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(54) Title: AUTOMATIC INTERBRAKE PADS DISTANCE ADJUSTER

(57) Abstract: A novelty for reduction of wearing and number of parts in brake adjustment mechanism in Pneumatic Disk brakes located in calliper and used for adjustment of pre-use distance between brake pads and pressing onto brake disk during braking and thus converting kinetic energy into heat energy, providing slowing down and stop of vehicle and automatically adjusting distance differences arising from wearing in the brake pads during period of use.

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AUTOMATIC INTERBRAKE PADS DISTANCE ADJUSTER

Technical Field

This invention relates to a novelty made in brake adjustment mechanism in Pneumatic Disk brakes located in calliper and used for adjustment of pre-use distance between brake pads and pressing onto brake disk during braking and thus converting kinetic energy into heat energy, providing slowing down and stop of vehicle and automatically adjusting distance differences arising from wearing in the brake pads during period of use.

Present State of Art

In pneumatic disk brakes, brake adjustment mechanisms are firstly used for adjustment of distance between brake pads during initial mounting of brake pads. Thickness of brake pads worn during use decreases, which increases the distance between them. Increase of distance between pads causes reduction in brake performance and security weakness.

In the related art the distance between worn pads is manually or automatically adjusted.

Manual adjustment of distance between worn brake pads consists of processes of removal of calliper, demounting, conduct of setting, mounting and re-placement. As parts in heavy vehicles are big and heavy, it not only causes risk in terms of occupational safety but also long time taking.

In the related art distance between worn brake pads can be adjusted automatically. In general mechanisms called brake adjustment mechanisms are used for this operation.

Conduct of brake adjustment is made by means of brake adjustment mechanism placed inside brake adjustment spindle. Flaps located on the brake adjustment mechanism are placed into adjustment spindle and the motion given to brake adjustment mechanism is transferred to the spindle by a set lever. Thus grooves on outer wall of the spindle provides a motion perpendicular to rotation motion spindle. Thus pads located on end of the spindle can be adjusted.

Regarding the second duty of brake adjustment mechanism which is automatic return of pads distance of which is changed due to wearing after use, the related art has following applications.

In the related art this operation is conducted by means of one-way rotating brake pad adjustment mechanisms located inside brake adjustment spindle. When braked, brake pads moves until pressing onto brake disk. In this case, if the pads are worn, brake adjustment mechanism rotates the brake adjustment spindle wherein it is located as it is not able to rotate around itself, and moves it towards pads, and after braking it rotates in opposite direction around its axis that time and leaves the adjustment spindle in adjusted position without moving brake adjustment spindle.

Angle of rotating at its axis of brake adjustment mechanism placed inside brake adjustment spindle is classified by a fixed stop member and clutch ring under patent description numbered 2012/13921.

Under patent description numbered 2012/14271, motion of rotating around its axis of brake adjustment mechanism placed in brake adjustment spindle is provided by ball bearings but opposition motion is prevented by a part called conical clutching and thus setting is provided.

Purpose of the Invention

The following problems are discovered in brake adjustment mechanism in Pneumatic Disk brakes located in calliper and used for adjustment of pre-use distance between brake pads and pressing onto brake disk during braking and thus converting kinetic energy into heat energy, providing slowing down and stop of vehicle and automatically adjusting distance differences arising from wearing in the brake pads during period of use.

Brake adjustment mechanisms consist of many parts and this case causes increase in production cost and also makes production processes difficult.

Increase in number of parts also increases rise in rate of failure and non-matching problems.

This process sometimes reaches temperatures above 300 C degrees from time to time as kinetic energy is converted into heat energy by friction effect and therefore wearing caused by friction may occur, which shortens lives of parts.

Purpose of the invention is to reduce number of parts used in brake adjustment mechanism.

Reduction in number of parts will reduces production cost.

In addition, reduction in number of parts will shorten production period.

Another result aimed to be achieved in brake adjustment mechanism is to provide longer life of use. Conduct of locking operation by use of only ball bearings without need for any conical clutching prevents wearing, which provides longer use life of adjustment mechanism.

Detailed Description of the Invention

The brake adjustment mechanism developed to achieve the purpose of the invention is shown in the figures attached hereto.

The figures are as follows:

Figure 1 – Brake Adjustment Mechanism

Figure 2 – Demounting view of Brake Adjustment Mechanism

Figure 3 – Cross-section view of Brake Adjustment Mechanism

Figure 4 – Perspective view of Short Body

Figure 5 – Perspective view of Brake Adjustment spindle

Parts constituting Brake Adjustment Mechanism disclosed under the invention are shown in figures with the numbers given below.

1- Set Spindle

2- Flange

3- Cover

4- Locking Spring

5- Short Body

6- Pin ball bearing

7- Ball bearing housing

8- Fixed spring

9- Inner Body

10- Single ball

11- Long Body

12- Steel Press Spring

13- Eccentric Flap

14- Brake Adjustment Spindle

15- Brake Adjustment Mechanism

16- Short Body Clamps

Brake adjustment mechanism consists of following parts.

(Figure 2) Set spindle (1) of bracket structure providing manual adjustment is located at the very end in a manner it remains outside when brake adjustment mechanism is seated onto calliper. The part sitting onto calliper is cover (3) part. Flange (2) is placed to enable movement between set spindle (1) and cover (3) and sliding. Locking spring (4) is placed between short body (5) of brake adjustment mechanism and cover (3).

Inner part of short body (5) consists of pin ball bearings (6) which is one of main component of the invention providing one way rotation and locking movement in case of opposite movement. Outer part of short body (5) consists of fixed spring (8) surrounding body.

Short body (5) is placed on ball bearing (7) and single ball in order to enable easy movement to the side where short body (5) can move. Inner body (9) is located inside ball bearing housing (7) of short body (5) and partially long body (11) and transforms motion. Steel press spring (12) is placed inside long body (11). Eccentric flaps (13) are located in the section in bottom inside adjustment spindle of long body (11).

Working principle of brake adjustment mechanism is as follows. Cover (3) part of the mechanism seated into brake adjustment spindle (14) in a manner set spindle (1) remains outside seats onto calliper. Eccentric flaps (13) located in lower part of brake adjustment mechanism seat into cavities inside the brake adjustment spindle (14) and thus any rotation movement provided in mechanism is transferred to brake adjustment spindle (14)

Brake adjustment spindle (14) is moved forward or backward by means of rotation of set spindle (1) around its axis, and positions of pads on other end are adjusted.

In case of wearing of pads, in turn, brake adjustment spindle (14) is moved forward in the distance corresponding to thickness of wearing. This motion is provided by means of rotation of short body clamps (16) on the short body (5) by rotating arm located inside calliper (during braking). Since pin ball bearings (6) located on inner surface of short body (5) do not allow rotation in this direction, short body (5) remains fixed and brake adjustment mechanism rotates as a whole.

In cases where there is no wearing, this rotation movement does not occur as there is no distance that brake adjustment spindle (14) may move while in case of wearing brake adjustment spindle (14) rotates around its axis in the distance corresponding to wearing.

After baking, brake adjustment spindle (14) current position should be protected and therefore rotation movement of rotating arm in opposite direction in calliper should be absorbed. Since opposite movement of rotating arm is in direction where pin ball bearings (6) on inner surface of short body (5) can rotate, pins make a free rotation movement and provides rotation of short body (5) independent from mechanism and thus brake adjustment spindle (14) and provides protection of brake adjustment spindle.

Where brake adjustment mechanism rotates as a whole, rotation movement transferred to short body (5) is transmitted to long body (11) where eccentric flaps (13) are by means of inner body (9). Single balls (10) are located in the joining point between inner body (9) and long body (13) in order to enable problem-free and high efficient transmission of motion under high pressure.

The rate of part used for uniform rotation of mechanism in the prior art is reduced to one to fourth and negative results arising from high number of part are prevented.

Also rotation of short body (5) on one single axis is provided by means of pin ball bearings (6) placed on inner wall, locking with inner body (9) developed in harmony with such bearings and rotation separate from mechanism is provided. Fixing members of clamp structure used for locking operation and conical

clutching in prior art may get worn under high torque by time and need replacement every six months on average. Pin ball bearings (6) and inner body (9) solve wearing problem and thus life of brake adjustment mechanism is made longer and easy to use and cost advantage is provided.

CLAIMS

1. A brake adjustment mechanism (15) in Pneumatic Disk brakes located in calliper and used for adjustment of pre-use distance between brake pads and pressing onto brake disk during braking and thus converting kinetic energy into heat energy, providing slowing down and stop of vehicle and automatically adjusting distance differences arising from wearing in the brake pads during period of use characterized comprising

   - at least one short body (5) on inner surface

   - inner body (9) connected inside the short body (5).

2. A short body (5) according to claim 1 characterized comprising at least one pin ball bearing (6) allowing one way rotation on inner wall.

3. a short body (5) according to claim 1 characterized outer wall is of cavity structure.

4. A short body (5) according to claim 1 characterized outer wall is of cavity structure.

5. A short body (5) according to claim 1 characterized comprising at least one notch at least on one surface.

6. an inner body (9) according to claim 1 characterized comprising one end of diameter enabling insertion into short body (5).

7. an inner body (9) according to claim 1 characterized comprising at least one single ball bearing on at least one end.

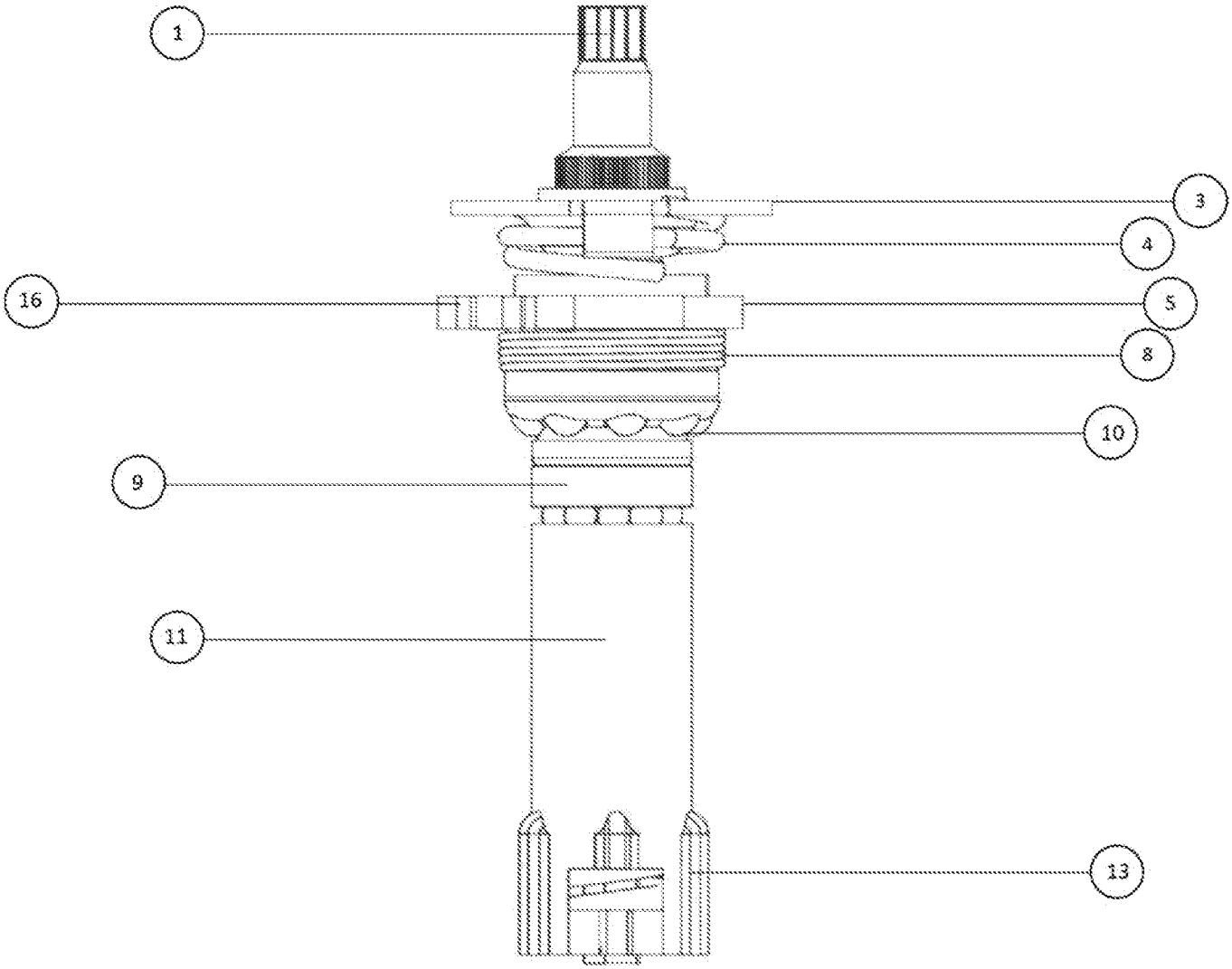

FIGURE - 1

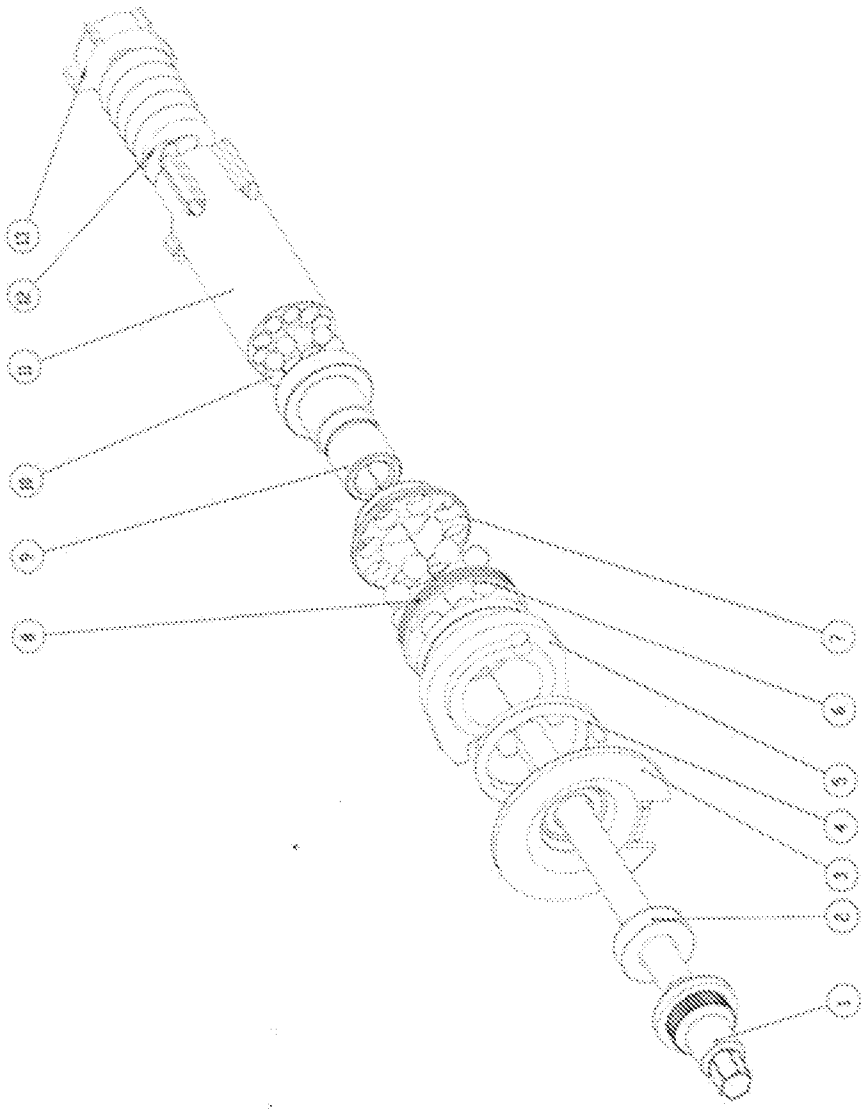

FIGURE - 2

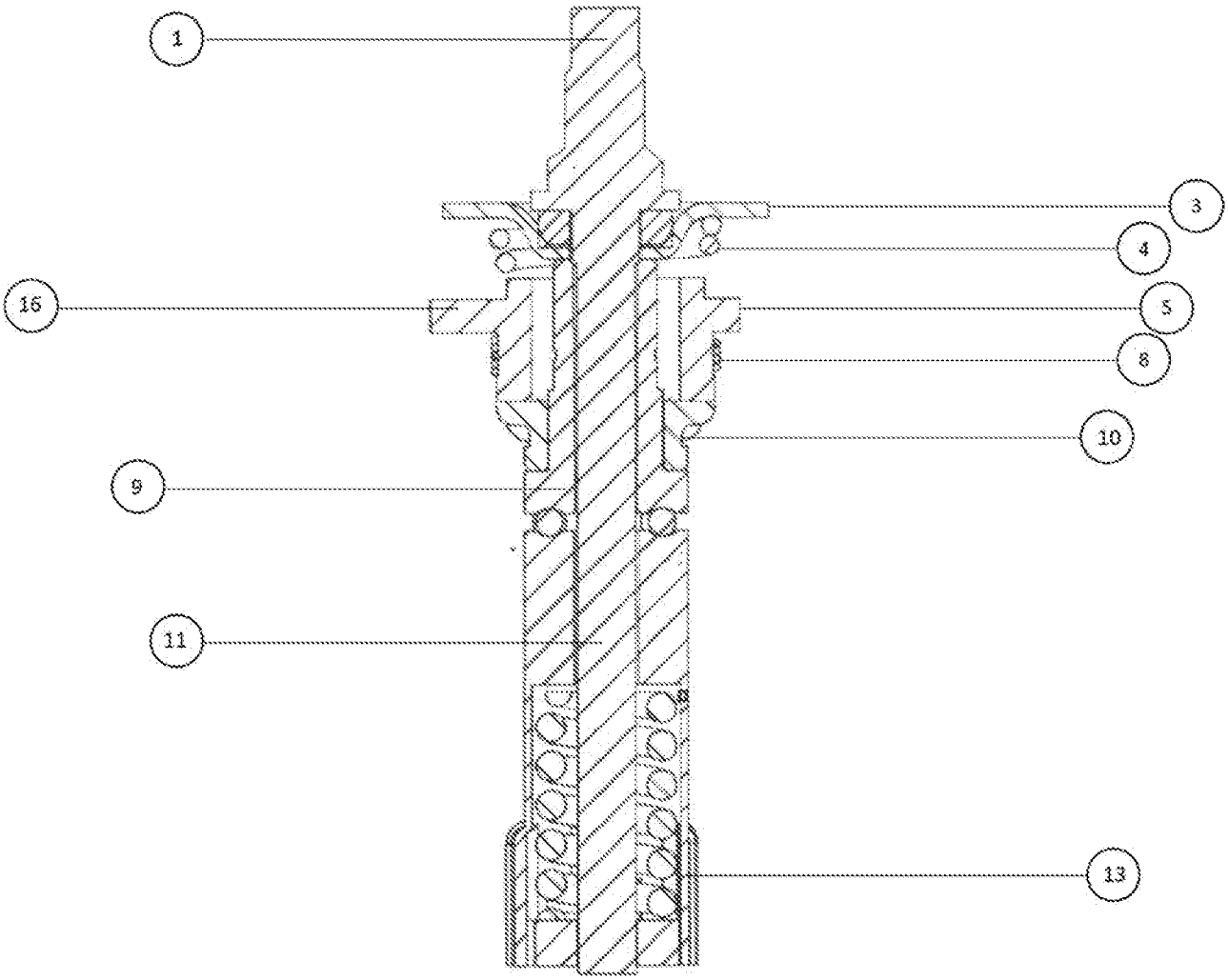

FIGURE – 3

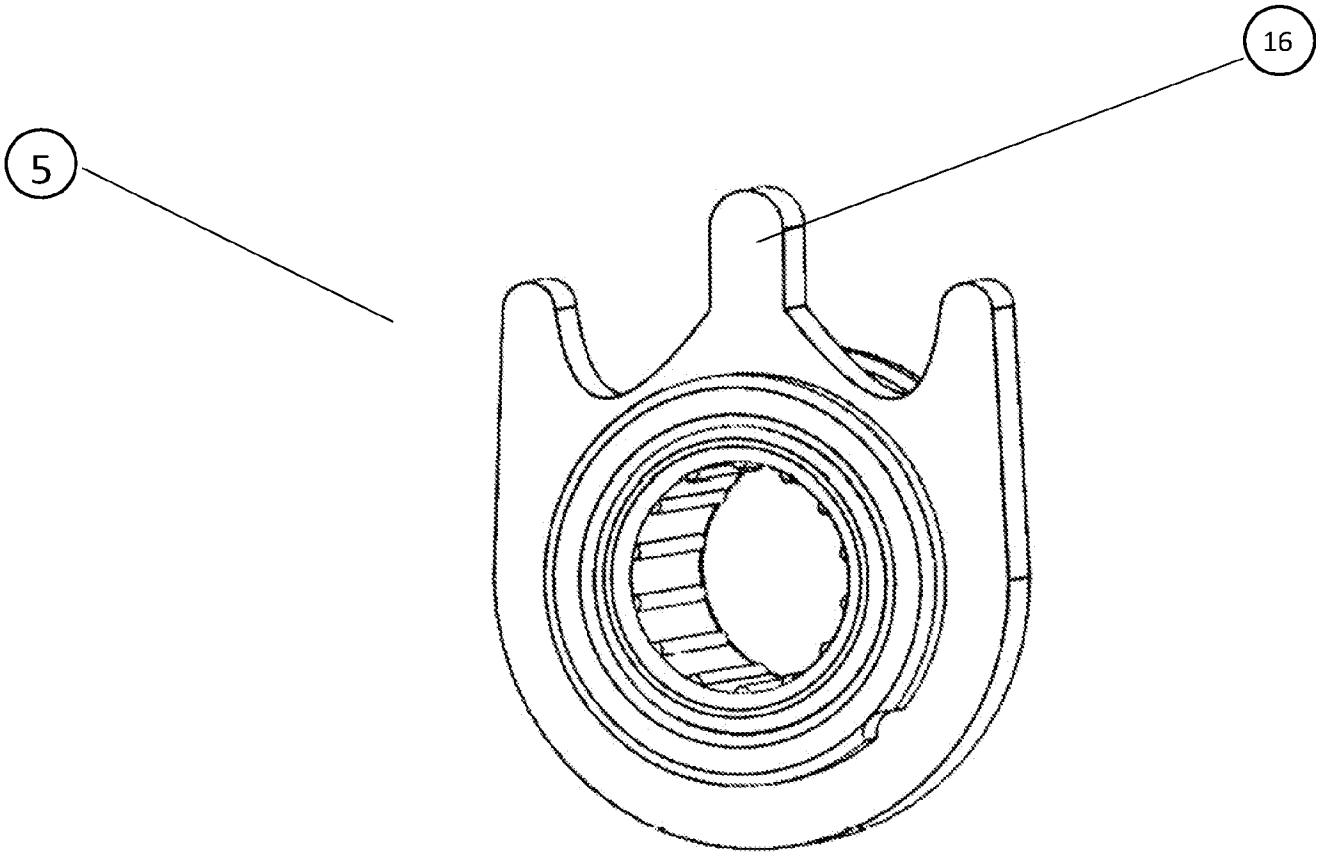

FIGURE - 4

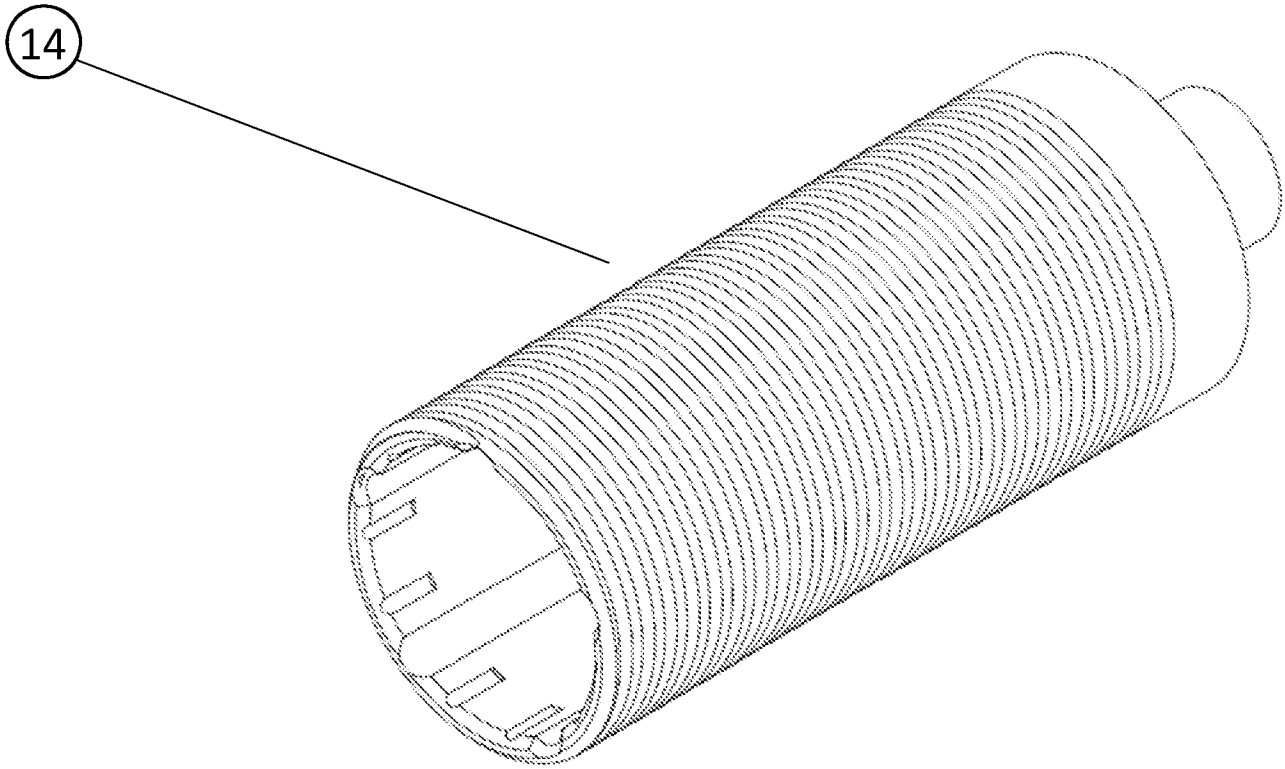

FIGURE- 5