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(54) **Sharpening apparatus, particularly for drilling bits**

(57) A sharpening apparatus (1), particularly for drilling bits, comprising, within a containment enclosure (2), a frustum-shaped grinding wheel (10), which is connected to a shaft (11) turned by motor means (12), the apparatus further comprising, on the containment enclosure (2), a registration assembly (20) for the axial positioning of a bit (26) to be sharpened in a supporting mandrel (22); on the containment enclosure (2), a sharpening seat (50) being also provided for accommodating the supporting mandrel (22) with a presettable positioning angle of the sharp edge of the bit (26) to be sharpened with respect to the frustum-shaped grinding wheel (10).

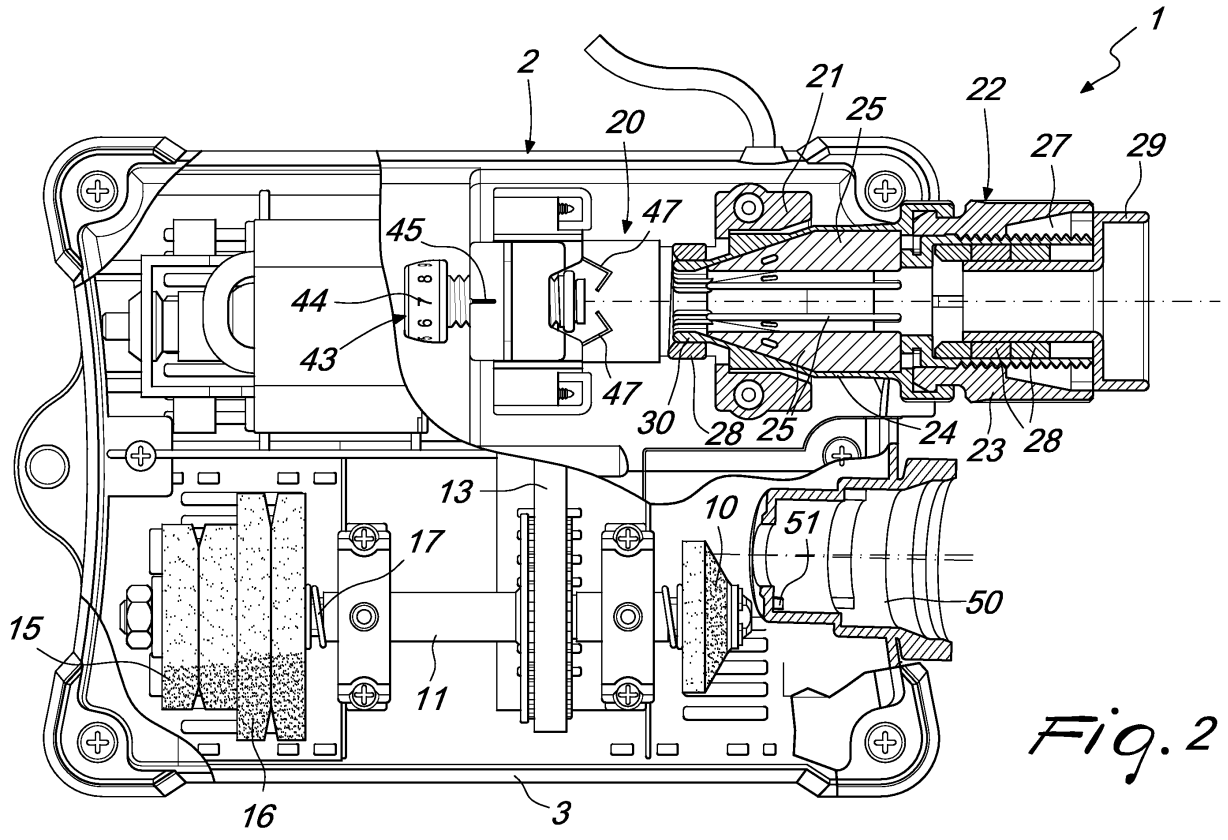

Fig. 2

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Description

[0001] The present invention relates to a sharpening apparatus, particularly for drilling bits.

[0002] As is known, sharpening apparatuses, in particular for sharpening drilling bits, are already commercially available and use a grinding wheel supported by a shaft that is turned and against which the bit to be sharpened is positioned.

[0003] With the solutions of the background art, the correctness of the sharpening, which must be provided with a preset rake angle on the cutting edge, is practically entrusted uniquely to the skill of the operator, who must be able to position the bit correctly.

[0004] It is evident that this method is particularly unreliable and most of all does not allow assured repetitiveness of the results.

[0005] The aim of the present invention is to solve the problems noted above by providing a sharpening apparatus, particularly for drilling bits, that allows to prearrange the positioning of the bit with respect to the grinding wheel, with the advantage of always achieving an optimum rake angle as regards sharpening of the cutting edge.

[0006] Within this aim, an object of the invention is to provide an apparatus which, besides sharpening drilling bits, is capable of sharpening blades, blades of tools, and blades of scissors, being able to combine in a single element a plurality of different functionalities.

[0007] Another object of the invention is to provide a sharpening apparatus, particularly for drilling bits, which thanks to its particular constructive characteristics is capable of giving the greatest assurances of reliability and safety in use.

[0008] This aim, as well as these and other objects that will become better apparent hereinafter, are achieved by a sharpening apparatus, particularly for drilling bits, according to the invention, comprising, within the containment enclosure, a frustum-shaped grinding wheel, which is connected to a shaft turned by motor means, characterized in that it comprises, on said containment enclosure, a registration assembly for the axial positioning of a bit to be sharpened in a supporting mandrel, there being also, on said containment enclosure, a sharpening seat for accommodating said supporting mandrel with a presettable positioning angle of the sharp edge of the bit to be sharpened with respect to said frustum-shaped grinding wheel.

[0009] Further characteristics and advantages will become better apparent from the description of a preferred but not exclusive embodiment of a sharpening apparatus, particularly for drilling bits, illustrated by way of non-limiting example with the aid of the accompanying drawings, wherein:

Figure 1 is a perspective view of the sharpening apparatus according to the present invention;
Figure 2 is a plan view of the apparatus, with the closing cover removed;
Figure 3 is a perspective view of the supporting mandrel;
Figure 4 is an exploded view of the supporting mandrel, with the registration elements highlighted, as a function of the size of the bits;
Figure 5 is a view of the supporting mandrel with a registration element applied thereto;
Figure 6 is a sectional plan view of the registration assembly with the supporting mandrel shown in exploded view;
Figure 7 is a view of the initial step of the positioning of the supporting mandrel of the registration assembly;
Figure 8 is a sectional view of the step of axial positioning of the bit in the supporting mandrel and of positioning of the cutting edge with respect to the axis;
Figure 9 is an exploded view of the step of insertion of the mandrel in the sharpening seat;
Figure 10 is a view of the step for sharpening the cutting edge;
Figure 11 is a sectional view of the sharpening seat, taken along a horizontal plane; and
Figure 12 is a sectional view of the apparatus, taken along a vertical plane at the grinding wheel supporting shaft.

[0010] With reference to the figures, the sharpening apparatus, particularly for drilling bits, generally designated by the reference numeral 1, comprises a containment enclosure 2, which is constituted by a container body 3 onto which a cover 4 is applied.

[0011] A frustum-shaped grinding wheel 10 is provided inside the container body and is connected to a shaft 11, which is turned by motor means constituted by an electric motor 12 connected to the shaft 11 by means of a conventional belt 13.

[0012] A peculiarity of the sharpening apparatus according to the invention consists in that on the same shaft 11 a first pair of front grinding wheels 15 and a second pair of front grinding wheels 16 are provided, which are mutually laterally adjacent and are pushed elastically by a compaction spring 17.

[0013] The use of the pairs of grinding wheels 15 and 16 will be described in greater detail hereinafter.

[0014] An important peculiarity of the invention consists in that on the cover 4 a registration assembly is provided, generally designated by the reference numeral 20, which has a collar 21 in which it is possible to insert a supporting mandrel, generally designated by the reference numeral 22.

[0015] The supporting mandrel 22 has a body 23 to which a ring 24 is connected for adjusting the radial positioning of laminas 25 that fasten the bit, generally designated by the reference numeral 26.

[0016] The mandrel further has, in its rear portion, a containment region, designated by the reference numer-

al 27, in which it is possible to insert registration elements or abutments 28, which are kept in position by a plug 29.

[0017] The registration elements 28 can be arranged, as a function of the diameter of the bit to be sharpened, on a front shank 30 of the supporting mandrel, which is provided with abutment notches 31 for the angular positioning of the abutments 28.

[0018] The registration elements 28 are provided axially with a cam-like shape 32, with two inclined ramps that are designed, as will become better apparent hereinafter, to determine the axial penetration of the bit to be sharpened.

[0019] The registration assembly 20 has an abutment pad 40, which is connected to a threaded shank 41 that can be engaged in a threaded seat 42.

[0020] An actuation knob 43 is connected to the threaded shank 41, and reference markings 44 are arranged thereon which correspond to the diameter of the bit and can be arranged so as to be aligned with a registration or abutment notch 45, which is arranged on a slider 46 that is designed to divaricate the positioning laminas 47 that engage the bit, so as to turn it to arrange the cutting edge on a preset plane.

[0021] The mandrel 22, with the corresponding bit arranged axially, is inserted in a sharpening seat, designated by the reference numeral 50 and provided on the cover 4, which is arranged so as to be angularly inclined, with respect to the horizontal axis of the shaft 11, both on a vertical plane and on a horizontal plane, as clearly shown in the sectional views taken on the horizontal and vertical planes.

[0022] On the bottom of the seat abutment notches 51 are provided, with which the cams 32 arranged on the abutments 28 engage in order to provide, during sharpening, a rotation with axial movement, which creates a cutting edge with the selected rake angle, as will become better apparent hereinafter.

[0023] On the cover 4, at the first and second pair of grinding wheels 15 and 16, there are provided a first slot 60 for the insertion of the blades of knives and a second slot 61 for the insertion of the blades of tools, farming equipment and the like.

[0024] A front slot 62 is also provided, which is arranged at the axial base of the first pair of grinding wheels 15 that allows the sharpening of the blades of scissors.

[0025] In practical use, with the apparatus described above it is possible to sharpen the bits according to the size of the bit proper, always obtaining a particularly precise sharpening.

[0026] To sharpen a bit, the registration element 28 is first applied to the mandrel 22 that corresponds to the diameter of the bit, and then the mandrel 22 is inserted in the collar 21 with the bit 26 held loose inside it, so that it can abut against the pad 40, and so that by releasing the slider 46 it is possible to turn the bit, by means of the positioning laminas 47, so as to arrange the cutting edge on a preset plane.

[0027] Once the positioning of the bit has been performed, the bit is locked on the mandrel by turning the ring that supports the laminas 25 so as to lock the bit.

[0028] Once positioning has been performed, the supporting mandrel is removed and, after actuating the motor, the bit is inserted, with the selected registration element applied thereto, in the sharpening seat 50, and a clockwise rotation is performed first on one side and then on the opposite side, taking care to turn both sides a same number of times.

[0029] Once this step has been performed, the mandrel is removed from the support and the correct sharpening of the bit is checked.

[0030] The apparatus described above also allows to sharpen blades of tools and farming equipment, and in this case the second slot 61 is used by inserting the blade between the second pair of grinding wheels 16 and taking care to pull the blade toward oneself in order to perform sharpening.

[0031] Likewise, knives are inserted in the first slot 60, between the first pair of blades, performing perfect sharpening.

[0032] To sharpen scissors, it is sufficient to arrange the blade flat at the front slot 62 so as to perform correct sharpening.

[0033] From what has been described above, it is evident that the invention achieves the proposed aim and objects, and in particular the fact is stressed that an apparatus is provided which allows, in a single component, to sharpen both drilling bits and blades of several kinds, as well as scissors.

[0034] Moreover, another important aspect of the invention consists in that sharpening of bits is performed precisely and repetitively, allowing to always obtain the correct rake angle.

[0035] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

[0036] All the details may further be replaced with other technically equivalent elements.

[0037] In practice, the materials used, so long as they are compatible with the specific use, as well as the contingent shapes and dimensions, may be any according to requirements.

[0038] The disclosures in Italian Patent Application No. MI2008A000317 from which this application claims priority are incorporated herein by reference.

[0039] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A sharpening apparatus (1), particularly for drilling

bits, comprising, within a containment enclosure (2), a frustum-shaped grinding wheel (10), which is connected to a shaft (11) turned by motor means (12), **characterized in that** it comprises, on said containment enclosure (2), a registration assembly (20) for the axial positioning of a bit (26) to be sharpened in a supporting mandrel (22), there being also, on said containment enclosure (2), a sharpening seat (50) for accommodating said supporting mandrel (22) with a presettable positioning angle of the sharp edge of the bit (26) to be sharpened with respect to said frustum-shaped grinding wheel (10).

2. An apparatus for sharpening tools, comprising an enclosure (2) for containing sharpening grinding wheels, **characterized in that** it comprises, on a single shaft (11) actuated by motor means (12), a frustum-shaped grinding wheel (10) for sharpening drilling bits (26) at a sharpening seat (50), there being also a first slot (60) at a first pair of grinding wheels (15) for sharpening blades of knives, and a second slot (61) at a second pair of grinding wheels (16) for sharpening the blades of equipment and tools in genera, there being also a front slot (62) for sharpening scissor blades.

3. The apparatus according to one or more of the preceding claims, **characterized in that** said containment enclosure (2) has a container body (3) on which a cover (4) is applied.

4. The apparatus according to one or more of the preceding claims, **characterized in that** said registration assembly (20) comprises a collar (21) for the detachable insertion of a supporting mandrel (22), which comprises a ring (24) for adjusting the radial positioning of laminas (25) for fastening the bit (26) to be sharpened, said mandrel (22) having a front shank (30) for mating with a registration element (28) selected according to the diameter of the bit (26) to be sharpened.

5. The apparatus according to one or more of the preceding claims,
characterized in that said registration assembly (20) has an abutment pad (40) that faces said collar (21) and is connected to a threaded shank (41), which can engage a threaded seat (42) formed on said cover (4), an actuation knob (43) being associated with said threaded shank (41) and having reference markings (44) that correspond to the diameter of the bit (26) to be sharpened and can be arranged so as to be aligned with a registration notch arranged on a slider (46) for divaricating positioning laminas (47), which can engage said bit (26) in order to position angularly the cutting edges in a preset position with respect to said mandrel (22).

6. The apparatus according to one or more of the preceding claims, **characterized in that** said registration elements (28) have, on an axial base, a cam-like shape (32), with inclined ramps for defining the axial positioning of the bit (26) to be sharpened in said sharpening seat (50).

7. The apparatus according to one or more of the preceding claims, **characterized in that** said sharpening seat (50) is formed in said cover (4) and can be arranged so as to be inclined angularly with respect to the axis of said shaft both on the vertical plane and on the horizontal plane.

8. The apparatus according to one or more of the preceding claims, **characterized in that** it comprises, on the bottom of said sharpening seat (50), abutment notches (51) that can engage said cams (32) of said registration elements (28) in order to provide a preset inclination and axial arrangement of the cutting edge of said drilling bit (26) with respect to said cup grinding wheel.

9. The apparatus according to one or more of the preceding claims, **characterized in that** said mandrel (22) has, on its outer surface, abutment notches for the angular positioning of said registration elements (28).

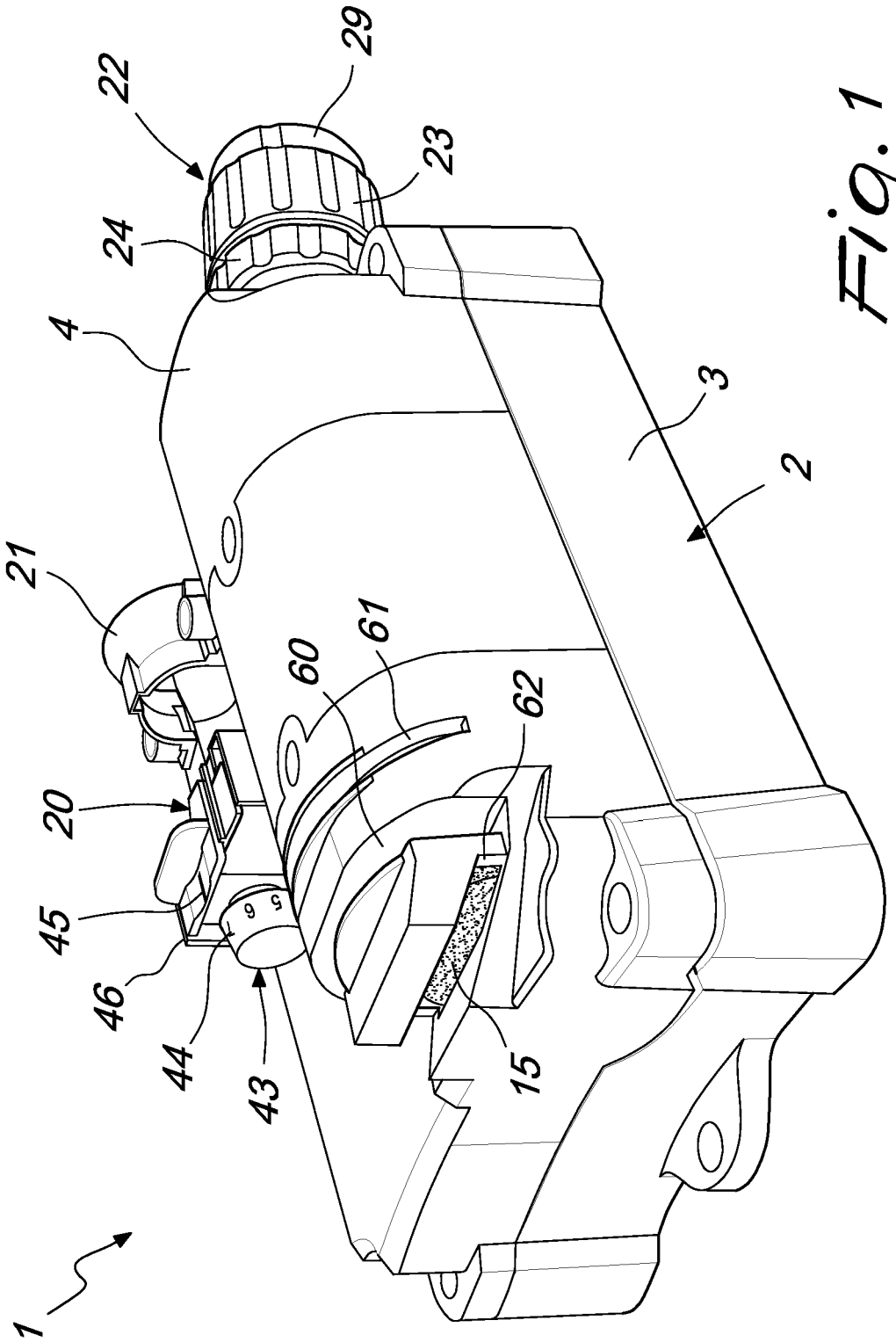

Fig. 1

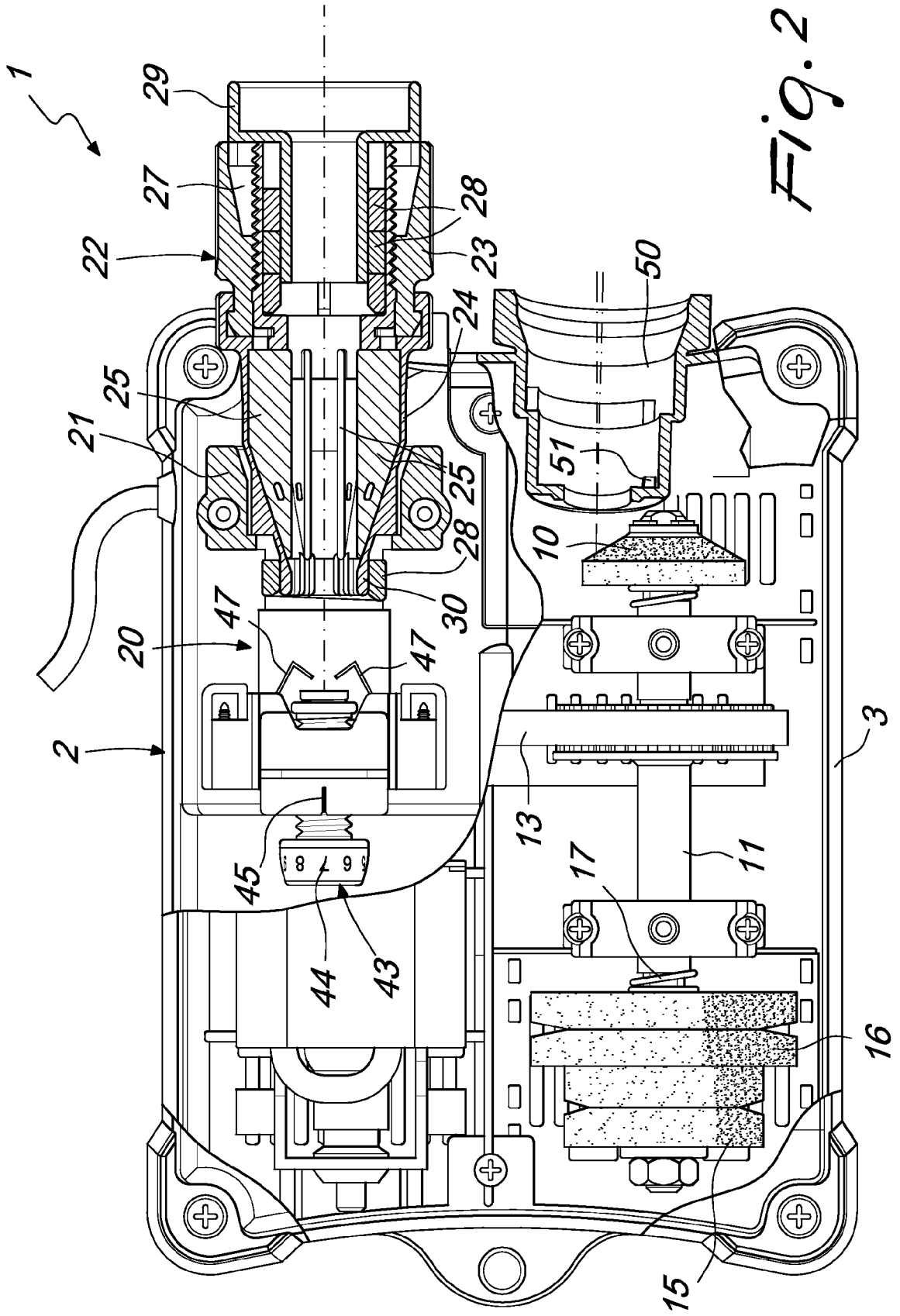
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Fig. 2

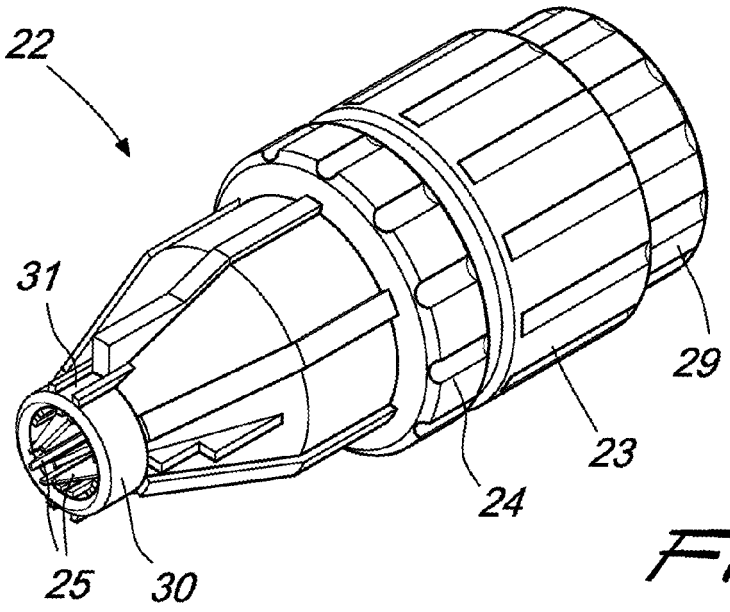

Fig. 3

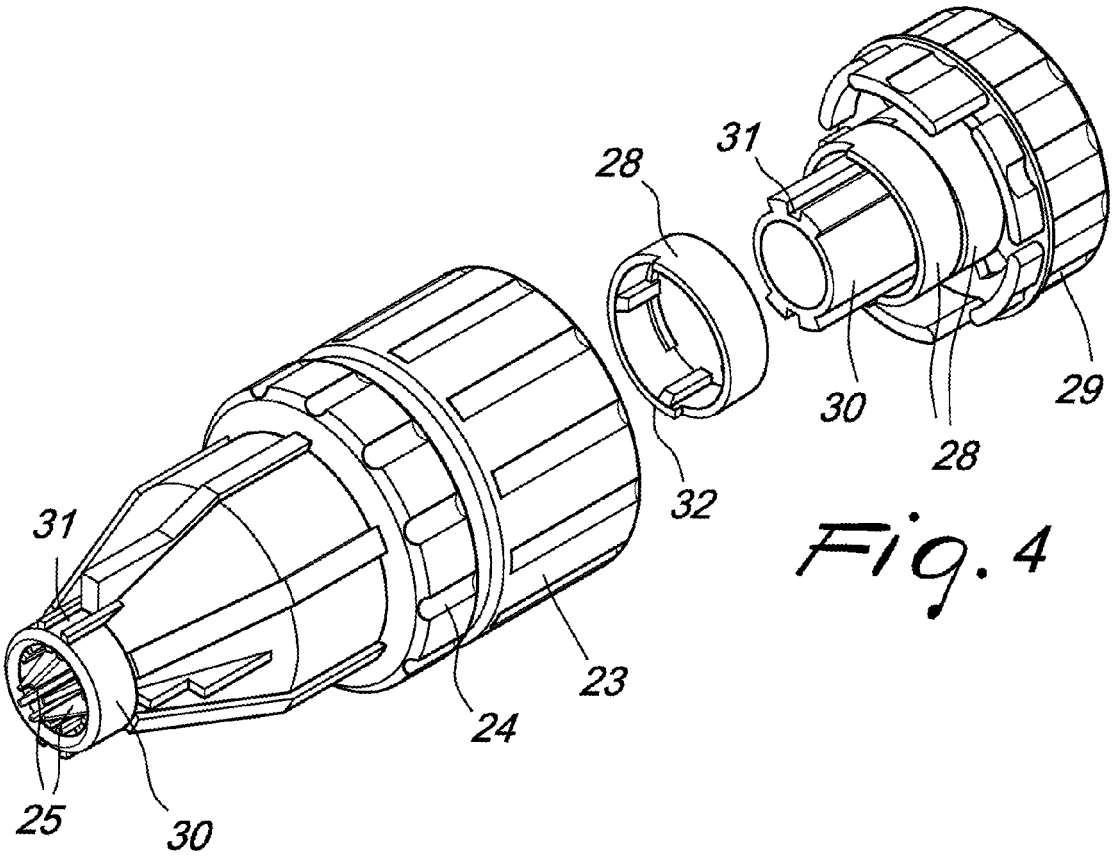

Fig. 4

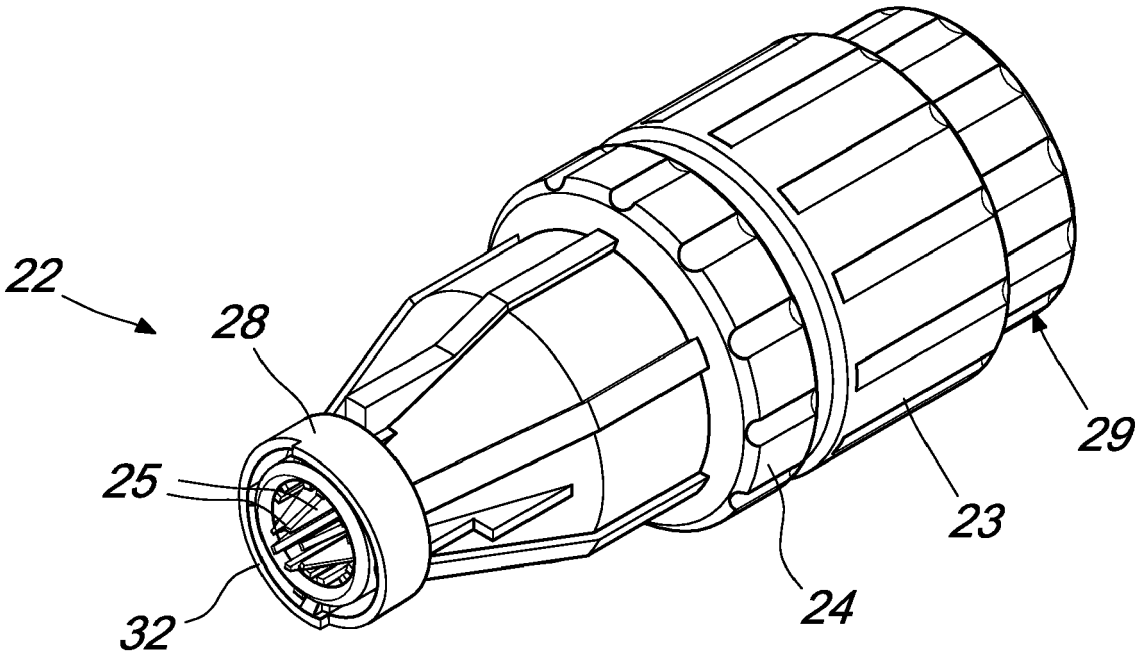

Fig. 5

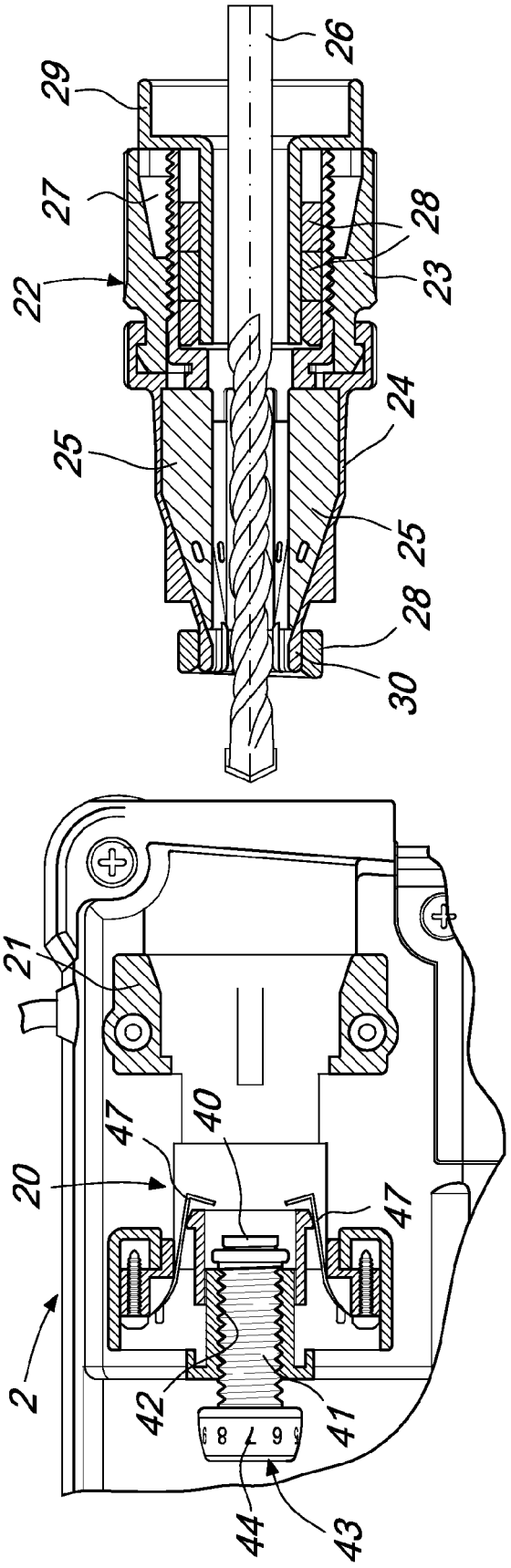

Fig. 6

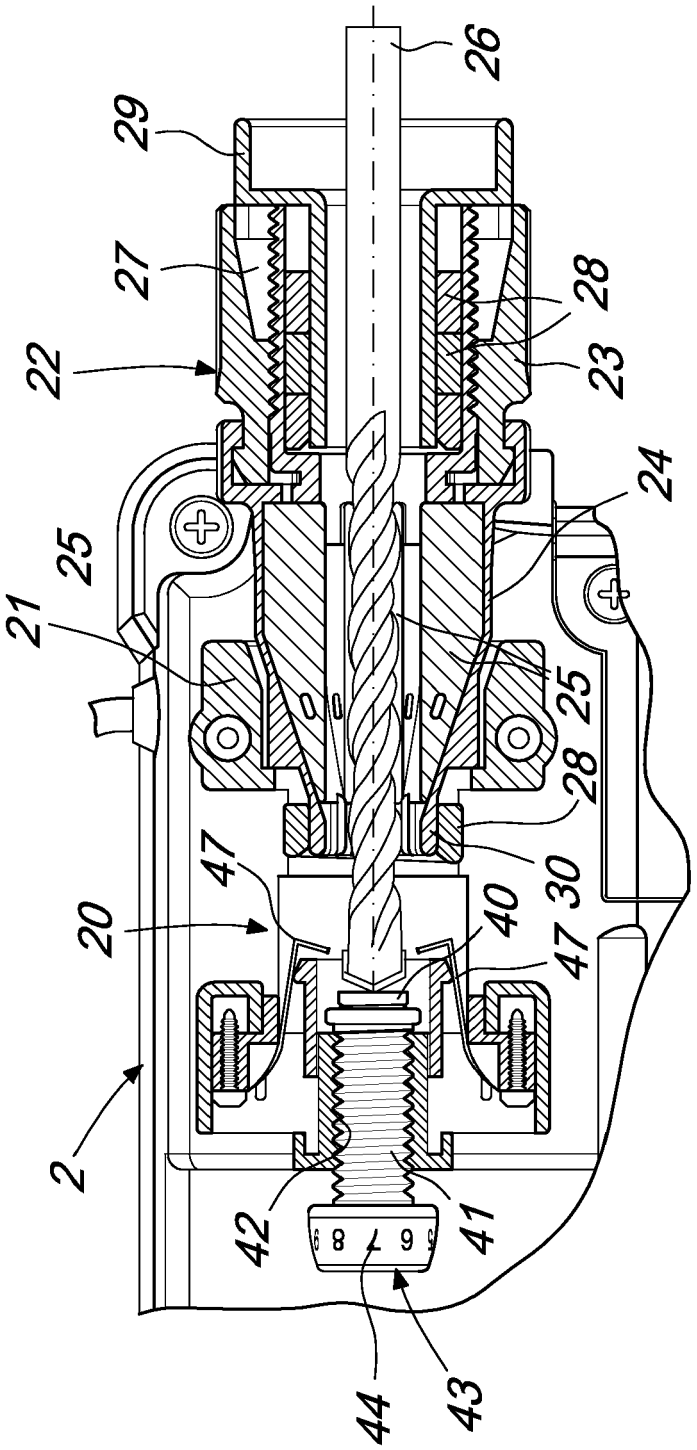

Fig. 7

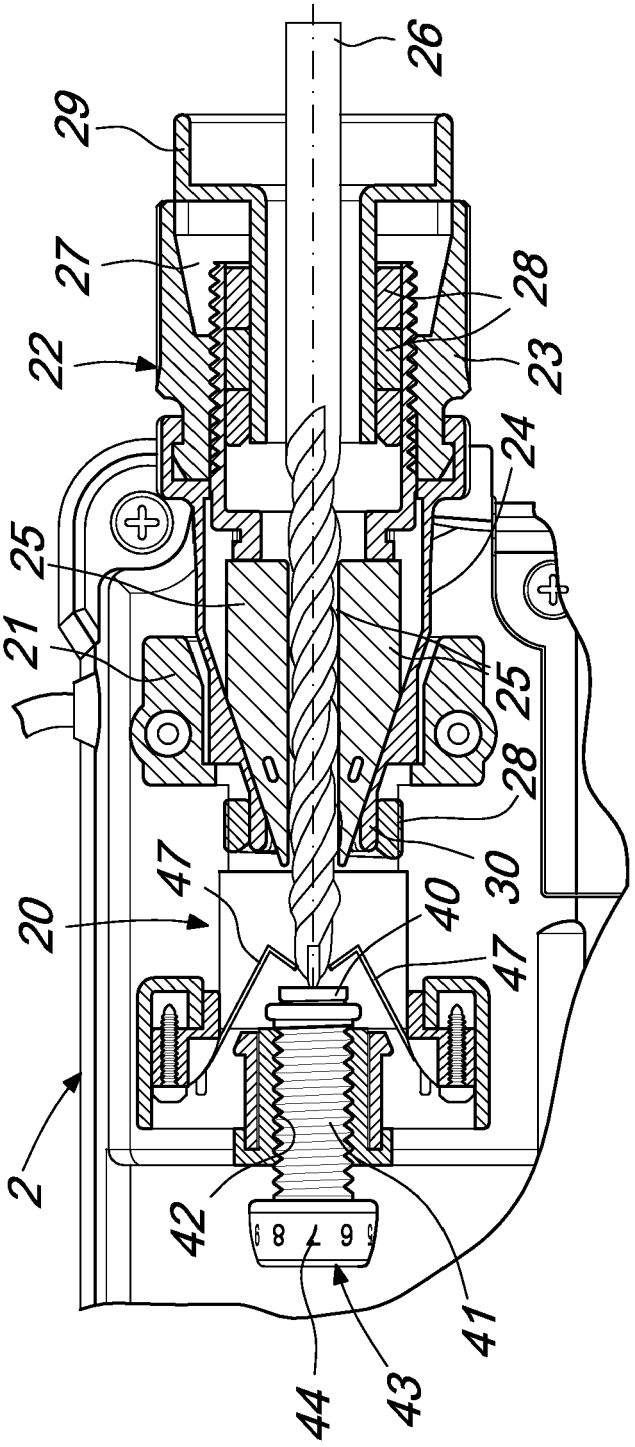

Fig. 8

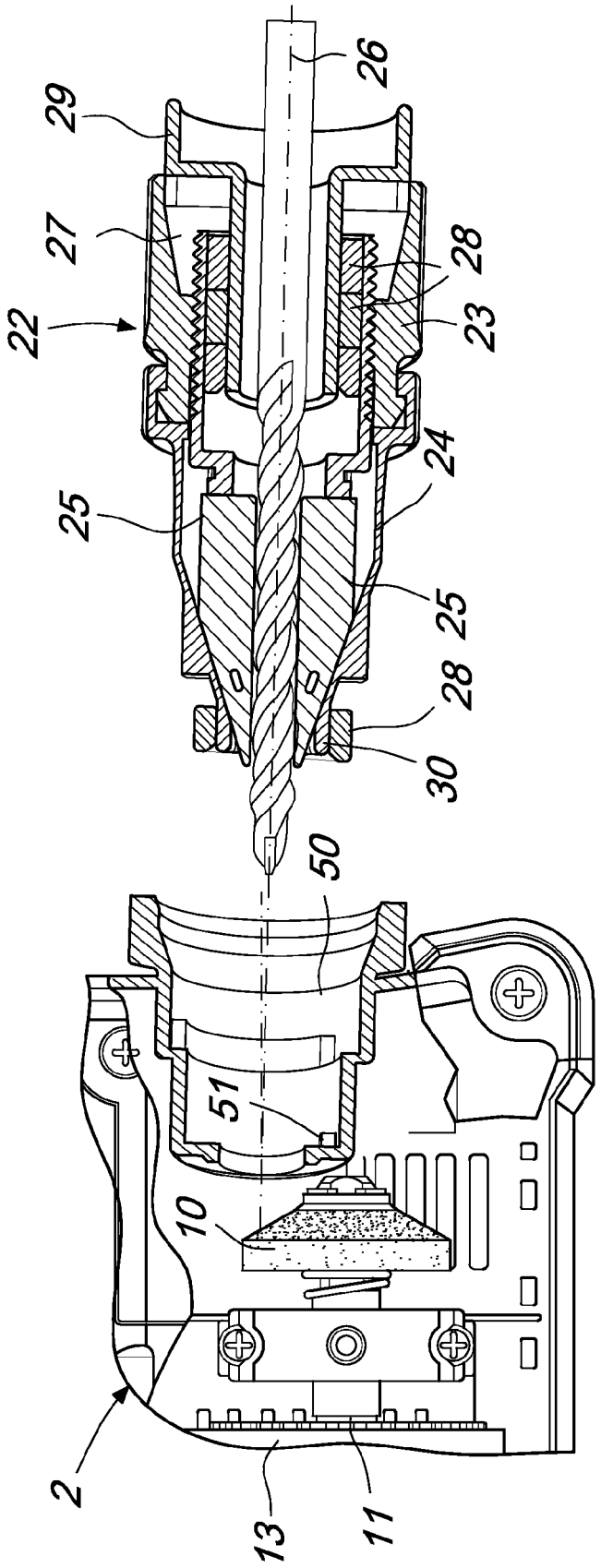

Fig. 9

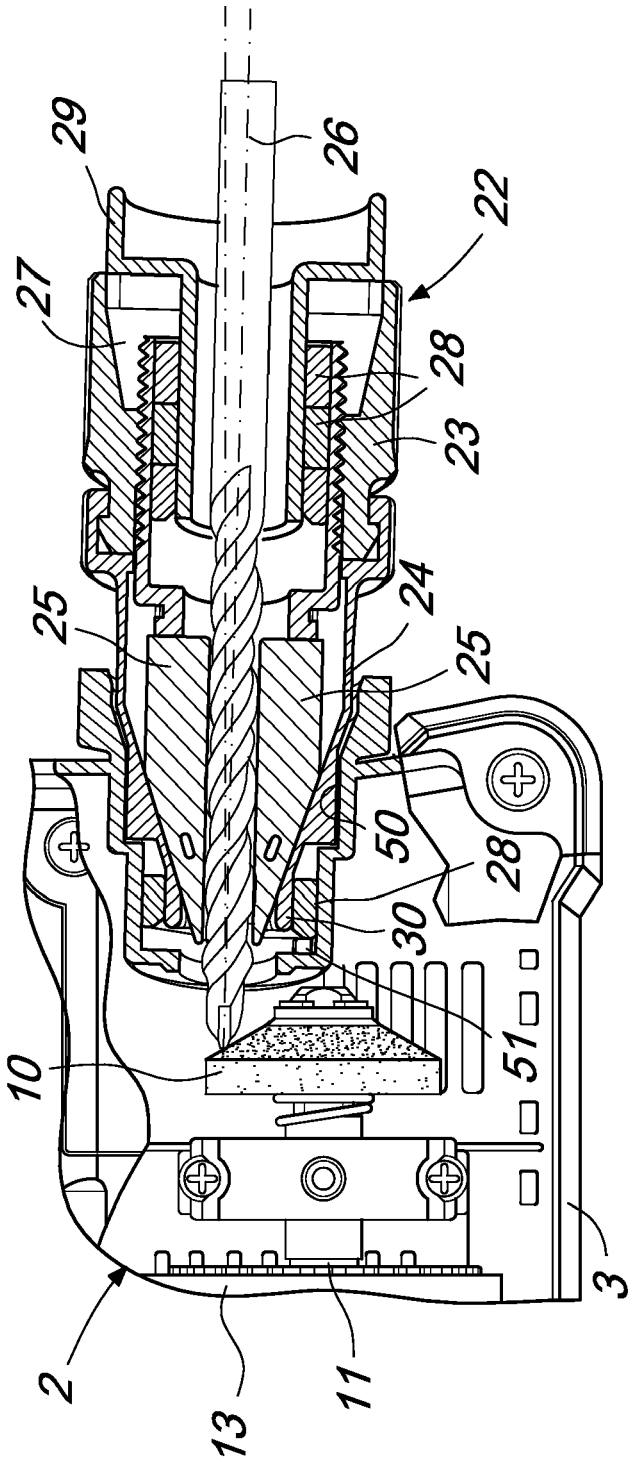

Fig. 10

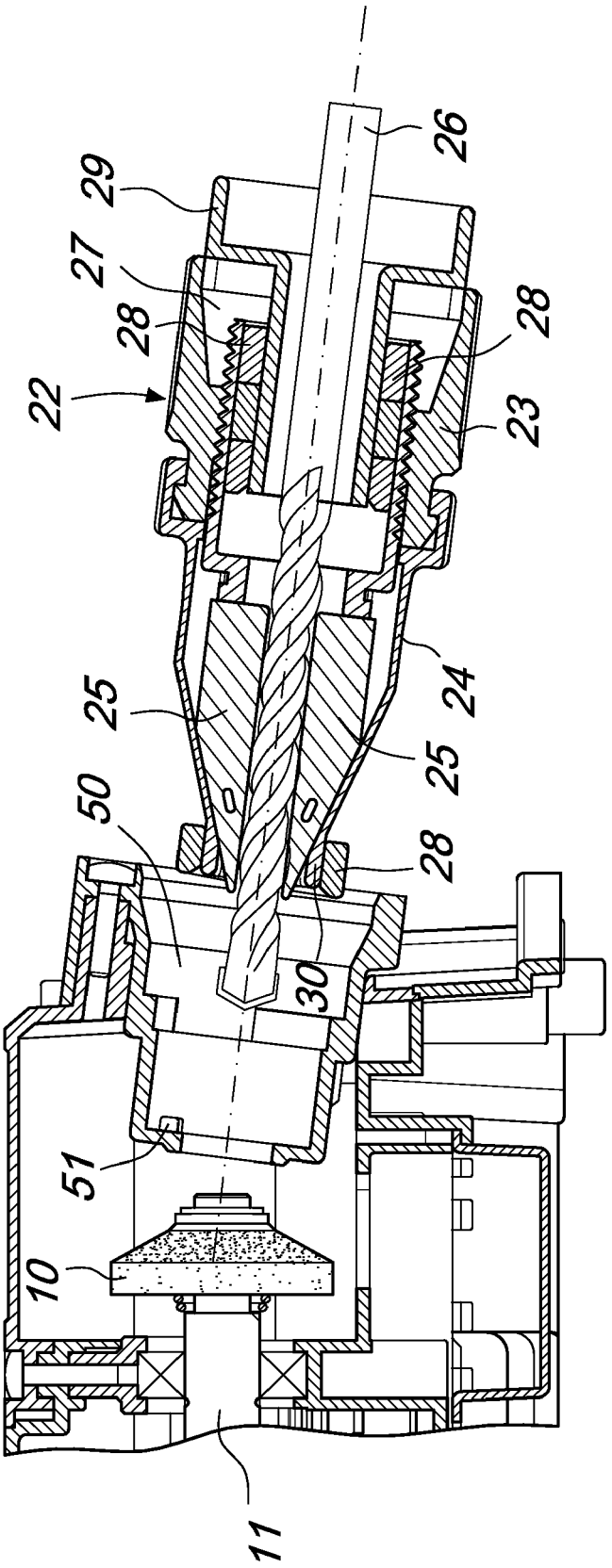

Fig. 11

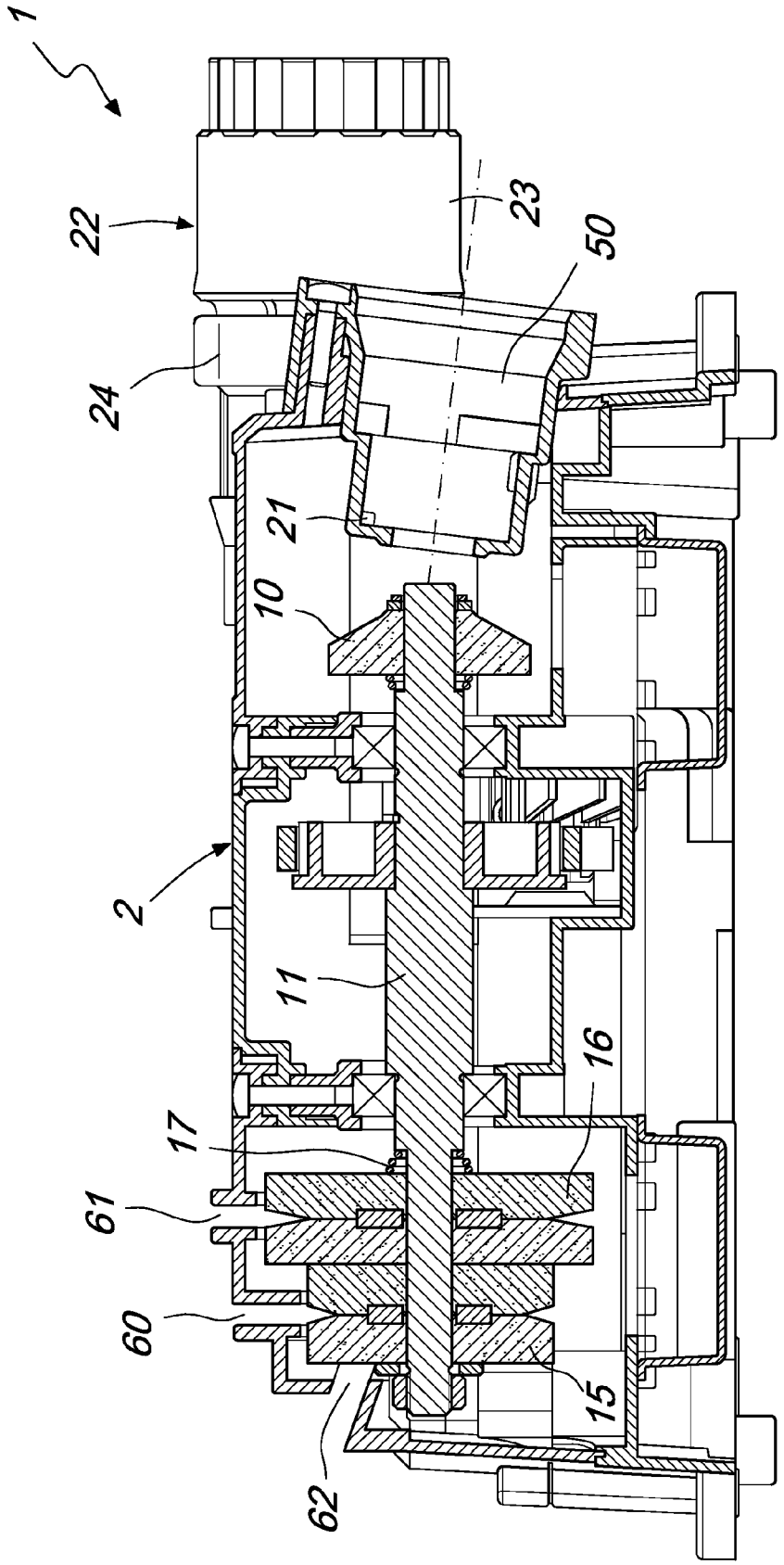

Fig. 12

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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