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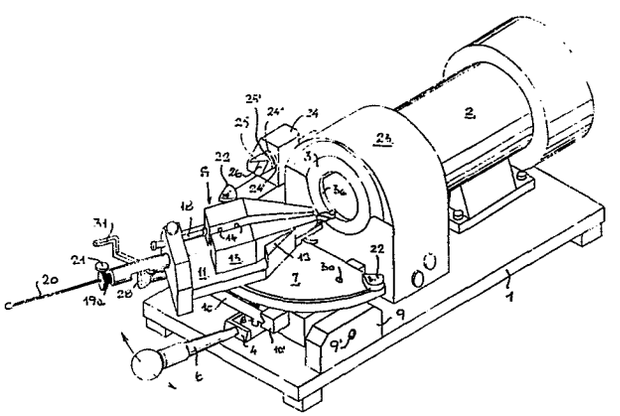
(54) Machine for grinding points of drills.

(57) A machine for reconditioning the points of twist drills is described comprising a grindstone (3), a drill holder (13) and supports for the latter, said supports being carried on a platen (7) which platen is movable in a horizontal plane towards and away from the grindstone (3), the said platen (7) being further supported on an inclined surface (5) of a member (4) which latter is adapted to be moved so that the place of support of the platen (7) on such inclined surface (5) is at a higher or lower level of the said inclined surface (5).

With such a structure it is possible to semplify the position changing steps and to dispence with dismounting of the support and/or holder, since the whole change can be attained by a simple switch-over of a lever.



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The present invention relates to a machine for reconditioning and regrinding worn points of twist drills.

As is known, the conventional twist drill is a slender rod shaped piece of steel along which extend two helical flutes (see Fig. 1). The pointed end of the drill shows two oppositely disposed lands, i.e. substantially triangular areas, being mirror representations of one another (see Fig. 1). These areas extend in two curved planes defining an angle between them - and which are also in angular relation to the axis of the drill. The edges of these triangular areas, the so-called "lips" are apt to become worn and require regrinding.

There are known already machines which perform the required regrinding, some of these machines comprise disc-shaped grind stones or the peripheral face of which the regrinding of worn twist drills can be effected. Other - probably more modern - machines employ cup-shaped grind stones on the inner wall of which the grinding of the drill point is effected.

Both types of these machines employ holders for the drill which holders - in turn - are carried in a support presenting the drill tip to the grind stone at a predetermined angle, corresponding to the angle of the drill point, which is a constant.

The known machines have the disadvantage of requiring the change of position of a drill between the grinding of one flank to the opposite one. This is a time consuming operation since it requires also the proper reorientation of the support, drill holder and drill.

Furthermore, usually there are needed two machines or at least two holders for different sizes of drills.

Another disadvantage is that in order to advance the drill while regrinding, the operation must be stopped to release the drill, reposition it and then restart.

Another disadvantage is that the grinding stone must be redressed or smoothened. A further disadvantage is the need to adjust the lip relief setting.

It is the main object of this invention to provide a machine which simplifies the position changing step and dispenses with dismounting of support and/or holder, the whole change of position being attained by a simple switch-over of a lever. It is a further object to overcome all the above mentioned disadvantages.

There is provided a machine for grinding the points of twist drills which comprises, as is usual, a grind stone, a drill holder and a support for the latter, the said support being carried on a platen, which platen is movable in a horizontal plane towards and away from the grindstone, the said platen being further supported on an inclined surface of a member which latter is adapted to be moved so that the place of support of the platen on such inclined surface is at a higher or lower level of the said inclined surface.

According to a further feature of the invention, an annular grindstone having an inner, cylindrical face is used.

The invention will now be described in detail with reference to the accompanying drawings wherein:

Fig. 1 schematically illustrates the point of a twist drill;

Fig. 2 is a perspective, schematical view of the new machine, and

Fig. 3 is a plan view thereof.

Fig. 3a is a partial view of the machine showing the drill holder;

Fig. 3b is a view of the machine in the direction of the arrow in Fig. 3a (without the upper elements seen in Fig. 3a).

Fig. 4 shows -in perspective- one jaw of the drill holder, while

Fig. 5 is a like view of the member supporting the platen on an inclined face.

DESCRIPTION OF PREFERRED EMBODIMENT

Turning first to Figures 1 and 2, there is seen the point of a twist drill with its two lands a and b which have lips a_1 and b_1. To recondition a worn point of a drill, the two lands are ground by being presented to the cylindrical face of a grindstone. In the machine, according to the present invention, the inner cylindrical edge face of an annular grindstone is the one to which the point is held for grinding. The lands are - as seen, of roughly triangular shape, the sides of the triangles being slightly curved. The surface of each land is ground convexly and the respective lip, which is the active cutting part of the drill, is appropriately sharpened.

The new machine is mounted on a bottom plate 1 and derives its drive from an electrical motor 2 which drives the grindstone 3. This latter is an annulus, the inner cylindrical face 3a of which, is operative.

On bottom plate 1 lies flat a member 4 (also see Fig. 5). Member 4 is plate-like, and has a plane underside with which it rests on plate 1. The member 4 is pivotally connected at 4a with the plate 1. At its upper side the member 4 has two inclined areas 5. From its outwardly directed side extends a handle 6. Above member 4 lies a U-shaped member 10 which is journalled between two blocks 9. From the said member 10 extend downwardly screw threaded legs 8 (only one of which is seen in Fig. 2), which, with their lower ends, stand on member 4 within the range of the inclined areas 5.

Between the vertical legs of U-member 10 are fixed two oppositely disposed traverses 10' having each a V-shaped groove 10". In those grooves run rollers 7' which turn on pins 7" extending downwardly from a semi-circular platen 7 permitting the said platen to perform a to-and-fro movement relative to the grindstone.

On top of platen 7 lies the support S which pivots about an axle 11a (Fig. 3). It consists of a plate 11 and two oppositely disposed fixed jaws 12 which between them define a space which tapers towards the grindstone 3. The space constitutes the emplacement for a drill holder. The holder comprises two jaws 13 which are loosely connected by pins 14, fixed in the side of one of jaws 13, entering

holes 15 in the opposite, complementary jaw 13. The portion of both jaws 13 which extends towards the grindstone 3 tapers off gradually in that direction. The sides of the jaws 13 which face one another have each a longitudinally extending groove 16 in which the drill to be reconditioned can be placed. Within one of the grooves 16, at its forward end, is positioned a small pin 16a. The two jaws 13, held together by pins 14 can be slidingly inserted between the fixed jaws 12. At the rear end of plate 11 extends - normal thereto - a block 17, from which extends a rod or spiral spring 18 which holds jaws 13 in position.

Underneath plate 11 there is a screw arrangement 28 by means of which plate 7, with support S, can be moved within the V-shaped grooves 10" reciprocally relative to grindstone 3. To block 7 there is connected a handle 31 to which reference will be made later. From the outer side of block 17 extends a centrally bored bar 19 into which enters, via screw 19a, a slender, elongated pin 20, which emerges from a bore in block 17 to enter into a gap between jaws 13 and apply its end onto the rear end of the drill held between jaws 13. This pin can be immobilized by a set screw 21. By turning screw 19a pin 20 can be moved.

It has been said that the support S pivots on axle 11a. This movement on platen 7 is delimited at both sides by abutments 22 fixed on platen 7 which determine the drill point angle. Once the support S is moved to one of the two sides, it is secured by a ball and dent 30.

The grindstone 3 is enclosed by a protective hood 23 beside which is turnably affixed on plate 2, a block 24, in which is held a locator 25 having a V-cutout 26, said block 24 having a collar 24' with a mark 24". A second mark 25' is marked on the turnable locator 25.

The operation of the new machine may be effected by practising the following steps:

1. by placing the drill between jaws 13 in such manner that pin 16a enters a flute of the drill;

2. placing jaws 13 on plate 11 within jaws 12 and securing them by means of spring or rod 18;

3. entering pin 20 into the groove 16 and applying its end onto the rear end of the drill, and immobilizing it by means of screw 21;

4. now, block 24 is brought into position in front of the drill point by entering the point into the V-cutout 26 and turning the drill until the two mark lines 24" and 25' will match, indicating that the drill is in the right position to start grinding;

5. when this is accomplished, block 24 is brought to normal position by means of handle G; the whole assembly is swung about axis 9' to either x or y position (see Fig. 3a) due to the inclined area 5 and the travelling of screw on them;

6. by means of screw 28, support "S" is brought in contact with grinding stone 3;

7. the actual grinding starts while moving the whole assembly reciprocally. The drill may be advanced by being turned by means of screw 19a;

8. after one flank is completed, handle 31 is lowered, thus pulling support S back, away from the grinding stone without changing the position of the drill, handle 6 is swung to the other side, and the support S is pivoted about axle 11a to its second position, handle 31 is returned to its normal position, and the grinding starts again as above.

CLAIMS:

1. A machine for reconditioning the points of twist drills comprising a grindstone, a drill holder and a support for the latter, the said support being carried on a platen, which platen is movable in a horizontal plane towards and away from the grindstone, the said platen being further supported on an inclined surface of a member which latter is adapted to be moved so that the place of support of the platen on such inclined surface is at a higher or lower level of the said inclined surface.

2. The machine claimed in Claim 1, characterised thereby that the said inclined surface is constituted by an elongated, sloping area of the member on which the platen is supported.

3. The machine claimed in Claim 2, characterised thereby that two such elongated, sloping areas are provided on the supporting member.

4. The machine claimed in Claim 1, characterised thereby that the said supporting member is pivotally connected with the bottom plate.

5. The machine claimed in Claim 1 or any of Claims 2 - 4, characterised thereby that the said platen is carried on a U-shaped member which latter is journalled between two block members, two oppositely disposed traverses extending in the space between the vertical legs of the U-member, such traverses having grooves in their lateral faces which are directed towards one another, rollers turning on pins extending from the platen downwardly running in said grooves.

6. The machine claimed in Claim 1, characterised by a support for the twist drill to be treated, such support being positioned on top of the said platen and comprising two oppositely disposed jaws, such jaws defining between them a space being an emplacement for a drill holder.

7. The machine claimed in Claim 6, characterised thereby that the drill holder comprises two jaws which are loosely connectable, a longitudinally extending groove being provided in each jaw, such opposite grooves registering with one another and forming the space in which a twist drill can be placed.

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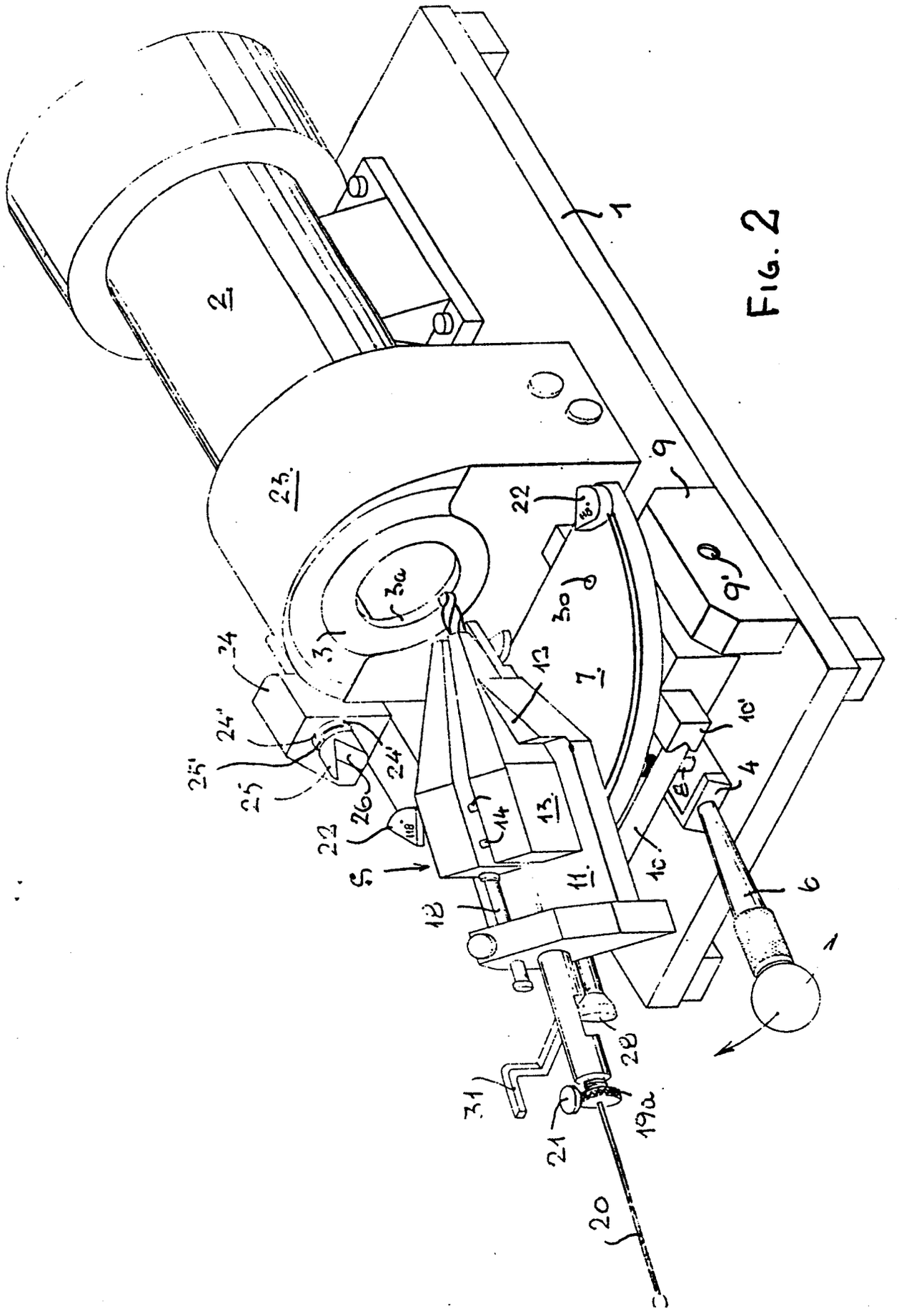

FIG. 2

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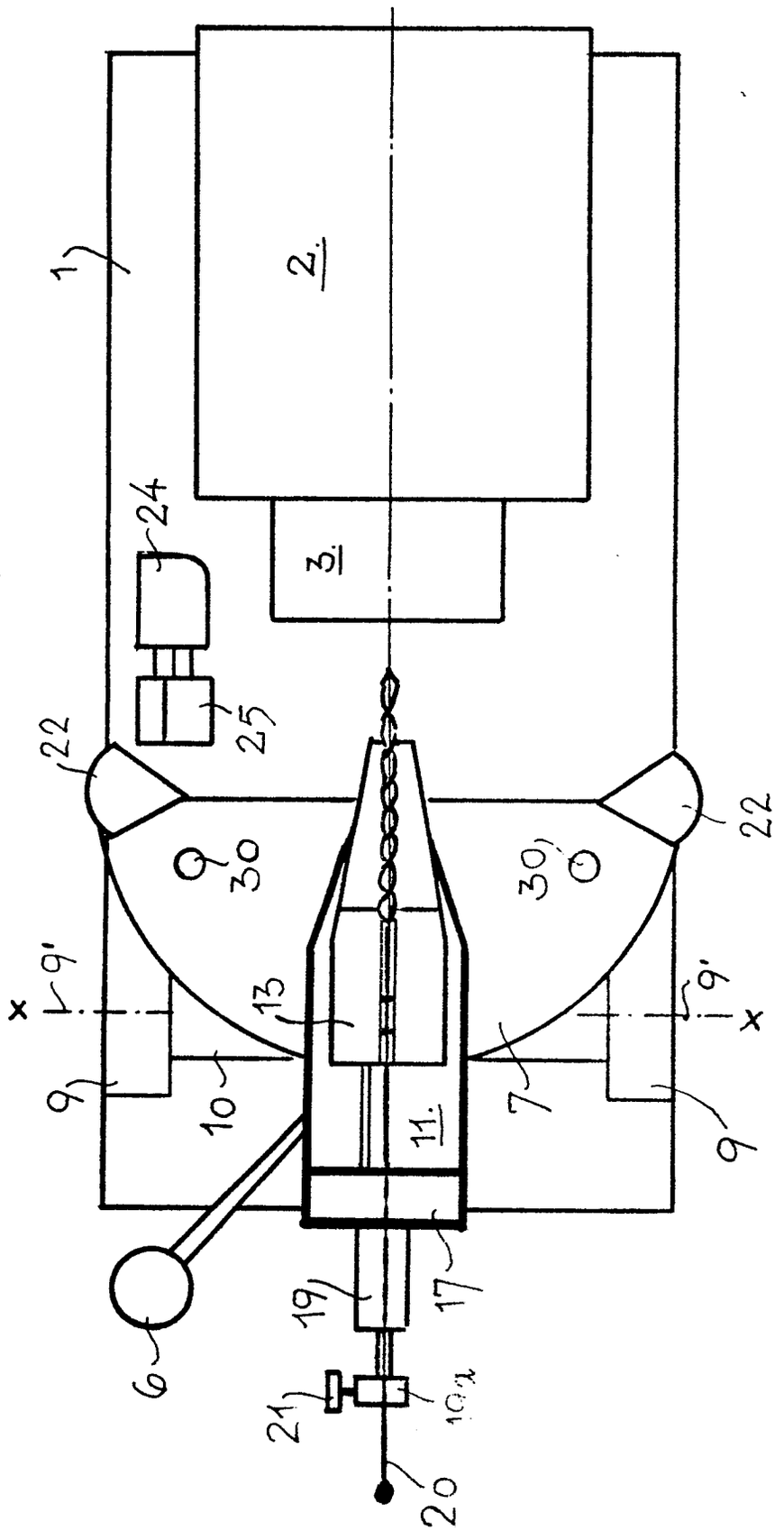
FIG. 3



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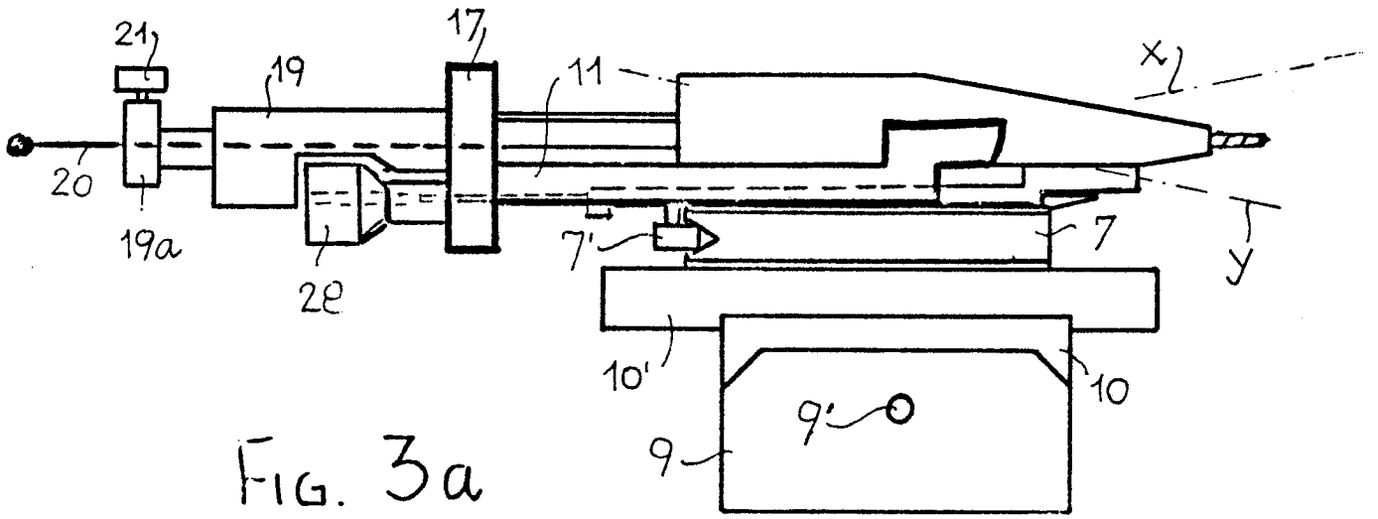

FIG. 3a

FIG. 3b

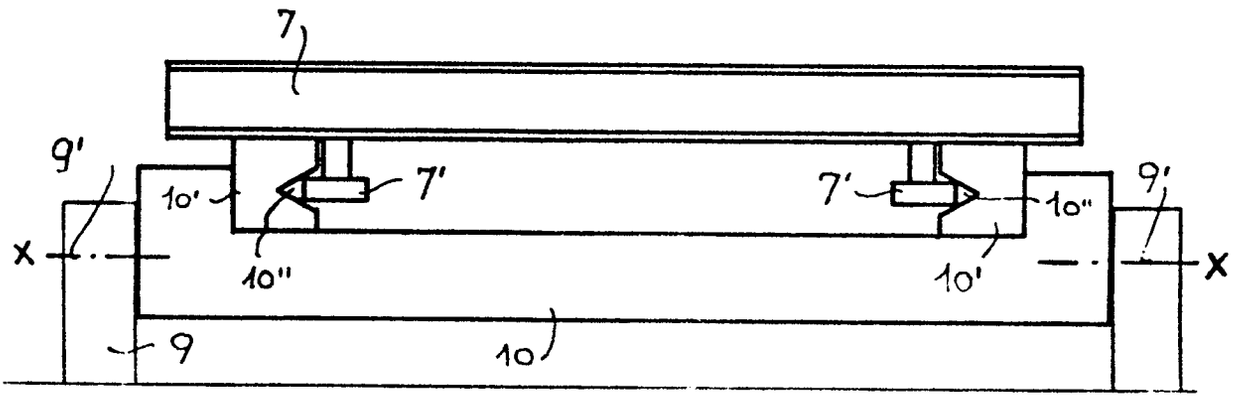

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FIG. 1a

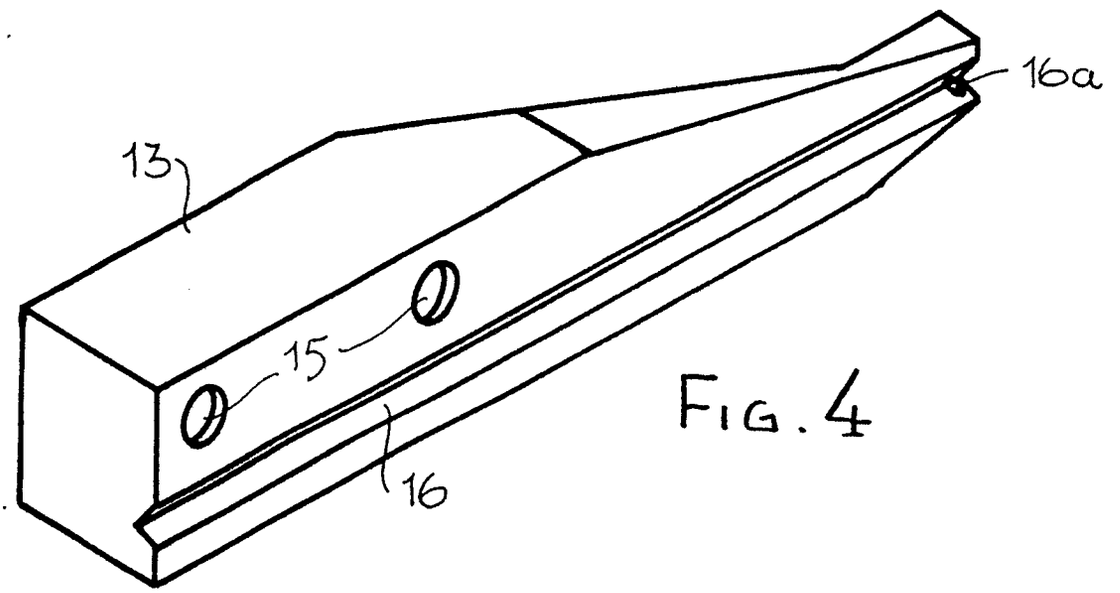

FIG. 4

FIG. 1

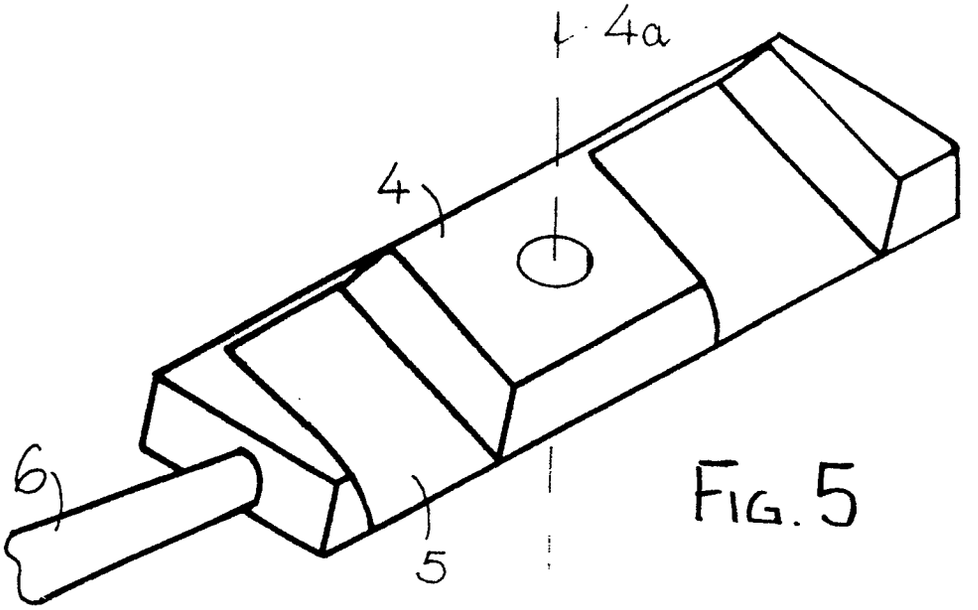

FIG. 5