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(54) Cup handling mechanism particularly for a beverage vending machine

(57) A cup handling mechanism, particularly for a beverage vending machine, comprising a body for supporting a cup which can move therein from at least one standby position to at least one infusion position. The mechanism is constituted exclusively by a crank without any lever or linkage.

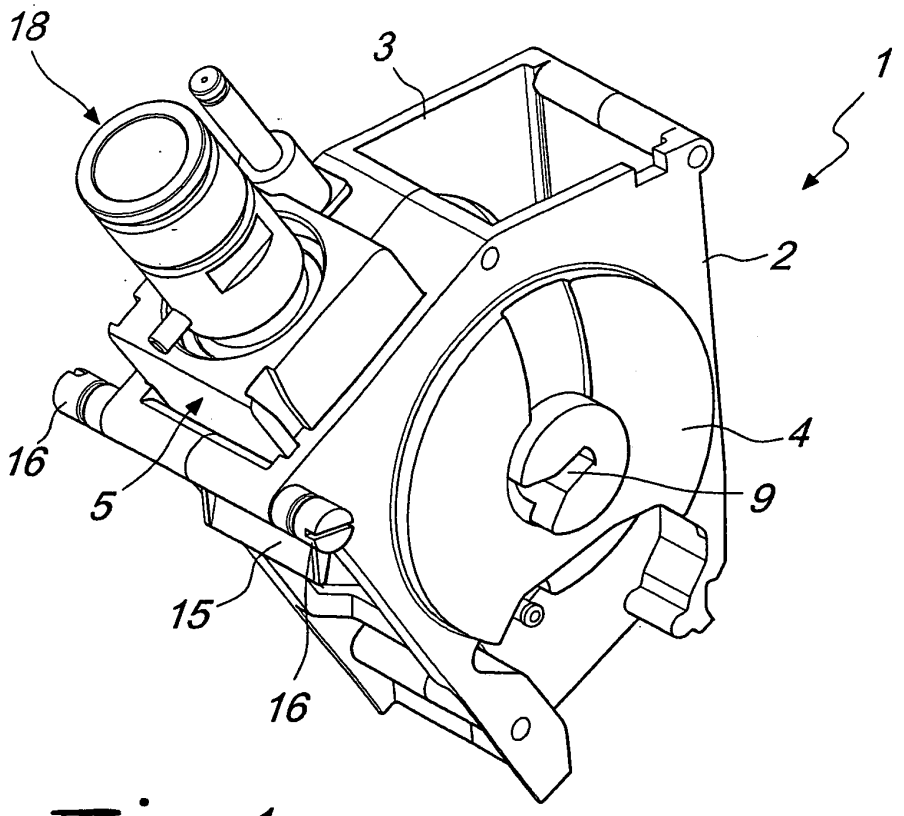

Fig. 1

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Description

[0001] The present invention relates to a cup handling mechanism particularly for a beverage vending machine.

[0002] More particularly, the present invention relates to a mechanism which can be used in automatic machines dispensing espresso coffee and other beverages.

[0003] Currently, a typical beverage vending machine includes a mechanical assembly constituted essentially by a rod-and-crank system for moving a cup into which the beverage is infused by feeding water under pressure through an appropriately dosed powder inside the cup.

[0004] The aim of the present invention is to provide an improved mechanism for handling the cup.

[0005] A particular object of the invention is to provide a mechanism which is structurally simpler and more compact and at the same time has functional characteristics which are similar or superior to those of conventional mechanical assemblies.

[0006] A further object of the invention is to provide a mechanism which can be used in conventional machines, increasing their functionality.

[0007] A further object is to provide a mechanism which can contribute to an improvement in the quality of the dispensed product.

[0008] A further, important, object of the invention is to provide a mechanism which allows to facilitate machine maintenance.

[0009] This aim and these and other objects which will become better apparent hereinafter are achieved by a cup handling mechanism, particularly for a beverage vending machine, comprising a body for supporting a cup which can move therein from at least one standby position to at least one infusion position, characterized in that it comprises exclusively a crank supported by the supporting body for the movement of the cup.

[0010] Further characteristics and advantages will become better apparent from the description of preferred but not exclusive embodiments of the invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a perspective view of the mechanism according to the invention, with a piston assembly applied thereto;
Figure 2 is a perspective view of the mechanism, taken from the opposite side with respect to Figure 1;
Figure 3 is a lateral elevation view of the mechanism and of the piston assembly;
Figure 4 is a lateral elevation view of the mechanism, taken from the opposite side with respect to Figure 3;
Figure 5 is a front elevation view of the mechanism;
Figure 6 is a perspective view of the mechanism according to the invention, with a piston assembly and a sheet metal casing applied thereto;
Figure 7 is a perspective view of the mechanism, taken from the opposite side with respect to Figure 6;
Figure 8 is a perspective view of a series of three mechanisms mounted side-by-side;
Figure 9 is a sectional lateral elevation view of the mechanism in a standby position;
Figure 10 is a view, similar to Figure 9, but illustrating the mechanism in a step in which the cup descends and rotation toward the dispensing position begins;
Figure 11 is a view, similar to Figure 10, but illustrating the mechanism in a step of rotation of the cup with powder;
Figure 12 is a view, similar to Figure 11, but illustrating the mechanism in a step in which the cup starts to rise toward the piston;
Figure 13 is a view, similar to Figure 12, but illustrating the mechanism in a dispensing position;
Figure 14 is a view, similar to Figure 13, but illustrating the mechanism in a step in which the cup descends after dispensing;
Figure 15 is a view, similar to Figure 14, but illustrating the mechanism in a step for initial rotation and rise toward the standby position;
Figure 16 is a view, similar to Figure 15, but illustrating the mechanism in a step during which the cup rises toward the new standby position;
Figure 17 is a perspective view of the cup of the mechanism according to the invention;
Figure 18 is a cutout perspective view of the crank of the mechanism according to the invention.

[0011] With reference to the above cited figures, a device according to the invention, generally designated by the reference numeral 1, comprises a substantially box-like supporting body, constituted by two half-shells, designated respectively by the reference numerals 2 and 3 and adapted to accommodate a crank 4 for actuating a cup 5.

[0012] The crank 4 is constituted by two disks 6, which are associated by means of a cross-member 8. Each disk 6 has a crank pivot 7 and a slot 9, which constitutes an engagement means for the actuation of the crank on the part of a motor, which is not shown in the figures.

[0013] The cross-member 8 is provided with a tab 10, which constitutes a spatula, the function of which will be explained hereinafter.

[0014] The cup 5 is constituted by a substantially quadrangular monolithic body, which has a cylindrical seat 11, adapted to accommodate a secondary piston 12, and a seat 13 adapted to accommodate the crank pivot 7.

[0015] The cup 5 has two guiding pins 14 and a baffle or chute 15 to facilitate the expulsion of the pellet, not shown, when the infusion ends.

[0016] The box-like body, constituted by the two half-shells 2 and 3, comprises a double fixing pin 16 for fixing the box-like body in the support of the machine, which in the specific case is constituted by a sheet metal casing 17, shown in Figures 6 and 7, which acts as a support and insulation for the infusion device. The mechanism 1 can thus be mounted in an oscillating front position.

[0017] The mechanism 1 according to the invention

can be applied to an automatic machine dispensing espresso coffee and other beverages, which is per se known and comprises a piston 18, for dispensing water under pressure, and adapted to pass through a cartridge or pellet of coffee or other substance in order to prepare a beverage.

[0018] The operation of the mechanism according to the invention is shown in detail in Figures 9-16.

[0019] As shown in Figure 9, initially the mechanism 1 is in a standby position, with the cup raised to the left, with reference to the side views of Figures 9-16.

[0020] In this standby position, the piston 12, which acts as a filter holder, is in a lower position and is ready to accommodate the powder which descends from a dispenser, not shown in the figures, once the infusion command has been received.

[0021] Once the infusion command has been received and the powder has been dispensed, the motor drives the crank 4, which acts on the cup 5, which starts a step for descent and rotation toward the dispensing position, as shown in Figure 10.

[0022] Figure 11 illustrates the step of rotation of the cup with powder and Figure 12 illustrates the step of the beginning of the rise of the cup toward the dispensing piston 18.

[0023] Once the dispensing position, shown in Figure 13, has been reached, the piston 18 sends water under pressure through the powder contained in the cup in the space between the dispensing piston 18 and the secondary piston 12.

[0024] By virtue of the particular configuration and arrangement of the seat 13 of the crank pivot 7, the cup 5 remains locked in the upper position during the step of dispensing under pressure.

[0025] Once the dispensing step has ended, a step for the descent of the cup 5, shown in Figure 14, begins. In this step, the secondary piston 12 is moved to a raised position and locked in that position by locking in the lower region, so that the pellet rises and the rotation of the cup 5 and of the crank 4, and therefore of the spatula 11, begins.

[0026] As shown in Figure 15, the cup 5 begins a rotation and an upward movement toward the standby position. In this step, the secondary piston 12 remains in the raised position in order to complete cleaning on the part of the spatula 10 and the secondary piston 12 is then locked by the intervention of an engagement member 19, which is part of the box-like body.

[0027] Figure 16 illustrates the step of rising the cup 5 towards the new standby position. In this step, the secondary piston 12 remains locked by the engagement member 19 so as to be in a lower position, with respect to the cup 5, at the end of the stroke.

[0028] In practice it has been found that the invention achieves the intended aim and objects, a mechanism having been provided which is structurally simpler and more compact than the mechanical assemblies of the prior art.

[0029] The mechanism of the present invention in fact does not include levers and linkages, but only a crank which acts directly on the cup.

[0030] The mechanism according to the present invention offers several important functional advantages to a machine of a traditional type and also allows to provide new machines with superior characteristics.

[0031] For example, by virtue of its compactness, it is possible to mount more than one assembly in a battery, as illustrated by way of example in Figure 8, which shows three assemblies which can be actuated by a single motor in order to offer three different beverages.

[0032] The actuation motor can be mounted, with respect to the mechanism according to the present invention, laterally or at the rear, as required, without affecting the overall dimensions of the machine.

[0033] A further advantage of the present invention is that the mechanism surrounded by the sheet metal casing maintains the ideal temperature when it is in standby, a very important characteristic in order to provide a beverage of satisfactory quality.

[0034] The mechanism according to the present invention also works with commercially available pods.

[0035] The mechanism according to the invention is susceptible of numerous modifications and variations, within the scope of the appended claims. All the details may be replaced with technically equivalent elements.

[0036] The materials used, as well as the dimensions, may of course be any according to the requirements and the state of the art.

Claims

1. A cup handling mechanism, particularly for a beverage vending machine, comprising a body for supporting a cup which can move therein from at least one standby position to at least one infusion position, **characterized in that** it comprises exclusively a crank supported by said supporting body for the movement of said cup.

2. The mechanism according to claim 1, **characterized in that** said supporting body is constituted by two half-shells.

3. The mechanism according to claim 1 or 2, **characterized in that** said crank is constituted by two disks which are associated by means of a cross-member.

4. The mechanism according to one or more of the preceding claims, **characterized in that** each one of said disks comprises a crank pivot and a slot, which constitutes an engagement means for the actuation of the crank on the part of a motor.

5. The mechanism according to one or more of the preceding claims, **characterized in that** said cross-

member is provided with a tab which constitutes a spatula.

6. The mechanism according to one or more of the preceding claims, **characterized in that** said cup is constituted by a single body, which is substantially quadrangular and is provided with a cylindrical seat that accommodates a secondary piston and with a seat that accommodates said crank pivot.

7. The mechanism according to one or more of the preceding claims, **characterized in that** said cup comprises two guiding pivots and a baffle or chute to facilitate the expulsion of the pellet at the end of infusion.

8. The mechanism according to one or more of the preceding claims, **characterized in that** said box-like body, constituted by said half-shells, comprises a double pivot for fixing said box-like body in the support of the machine.

9. The mechanism according to one or more of the preceding claims, **characterized in that** said support in the machine is constituted by a sheet metal casing, which provides support and insulation for the infusion mechanism.

10. The mechanism according to one or more of the preceding claims, **characterized in that** said mechanical assembly is mounted in said support in the machine at the front and so that it can oscillate.

11. The mechanism according to one or more of the preceding claims, **characterized in that** it comprises a piston for dispensing water under pressure, said piston passing through a pellet of coffee or other substance in order to prepare a beverage.

12. The mechanism according to one or more of the preceding claims, **characterized in that** said secondary piston acts as a filter holder, when it is in a lower position within said seat of said cup, so as to accommodate the powder which descends from a dispenser once the infusion command has been received.

13. The mechanism according to one or more of the preceding claims, **characterized in that** it comprises an engagement member, which is integrated in said box-like body and keeps said piston in a raised position in said seat of said cup during the cleaning operation performed by said spatula in order to eliminate the used powder after infusion and keep said piston in a lowered position with respect to said seat of said cup, at the end of the stroke, once the new standby position has been reached.

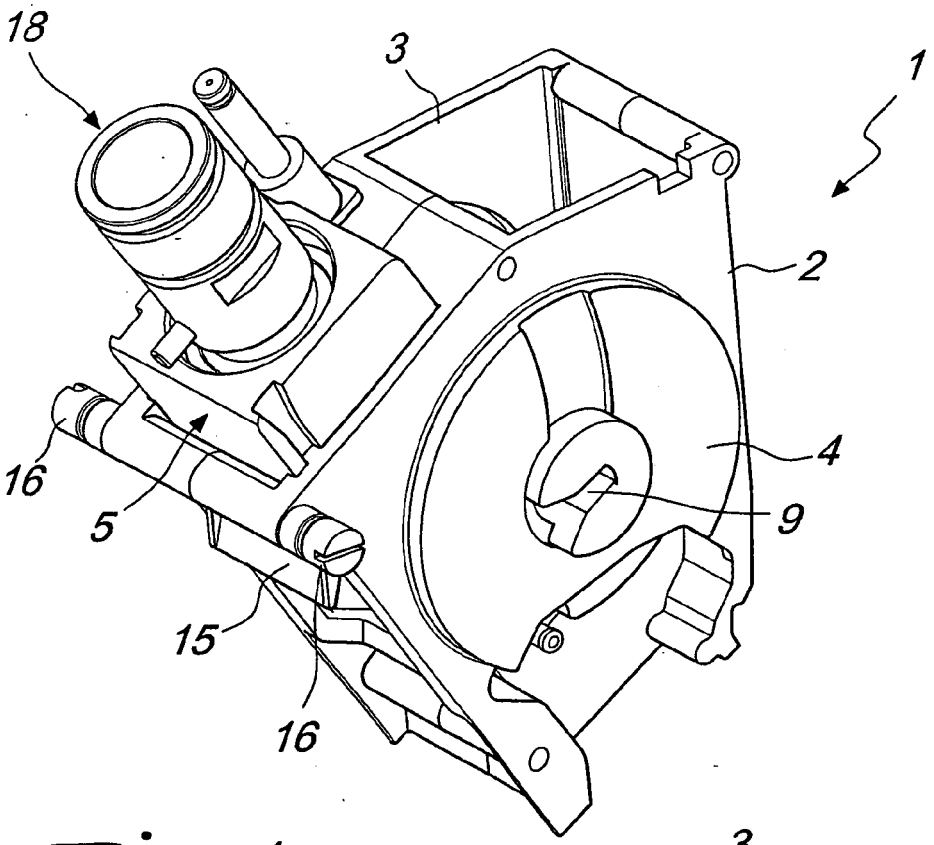

Fig. 1

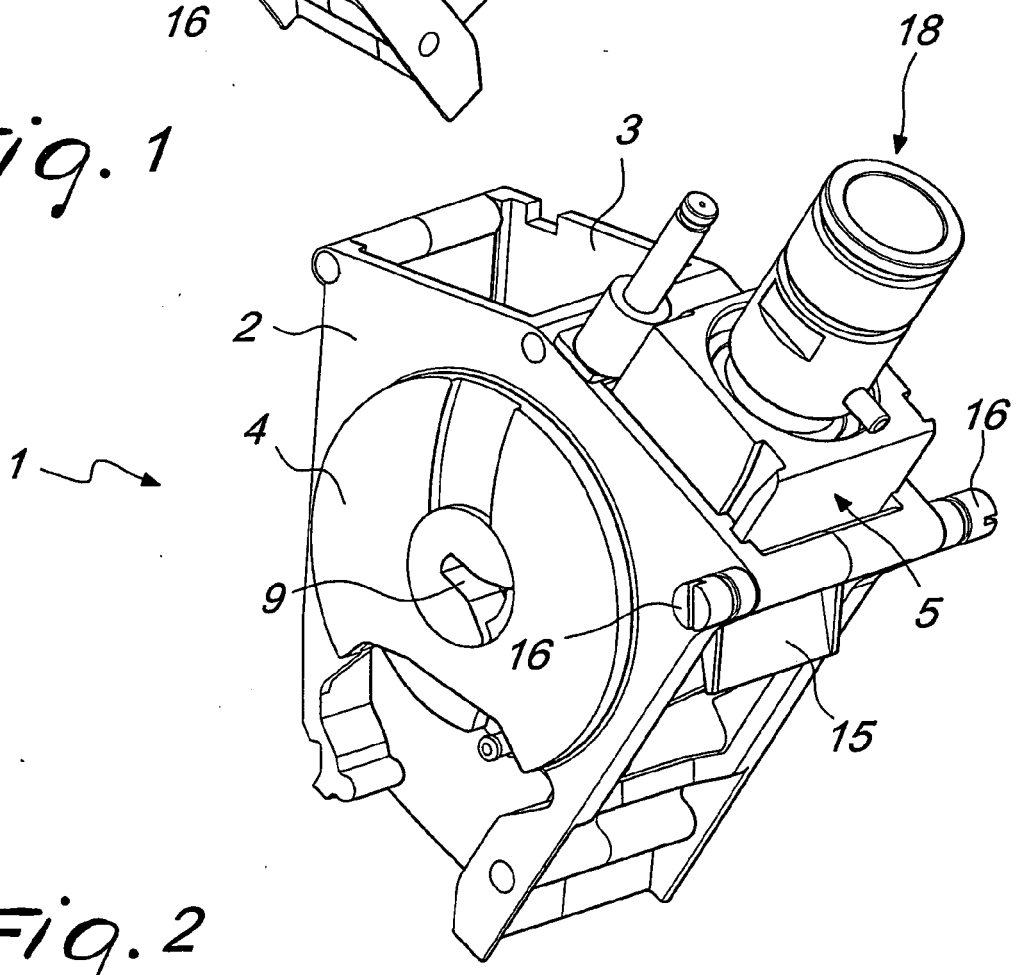

Fig. 2

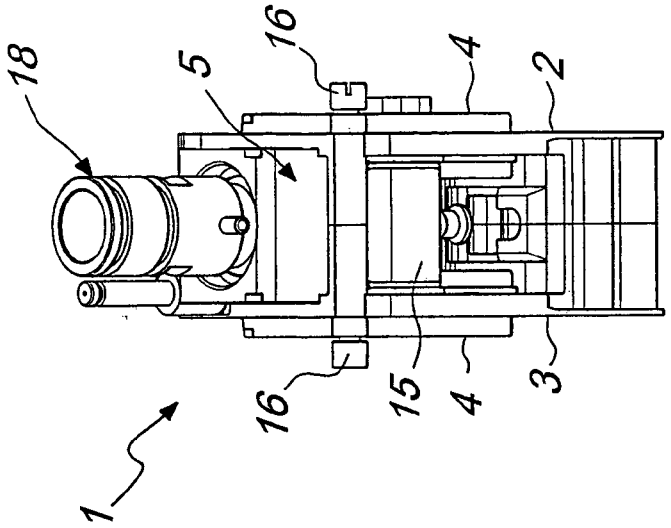

Fig. 5

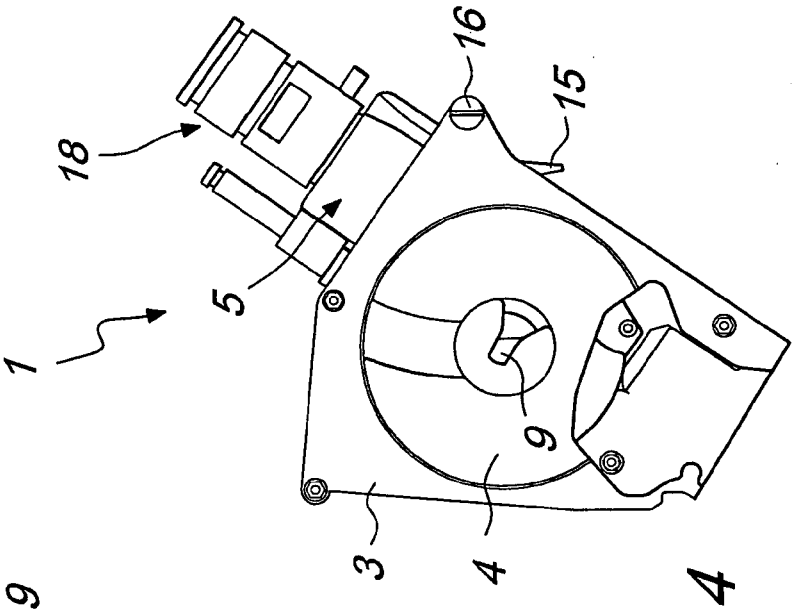

Fig. 4

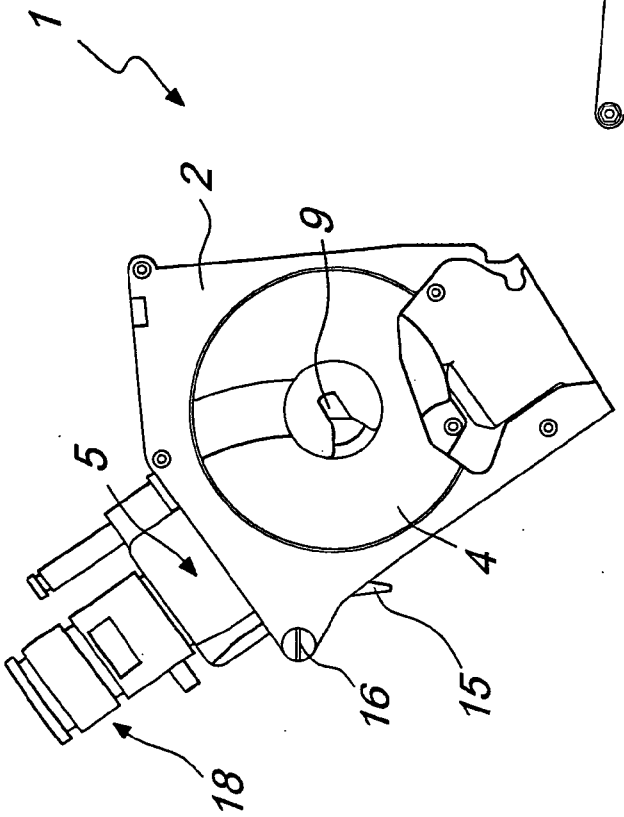

Fig. 3

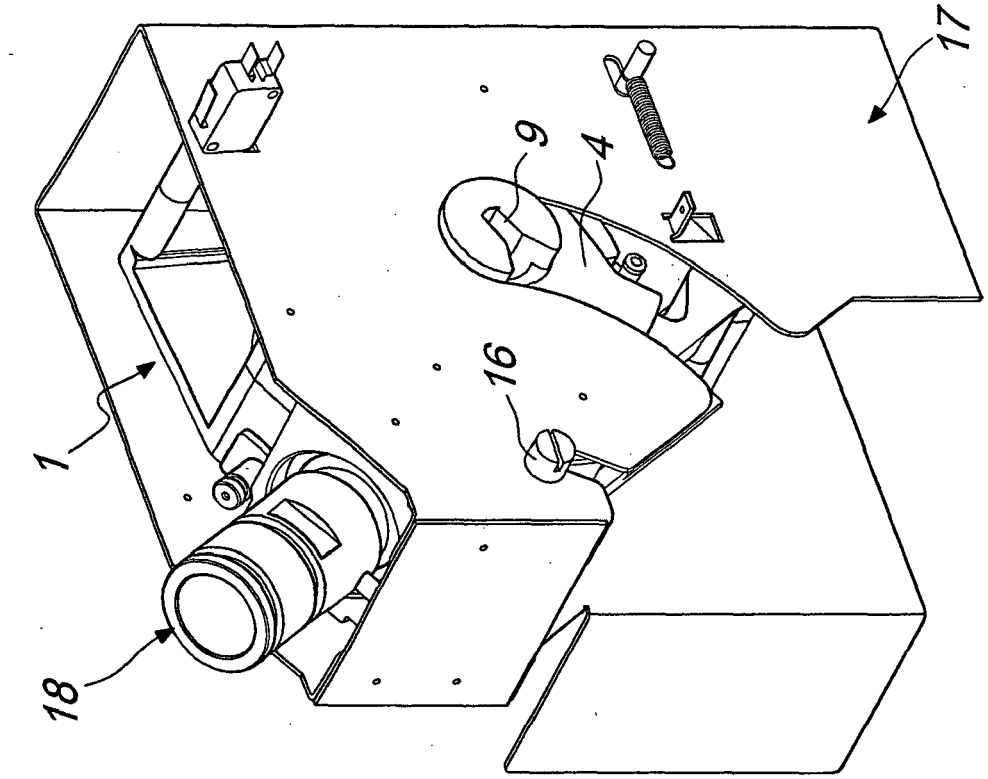

Fig. 7

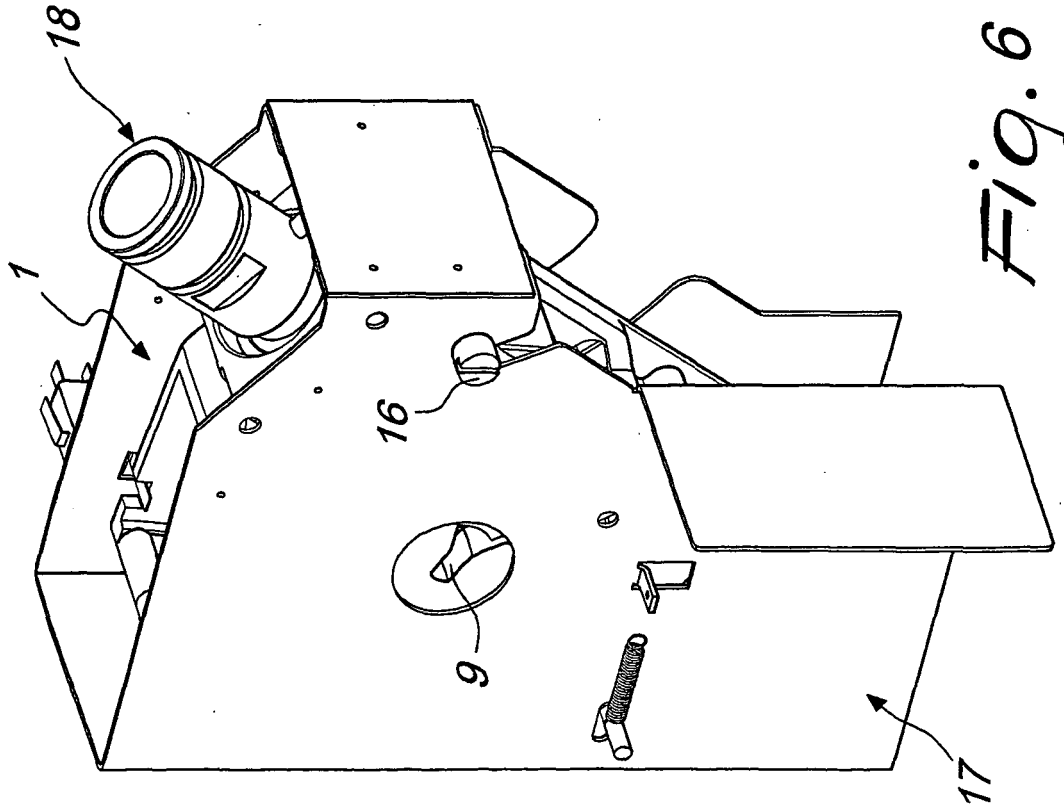

Fig. 6

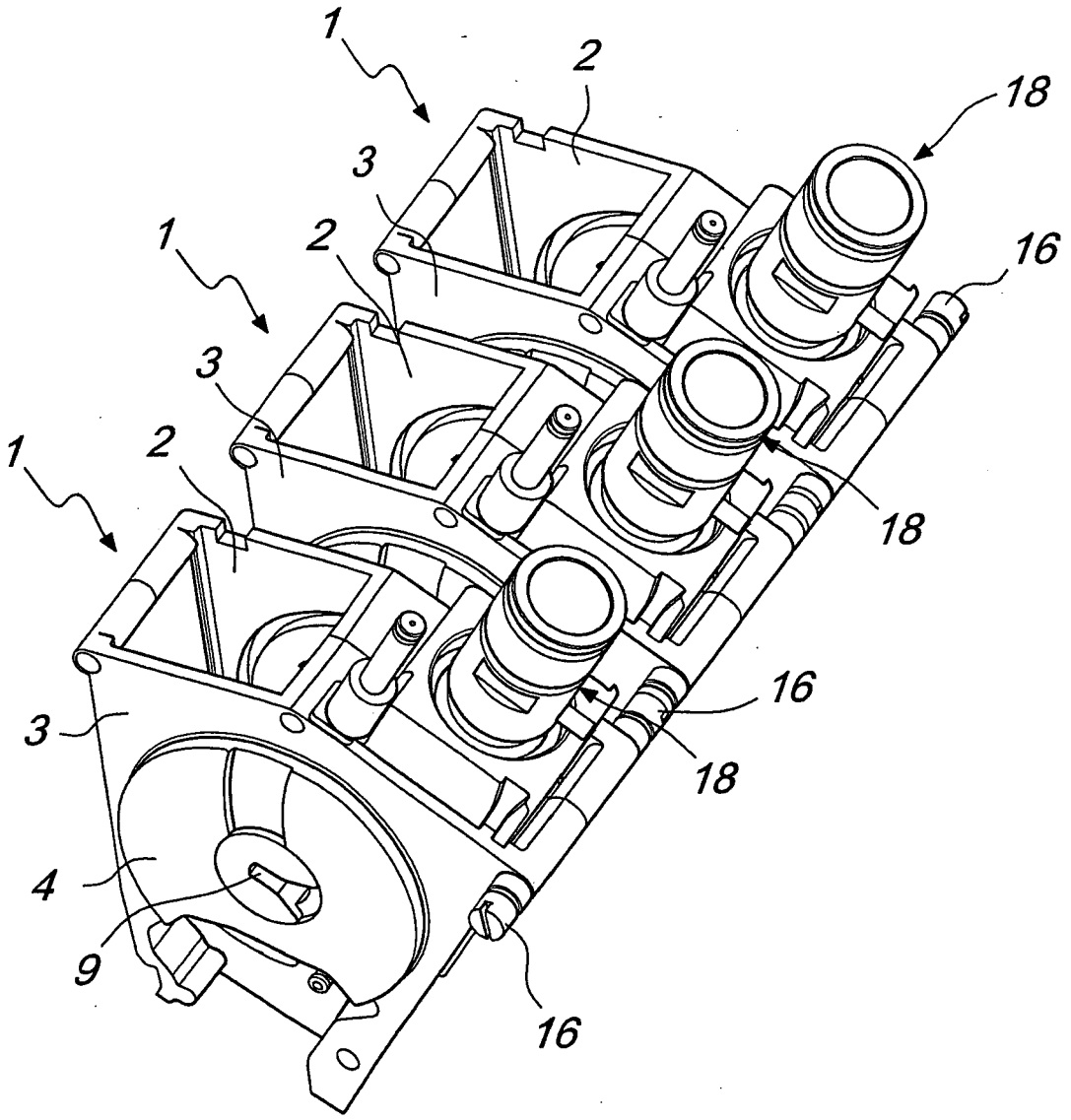

Fig. 8

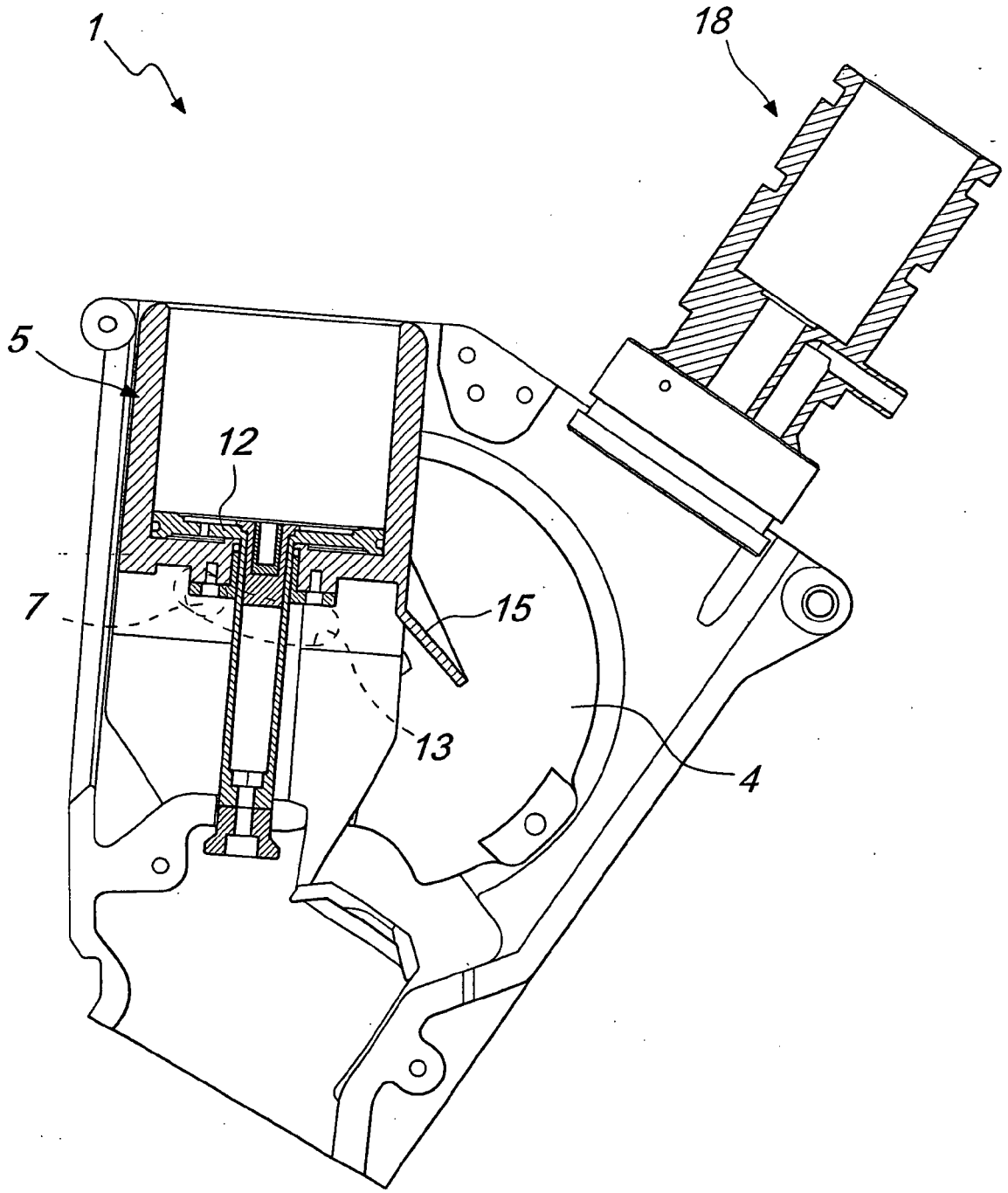

Fig. 9

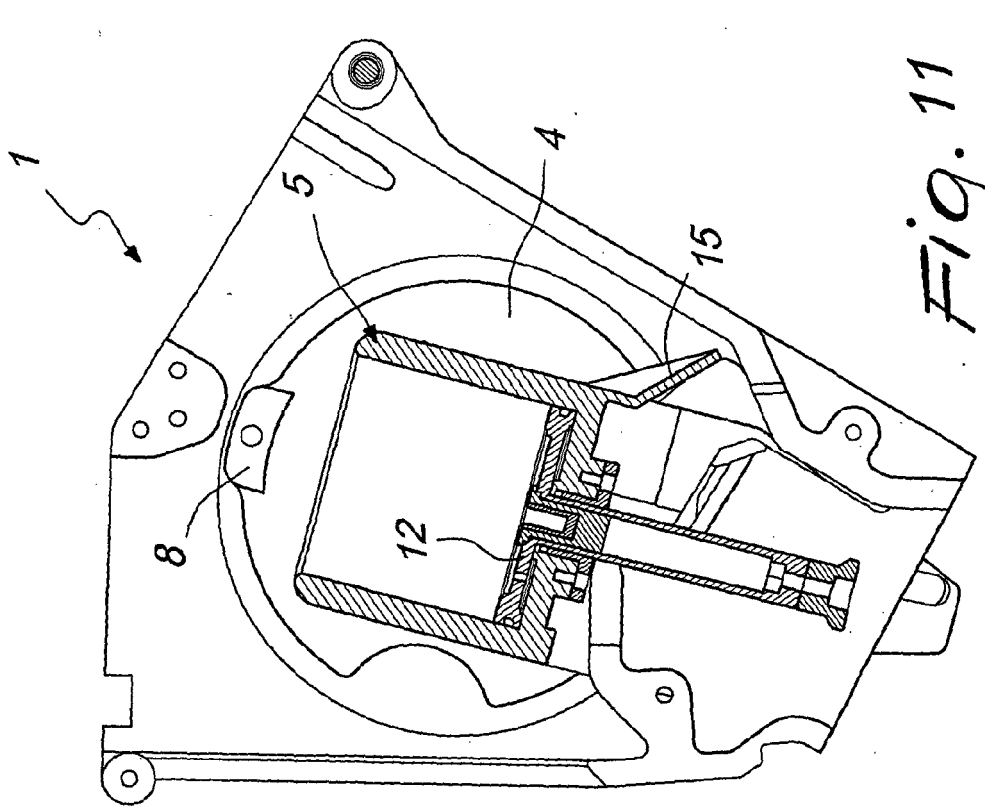

Fig. 11

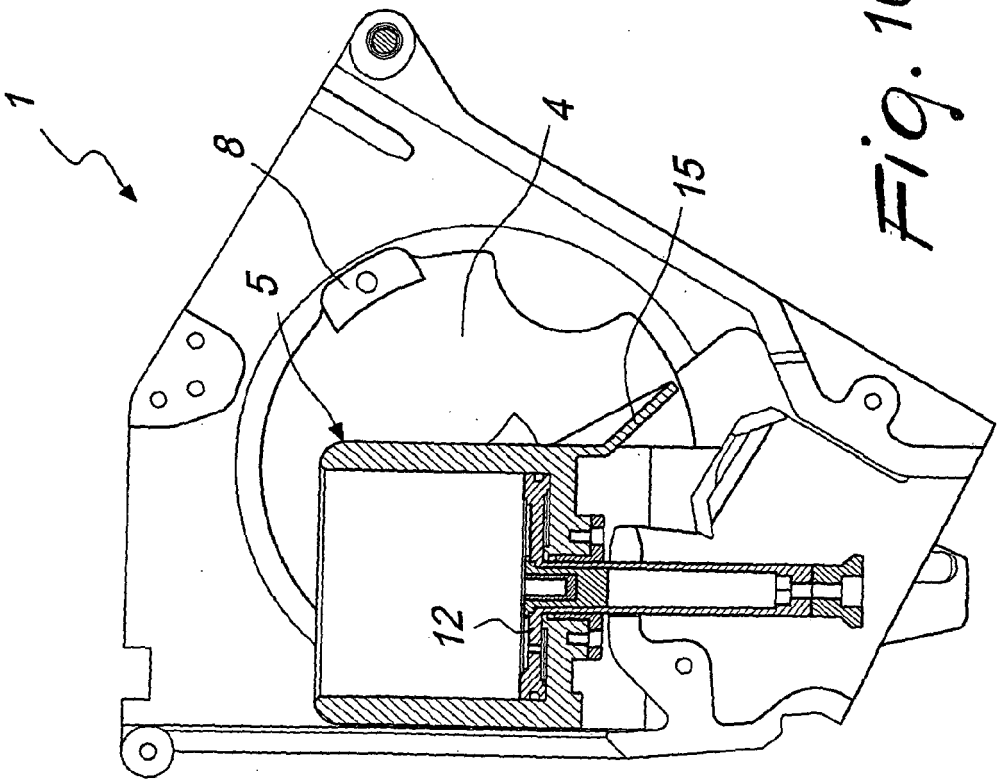

Fig. 10

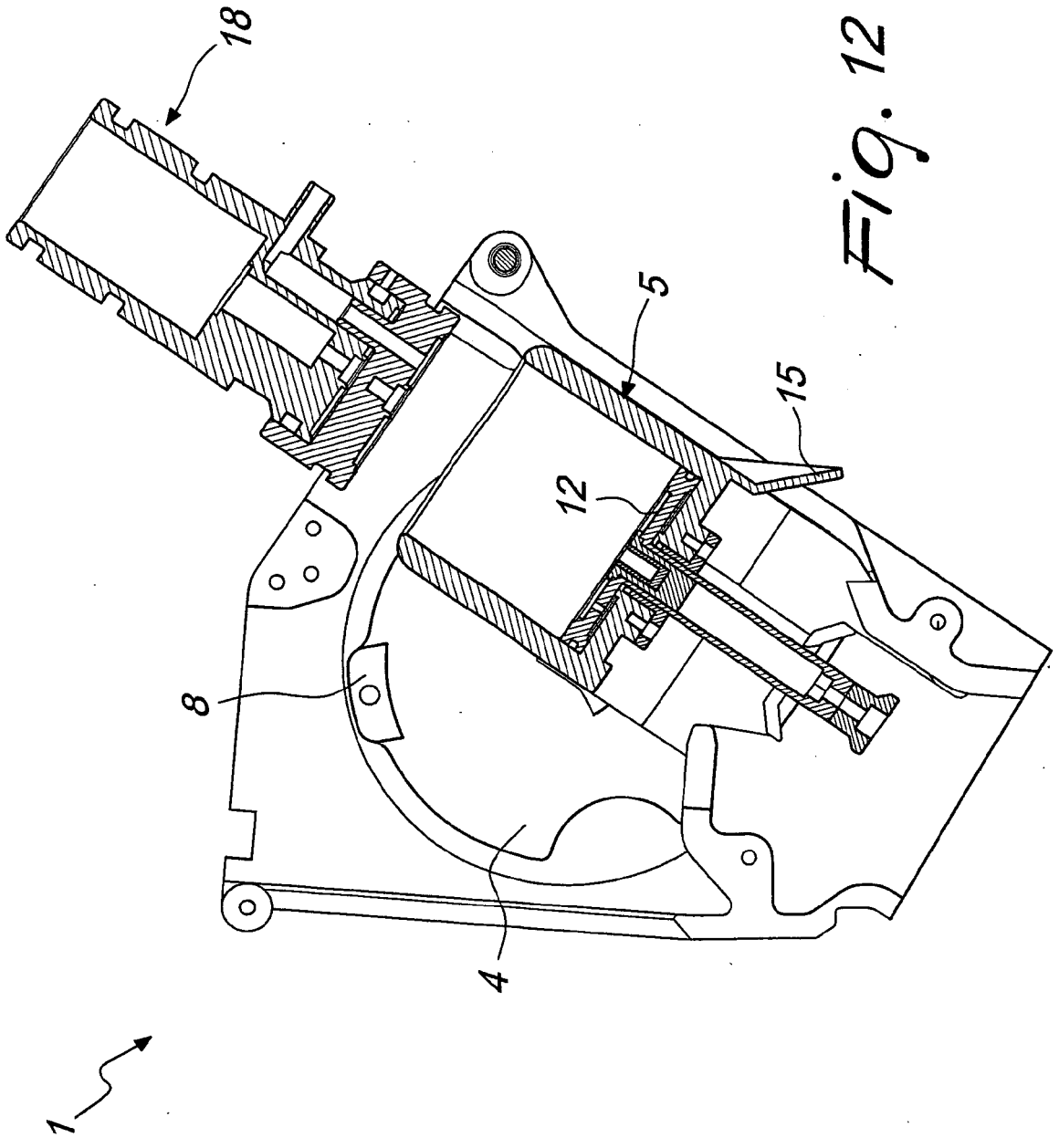

Fig. 12

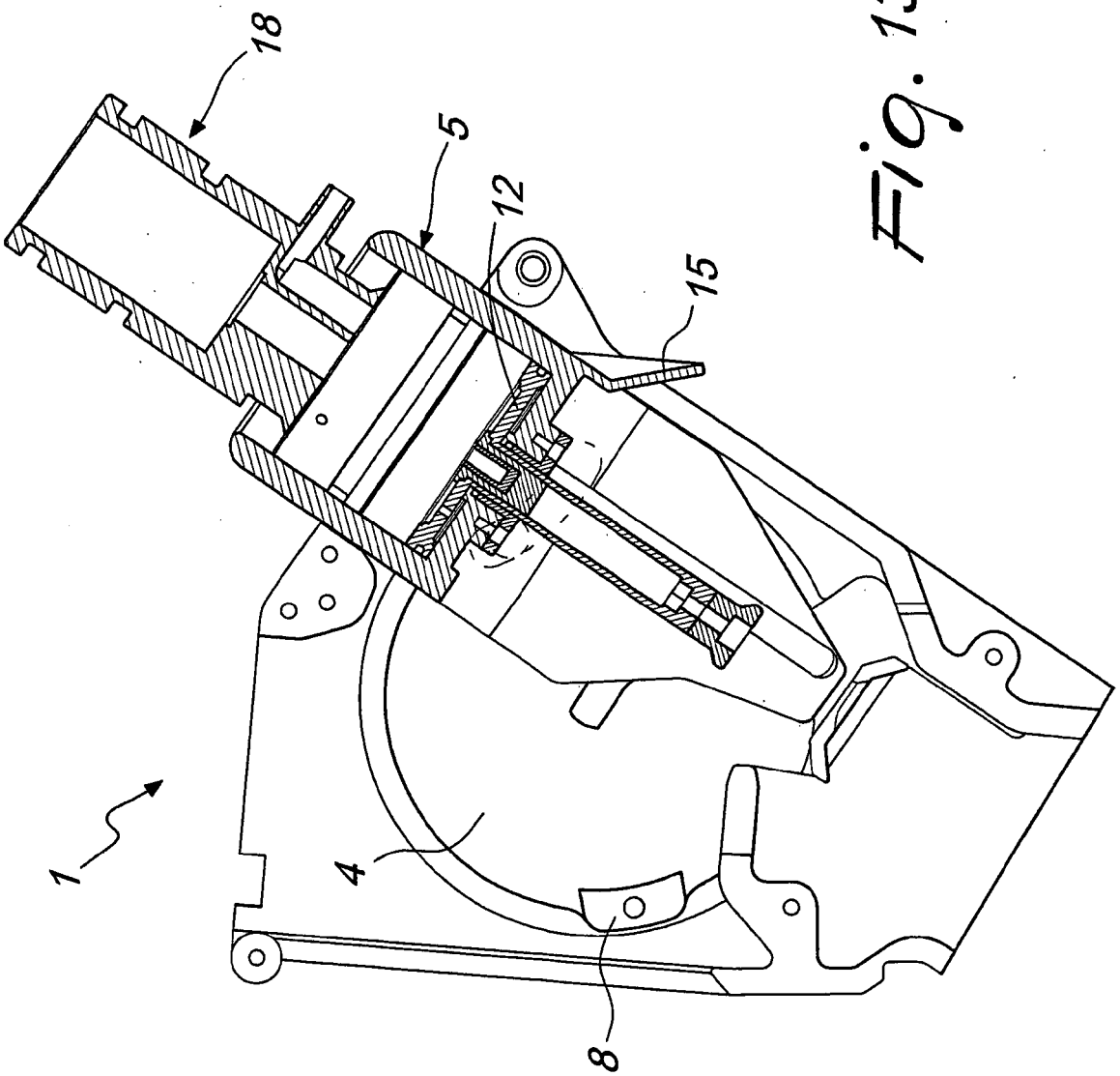

Fig. 13

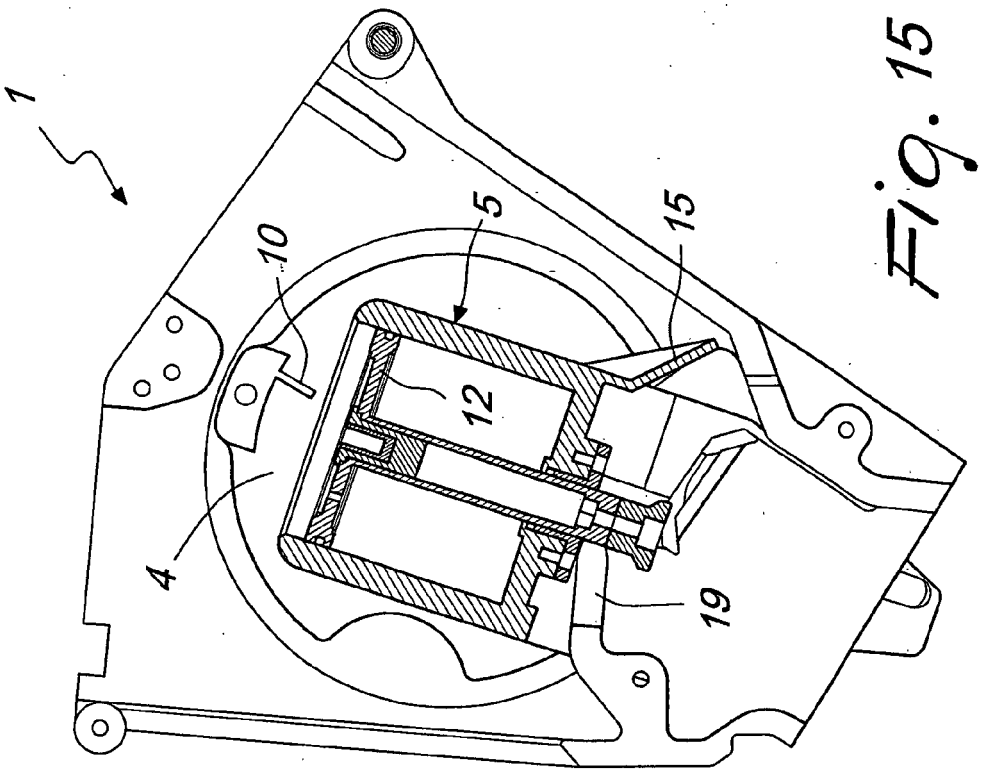

Fig. 15

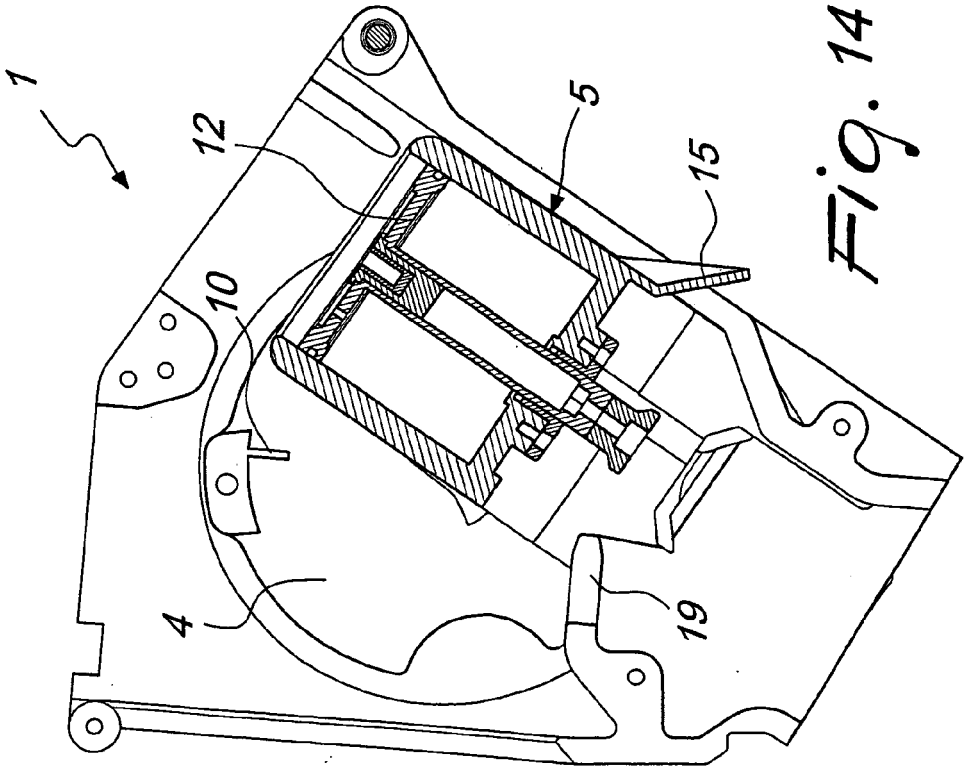

Fig. 14

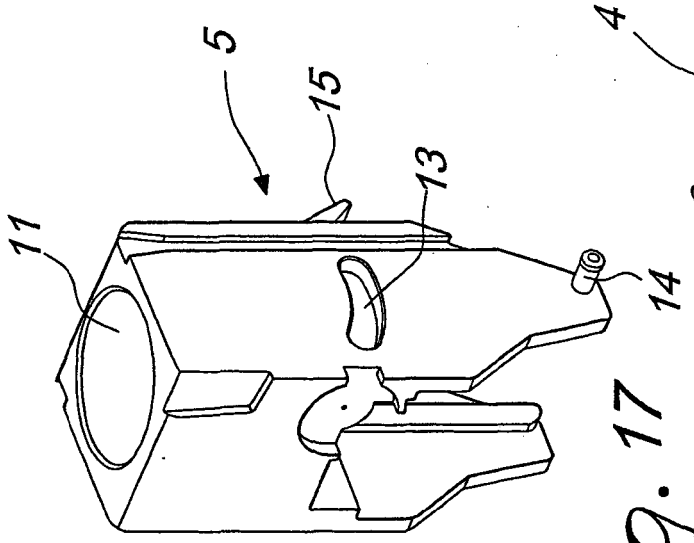

Fig. 17

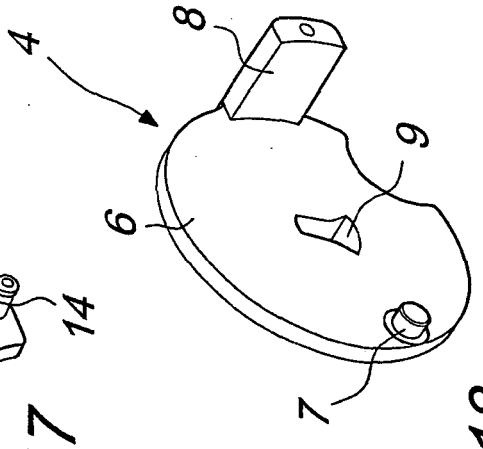

Fig. 18

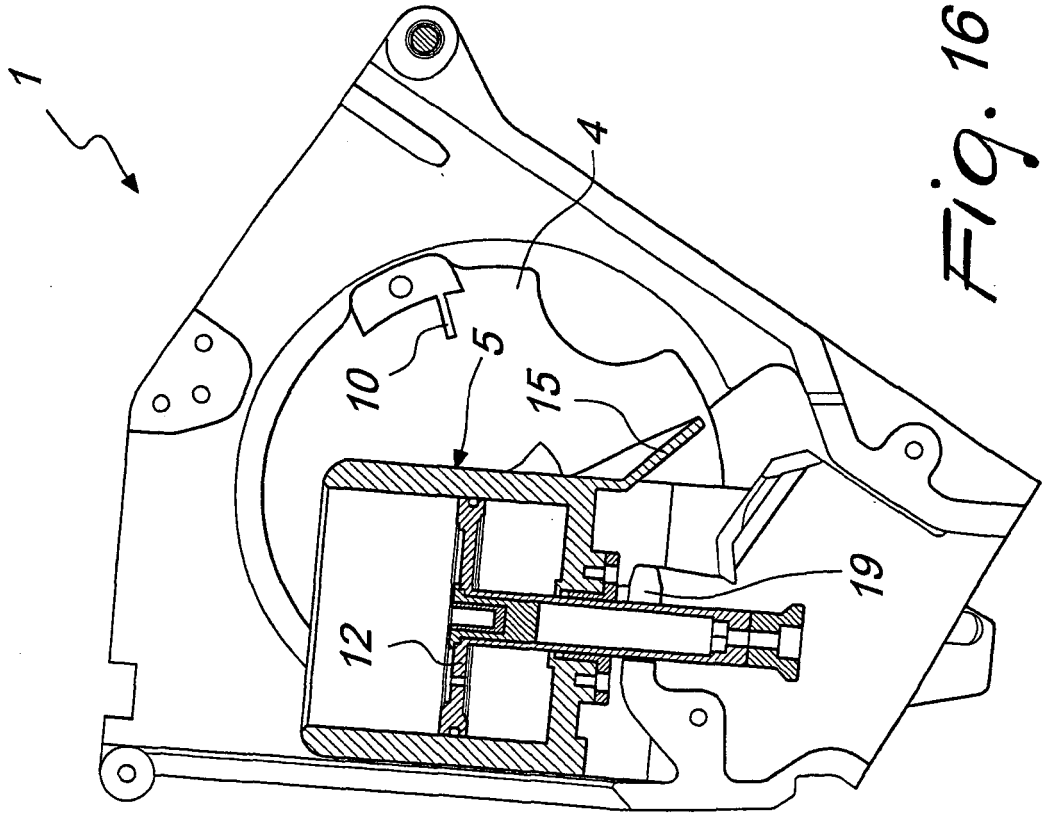

Fig. 16