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(54) Title: DEVELOPMENT MADE IN SERIAL SCREW ATTACHING SYSTEM ON CLIPS

(57) Abstract: This invention is about the development made in serial screw attaching system on clips enabling the connection of screws with clips used for fixing ventilation ducts in ventilation and climatization industries and its' characteristic is being consisted of a helically formed clip position changer (6), a servo motor (5) transferring rotary motion to the clench key (9), a first plunger (2) and a second plunger (3) enabling the clench key (9) to operate on two axis, a holder plate (8) properly positioning the screws coming from the screw setter unit (7) and enabling the magnetic holder (1) determine them and a third plunger (4) transferring forward and backward motion to the holder plate (8).



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DEVELOPMENT MADE IN SERIAL SCREW ATTACHING SYSTEM ON CLIPS

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Technological Area:

This invention is about the development made in serial screw attaching system on clips enabling the connection of screws with clips used for fixing ventilation ducts in
10 ventilation and climatization industries.

Current Situation of The System:

Today need for ventilation and climatization systems is increasing due to the increasing
15 population and thus the indoor environments in cities. The problem related to ventilation especially in communal life areas is being solved with central climatization-ventilation systems. Ventilation ducts are very important for these systems to work efficiently.

20 There are various systems developed to manufacture some specific sizes of ducts used in ventilation-climatization systems. With these systems rectangular, square and round air ducts are being manufactured and ventilation systems specific for the needs are being installed. There are different methods used to attach air ducts and compose the duct system. These are: S lock and slide system, ducts with driven flanges and self-
25 flanged ducts. When manufacturing usual ducts with driven flanges first the sheet is bended to form a duct, then flanges are produced according to the side lengths of the duct and manually driven on the connection points of the ducts and air ducts are made ready to be attached each other.

30 Assembly clips are of great importance in fixing ventilation ducts to each other. And then there's the process of attaching assembly clips with press screws. For this process step there are machines manufactured working serially. But in this manufactured

machines, the process of attaching press screws to clips, is taking high costs and long times.

5 In the patent application numbered TR201303381, "One connection clip" is being described. The invention is a connection clip enabling the detachable connection of two pieces made of plastic, metal etc.

10 In the patent application numbered TR201412631, "Connection clip set-up" has been described. It's about a set-up containing the bearing where the connection clip is seated on; the connection clip to be connected with the said lower piece; fixing tab located on the upper piece enabling the said connection clip to be connected with the upper piece by locking on the said locking slot.

15 There's a connection clip being described in the patent applications mentioned above. The described product is used in fixing low-endurance parts in white goods and automotive industries. It's not possible for them to be used in fixing metal and metal-like parts. But said systems don't involve a setting about serial attaching of clips and screws. Clips are attached to screws all manually in these systems.

20 As seen in the system shown in <https://www.youtube.com/watch?v=TNLETyEr6zw> screw attaching to crochet system is considered. But as well as the operating system is not efficient it's also high at cost and hard to use. The difficulty in assembling the system is making the production time longer and it also increases the costs because of the time-taking spare part replacement.

25

As a conclusion there's a need for a low-cost new technology with a different design, low production time, high fixing performance, that overcomes the disadvantages mentioned above and enables clips and screws to be serially connected with each other.

30

The Invention Definition:

This invention is the development made in serial screw attachment system on clips and its' characteristic is being a low-cost new technology with a different design, low
5 production time, high fixing performance and that enables clips and screws to be serially connected with each other.

In the Utility Model application numbered TR201603975, the "Duct Assembly Clip Manufacturing Machine" has been explained to the applicant. This invention is about
10 the duct assembly clip manufacturing machine and it involves the driver group, driver, tap, alignment, holder, puller, plunger 1, fixer, connection group, mould group, connection pieces 1, mould, blade, connection pieces 2, pusher, tapping, plunger 2, support piece, eccentric press, inverter, roll opener, sheet and the finished product.

15 In the Utility Model application numbered TR201603975, the "Duct Assembly Clip" has been explained to the applicant. This invention is about the duct assembly clip used in fixing the ducts in ventilation and climatization industries and its' characteristic is being consisted of at least one tie piece located inside preferably on the corner closer to the press screw hole and the fixing curve located in parallel with the press screw hole
20 axis.

In the utility model/patent applications belonging to the applicant mentioned above, assembly clips are considered. The applicant provides the clips manufacturing with the help of these applications made. After the clips manufacturing process there's the
25 process of clips being attached to the screws. At this stage the applicant introduces the product subject to invention which he provides serial attachment of screws to the clips.

All the advantages of the method subject to invention will be understood clearer with the diagram given below and the detailed description written by referring this diagram
30 so for this reason the assessment should be made considering this diagram and the detailed description.

Description of Figures:

The invention will be described by referring the figures enclosed, this way the characteristics of the invention will be understood and assessed clearer, but this is not intended to limit the invention with this specific arrangements. Vice versa it's intended to cover all alternatives, changes and equivalents which can be involved under the area the invention is defined in by the claims enclosed. It must be understood that the shown details are given only for the description of the preferred arrangements of the current invention and presented to provide the most utilisable and clear definition of both the formation of the methods and the rules and conceptual characteristics of the invention. In these figures;

- Figure 1 Perspective view of the system.
- Figure 2 Front view of the system.
- 15 Figure 3 Detailed front view of the system.
- Figure 4 Detailed perspective view of the system.
- Figure 5 Perspective view of the third plunger and the holder plate.
- Figure 6 Perspective view of the system.
- Figure 7 Perspective view of the system.

20

The figures that will help out to understand this invention are numbered as specified in the enclosed figure and they're given below by their names.

Description of References:

25

- 1. Magnetic Holder
- 2. First Plunger
- 3. Second Plunger
- 4. Third Plunger
- 30 5. Servo Motor
- 6. Clip Position Changer
- 7. Screw Setter Unit

- 8. Holder Plate
 - 8.1 Through Gap
- 9. Clench Key
- 10. Slide

5

Description of Invention:

The invention is consisting of a helically formed clip position changer (6), a servo motor (5) transferring rotary motion to the clench key (9), a first plunger (2) and a second plunger (3) enabling the clench key (9) to operate on two axis, a holder plate (8) properly positioning the screws coming from the screw setter unit (7) and enabling the magnetic holder (1) determine them and a third plunger (4) transferring forward and backward motion to the holder plate (8) (Figure-1, Figure-2, Figure-3, Figure-4, Figure-5, Figure-6, Figure-7).

15

The invention involves the second plunger (3) that enables the screws to be attached to the clips by the clench key (9) rotating with the help of servo motor (5) and for this, moves the clench key (9) upwards and downwards (Figure-1, Figure-2, Figure-3, Figure-4, Figure-6, Figure-7).

20

The invention involves a clip position changer (6) that enables clips holes for screws to be positioned as to come across with the head of the clench key (9), without a need for any extra action (Figure -1, Figure -2, Figure -3, Figure -4, Figure -6, Figure -7).

25 The invention makes a 90 degrees difference between the angle of the clips where they enter the clip position changer (6) and where they reach the end of the clip position changer (6) (Figure -1, Figure -6).

The invention involves the helically formed clip position changer (6) that enables clips to rotate 90 degrees (Figure -1, Figure -6).

30

The invention involves a first plunger (2) that gains the clench key (9) a right-left motion (Figure -1, Figure -2, Figure -3, Figure -4, Figure -6, Figure -7).

To prevent the coming screw from falling off as a result of the forward motion by the
5 third plunger (4), the invention involves the holder plate (8) that gets back to its' former position (Figure -1, Figure -2, Figure -3, Figure -4, Figure -5, Figure -6).

The invention involves the holder plate (8) which has a through gap (8.1) on itself (Figure-5). While the holder plate (8) that has been moved forward by the third plunger
10 (4) is at this position, the through gap (8.1) provides required area for the screws connected to the clench key (9) to move easily to come across with the top of the clip (Figure -4, Figure -5). The invention involves the slide (10) that enables the holder plate (8) to easily move forward and backward (Figure-5).

15 **Detailed Description of Invention:**

The main elements involved in the invention are; the magnetic holder (1), the first plunger (2), the second plunger (3), the third plunger (4), the servo motor (5), clip position changer (6), the screw setter unit (7), the holder plate (8), the clench key (9)
20 and the slide (10) (Figure -1, Figure -2, Figure -3, Figure -4, Figure -5, Figure -6, Figure -7).

The operating of the product subject to invention is as follows; first clips, more than one in quantity, are aligned on the clip position changer (6) (Figure -1, Figure -6). As the
25 clips move upon the clip position changer (6) they also change their angles (Figure-1, Figure-6). There's a 90 degrees difference between the angle of the clip where it enters and where it reaches to the end of the clip position changer (6) (Figure -1, Figure -6) Clip position changer (6) is manufactured in this way and it's a special design (Figure -1, Figure -6) When clips reaches to the end of the clip position changer (6) there's the
30 clench key (9) right on top of the clips (Figure -1, Figure -2, Figure -3, Figure -4, Figure -6, Figure -7). At this stage, keeping the clench key (9) at the proper distance is

maintained by the upward-downward motion of the second plunger (3) (Figure -1, Figure -2, Figure -3, Figure -4, Figure -6, Figure -7).

Screws coming from the screw setter unit (7) are moving towards the screw holder plate (8) (Figure-1, Figure-2, Figure-3, Figure-4, Figure-5, Figure-7). After the screw touches the holder plate (8) first plunger (2) moves the clench key (9) towards the holder plate (8) and the second plunger (3) moves downward (Figure-1, Figure-2, Figure-3, Figure-4, Figure-5, Figure-6, Figure-7). While the clench key (9) is being moved upward and downward by the second plunger (3) it's rotated by the servo motor (5) especially while being moved downward (Figure-1, Figure-2, Figure-3, Figure-4, Figure-6, Figure-7). The first screw touching the holder plate (8) is held by the magnetic holder (1) that's connected to the head of the clench key (9) (Figure-1, Figure-2, Figure-3, Figure-4, Figure-5, Figure-6, Figure-7). After the screw is taken by the magnetic holder (1) the holder plate (8) is moved forward by the third plunger (4) upon the slide (10) (Figure-1, Figure-2, Figure-3, Figure-4, Figure-5, Figure-6). While the holder plate (8) is on the forward direction, the screw taken by the clench key (9) easily passes through the through gap (8.1) located at the back of the holder plate (8) and is moved towards the screw hole on the clip. The holder plate (8) being moved forward by the third plunger (4), is taken back to its' former (initial) position to prevent the other screw to fall off (Figure-1, Figure-2, Figure-3, Figure-4, Figure-5, Figure-6). In this way the screw is attached to the screw hole on the clip.

25

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CLAIMS

- 1- The invention is about the development made on the serial screw attachment system on clips, which involves a magnetic holder (1) and a clench key (9) and its' characteristic is being consisted of;
- helically formed clip position changer (6),
 - servo motor (5) that transfers rotary motion to the clench key (9),
 - first plunger (2) and second plunger (3) that enables the clench key (9) to operate on two axis,
 - holder plate (8) that properly positions the screws coming from the screw setter unit (7) and makes them determined by the magnetic holder (1) and
 - third plunger (4) that transfers forward and backward motion to the holder plate (8).
- 2- What is mentioned in Claim 1 is the development made on the serial screw attachment system on clips and its' characteristic is involving the second plunger (3) that enables the screws to be attached to the clips by the clench key (9) rotated with the help of the servo motor (5) and for this, moves the clench key (9) upward and downward.
- 3- What is mentioned in Claim 1 is the development made on the serial screw attachment system on clips and its' characteristic is involving the clip position changer (6) that enables clips holes for screws to be positioned as to come across with the head of the clench key (9), without a need for any extra action.
- 4- What is mentioned in Claim 1 is the development made on the serial screw attachment system on clips and its' characteristic is making a 90 degrees difference between the angle of the clips where they enter the clip position changer (6) and where they reach the end of the clip position changer (6).

5- What is mentioned in Claim 1 or Claim 4 is the development made on the serial screw attachment system on clips and its' characteristic is involving the helically formed clip position changer (6) that enables clips to rotate 90 degrees.

5 6- What is mentioned in Claim 1 is the development made on the serial screw attachment system on clips and its' characteristic is involving the first plunger (2) that gains the clench key (9) a right-left motion.

7- What is mentioned in Claim 1 is the development made on the serial screw
10 attachment system on clips and its' characteristic is involving the holder plate (8) that gets back to its' former position to prevent the coming screw from falling off as a result of the forward motion by the third plunger (4).

8- What is mentioned in Claim 1 is the development made on the serial screw
15 attachment system on clips and its' characteristic is involving the holder plate (8) which has a through gap (8.1) on itself.

9- What is mentioned in Claim 1 or Claim 8 is the development made on the serial screw attachment system on clips and its' characteristic is involving the through gap
20 (8.1) provides required area for the screws connected to the clench key (9) to move easily to come across with the top of the clip while the holder plate (8) that has been moved forward by the third plunger (4) is at this position.

10- What is mentioned in Claim 1 is the development made on the serial screw
25 attachment system on clips and its' characteristic is involving the slide (10) that enables the holder plate (8) to easily move forward and backward.

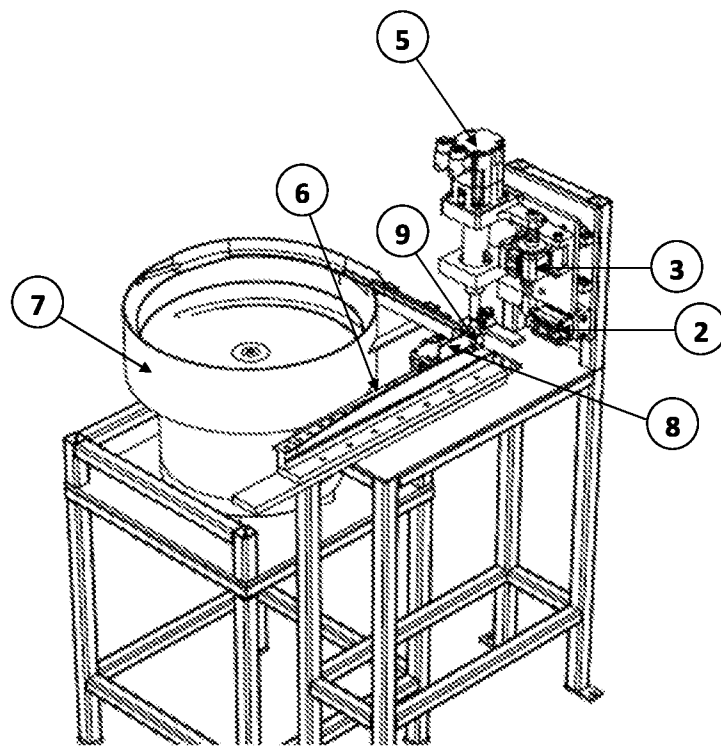


Figure-1

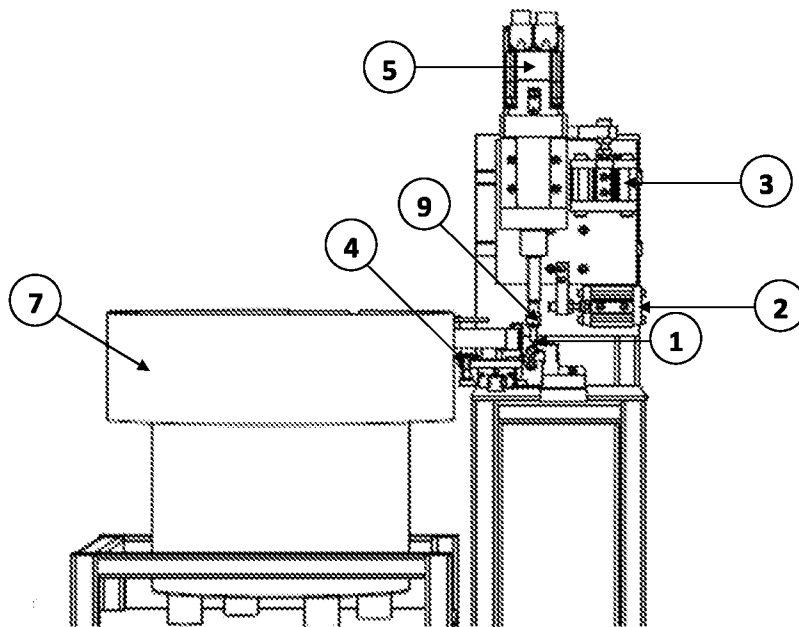


Figure-2

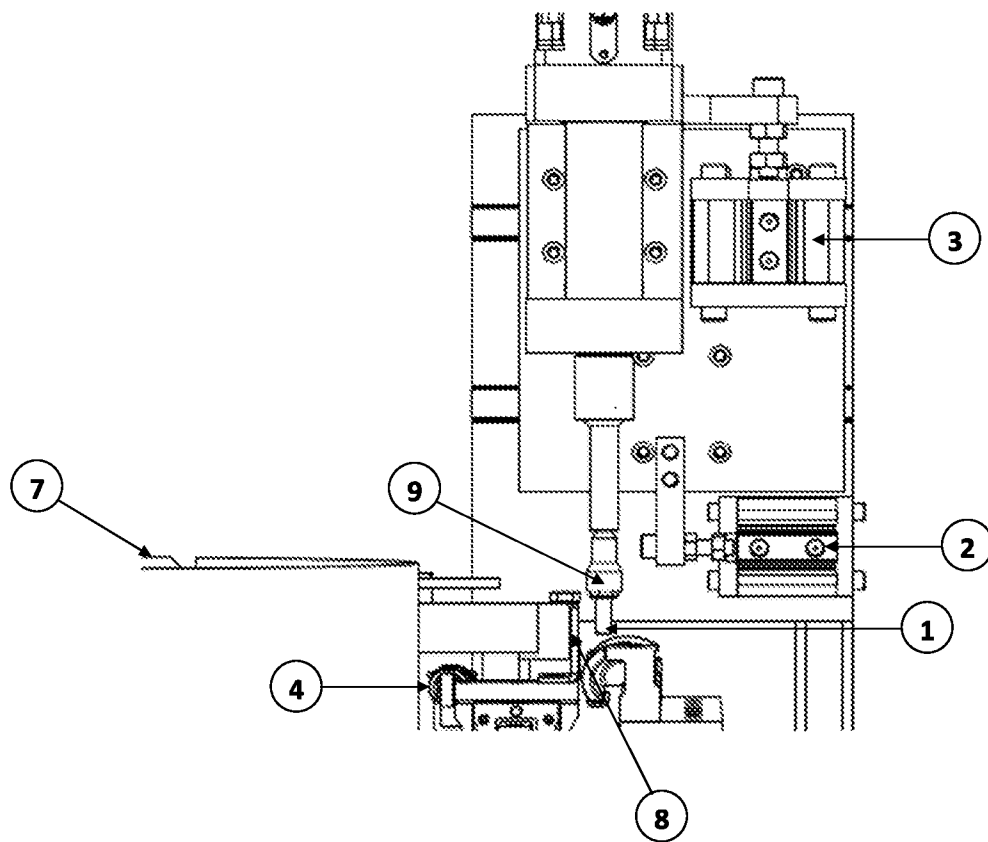


Figure-3

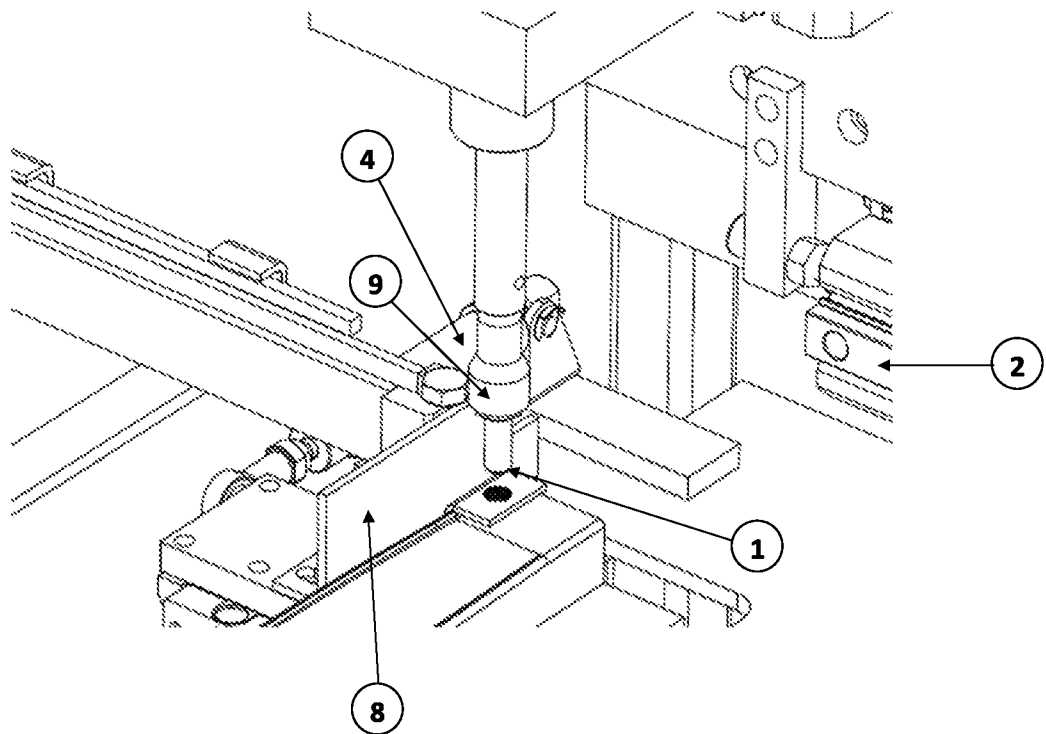


Figure-4

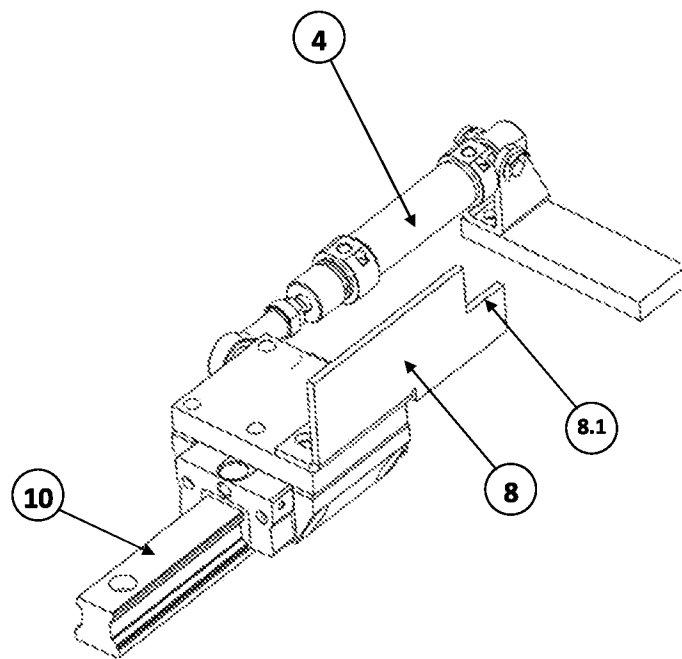


Figure-5

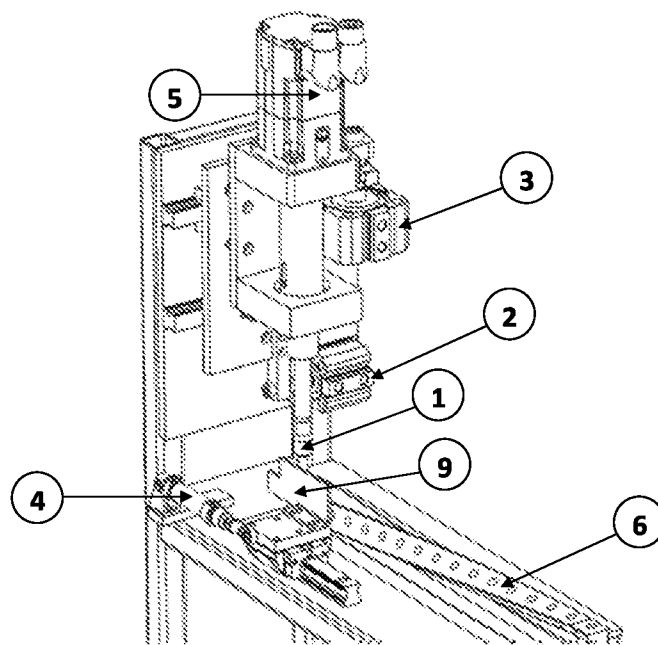


Figure-6

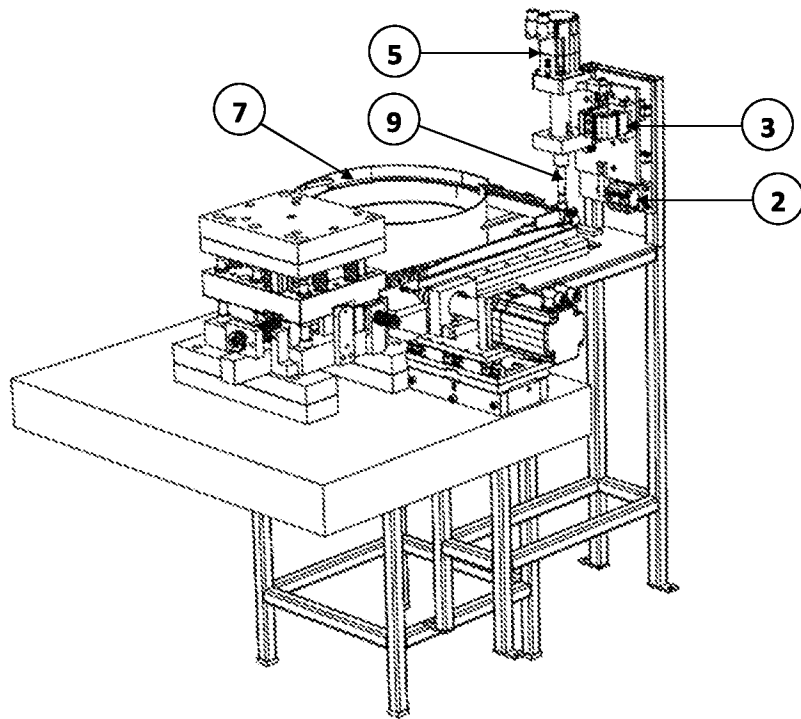


Figure-7