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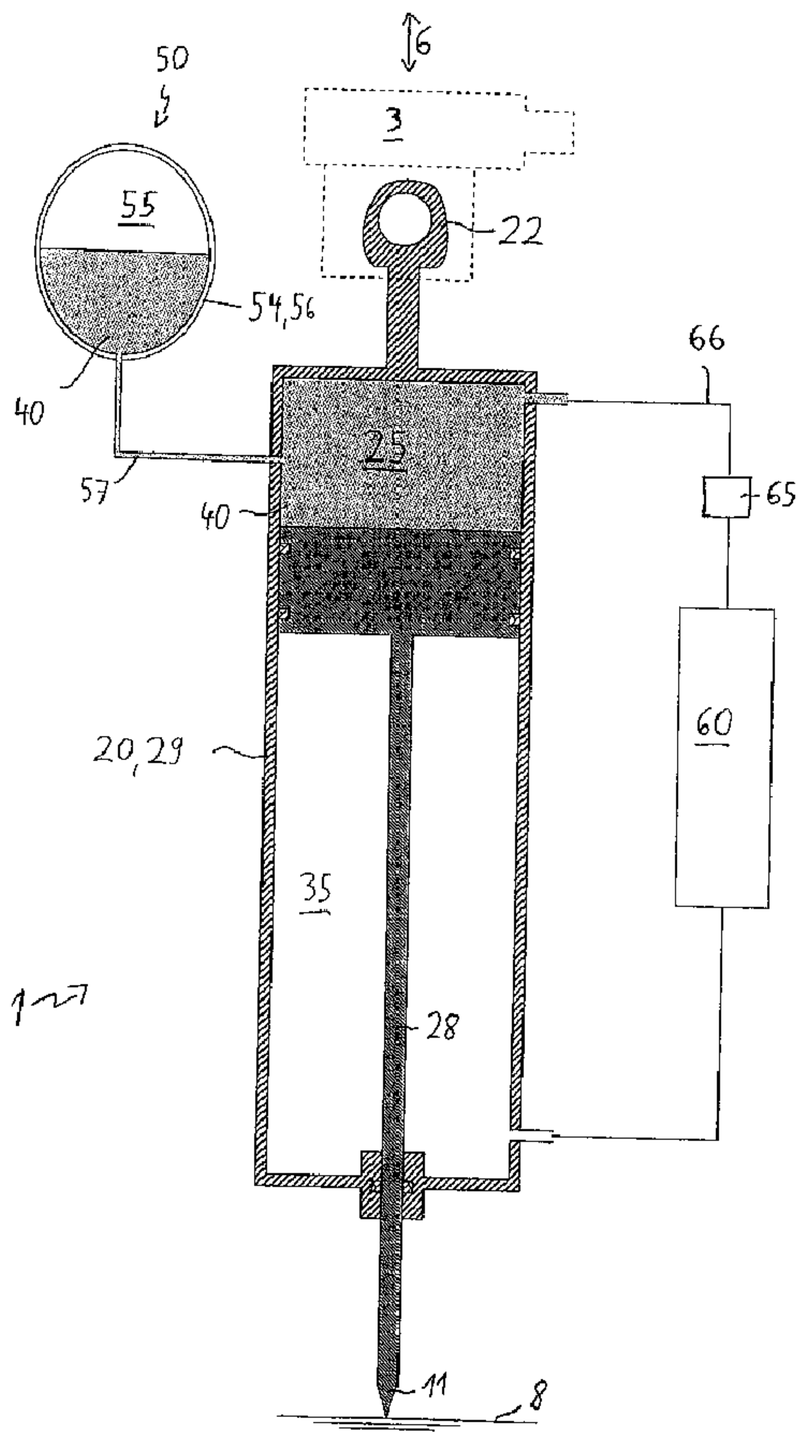
(54) Titre : SUPPORTS DE PERFORATEUR POUR MARTEAU PNEUMATIQUE
(54) Title: DRILL SUPPORTS FOR A DRILL HAMMER



(57) Abrégé/Abstract:
The invention relates to a drill support for a drill hammer with a foot for placement on the floor, a holder for the drill hammer, and a telescopic, hydraulic cylinder with which the holder can be moved in an axial direction in relation to the foot, wherein at least one

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(57) Abrégé(suite)/Abstract(continued):
pressure chamber is placed in the telescopic hydraulic cylinder, that allows hydraulic fluid for the pulling out of the telescopic hydraulic cylinder. As per the invention, the drill support has at least one spring device for the axial cushioning of the holder against the foot.

ABSTRACT

The invention relates to a drill support for a drill hammer with a foot for placement on the floor, a holder for the drill hammer, and a telescopic, hydraulic cylinder with which the holder can be moved in an axial direction in relation to the foot, wherein at least one pressure chamber is placed in the telescopic hydraulic cylinder, that allows hydraulic fluid for the pulling out of the telescopic hydraulic cylinder. As per the invention, the drill support has at least one spring device for the axial cushioning of the holder against the foot.

Drill Supports for a Drill Hammer

The invention relates to a drill support for a drill hammer as per the preamble of Claim 1. Such a drill support is designed with a foot for placement on the floor, a holder for the drill hammer, and a telescopic, hydraulic cylinder with which the holder can be moved in an axial direction in relation to the foot, wherein at least one pressure chamber is placed in the telescopic hydraulic cylinder, that allows hydraulic fluid for the deployment of the telescopic hydraulic cylinder.

Such drill supports, sometimes also described as drill columns, are known for e.g. from AT 226174. They are used, amongst other things, for the creation of blast holes in underground mining and serve the purpose of at least creating a part of the contact pressure of the drill hammer and/or of supporting the drill hammer.

There are known pneumatic as well as hydraulic drill supports, especially those operated by water hydraulics, whereby the selection of the operational fluid for the drill supports can depend on the type of energy used to operate the drill hammer.

Tests have shown that the drilling performance achieved by hydraulically operated drill supports, can under certain circumstances, be lower than the drilling performance of comparative pneumatically operated drill supports, especially with lower contact pressures (wherein under drilling performance the achievable advance per time unit can be understood).

The function of the invention is to present a drill support with which a particularly high drilling performance and high level of reliability can be achieved, even with a particularly simple design.

The function is solved by means of a drill support as per the invention with the characteristics of Claim 1. Preferred designs are given in the attached claims.

A drill support as per the invention is characterized thereby, that it at least has one spring device for the axial cushioning of the holder against the foot.

The basic idea of the invention can be seen therein, that a spring device is provided in the path between the holder for the drill hammer and the foot which works together with the hydraulic cylinder. This spring device can absorb the elongation of the drill supports in axial direction, between the holder and the foot. The invention has recognized that the increased drilling performance that is observed with pneumatic drill supports could be based on the cushioning effect that takes place with pneumatic drill supports because of the compressibility of the gaseous operational fluid. This cushioning effect results in the reaction time being lower when compared to that of a hydraulic drill support, which in turn could accompany higher drilling performance, especially with lower contact pressures. As against this, hydraulic drill supports are often carriers as compared to pneumatic drill supports because of the lack of compressibility of the operational fluid and therefore slower with lower contact pressures. Based on this knowledge, the invention has planned additionally of providing a spring device for the hydraulic drive. Because of this additional spring device, reaction times with hydraulic drill supports that correspond to reaction times of pneumatic drill supports can be achieved. As a result, particularly high drilling performance can be achieved by the invention, without having to abandon the especially tough and reliable hydraulic drive concept.

It is highly preferred that the spring device is provided and/or works in series with the pressure chamber. This design adds to the elongation caused by the expansion of the spring elements and an elongation caused by the expansion of the pressure chamber. With such serial connection, a particularly good reduction in reaction time is achieved.

For example, it can be planned that the spring device has at least one solid spring, esp. a metal spring. This can be an advantage with a view on the construction expenses. Example, the solid spring can be a metal spring. The solid spring can especially be a coil spring or a plate spring.

Alternatively or additionally it can be planned, that the spring device has at least one gas pressure spring. In the case of such a gas pressure spring, a gas, especially air is used to prepare the spring force. Such a gas pressure spring can produce a convenient path. Moreover a gas pressure spring can be particularly reliable, especially in long-term operation.

As long as a gas pressure spring is provided, it would be helpful to see that the gas pressure spring has a spring gas volume that lies outside the hydraulic cylinder and/or pressure chamber of the hydraulic cylinder. Accordingly, the gas pressure spring must have spring housing in which the spring gas volume is located and which is in fluid connection with the pressure chamber through a line link. Such an arrangement is advantageous with regard to maintenance expenses because the gas pressure spring and the hydraulic cylinder can be serviced separately.

Alternatively or additionally it can be planned that the gas pressure spring has a spring gas volume which is located in the pressure chamber of the hydraulic cylinder. This helps in achieving a highly compact arrangement.

The invention also relates to a drilling device with a drill support as per the invention, and a pressure source for impacting the pressure chamber of the hydraulic cylinder with pressure fluid. The pressure fluid can preferably be water, but could basically also just be hydraulic oil. The hydraulic cylinder is preferably a double-effect cylinder so that it can be moved in and out hydraulically.

From the practical point of view, the drilling device has a drill hammer placed on the holder of the drill support. The drill hammer can for e.g. have an electro-pneumatic drive.

The cushioning device is preferably placed on the drill support resulting in a simple and compact arrangement.

In addition it is good to at least plan one valve with which the flow of pressure fluid between the pressure source and the pressure chamber can be influenced. Through such a valve the drawing out of the drill support can be controlled in a simple manner. Here it is preferred that the spring device has at

least one gas pressure spring, wherein the valve is placed between the gas pressure spring and the pressure source. In such an arrangement, the gas pressure spring can also be effective when

the valve is controlled shut or is greatly reduced in its profile. It is also practical if the valve is placed between the gas pressure spring and/or the pressure chamber in the line link.

The invention is explained in detail as follows with the help of preferred sample designs, which are shown in the attached diagrams. The diagrams show:

Fig. 1: A partly cut profile of an initial design of a drilling device with a drill support as per the invention; and

Fig. 2: A partly cut profile of a second design of a drilling device with a drill support as per the invention.

A first design of a drilling device as per the invention is shown in Figure 1. The drilling device just shows a drill hammer 3 as well as a drill support 1 on which the drill hammer is fixed and which can brace the drill hammer 3 and support a drive of the drill hammer 3.

The drill support 1 has, on one end, an eye-like holder 22 on which the drill hammer 3 is fixed in a hinged manner. At its other end the drill support has a foot 11 which is standing on the floor 8. The drill support 1 further has a hydraulic cylinder 20 which is placed between the holder 22 and the foot 11, and with which the holder 22 can be adjusted in an axial direction 6, relative to the foot 11. Accordingly, on drawing out of the hydraulic cylinder 20, the drill hammer 3 is moved away from the floor 8.

The hydraulic cylinder 20 has a cylinder housing 29 and a piston 28 that can be moved within. In the sample design presented, the holder 22 on the cylinder housing 29 and the foot 11 are arranged on the piston 28. Basically, however, a reverse arrangement is also possible in which the holder is attached to the piston and the foot to the cylinder housing. The piston can be made in multiple parts and/or telescopic.

The hydraulic cylinder 20 is designed as a double-effect cylinder and therefore shows a first pressure chamber 25 that has pressure fluid 40 for pulling out of the hydraulic cylinder 20, and

a second pressure chamber 35 with pressure fluid 40 meant for driving in of the hydraulic cylinder 20. A pressure source 60 is connected to the hydraulic cylinder 20 with which pressure fluid 40, especially water, can be introduced into the pressure chamber 25 or 35 for targeted pulling out or driving in of the hydraulic cylinder. In the line link 66 which runs between the pressure source 60 and the pressure chamber 25, a valve 65 is placed to influence the fluid exchange between the pressure source 60 and the pressure chamber 25. This valve 65 can be built as a directional valve or as a combination of directional and control valve.

In order to make it clearer in the diagrams, the pressure fluid 40 is shown only in the first pressure chamber 25. In a double-effect hydraulic cylinder 20, however, pressure fluid would normally be found also in pressure chamber 35.

In order to reduce the reaction time of the drill support 1 and thereby to improve the drilling performance, a spring device 50 is considered which in the design sample in Figure 1 is a gas pressure spring 54. In the design sample of Figure 1, the gas pressure spring 54 is arranged outside the cylinder housing 30 and/or the pressure chamber 25. It shows a spring housing 56 the inner chamber of which is connected with the pressure chamber 25 in a line link. On the inside of the spring housing 56 is spring gas volume 55, especially air, which creates the desired resilience. The gas pressure spring 54 of Figure1 is therefore made like a bubble storage.

In another design variation not presented here, the gas pressure spring can also be formed in a way that the spring gas volume is placed within the pressure chamber 25, thus doing away with the external spring housing 56 and the line link 57.

A further design sample of a drilling device as per the invention is presented in Figure 2. The design sample of Figure 2 varies from that of Figure 1 only with regard to the arrangement and placement of the spring device. For the other remaining elements one can therefore refer to the above description of Figure 1.

In the design sample of Figure 2, the spring device 50' is a solid spring 52, for e.g. a coil spring. In the design sample presented, the spring device 50 is placed in the course of the piston 28 i.e.

between the pressure chamber 25 and the foot 11. The spring device could also be placed for e.g. between the holder 22 and the pressure chamber 25.

In both design samples of Figure 1 and Figure 2, the spring devices 50 and 50' work in series with the pressure chamber i.e. the spring devices 50 and 50' can accept elongations between holder 22 and foot 11 without having the pressure fluid from the pressure chamber 60 lead into or out of the pressure chamber 25. Therefore if during operation of the drilling device crushes arise in the axial direction 6 from the drill hammer 3 and/or holder 22 towards the foot 11, these can be cushioned by the respective spring devices 50 and 50'.

PATENT CLAIMS

1. Drill support (1) for a drill hammer (3) with a foot (11) for placement on the floor (8), a holder (22) for the drill hammer (3) and a telescopic hydraulic cylinder (20) with which the holder (22) can be moved in an axial direction (6) relative to the foot (11), wherein there is at least one pressure chamber (25) in the hydraulic cylinder (20), which has pressure fluid (40) for the pulling out of the hydraulic cylinder (20), characterized by the fact that the drill supports (1) have at least one spring device (50) for the axial cushioning of the holder (22) against the foot (11).

2. Drill support (1) as per claim 1, characterized by the fact
that the spring device (5) is placed in line with the pressure chamber (25).

3. Drill support (1) as per one of the above claims, characterized by the fact
that the spring device (50) has at least one solid spring (52).

4. Drill support (1) as per one of the above claims, characterized by the fact
that the spring device (50) has at least one gas pressure spring (54).

5. Drill support (1) as per claim 4, characterized by the fact
that the gas pressure spring (54) has a spring gas volume (55) which is located outside the hydraulic cylinder (20).

6. Drill support (1) as per claim 4 and 5, characterized by the fact
that the gas pressure spring (54) has a spring gas volume that is located in the pressure chamber (25) of the hydraulic cylinder (20).

7. Drilling device with a drill support (1) as per one of the above claims, a pressure source (60) for loading the pressure chamber (25) of the hydraulic cylinder (20) with pressure fluid (40), especially with water, and a drill hammer (3) which is placed on the holder (22) of the drill support (1).

8. Drilling device as per claim 7, characterized by the fact
that the spring device (50) is placed on the drill support.

9. Drilling device as per claim 7 or claim 8, characterized by the fact
that there is at least one valve (65) with which the flow of the pressure fluid (40) between the pressure source (60) and the pressure chamber (25) can be influenced
and
that the spring device (50) has at least one gas pressure spring (54) wherein the valve (65) is placed in the line link between the gas pressure spring (54) and the pressure source (60).

Fig. 1

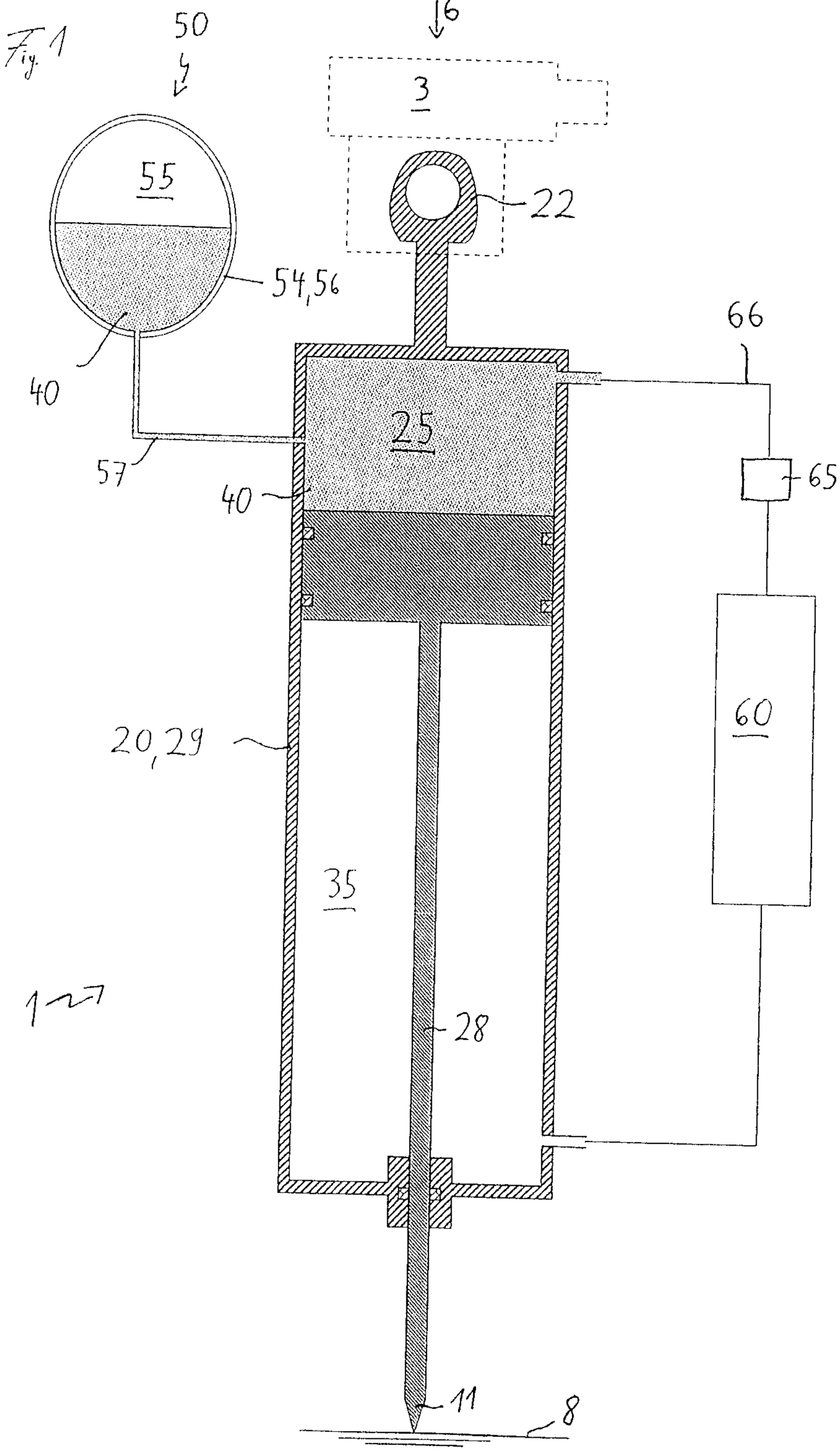
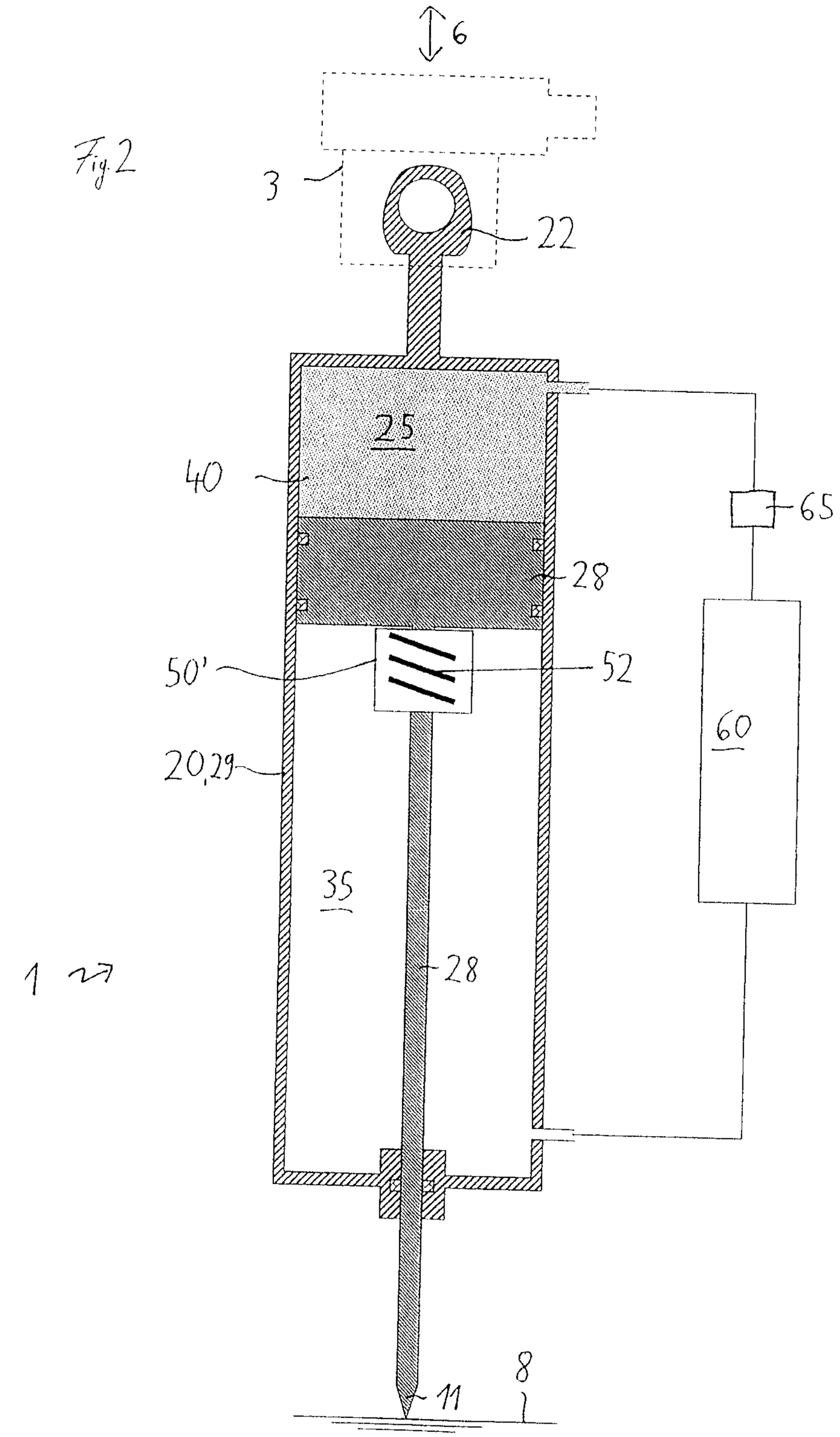
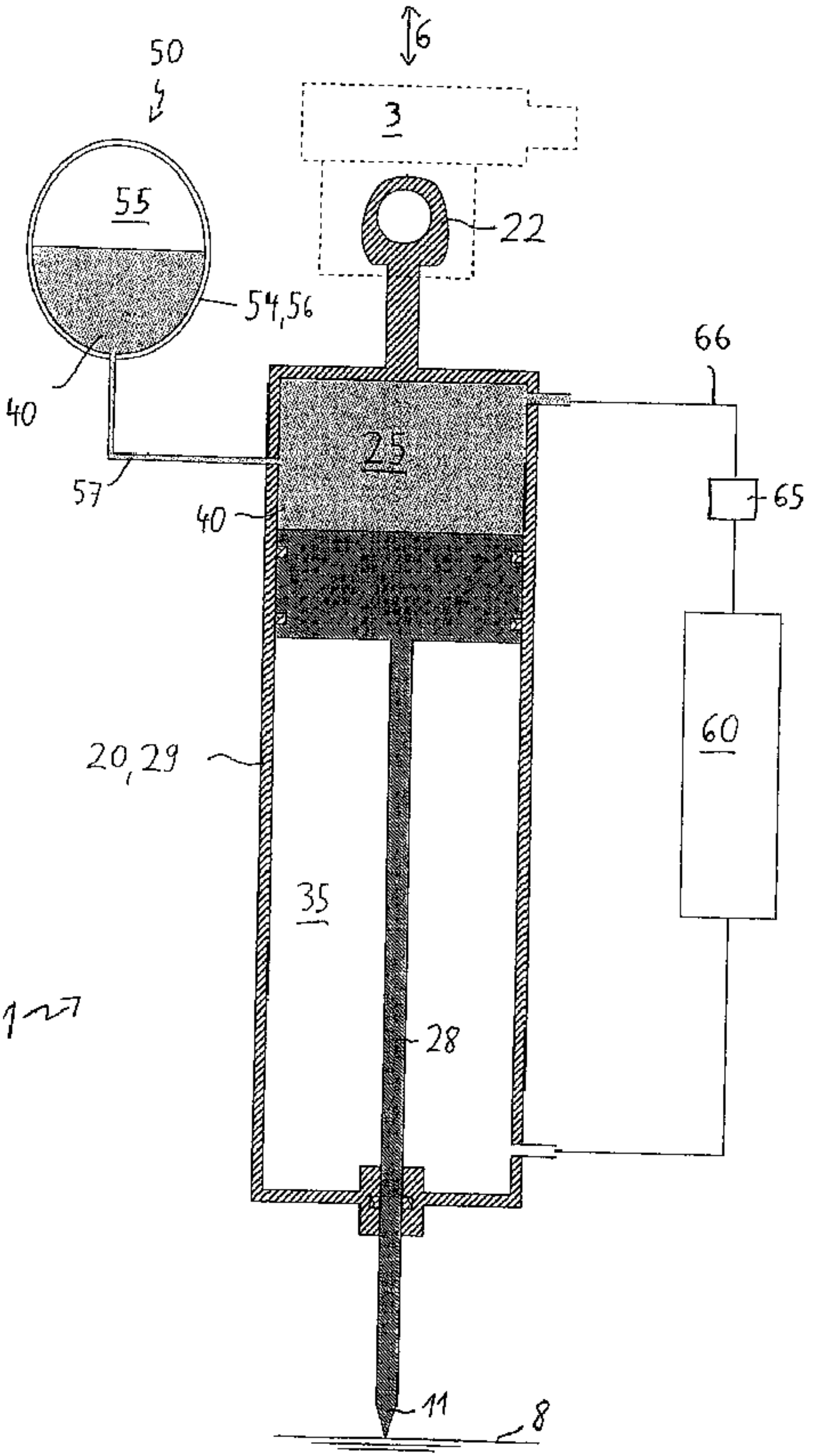


Fig. 2

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