooves (19, 31) to form the girdle by feeding wire from outside along said seat; and
- a second open position, in which the cage (10) is slid off the spindle (17) and repositioned on the cup (23).



**Fig.8**

## Description

**[0001]** Forming the subject of the present invention is a device for forming the girdle in metal cages for tops of bottles for sparkling drinks.

**[0002]** It is known, for example from the Italian patent No. 1 264 110, to form the girdle of the cages by means of a mask, which, while advancing, comes to rest on the conveying cup of the body of the cage. Formed between the mask and the cup are a substantially circular seat for receiving the girdle and four radial seats, which are set at equal distances apart from one another along the circular seat, and are designed to house the eyelets of the body of the cage between which the girdle is to pass. Part of the mask is mobile with respect to the remaining part so as to form a loop in the girdle, which, once twisted, has the purpose of gripping the cage to the neck of the bottle.

**[0003]** However, the above device presents various drawbacks, for the reasons that will be outlined in what follows.

**[0004]** In the first place, it is indispensable to obtain a correct and precise setting, cup by cup, with respect to the mask in order for the operations of insertion and forming of the girdle to be always the same and perform properly from one station to another. Using the mask according to the aforesaid patent, the above setting is difficult to obtain in such a way that it is the same and precise at each station, so that it frequently happens that there are rejects during forming of the girdle.

**[0005]** Of considerable importance is moreover the sizing and angular positioning of an eyelet of the cage in the seat that is traversed by the wire that forms the girdle, in so far as the wire always has to centre all of the eyelets of the cage and traverse them correctly to form a loop that passes through all of them.

**[0006]** With the device according to the aforesaid patent it may happen that, in the step of advance of the mask against the cup, the eyelet of the body of the cage does not reflect the design dimensions or the right angular positioning for the wire to pass through the eyelet correctly. This causes absence of partial insertion of the wire of the girdle and consequent rejection of the cage.

**[0007]** The purpose of the invention is to provide a device for forming the girdle in metal cages for tops of bottles for sparkling drinks that will not present the aforesaid drawbacks, and in particular will be able to present the cage on which the girdle is to be made always in the right position in each station, both as regards the seat for forming the loop of the girdle and as regards the shape and angular arrangement of the eyelets that the wire is to traverse during said forming operation.

**[0008]** In order to achieve the above and further purposes that will be better understood hereinafter, the invention proposes providing a device for forming the girdle in metal cages for tops of bottles for sparkling drinks in which the cage to which the girdle is to be applied proceeds along a production line withheld within a conveying

cup, the device being characterized in that it comprises a spindle, which sets itself facing said conveying cup, the spindle being provided with jaw means, which are designed to create with the spindle a substantially circular seat for passage of the wire for forming the girdle and radial grooves along said seat for housing the eyelets of the cage that are to be traversed by said wire; the jaws being mobile between:

- 10 - a first open position, designed to receive in the radial grooves the eyelets of the cage, which is pushed partially outside of the cup on the spindle; .
- a closed position, in which the jaws form with the spindle said circular seat and said oblique grooves so as to form the girdle by feeding wire from outside along said seat; and
- 15 - a second open position in which the cage is slid off the spindle and repositioned on the cup.

**[0009]** In particular, according to the invention, it is the cage body that, without any mechanical constraints, comes to be housed in the area of the device in which the wire for forming the girdle is fed through the eyelets, and purposely provided jaw means correct any imperfection of the eyelets to enable the wire for the girdle to pass through correctly.

**[0010]** The girdle-forming spindle according to the invention is single and not made up of a number of cups, and consequently guarantees a perfect shaping of the girdle cage by cage. In addition there is a considerable saving in terms of time necessary for calibrations and settings for each individual cup. In fact, once the single system has been regulated, there is no longer any problem of getting mechanical assemblies to coincide.

**[0011]** The device according to the invention will now be described in a preferred but certainly non-limiting embodiment thereof, with reference to the attached plates of drawings, in which:

40 Figure 1 illustrates a model of top-holding cage referred to as "free girdle";

Figure 2 illustrates the station for feeding the wire to the device for forming the girdle;

45 Figure 3 illustrates the rotary-table system for making the cage;

Figure 4 illustrates a detail (spindle) of the device according to the invention;

50 Figure 5 is the side view of the coupling of the spindle of Figure 4 with the cage-bearing cup of the system of Figure 3;

Figures 6, 8 and 10 are three different operating steps of the device according to the invention in side view;

55 Figures 7, 9 and 11 are front views of the device of Figures 6, 8 and 10 in the respective operating steps; and

Figure 12 illustrates the seat of the device in which the girdle is formed.

**[0012]** The model of top-holding cage referred to as "free girdle" (see Figure 1) is distinguished by a body 10 constituted by four legs 11, which on one side converge into one another to form an end loop 12 and on the other terminate each with an eyelet 13, through which a girdle 14 made of zinc-plated wire having a diameter of 1 mm is to be passed to form a ring.

**[0013]** Precisely on account of the small diameter of the material the process is very critical in certain steps; one of these is the insertion of the girdle 14 through the purposely provided eyelets 13 formed previously by the system on the body 10.

**[0014]** As has already been mentioned above, the passage of the wire in the eyelets 13 has to be done in a uniform way, preventing the wire from following a path bending to and fro. The wire 16 (see Figure 2) is fed mechanically by rollers 15, which, by pressing against one another, exert a thrust, which enables the wire 16 to be fed into the spindle 17 that is to form the girdle.

**[0015]** The spindle 17 (see Figures 4 and 5) has a fixed shape, purposely studied to obtain development of the girdle without having any need for intervention on the part of other mechanical systems. In this way, the desired length of wire is obtained, without creating any deformation and lengthening due to the aid of other mechanical members that alter the main characteristics of the wire, which are fundamental, given that the girdle has to guarantee gripping around the neck of the bottle.

**[0016]** Contrary to the known solutions, the spindle 17 is fixed on the structure 18 of the system (see Figure 3) and has four grooves 19 (see Figure 4) set at 45° with respect to its vertical axis Y and set at 90° with respect to one another.

**[0017]** The body 10 of the cage is inserted by the system for production of the cages into an appropriate cup 23 (see Figure 3), which enables it to turn on a rotary table 24 with a positioning movement, until it sets itself aligned with the spindle 17 for passing the wire.

**[0018]** At this point, a pusher 22 presses on the rear loop 12 of the cage so as cause the body 10 to slide in the direction A (see Figure 5) extracting it partially from the cup 23 until the eyelets 13 pass into the grooves 19 of the spindle 17.

**[0019]** These grooves 19 serve as a guide for the eyelets 13 of the body 10, which, coming out from the appropriate cup 23, will be guided up to the precise point of insertion of the girdle 14 set on the spindle 17. Said grooves 19 are moreover inclined by a few degrees so as ensure a proper positioning even if the legs 11 of the cage are not formed regularly so that the eyelets 13 require an angular and circumferential correction for their proper positioning.

**[0020]** Once the body 10 has been brought into position, jaw means 25 (see Figures 6-11), four according to the embodiment illustrated and arranged at approximately 90° with respect to one another, close around the spindle 17 by actuation of a cam 27 located at the rear.

**[0021]** The front free end of each jaw means 25 is pro-

vided with appendages 28, which extend to form an arc of a circumference and have a C-shaped cross section to form a substantially circular track 20 provided with three small discontinuities 29 and one discontinuity 30 of larger dimensions than the others.

**[0022]** Each appendage 28 is moreover provided with radial seats 31, set angularly at a distance from one another and oriented like the grooves 19 of the spindle 17.

**[0023]** Figures 6 and 7 illustrate the initial step in which the jaws 25 are open and the eyelets 13 are about to fit into the seats 19 of the spindle 17 under the appendages 28 of the jaws themselves.

**[0024]** Figures 8 and 9 illustrate the next step in which the jaws 25 close under the action of the cam 27. The circular seat 20 is thus provided so that the wire 16 can be fed into the seat 20 to form the girdle 14 that passes through the eyelets 13.

**[0025]** Finally, Figures 10 and 11 illustrate the step in which the jaws 25 open and the cage with the girdle can be slid off the spindle 17.

**[0026]** In summary, when the jaws 25 close on the spindle 17, their circular appendages 28 provide the aforesaid circular track 20, whilst the radial seats 31, together with the radial grooves 19 of the spindle 17, form housing seats for the eyelets 13 such as to prevent them from coming out of the position for passage of the wire and to adjust any possible irregularities of angular positioning thereof.

**[0027]** The jaws, by closing on the eyelets 13, guarantee that the conformation of the latter is suitable for insertion of the metal wire with extreme simplicity. In addition, by means of the track 20 made in the appendages 28 of the jaws 25, which reflects exactly the outer boundary of the spindle 17, the wire 16 coming off the rollers 15 is guided with extreme precision: namely, the wire enters the opening 30 at the start of the track 20, which bestows the pre-set shape thereupon, is fed along the track 20 itself, and, having passed through the eyelets 13 of the body 10, comes out again from the inlet opening 30 after forming the girdle.

**[0028]** The track 20 intersects the seats 19-31 perfectly to centre the eyelets 31 once they are brought into position.

**[0029]** Once the process for forming the girdle 14 is completed, the four jaws 25 open outwards, enabling extraction of the cage formed and re-insertion thereof into the cup 23 by pick-up means, which could even be the pusher 22, the latter now having the opposite function to the one it had previously.

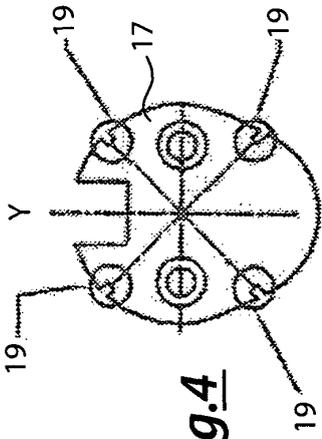
## Claims

1. A device for forming the girdle in metal cages for tops of bottles for sparkling drinks, in which the cage (10) to which the girdle is to be applied proceeds along a production line withheld by a conveying cup (23); the device being **characterized in that** it comprises

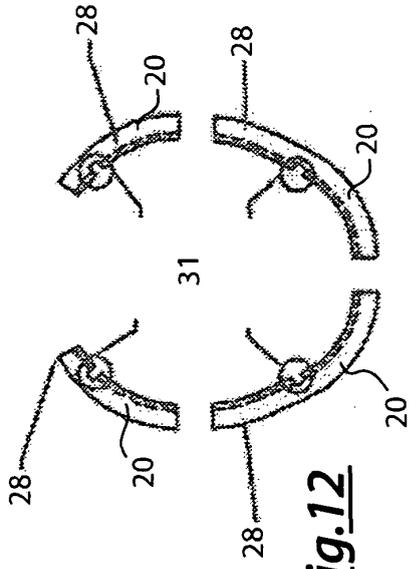
a spindle (17), which sets itself facing said conveying cup (23); the spindle being provided with jaw means (25), which are designed to create with the spindle a substantially circular seat or track (20) for passage of the wire (16) for forming the girdle (14), and radial grooves (19, 31) that traverse said seat for housing the eyelets (13) of the cage that are to be traversed by said wire (16); the jaws being mobile between:

- a first open position, designed to receive in the radial grooves (19, 31) the eyelets (13) of the cage, which is pushed partially outside of the cup (23) on the spindle;
- a closed position, in which the jaws form with the spindle (17) said circular seat (20) and said oblique grooves (19, 31) for forming the girdle by feeding from outside wire along said seat; and
- a second open position, in which the cage (10) is slid off the spindle (17) and repositioned on the cup (23).

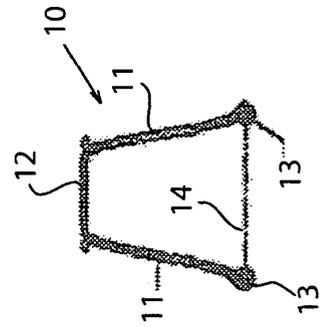
2. The device according to Claim 1, **characterized in that** the spindle (17) is fixed on the structure (18) of the system for production of the cages and has four grooves (19) set at 45° with respect to its vertical axis Y and set at 90° with respect to one another.
3. The device according to Claim 1, **characterized in that** the body (10) of the cage is inserted by the system for production of the cages into said cup (23), which enables it to rotate on a rotary table (24) with a positioning movement, until it arrives in alignment with the spindle (17).
4. The device according to the preceding claims, **characterized in that** the table (24) envisages a pusher (22) that presses on the rear eyelet (12) of the cage so as cause the body to slide (10) along its own axial direction (A) extracting it partially from the cup (23), until the eyelets (13) slide into the grooves (19) of the spindle (17).
5. The device according to Claim 1, **characterized in that** the jaws (25) are four in number, arranged at approximately 90° with respect to one another, and close around the spindle (17) by actuation of a cam (27).
6. The device according to Claim 5, **characterized in that** the front free end of each jaw (25) is provided with appendages (28), which extend to form an arc of a circumference and have a C-shaped cross section to form said substantially circular seat (20), which is provided with three small discontinuities (29) and one discontinuity (30) of dimensions larger than the others, the latter for enabling the wire (16) to be fed into the seat (20) and to come out therefrom after passing through it.
7. The device according to Claim 6, **characterized in that** each appendage (28) is moreover provided with radial seats (31) set angularly at a distance from one another and oriented like the grooves (19) of the spindle (17) for forming said radial grooves (19-31).



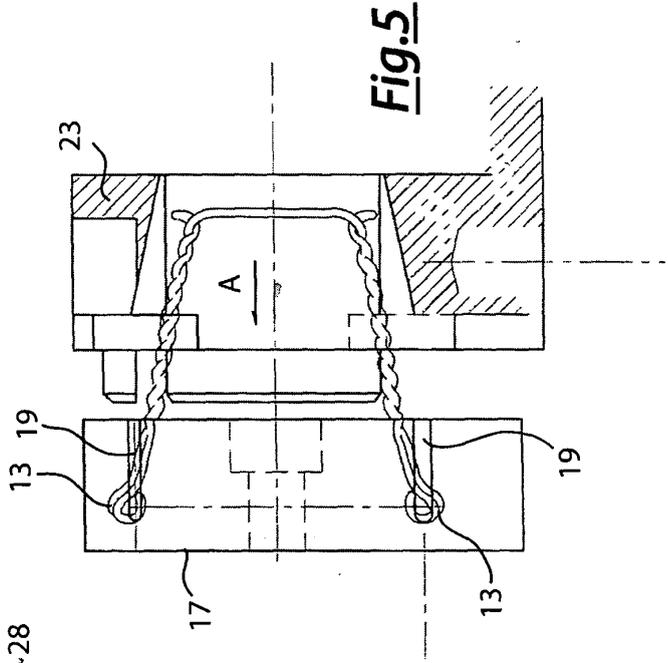
**Fig. 4**



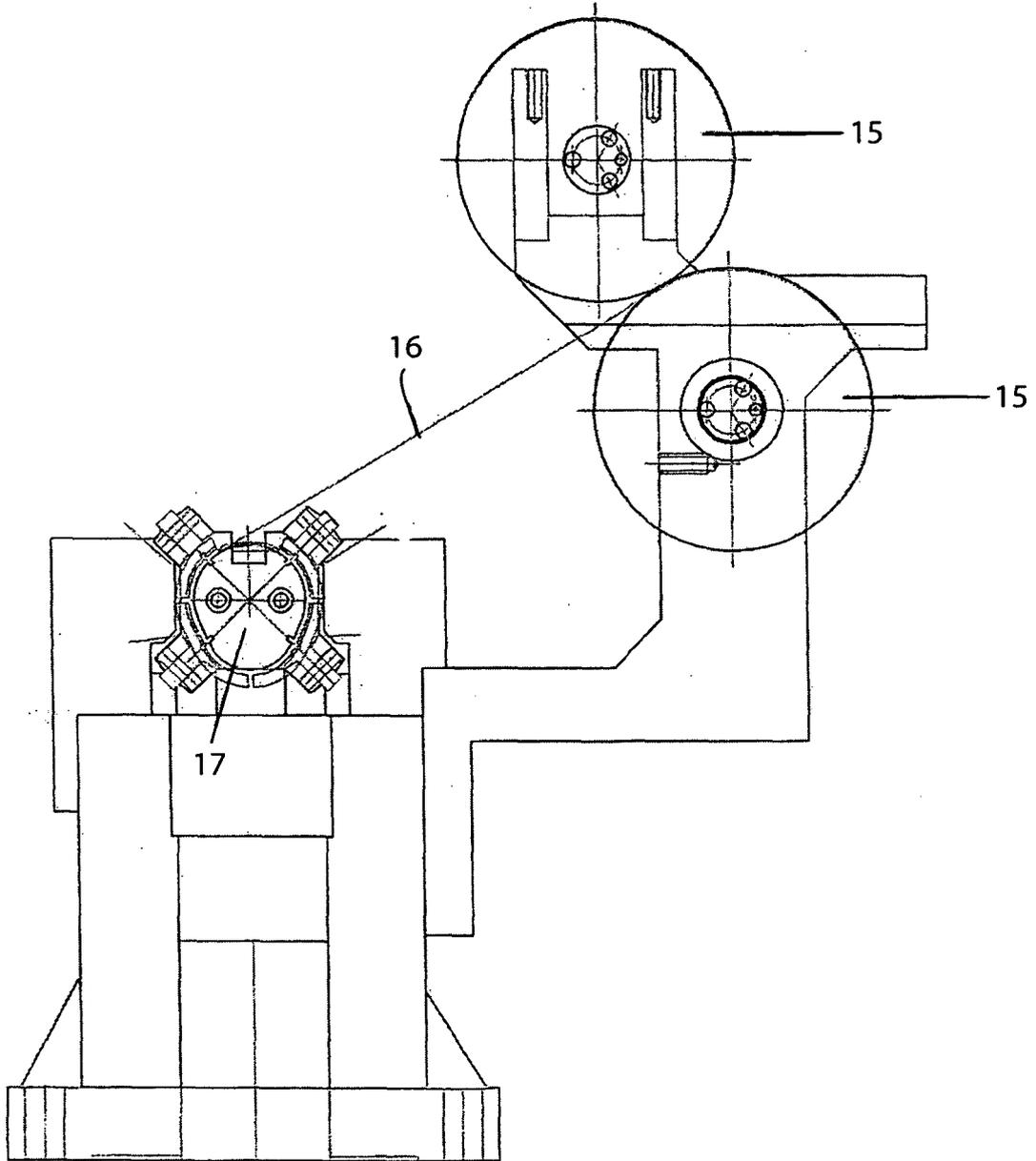
**Fig. 12**



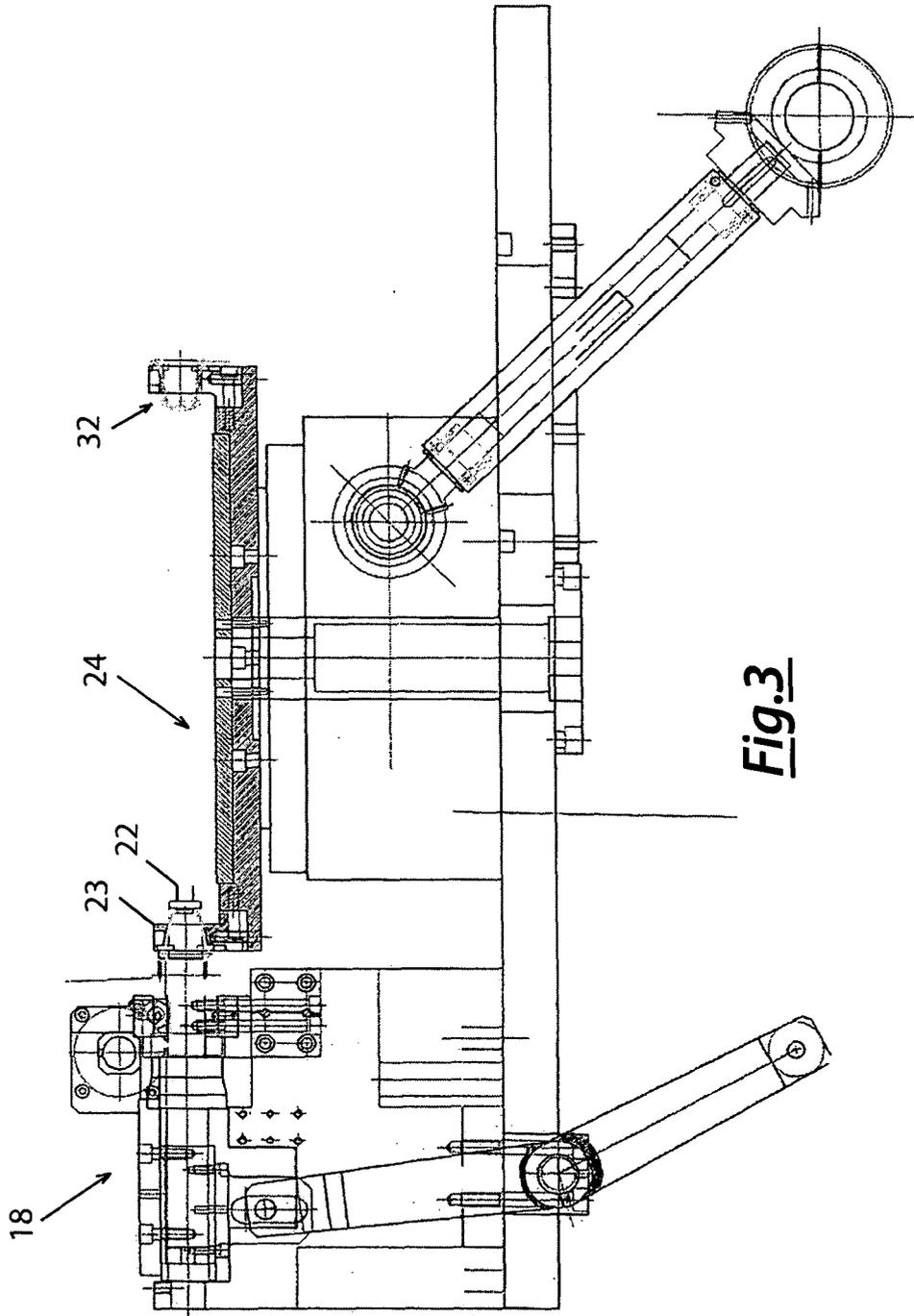
**Fig. 1**



**Fig. 5**



**Fig.2**



**Fig. 3**

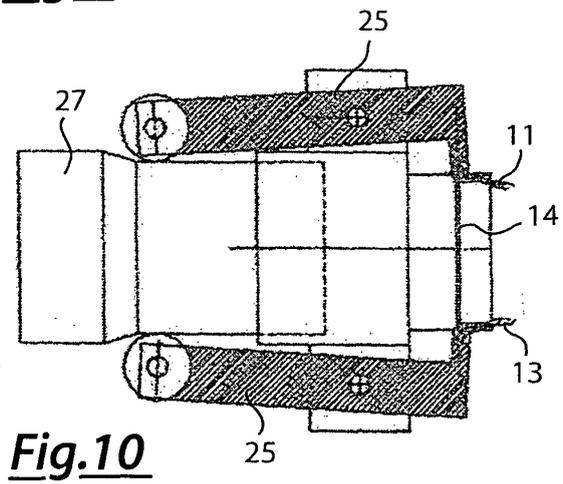
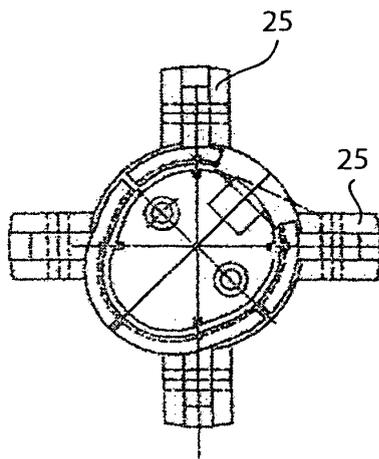
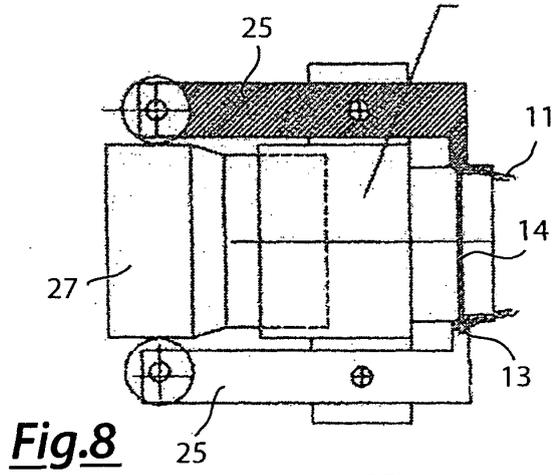
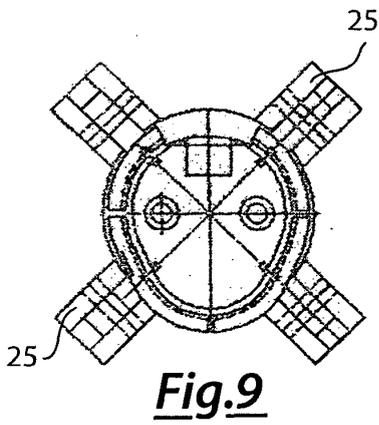
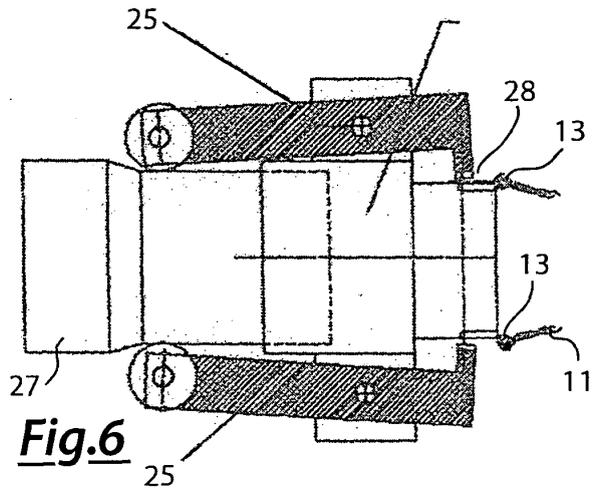
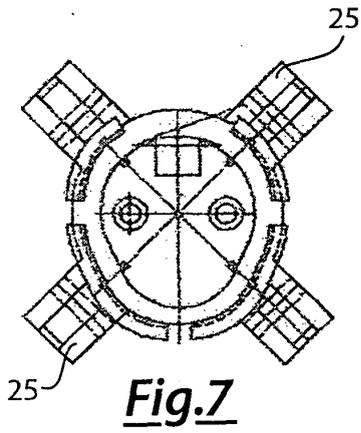


Fig.11



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	EP 0 894 554 A (ECKSTEIN MICHAEL [DE]; ECKSTEIN MARCUS [DE]) 3 February 1999 (1999-02-03) * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			B21F
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 2 July 2008	Examiner Ritter, Florian
CATEGORY OF CITED DOCUMENTS		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  
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EP 08 00 3415

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02-07-2008

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

**REFERENCES CITED IN THE DESCRIPTION**

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