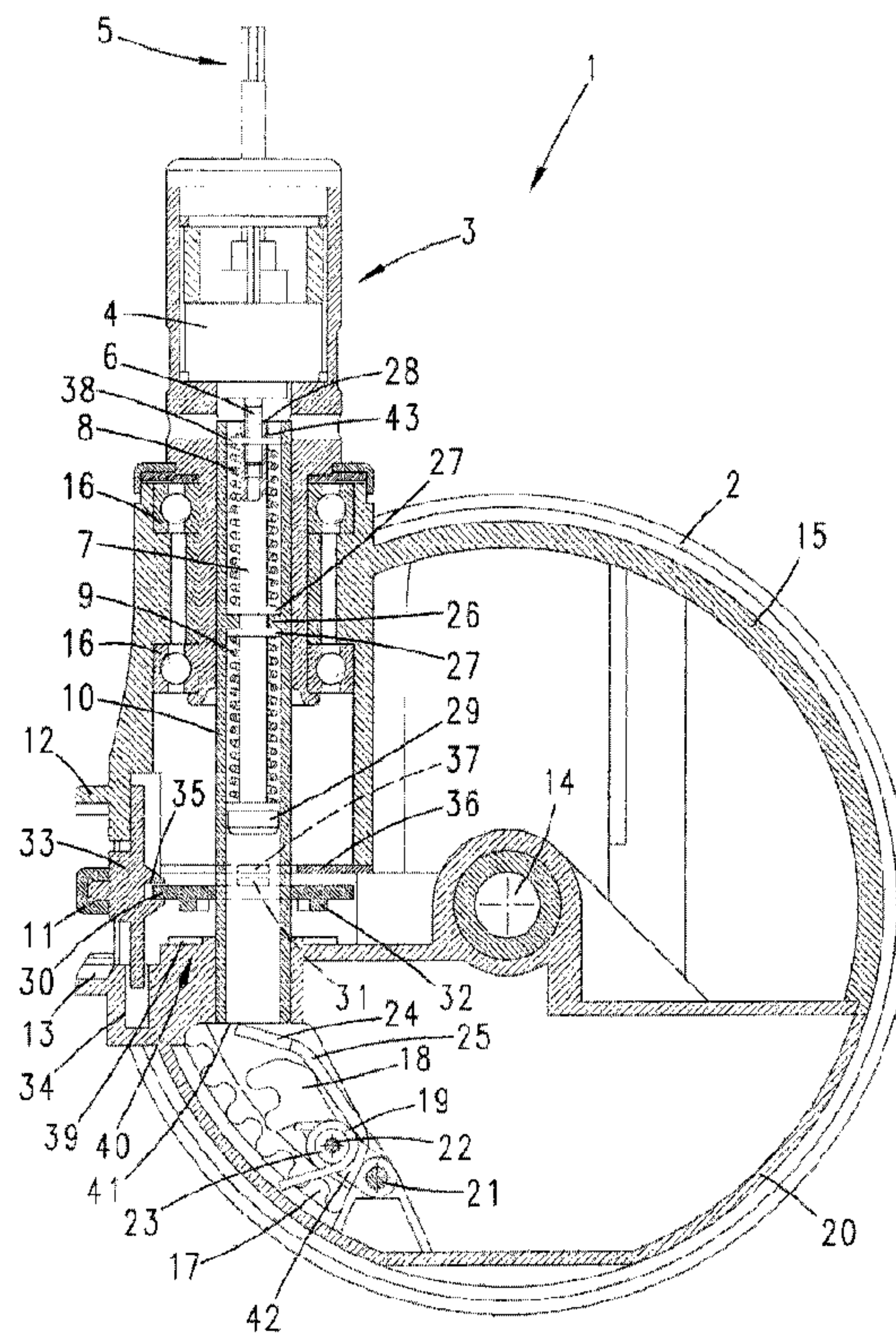




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(57) Abrégé/Abstract:

The invention relates to a roller (1) with preferably two wheels (2) and a locking device. An acting part (10) acts on the locking device for releasing or locking purposes, and the acting part (10) can be moved by a drive. A transmission part (7) movement that is generated by the drive is transmitted onto the acting part via spring force in order to move the acting part (10), and a spring (8) is mounted on the transmission part. The aim of the invention is to provide a roller that allows a favorable structural design. This is achieved in that the transmission part (7) can pass through a support region that is formed on the acting part (10) for the spring (8) and/or the spring (9) and/or the pressure spring (44).

1 **ABSTRACT**

2 The invention relates to a roller (1) with preferably two wheels (2) and a locking device.
3 An acting part (10) acts on the locking device for releasing or locking purposes, and the acting
4 part (10) can be moved by a drive. A transmission part (7) movement that is generated by the
5 drive is transmitted onto the acting part via spring force in order to move the acting part (10),
6 and a spring (8) is mounted on the transmission part. The aim of the invention is to provide a
7 roller that allows a favorable structural design. This is achieved in that the transmission part (7)
8 can pass through a support region that is formed on the acting part (10) for the spring (8) and/or
9 the spring (9) and/or the pressure spring (44).

ROLLER

The invention relates to a roller, preferably comprising two wheels and a locking device, an activating part acting on the locking device for releasing or locking, and the activating part being movable by a drive, a linear movement of a transmission part that is effected by said drive being transmitted via spring force to the activating part for moving same, and the spring being supported on the transmission part.

In the case of a known roller, cf. DE 10 2007 039 208 A1, the springs acting on the activating part are supported on the one hand between the transmission part and the activating part, and on the other hand between the activating part and a housing of the roller. Moreover, it is also known to support both springs on the transmission part.

However, the known construction is relatively large in vertical extent.

Based on the cited prior art, it is an object of the invention to provide a roller of the aforementioned type that enables an advantageous constructional design.

According to a first teaching of the invention, such a roller is provided with a support region for the spring which is formed on the activating part, through which region the transmission part can pass. The possibility of nesting the activating part and the transmission part into one another to a certain degree is achieved in this way. For this purpose, the activating part can comprise an opening which is open at least vertically at the top and which allows a corresponding engagement of the transmission part into the activating part and a corresponding movement of the transmission part relative the activating part. Due to the fact that the transmission part is provided such that it vertically passes through to a region for supporting a spring or, as further preferred, in the case of two springs, for supporting both springs on the activating part, interaction between at least one of the springs and the transmission part is also enabled in a simple manner below the support region for the spring or the springs on the activating part.

The transmission part preferably moves in the direction of compression or decompression of a spring. With regard to the conventional structure and the conventional arrangement of a roller,

1 the transmission part moves vertically. More preferably, it moves only vertically, and therefore
2 not in the sense of a (superimposed) rotational movement, for example.

3
4 According to a further teaching of the invention, it is provided that the drive is an electric motor
5 drive, and a component that is comparable to a rotor shaft of a standard electric motor can be
6 provided as a part that is (only) linearly displaceable. This involves an electric motor, the rotor
7 shaft of which is formed as a hollow part having an internal thread that interacts with a part that
8 has a central external thread and accordingly is linearly movable when the rotor rotates. Such
9 an electric motor is also designated as a linear actuator. With regard to linear actuators,
10 reference is also made, for example, to EP 1 555 446 B1 and DE 20 2009 015 840 U1. In the
11 present context, a linear actuator is preferred in which the linearly moved part (spindle) is
12 centrally disposed, and a nut (threaded rotor) driving the linearly moved part is disposed
13 surrounding the latter, within the drive.

14
15 The transmission part is vertically movable relative to the support part for the spring on the
16 activating part. The possibility of nesting the activating part and the transmission part into one
17 another to a certain degree is also achieved in this way.

18
19 Further features of the invention are described and illustrated below, also in the description of
20 the figures and in the drawings, often in their preferred association with the features already
21 explained above; however, they may also be of importance in an association with only one or
22 more individual features which are described herein or illustrated in the drawings, or
23 independently or in some other overall concept.

24
25 In particular, the activating part can have an opening which is open at least vertically at the top
26 and which allows a corresponding engagement of the transmission part into the activating part
27 and a corresponding movement of the transmission part relative the activating part. Due to the
28 fact that the transmission part is provided such that it vertically passes through to a region for
29 supporting a spring or, as further preferred, in the case of two springs, for supporting both
30 springs on the activating part, interaction between at least one of the springs and the
31 transmission part is also enabled in a simple manner below the support region for the spring or

1 the springs on the activating part. The transmission part preferably passes through the support
2 region only with a linear movement, i.e., without rotation.

3
4 The drive can be an electric motor drive, and a component that is comparable to a rotor shaft of
5 a standard electric motor can be provided as a part that is (only) linearly displaceable. This
6 involves an electric motor, the rotor shaft of which is formed as a hollow part having an internal
7 thread that interacts with a part that has a central external thread and accordingly is linearly
8 movable when the rotor rotates. Such an electric motor is also designated as a linear actuator.
9 With regard to linear actuators, reference is also made, for example, to EP 1 555 446 B1 and
10 DE 20 2009 015 840 U1. In the present context, a linear actuator is preferred in which the
11 linearly moved part (spindle) is centrally disposed, and a nut (threaded rotor) driving the linearly
12 moved part is disposed surrounding the latter, within the drive.

13
14 In the position of the total lock and/or the directional lock, there is preferably also space for
15 spring deflection, i.e., deflectability, so that with appropriate manipulation, the activating part can
16 yield in a spring-loaded manner. This is advantageous in particular with regard to the already
17 described emergency release. This configuration is also advantageous in the case of a positive-
18 fit lock such as a toothed lock, for example. Latching that is not immediately possible at the time
19 of the lock release can be compensated for in terms of height. A corresponding possibility to
20 overrun the position to a certain extent, at least temporarily or initially, is also however important
21 with regard to the drive. In one or both mentioned locking positions, the motor does not run
22 "against a block," and thus, for example, there is no direct engagement of spring turns which in
23 this position would have the effect of a solid part. Rather, due to the motor, overrunning this
24 position to a certain extent is possible, which would merely result in a possible increase in
25 spring force.

26
27 In the case of two springs acting between the transmission part and the activating part, it is
28 preferred that the springs are arranged one above the other. More preferably, the springs abut
29 one another in the vertical direction, i.e., without forming a vertical overlap region in which both
30 springs possibly extend.

1 It is also preferred that the lower spring is supported by its upper end on the activating part, and
2 the upper spring is supported by its lower end on the activating part. For this purpose, the
3 activating part can have a radially inwardly projecting flange, for example, both sides of which
4 serve for supporting one of these springs.

5
6 Furthermore, it is also preferred that independently of the operating state, which generally can
7 be a full release or a total lock, and more preferably can also be only a directional lock, the
8 spring, or in the case of two springs, one of the two springs, is disposed within the activating
9 part. More preferably, both springs are disposed in each case within the activating part,
10 independently of one of the mentioned positions.

11
12 Furthermore, it is also preferred that in the case of one spring, the one spring, otherwise in any
13 case at least one, more preferably both springs, is/are disposed outside the transmission part.

14
15 It is particularly preferred that the transmission part and the activating part are formed as
16 geometrically simple bodies, for example, as a rod or a tube. With regard to the formation of the
17 support regions for the springs, this merely requires a deviation from the mentioned
18 geometrically simple configuration.

19
20 It is particularly preferred that the transmission part is formed as a cylindrical part, with one or
21 both springs being disposed on the outside with regard to the outer surface of the cylinder.
22 Preferably, these are coil springs which are arranged coaxially with respect to the outer cylinder
23 surface and surround the transmission part.

24
25 In further detail, the transmission part can be formed as a hollow part; on the other hand,
26 however, it can also be substantially formed as a solid part. An internal thread can be provided
27 in the region of its upper end. The transmission part can be coupled to the linear part of the
28 linear actuator by means of the internal thread.

29
30 Accordingly, the linear part of the linear actuator can also be a solid part. At its end facing
31 toward the transmission part, the linear part can have an external thread which is screwable into
32 the internal thread of the transmission part so as to connect these parts.

1
2 The electric motor preferably is a stepper motor, more preferably a hybrid stepper motor or a
3 permanent magnet stepper motor. Specifically, this is also a claw pole stepper motor.
4

5 The activating part may have a tubular design. In a deviation from the tubular shape, the
6 mentioned inwardly protruding flange is provided here, on which flange a spring or the
7 mentioned springs are supported, optionally by means of a washer.
8

9 Preferably, the roller also has an emergency release so as to still be able, for example, in the
10 event of a failure of the motor that actuates the transmission part, in particular an electric motor,
11 to manually release a locking position that is occupied, be it a directional lock or a total lock.
12

13 For this purpose, the activating part can be moved, in any case in a position corresponding to
14 the total lock or in any case in a position corresponding to the directional lock, relative to the
15 stationary transmission part into a release position, against a spring supported on the
16 transmission part, by means of an actuating handle that is movable independently of the drive
17 and preferably by hand so as to override the total lock or the directional lock.
18

19 Furthermore, to this end it is preferred that a geometric rotational axis of the actuating handle is
20 disposed on the same side as the activating part with regard to the rotational axis of the wheel,
21 the activating part being disposed offset, in a vertical section, from the rotational axis of the
22 wheel. The actuating handle and the activating part are configured to be structurally close to
23 one another. An advantageous application of force is thus possible. In particular, advantageous
24 accommodation in the housing is also possible. If, as is preferred, the activating part is situated
25 in the region of a mounting journal, if necessary in the vertical extension thereof, the actuating
26 handle can also be accommodated in the associated region of the housing.
27

28 It is preferred that the geometric axis of rotation of the actuating handle runs through the
29 activating part and/or extends in a horizontal plane that passes through a wheel. The fact that
30 the axis of rotation passes through the activating part means that the actuating handle and the
31 activating part are to be arranged directly next to one another, the focus here preferably being
32 on the entire range of movement of the actuating part, including both end positions in the case

1 of a directional lock or total lock. In this manner, the shortest possible distance between the
2 actuating handle, which is accessible from the outside, and the part to be acted on, the
3 activating part, is achieved. Due to the fact that, alternatively or additionally, the axis of rotation
4 also extends in the horizontal plane passing through a wheel, it is made clear at the same time
5 that the arrangement is provided relatively far down with regard to the roller.
6

7 Furthermore, it is preferred that a horizontal plane which passes through the wheel axis also
8 passes through the actuating handle. This describes the arrangement of the actuating handle at
9 a vertical height that corresponds to the center region of a wheel of the roller.
10

11 A further preferred configuration provides that the actuating handle is vertically stationary during
12 a movement of the actuating part. As described below in further detail, in principle it can in first
13 instance be provided that together with a movement of the actuating part, the actuating handle
14 moves vertically together with the actuating part, which is also possible independently of manual
15 intervention via the actuating handle. However, it is preferred that the actuating handle is
16 stationary so that during a (motor-driven) actuation of the roller, at the same time no movement
17 of the actuating handle is visible from the outside. There is, so to speak, a decoupling between
18 the activating part and the actuating handle via a decoupling mechanism which is described in
19 further detail below. Thus, for example, unintentional blocking of the (motor-driven) movement
20 of the activating part due to the actuating handle getting externally caught, for example, at a
21 building step or an object standing in the region of the roller, is prevented.
22

23 It is in particular also preferred that a cantilever which interacts with the actuating part interacts
24 with a sliding part guided in the housing in the direction of movement of the activating part. This
25 configuration is at the same time also essential for the mentioned decoupling. Due to the fact
26 that the cantilever moves the sliding part, the sliding part can be disposed inside the roller or
27 inside the housing of the roller so as to be shielded from the outside. It is further preferred in this
28 regard that the sliding part is guided in a stationary housing insert through which the actuating
29 handle passes. Thus, the housing insert is part of the roller housing. The sliding part can also be
30 guided directly in a housing shell part. However, with regard to the construction, it is more
31 advantageous to provide such a housing insert as an additional feature in the housing.
32

1 The actuating handle may have a through pin that acts directly on the sliding part. Since the
2 actuating handle is to be actuated by rotating, such a through pin, which preferably is arranged
3 eccentrically or comprises an eccentric, can act on the sliding part during rotation of the
4 actuating handle, preferably, in particular without undergoing a vertical movement at the same
5 time.

6
7 It is also preferred that the sliding part has a lower limit stop and an upper limit stop which can
8 be acted on by the through pin for releasing in the total lock or the direction lock. If the activating
9 part is in one of the mentioned positions, the actuating handle having the through pin is
10 preferably arranged such that there is contact with the corresponding limit stop of the sliding
11 part, or the limit stop can be reached after a short movement. Then, mechanical coupling
12 between the actuating handle and the sliding part is established so that further movement then
13 acts directly on the cantilever, and therefore on the activating part.

14
15 With regard to its rotary movement, the actuating handle can be spring-biased into a neutral
16 position. This neutral position preferably corresponds to the aforementioned near-engagement
17 position. When the activating part is in the position corresponding to the total lock or the
18 directional lock, the through pin, due the neutral position, is in contact or nearly in contact with
19 the corresponding limit stop of the sliding part.

20
21 The actuating handle can in first instance be formed such that it can be actuated directly by
22 hand, for example by means of a rib or a projection formed on the outside thereof. However, it is
23 preferred that it is formed so that it can preferably be actuated only with a simple tool such as a
24 coin, a double claw, or the like. Thus, on the one hand, it can be achieved that handling is
25 always possible in the case of an emergency, and, on the other hand, undesired actuations can
26 also be prevented in the case of a non-emergency.

27
28 It is also preferred that an emergency release position, which is set by hand, is latched. The
29 latching can be achieved, for example, in that in the course of the interaction of the through pin
30 with one of the mentioned limit stops, the through pin moves into a detent recess in one of the
31 limit stops. However, as can be seen, alternative configurations for latching are also possible.
32 Thus, a rotary part of the actuating handle itself can interact with a detent cam which, for

1 example, moves into a circumferential recess. The detent provides for unhindered movability of
2 the roller when emergency-released in this manner. The release position does not have to be
3 maintained by hand.

4
5 It is also preferred that after completion of the emergency release via the actuating handle, the
6 neutral position of the actuating handle can be established again by a motor-driven movement
7 of the activating part. This can be achieved in a preferred and particularly advantageous manner
8 in conjunction with the already-described spring biasing of the actuating handle into a neutral
9 position. Upon releasing the detent position, the actuating handle then moves back into the
10 mentioned neutral position due to the spring bias. However, it is alternatively also possible that
11 after the detent position is released, the actuating handle moves, for example due to gravity,
12 into a position in which a detent is no longer provided.

13
14 It is also particularly preferred that for re-establishing the neutral position, the activating part is
15 initially to be moved by motor further in the direction of the movement forced by the actuating
16 handle. Once releasing the directional lock is achieved due to the actuation of the actuating
17 handle, a further movement of the activating part in the corresponding direction, which then
18 corresponds to the total lock, takes place, thereby disengaging the detent position, specifically,
19 disengaging the through pin from a detent recess in one of the mentioned limit stops, as a result
20 of which the actuating handle is released and can move into another position again, which no
21 longer results in a detent, or simply into the neutral position. Conversely, in the case of an
22 emergency release from the total lock, a further movement, which, however, can then only be
23 induced by electric motor, of the activating part in the direction of the directional lock is needed
24 to achieve the same effect. It is further preferred in this regard that in the case that the activating
25 part is moved by a motor, in particular an electric motor, this motor always initially passes
26 through a given cycle, so that in the event that an emergency release has previously taken
27 place, the emergency release is reliably released and the motor is then in the customary
28 operating cycle.

29
30 With regard to the emergency release by means of a handle, which can then be actuated
31 independently of the rotary drive, it is furthermore preferably provided that the activating part is
32 formed with a movement extension, which is furthermore preferably fitted on the outside with

1 regard to the activating part and is movable directly, in particular by hand, so as to move the
2 activating part. It is also possible that when the activating part is moved, for example by the
3 mentioned rotary drive, the handle for the emergency release also undergoes a movement,
4 optionally even in a visible manner, preferably in the vertical direction. However, if an
5 emergency release is to be carried out, the required movement of the activating part can be
6 carried out manually by means of the handle.

7
8 The handle can in particular also be formed as a rotary lever. By means of interaction with a
9 support which is fixed to the housing, the rotary lever can transmit a displacement force
10 vertically upwardly or vertically downwardly onto the activating part. For this, a cantilever fixedly
11 connected to the activating part and serving as movement extension can be provided between
12 the activating part and the rotary lever. The rotary lever is preferably fitted to the outside of the
13 housing. Upon actuating the transmission part or the activating part, it can be seen that the
14 rotary lever moves vertically upwardly or vertically downwardly, but by doing so does not
15 undergo a rotational movement, but, rather, only the mentioned vertical movement.

16
17 It is further preferred that the spring can be lifted off the support region on the activating part by
18 means of the transmission part. A corresponding carrier is preferably formed on the
19 transmission part, and lifts the spring off the activating part during a corresponding movement of
20 the transmission part relative to the activating part.

21
22 Furthermore, the activating part preferably forms a lower central chamber which is open at the
23 bottom and in which one of the springs or the spring is accommodated. In this respect, the
24 activating part has a bell-like design. The central chamber, which is open at the bottom, is
25 preferably also a cylindrical chamber.

26
27 With regard to the mentioned lifting of the spring off the support region, an upward lifting is
28 preferably possible; it is further preferred, however, that locking via a corresponding limit stop,
29 for example via an inwardly protruding step on the activating part, is possible at the bottom.
30 When the spring is vertically moved further down relative to the activating part, it cannot be
31 moved beyond a position defined in this respect.

1 Furthermore, an upper support region for the spring is preferably formed on the transmission
2 part. With regard to this support region, it is preferably also provided that the spring can be lifted
3 off in the downward direction. Accordingly, comparable to the mentioned support on the
4 mentioned activating part, when the spring is moved upwardly relative to the transmission part,
5 it cannot be moved beyond the support region.

6
7 With regard to the handle, which, if necessary, can be used for carrying out the emergency
8 release, it is also preferred that the handle moves together with the activating part. When
9 various customary operating states such as a directional lock and/or a neutral position and/or a
10 total lock are assumed, a change between these operating positions is visible from the outside
11 in the form of a corresponding displacement of the handle in the vertical direction.

12
13 In other respects, the handle is preferably fixedly connected to the activating part, with the
14 exception that it is rotatable relative to the activating part. Furthermore, one or two abutments
15 associated with the handle is or are formed on the housing, preferably on the outside thereof.
16 The handle is movable relative to a stationary abutment. For example, by rotating the handle,
17 supporting on an abutment can take place, and the supporting movement toward the activating
18 part can therefore be used for moving the activating part from the total lock or the directional
19 lock into the neutral position.

20
21 Furthermore, such a movement of the activating part by means of the handle is preferably
22 carried out relative to the stationary transmission part while carrying along the supporting region
23 or the support region of the spring. With regard to the support region, there can also be an
24 upper support region on the activating part via which the spring is carried along during a
25 corresponding movement of the activating part. This relates in particular to the movement of the
26 activating part from the directional lock into the neutral position.

27
28 If two springs are provided, it is preferred that one spring is required for moving the activating
29 part into a position corresponding to the total lock, and one spring is required for moving the
30 activating part into a position corresponding to the directional lock. The functions of the springs
31 can be separated in this manner.

1 In the case of two springs, which are preferably also arranged vertically one above the other,
2 the lower spring can be supported with its [upper] end on the activating part, and the upper
3 spring can be supported with its lower end on the activating part.

4
5 Also, it can be provided that a spring and/or the first spring and/or the second spring is/are
6 disposed within the activating part. Preferably, a plurality of springs is in each case disposed
7 completely within the activating part, in any case in a position that corresponds to the neutral
8 position. However, a position that corresponds to the directional lock and/or a position that
9 corresponds to the total lock is/are also preferred. This can be achieved by an overall tubular
10 design of the activating part in which a spring or, if applicable, two springs are arranged in
11 particular vertically one above the other. This can also be achieved only in the lower portion of
12 the activating part, for example by means of the mentioned bell-shaped widening. Furthermore,
13 it is also preferred that a spring or, if two springs are provided, at least one of the two springs or
14 both springs is/are disposed outside the transmission part. The transmission part can thus be
15 formed in a very simple manner even in this region, in any case as a solid part.

16
17 It is further preferred that the transmission part is disposed within the activating part. It can thus
18 also be guided in an advantageous manner within the activating part. Guiding the transmission
19 part within the activating part can also be achieved, for example, by means of a support part
20 and/or supporting part.

21
22 With regard to the handle, it is preferred that the handle is rotatable relative to the carrier or the
23 movement extension.

24
25 With regard to the respective end positions of the linear part and/or of the transmission part
26 and/or of the activating part, it is preferred that they are monitored by sensors, more preferably
27 by sensors arranged outside the electric motor. The respective end positions can be taken into
28 account in a controller of the electric motor. However, if an end position is not reached, or is not
29 reached after a given period of time, a warning message can also be output, for example.

30
31 The invention is explained in greater detail below with reference to the accompanying drawings,
32 which show exemplary embodiments of the invention. A part that is explained only with

reference to one of the exemplary embodiments, and in a further exemplary embodiment is not (specifically) replaced by another part due to the special feature emphasized therein, is therefore also described for this further exemplary embodiment as a part which in any case is potentially present. In the figures:

Fig. 1 shows a perspective view of a roller implemented as a double roller;

Fig. 2 shows a rear view of the roller according to Figure 1;

Fig. 3 shows a cross-section through the roller according to Figure 1 and Figure 2, sectioned along the line III-III in Figure 2;

Fig. 4 shows an illustration according to Fig. 2 in the state of the directional lock;

Fig. 5 shows a cross-section through the object according to Figure 4, sectioned along the line V-V;

Fig. 6 shows an illustration according to Figure 2 in the state of the total lock;

Fig. 7 shows a cross-section through the object according to Figure 6, sectioned along the line VII-VII in Figure 6;

Fig. 8 shows an illustration of the roller according to Figure 1 and Figures 2, 4 or 6, after completion of the emergency release;

Fig. 9 shows a cross-section through the object according to Figure 8, sectioned along the plane IX-IX, after an emergency release from the position according to Fig. 5;

Fig. 9a shows an illustration according to Fig. 9, after an emergency release from the position of Fig. 7;

Fig. 10 shows a perspective cross-sectional view of the roller according to Figures 1 to 3;

- 1
- 2 Fig. 11 shows an exploded view of the activating part in the region of the emergency
- 3 release;
- 4
- 5 Fig. 12 shows a perspective view diagonally from below of the parts interacting with
- 6 regard to the directional lock and the total lock;
- 7
- 8 Fig. 13 shows a perspective illustration corresponding to Figure 1 of a further
- 9 embodiment;
- 10
- 11 Fig. 14 shows a rear view of the roller according to Figure 13 in the neutral position;
- 12
- 13 Fig. 15 shows a cross-section through the roller according to Figure 13 and Figure 14,
- 14 sectioned in the plane XV-XV in Figure 14;
- 15
- 16 Fig. 16 shows an illustration of the roller according to Figure 14 in a position
- 17 corresponding to the directional lock;
- 18
- 19 Fig. 17 shows a cross-section through the roller according to Figure 16, sectioned in the
- 20 plane XVII-XVII in Figure 16;
- 21
- 22 Fig. 18 shows an enlarged detail of the region XVIII in Figure 17;
- 23
- 24 Fig. 19 shows a perspective illustration of a detail of the parts interacting with regard to
- 25 the directional lock;
- 26
- 27 Fig. 20 shows an illustration of the roller according to Figure 14 in a position
- 28 corresponding to the total lock;
- 29
- 30 Fig. 21 shows a cross-section through the roller according to Figure 20, sectioned in the
- 31 plane XXI-XXI in Figure 20;
- 32

- 1 Fig. 22 shows an illustration of the roller according to Figure 14 after completion of the
2 emergency release;
3
- 4 Fig. 23 shows a cross-section through the roller according to Figure 22, sectioned in the
5 plane XXIII-XXIII, after an emergency release from the position in Fig. 17;
6
- 7 Fig. 23a shows a cross-section corresponding to Fig. 23, after completion of the
8 emergency release from the position in Fig. 21;
9
- 10 Fig. 24 shows a perspective cut-away illustration of the embodiment in Figures 13 and 14
11 in the position according to Figure 14;
12
- 13 Fig. 25 shows a perspective illustration of a roller in a further embodiment;
14
- 15 Fig. 26 shows a rear view of the roller according to Fig. 25;
16
- 17 Fig. 27 shows a rear view according to Fig. 26 in a position corresponding to an
18 emergency release from the directional lock or the total lock;
19
- 20 Fig. 28 shows a cross-sectional illustration of the roller according to Figures 25 to 27, in
21 the neutral position;
22
- 23 Fig. 29 shows an illustration according to Fig. 28 in the directional lock;
24
- 25 Fig. 30 shows an illustration according to Fig. 28 in the total lock;
26
- 27 Fig. 31 shows an exploded illustration of the parts interacting for the emergency release;
28
- 29 Fig. 32 shows an enlarged detail according to the detail XXXII in Fig. 29, but after
30 completion of an emergency release; and
31

Fig. 33 shows an illustration according to the detail XXXII in Fig. 29, but after completion of an emergency release and

Fig. 34 shows an illustration according to Fig. 24 of the embodiment according to Fig. 28.

Referring in first instance in particular to Figures 1 to 12, a roller 1 formed as a double roller is described. The roller 1 has two wheels 2 and a mounting journal 3. As will be explained in greater detail below, an electric motor 4 is disposed in the mounting journal 3, the power connection 5 of the electric motor being led, preferably centrally, out of the top of the mounting journal 3. The electric motor 4 effects a linear drive movement of a linear part 6 (see Figure 3) that acts on a transmission part 7 for vertical adjustment.

The transmission part 7 interacts with an activating part 10 via compression springs 8, 9.

As further shown in Figure 1, a handle 11 for emergency release of the roller 1 is fitted to the housing of the roller 1, optionally on the mounting journal 3 or in extension thereof or, in the exemplary embodiment, in the lower region thereof. Above and below the handle 11, which is specifically formed as a rotary lever, abutments 12, 13 are formed on the housing.

In Figure 2 and also in Figure 14, a rear view of the roller according to Figure 1 is represented in a neutral position. In this position, there is no directional lock and no total lock. The roller can rotate freely and the wheels can roll freely.

Further referring to Figure 3 and also, for example, to Figure 15, it can be seen that the wheels 2 are disposed on an axle 14. The sectional view shows a central housing part 15 that is formed between the wheels 2.

The housing part 15 is arranged by means of antifriction bearings 16 to be rotatable relative to the mounting journal 3, which is stationary in the assembled state. The wheels 2 further comprise an internal toothing 17 provided for rotational locking. In interaction with an engagement part 18, for example, one engagement part per wheel, but also, if necessary, with two engagement parts per wheel (cf. second embodiment), the internal toothing 17 forms a first

1 part of the locking device in the exemplary embodiment. The engagement part 18 is biased into
2 the release position according to Figure 3 by a leg spring 19. The leg spring 19 is supported on
3 the one hand on the engagement part 18 and on the other hand on an inner region of the
4 housing part 15, namely on the bottom part 20 thereof, which in the exemplary embodiment is
5 formed as a part of the housing part 15.

6
7 Furthermore, the engagement part 18 is held via an axle 21 so as to be rotatable in the housing
8 15 or the bottom part 20. The axle 21 is formed in a pivot part 43 which has two bearing
9 receptacles 23 for the axle 21 and a further axle 22. The axle 22 supports the engagement part
10 18 on the leg part 42. An acting portion 24 is fixedly connected to the part that accommodates
11 the bearing receptacle 23 and the axle 21. As is apparent, for example, from the illustration
12 according to Figure 10, the acting portion 24 is centered in the direction toward the axle 14
13 between two lateral acting portions 25. Each of the lateral acting parts 25 acts directly on one of
14 the two engagement parts 18 associated with each wheel 2.

15
16 Except for the difference of two springs versus one spring, in particular the above-described
17 designs of the two embodiments correspond to one another.

18
19 The activating part 10 is at least substantially tubular. Furthermore, the activating part 10 has a
20 support flange 26 on the inside which serves as a support region, and on which, in the first
21 embodiment, the compression spring 8 and also the compression spring 9 are supported. In the
22 exemplary embodiment, supporting occurs by means of a washer 27.

23
24 The two springs 8, 9 provided in the first embodiment are arranged one above the other.

25
26 The lower spring 9 is supported by its upper end, and the upper spring 8 is supported by its
27 lower end, on the activating part 10 by means of the support flange 26. The arrangement of the
28 springs one above the other is provided without vertical overlap.

29
30 The upper spring 8 is used for moving the activating part 10 into the position corresponding to
31 the total lock (see Figure 7), and the lower spring 9 is used for moving the activating part 10 into
32 the position corresponding to the directional lock (see Figure 5).

1
2 The transmission part 7 extends within and coaxially with respect to the activating part 10. In
3 both embodiments, the transmission part 7 is substantially solid, the transmission part having an
4 internal thread associated with the upper end 28 thereof. The internal thread interacts with the
5 external thread of the linear part 6. By a rotational movement of the rotor of the electric motor 4,
6 which rotor is preferably formed here corresponding to a nut having an internal thread, the linear
7 part 6 and therefore the transmission part 7 can thus be moved upwardly or downwardly.

8 Therefore, the transmission part 7 is also moved up and down preferably only linearly, thus,
9 without rotating.

10
11 On the underside, the transmission part 7 has a head 29 that is formed corresponding to a
12 screw head. The head 29 can also be used to supplement the guidance within the activating
13 part 10. A further guiding effect is provided by the inner surface of the support flange 26,
14 through which the transmission part 7 passes axially in a freely movable manner.

15
16 On the upper side of the head 29, a further washer is arranged which, with regard to the second
17 embodiment, is also designated as a support part 48, and on which the underside of the
18 compression spring 9 is supported.

19
20 As can be seen, the support of the spring 8 on the activating part 10 and/or the support of the
21 spring 9 on the activating part 10 and/or the support of the compression spring 44, whether in
22 the lower or upper region, on the activating part 10 can in each case be passed through by the
23 transmission part 7.

24
25 Furthermore, the activating part 10 is fixedly connected, in any case in the vertical direction, to a
26 movement extension formed as a cantilever 30. The cantilever 30 can, for example, also be
27 welded to the activating part 10. In the exemplary embodiment, formations 31 for directional
28 locking are formed on the upper side on the cantilever 30 (see Figures 10 and 11), and on the
29 underside (see Figure 12) projections 32 are formed for directional locking in the case of the
30 total lock. The arrangement of the cantilever 30 (in this respect, both embodiments are in
31 accordance with one another) is provided with vertical spacing from the lower and/or upper end
32 of the activating part 10. Furthermore, the arrangement of the cantilever 30 is preferably

1 provided to be eccentric with regard to the vertical height of the activating part 10, namely,
2 preferably closer to the lower end of the activating part 10. The spacing of the cantilever 30 from
3 the lower end of the activating part 10 once again preferably corresponds approximately to a
4 range of one to three times the (outer) diameter of the activating part 10, and, if applicable, in
5 the case of a difference, with regard to the lower region thereof.

6
7 Due to its fixed connection to the activating part 10, the cantilever 30 moves together with the
8 activating part in the vertical direction.

9
10 Furthermore, the handle 11 is connected to the cantilever 30, in particular by means of a sliding
11 part 33 in the first embodiment. The sliding part 33 is accommodated so that it is movable only
12 in the vertical direction in guides 34 that are fixed on the housing and act in particular in the
13 lateral direction.

14
15 In the exemplary embodiment, the sliding part 33 is connected to the cantilever 30 by a positive
16 locking connection 35. The connection is in any case established in such a manner that a
17 movement of the sliding part 33 in the vertical direction is transmitted directly to the cantilever
18 30, and therefore to the activating part 10.

19
20 The handle 11, which is arranged to be rotatable relative to the sliding part 33 or, where
21 applicable, is arranged directly on the sliding part so as to be rotatable relative thereto, can be
22 used for the emergency release if, for example, the electric motor 4 cannot be actuated, as
23 explained hereinafter in greater detail.

24
25 The roller 1 can be operated as follows:

26
27 Starting from the position according to Figures 1 to 3, the linear part 6 can be moved by means
28 of the electric motor 4 in such a manner that a vertical movement of the transmission part 7
29 takes place; compare the difference in the position of the transmission part 7 in Figure 3 and in
30 Figure 5. Since there is a tendency toward a reduction in the spacing between the head 29 of
31 the transmission part 7 and the support flange 26 of the activating part 10, a force is hereby
32 exerted on the activating part 10 via the spring 9, which force moves the activating part vertically

1 upwardly. The cantilever part 30, which is fixedly connected to the activating part 10, thus
2 likewise moves vertically upwardly and interacts with a directional locking part 36 that is fixedly
3 mounted on the housing. In the directional locking part 36, formations [sic; recesses] 37 are
4 formed in which the formations 31 (detent recesses) engage upon corresponding alignment of
5 the wheels 2 of the roller 1, so that the directional lock is achieved with regard to a selected
6 direction.

7
8 A linear movement of the linear part 6 of the electric motor 4 in the opposite direction causes a
9 downward displacement of the transmission part 7, thus from the position in Figure 3 or Figure 5
10 into the position according to Figure 7. The spring 8 causes a downward movement of the
11 activating part 10, the spring being axially fixedly supported on the transmission part 7 by the
12 disc 38, which, with regard to the second embodiment, is also designated as support part 45,
13 and the retaining element 43 as abutment. A front end 41 of the activating part 10 thus acts on
14 the acting part 24, thereby moving the engagement part 18 against the action of the leg spring
15 19 into the engagement position according to Figure 7.

16
17 At the same time, the cantilever part 30 moves downwardly together with the activating part 10.
18 The projections 32 formed on the underside of the cantilever engage with the holding recesses
19 39 (projections) of the locking part 40, and thus effect the directional lock. As can be seen, one
20 direction, which is then locked, can be provided out of a multiplicity of different directions. In
21 contrast, in the case of the single rotational lock (see in particular Fig. 5 and the related
22 description), it can be provided to lock (in each case) only one direction. However, as an
23 alternative, as described, for example, for the second embodiment, it is also possible to lock
24 only one direction from a multiplicity of directions.

25
26 The locking part 40 is fixedly mounted on the housing.

27
28 With regard to the fact that it is necessary to provide for the possibility that the electric motor 4
29 cannot be actuated, for example because of a power outage, precaution is taken that the
30 directional lock or the total lock can be released by hand.

1 This merely requires rotating the handle 11, which is disposed on the sliding part 33 so as to be
2 rotatable relative thereto. If, as a result of the directional lock, the handle 11 is in the position
3 according to Figure 4, by rotating it counterclockwise, the handle can be supported on the
4 abutment 12 that has a corresponding supporting surface that preferably is not arc-shaped,
5 whereby, without changing the position of the transmission part 7, the activating part 10 is
6 moved vertically downwardly, thereby compressing the spring 9.

7
8 If the roller 1 is in the total lock according to Figure 6, the handle 11, by rotary actuation in
9 counterclockwise direction, can be supported in the same manner on an abutment, now the
10 lower abutment 13, so that the activating part 10 is moved upwardly against the action of the
11 spring 8 without changing the position of the transmission part 7. The position after an
12 emergency release from the total lock is illustrated in Figure 9a. The handle position
13 corresponding to an emergency release can be latched.

14
15 The position of the activating part 10 and of the transmission part 7, which does not move
16 during any emergency release, is shown in Figures 9 and 9a.

17
18 With regard to its rotatability, the handle 11 can be spring-biased into its neutral position
19 according to Figure 1.

20
21 In order to bring the handle back into its initial position, manual actuation of the handle into its
22 neutral position is required.

23
24 The further embodiment is described with reference in particular to Figures 13 to 24.

25
26 A significant difference from the previously described embodiment is that only one spring is
27 provided between the transmission part 7 and the activating part 10, namely, the compression
28 spring 44.

29
30 With regard to support, the compression spring 44 can be alternately supported on the
31 transmission part 7 or the activating part 10.

1 In the upper region, the compression spring is supported in first instance on the transmission
2 part 7 itself by means of a support part 45. For this purpose, in particular a counter limit stop 46
3 for the support part 45 is formed on the transmission part. Furthermore, the counter limit stop 46
4 is preferably achieved by tapering the shank diameter of the transmission part 7. The shoulder
5 which is thus formed forms the counter limit stop for the support part 45 in the upward direction.
6

7 However, when the transmission part 7, starting from the position in Figure 15, moves further
8 upwardly, for example into the position in Fig. 17, the support part 45 cannot follow the counter
9 limit stop 46 on the transmission part 7, and instead remains on or reaches the support on the
10 activating part 10. In particular, a counter limit stop 47 is formed for this purpose on the
11 activating part 10, which counter limit stop is in particular achieved by a step resulting from an
12 increase of the clear inside dimension of the activating part 10.
13

14 In this respect, during a movement of the transmission part 7 from a position corresponding to
15 the neutral position into the directional lock, a change in the support of the compression spring
16 44 takes place, namely, from the support on the transmission part 7 to the support on the
17 activating part 10. The support part 45 switches from a support on the counter limit stop 46 to a
18 support on the counter limit stop 47. At the same time, if it has not already taken place
19 previously, a corresponding change can also take place in the lower region of the compression
20 spring 44. The support part 48 and therefore the compression spring 44 are in any case no
21 longer supported on the limit stop 50, but rather, only on the head 29 and therefore on the
22 transmission part 7 itself.
23

24 The support part 48, the same as the support part 45, is displaceable relative to the
25 transmission part 7, in any case in the region of the shank portion 49 that has a thinner
26 diameter.
27

28 Furthermore, here as well, a limit stop is formed on the underside of the activating part 10,
29 which limit stop cannot be overrun by the support part 48. This is the limit stop 50, which can be
30 formed, for example, by a circlip that is inserted at this location in an inner groove of the
31 transmission part 10. In this respect, here as well a support region is formed through which the
32 transmission part 7 can pass through — in this case, in the downward direction.

1
2 In addition, an overlap on the front end engages over the support part 48 by means of the head
3 29 of the transmission part 7, which has already been discussed and also described in
4 connection with the first embodiment. Thus, the support part 48 cannot run over a front end of
5 the transmission part 7.

6
7 If, again approximately corresponding to Figure 17, the transmission part 7 is now moved
8 upwardly from the position in Fig. 15, the support part 48 is carried along accordingly. Thus, the
9 compression spring 44 is shortened and its compressive force is increased, unless, as intended
10 in first instance, the activating part 10 is moved upwardly as a result of the spring force. This
11 upward movement by means of the spring force occurs via the support part 45 and the counter
12 limit stop 47 on the activating part 10.

13
14 Referring to Figures 18 and 19, the structure and the interaction between the parts for achieving
15 the directional lock are further explained.

16
17 Also in accordance with the embodiment described in first instance, a cantilever 30, which in
18 this embodiment has engagement holes 51, is connected to the activating part 10. Accordingly,
19 the directional locking can take place from a plurality of possible directions. In this embodiment
20 as well, the cantilever 30 is enclosed on one side by a positive locking part 35 on which the
21 handle 11 is mounted outside the housing 15. In the region of a narrowing (preferably
22 cylindrical) outer diameter of the activating part 10, the cantilever 30 is connected fixedly, in any
23 case with regard to a vertical movement, to the activating part 10. As can be seen, the
24 cantilever is already connected at the top by the step 52 formed due to the narrowing.
25 Furthermore, with regard to a downward movement, the cantilever can also be connected, for
26 example, by a shrink-fit connection, or welding, or any other fixed connection.

27
28 In this embodiment, the directional lock 36 which is fixedly mounted on the housing is provided
29 with downwardly facing engagement projections 53. Accordingly, the engagement projections
30 engage in the engagement holes 51 of the cantilever 30 when they move toward one another.

1 The same as in the first embodiment, as a result of the directional lock, the housing 15, which
2 due to the antifriction bearings 16 is in principle rotatable relative to the mounting journal 3 and
3 therefore in particular relative to the activating part 10, is rotationally locked to the activating part
4 10.

5
6 With regard to a total lock, corresponding engagement projections 54 are also formed on the
7 underside of the cantilever 30, corresponding to a position of the total lock of the activating part
8 10. As can be seen, these engagement projections can preferably be formed as one piece with
9 the corresponding housing part.

10
11 As is apparent in particular from Figure 19, the cantilever 30, which preferably is disc-like, can
12 have an inner contour that deviates from circularity. Flat portions 55 can be provided, which
13 preferably face one another. The flat portions 55 can interact with corresponding flat portions on
14 the outer contour of the transmission part 10, which is not illustrated in detail.

15
16 In this embodiment as well, the positive locking part 35 is accommodated in a guide 34 of the
17 housing, thereby forming a sliding part 33. The positive locking part is thus movable relative to
18 the housing. In doing so, it correspondingly carries along the rotatably connected handle 11
19 vertically, which handle, however, is otherwise fixedly connected to the sliding part or the
20 cantilever 30.

21
22 Furthermore, for a total lock, the activating part 10 acts on the overall four engagement parts 18
23 provided in the second embodiment.

24
25 The engagement parts 18 are each formed on lever parts 56 and 57, respectively, which are
26 fixedly mounted in the housing via axles 58, 59. The corresponding housing part 60, which, as
27 can be seen here, is also reinforced in a grid-like manner, is stationary, while the internal
28 toothing 17 correspondingly revolves together with the wheel.

29
30 The two lever parts 56, 57 are connected via a pivot joint 61 at their mutually facing ends. A
31 corresponding pivot joint axle 62 can move substantially in the radial direction in an elongated
32 hole 63.

Furthermore, the lever parts 56, 57 are biased into their non-engagement position by a clip spring 64, as illustrated, for example, in Figure 23.

In the second embodiment, the action by the activating part 10 takes place in particular by means of a clip part 68, which can also have a resilient design.

As is further shown, in a side view the clip part 68 is substantially U-shaped, comprising two U legs 64, 66 and a pivot axis 67. As is apparent, for example, from Figure 24, the lower U leg 66 shown in the illustration is provided twofold, with the two legs being horizontally spaced apart, which in each case act on an associated head surface of an engagement part 18 associated with each of the wheels.

With regard to the first embodiment but in particular also with regard to the second embodiment, the design of the engagement parts 18 is also of importance, independently of the actual design of the activating part 10 and/or the interaction of this actuating part 10 with the transmission part 7.

Thus, provided with regard to the second embodiment are in particular the formation of each of the engagement parts as levers, which are connected in an articulated manner at associated ends, and/or the action on only one of the two engagement parts associated with the respective wheel so as to bring both engagement parts into the engagement position, and/or the action on the engagement parts by a clip part, and/or the further details that are described above in this regard.

The roller 1 according to the second embodiment is operated basically in the same manner as the roller 1 of the first embodiment.

Starting from the position according to Figures 13 to 15, the linear part 6 is moved by means of the electric motor 4 in such a manner that with regard to a total lock, a vertical downward movement of the transmission part 7 takes place, i.e., from a position according to Figure 15 into a position according to Figure 21. The compression spring 44, which is pushed downwardly

1 from the upper side by means of the counter limit stop 46, pushes the transmission part 10
2 downwardly as the result of contact of its opposite end with the limit stop 50 of the transmission
3 part via the support part 48. Thus, the end face of the transmission part 10 acts on the upper U
4 leg of the clip part 68, as is also apparent in particular from Fig. 24. Thus, at the same time,
5 compressive force is exerted on the two lever parts 57 via the lower leg 66 so that the
6 engagement parts 18 are pushed, against the action of the clip spring 64, into their locking
7 position. Due to the lever connection with the lever parts 56, which, accordingly, are provided
8 twofold, the oppositely situated engagement parts 18 are also pushed into the locking position.
9 Thus, in this embodiment as well, the cantilever part 30, which is fixedly connected to the limit
10 stop part 10, likewise moves vertically downwardly. The engagement holes 51 interact with the
11 engagement projections 54 for directional locking.

12
13 A linear movement of the linear part 6 of the electric motor 4 in the opposite direction causes the
14 transmission part 7 to move upwardly, thus, for example, from the position in Figure 15 or
15 Figure 21 into the position in Figure 17 (unless only the neutral position is to be reached from
16 the position in Figure 21). The compression spring 44 is hereby carried along upwardly by
17 means of the head 29 and the support part 48, as a result of which the compressive stress on
18 the support part 45 increases, and by engaging against the counter limit stop 47, the support
19 part pushes the activating part upwardly so that the mentioned position can be reached.

20
21 At the same time, as can also be seen here, the cantilever part 30 and therefore the handle 11
22 move upwardly together with the activating part 10.

23
24 Comparable to the above-described emergency release, the emergency release can also be
25 carried out in this second embodiment.

26
27 The displaceability of the activating part 10 relative to the stationary transmission part 7, which
28 is basically achieved here, is explained by way of the example of the emergency release, this
29 feature also being of importance independently of this example. This is carried out in each case
30 against a spring force. In the second exemplary embodiment, it is carried out against the action
31 of the same respective compression spring 44.

1 In both cases of emergency release, the same as in the first embodiment, a counterclockwise
2 rotary movement of the handle 11 is required. One of the handle cantilevers is then supported
3 either on the lower abutment 13 or the upper abutment 12.

4
5 As can be seen from this second embodiment, the lower abutment is formed as a horizontally
6 extending, protruding rib, which could correspondingly also be provided in this manner in the
7 first embodiment. On the upper side, a detent recess is formed in the rib, in which detent recess
8 the corresponding part of the hand lever engages in a latching manner after completion of the
9 emergency release. Accordingly, in the case of the upper abutment 12, a receptacle is provided
10 at the zenith of the inner curve guide, which receptacle acts in the same locking manner on the
11 corresponding part of the hand lever after completion of the emergency release carried out in
12 this manner.

13
14 A further embodiment of the emergency release and the actuating handle is illustrated in
15 Figures 25 to 33.

16
17 In this embodiment, the actuating handle 11 is formed as a disc part which is rotatable about the
18 axis of rotation d. In this embodiment the actuating handle 11 is also preferably substantially
19 integrated into the outer contour of the housing 15, which surrounds the actuating handle in this
20 region. There are virtually no significantly protruding regions. An outer surface of the actuating
21 handle 11 preferably continues the spherical curvature of the surrounding housing region, in any
22 case in a neutral or initial position according to Fig. 25.

23
24 In the illustrated exemplary embodiment, the actuation can in particular be carried out by means
25 of a fork part by engaging in the two actuation recesses 69. In the exemplary embodiment, as
26 can be seen, the actuation recesses 69 are circular indentations which are formed on a
27 diameter line on opposite sides with regard to the axis of rotation. Alternatively, a slot, for
28 example, can also be provided which, for instance, can be actuated with a coin.

29
30 Furthermore, as is apparent from Fig. 28, for instance, the actuating handle 11 in the exemplary
31 embodiment described here, but also in all previously described exemplary embodiments, is

1 disposed on the same side as the activating part 10 with regard to an axis of rotation D of a
2 wheel 2.

3
4 The geometric axis of rotation d of the actuating handle also passes through the activating part
5 10. Moreover, in the exemplary embodiment and preferably, it is arranged to extend in a
6 horizontal plane that passes through the wheel 2. In the exemplary embodiment, the horizontal
7 plane also passes through the physical wheel axle 14 of the wheel 2.

8
9 In the course of actuating the locking device of the roller, whether into the directional lock
10 according to Fig. 29 or into the total lock according to Fig. 30, the activating part 10 is
11 correspondingly moved in the vertical direction. However, in contrast the actuating handle 11 is
12 (vertically) stationary.

13
14 In this embodiment as well (see in particular Fig. 31), the activating part 10 interacts with a
15 cantilever 30, which, however, interacts here initially with a sliding part 70, which is guided in the
16 housing 15 in the direction of movement of the activating part 10. As is also apparent, for
17 instance, from Fig. 28, for this purpose the cantilever 30 engages in a horizontal slot 71 of the
18 sliding part 70.

19
20 The sliding part 70 is guided in a housing insert part 72. For this purpose, the housing insert part
21 72 has oppositely situated guide grooves 73 which are open toward one another. Guide
22 projections 80 are formed on opposite sides at the longitudinal edges of the overall rectangularly
23 configured sliding part 70, and are accommodated in the guide grooves 73. The actuating
24 handle 11 has a through pin 74 that points in the direction facing the activating part 10. The
25 through pin 74 is arranged eccentrically with regard to the axis of rotation d of the activating
26 handle 11. The through pin 74 acts directly on the sliding part 70 through the housing insert part
27 72.

28
29 The sliding part 70 has an upper limit stop 75 and a lower limit stop 76. In the exemplary
30 embodiment and preferably, the limit stops 75, 76 are formed as transversely and horizontally
31 extending ribs 81. In the position corresponding to the directional lock according to Fig. 29, the
32 through pin 74 is closer to the lower limit stop 76, and in the position corresponding to the total

1 lock according to Fig. 30, it is closer to the upper limit stop 75. Positions that are in each case
2 close to or are just touching the limit stops 75 and 76 can also occur. In any case, the design is
3 preferably such that during the customary motor-driven movement of the activating part 10 from
4 the neutral position into the position of the total lock (Fig. 30) or the position of the directional
5 lock (Fig. 29), a (rotational) movement of the actuating handle 11 does not yet take place. A
6 subsequent rotation of the actuating handle 11 moves the through pin 74, on a circular path,
7 further upwardly or downwardly so that the respective locking position is thus overridden.

8
9 Figures 32 and 33 each show a position after rotating the actuating handle 11. Accordingly, the
10 illustration of the detail of Fig. 32 shows the positions of the sliding part 70 and of the through
11 pin 74 after completion of the emergency release from the position of the direction lock which
12 was previously reached by motor drive. The enlarged detail of Fig. 33 shows the positions of the
13 through pin 74 and of the sliding part 70 after completion of the emergency release from the
14 total lock position. In both positions, the through pin 74 is inserted in the respective detent
15 opening 78 or 79.

16
17 Furthermore, the actuating handle 11 is biased into a neutral position by a spring, preferably a
18 spiral coiled spring 77. Upon actuation of the emergency release, the through pin 74 moves
19 further into detent openings 78 and 79 in the region of the upper limit stop 75 and the lower limit
20 stop 76, respectively. The release position reached due to the emergency release, which,
21 however, preferably does not correspond to a neutral position of the activating part, is thus
22 fixed.

23
24 During a subsequent (repeated) motor-driven activation of the activating part 10, the neutral
25 position of the actuating handle 11 and therefore of the through pin 74 can be reached again
26 due to the spring bias. In the described exemplary embodiment, this requires that the activating
27 part 10 is initially moved further by motor in the direction of the movement forced on the
28 activating part 10 in the case of an emergency release and thus, in the case of the emergency
29 release from the directional lock, is moved further in the direction of a total lock, and in the case
30 of the emergency release from the total lock, is moved further in the direction of the directional
31 lock.

1 The embodiment in Figures 25 to 32 is further characterized by a particular configuration of the
2 clip part 68 or an intermediate part between the activating part 10 and one or more lever parts
3 57, the plurality thereof being movably coupled to one another, if necessary.

4
5 The intermediate part acts on an acting part which is designed, for example in the form of the
6 mentioned lever part 57, which in the course of a total lock engages with the wheel 2, preferably
7 with an internal toothing 17 formed on the wheel 2. For this purpose, the engagement part, for
8 example a lever part 57, is to be moved between an engagement position (compare to Figure
9 30, for example) and a release position (compare to Figure 28, for example), namely, preferably
10 to be moved by pivoting. To this end, the acting part is also mounted on the wheel 2, preferably
11 in a pivotable manner (cf. also axle 59).

12
13 The intermediate part, the clip part 68, for example, moves the engagement part, a lever part
14 57, for example, into the release position. The intermediate part carries the engagement part
15 along with it into the release position during a movement of the activation part 10 from the
16 position of the total lock into a neutral position or a position of the directional lock, the
17 intermediate part preferably following this movement due to spring bias.

18
19 It is in particular further provided here that the intermediate part has an activating projection 82
20 which is connected to the intermediate part or, more preferably, integrally formed as one piece
21 with the intermediate part, for example, the clip part 68. This activating projection 82 is
22 particularly preferably a resilient projection. Moreover, the activating projection 82 preferably
23 provides a load on the engagement part, which preferably is formed as a lever part, at the same
24 time that a load is provided by the activating part 10, in which the activating part moves back
25 vertically upwardly, for example, thereby moving the engagement part into the release position.

26
27 Particularly preferably, a lever part 56, 57 is in each case loaded at a lever extension in such a
28 manner that during a movement resulting from this load, the engagement part is removed from
29 the engagement position, so that the wheel 2 is able to rotate freely. This load is preferably
30 constantly provided by the activating part. However, the load is exceeded during a movement of
31 the activating part 10 into the position of the total lock, since the greater force is thereby exerted
32 on the other lever portion of the lever part 57 by means of the clip part 65 or in particular the U

1 leg 66, and therefore the engagement part is moved by force into the engagement position. The
2 same intermediate part, in particular the clip part 68, thus acts twice on the same engagement
3 part, one action being performed with a greater force than the other one.

4
5 With regard to a pivot axle 67 by means of which the intermediate part is pivotably secured to
6 the wheel 2, preferably to the bottom part 20, the activating projection 82 is disposed at least
7 partially on one side of the pivot axle 67, and the U leg 65 is disposed on the other side, with
8 respect to a vertical in the case of a normal position of use of the roller 1.

9
10 Due to the fact that, more preferably, as illustrated and described, two engagement parts 56, 57,
11 both being formed in a lever-like manner, are drivingly connected to one another by means of
12 the pivot joint 62, which can be formed, for example, by a pin running in a corresponding
13 elongated hole, the described action on only one lever part 56 or 57 is sufficient to also move
14 the other one. However, in principle it would also be possible, for example, to act on the one
15 lever part 57 with regard to the movement into the engagement position and to act on the other
16 lever part 56 with regard to the movement back into the release position.

17
18 With regard to the latter, reference is made in particular to the illustration according to Figure 34.

19
20 All features disclosed are (in themselves) pertinent to the invention. The subsidiary claims in
21 their optional subordinated formulation characterize independent inventive refinement of the
22 prior art, in particular to undertake divisional applications based on these claims.

Reference list

- 1 Roller
- 2 Wheel
- 3 Mounting journal
- 4 Electric motor
- 5 Power connection
- 6 Linear part
- 7 Transmission part
- 8 Compression spring
- 9 Compression spring
- 10 Activating part
- 11 Grip for actuating handle
- 12 Abutment
- 13 Abutment
- 14 Axle
- 15 Housing
- 16 Antifriction bearing
- 17 Internal toothing
- 18 Engagement part
- 19 Leg spring
- 20 Bottom part
- 21 Axle
- 22 Axle
- 23 Bearing receptacle
- 24 Acting part
- 25 Lateral acting portions
- 26 Support part
- 27 Washer
- 28 Upper end
- 29 Head

- 30 Cantilever
- 31 Formation
- 32 Projection
- 33 Sliding part
- 34 Guide
- 35 Positive locking part
- 36 Directional lock
- 37 Detent recess
- 38 Disc
- 39 Holding recess
- 40 Locking part
- 41 Front end
- 42 Pivot part
(Leg part)
- 43 Retaining element
- 44 Compression spring
- 45 Support part
- 46 Counter limit stop (of 7)
- 47 Counter limit stop (of 10)
- 48 Support part
- 49 Shank portion
- 50 Limit stop
- 51 Engagement holes
- 52 Step
- 53 Engagement projection
- 54 Engagement projection
- 55 Flat portion
- 56 Lever part
- 57 Lever part
- 58 Axle

59	Axle
60	Housing
61	Pivot joint
62	Pivot joint
63	Bearing
64	Clip spring
65	U leg
66	U leg
67	Rotational axis
68	Clip part
69	Actuating recess
70	Sliding part
71	Horizontal slot
72	Housing insert part
73	Guide groove
74	Through pin
75	Limit stop
76	Limit stop
77	Spiral coiled spring
78	Detent opening
79	Detent opening
80	Guide projection
81	Rib
82	Activating projection

CLAIMS

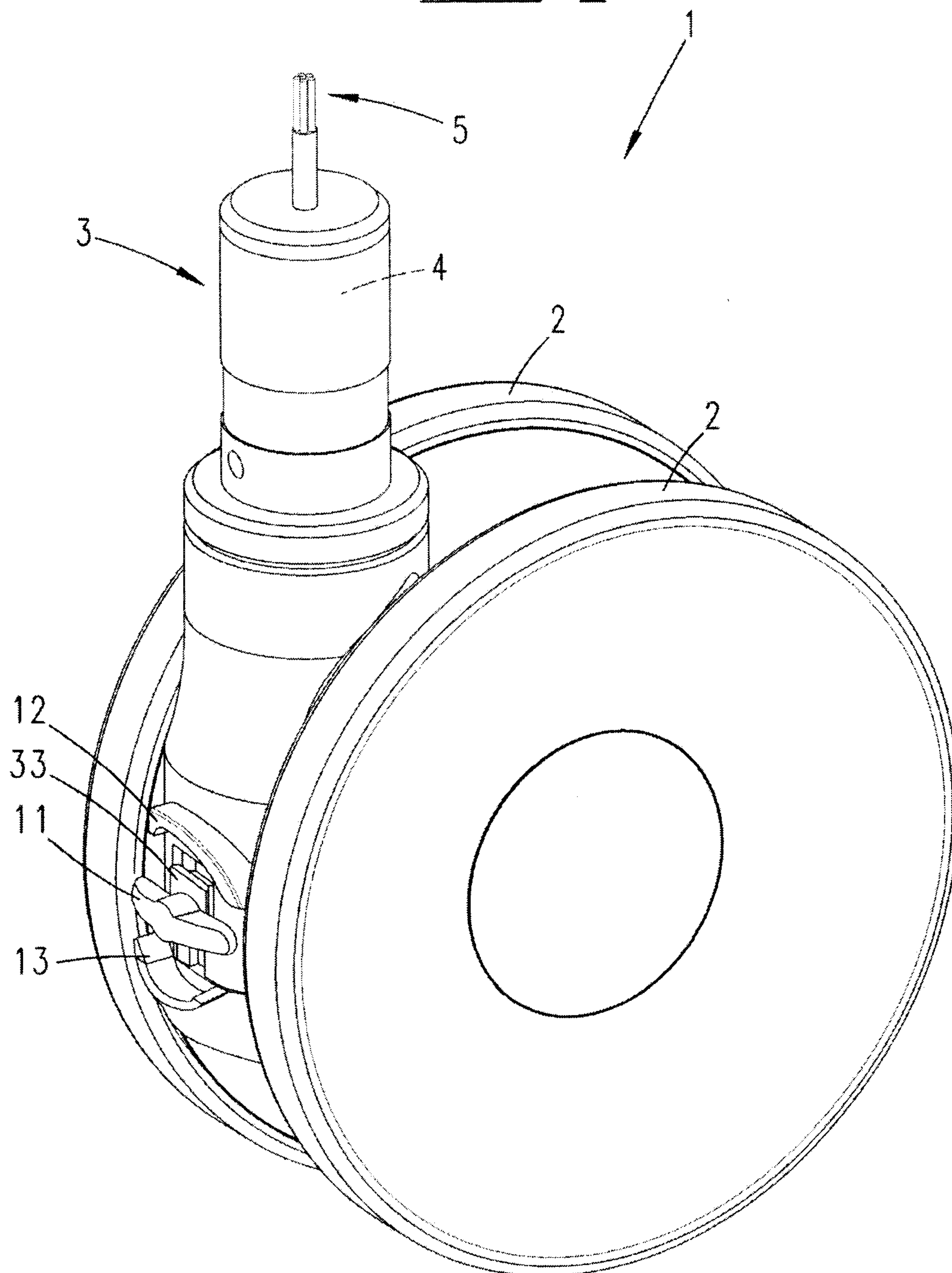
1. A roller (1), comprising two wheels (2) and a locking device, an activating part (10) acting on the locking device for releasing or locking, and the activating part (10) being movable by a drive, a movement of a transmission part (7) that is generated by said drive being transmitted via spring force to the activating part (10) for moving same, and at least one spring (8, 9, 44) being supported on the transmission part, characterized in that a support region for the at least one spring (8, 9, 44) is formed on the activating part (10), through which region the transmission part (7) can pass.
2. The roller according to claim 1, characterized in that the at least one spring is adapted to be lifted off from a support region on the transmission part (7).
3. The roller according to either of claims 1 and 2, characterized in that the at least one spring is adapted to be lifted off from the support region on the activating part (10) by means of the transmission part (7).
4. The roller according to any one of claims 1 to 3, characterized in that the activating part (10) forms a lower central chamber which is open at the bottom and in which the at least one spring is accommodated.
5. The roller according to any one of claims 2 to 4, characterized in that the at least one spring is adapted to be lifted off upwardly from the support region.
6. The roller according to any one of claims 2 to 5, characterized in that on the transmission part (7) is formed an upper support region and a lower support region for supporting the at least one spring and that the at least one spring is adapted to be lifted off downwardly from the upper support region.
7. The roller according to any one of claims 1 to 6, characterized in that the transmission part (7) is disposed within the activating part (10).

8. The roller according to any one of claims 1 to 7, characterized in that the actuating part (10) acts on an engagement part by means of a springlike intermediate part, in that the intermediate part is pivotably mounted in the wheel for movement between an engagement position and a release position, and the intermediate part of the engagement part moves into the release position.
9. The roller according to any one of claims 1 to 8, characterized in that for carrying out an emergency release, the activating part (10) is adapted to be actuated by engaging a handle (11) that is accessible from the outside.
10. The roller according to claim 9, characterized in that the handle (11) moves together with the activating part (10).
11. The roller according to either of claims 9 and 10, characterized in that the handle (11) is fixedly connected to the activating part (10).
12. The roller according to any one of claims 9 to 11, characterized in that that the activating part (10) is adapted to be moved relative to the stationary transmission part (7) by means of the handle (11).
13. The roller according to one of claims 9 to 12, characterized in that that the handle (11) is adapted to be moved relative to a stationary abutment (12, 13).
14. The roller according to either of claims 12 and 13, characterized in that the movement of the activating part (10) takes place relative to the stationary transmission part (7) while carrying along the support region for the at least one spring.
15. The roller according to any one of claims 1 to 14, characterized in that only one spring is provided.
16. The roller according to one of claims 1 to 14, characterized in that a first spring and a second spring are provided, the first spring being required for moving the activating part

(10) into a position corresponding to a total lock, and the second spring being required for moving the activating part (10) into a position corresponding to a directional lock.

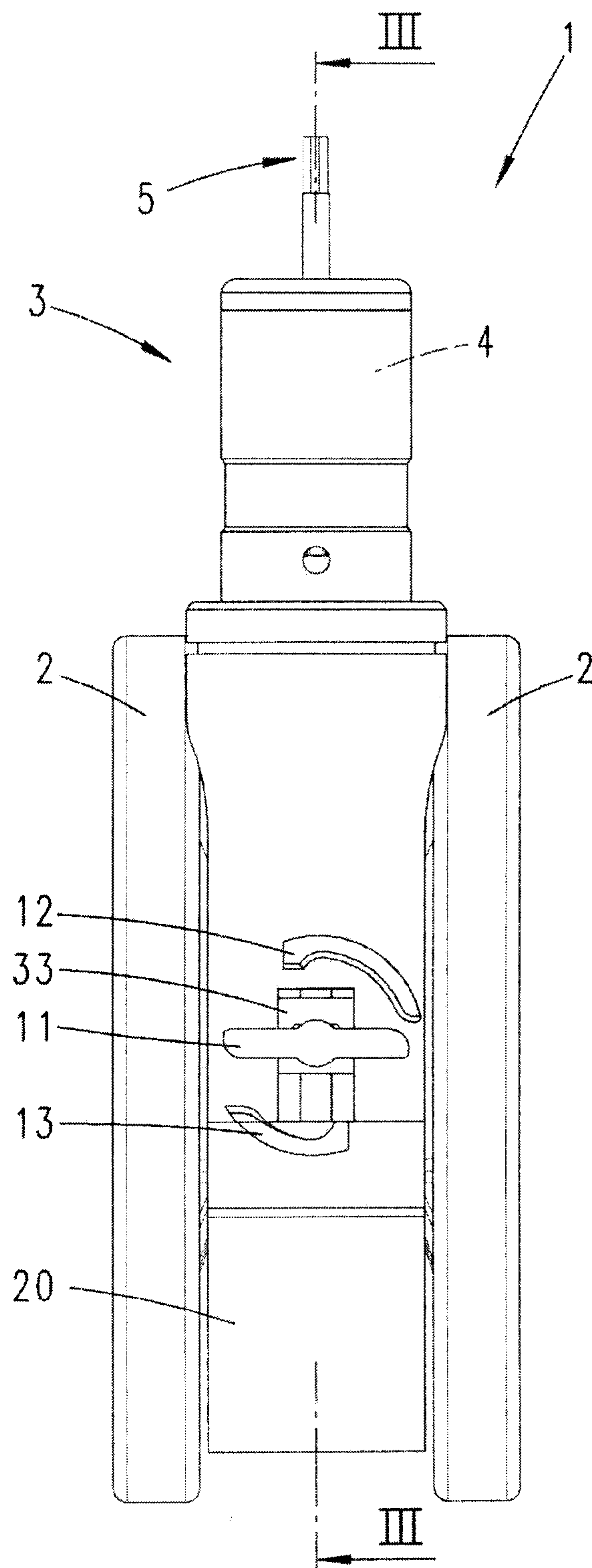
17. The roller according to claim 16, characterized in that the first spring and the second spring are arranged one above the other.
18. The roller according to claim 17, characterized in that the first spring is arranged above the second spring, and the second spring is supported by its upper end on the activating part (10), and the first spring is supported by its lower end on the activating part.
19. The roller according to one of claims 16 to 18, characterized in that the first spring is situated within the activating part (10).
20. The roller according to one of claims 16 to 19, characterized in that the second spring is situated within the activating part (10).
21. The roller according to one of claims 16 to 20, characterized in that at least one of the first spring and the second spring is situated outside the transmission part (7).
22. The roller according to claim 21, characterized in that both the first spring and the second spring are situated outside the transmission part (7).

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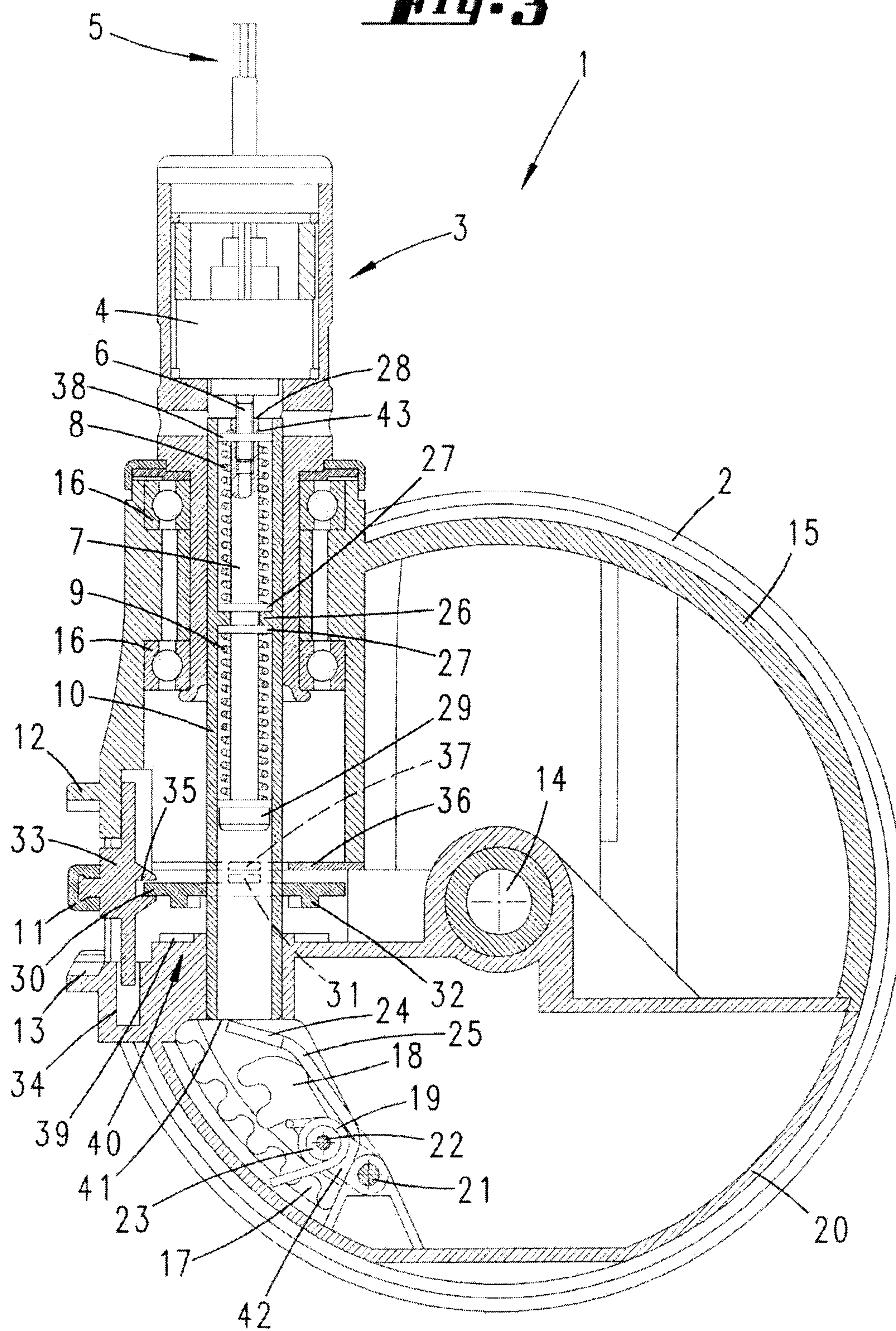
Fig. 1

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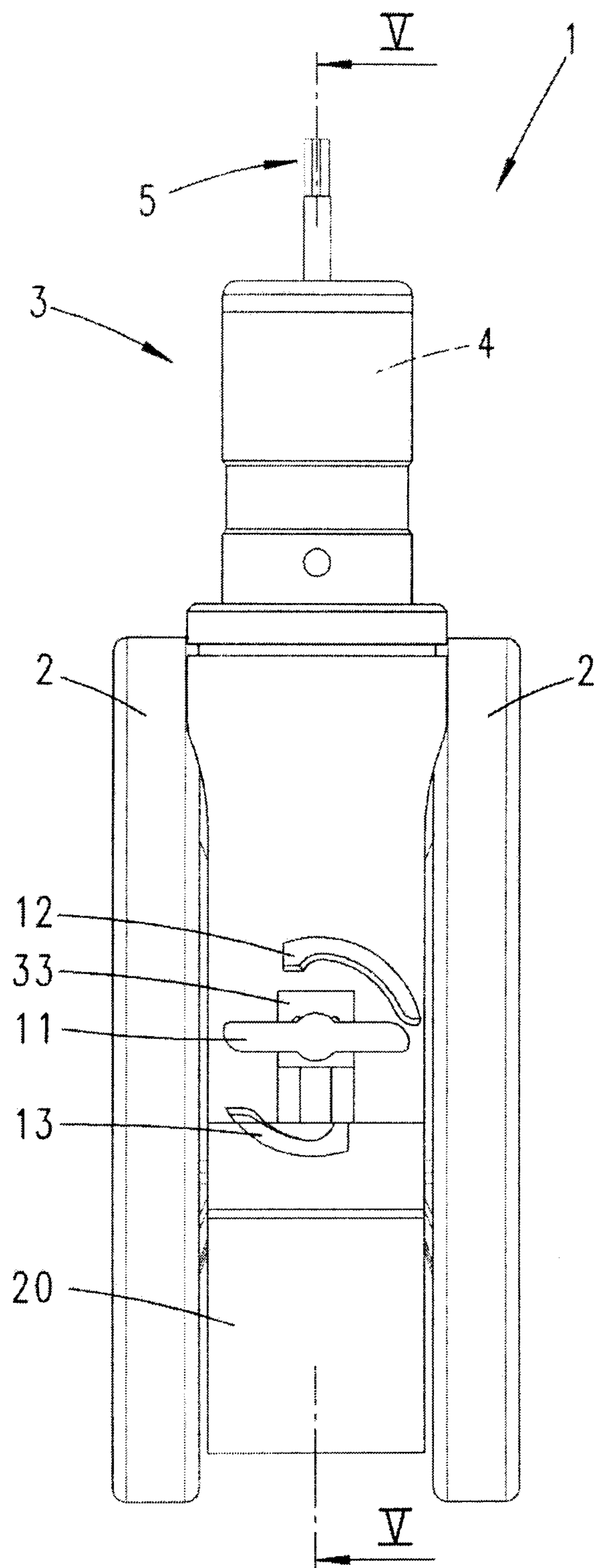
Fig. 2



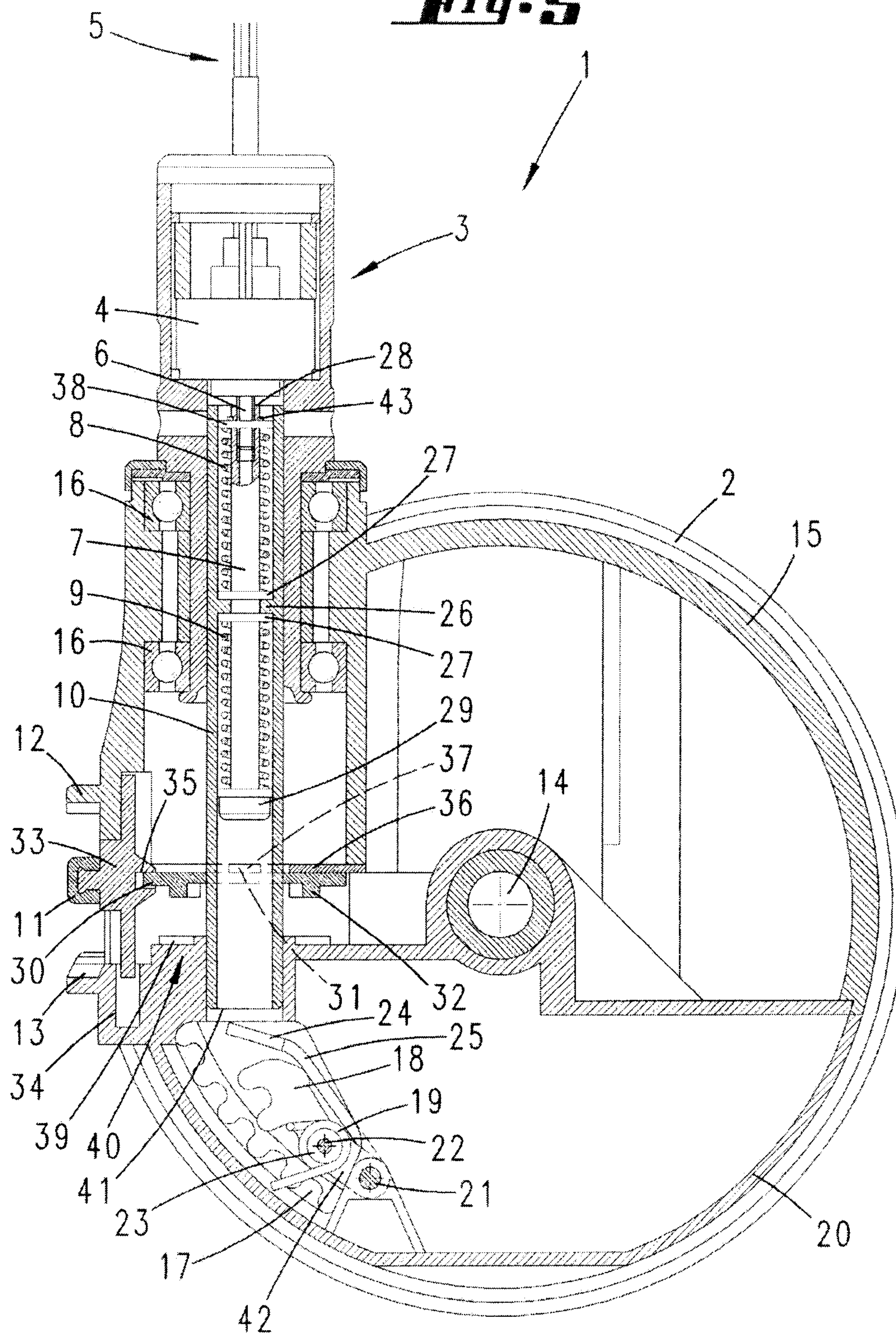
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Fig. 3

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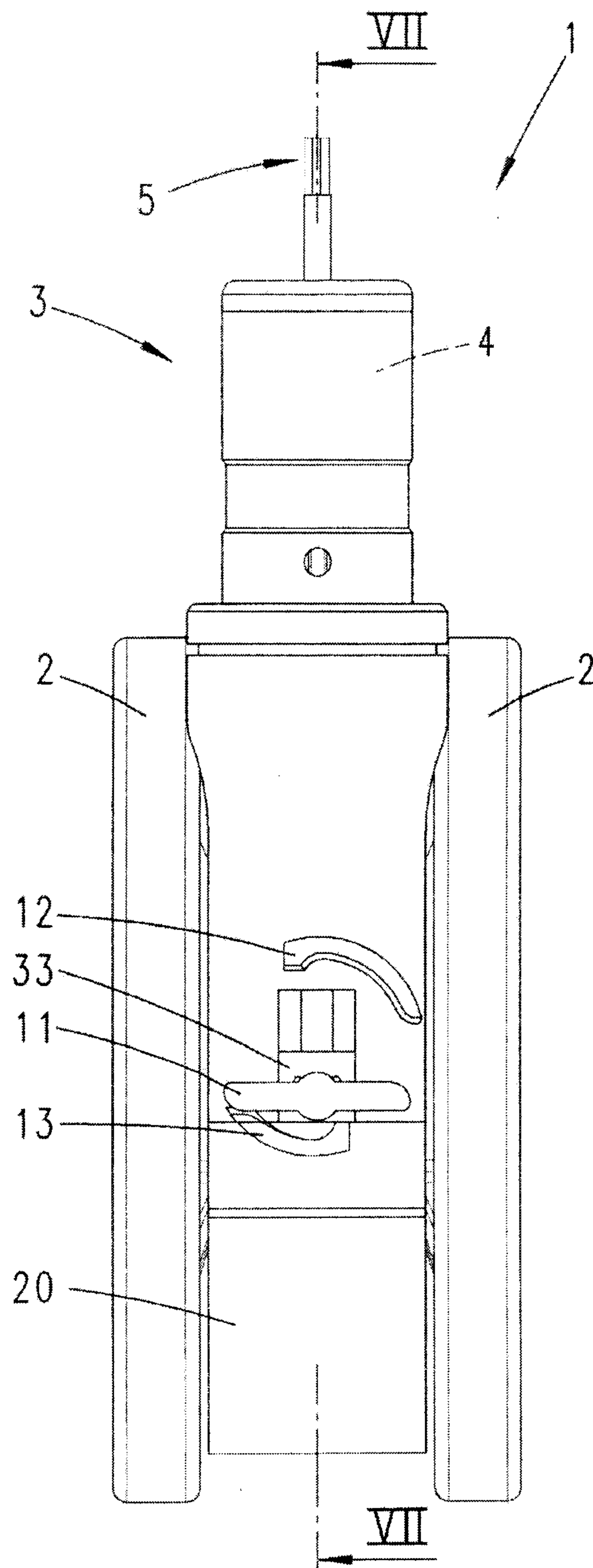
Fig. 4

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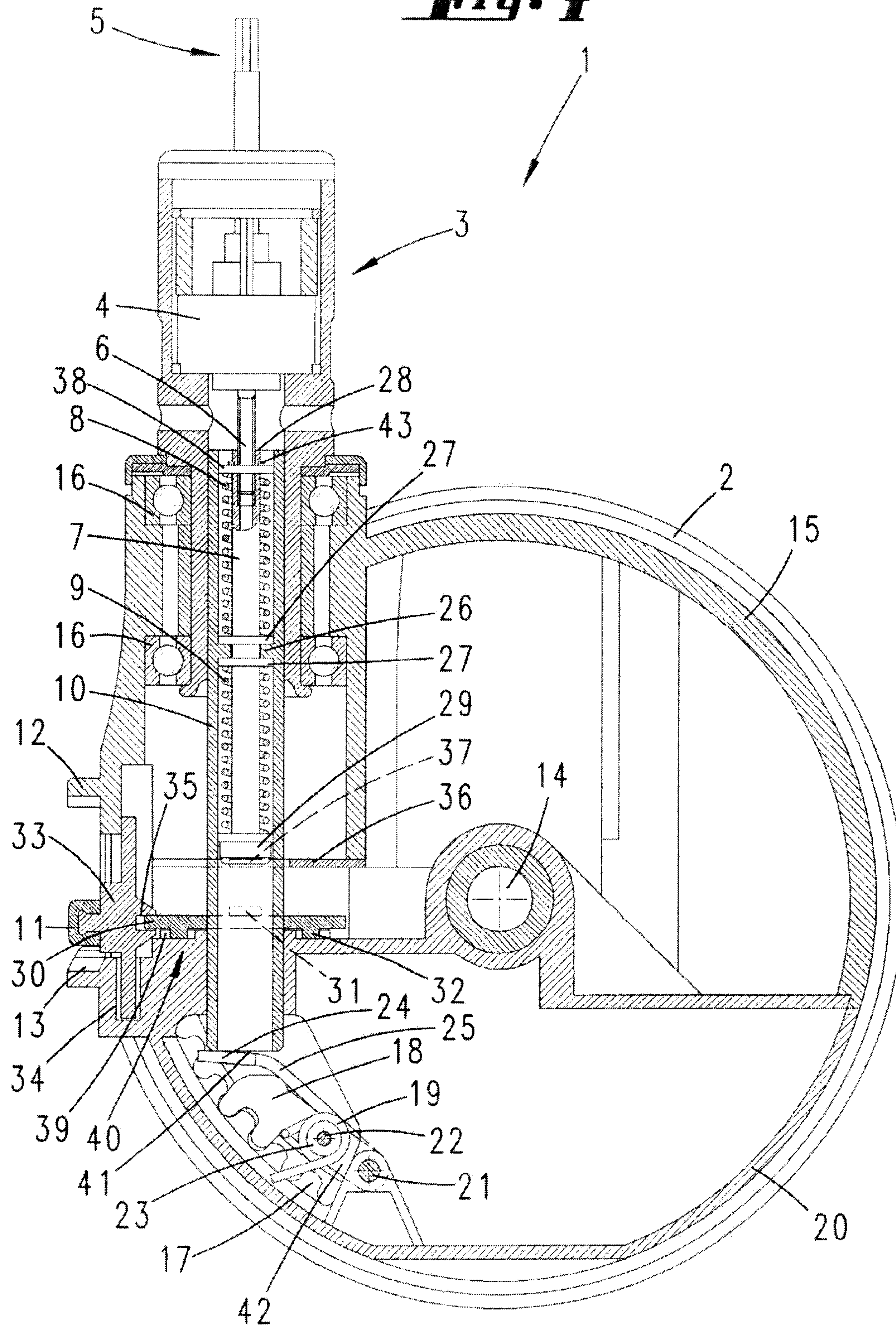
Fig. 5

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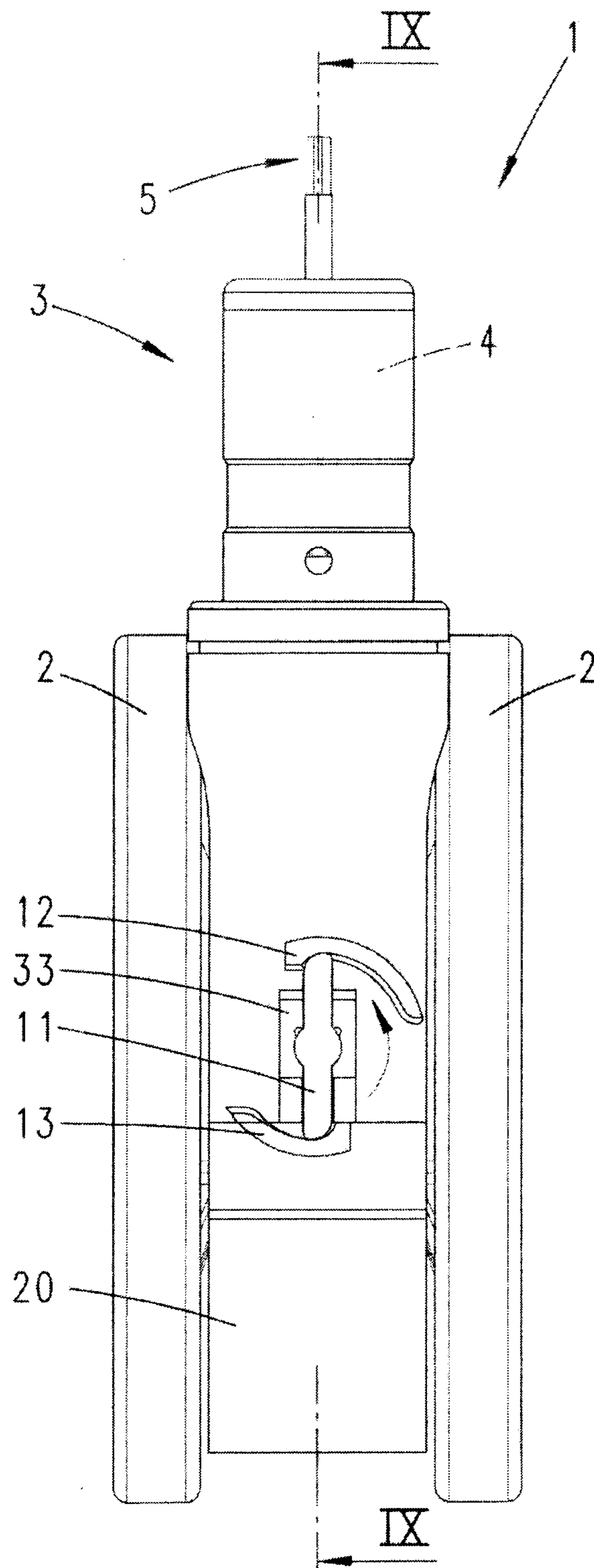
Fig. 6



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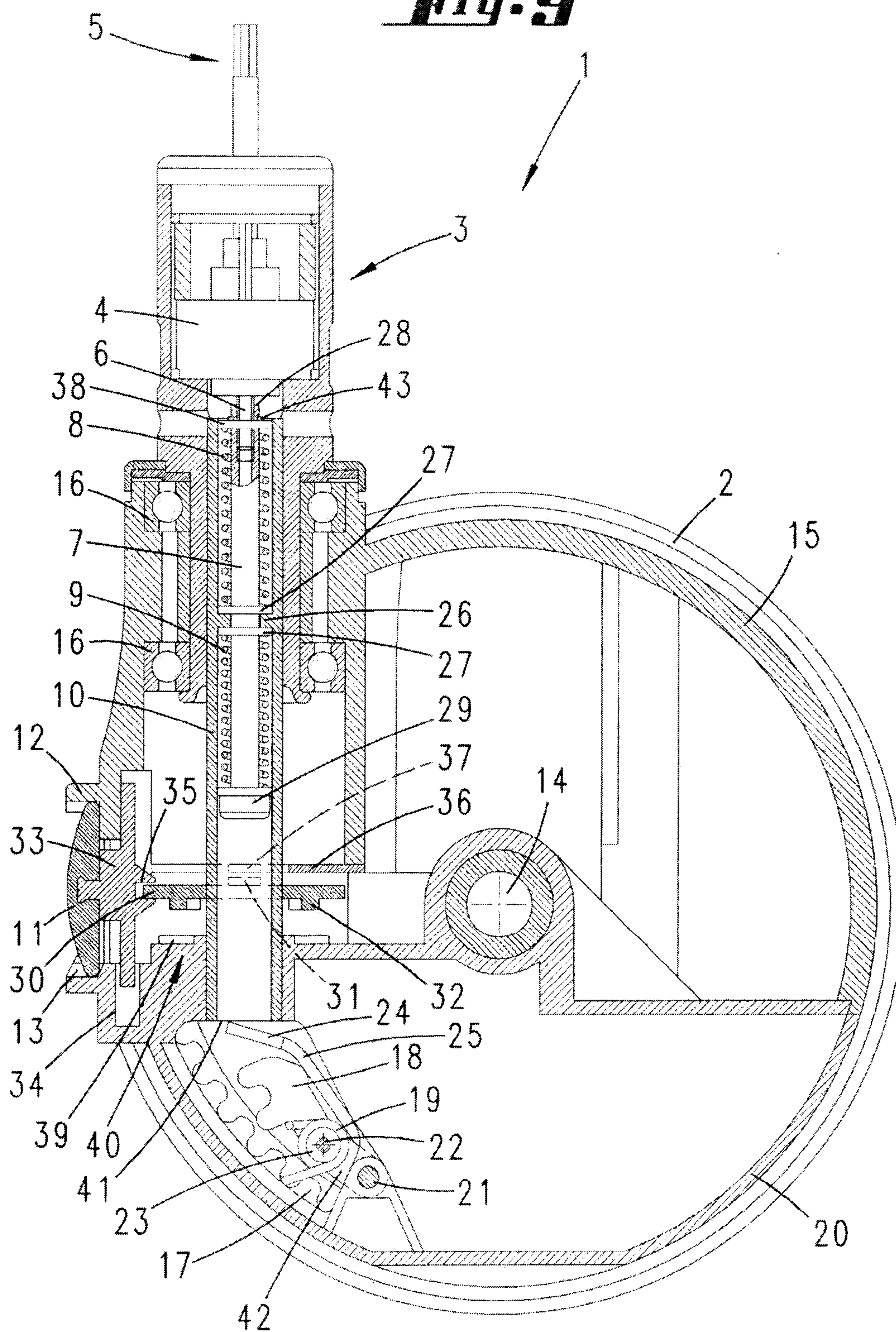
Fig. 7

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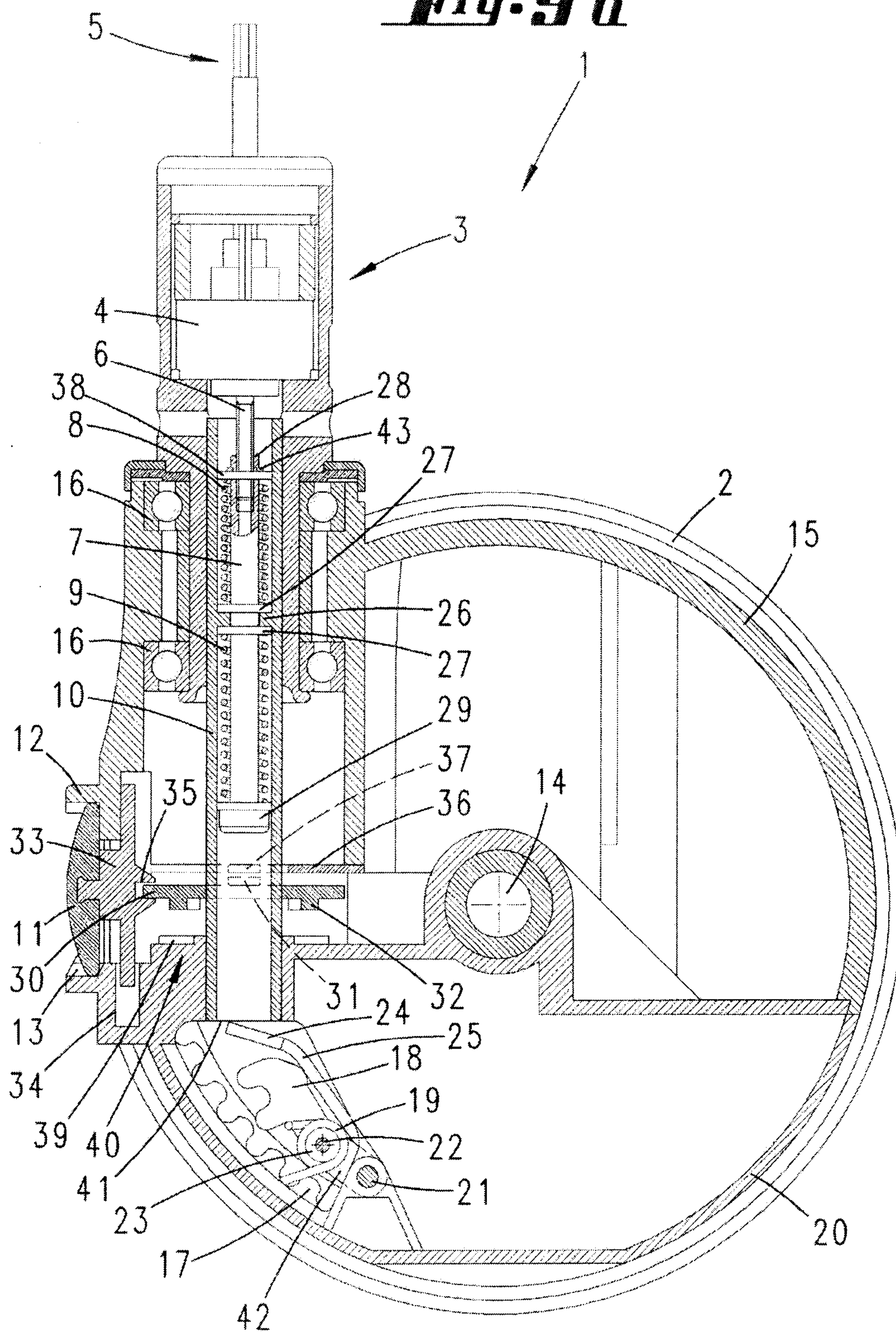
Fig. 8

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Fig. 9

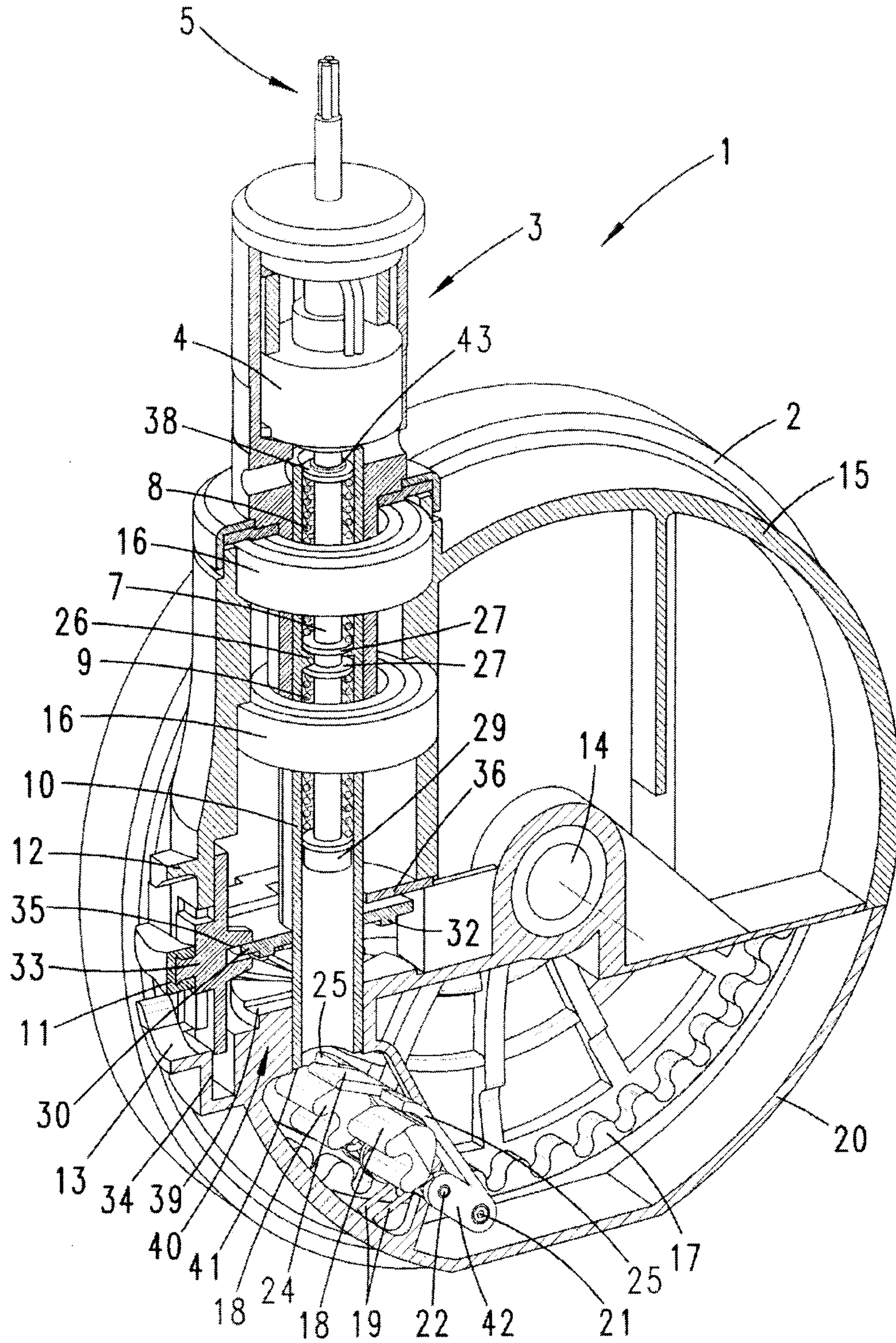


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Fig. 9a

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Fig: 10



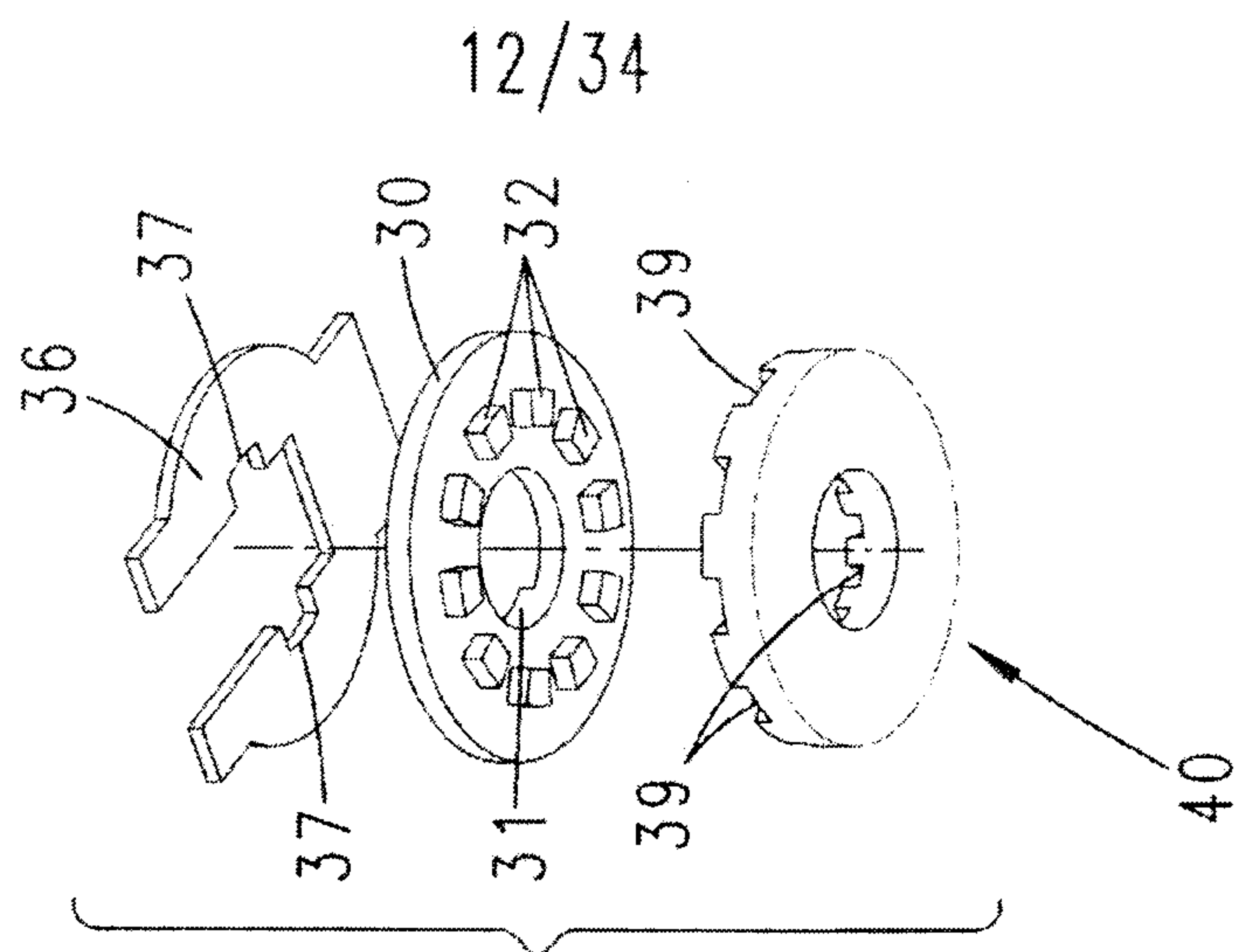


Fig. 12

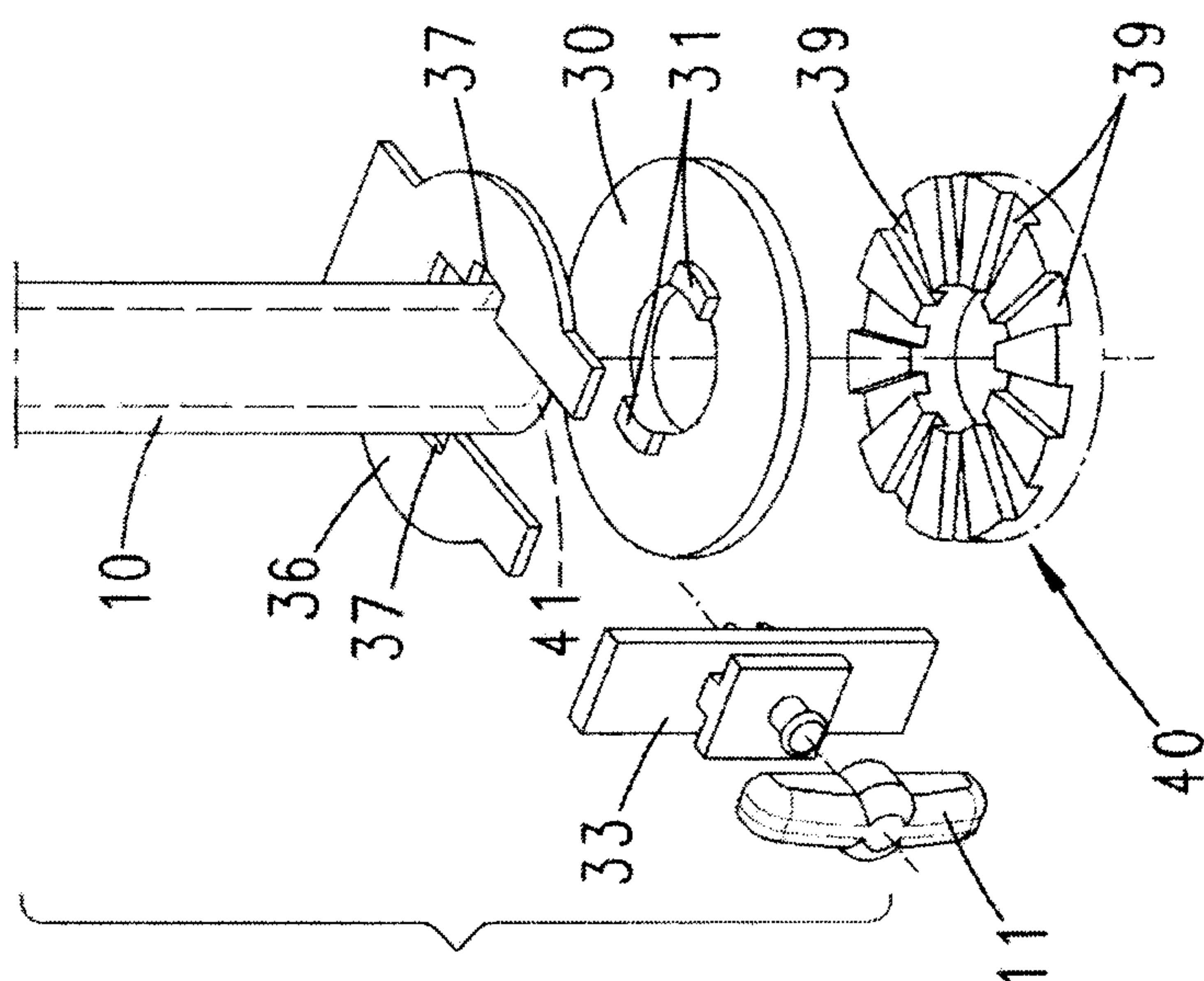
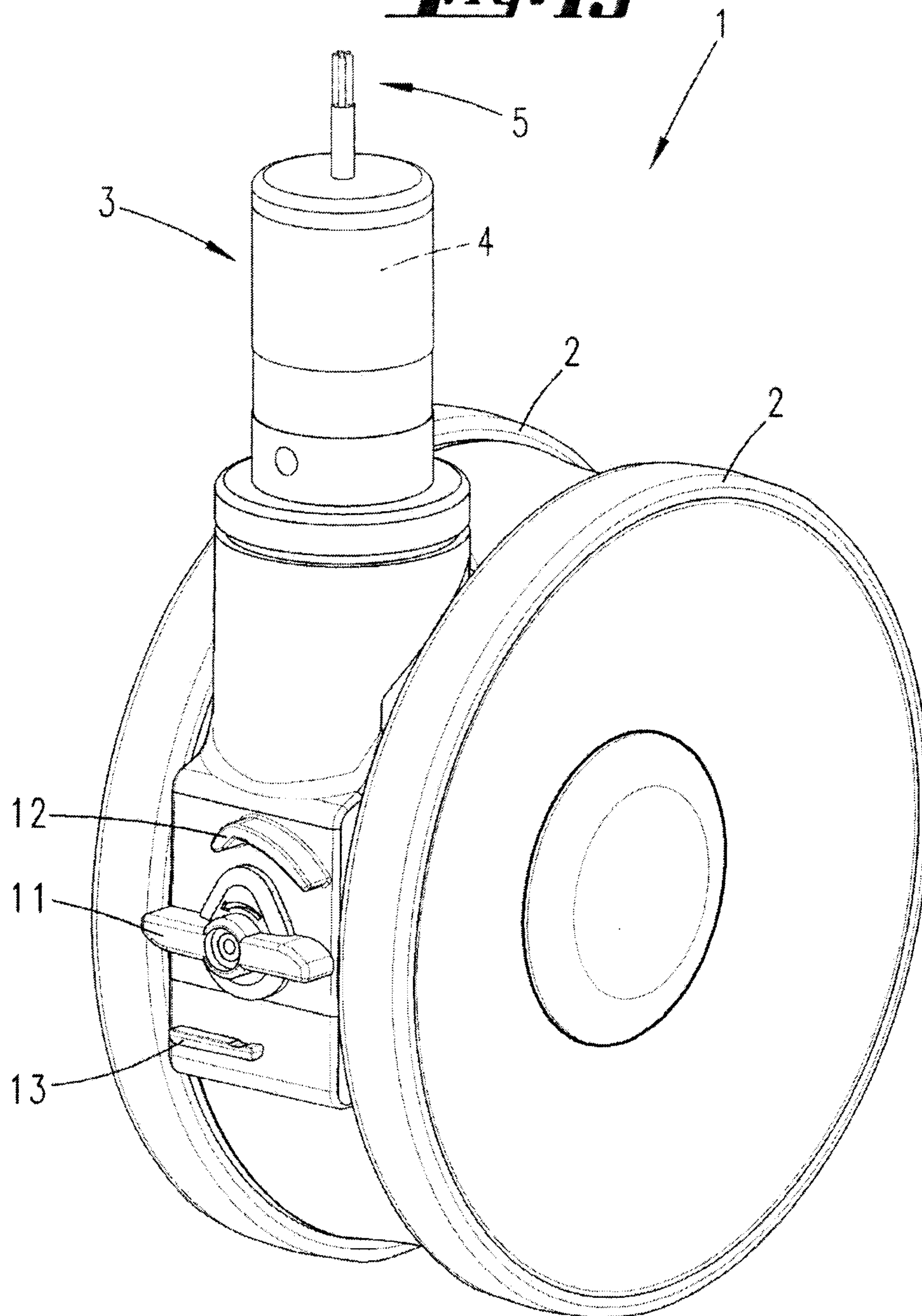
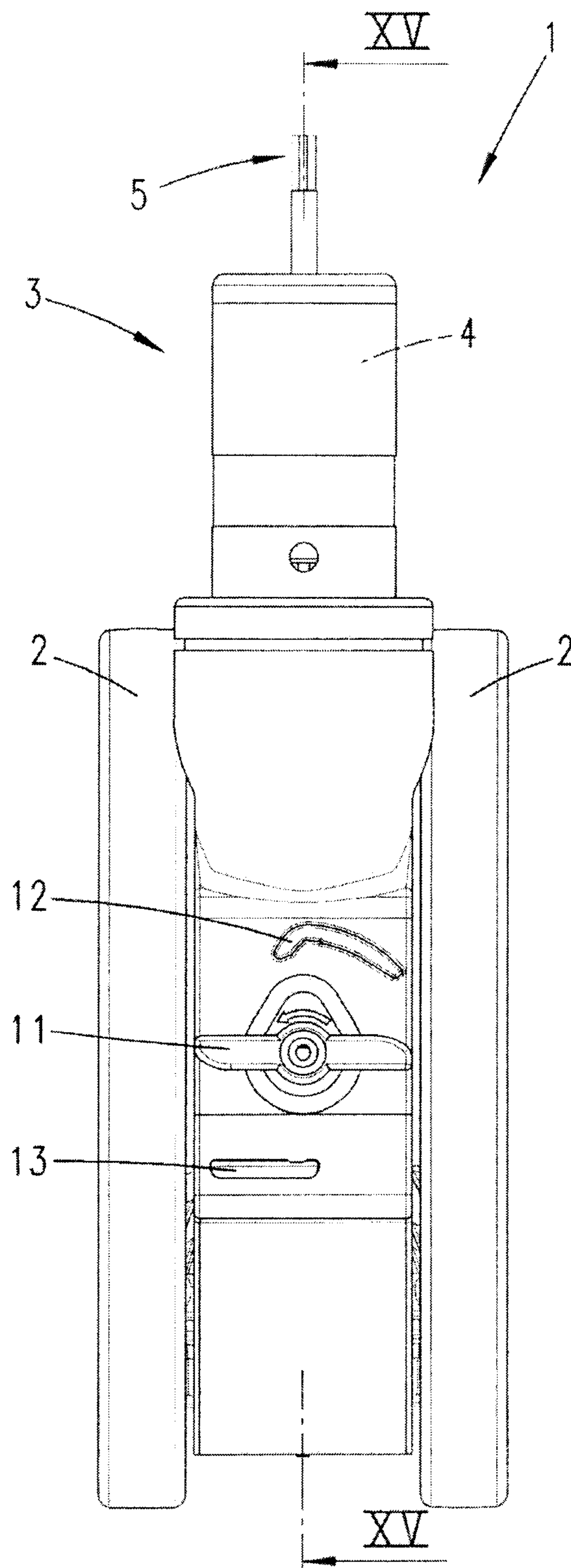


Fig. 11

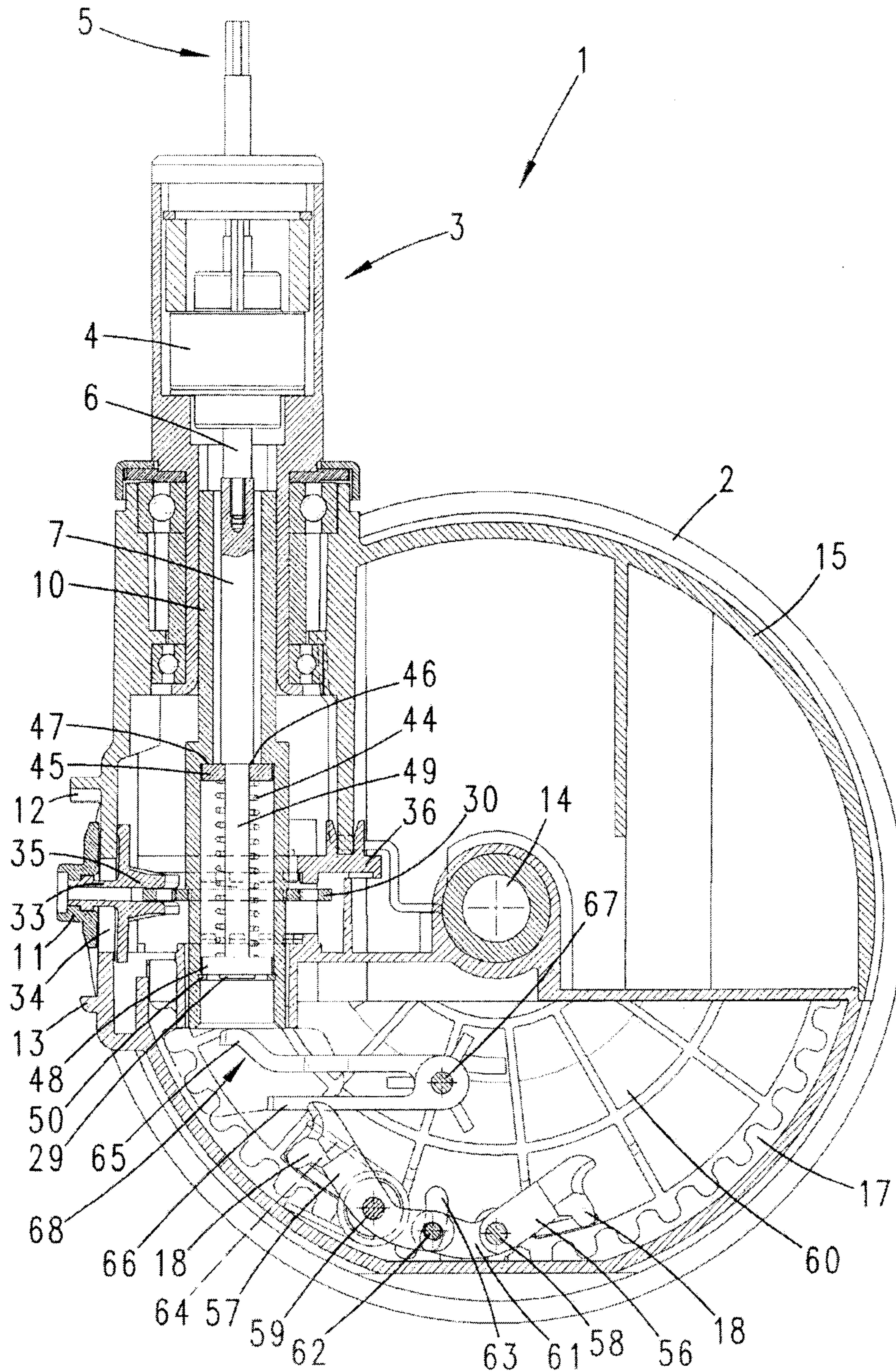
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Fig. 13

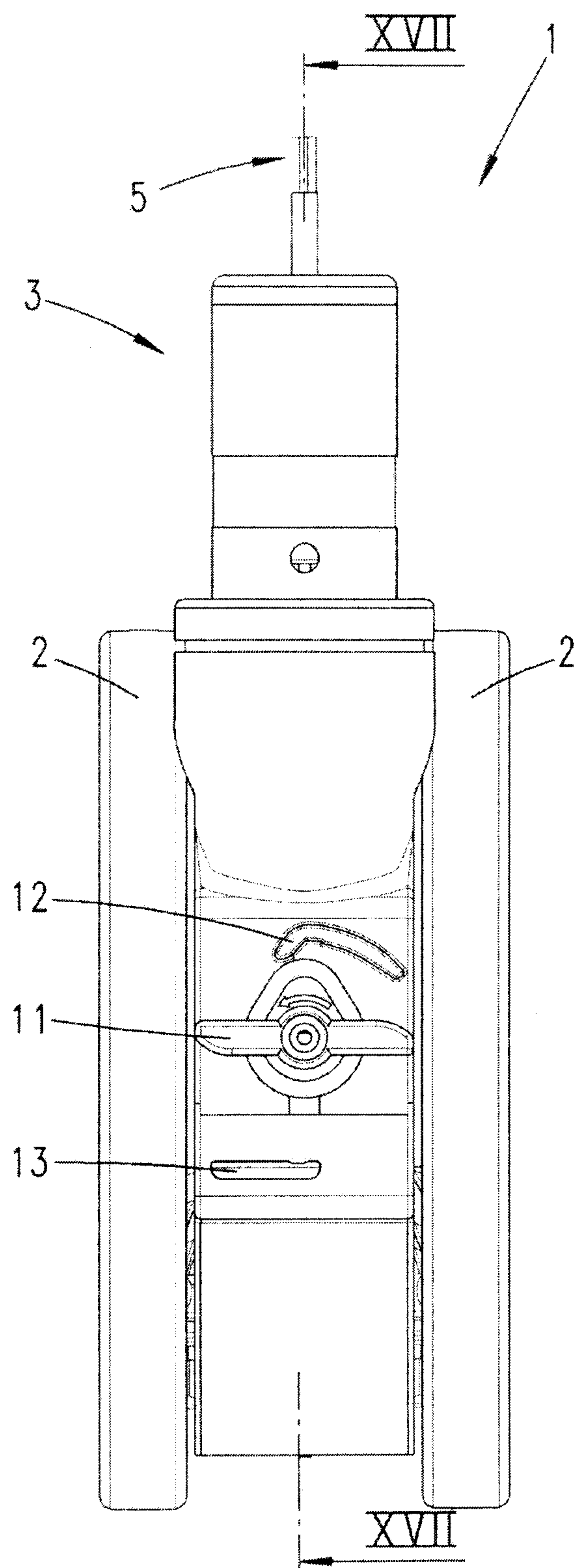
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Fig. 14

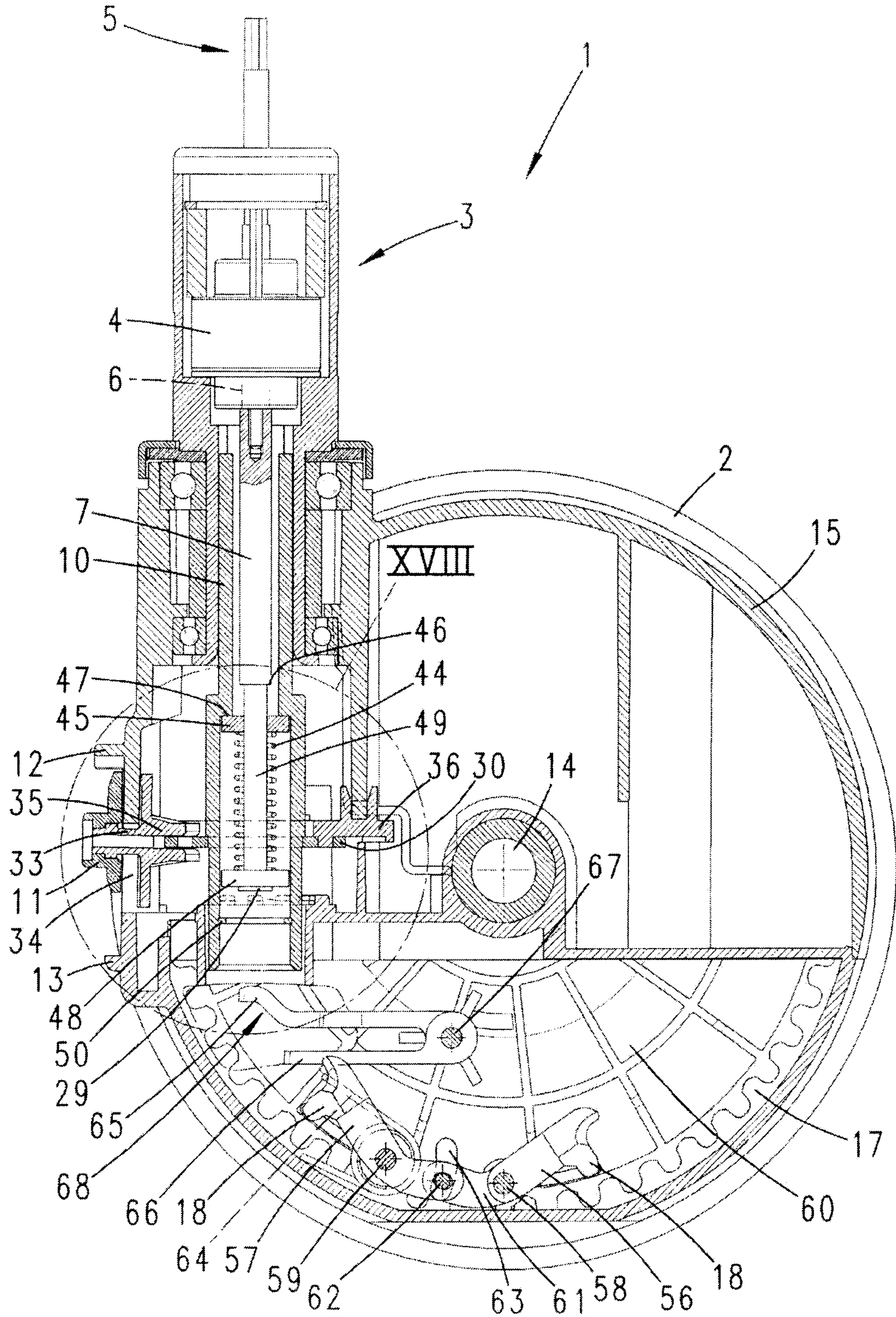
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Fig. 15

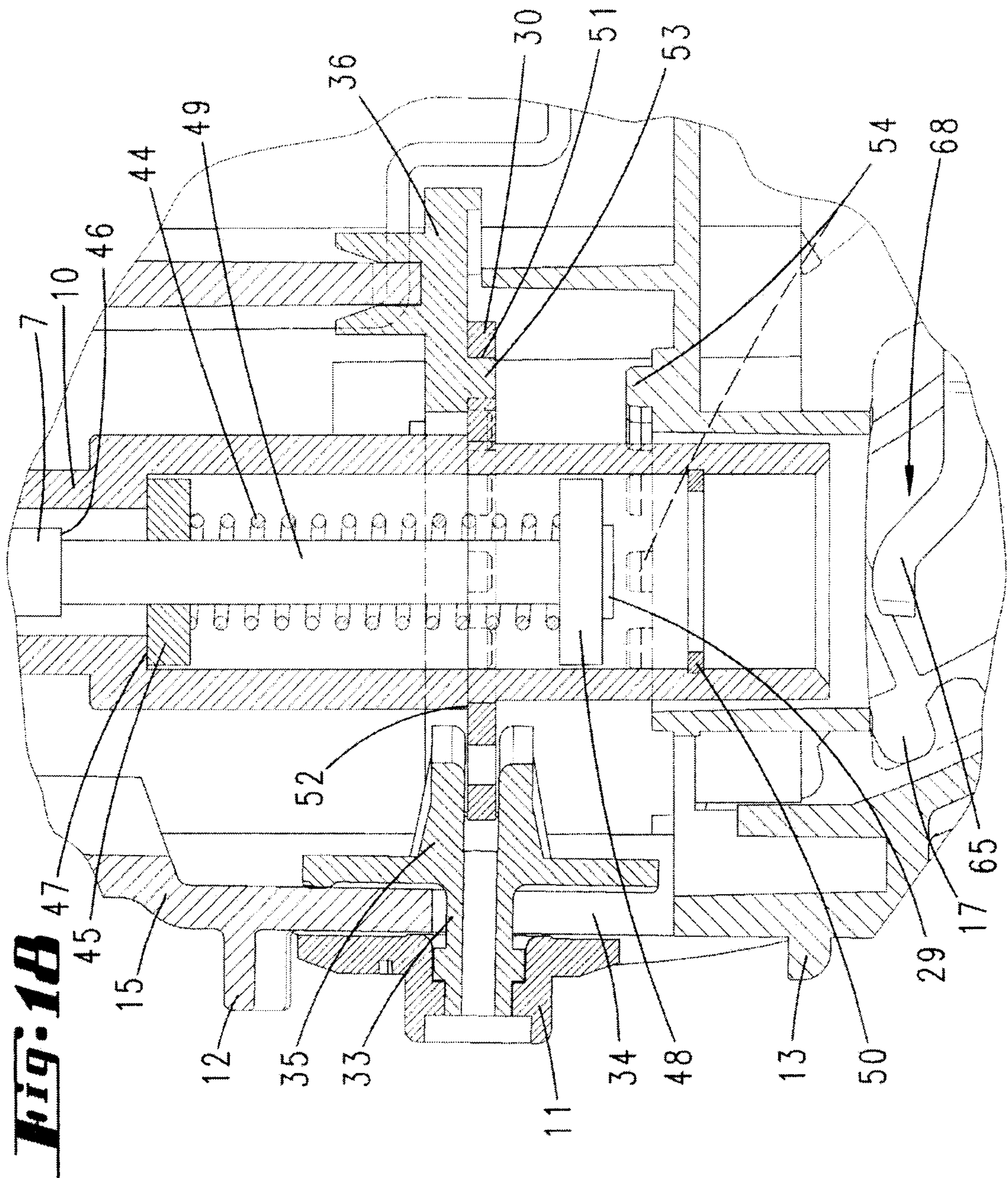
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Fig. 16

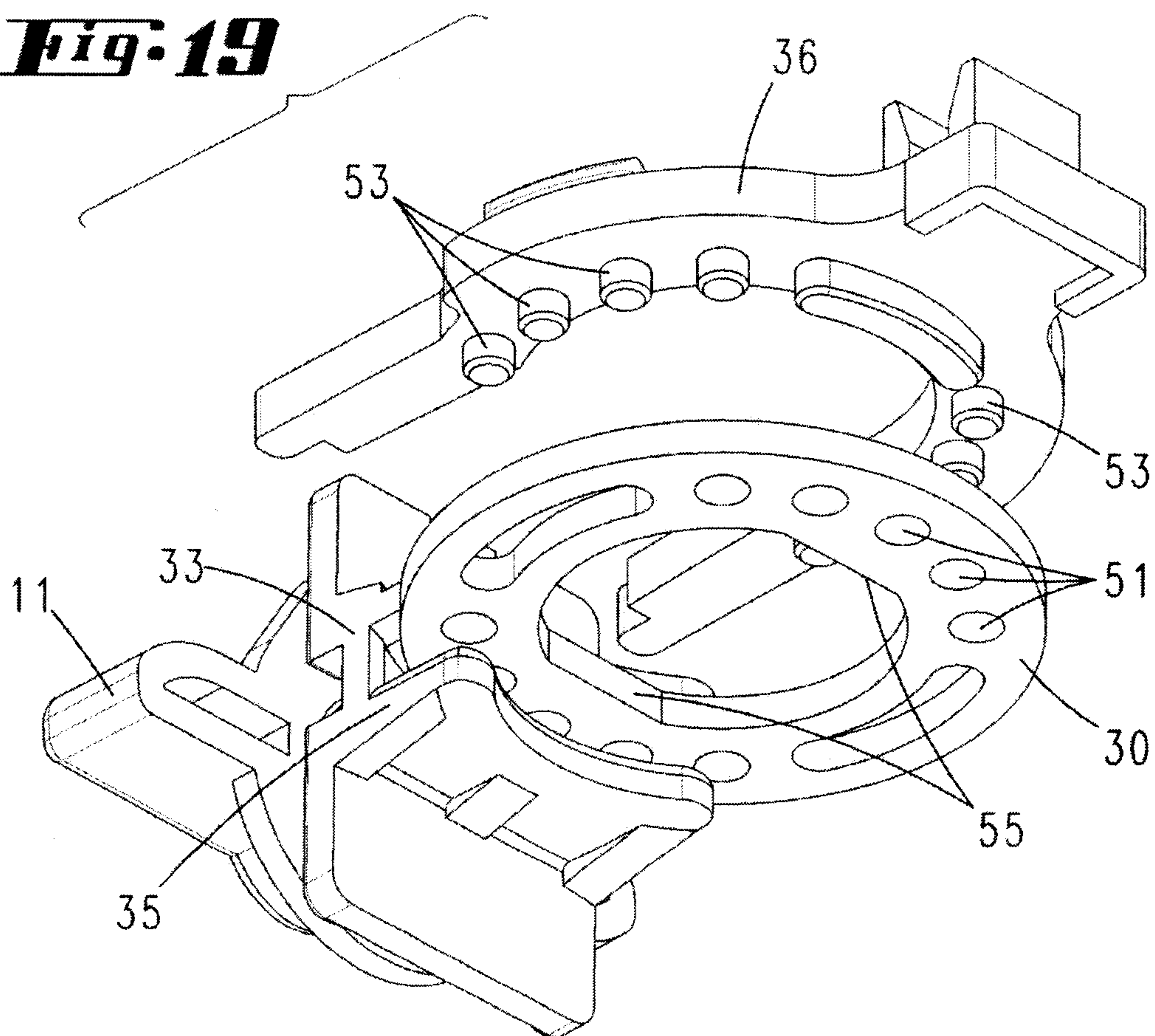
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Fig. 17

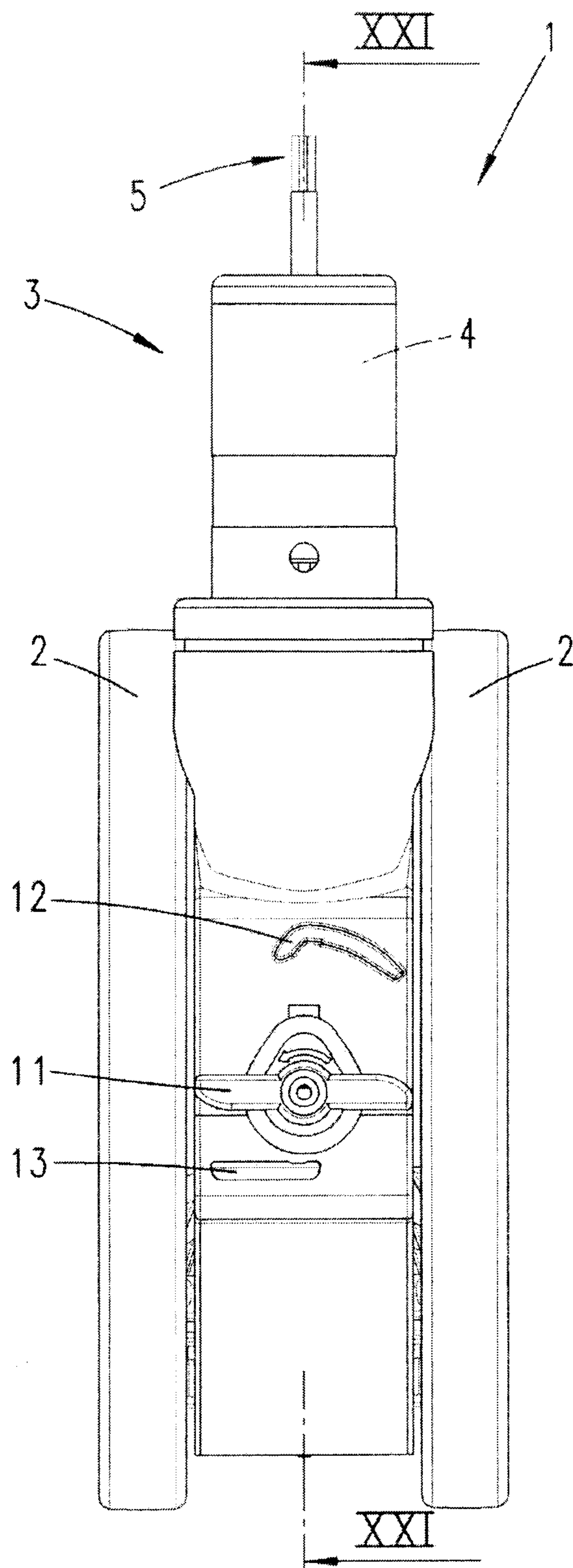
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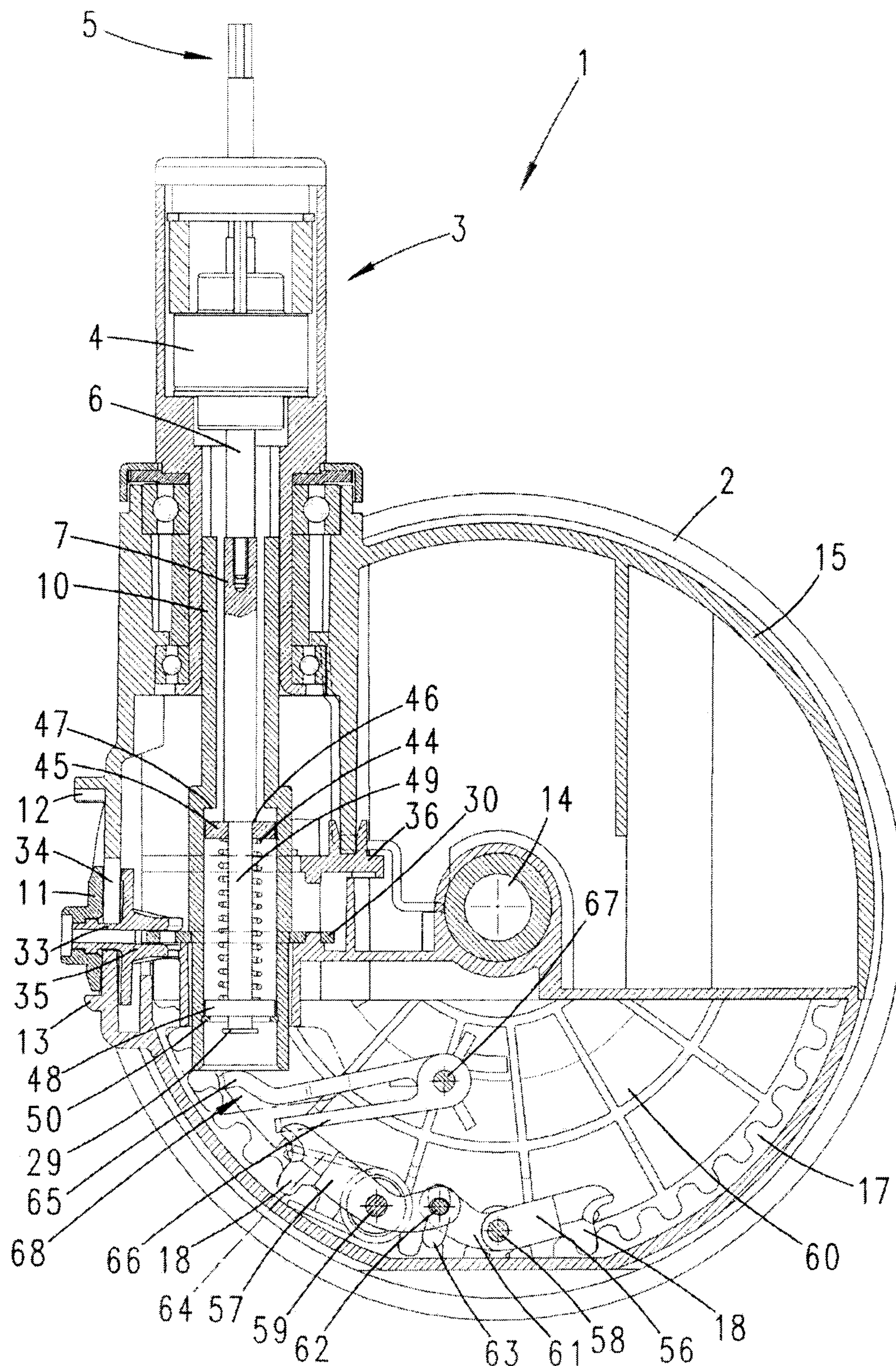
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Fig. 19

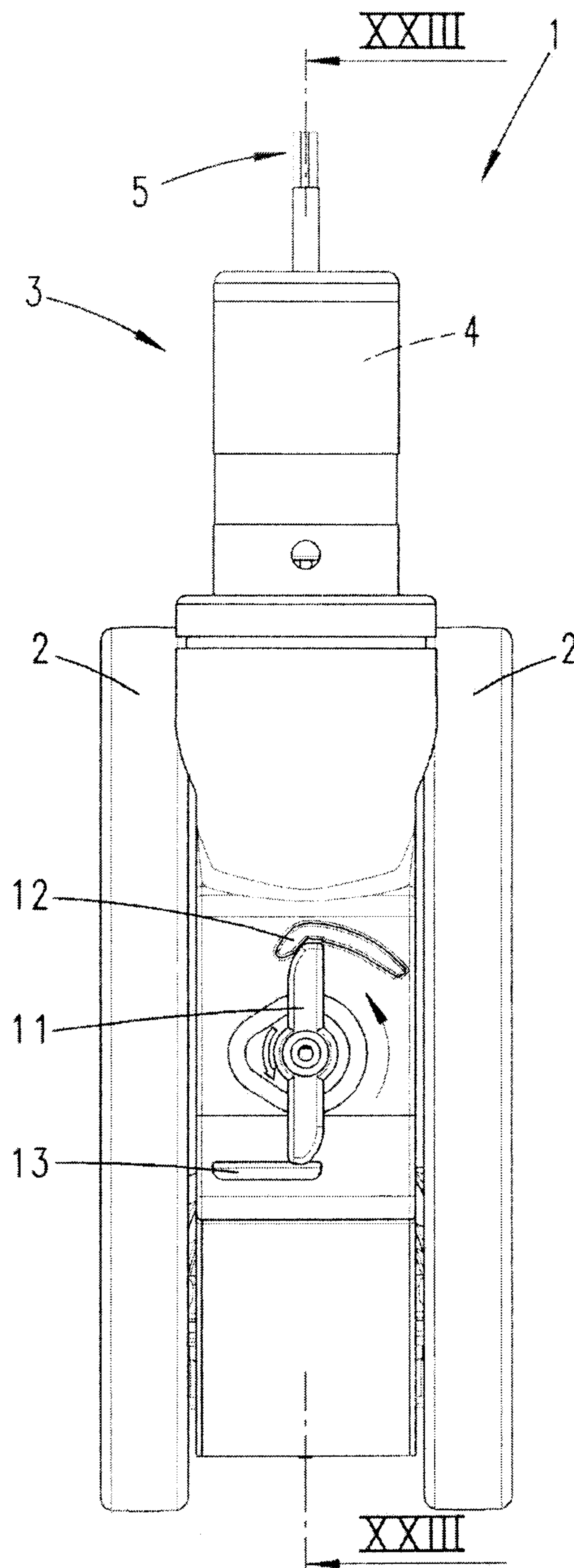
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Fig. 20

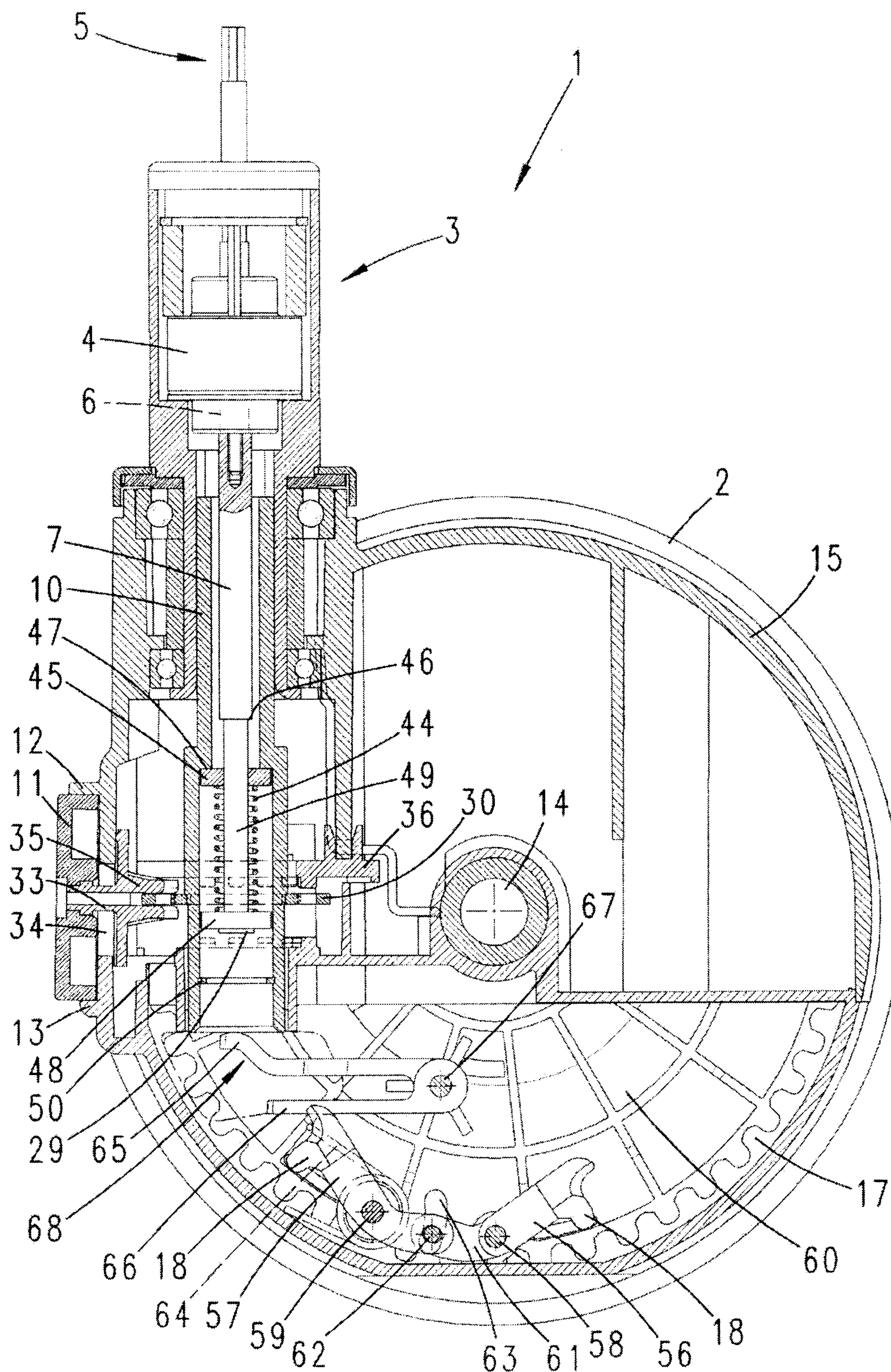
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Fig. 21

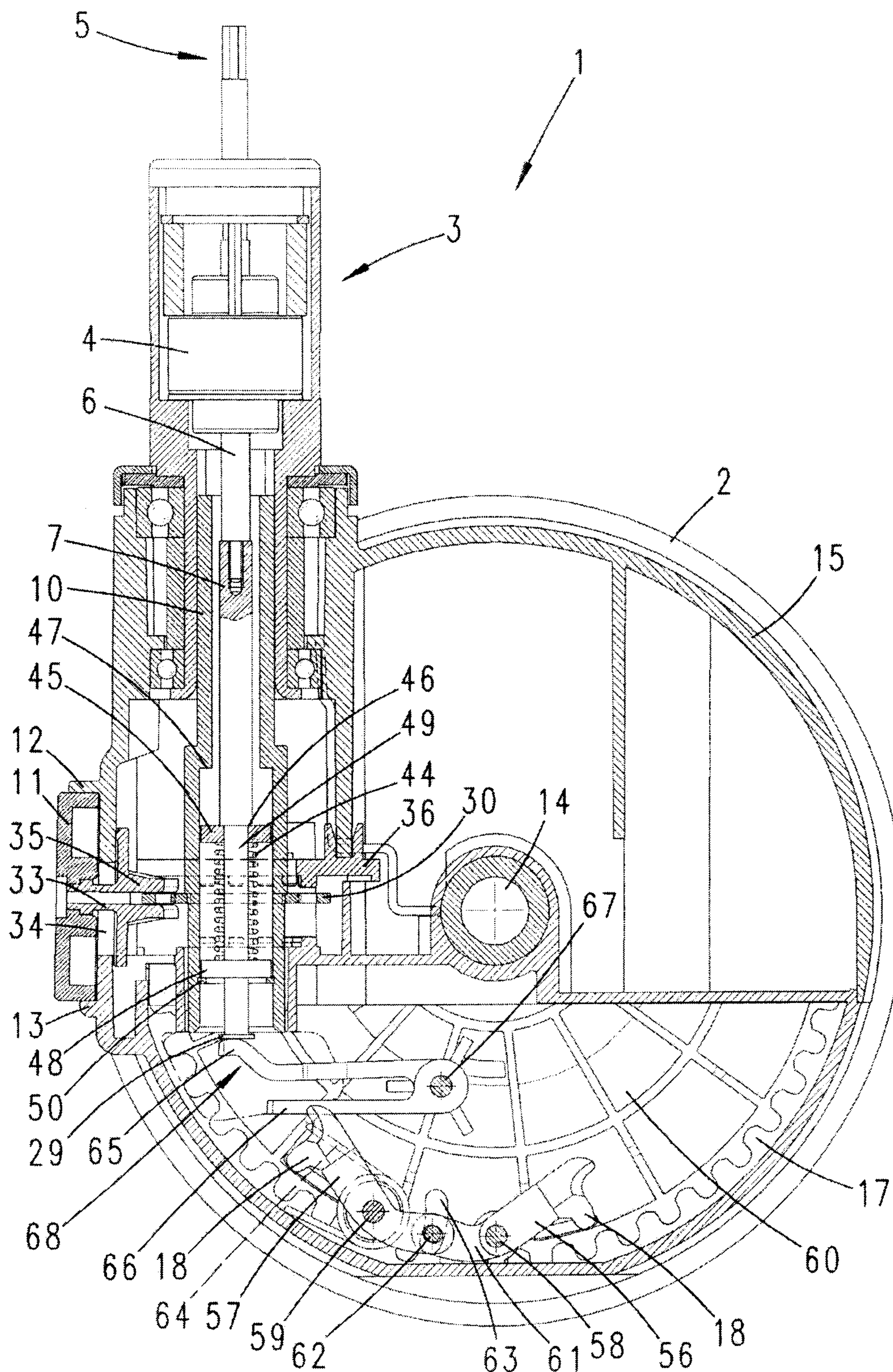
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Fig. 22

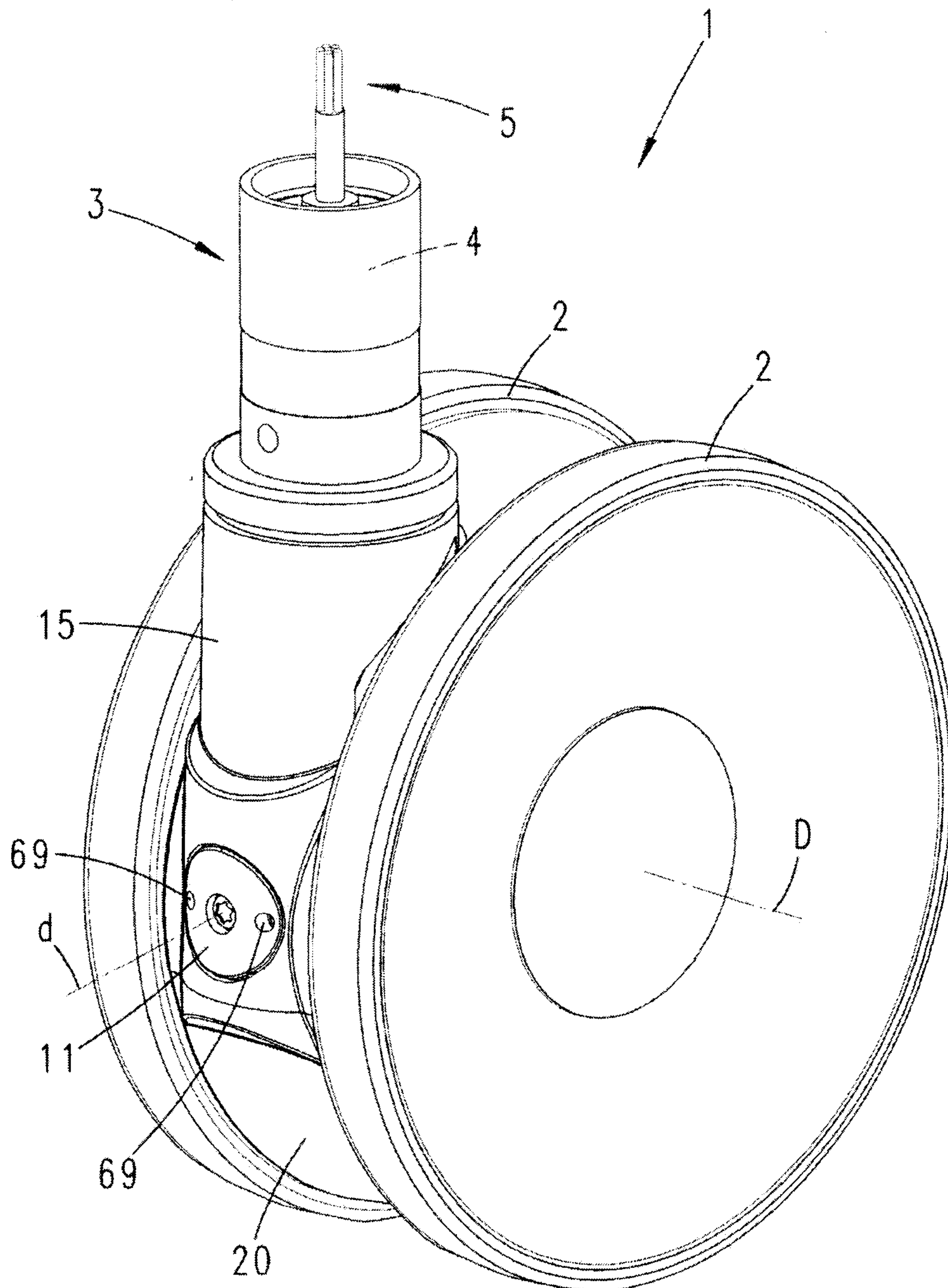
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Fig. 23

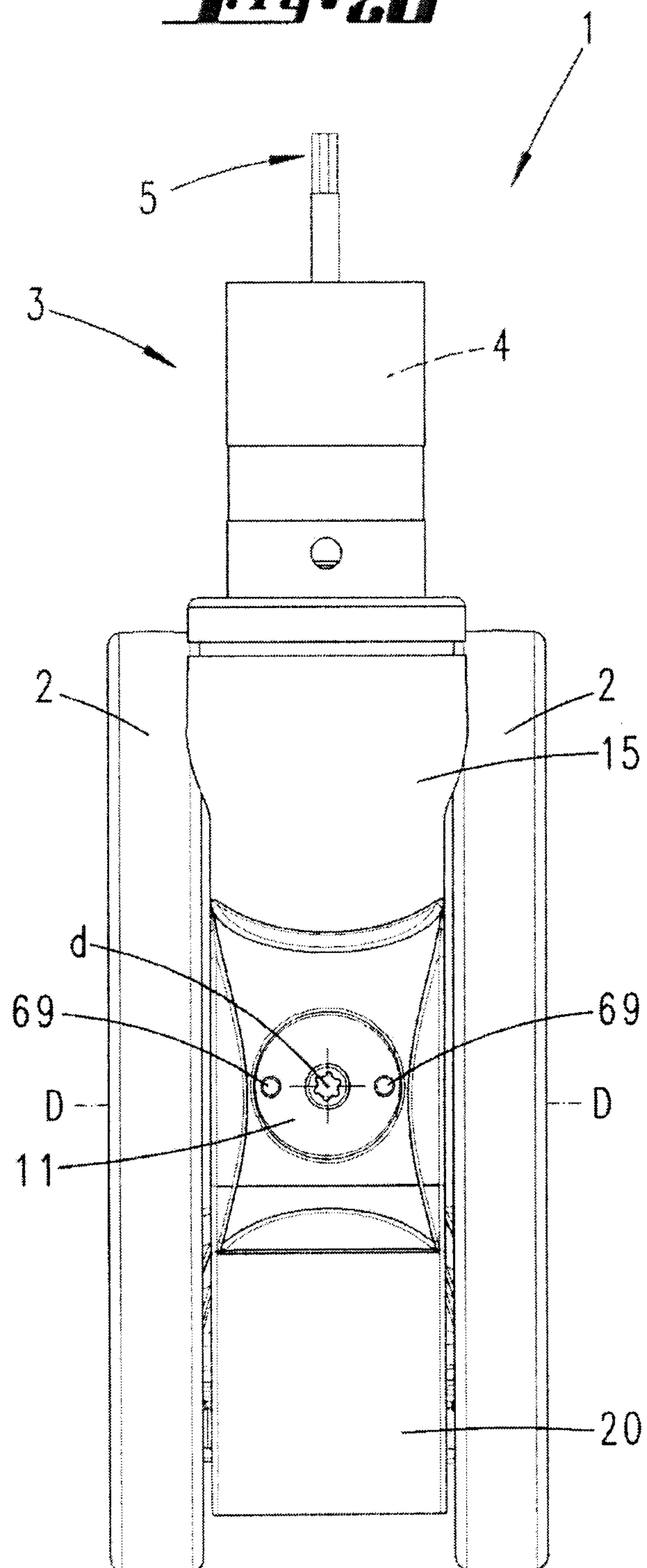
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Fig. 23 a

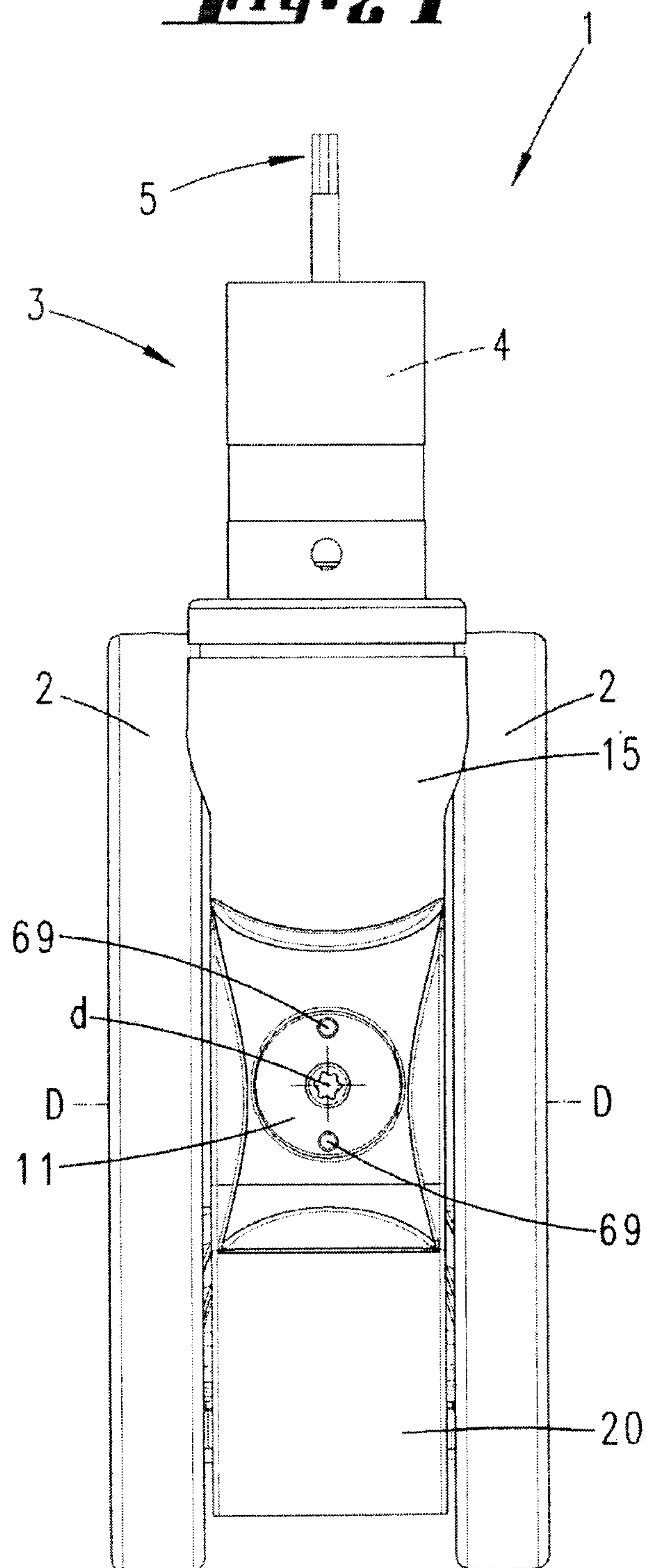
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Fig. 25

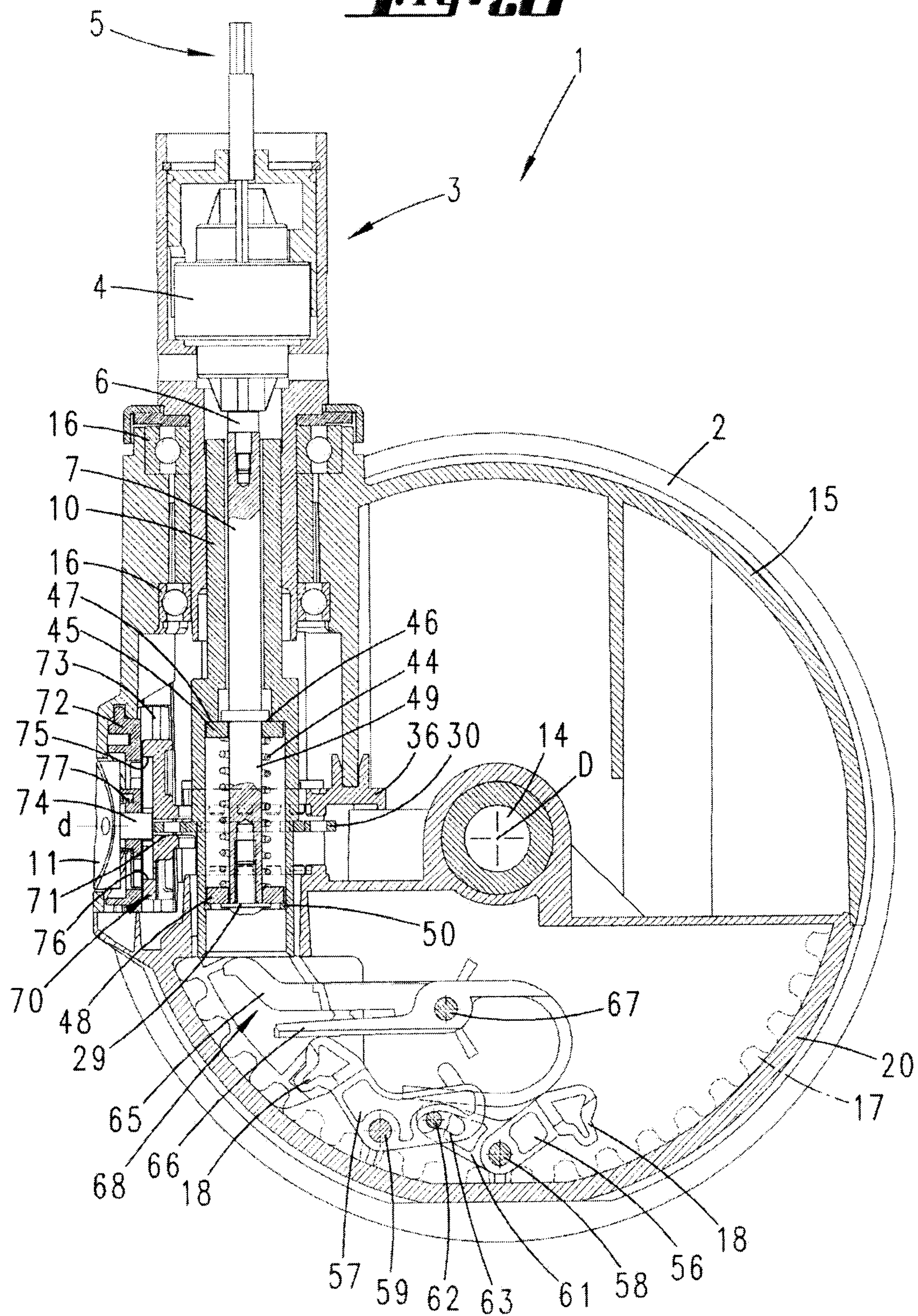
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Fig. 26

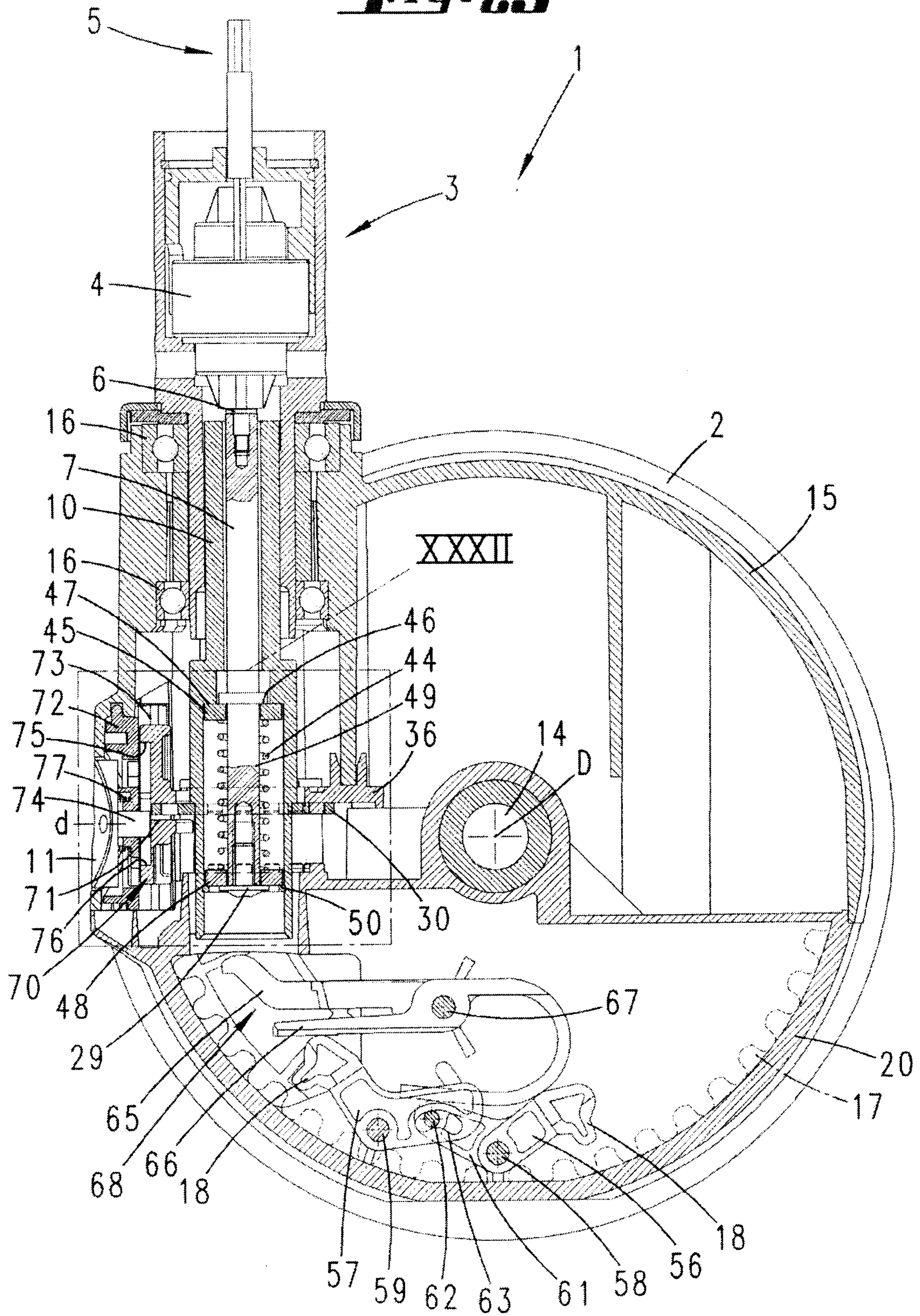
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Fig. 27

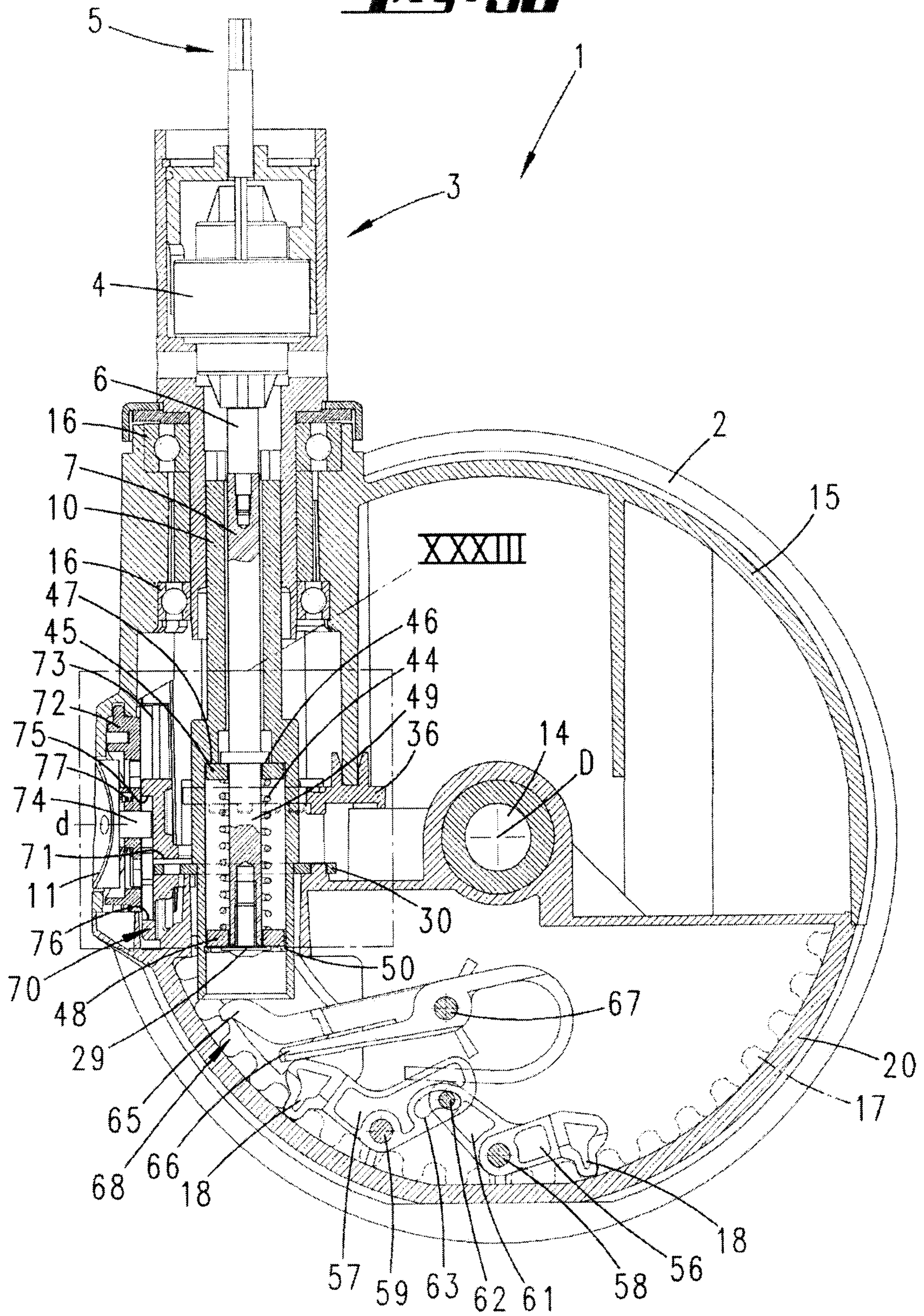
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Fig. 28

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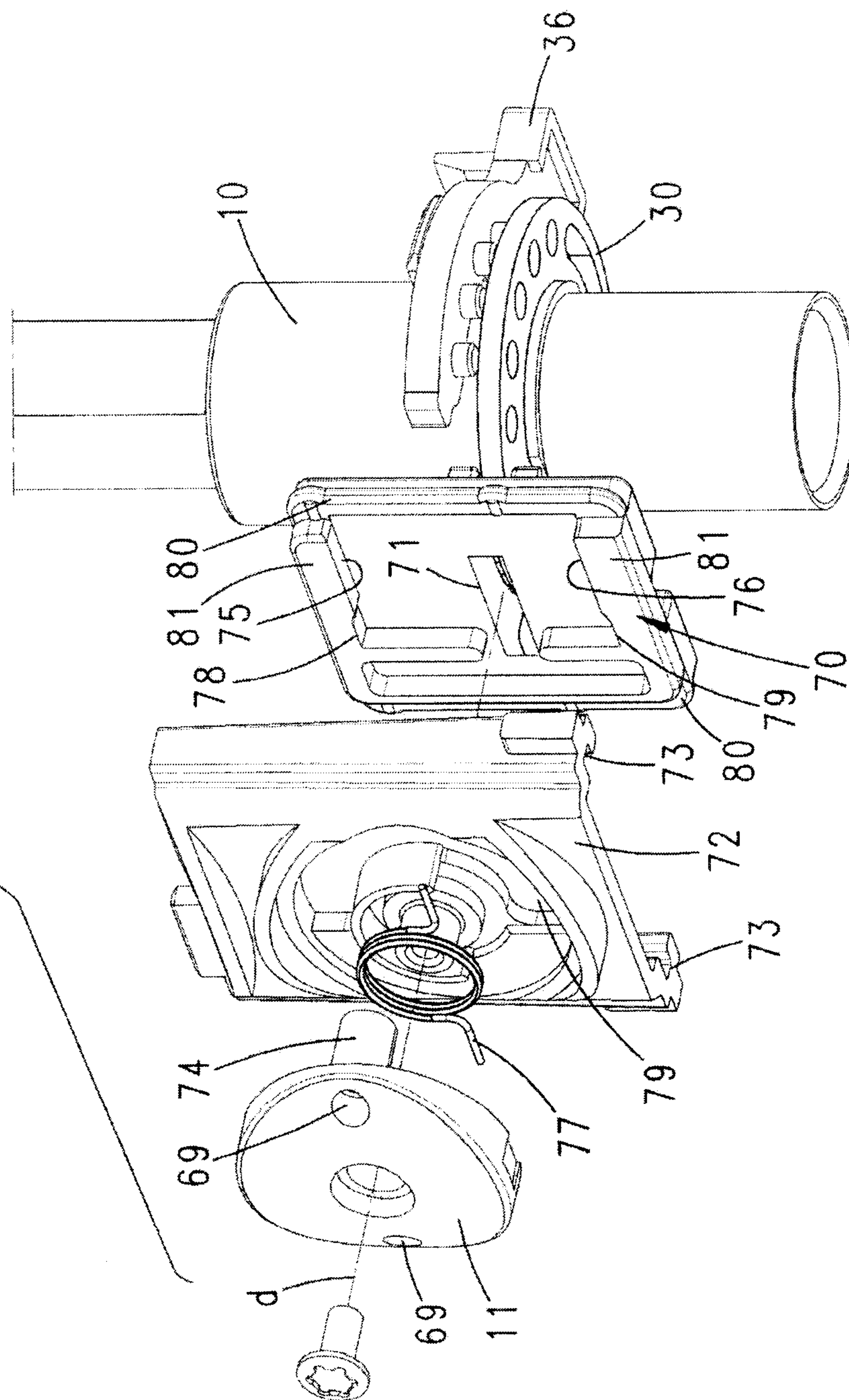
Fig. 29

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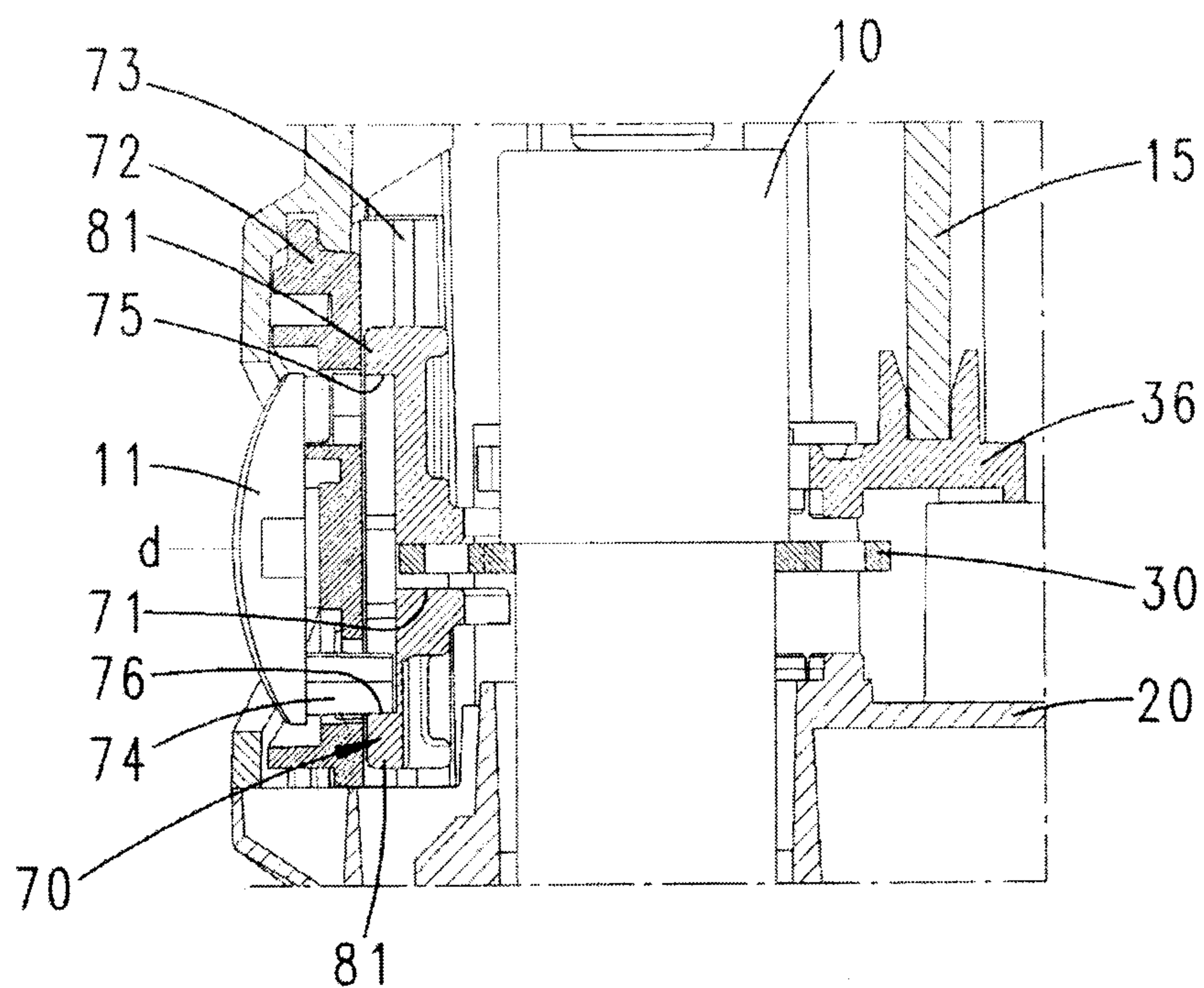
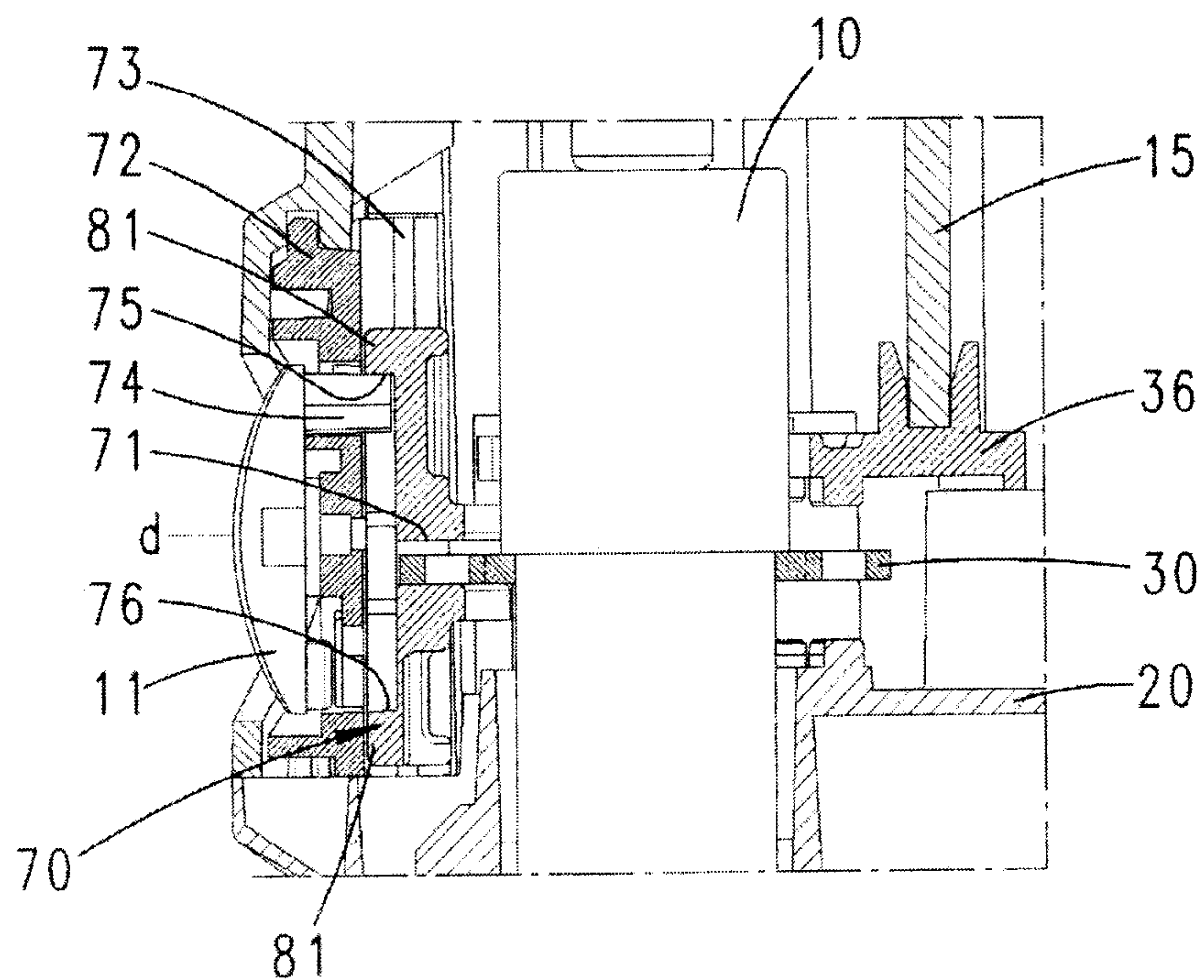
Fig. 30

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Fig. 31



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Fig. 32**Fig. 33**

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Fig. 34