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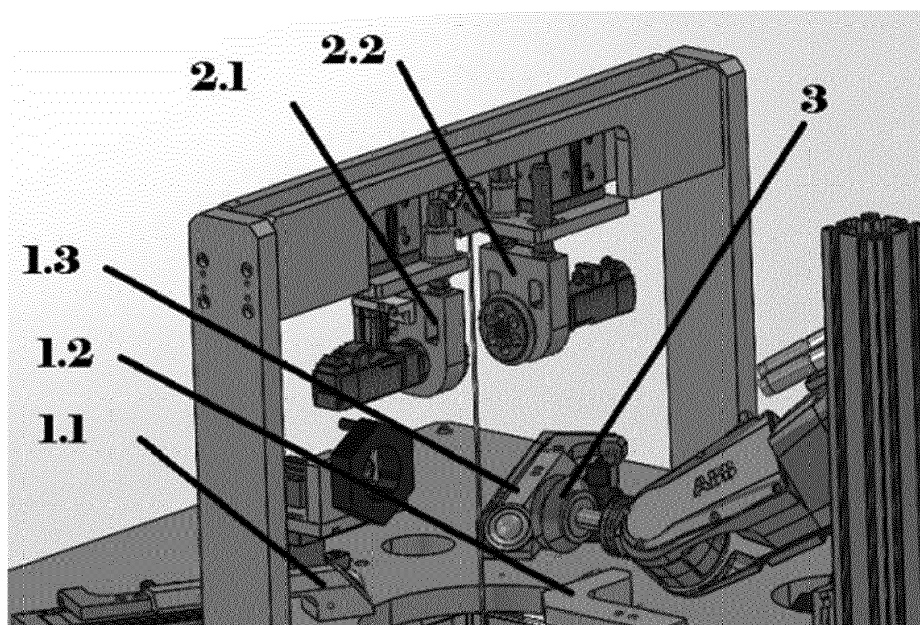
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(54) **BALL POSITIONING AND DESIGN RECOGNITION MACHINE**

(57) Ball positioning machine intended for placing balls in the precise place based on the location of the valve and which recognizes design patterns, made up of a frame with three sliding elements and a upper arc structure where servomotors are located which rotate

the ball in lateral, vertical and horizontal turns in combination with the recognition chamber of the valve, the antipodal part of the valve and the recognition of the specific design of the ball.



**FIGURE 1**

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## Description

### Object of the invention

**[0001]** The present invention relates to a ball positioning machine, whose obvious purpose is to place balls in the precise place based on the location of the valve, which also performs design pattern recognition through the use of hydraulic cylinders that rotate the ball on the three three-dimensional axes in combination with three recognition chambers of the valve, the antipodal part of the valve and the recognition of the specific design of the ball.

**[0002]** The object of the invention is to improve both the accuracy in the placement or positioning of balls, and the yield in their fast placement in a correct positioning, reducing the economical cost required in the process.

### Background of the invention

**[0003]** Conventionally, the placement and positioning of balls is carried out manually by operators, requiring a considerable amount of time and balls are levelled using rather rudimentary methods, that even sometimes do not detect errors in the design of balls and which fall outside the tolerance established for this purpose in many regulations on the admissible shapes of balls in many sports competitions.

**[0004]** In addition to the inaccuracy of the manual method or procedure of placement of balls, the yield is rather low, because a long placement time is used and the specific design of balls is not checked, sometimes allowing the designs to be defective and be considered a defective ball to be sold at a lower cost.

**[0005]** This machine has no background of the invention, as the only thing it has in common with previous inventions would be the automatic filling of balls, but not their positioning, which it is always carried out. In this invention, the aim is to achieve the correct positioning and revision of design patterns at the same time time as allowing for filling by means of other machines for this purpose.

### Description of the invention

**[0006]** The proposed ball positioning machine has been conceived to solve the above-mentioned problems, dramatically improving both precision and yield in the placement of balls to be filled, compared to manual processes or methods, reducing the working time of users with a substantial improvement in the quality of work and with the consequent economic benefit.

**[0007]** More specifically, the invention machine is made up of a working surface or frame where the pusher cylinder, located on the lower plane of the frame, vertically lifts the ball, that can be introduced manually or by means of an automated self-loading feeder, through a hole where a sensor detects the ball. This movement is

given through rollers, improving the sliding movement, taking it to the receiving place where the search and positioning system of the ball starts to be executed. In this phase, elements 1 (Figure 1) act at the same time holding the ball by means sliding elements that allow it to move freely without being thrown away. This allows servomotors (elements 2 in Figure 1) arranged in an upper arc on the frame also to be adjusted to the ball through O-rings, and so that they can carry out very fast vertical, horizontal and lateral turning movements, which help in the search of the valve during such turns by means of a chamber (element 3 in Figure 1) that uses specific software (named HALCON), to locate both the valve, recognize the design pattern and locate the antipodal part of the valve through design pattern recognition.

**[0008]** The rotation of the ball is driven after the actuation of servomotors that exert a precise pressure to rotate the ball quickly until the chamber has detected the valve.

**[0009]** When searching for the valve, the chamber (element 3 in Figure 1) is the one that detects the valve position, while the hexagonal pattern that matches the ball and also allows locating the opposite pole of the valve is detected. Once the valve position is determined, the ball is held in place by a suction cup which is vacuum-actuated and the deviation of the movement transfer is corrected using the reference hexagonal pattern.

**[0010]** The chamber is controlled with Halcon software, through algorithms that act on valve search, pattern recognition and location opposite the valve, which cannot be the object of this invention.

### Description of the drawings

**[0011]** In order to complement the above description and assist in a better understanding of the invention features, a figure with illustrative and non-limiting nature is attached hereto as an integral part of said description, showing a general perspective of the machine object of the invention with its elements indicated.

**[0012]** Therefore, the described ball positioning machine is designed to place balls in the precise place based on the location of the valve and it recognizes design patterns and is characterized because it is made up of a frame with three sliding elements (1.1, 1.2 and 1.3) and an upper arc structure where servomotors (2.1 and 2.2) are located which rotate the ball in lateral, vertical and horizontal turns in combination with the recognition chamber (3.1) of the valve, the antipodal part of the valve and the recognition of the specific design of the ball.

### Claims

1. Ball positioning machine intended for placing balls in the precise place based on the location of the valve and which recognizes design patterns, characterized because it is made up of a frame with three sliding elements (1.1, 1.2 and 1.3) and a upper arc

structure where servomotors (2.1 and 2.2) are located which rotate the ball in lateral, vertical and horizontal turns in combination with the recognition chamber (3.1) of the valve, the antipodal part of the valve and the recognition of the specific design of the ball.

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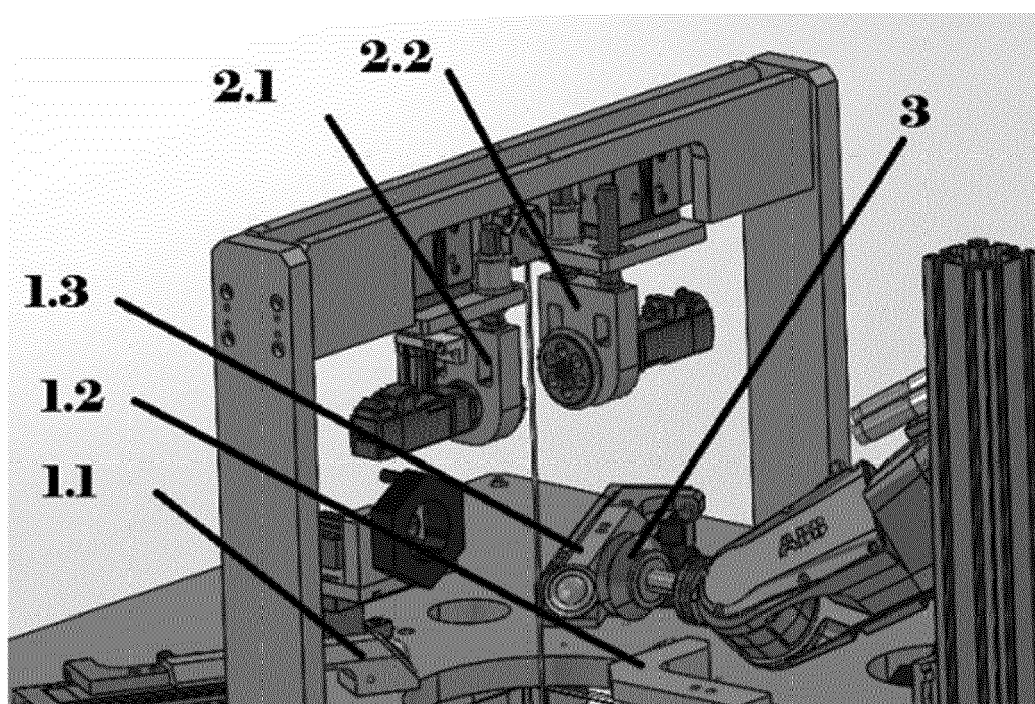


FIGURE 1



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Place of search <b>Munich</b>		Date of completion of the search <b>7 May 2024</b>	Examiner <b>Tejada Biarge, Diego</b>
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