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(54) Title: MACHINE FOR MANUFACTURING THE STAR-SHAPED PART OF THE WIRE CAGES FOR SECURING THE CORK IN BOTTLES OF CHAMPAGNE OR OTHER SPARKLING WINE

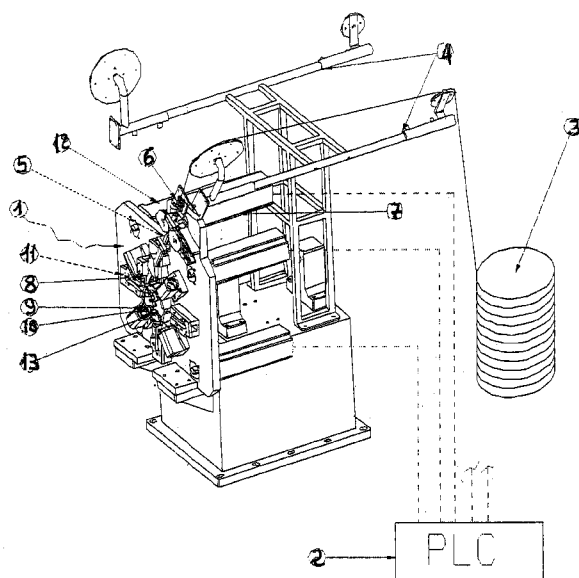


Fig. 1

(57) Abstract: The wire used to make the muselet (see figure 1) is unravelled from a coil of wire (3) positioned at the back of the machine, and from here, passing through a wire guiding system (4), is introduced into a groove (5), which leads it directly to the system for producing the star-shaped wire cage (1); before entering the groove (5), the thickness of the wire is measured by means of a succession of rollers (6), while the wire is made to progress along the groove by means of an engine (7), located upstream from the groove; on exiting the groove the wire is forced into a circular movement set by a PLC electronic control unit (2). A blade (8), controlled by a mechanical cam, then cuts the wire when it is long enough, and the mobile jaws (10) of a number of pliers, also controlled by means of mechanical cams, serve, in an initial stage, the purpose of guiding the wire, and subsequently that of keeping the two ends of the wire together during the action of certain press devices (11), during both the twisting of the legs by four engines (12), which are also operated by the electronic control unit (2); once the twisting action is complete, the mobile jaws (10) of the pliers are withdrawn.

**Machine for manufacturing the star-shaped part of the wire cages for  
securing the cork in bottles of Champagne or other sparkling wine**

5 **STATE OF THE ART**

It is well-known that the cork in bottles of champagne or other sparkling wine is traditionally secured by means of a wire cage called a “muselet” (from the French for “muzzle”) – a.k.a. wirehoods or champagne wires – wire muselets being the evolution of the hemp-string method used to hold corks in place  
10 until the mid-19th century.

Modern-day muselets comprise three parts: (i) a star-shaped part made of twisted-wire; (ii) a belt ring at the base, which enables the legs of the star-shaped twisted-wire element above to fasten securely around the neck of the bottle; and (iii) a metal disc or “plaque”, which sits on top of the cork.

15 Muselets can be customised, according to the customer’s needs, for example, by printing the name of the wine producer, or other names/designs, which means that there is an increasing demand for the wire cages to be made with wire of a special colour or a certain diameter.

Making the star-shaped element is the first step in producing the entire  
20 muselet, whereby any defects in this stage can seriously jeopardise the quality of the muselet, because the star-shaped structure must be: (a) stable, and (b) capable of ensuring that the belt ring and plaque fit perfectly.

The machines currently used to make muselets allow the use of wire of different colours and diameters, but each change requires the resetting of the  
25 machine, by means of an electronic control unit, in order to adapt to the required specifications.

## DESCRIPTION OF THE INVENTION

This invention relates to a machine for producing the star-shaped part which, together with the belt ring at the base and the plaque at the top, forms the muselet, i.e. the wire cage used to secure the cork in bottles of champagne or other sparkling wine; the machine would enable the production of structurally stable parts, suited to the geometry of the muselet, while at the same time allowing a high degree of flexibility, to remedy the problems illustrated above. According to the invention, the wire used to form the muselet would be unwound from a coil preferably placed at the back of the machine; the wire would be unravelled from the coil and its diameter measured by means of a succession of rollers, after which it would be fed into a groove – via a guide – leading to the system for producing the star-shaped part of the wire cage; the wire would be fed into the groove by means of an engine placed upstream from the groove itself.

At the exit from the groove the wire would be made to follow a circular path, regulated by an electronic control unit, and shaped by four mobile pliers radially arranged, at 90°, around the circular path, at the end of which two blades, controlled by a cam, cut the wire to the right length, while the mobile pliers – which initially guide the wire – clamp together and hold the two ends of the wire firmly in place; at this stage of the process, lateral press devices press the wire ring while the clamped mobile pliers rotate to twist the legs; once this operation is completed, the mobile pliers and press devices withdraw to the initial position.

## DESCRIPTION OF THE DRAWINGS

The preferred embodiment of the invention is illustrated, without limitation, by the attached drawings, in which:

figure 1 is an overall view of the machine used to manufacture the wire cage;

figure 2 shows the wire cage for bottles of champagne and other sparkling  
5 wines;

figure 3a shows the measurement of the wire before it is fed into the groove;

figure 3b shows the threading of the wire;

figure 4 shows the coupling of the stationary/mobile jaws of the pliers in position zero, i.e. when the mobile jaw has not yet moved;

10 figure 5 shows the coupling of the stationary/mobile jaws of the pliers, when the mobile jaw has travelled a part of the way, creating a gap for the wire to pass through;

figure 6 shows the coupling of the stationary/mobile jaws of the pliers, when the mobile jaw has travelled all the way and now holds the wire firmly against

15 the stationary jaw;

figure 7 shows the star-shaped part of the wire cage before it is fully formed and before the wire twisting stage;

figure 8 shows the finished part, ready for completing the wire cage manufacturing process.

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#### DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to the drawings above, the machine for manufacturing the star-shaped parts of the wire cages for securing the cork in bottles of champagne and other sparkling wines comprises: a coil of wire (3), preferably positioned  
25 at the back of the machine; a wire guiding system (4) for guiding the wire from the coil to the machine; a succession of rollers (6) through which the

wire is made to pass, so that its diameter can be measured; a groove (5) leading the wire to the machine; two rollers, one idle (14) and the other connected to the engine (7), through which the wire is pulled forward inside the groove (5); a round mask (16) inside which the wire is inserted; four  
5 devices featuring three positions: in one the wire is free to pass, in another its movement is enabled, and in the third the wire is blocked; in the preferred embodiment of the invention the devices consist of four pliers comprising a stationary jaw (9) and a mobile jaw (10), both the stationary and the mobile jaws being shaped so that, based on their mutual positions (open or closed),  
10 there is either a space through which the wire can pass, or the wire's passage is blocked; the mobile jaw (10) of the pliers slides axially along the stationary jaw, so that it can open and close, with a number of intermediate positions: when it opens it – obviously – forms a gap through which the wire can pass, while in the closed position, achieved by means of the mobile jaw sliding  
15 along the underlying stationary jaw, up to a stop, thus blocking the wire previously inserted. The four pliers are arranged along the perimeter of the round mask (16), at 90°, and coupled in such a way as to initially form the gap through which the wire can pass. The machine further comprises an electronic control unit (2), which calculates the number of revolutions of the engine (7)  
20 needed to complete the circle; cams for closing the mobile jaw (10), with respect to the stationary one (9), in the coupled pliers and in a staggered fashion, so as to block and hold the wire and, consequently, the ring in four specific points; a blade (8) for cutting the wire once the ring has been formed by the four pliers in the closed position; four press devices (11), arranged at  
25 45°, in between the pliers, which deform the wire ring in four precise points, to originate the four legs of the cage and the ring inside which the plaque will

be set; the engines (12) are connected by means of bevel gears to the mobile jaw of the pliers (10) and controlled by the electronic control unit (2), they rotate the pliers for twisting the leg wires.

The machine operates as follows: the wire for making the wire cage passes  
5 between the two rollers – one of which is idle (14) and the other connected (15) to the engine (7) – in this manner the wire is unravelled from the coil (3) and made to move inside the guiding groove (5); before entering the groove (5), however, the wire passes through a succession of rollers (6), the purpose of which is to measure its diameter, because due to storage in coils it may  
10 feature folds or curves, even after having been unravelled, which might impair the wire cage. The groove (5) guides the wire and holds it firmly up to the point in which it is forced into a circular path, to prevent the thrust imparted by the engine on the connected roller (15) located further up folding the wire, before it enters into the mask (16). The number of revolutions made by the  
15 engine (7) can be programmed beforehand, by means of the electronic control unit (2), so as to introduce the right length of wire into the mask (16). As can be seen in figure (3b), during its circular movement, the wire, besides running inside the guide in the mask (16), also enters the four gaps formed by the stationary (9) and mobile (10) jaws of the four pliers, which are arranged at  
20 90° along the circular path of the wire. Two of the mobile jaws (10) of the pliers slide along the stationary jaws (9), with a single movement, closing the mobile jaw (10) of the pliers up to the stop at the end of the stationary jaw (9); the mobile jaws (10) of the other two pliers – controlled by a cam with a different profile – travel and close the gap in two stages: in the first stage the  
25 mobile jaw of the plier travels only for a length sufficient to form a gap through which the wire can pass (fig. 5); in the second stage, it continues its

travel until it stops against the stationary jaw (9) (fig. 6) of the plier, thus blocking and holding the wire firmly before it is cut by the blade (8).

Fig. 3b shows the wire that, having completed its circular motion and having returned to the starting point, crosses the wire already introduced and is cut by  
5 the blade (8) controlled by a mechanical cam connected to the drive, and suitably placed in phase. At this point (fig. 7) the four press devices (11) come into action – staggered by 45° compared to the pliers – and deform the wire ring in four precise points, while the ring is held firm, as mentioned above, in four points by the closed pliers; this intervention deforms the circle in four  
10 points, as already mentioned above, and consequently determines the formation of the four legs, which are formed by four pairs of wire, and of the central ring for holding the plaque.

The closed pliers firmly hold the wire in four points, as mentioned above, while the engines (12) – connected by means of bevel gears to the mobile  
15 pliers (10), and controlled by the electronic unit (2) – rotate the pliers, which, being engaged at the ends of the legs, perform a twisting movement and form the holes for the belt ring used to close the muselet around the neck of the bottle.

The mobile jaw (10) of the pliers then withdraws and the pliers release the  
20 cage, which is then moved forward along the line by means of special devices (13).

## CLAIMS

1. A machine for manufacturing the star-shaped parts of the wire cages for securing the cork in bottles of champagne and other sparkling wines, comprising a coil of wire (3), preferably positioned at the back of the machine;  
5 a wire guiding system (4) for guiding the wire from the coil to the machine, **wherein** it also comprises a succession of rollers (6) through which the wire is made to pass, so that its diameter can be measured; a groove (5) leading the wire to the machine; two rollers, one idle (14) and the other connected to the engine (7), through which the wire is pulled forward inside the groove (5); a  
10 round mask (16) inside which the wire is inserted; four devices featuring three positions: in one the wire is free to pass, in another its movement is enabled, and in the third the wire is blocked; in the preferred embodiment of the invention the devices consist of four pliers comprising a stationary jaw (9) and a mobile jaw (10), both the stationary and the mobile jaws being shaped so  
15 that, based on their mutual positions (open or closed), there is either a space through which the wire can pass, or the wire's passage is blocked, which pliers are arranged along the perimeter of the round mask (16), at 90°; an electronic control unit (2), which calculates the number of revolutions of the engine (7) needed to complete the circle; cams for closing and opening the devices for  
20 allowing the passage of and blocking the wire, with at least the cam located in the vicinity of the cutting blade, which closes in two stages, thus leaving a gap for the wire to pass through and overlap, for a stretch, with the wire already present inside the closing device; a blade (8) for cutting the wire once the ring has been formed and the devices in the closed position; four press devices  
25 (11), arranged at 45°, in between the devices for allowing the passage of and blocking the wire, which deform the wire ring in four precise points, to

originate the four legs of the cage and the central ring; the engines (12) connected by means of bevel gears to the devices for allowing the passage of and blocking the wire, for rotating the said devices for allowing the passage of and blocking the wire and twisting the legs while the wire is blocked in  
5 between them.

2. A machine for manufacturing the star-shaped parts of the wire cages for securing the cork in bottles of champagne and other sparkling wines as claimed in claim 1 **wherein** the devices for allowing the passage of and blocking the wire consist of pliers formed by a stationary jaw (9) and a mobile  
10 jaw (10), the mobile jaw (10) of the pliers sliding axially along the stationary jaw (9), so that it can open and close, with a number of intermediate positions, thus allowing the wire to pass and slide in between the stationary jaw (9) and the mobile jaw (10), and when the the mobile jaw (10) is closed against the stationary jaw (9) to block the wire in between the said mobile jaw (10) and  
15 the said stationary jaw (9).

3. A machine for manufacturing the star-shaped parts of the wire cages for securing the cork in bottles of champagne and other sparkling wines as claimed in claim 2 **wherein** the stationary jaw (9) and the mobile jaw (10) of the pliers are shaped in such a manner that only when the mobile jaw (10)  
20 reaches the stop on the stationary jaw (9) is the wire actually blocked and clamped firmly.

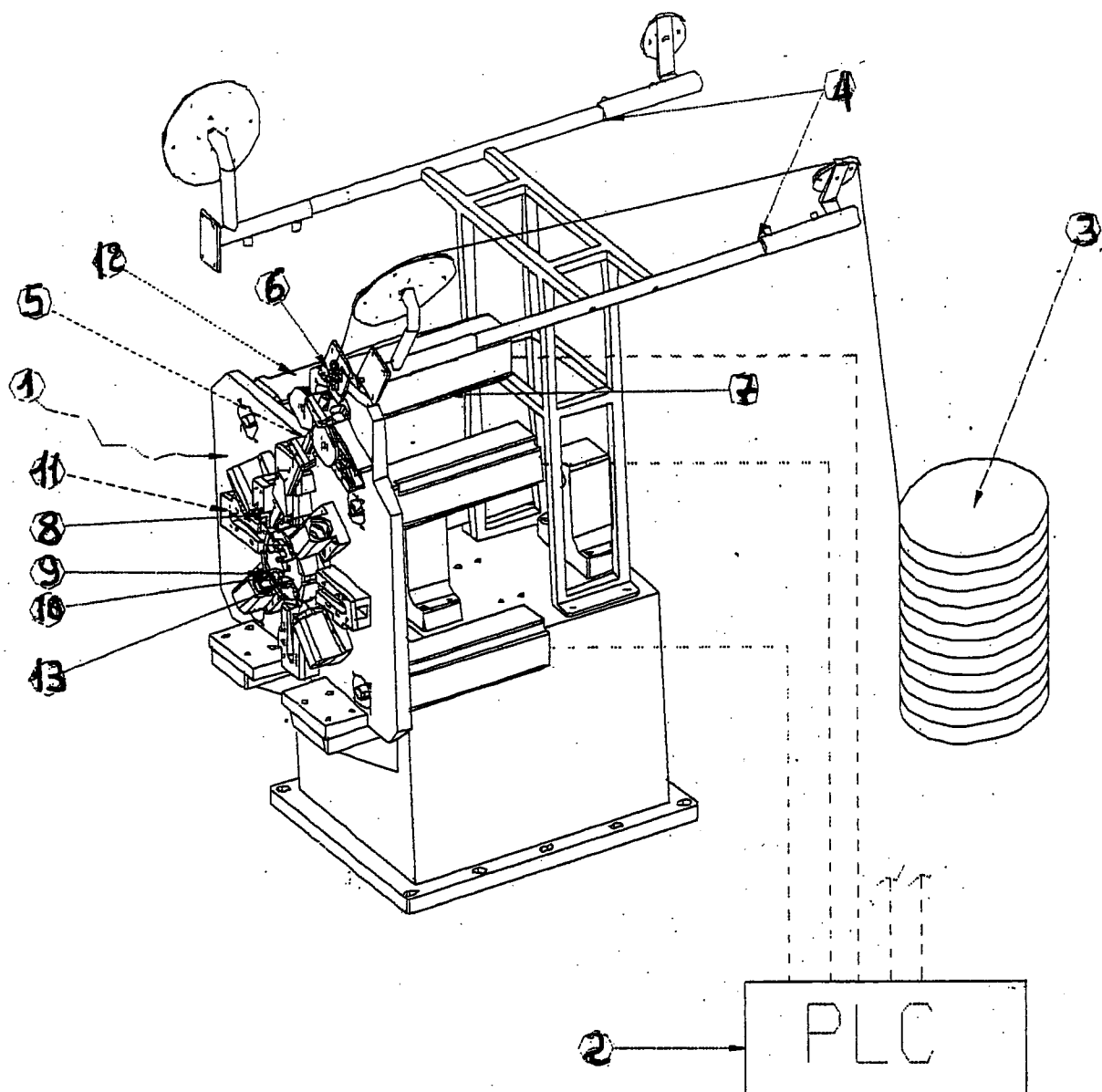


Fig 1

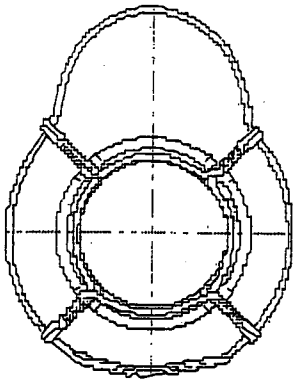
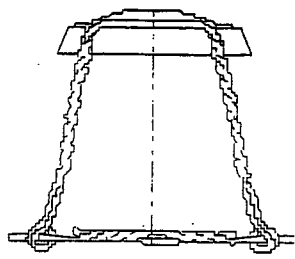


Fig. 2

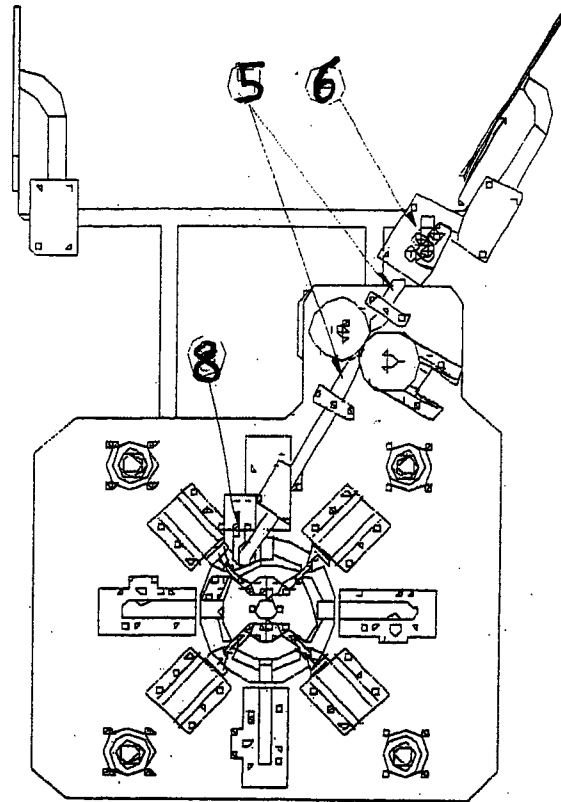


Fig. 3

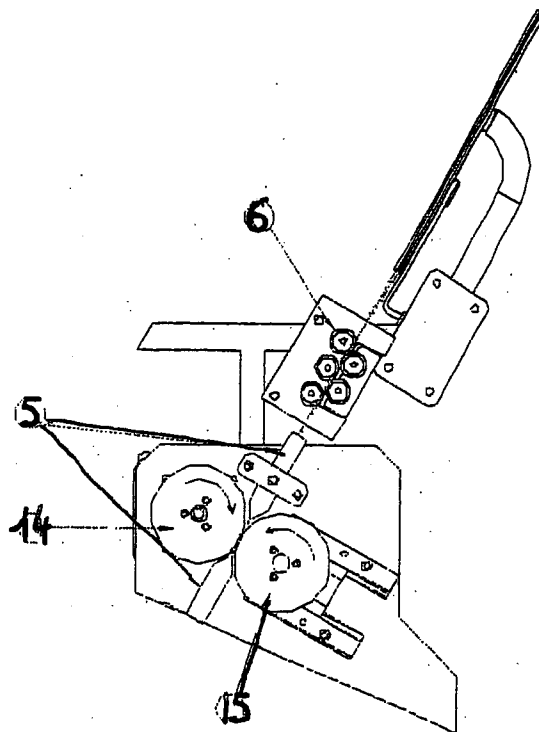


Fig. 3 - "a"

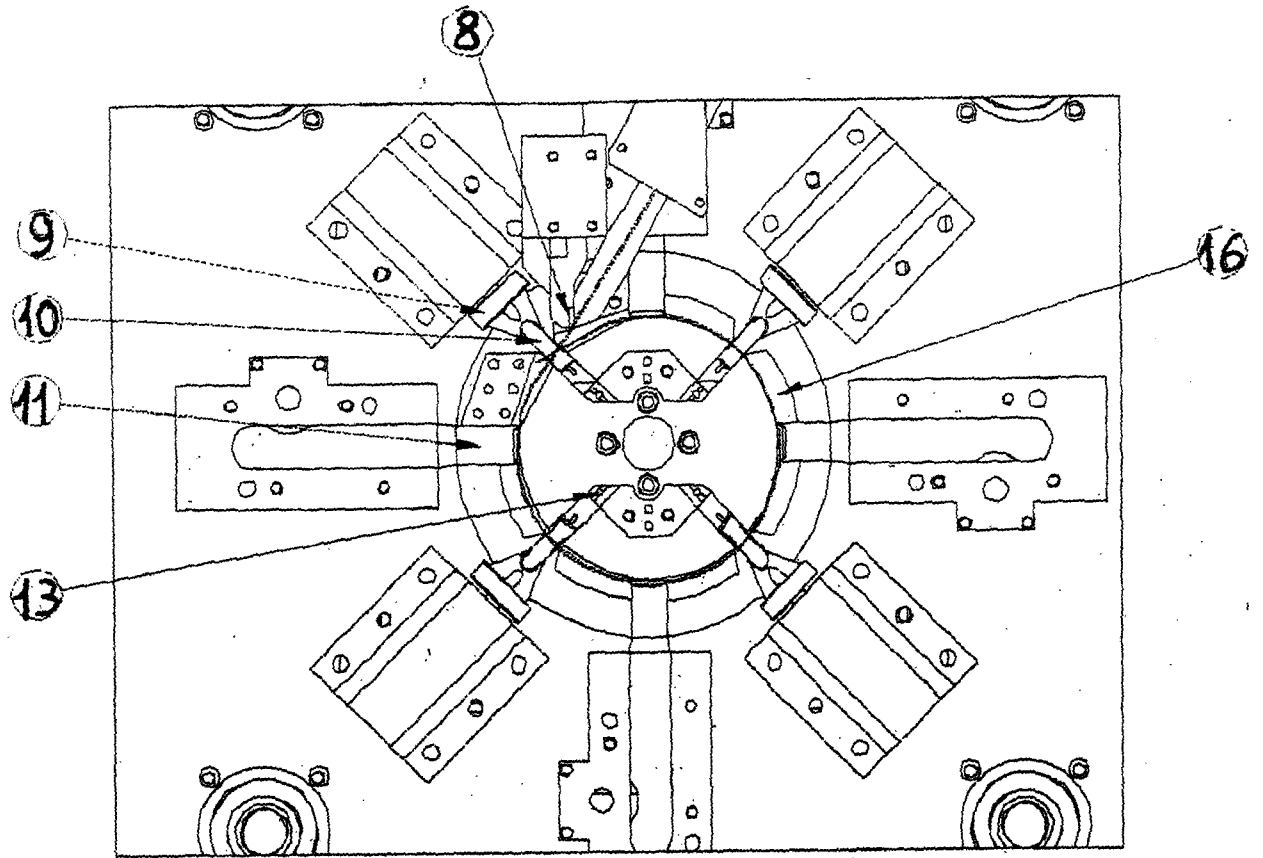


Figure 3 -

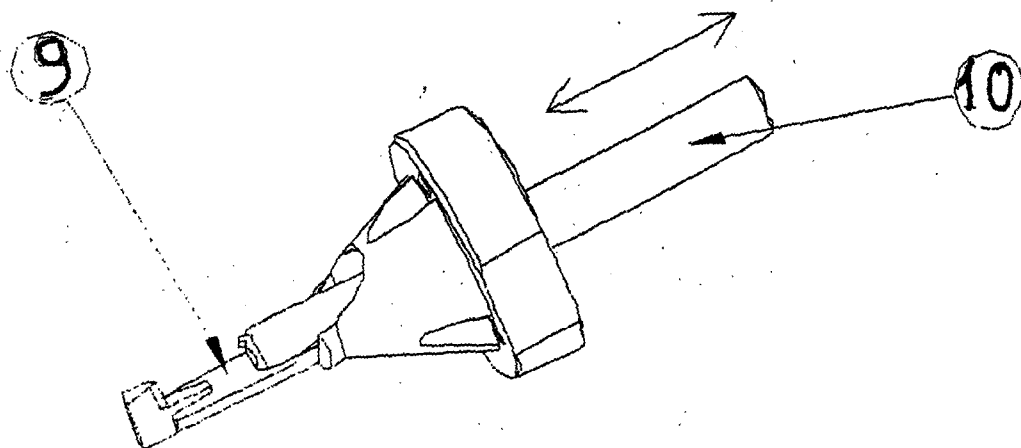


Figure 4

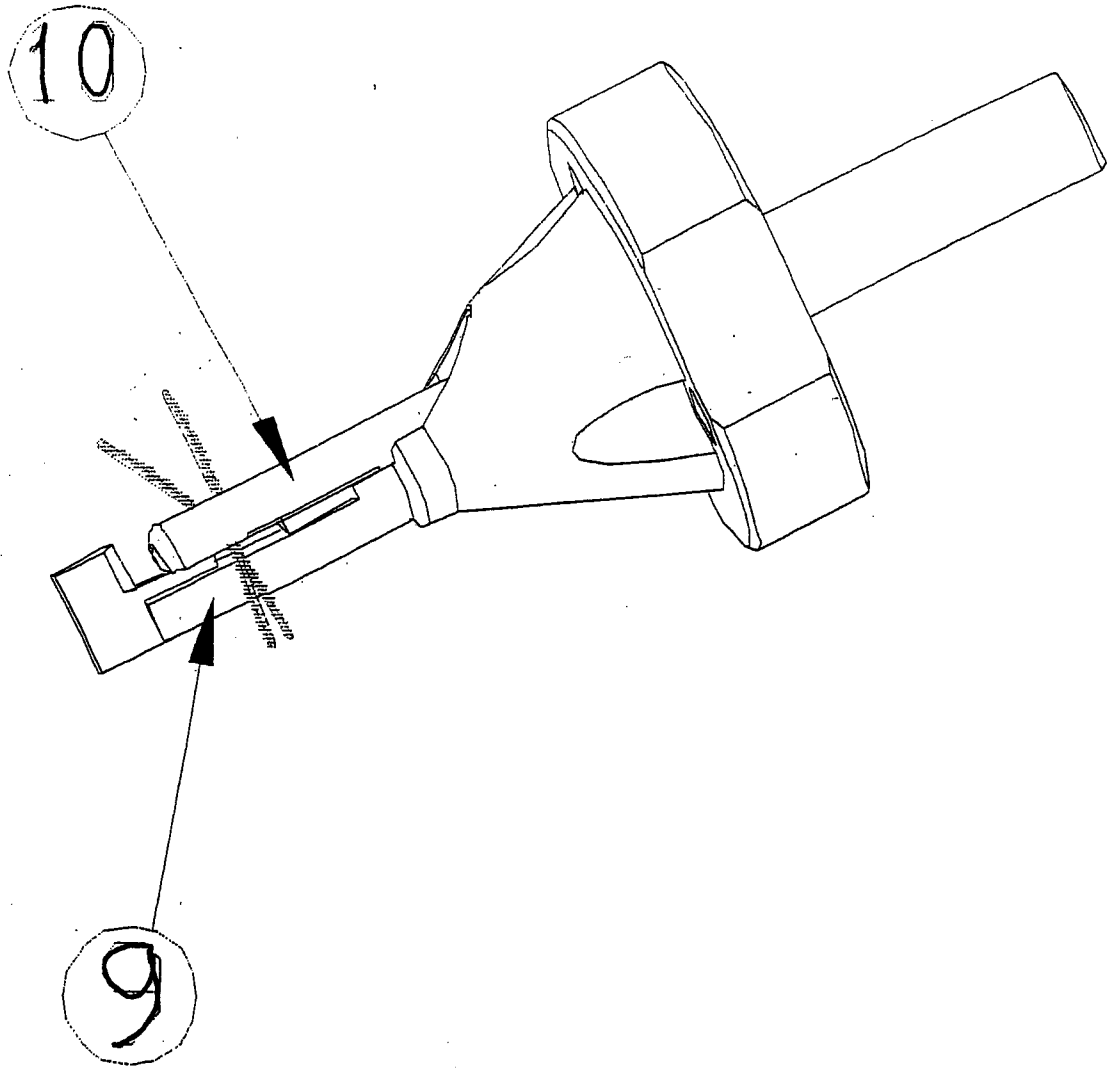


Fig. 5

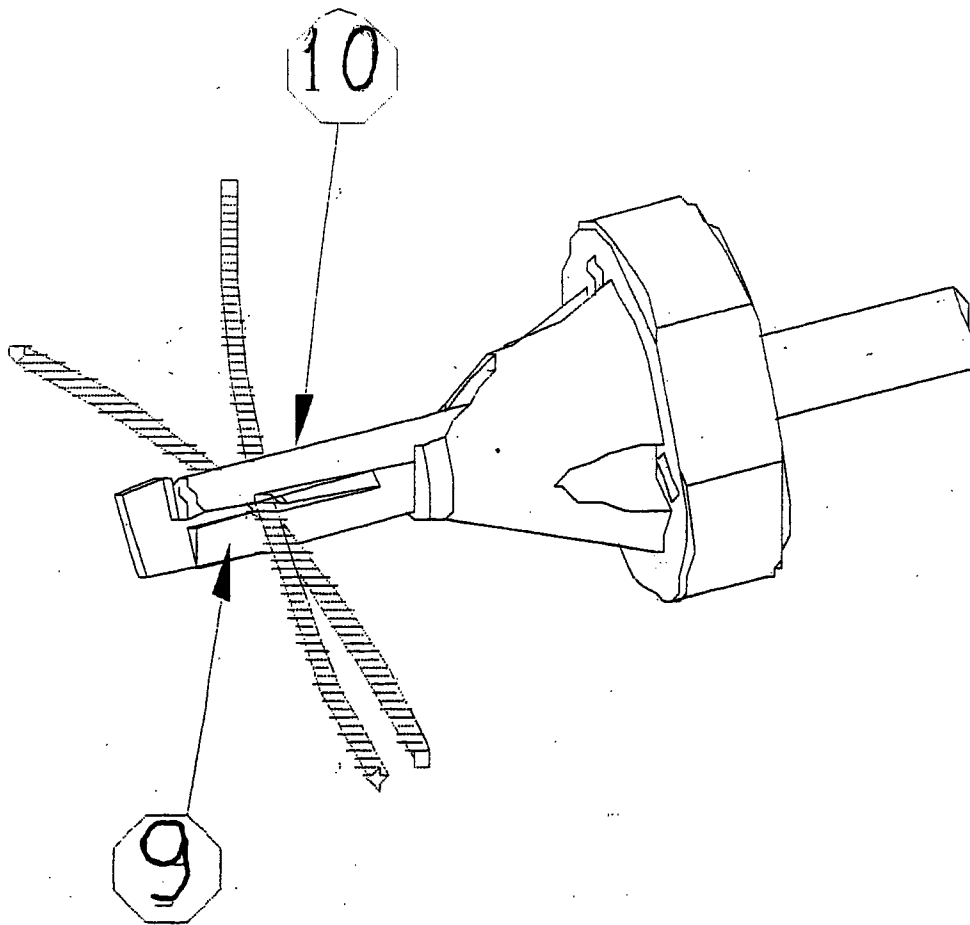


Fig. 6

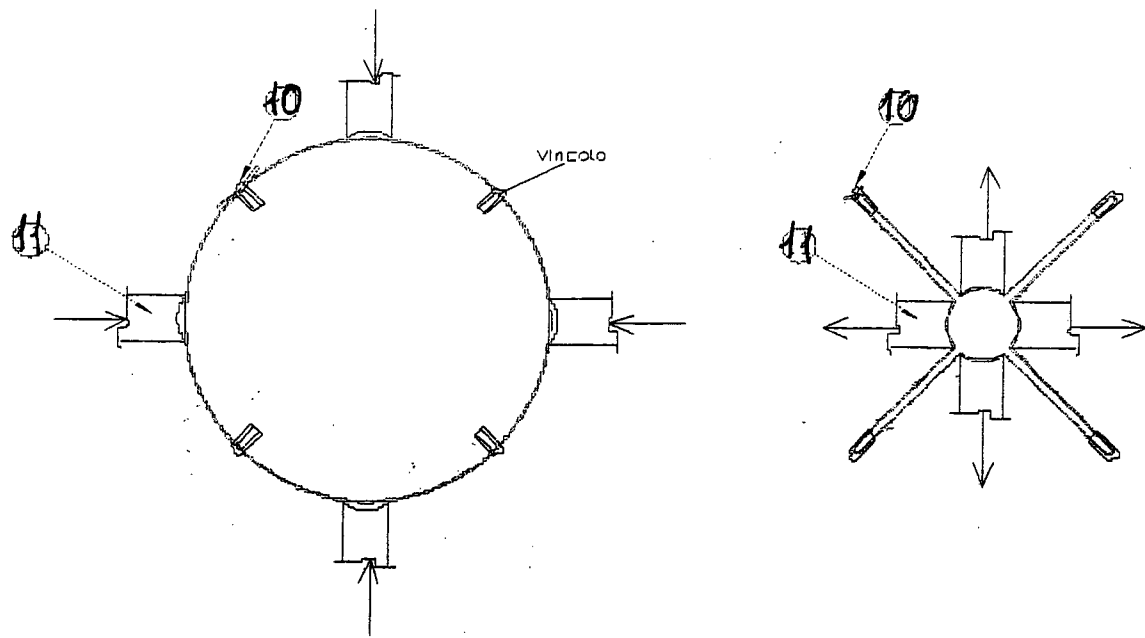


Fig. 7

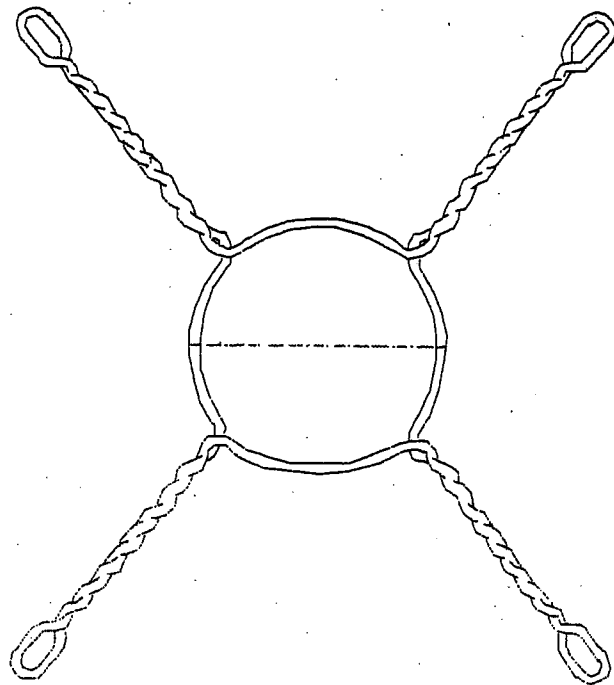


Fig. 8

## INTERNATIONAL SEARCH REPORT

International application No

PCT/IT2010/000261

**A. CLASSIFICATION OF SUBJECT MATTER**

INV. B21F45/04

ADD.

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)

B21F

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 practical, search terms used)

EPO-Internal, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category* | Citation of document, with indication, where appropriate, of the relevant passages         | Relevant to claim No. |
|-----------|--------------------------------------------------------------------------------------------|-----------------------|
| A         | EP 2 025 428 A1 (ME COM S R L [IT])<br>18 February 2009 (2009-02-18)<br>the whole document | 1-3                   |
| A         | EP 1 634 664 A1 (GEFIN SRL [IT])<br>15 March 2006 (2006-03-15)<br>the whole document       | 1                     |
| A         | DE 44 12 203 A1 (GEFIN SRL [IT])<br>13 October 1994 (1994-10-13)<br>the whole document     | 1                     |

☐

Further documents are listed in the continuation of Box C.

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See patent family annex.

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Date of the actual completion of the international search

9 September 2010

Date of mailing of the international search report

17/09/2010

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IT2010/000261

| Patent document<br>cited in search report |    | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|-------------------------------------------|----|---------------------|----------------------------|---------------------|
| EP 2025428                                | A1 | 18-02-2009          | NONE                       |                     |
| EP 1634664                                | A1 | 15-03-2006          | AT 350179 T                | 15-01-2007          |
|                                           |    |                     | AU 2005209611 A1           | 23-03-2006          |
|                                           |    |                     | DE 602004004126 T2         | 15-11-2007          |
|                                           |    |                     | ES 2279334 T3              | 16-08-2007          |
| DE 4412203                                | A1 | 13-10-1994          | ES 2110336 A1              | 01-02-1998          |
|                                           |    |                     | FR 2703607 A1              | 14-10-1994          |
|                                           |    |                     | FR 2752758 A1              | 06-03-1998          |
|                                           |    |                     | IT 1264109 B1              | 10-09-1996          |