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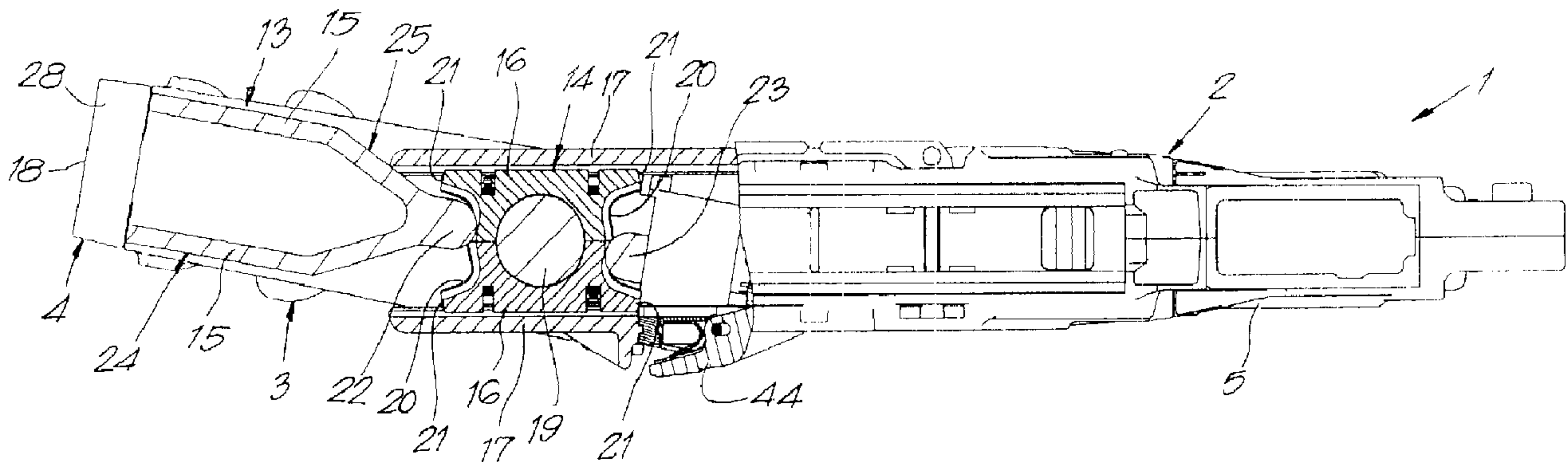
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(54) Title: IMPROVED GRENADE LAUNCHER



(57) Abrégé/Abstract:

Improved grenade launcher which comprises a frame (2), a barrel (4) mounted on the frame (2) and an opening mechanism, characterised in that the opening mechanism comprises guiding means which make it possible to advance the barrel (4) in the longitudinal direction of the frame (2) and to make it swivel laterally in the final phase of its longitudinal movement.



Abstract of the disclosure

Improved grenade launcher which comprises a frame (2), a barrel (4) mounted on the frame (2) and an opening mechanism, characterised in that the opening mechanism comprises guiding means which make it possible to advance the barrel (4) in the longitudinal direction of the frame (2) and to make it swivel laterally in the final phase of its longitudinal movement.

Improved grenade launcher.

The invention concerns an improved grenade launcher.

5 In a general manner, a grenade launcher comprises a frame with a percussion mechanism activated by a trigger; a barrel mounted on the frame; a locking mechanism for locking and unlocking the barrel in relation to the frame; an opening mechanism which makes
10 it possible to open the grenade launcher so as to load and extract the ammunition; a handguard to hold the grenade launcher and to simultaneously activate said locking and opening mechanisms.

15 Generally, a grenade launcher also comprises an extraction device which enables the automatic extraction of a non-fired grenade or the case of a fired grenade out of the barrel chamber.

20 A grenade launcher of the type having a longitudinal opening with an opening mechanism by means of a movement of the barrel in the longitudinal direction of the grenade launcher is already known.

25 For this type of grenade launcher, the locking mechanism and the automatic extraction mechanism often have a relatively simple design and use.

Indeed, the automatic extraction mechanism may form a whole with the bolt face of the frame, whereas the locking mechanism may consist of a bayonet catch which is activated by the simple axial rotation of the barrel
5 which is controlled for example by a simple longitudinal movement of the handguard.

In this case, the barrel is simply provided with locking lugs which fit in the front face of the frame of the grenade launcher. By rotating the barrel, the locking
10 lugs are disengaged from the front face.

A disadvantage of a grenade launcher of the type with a longitudinal opening is that the choice of the ammunition is restricted, as the length of the grenades to be used is limited to more or less the opening
15 distance of the grenade launcher.

A grenade launcher of the type having a lateral opening with a barrel that swivels laterally is already known as well.

This type of grenade launcher is advantageous in that
20 longer ammunition can be used without being restricted by the opening distance of the grenade launcher, since the ammunition can be laterally loaded and extracted.

However, this type of grenade launcher is disadvantageous in that it has a complex design, due to
25 the complexity of the locking mechanism, such that heavier embodiments are required, and due to the

complexity of the specific extraction mechanisms for the case, which is so inconvenient that certain designers abandon an automatic extraction and settle for a manual extraction.

The invention aims to remedy one or several of the above-mentioned and other disadvantages and to provide a grenade with a simple design which also makes it possible to use ammunition of any length whatsoever.

10

This aim is reached according to the invention with an improved grenade launcher which comprises a frame, a barrel mounted on the frame and an opening mechanism, characterised in that the opening mechanism comprises guiding means which make it possible to advance the barrel in the longitudinal direction of the frame and to make it swivel laterally in the final phase of its longitudinal movement.

20

In this manner, the ammunition can be laterally loaded in and extracted from the grenade launcher, which makes it possible to use ammunition of any length whatsoever.

Preferably, likewise, a grenade launcher according to the invention is characterised by an opening which is longitudinal in the first phase of the opening movement, which makes it possible to use opening mechanisms and locking mechanisms with a simple design.

The guiding means are preferably such that they make it possible to simultaneously advance and swivel the barrel

in said final phase of the longitudinal movement of the barrel.

This allows for a faster complete opening movement.
5 According to a preferred, relatively simple embodiment, the barrel is mounted in a handguard which comprises at least two sliding blocks which are mounted one after the other in the longitudinal direction of the handguard and which are mounted in a sliding manner between two
10 longitudinal sliding guides parallel to the frame, one sliding block of which is mounted fixed to the handguard, whereas the other sliding block is mounted such that it can swivel in the lateral direction of the handguard.

For clarity's sake, an example of an embodiment of an
15 improved grenade launcher according to the invention is described hereafter by way of example only and without being limitative in any way, with reference to the accompanying drawings, in which:

20 figure 1 is a schematic view of an improved grenade launcher according to the invention;
figure 2 shows the part indicated by F2 in figure 1 in perspective;
figure 3 is a cross section according to line III-
25 III of figure 1;
figures 4 and 5 are views similar to those in figure 3, but in other positions;
figures 6 and 7 are exploded views of the parts indicated by F6 and F7 respectively in figure 2;
30 figures 8 and 9 are sections according to line

VIII-VIII and IX-IX respectively of figure 1;
figure 10 is a section according to line X-X in
figure 9;
figure 11 is a view similar to that in figure 1,
5 but for a partially opened position of the grenade
launcher;
figure 12 is a section according to line XII-XII of
figure 11;
figure 13 is a section as that in figure 10, but
10 for a position corresponding to figure 11;
figures 14 and 16 are views similar to those in
figure 11, but for larger openings and after the
ammunition has been ejected;
figures 15 and 17 are sections as those in figure 12,
15 but for the positions of figures 13 and 15
respectively;
figure 18 is a section as that of figure 10, but
with non-fired ammunition.

The improved grenade launcher 1 according to the
20 invention as represented in the figures comprises a frame
2; a tubular handguard 3 mounted on the frame 2 and a
barrel 4 held in a rotating and sliding manner in the
handguard 3.

The frame 2 comprises a trigger housing 5 and a bolt 6
25 in which one extremity of the barrel 4 fits when the
grenade launcher 1 is closed and whose front face 7 may
support the ammunition which is loaded in the chamber 8
formed in the inserted extremity of the barrel 4.

A percussion mechanism 9 is incorporated in the frame 2 and comprises a firing pin 10 situated in a housing 11 in the front face 7 of the bolt 6.

The percussion mechanism 9 is controlled by a trigger 12.

5 The barrel 4 is fixed to the frame 2 by means of the handguard 3 which is suspended to the frame 2 in a sliding manner by means of two sliding blocks 13 and 14 which are mounted one after the other in the longitudinal direction X-X' of the handguard 3 and which are each
10 inserted with edges 15 and 16 respectively in two parallel, longitudinal sliding guides in the form of two grooves 17 in the frame 2.

The sliding block 13 which is closest to the muzzle 18 of the barrel 4 is fixed to the handguard 3, whereas the
15 other sliding block 14 which is farthest from the muzzle 18 of the barrel 4 is mounted in a laterally revolving manner on the handguard 3 by means of a central pivot 19.

As represented in figure 6, the revolving sliding block 14 is formed of two semi-circular pieces 20 which are
20 assembled by means of screw bolts 21.

Each extremity of the revolving sliding block 14 is provided with a cavity forming a protrusion on each side which can work in conjunction with a centre swivel stop, 22 and 23 respectively, whereby each of the stops
25 is situated in a cavity 20 and restricts the revolving course of the sliding block 14 round an average position

as represented in figure 2, in which the sliding block 14 is longitudinally directed in relation to the longitudinal direction X-X' of the handguard 3 and between two extreme swivel positions as represented in figures 4 and 5.

The fixed sliding block 13 comprises a straight part 24 which is situated at a distance from the revolving sliding block 14, as well as a part 25 formed of a narrowing conical extremity which extends in the longitudinal direction X-X' of the handguard towards the revolving sliding block 14.

The centre swivel stop 22 is formed of an extension of the conical part 25 of the fixed sliding block 13.

The handguard 3 is provided with a longitudinal end stop 26 which can work in conjunction with a corresponding end stop on the frame 2.

Both longitudinal end stops 26 and 27 are placed such that, when the grenade launcher is maximally opened in the longitudinal direction, the revolving sliding block 14 is still guided by the sliding guides 17 of the frame 2, whereas the straight part 24 of the fixed sliding block 13 protrudes entirely over the length of the sliding guides 17 and the conical part 25 of the fixed sliding block 13 protrudes over a certain distance of the length of said sliding guides 17.

To this end, the longitudinal end stops 26 and 27 are

placed on the pivot 19 of the handguard 3 and at the front extremity of the frame 2 respectively.

In this case, the stop 27 can be withdrawn or raised so as to dismount the handguard 3 from the frame 2.

5 The barrel 4 is mounted in the handguard 3 in a sliding and rotating manner.

An annular stop 28 at the muzzle 18 of the barrel 4 restricts the relative longitudinal movement of the barrel 4 in the handguard 3.

10 At the opposite extremity of the muzzle 18, the barrel 4 is provided with a bayonet catch 29, formed of lugs 30 which can fit as said extremity of the barrel 4 is inserted in the bolt 6, followed by a rotation of the barrel 4 so as to close the chamber 8 of the barrel 4
15 and to lock the barrel 4 on the frame 2.

The grenade launcher 1 is provided with means 31 which allow for an automatic control of the axial rotation of the barrel 4 by means of a longitudinal movement of the handguard 3 so as to be able to lock and unlock the
20 barrel 4 when the handguard 3 is moved over a certain distance in the longitudinal direction in relation to the frame 2.

In the example given in the figures, said means 31 are formed of a wedge going through the wall of the handguard
25 3 so as to form a protuberance 32 of the handguard 3

which is guided in a slanting groove 33 inside the barrel 4, whereby the groove 33 forms an angle with the longitudinal direction X-X'.

The barrel 4 is equipped with a brake 34 in the form of a tilting element which, thanks to the action of the spring 35, exerts a light radial force on the case of a grenade which may be present in the chamber 8 of the barrel 4, so that the case will be lightly held up in the chamber 8 when the grenade launcher is opened.

10

In order to secure the position of the axial rotation of the barrel 4 after it has been unlocked, a barrel plunger 36 is mounted in the handguard 3, whereby the plunger 36 is controlled by a spring 37 retained by a pin 37'.

15

Optionally, the grenade launcher 1 can be provided with an automatic extraction device for the ammunition with an extractor 38 in the form of a revolving hook which is mounted in the seat 6 of the frame 2.

20

The extractor 38 is controlled by a spring 39 which catches the collar of the case of a grenade present in the chamber 8 of the barrel 4, so that the case can be held against the face 7 of the bolt 6 when the grenade launcher 1 is opened.

25

The extractor 38 is provided with a lever 40 which makes it possible to make the extractor 38 swivel against the action of the spring 39, so that the extractor 38 can be made inactive.

In the same manner, the grenade launcher 1 can be provided with an ejector 41 mounted in the front face 7 of the bolt 6 and controlled by a spring 42 so as to exert an axial force on the case of the grenade.

The working and use of the grenade launcher 1 according to the invention are simple and as follows.

Figures 1, 9 and 10 represent the grenade launcher 1 in its closed position after a grenade has been fired and an empty case is situated in the chamber 8 of the barrel 4, maintained against the front face 7 by the extractor 38.

In order to open the grenade launcher 1, the user activates the unlocking key 44 of the handguard 3 in relation to the barrel 4 and pushes the handguard 3 forward, which, in the first few millimetres, makes the barrel 4 rotate round its axis, guided by the protuberance 32 of the handguard 3 in the slanting groove 33 of the barrel 4, such that the barrel 4 is unlocked as the lugs 30 are released from the bolt 6.

Next, thanks to the presence of the stop 28 at the muzzle 18 of the barrel 4, the longitudinal movement of the handguard 3 takes along the barrel 4 in its movement, while the axial orientation is being preserved.

During said movement of the barrel 4, the case 43 is being retained against the front face 7 and it is ejected downward as soon as it has entirely left the chamber 8

through the effect of the ejector 41 as represented in figures 11 and 13.

During said movement, the handguard 3 is forced to follow a longitudinal trajectory, as the two sliding blocks of the handguard 3 are guided in the sliding guides 17 of the frame 2.

As of the position represented in figures 11 and 13, the fixed sliding block 13 leaves the sliding guides 17 as shown in figure 12 and thus makes it possible for the handguard 3 and the barrel 4 to laterally swivel round the pivot 19 as a result of the revolving motion of the sliding block 14.

As represented in figures 14 and 15, the lateral rotation is restricted in that the conical part 25 of the fixed sliding block 13 comes to a stop against the front extremity of one of the sliding guides 17, depending on whether the handguard 3 swivels to the left or to the right.

Thus, the rotation of the handguard 3 is progressively guided up to a maximal lateral opening as represented in figures 16 and 17, and it is restricted by the presence of the stops 25 and 23.

As the lateral movement of the conical part 25 is guided by the fixed sliding block 13, this allows for a gradual and progressive opening movement of the grenade launcher 1.

Since the barrel 4 has now swivelled laterally, the selection of a new grenade to be loaded is not restricted by the opening distance of the grenade launcher 1.

5 In the case of a grenade 45 whose length is shorter than the opening distance of the grenade launcher 1, the non-fired grenade can be extracted by means of an automatic extraction device as represented in figure 18.

10 In case of a longer grenade, the automatic extraction device can be put out of action by pushing the lever 40 of the extractor 38 as the grenade launcher 1 opens. In that case, the non-fired grenade is maintained in the chamber 8 of the barrel 4 thanks to the brake 34, and the grenade can then be manually extracted into a lateral revolving position of the barrel 4.

15

It is clear that the grenade 45 can be loaded and extracted on the left side as well as on the right side of the grenade launcher 1, which has for a result that the grenade launcher according to the invention is useful
20 to a left-hand user as well as a right-hand user.

It is clear that the invention is by no means limited to the example described above, but that numerous modifications can be made to the improved grenade launcher while still remaining within the scope of the
25 invention as defined in the following claims.

WHAT IS CLAIMED IS:

1. Grenade launcher which comprises a frame (2), a barrel (4) mounted on the frame (2) and an opening mechanism, characterised in that the opening mechanism comprises guiding means which make it possible to advance the barrel (4) in the longitudinal direction of the frame (2) and to make it swivel laterally in the final phase of its longitudinal movement.
2. Grenade launcher according to claim 1, characterised in that the guiding means make it possible for the barrel (4) to simultaneously advance and laterally
10 swivel in said final phase of the longitudinal movement.
3. Grenade launcher according to claim 1 or 2, characterised in that the barrel (4) is mounted in a handguard (3) which comprises at least two sliding blocks (13, 14) which are mounted one after the other in the longitudinal direction (X-X') of the handguard (3) and which are mounted in a sliding manner between two parallel, longitudinal sliding guides (17) of the frame (2), one sliding block (13) of which is fixed to the handguard (3), whereas the other sliding block (14) is laterally mounted in a revolving manner on the handguard (3).
4. Grenade launcher according to claim 3, characterised in that the revolving sliding block (14) is the one farthest away from the muzzle (18) of the barrel (4).
- 20 5. Grenade launcher according to claim 3 or 4, characterised in that the revolving sliding block (14) can swivel round an average position in which the sliding block is longitudinally directed in relation to the longitudinal direction (X-X') of the handguard.
6. Grenade launcher according to any one of claims 3 to 5, characterised in that the course of the revolving sliding block (14) is restricted by at least one swivel stop (22-23) .

7. Grenade launcher according to claim 6, characterised in that the swivel stop (22-23) is a stop situated in a cavity (20) which is provided in one of the extremities of the revolving sliding block (14).
8. Grenade launcher according to any one of claims 3 to 7, characterised in that the fixed sliding block (13) comprises a straight part (24) situated at a distance from the revolving sliding block (14) and a conical part (25) formed of a narrowing extremity which extends in the longitudinal direction (X-X') of the handguard (3) towards the revolving sliding block (14).
9. Grenade launcher according to claim 7 or 8, characterised in that the swivel stop (22) is formed of an extension of the conical part (25) of the fixed sliding block (13).
10. Grenade launcher according to any one of claims 3 to 9, characterised in that the handguard (3) is provided with a longitudinal end stop (26) which can work in conjunction with a corresponding end stop (27) on the frame (2).
11. Grenade launcher according to claim 10, characterised in that the longitudinal end stops (26-27) are placed such that, when the grenade launcher (1) is maximally opened in the longitudinal direction, the revolving sliding block (14) is still guided by the sliding guides (17), whereas the straight part (24) of the fixed sliding block (13) protrudes entirely over the length of the sliding guides (17).
12. Grenade launcher according to claim 10, characterised in that the longitudinal end stops (26-27) are placed such that, when the grenade launcher (1) is maximally opened in the longitudinal direction, the revolving sliding block (14) is still guided by the sliding guides (17), whereas the conical part (25) of the fixed sliding block (13) protrudes over a certain distance of the length of said sliding guides (17).

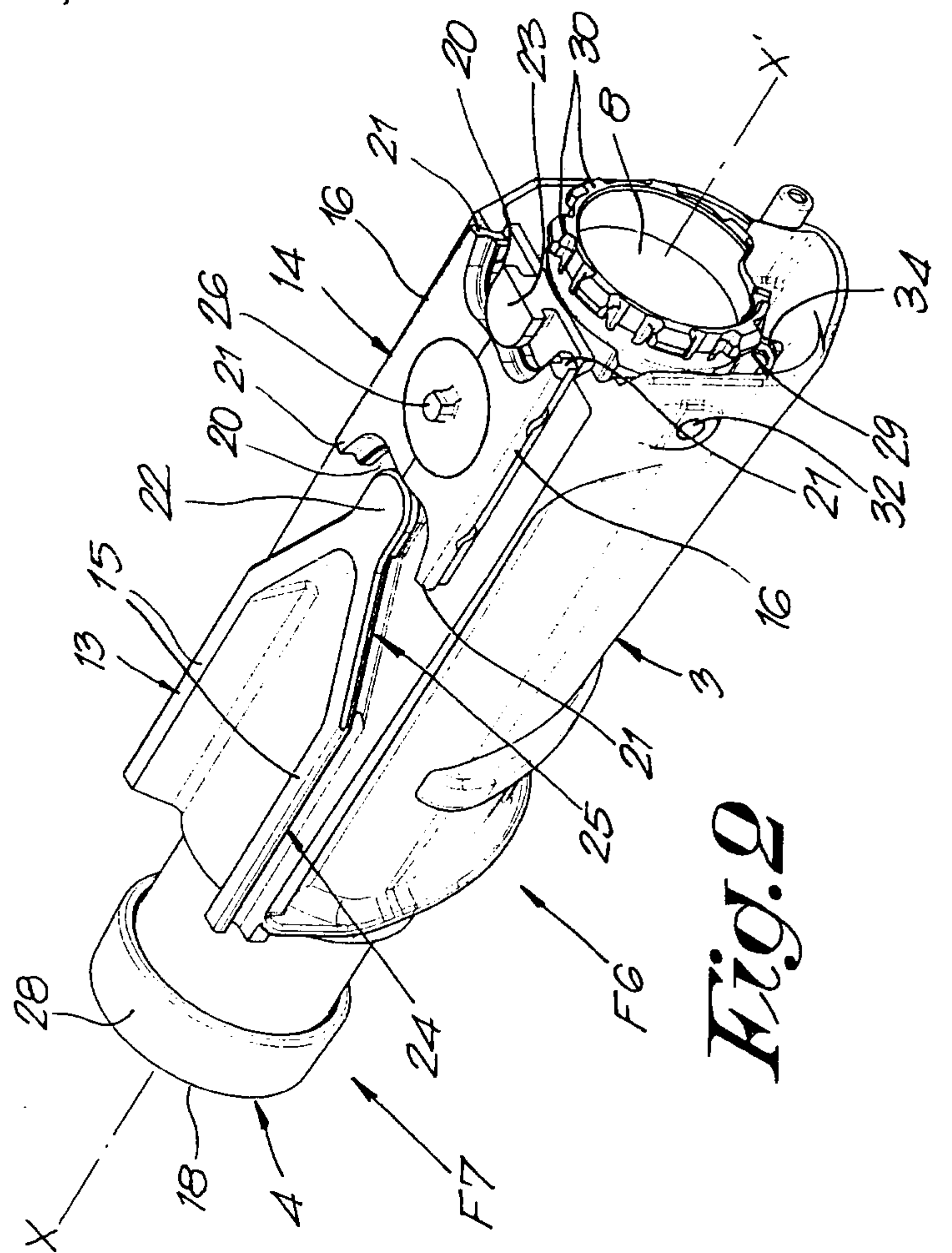
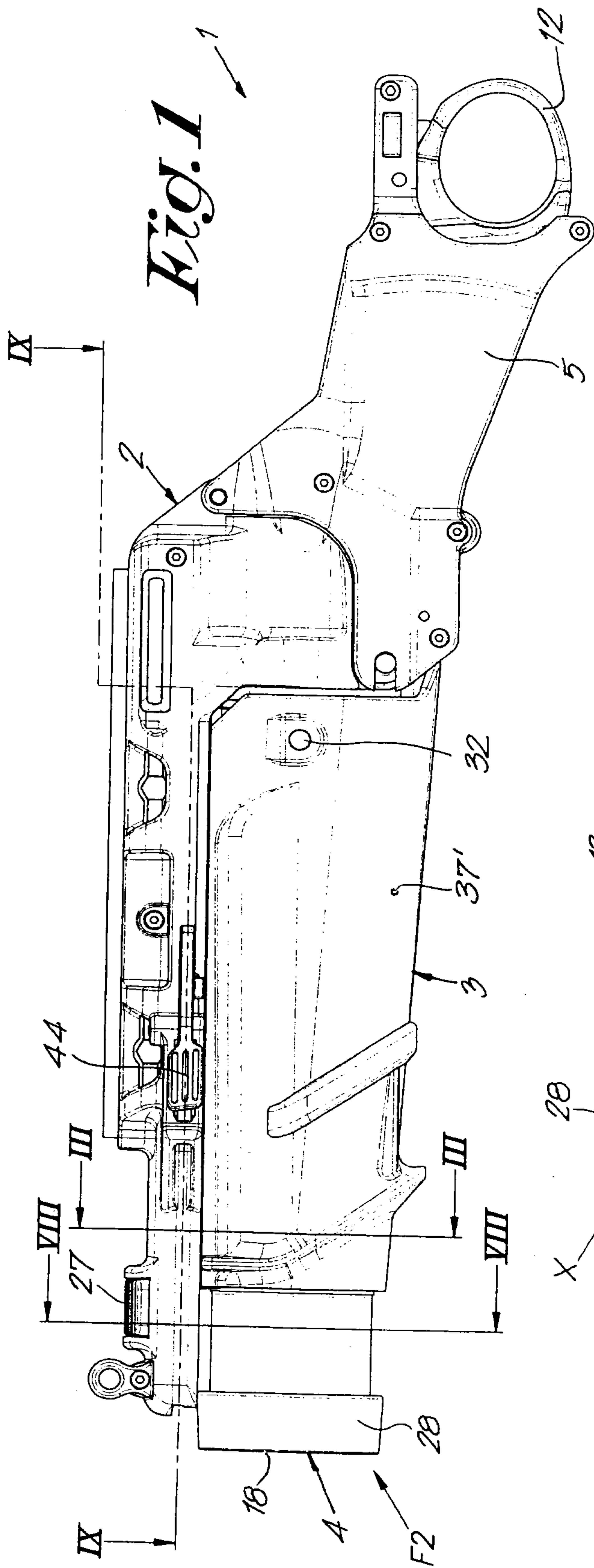
13. Grenade launcher according to any one of claims 10 to 12, characterised in that the longitudinal end stops (26-27) are placed on the pivot (19) of the handguard (3) and at the extremity of the frame (2) respectively.

14. Grenade launcher according to any one of claims 1 to 13, characterised in that the barrel (4) is provided with a rotating lock of the bayonet catch type and in that the grenade launcher (1) is provided with means (31) which allow for an automatic control of the axial rotation of the barrel (4) by means of a longitudinal movement of the handguard (3) so as to be able to lock and unlock the barrel (4) when the handguard (3) is moved over a certain distance in the longitudinal direction in relation to the frame (2) .

15. Grenade launcher according to claim 14, characterised in that the means (31) which allow for the control of the axial rotation of the barrel (4) are formed of a protuberance (32) of the handguard (3) which is guided in a slanting groove (33) in the barrel (4) forming an angle to the longitudinal direction (X-X') of the handguard (3).

16. Grenade launcher according to any one of claims 1 to 15, characterised in that it comprises an automatic extraction device with an extractor (38) mounted on the bolt (2).

17. Grenade launcher according to claim 16, characterised in that the extractor (38) is provided with a lever which makes it possible to make the extractor (38) inactive while the grenade launcher (1) is being opened.



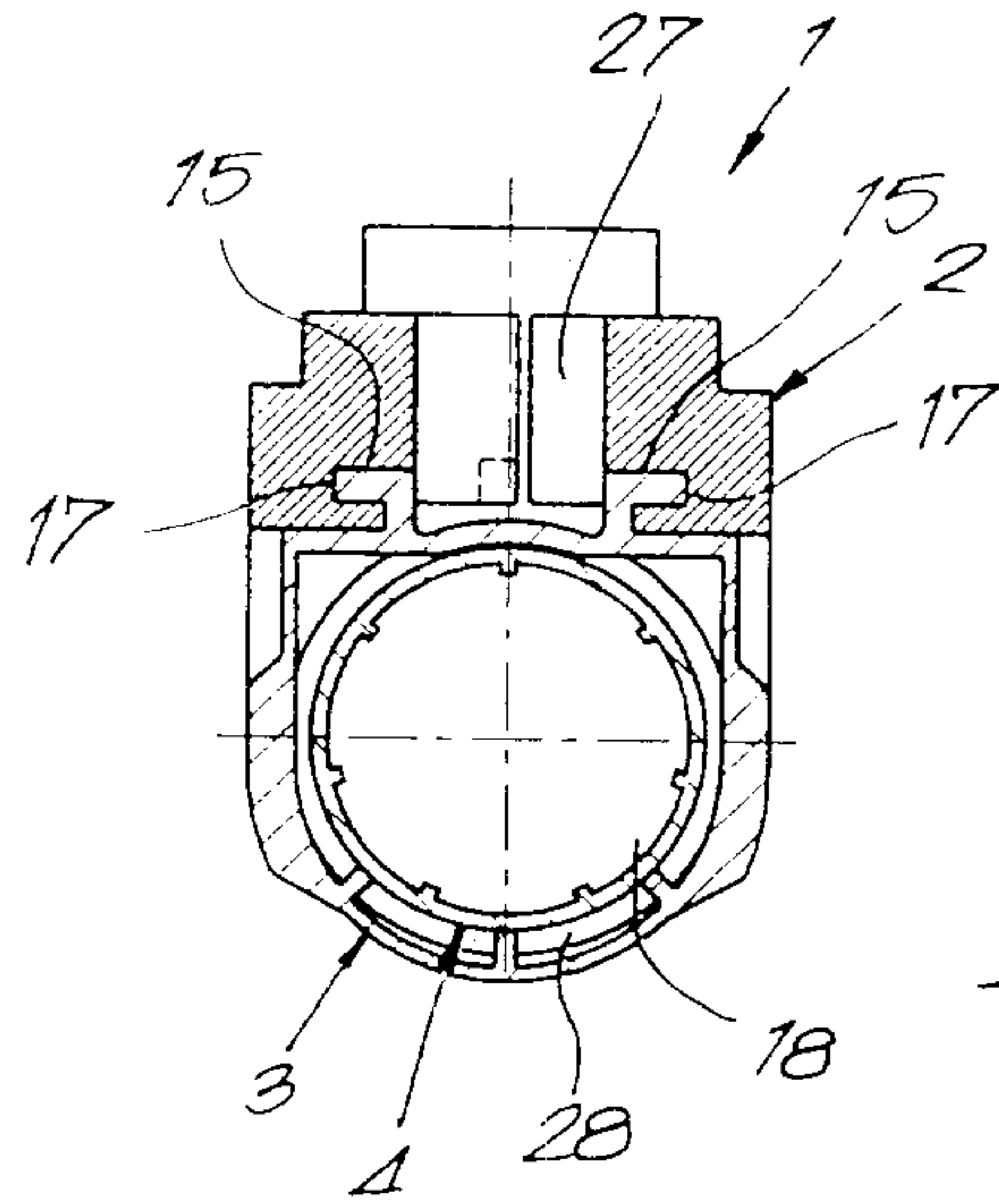


Fig. 3

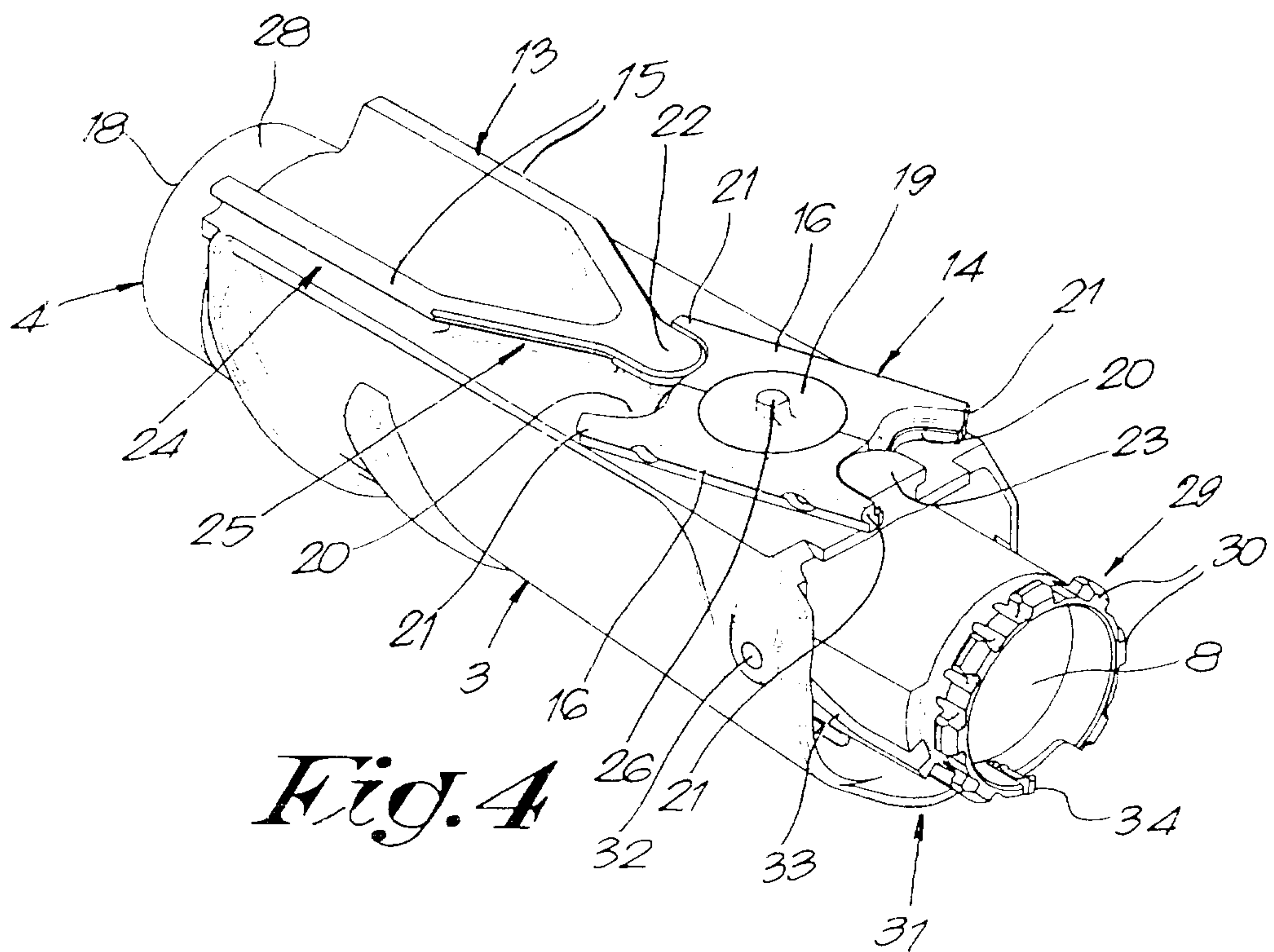
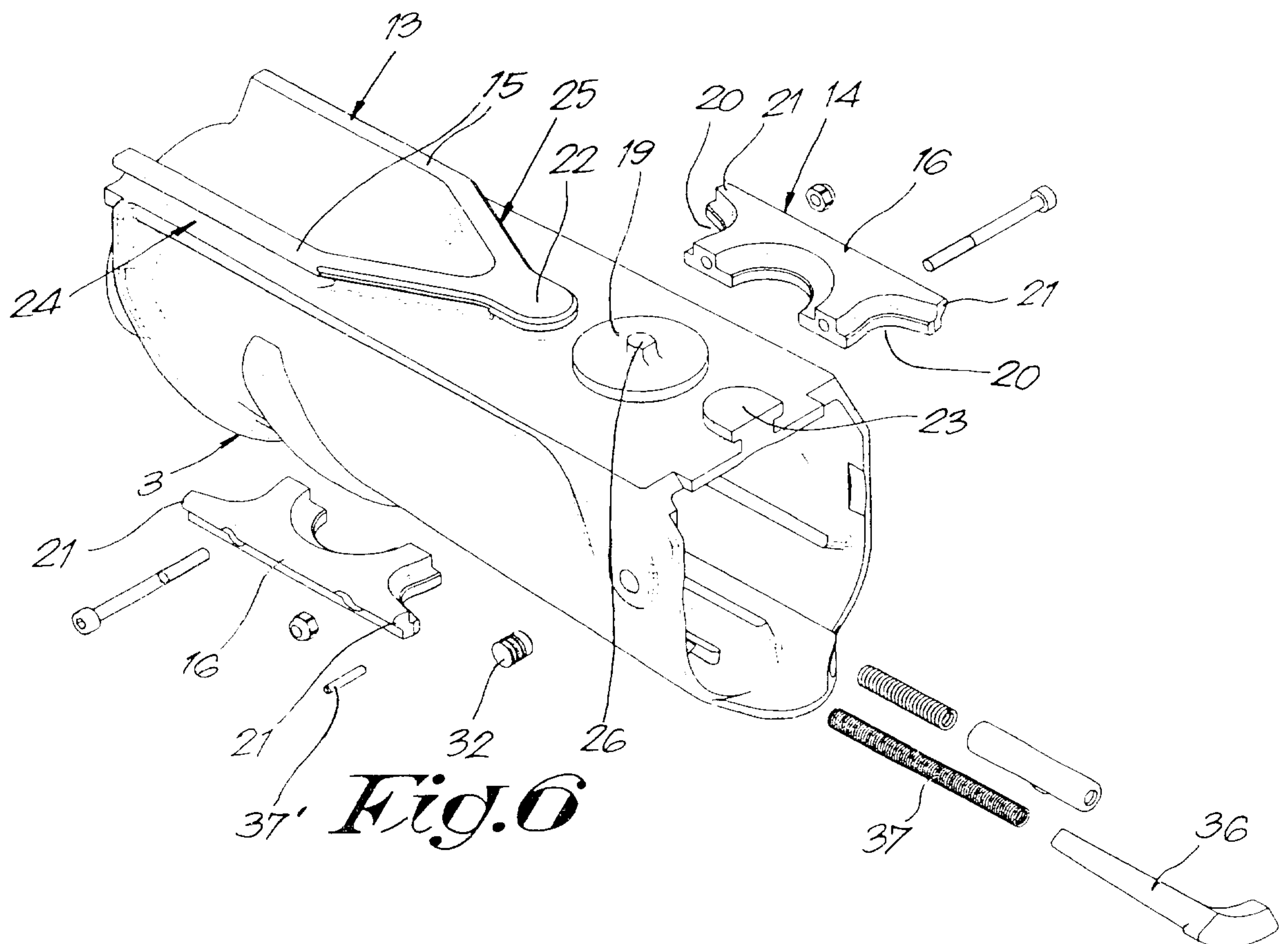
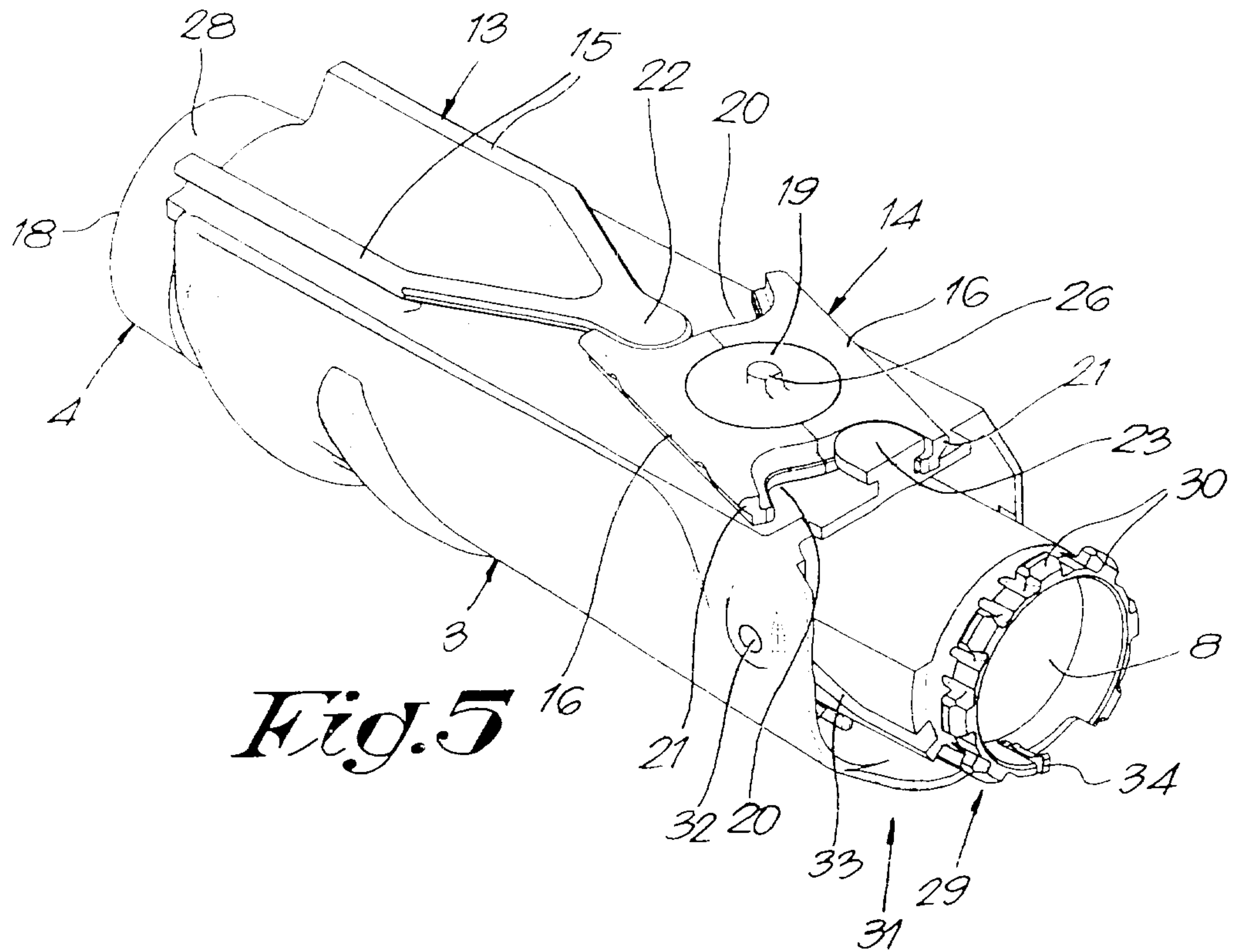
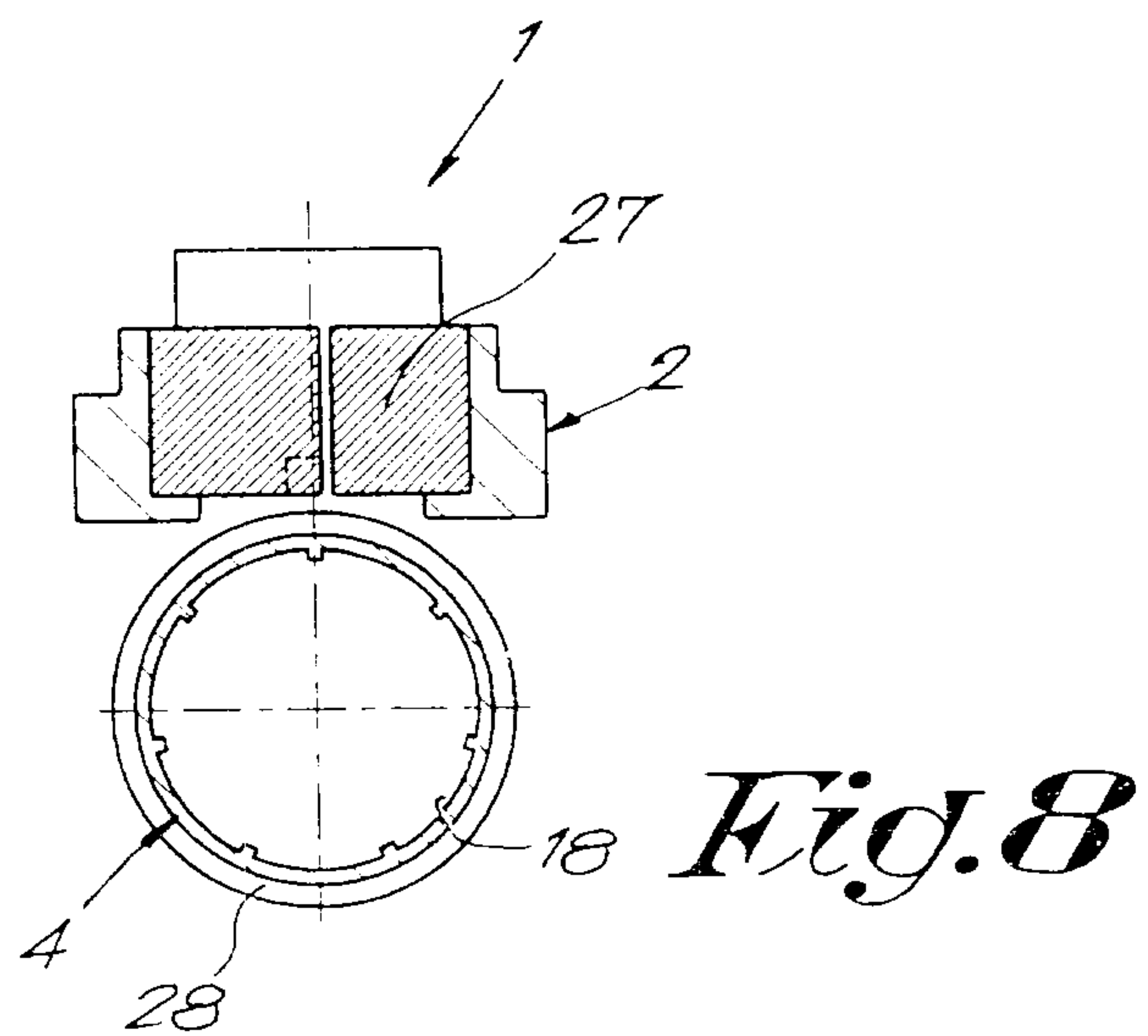
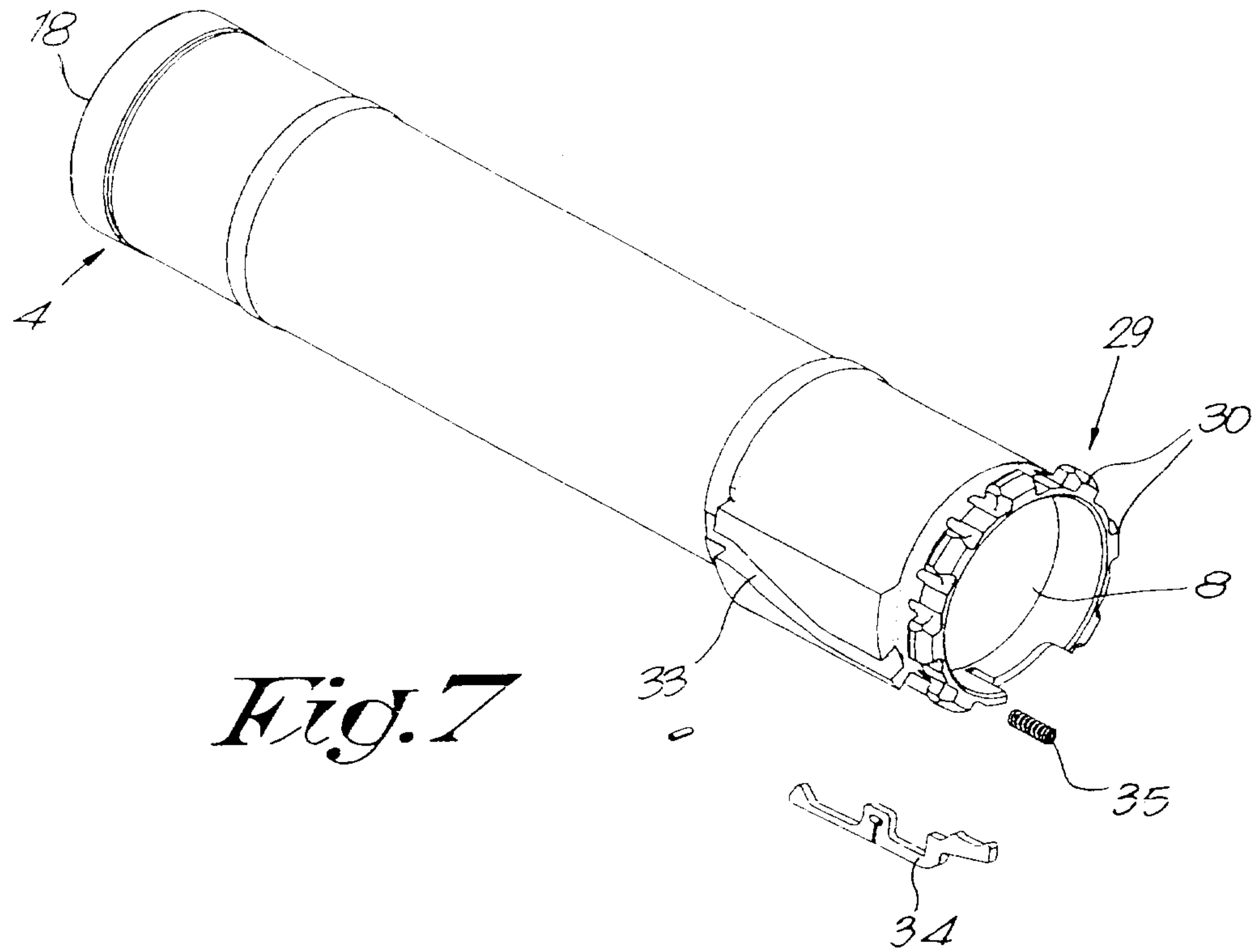


Fig. 4





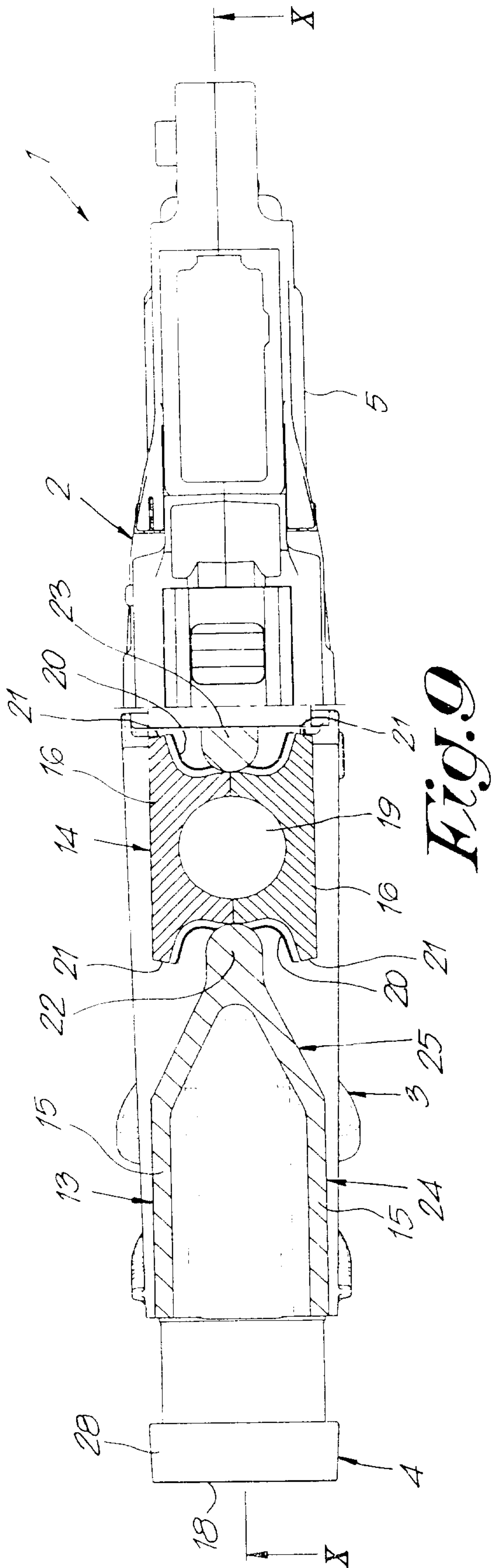


Fig. 9

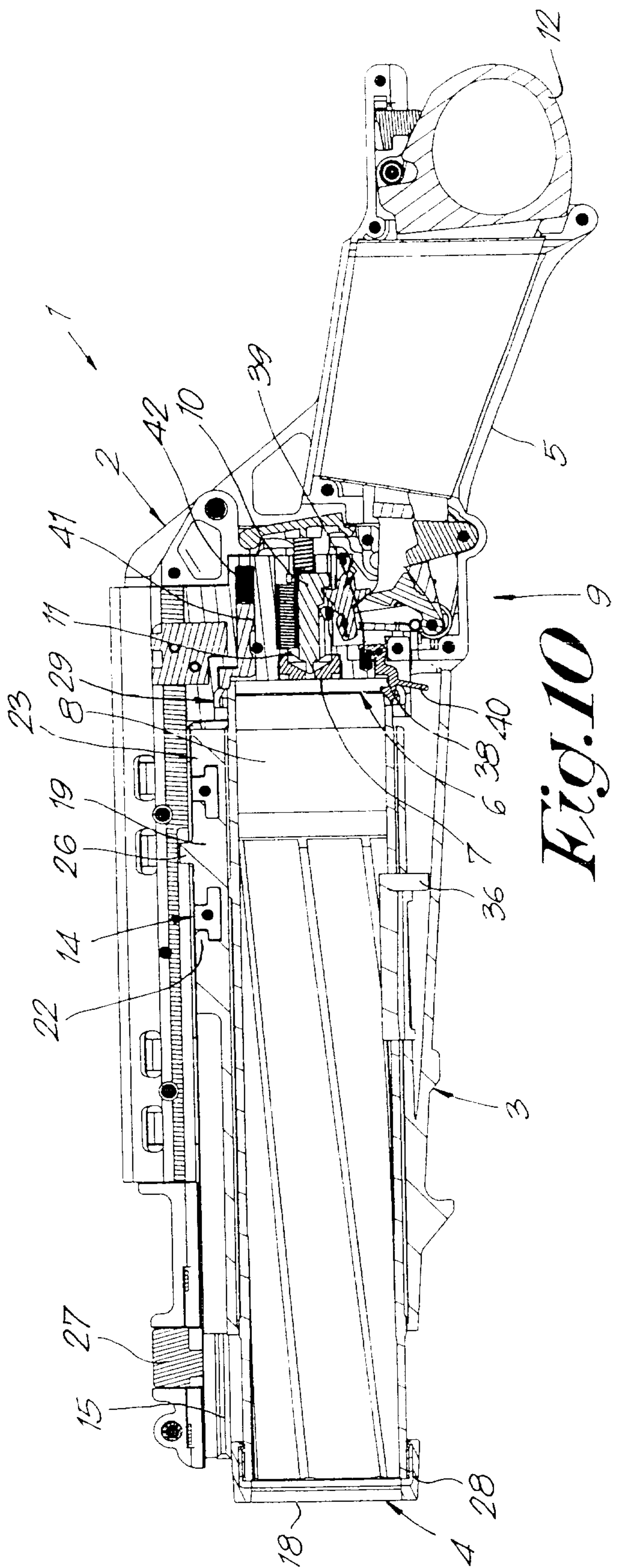
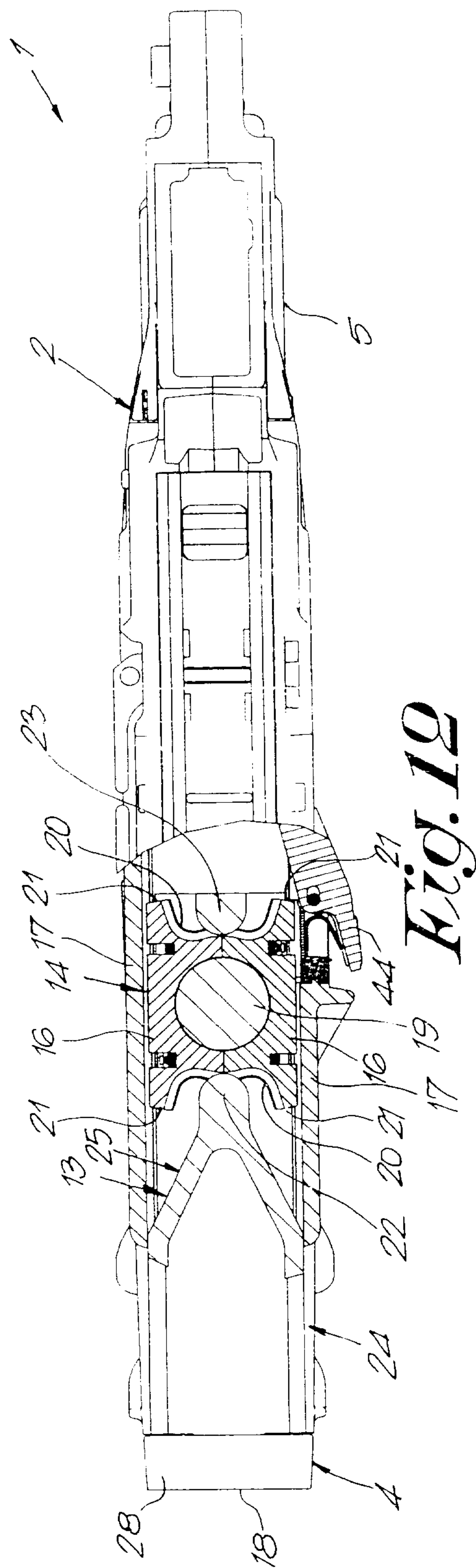
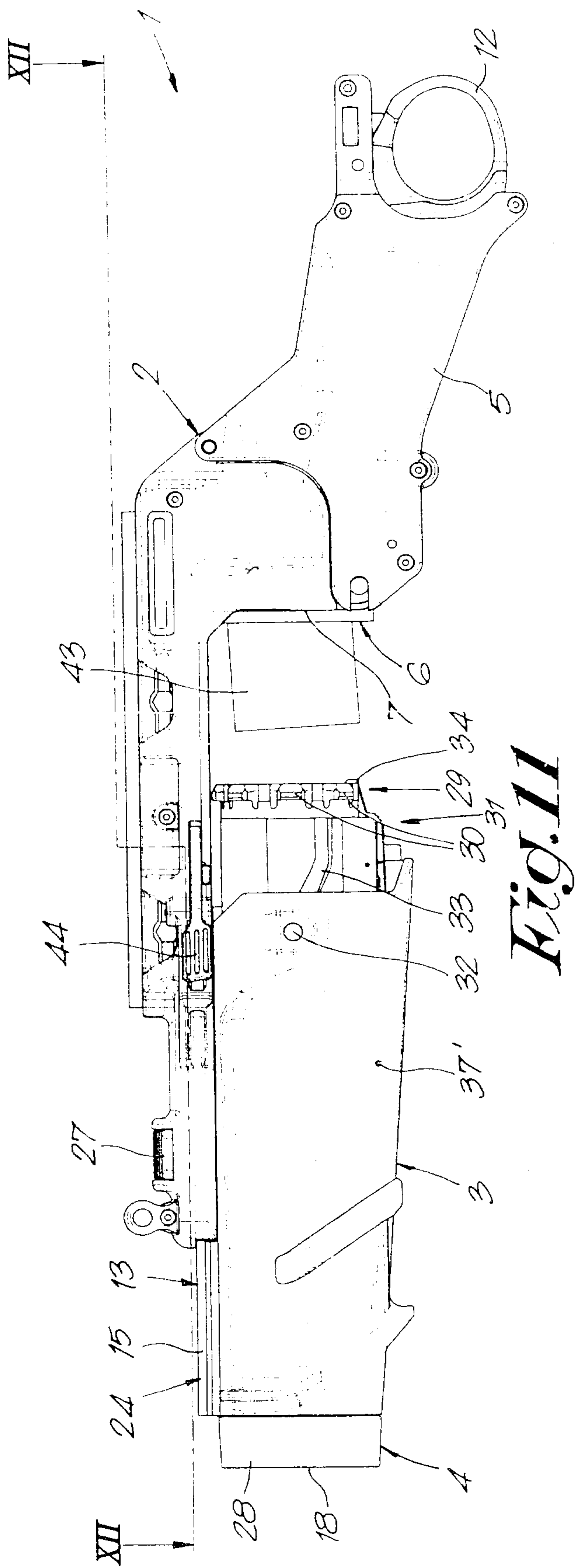
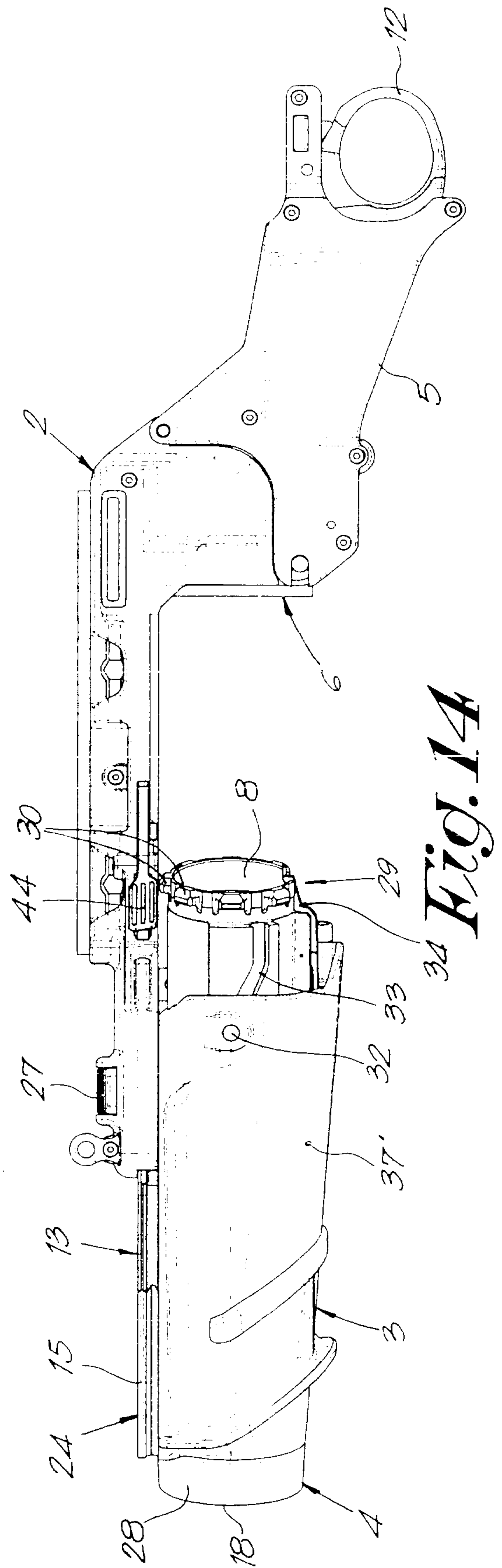
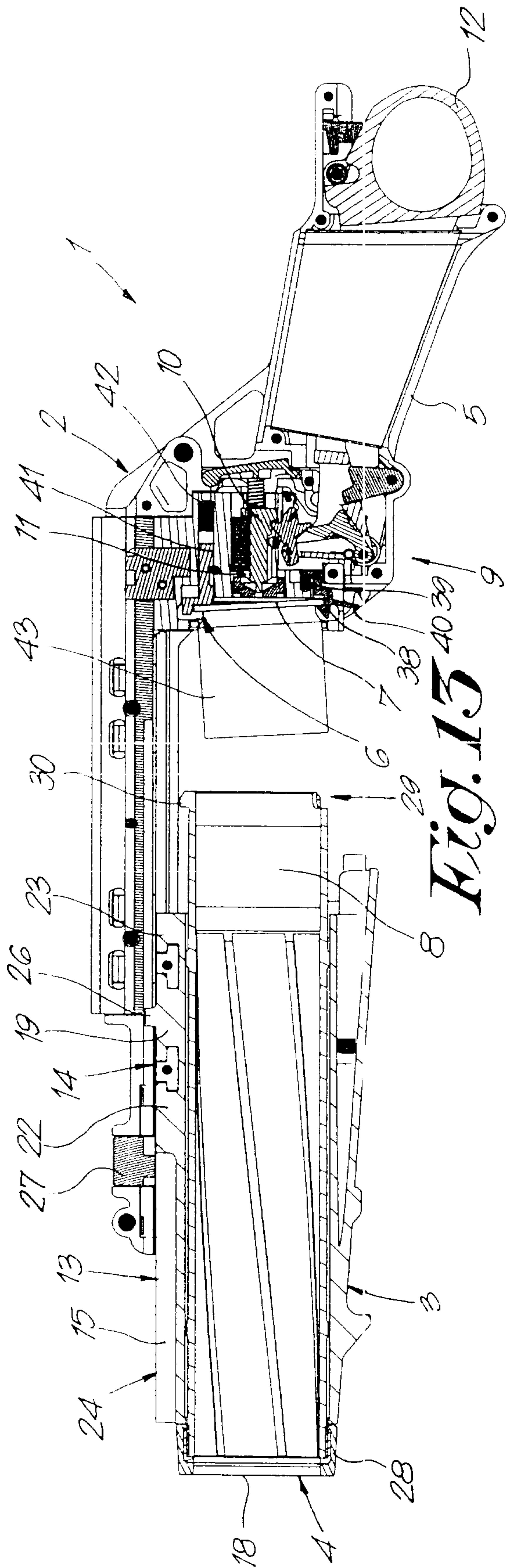
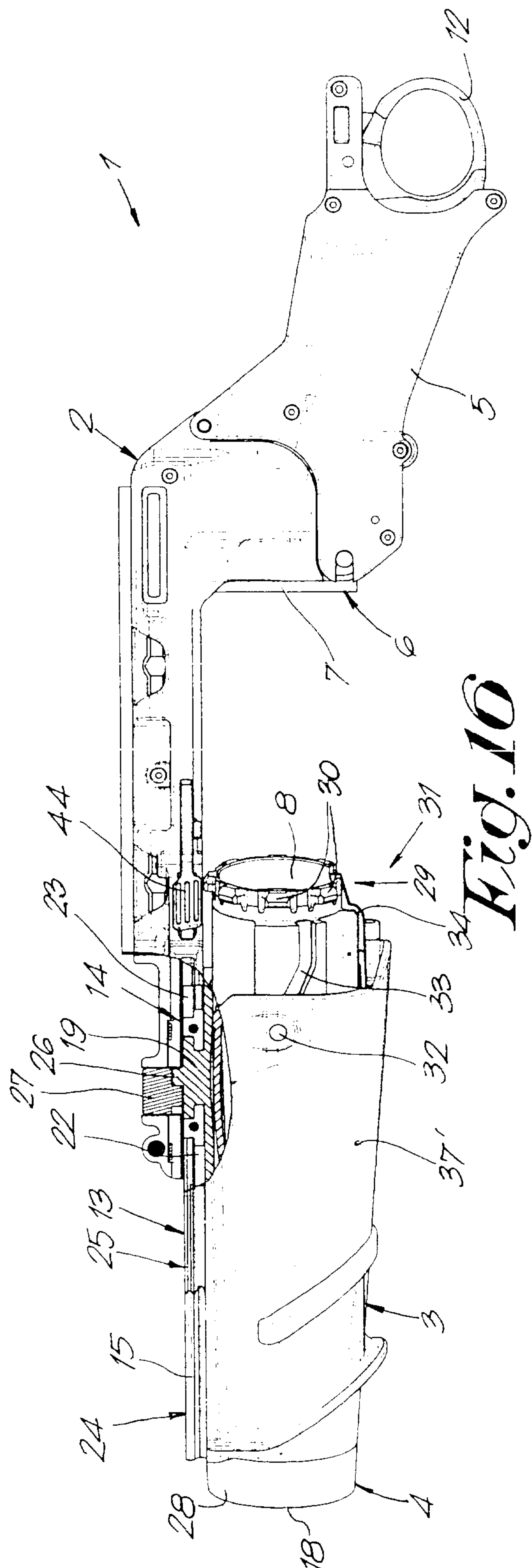
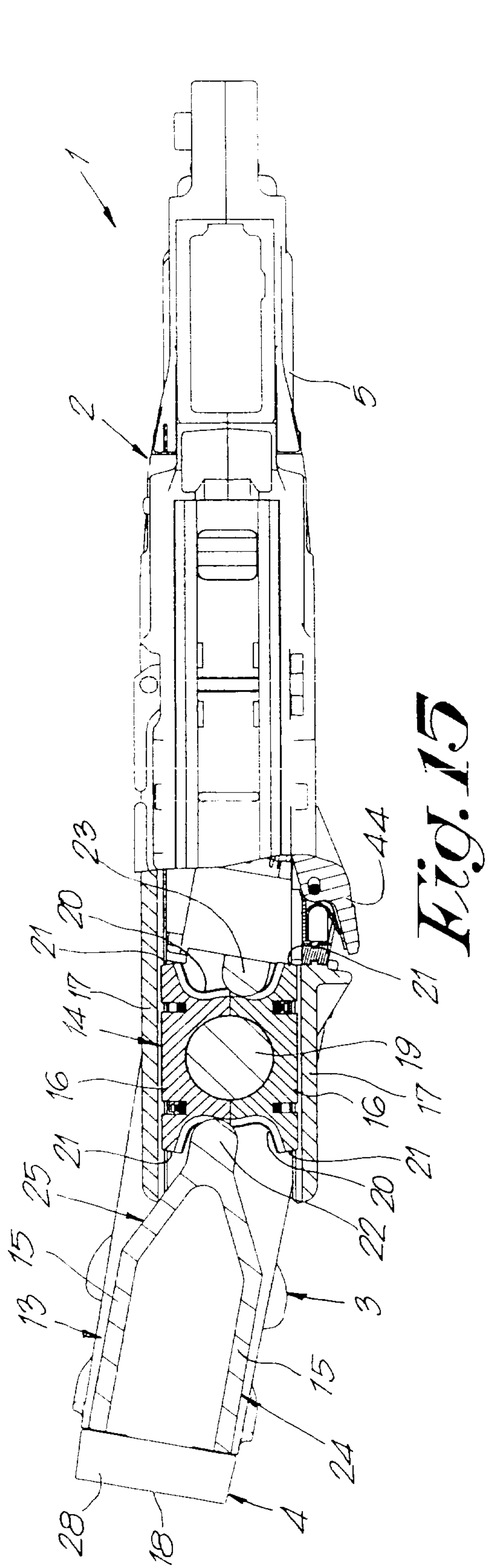


Fig. 10







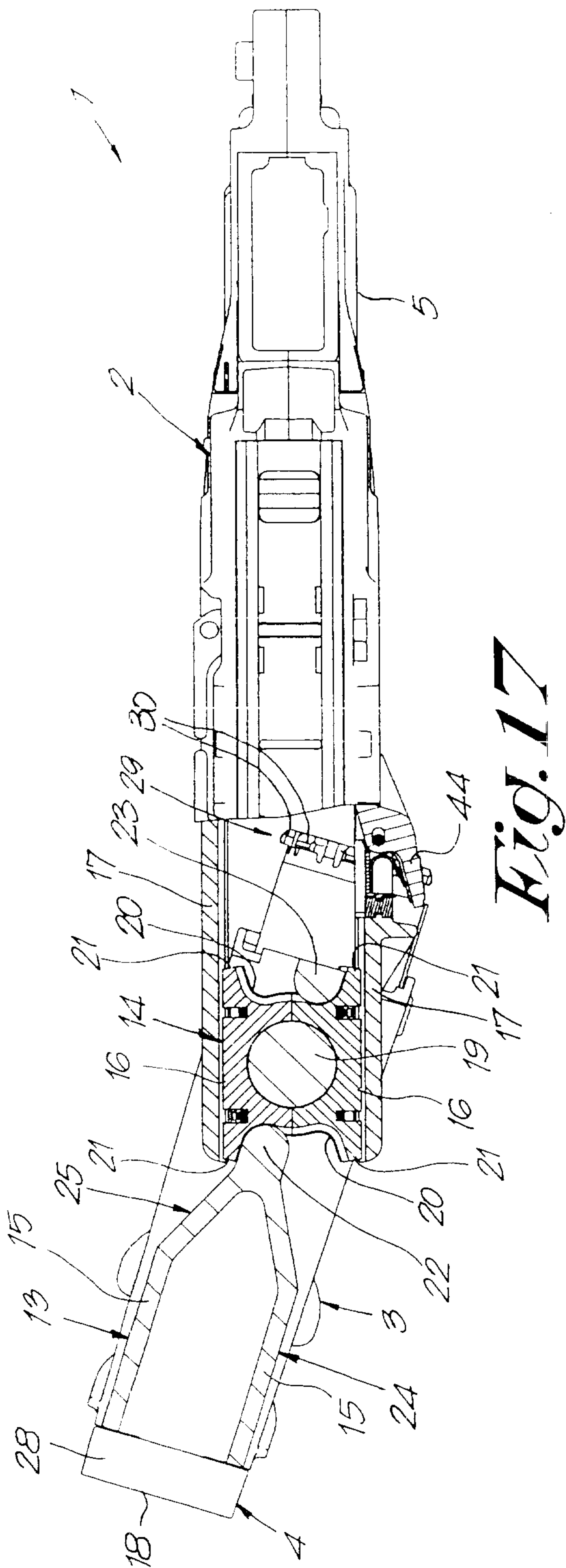


Fig. 17

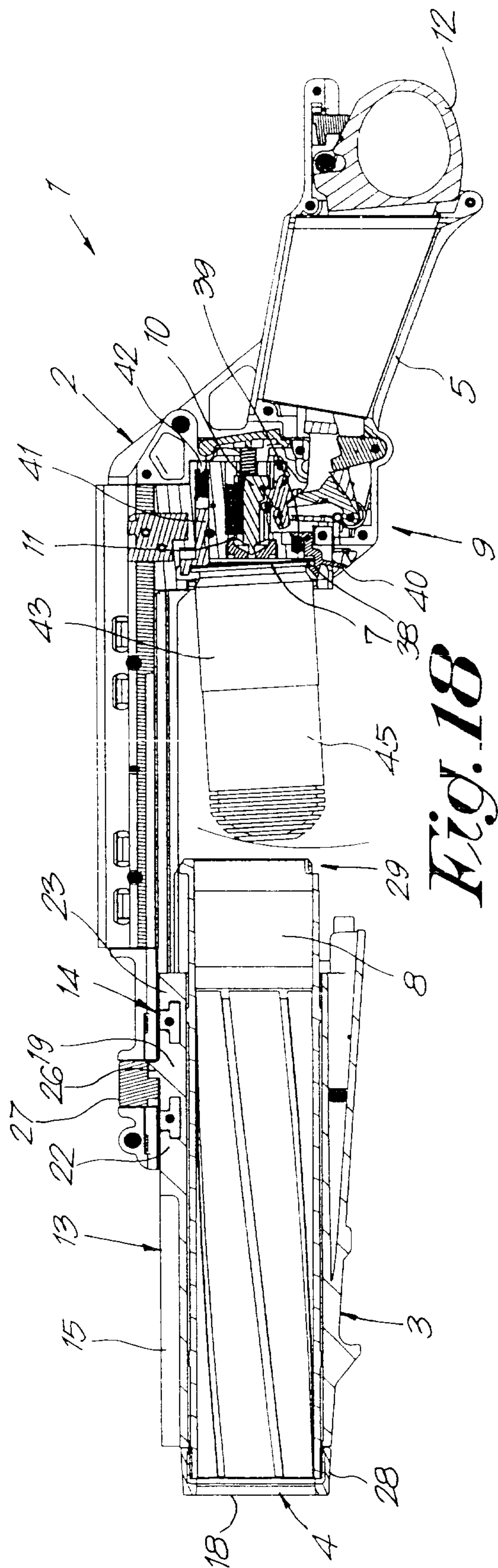


Fig. 18

