(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
23 December 2010 (23.12.2010)

PCT

(10) International Publication Number
WO 2010/146422 A1

(51) International Patent Classification:
B24B 23/00 (2006.01) *B24B 41/06* (2006.01)
B24B 27/00 (2006.01)

(21) International Application Number:
PCT/IB2010/001134

(22) International Filing Date:
17 May 2010 (17.05.2010)

(25) Filing Language: Italian

(26) Publication Language: English

(30) Priority Data:
UD2009A000095 15 May 2009 (15.05.2009) IT

(71) Applicants *(for all designated States except US)*: **NORDUTENSILI S.R.L.** [IT/IT]; Via Pramollo n. 2, I-33040 Povoletto (UD) (IT). **RE.M.A. S.A.S. DI PRESSATO EMANUELE & C.** [IT/IT]; Via Fermi n. 5, I-20060 Cassina de' Pecchi (MI) (IT).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **DIPLOTTI, Nereo** [IT/IT]; Via Pramollo n. 2, I-33040 Povoletto (UD) (IT). **PRESSATO, Emanuele** [IT/IT]; Via Fermi n. 5, I-20060 Cassina de' Pecchi (MI) (IT).

(74) Agent: **CRAGNOLINI, Sergio**; Viale Venezia, 277, I-33100 Udine (IT).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— *as to the identity of the inventor (Rule 4.17(i))*

— *of inventorship (Rule 4.17(iv))*

[Continued on next page]

(54) Title: PORTABLE SHAPENING MACHINE FOR SHAPENING WOOD DRILLS

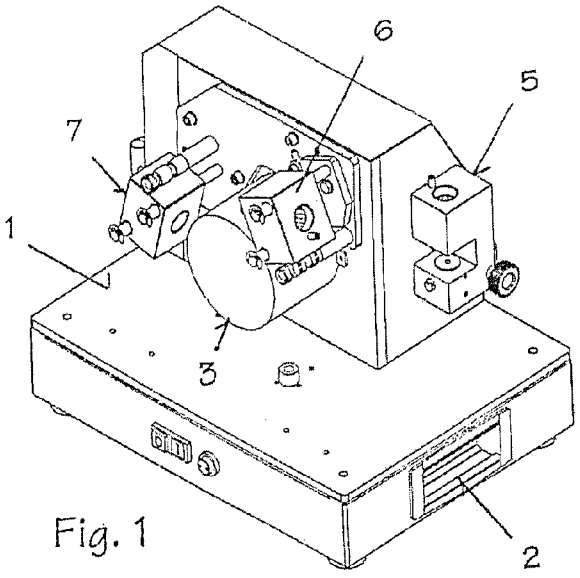

Fig. 1

(57) Abstract: Portable sharpening machine (1) for sharpening wood drill bits (9,9.1,9.2), provided with side handles (2) to facilitate its transport. Said machine (1) is provided with various different apparatuses (5,6,7,8) for aligning the drill bits (9,9.1,9.2), which can be dismounted and remounted and are interchangeable. The drill bits (9,9.1,9.2) are previously fitted into the stem of special drill bit holders (16) which can be reused in various sharpening and alignment stations. The portable sharpening machine (1) has vertically arranged on the side surface an apparatus (5) for preliminary aligning the drill bit (9,9.1,9.2) relative to the drill bit holder (16). The drill bits (9,9.1,9.2) together with the drill bit holders (16) are aligned onto the apparatuses (5,6,7,8) with the aid of reference pins (12) located on the apparatuses (5,6,7,8) and corresponding holes (17) provided on the drill bit holders (16).

WO 2010/146422 A1

Published:

— *with international search report (Art. 21(3))*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

PORTABLE SHARPENING MACHINE FOR SHARPENING WOOD DRILLS

Field of application

The present invention refers to a portable sharpening machine that is particularly adapted to sharpen wood drill bits, which is fitted out in a simplified manner so as to be used by personnel with no special training.

The machine is compact and not cumbersome, which means it can be easily transported and subsequently used in coordination with specific machine tools of the sector, and it can be used statically on a workbench or mobile on a suitable trolley.

The machine is provided with equipment adapted to simplify the work of the sharpening personnel, in particular for sharpening wood drill bits with two cutting edges, both for dead holes and of the type for through holes. It also allows the drill bit to be sharpened to be positioned in a special alignment apparatus, which involves fixing a special stem that is adapted to move such drill bit correctly and subsequently on the specific pre-positioned sharpening stations, without requiring the operator to have specific technical knowledge. The machine is provided with various sharpening stations and it is capable of sharpening the two horizontal cutting edges and also the side cutting edges of the drill bits and/or the inclined surfaces of drill bits used to make through holes.

The state of the art

In the state of the art, several types of machines are known for sharpening wood drill bits, but these are essentially of the fixed type, i.e. not portable, and usually they are made operative in specific departments. They are general in nature and very complicated to use, and thus they require specially trained and qualified operating personnel, which are not always easy to source on the labour market.

Such sharpening machines have various different types of grindstone for the various different types of sharpening to be performed, and in addition the

grindstones of such machines cannot be moved along an axis but instead rotate, fixed in position, which means that with wear and tear it is necessary to correctly reposition the slides of the apparatuses that support the utensils to be sharpened.

Such difficulties have led the industries in the sector to develop machines that are increasingly easy to use and to reduce the specialisations of such machines so as to consequently reduce the skills required of the operating personnel.

To better meet the requirements of companies that operate in the sector of processing involving the removal of shavings, in the metal and wood sectors, and which do not have a specific sharpening department, the tendency is toward making small, low cost machines in order to facilitate the sharpening phases of the various different utensils without needing to request the intervention of external companies and operators for such tasks, and still less set up a specific department for the purpose.

Aim of the invention

The aim of the invention is to overcome the drawbacks found in making sharpening machines particularly for drill bits in general and specifically for drill bits for wood, by devising a simplified sharpening machine that is easy to use even for personnel without special training, and which has the following principal characteristics:

- It is compact, light, and not cumbersome, so as to be easily transportable and usable on any bench, fixed or movable, mounted for example on a trolley;
- It is portable;
- It is provided with apparatus for correctly pre-positioning or aligning the utensil or drill bit (specifically), so as to simplify this phase and the subsequent phases for the operator. It has an apparatus that allows the application of a special stem for manipulation on the other end of the drill bit to be sharpened, so as to facilitate the subsequent insertion of such drill bit correctly in the specific apparatuses provided for the various phases of

sharpening the cutting edges;

- It is provided with a grindstone wheelhead rotating axis, longitudinally movable and adjustable as required;
- It is provided with a profiled grinder or multiple grinders or shaped grinder sectors that are fixed coaxially on the same axis of rotation;
- It is provided with appropriate drill bit holder equipment with respective guides or seats for fixing such drill bits in relation to the type of utensil to be sharpened;
- It is provided with fixed or movable apparatuses, which can be angularly adjusted with respect to the grinder or grinders;
- It has an ancillary device for dressing the profile of the shaped grinder when it is worn.

Summary of the invention

The objectives of the invention are achieved according to the characteristics of the principal claim and/or of any other claim contained in this patent text, by means of devising a portable automatic sharpening machine, particularly for sharpening wood drill bits, both for dead holes and for through holes, but which with suitable modifications is also adapted to sharpen drill bits or utensils for metal and/or for other materials.

The machine comprises a closed body that has at least two vertical surfaces, of which one is a principal surface from the central area of which a profiled grindstone wheelhead rotating axis with adjustable longitudinal movement protrudes, and it allows the fixing of two drill bit holder supports which have angulations that are different from such axis of rotation, for sharpening drill bits for dead holes; and a secondary surface to which is fixed the device for correctly aligning the drill bit. Similarly, the sharpening machine has a short lower horizontal plane, on which it is possible to fix a sliding guide in a position that is perpendicular to the axis of the grindstone, for fixing equipment for holding a drill bit or other utensil, at an angle to the axis of rotation of the grindstone. This

particular apparatus is used for sharpening drill bits for through holes and/or for dressing the grindstone itself by means of devices adapted to the task.

Obviously, the machine has a suitable closing guard for protection and safety.

Moving on to the description of the fundamental elements of the portable sharpening machine, particular importance – for the purposes of simplifying its use – is assumed by the device for aligning the drill bits before the sharpening phase, since it equips such drill bits with a special stem with a concentric location hole. Such stem is positioned vertically on the secondary surface of the machine. The drill bit to be sharpened is inserted vertically into the special upper hole of the alignment device, placing the two cutting edges of the drill bit against the lower reference shape that is located inside the device and which is clearly visible from outside. In this way the drill bit is correctly positioned at an angle, until it reaches the point where the cutting edges and the base shape fit exactly together.

At this point the operator has only to place a drill bit holder mask, or ferrule, on the drill bit stem for the subsequent phases, which has two radial holes that are 180° apart and which are parallel and coaxial with the axis of such drill bit, one of such holes engaging with an eccentric pin that protrudes from the upper surface of the centering device. These reference holes on the drill bit holder ferrule serve to simplify the subsequent phases of centering on the respective apparatuses for sharpening the cutting edges of the drill bit, because such holes will engage with the protruding pins provided on the specific apparatuses, which are eccentric with respect to the hole into which the drill bits are inserted.

Such device for correctly aligning the drill bits also allows both left-handed and right-handed drill bits to be centered, with simple movements of the base locators with a special button or lever situated at the base of such device. In addition, for drill bits of varying diameters it is possible to interchange the corresponding centering bushings on the part where the alignment device is inserted.

The portable sharpening machine is provided with suitable support

apparatuses for sharpening drill bits adapted for dead holes and for through holes. Since these two types of drill bit are different from each other, they will require the use of different support apparatuses. There are two apparatuses for drill bits for dead holes and they are fixed to the principal vertical surface of the machine with suitable reference pins and tightening screws. There are two types, because there are two different types of cutting edge. They are fixed with preset angles of inclination to the grindstone: in this way one apparatus will be used for sharpening the upper rake of the two cutting edges and the other for sharpening the reference mark and the lateral trimmer. Since these drill bits have two cutting edges, the operator has to insert the drill bit a first time in such a way as to make one hole of the drill bit holder mask engage with a reference pin located on the front surface of the first apparatus, and a second time, with the drill bit rotated through 180°, in such a way as to make the second hole of the drill bit holder mask engage with such reference pin.

The second sharpening apparatus will be used for sharpening the reference mark and the lateral trimmers and will be used in a similar manner to the foregoing. It is evident that the operator does not have to be an expert in sharpening, it being sufficient to use the mask provided on the drill bit stem to correctly arrange the drill bit on the sharpening apparatus. In the same way drill bits with opposing cutting edges, i.e. left-handed bits, will be sharpened: in this case all that is needed is to rotate the reference guide of such apparatuses.

The portable sharpening machine according to the present invention is also able to sharpen wood drill bits for through holes, both left-handed and right-handed. For such drill bits another apparatus will be used, which is fixed to the guides that are perpendicular to the grindstone situated on the base plane of the machine with the same procedure described immediately above. The angle of inclination with respect to the grindstone is provided to be fixed, in order to simplify the work of the operator. One cutting edge is sharpened at a time by inserting the drill bit with the alignment mask into the apparatus and performing the first sharpening by sliding the slide and then the second sharpening after

rotating such drill bit through 180°, again making the fixed reference pin of the apparatus engage with the 180° holes of the drill bit holder mask. For sharpening left-hand drill bits all that is needed is to replace the drill bit holder slide.

According to another characteristic of the present invention, the portable sharpener includes the use of an apparatus that can be dismounted from and remounted onto the horizontal guide of the plane for dressing the grindstone when it is worn. Such apparatus will be provided with a spring-loaded piston that will allow the correct position for dressing the grindstones, and the increase in the spread of the dressing will be managed by an adjustment slide by means of locking a safety screw.

The objectives of the present invention are achieved by devising a machine for sharpening wood drill bits, for dead holes and/or through holes, that is compact, portable, and not cumbersome, which can be used on a fixed bench or on a mobile trolley, and which is easy to use even for non-specialist personnel.

Description of the drawings

An embodiment according to the present invention is shown for the purposes of preferred but non-limiting example, in the accompanying eight drawings, wherein:

- Fig. 1 shows, in a perspective view, the portable sharpening machine equipped with the two assemblies for sharpening the cutting edges for wood drill bits for dead holes, highlighting the device for aligning the drill bits;
- Fig. 2 shows, in a perspective view, the same portable sharpening machine but equipped with the wood drill bit holder assembly for sharpening drill bits for through holes;
- Fig. 3 shows, in a partial side view, a wood drill bit for dead holes;
- Fig. 4 shows, in a partial side view, a wood drill bit for through holes with cutting edges at the end;
- Fig. 5 shows, in a partial side view, a wood drill bit for through holes with two inclined cutting edges;
- Fig. 6 shows, in a front elevation view, the device for pre-aligning the bits

to be sharpened;

- Fig. 7 shows, in a side elevation view, the same device as the previous figure but highlighting the upper centering pin for the drill bit holder assembly, the drill bit support base and the lever for orienting right-hand and left-hand drill bits;
- Fig. 8 shows, in a plan view, the same device as the two previous figures but highlighting the centering pin for the drill bit holder, which is concentric with the insertion hole of the drill bit to be oriented and of the drill bit stem;
- Fig. 9 shows, in a partial sectional view from the front, the drill bit alignment device, highlighting the top of the drill bit in the seat of correct support and the drill bit holder engaged with the upper concentric pin;
- Fig. 10 shows, in a perspective view of an enlarged section, the area of contact of the end of the drill bit with the base locators;
- Fig. 11 shows, in an enlarged perspective view, the same area of the previous figure but highlighting the cutting edges of a drill bit for dead holes in position against the reference base and locator;
- Fig. 12 shows, in a side elevation view, the portable sharpening machine equipped with the two assemblies for sharpening drill bits for dead holes;
- Fig. 13 shows, in a front elevation view, the same machine of the previous figure but highlighting the two sharpening assemblies in different orientations with respect to the grindstone, each for sharpening different cutting surfaces;
- Fig. 14 shows, in a plan view, the same machine as the two previous figures but highlighting the two drill bits with the respective stems on the respective drill bit holders;
- Fig. 15 shows, in an enlarged plan view, the sharpening zone of the two drill bits;
- Fig. 16 shows, in a side elevation view, the portable sharpening machine with the assembly for sharpening drill bits for through holes;

- Fig. 17 shows, in a front elevation view, the machine in the previous figure but highlighting the apparatus on horizontal sliding guides on the base plane of the machine;
- Fig. 18 shows, in a plan view, the sharpening machine in the two previous figures but highlighting the orientation of the drill bit with respect to the grindstone;
- Fig. 19 shows, in an enlarged plan view, the sharpening zone for a drill bit for through holes;
- Fig. 20 shows, in a plan view, the portable sharpening machine equipped with the grindstone dressing device, with adjustable movements;
- Fig. 21 shows, in an enlarged plan view, the area of contact between the dressing grindstone and the grindstone itself.

As can be seen from the accompanying figures, the portable sharpening machine (1) for wood drill bits, particularly for dead holes (9) (9.1) and through holes (9.2), is shown with various apparatuses mounted and adapted to sharpen various cutting edges of such drill bits. It is not cumbersome and it can be easily transported by hand by means of the two side handles (2), and it can be placed and operated on a normal fixed bench or on a mobile trolley. It is obviously shielded with suitable safety means for the operator according to current applicable legislation.

The sharpener consists of a horizontal base plane on which it is possible to fix sliding guides (4) for the appropriate apparatus (8). The body of the machine rises vertically from such base plane with two surfaces, one principal and one secondary. From the principal surface, the grindstone wheelhead rotating shaft (3) (3.1) protrudes horizontally, in the centre of and perpendicular to such surface.

The grindstone shaft can be moved longitudinally with suitable adjustment. On the same vertical surface there are stations for fixing the various apparatuses (6) and (7), plus others that may be provided such as for example the grindstone dresser (19). Meanwhile, mounted on the secondary surface, which is smaller and located beside the principal surface, is the drill bit alignment device (5) which

serves to simplify the work of the operator and to facilitate the insertion of a tool holder (16) into the drill bit stem, such tool holder (16) subsequently being used to correctly position the drill bit in the various and subsequent phases of sharpening in the various stations.

The drill bit alignment device (5) comprises a vertical structure, into which the wood drill bit (9)(9.1)(9.2) is inserted vertically from above and is positioned through the central hole (10) by making the cutting edges on its end engage against the base shape (13)(14) and the lower lateral locator (15). Such latter lower lateral locator can be modified, with a special mechanical system operated by lever or by command button (11) according to whether the cutting edges of the drill bit are right-handed or left-handed.

In addition, on the upper part of the device there is a vertical reference pin (12), which is eccentric with respect to the insertion hole (10). Such pin will be engaged by the drill bit holder (16) which will be locked to the stem at the moment of the exact radial orientation of the cutting edges with respect to the lower reference locator (15). Such drill bit holder (16) is provided with two holes (17) for engaging pins (12), such holes (17) being located at 180° with respect to such drill bit holder's central axis, since there are two cutting edges on the drill bit which are positioned 180° from each other and so also are the holes (17) similarly positioned on the drill bit holder, while on the apparatuses there will be one pin only (12) which will be used singly for each reference hole, one at a time. In this way all that is needed is to correctly insert the drill bit into the single apparatus twice to perform a perfect sharpening by executing a correct angulation of the rake angle of the utensil.

The portable sharpening machine (1) is provided with various apparatuses (6) and (7) and corresponding grindstone (3) for sharpening drill bits for dead holes (9) and (9.1), and an apparatus (8) with corresponding grindstone (3.1) for sharpening drill bits for through holes (9.2), and lastly the adjustable grindstone dressing assembly (19). All the apparatuses can be dismounted so as to be able to equip the machine for the specific sharpening operations each time as they are

needed. As already mentioned above, each apparatus for sharpening (6)(7)(8) is provided with a hole for inserting the drill bit and the drill bit holder, and with a centering pin (12) which is perpendicular to the support surface of the drill bit holder (16): in this way the drill bit (9)(9.1)(9.2) arrives at the correct angular positions with respect to the corresponding grindstone (3)(3.1) only when the pin (12) engages with one of the two 180° holes (17) of the drill bit holder at a time. Thus the operator does not have to radially orientate the drill bit on the grindstone, but instead simply inserts the drill bit holder into the provided apparatus, taking care to engage the reference pin (12) with a reference hole (17) of the drill bit holder (16), alternately one at a time: in this way the sharpening of the two cutting edges of the drill bit is performed correctly.

A first apparatus is comprised of two individual assemblies (6) and (7) which are positioned on the principal vertical surface of the machine and which are incident to the central grindstone (3). There are two apparatuses because they execute separate sharpening operations: one of these is upon the front cutting edge with specific rake angle, and the other simultaneously sharpens a part of the reference mark and of the lateral face of the wood drill bit for dead holes (9)(9.1). So for a perfect sharpening, first the operator has to sharpen the two cutting edges that are 180° apart, by inserting the drill bit twice into the same apparatus (6) with the trick of turning the tool holder (16) through 180°, and then taking such tool holder (16) with the drill bit to the other apparatus (7) to perform two sharpening operations, again at 180° with respect to each other, there as well.

A second apparatus (8) is provided by the present invention for sharpening wood drill bits for through holes (9.2). It is mounted on special horizontal guides (4) on the base plane of the machine. The grindstone (3.1) has a different shape to the previous one, because the surface of the drill bit to be sharpened is external only and it is inclined in a specific manner. This drill bit also has two cutting edges and two external surfaces to be sharpened, and hence it is sufficient to have a single apparatus (8) which performs the sharpening of one cutting edge at a time, again with the same operating method described previously.

A third apparatus (19) is provided for maintaining the machine and in particular for dressing the grindstone (3) and/or (3.1) when it becomes worn owing to use in sharpening. Such apparatus is fixed to the base plane of the machine with appropriate angulation with respect to the grindstone, and is provided with an adjustment screw (20) to correctly operate with the grindstone dressing tool (18).

Obviously, the invention is not limited to the embodiment described above, starting from which other forms and other methods of implementation can be specified, and the details of execution may in any case change without departing from the description of the invention as stated and as claimed below.

CLAIMS

1. Portable sharpening machine for sharpening wood drill bits, both for dead holes and for through holes, which is light, not cumbersome, easily transported, operative both on a work surface and on a mobile trolley, and which can also be used alongside other machine tools in work departments, since it can also be used directly in maintenance and outfitting operations of such machine tools, characterized in that it is provided with:

a first apparatus (5) for pre-aligning the wood drill bits (9, 9.1, 9.2), for both right-handed and left-handed drill bits, that is fixed vertically with respect to the base plane of the sharpening machine and which has a dead vertical hole (10) that is accessible from its upper surface for inserting drill bits (9, 9.1, 9.2) and a drill bit holder (16) onto the associated drill bit stem (9, 9.1, 9.2), in which, on the upper surface, in a position that is eccentric with respect to the hole (10), there is a reference pin (12), which protrudes vertically and which is adapted to engage with one of the holes (17) provided on the drill bit holder (16), said first apparatus (5) also being provided with a contact seat (13) for the end of a drill bit (9, 9.1, 9.2) in a support alignment base with a hole (14), with a lateral reference (15) for the cutting edges of the drill bit (9, 9.1, 9.2), said first apparatus (5) comprising a mechanical orientation device (11) that can be actuated externally, which acts on the lateral reference (15) to exactly position a left-hand or right-hand drill bit, the contact seat (13) and the support alignment base with a hole (14) with the lateral reference (15) thus forming end locators (13, 14, 15) for the cutting edges of the drill bit (9, 9.1, 9.2); and

at least one drill bit holder (16) to facilitate the subsequent manipulation of the drill bits (9, 9.1, 9.2) to be sharpened, said drill bit holder (16) being provided, on the plane of contact with the apparatuses (5, 6, 7, 8), with two through holes that are mutually parallel and symmetrical and which are at 180° with respect to its axis, and which are adapted to engage with the respective reference pin (12), the reference pins being on the contact surfaces of the first apparatus (5), said drill bit holder (16) being capable of being inserted by the operator along the stem or rear

portion of a drill bit (9, 9.1, 9.2) thus locking said drill bit holder (16) in position, in a phase that comes after the phase where the cutting edges of the drill bit (9, 9.1, 9.2) are engaged against the end locators (13, 14, 15) of the first apparatus (5), thus locking the drill bit (9, 9.1, 9.2) onto the drill bit holder (16) in the right position, in the correct angular radial position with respect to a fixed reference point that is constituted by one of the two symmetrical holes (17).

2. Portable sharpening machine according to claim 1, characterized in that it is additionally provided with:

at least one second dismountable apparatus (6, 7) that is fixed on the vertical surface in parallel with the axis of a grindstone (3) of the sharpening machine, and which is provided with seats for inserting the drill bits (9, 9.1, 9.2) to be sharpened and which are equipped with drill bit holders (16) in a direction that is incident upon the surfaces of the grindstone (3), each dismountable apparatus (6, 7) being provided with a respective reference pin (12) on the contact surface, which can be engaged with one of the two holes (17) of the drill bit holder (16), in this way guaranteeing the angular orientation of the approach of the drill bit to the grindstone owing to the previous pre-alignment, each dismountable apparatus (6, 7) being conceived for a specific sharpening of the cutting edges of wood drill bits for dead holes: for example one (6) is used for sharpening, one at a time, the two frontal head cutting edges and the other (7) for sharpening, one at a time, the reference mark and the lateral faces of the same drill bit.

3. Portable sharpening machine according to one or more of the previous claims, characterized in that it is additionally provided with:

a third apparatus (8) that can be dismounted from and remounted onto the horizontal base plane, and which can be mounted on a sliding guide (4) of the sharpening machine, and which is movable and adjustable including angularly, incident to a grindstone (3.1) of the sharpening machine, said third apparatus (8) having, on the contact surface with the drill bit holder (16), a protruding pin (12) for reference and engagement with the holes (17) of said drill bit holder (16), said third apparatus (8) being adapted to sharpen wood drill bits for through holes,

sharpening one cutting edge at a time and so requiring the drill bit to be inserted twice into the third apparatus (8), rotating it through 180° thus engaging the pin (12) alternately with two holes (17) that are 180° from each other and which are cut into the drill bit holder (16).

4. Portable sharpening machine according to one or more of the previous claims, characterized in that it is composed of:

a basic structure, equipped with two opposing side grip handles (2) to facilitate its transport;

a short horizontal base plane on which sliding guides (4) can be fixed, and/or other movable (8) or fixed (19) apparatuses, that can be easily dismounted and remounted and which are provided with and accompany the machine itself and which can be used as needed;

at least one principal vertical plane surface, from the central area of which protrudes a grindstone wheelhead shaft (3, 3.1) in a perpendicular direction from the surface itself and which is movable and adjustable longitudinally on its axis, with next to it a number of reference pins and/or attachment points for other apparatuses; and

a vertical surface upon which is fixed the first vertical apparatus (5) for preliminary alignment of the drill bits.

5. Portable sharpening machine according to one or more of the previous claims, characterized in that it is additionally provided with:

a fourth apparatus (19) for maintenance, which can be dismounted and adjusted (20), which is fixed to the base plane of the sharpening machine for dressing a grindstone (3, 3.1) of the sharpening machine, when it becomes worn.

6. Portable sharpening machine according to one or more of the previous claims, characterized in that the second and the third apparatuses (6, 7, 8) for the simplified sharpening of wood drill bits (9, 9.1, 9,2) are provided for the respective sharpening operations of the cutting edges, specifically for wood drill bits of various different diameters and lengths.

7. Portable sharpening machine according to one or more of the previous

claims, characterized in that the drill bit holder (16), for the pre-alignment of the drill bits and for the subsequent positioning operations on the specific sharpening operations, is adapted to lock wood drill bits (9, 9.1, 9.2), of various different diameters and lengths, in position along the stem.

8. Portable sharpening machine according to one or more of the previous claims, characterized in that it is provided with safety guards or protections for preventing accidents.

9. Portable sharpening machine according to one or more of the previous claims, characterized in that the first apparatus (5) for pre-aligning the drill bits is positioned on a secondary surface of the sharpening machine so as not to hamper the subsequent sharpening phases.

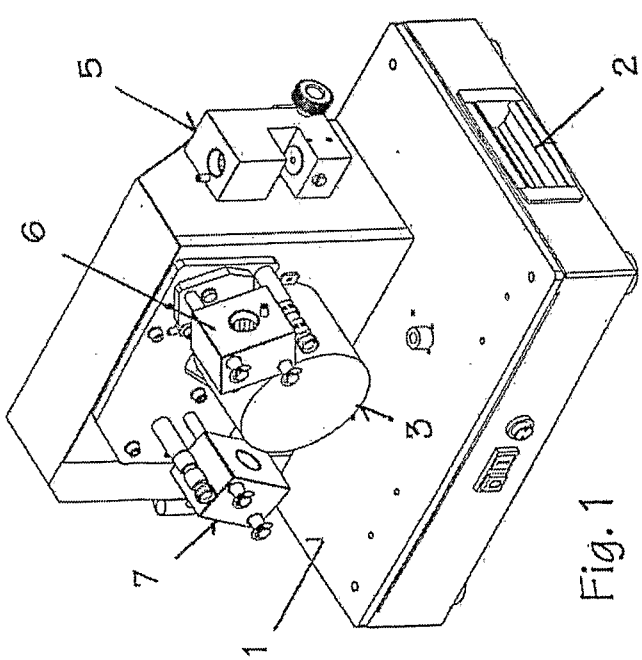

Fig. 1

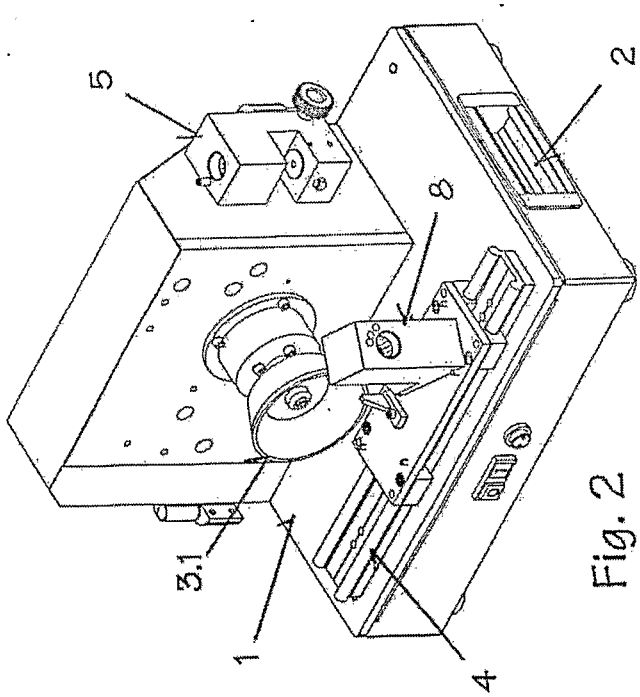

Fig. 2

Fig. 3

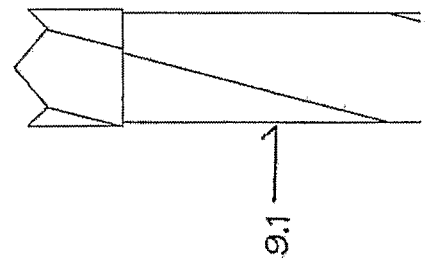

Fig. 4

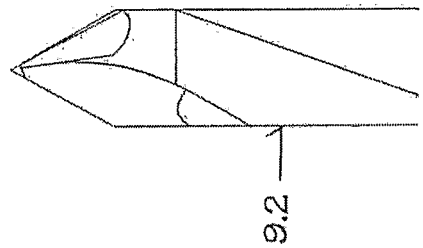

Fig. 5

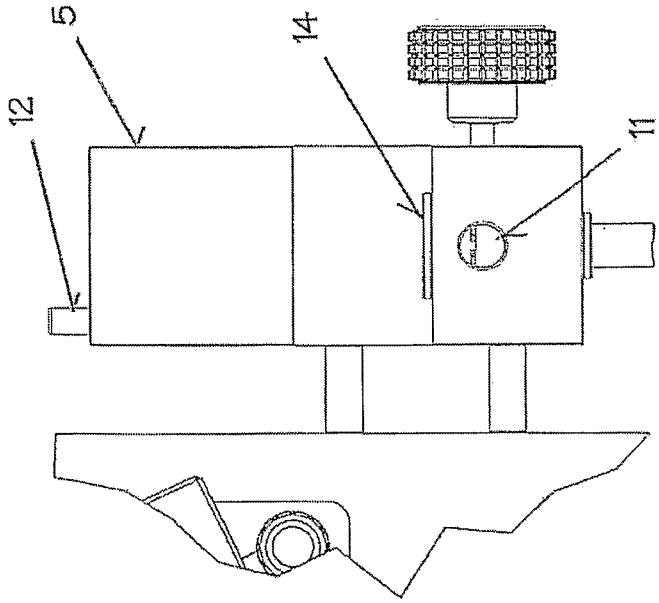

Fig. 7

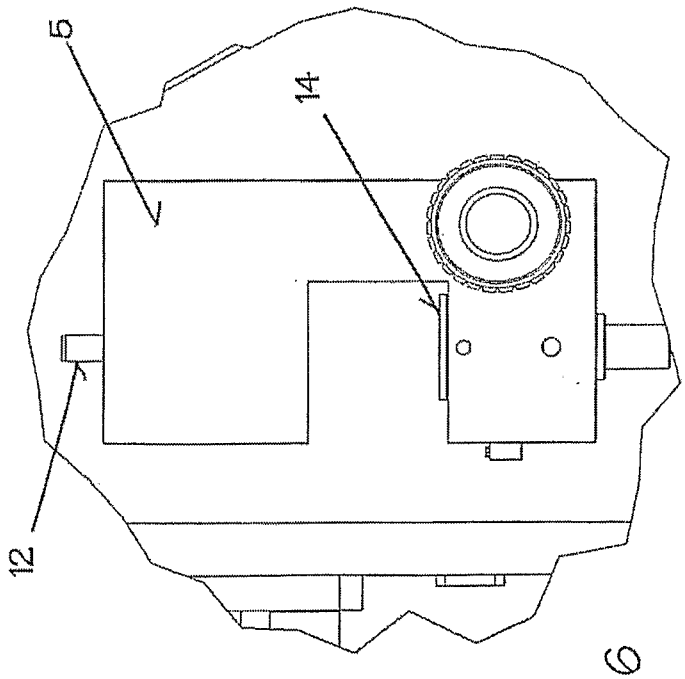

Fig. 6

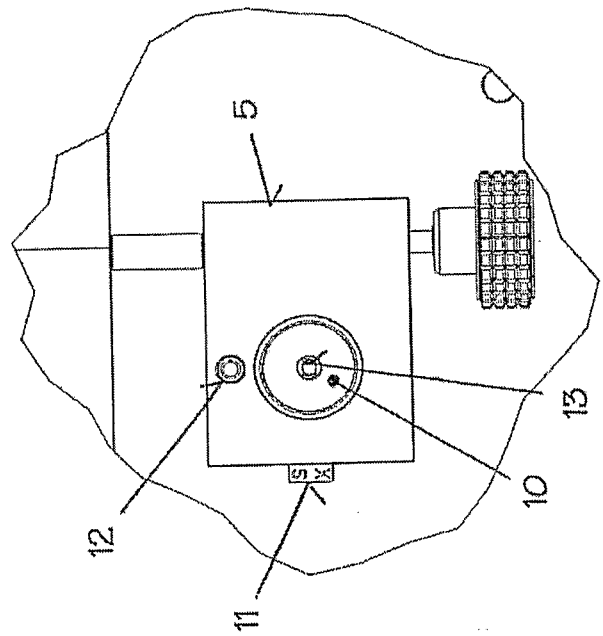

Fig. 8

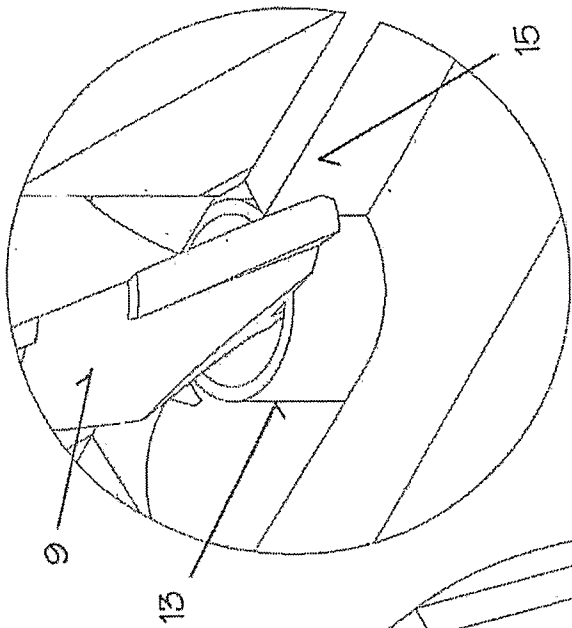

Fig. 11

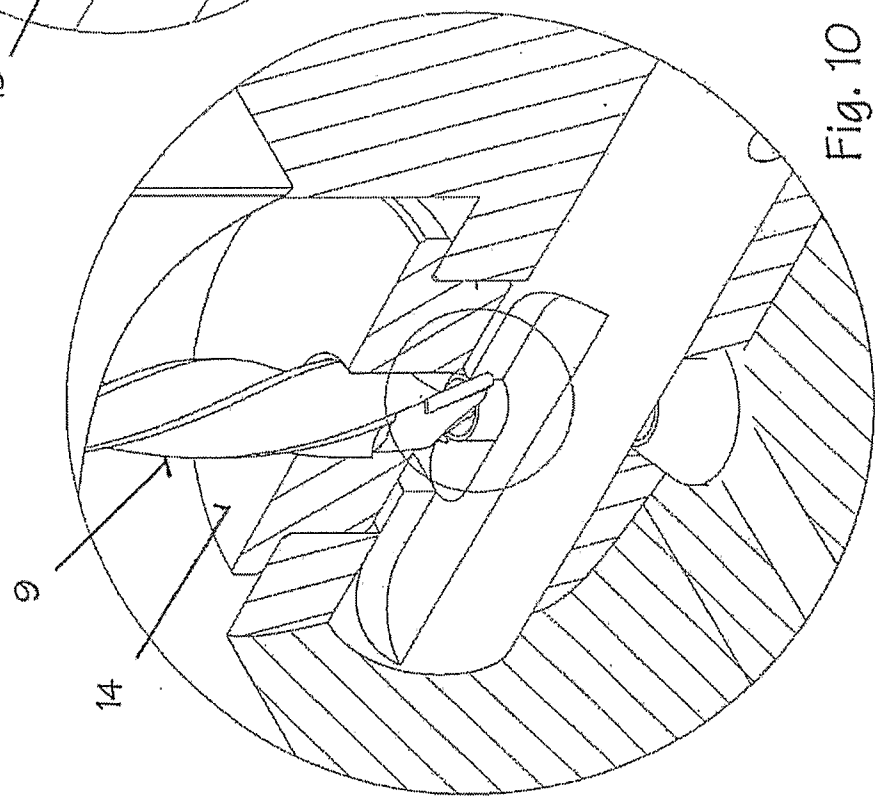

Fig. 10

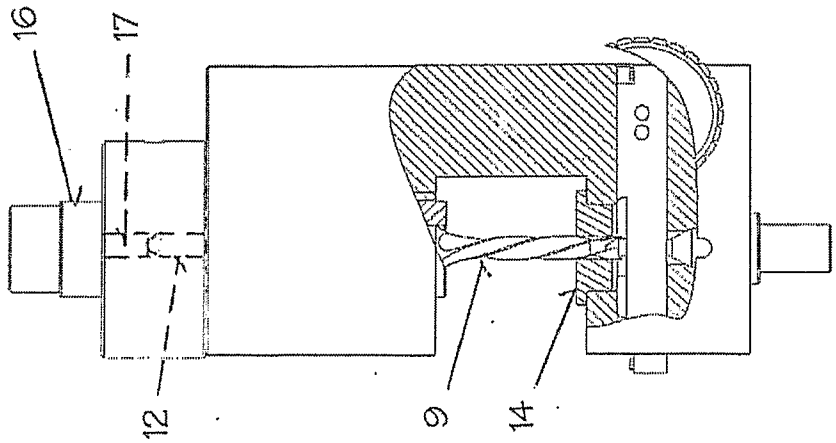

Fig. 9

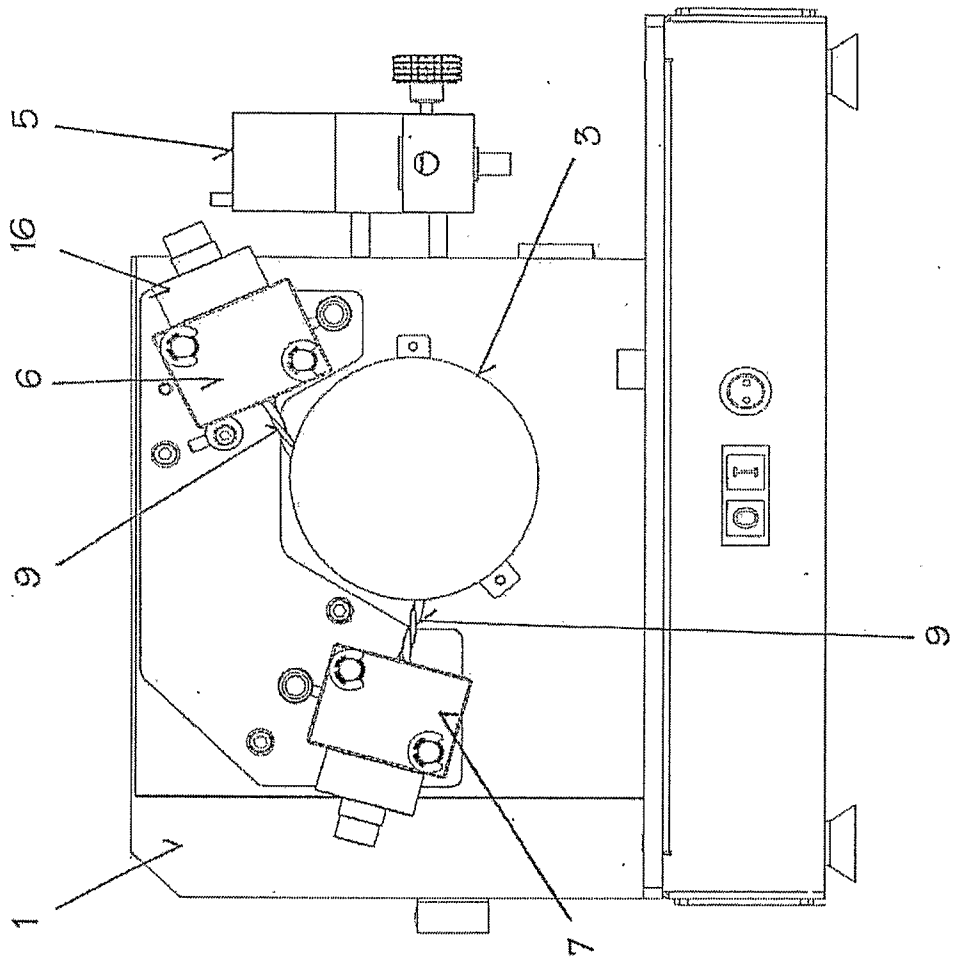

Fig. 13

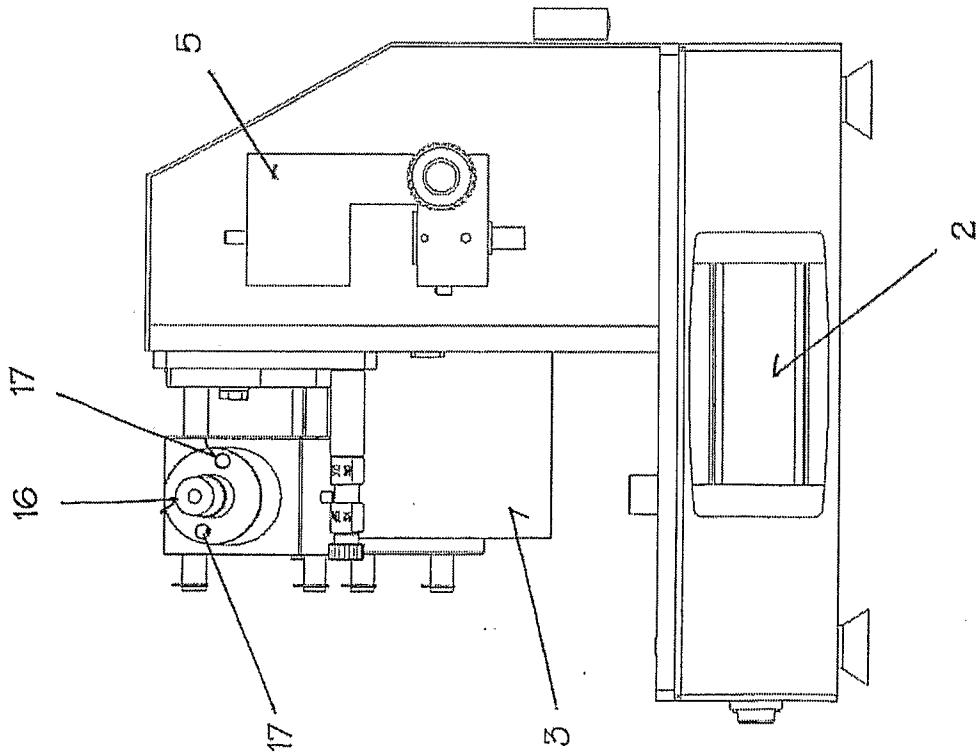

Fig. 12

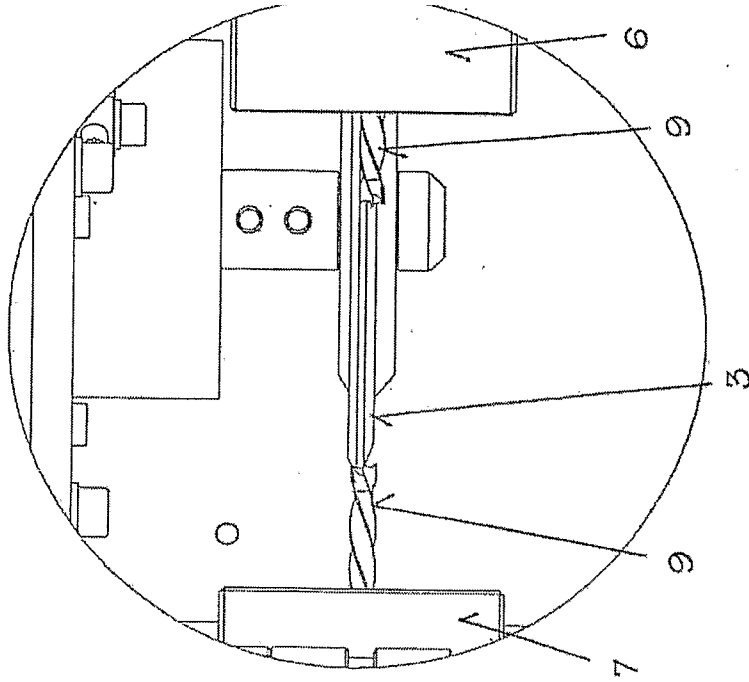

Fig. 15

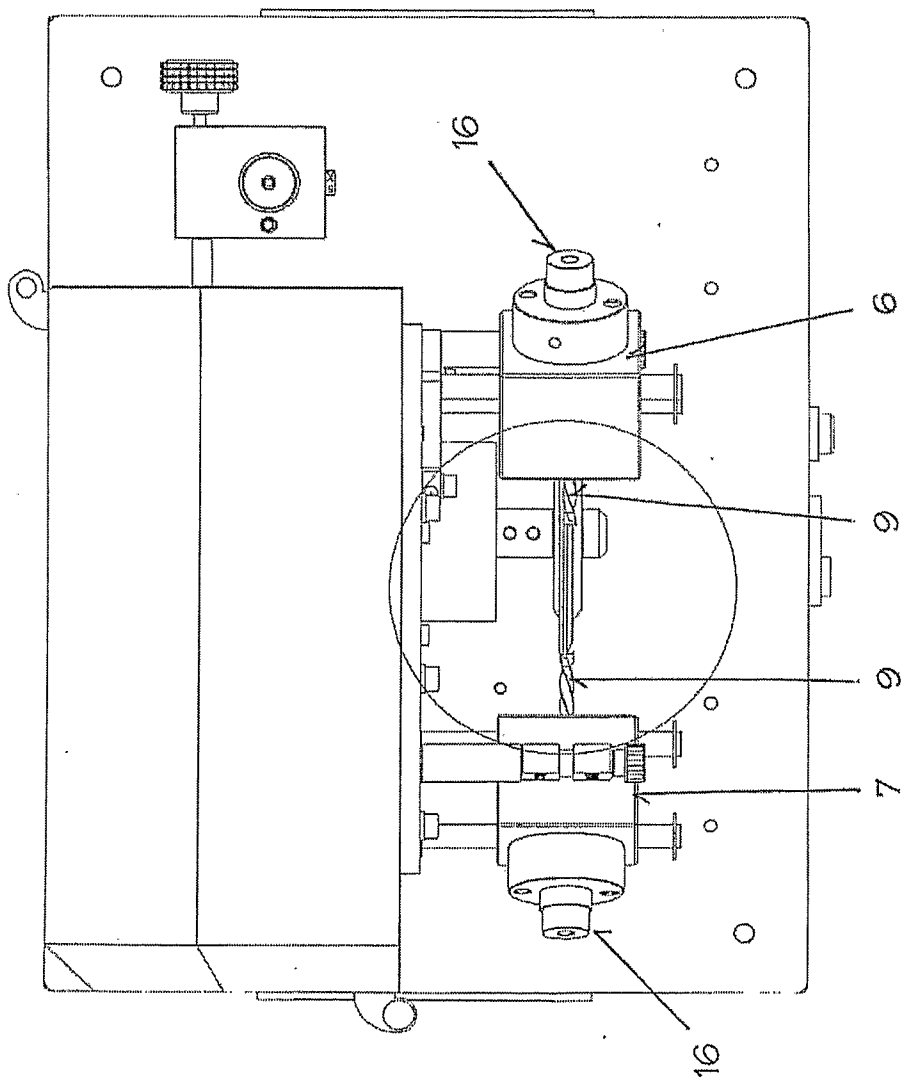

Fig. 14

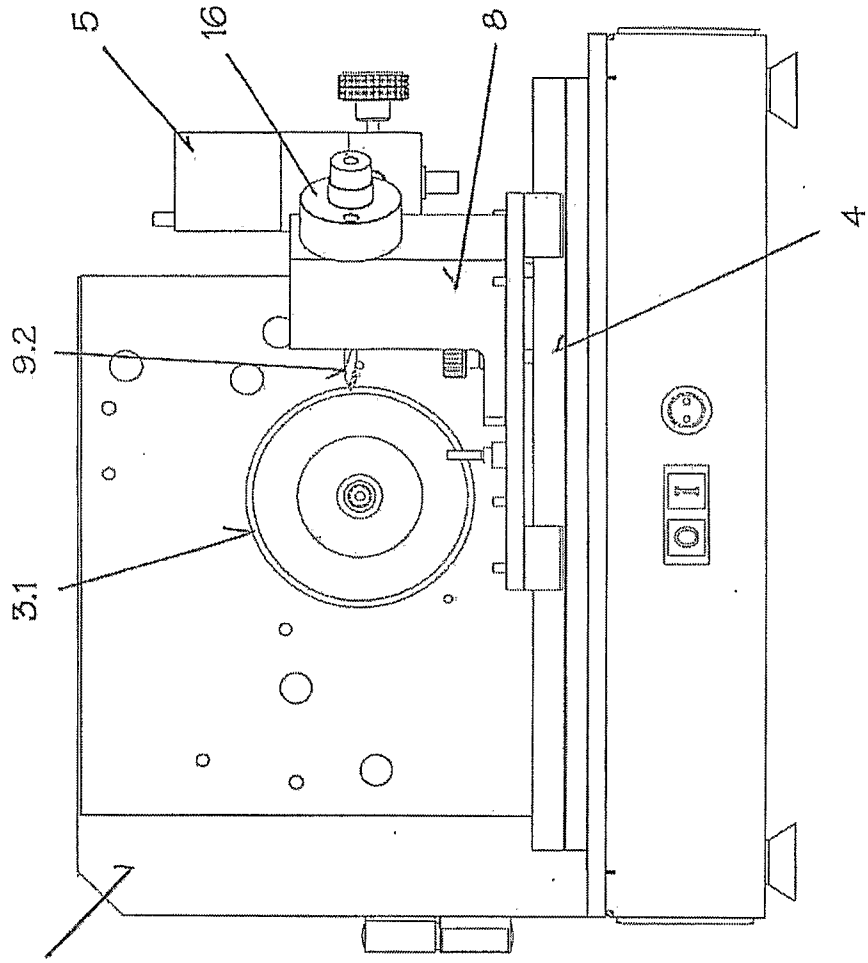

Fig. 17

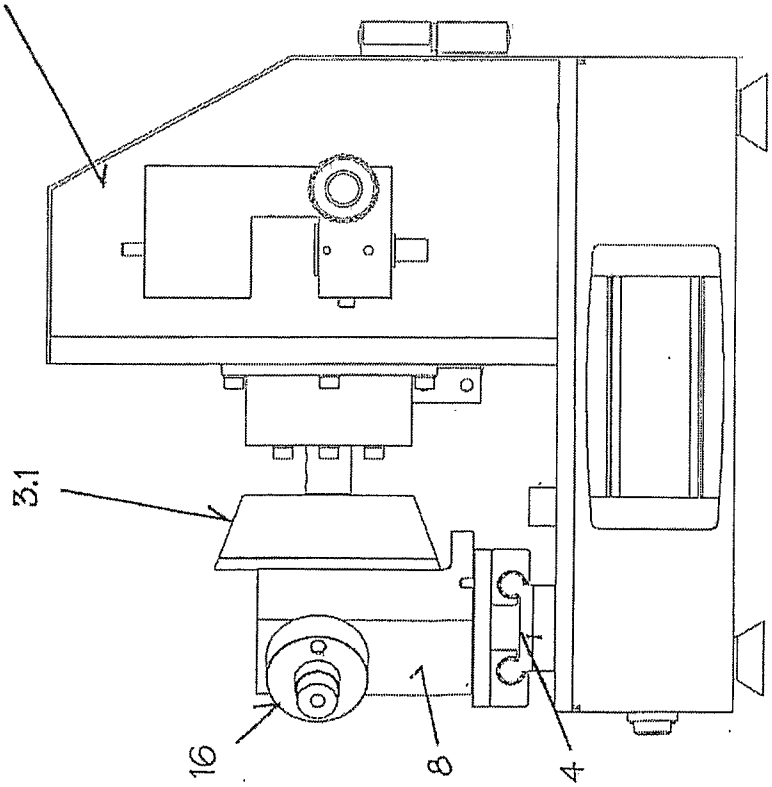

Fig. 16

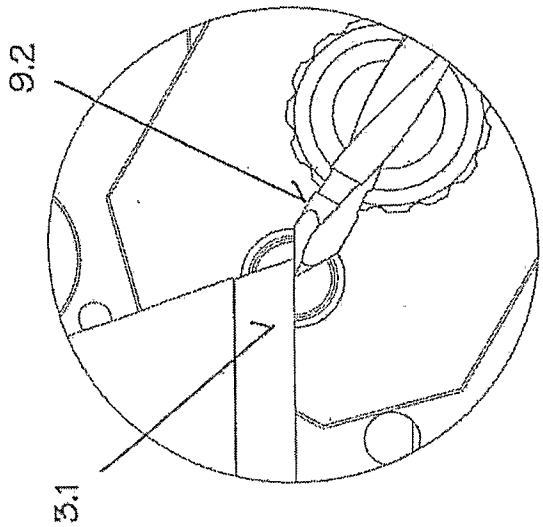

Fig. 19

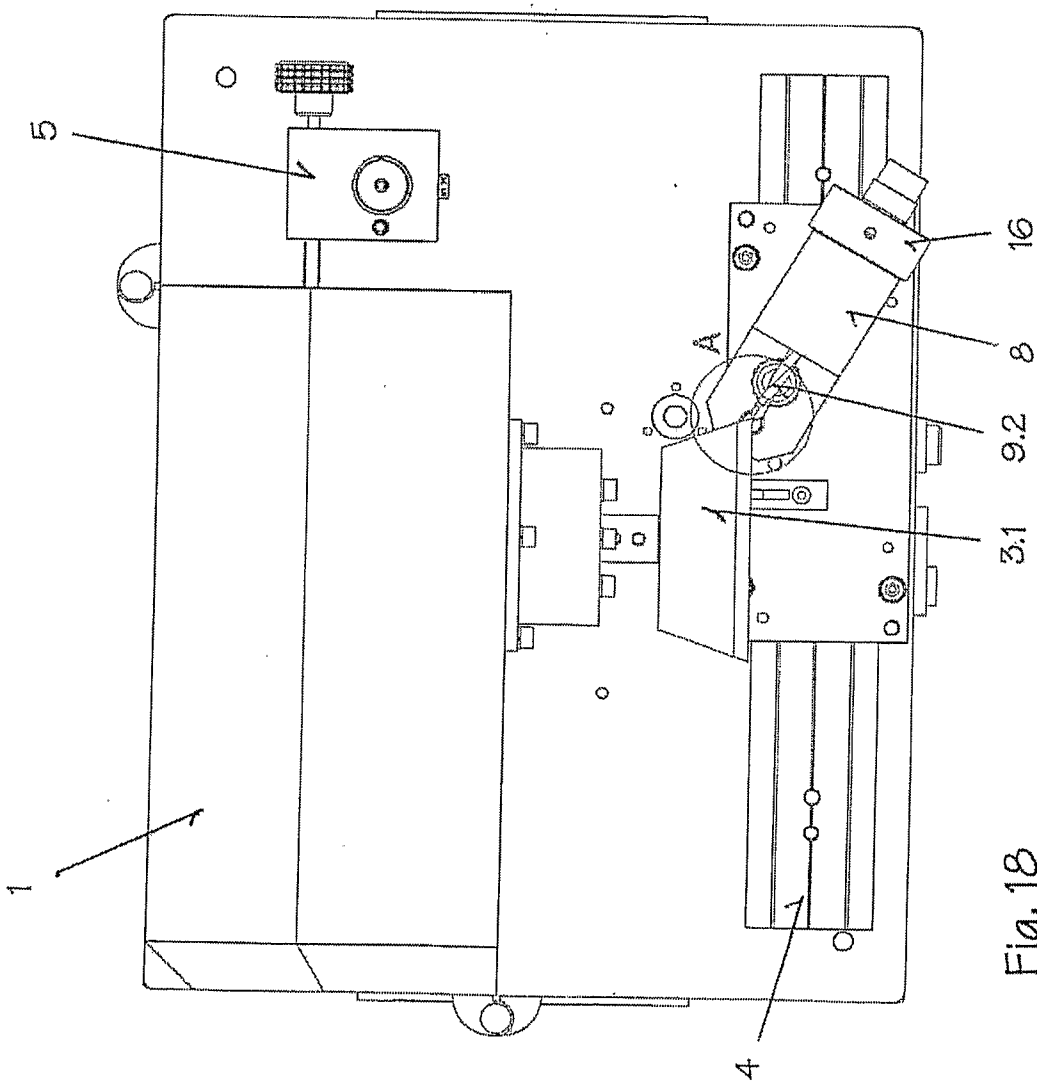

Fig. 18

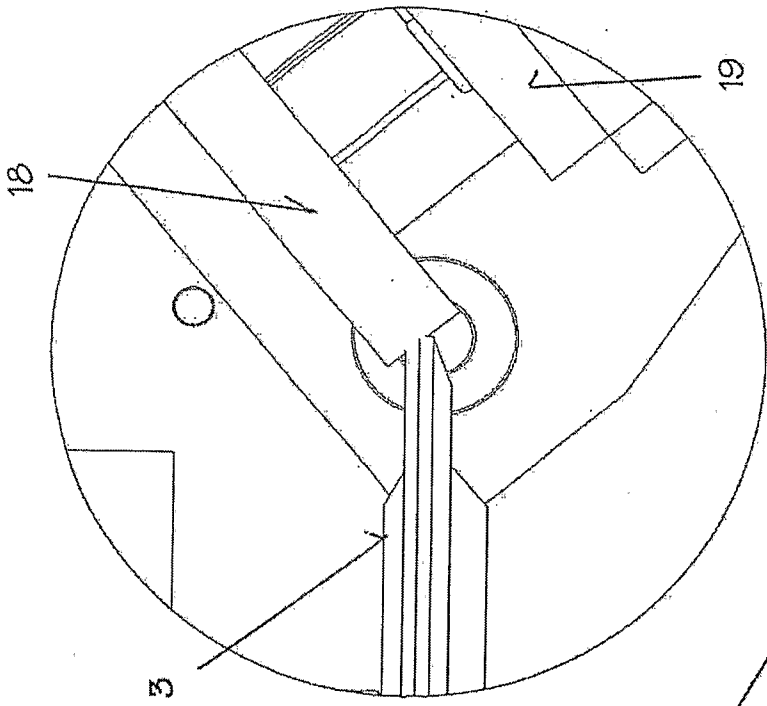

Fig. 21

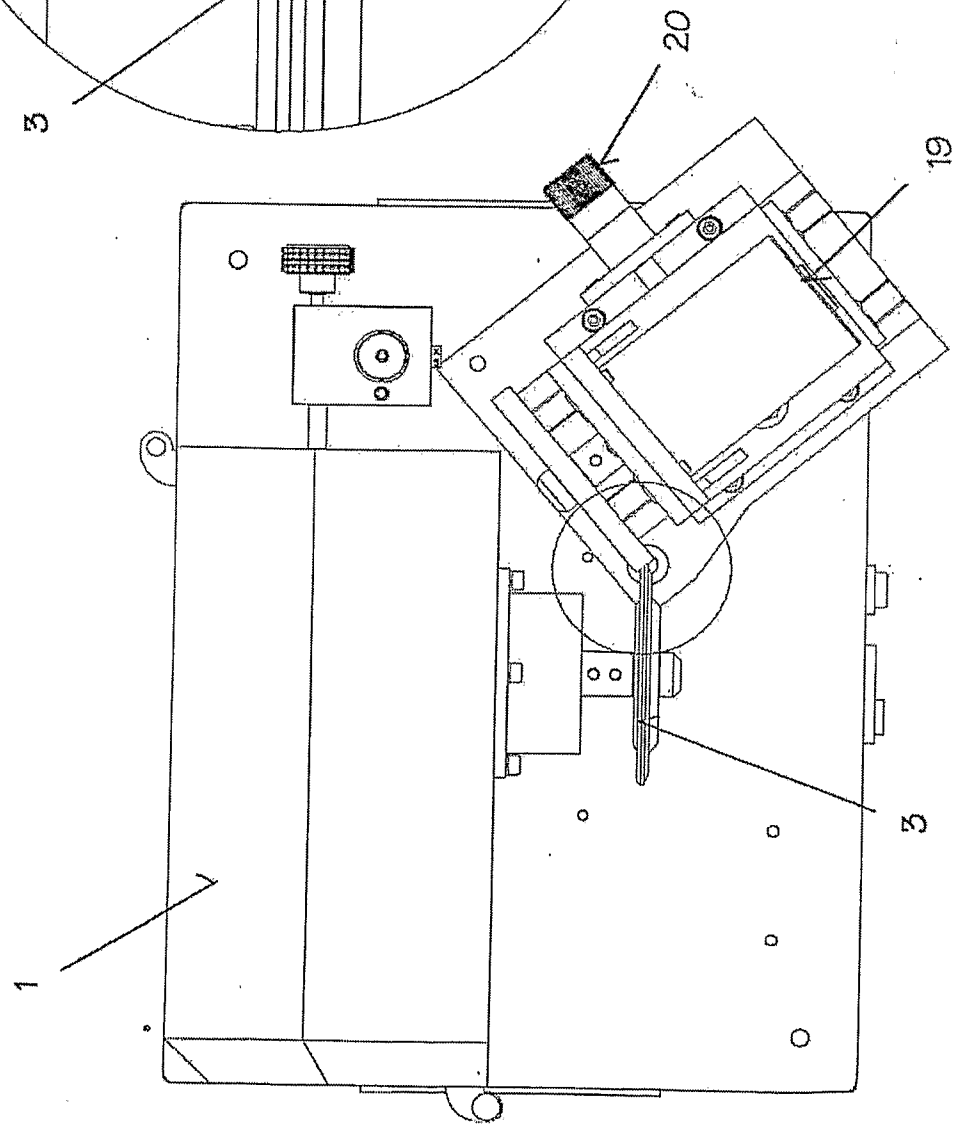

Fig. 20

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2010/001134

A. CLASSIFICATION OF SUBJECT MATTER
INV. B24B23/00 B24B27/00 B24B41/06
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B24B B23Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 20 2005 005859 U1 (TAIWAN MORE CASH VILLAGER CORP [TW]) 7 July 2005 (2005-07-07) figures 1-6 paragraphs [0002], [0015], [0017], [0018], [0021], [0024], [0026]	1-4,6-9
A	US 2007/243801 A1 (LIAO MING-KO [TW]) 18 October 2007 (2007-10-18) figures 1-6 paragraphs [0008], [0010], [0028] - [0030]	1-4,6-9
A	EP 2 006 052 A1 (TAIWAN MORE CASH VILLAGER CORP [CN]) 24 December 2008 (2008-12-24) paragraph [0017]; figures 1-3,7,8	1-4,6-9

-/--

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
1 October 2010	12/10/2010

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Janzon, Mirja

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2010/001134

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 7 473 163 B1 (LEE WANG-SHENG [TW]) 6 January 2009 (2009-01-06) column 2, line 38 - column 3, line 26; figures 1,4,5,6,7,9,12,13	1-4,6-9
A	US 5 400 546 A (CHRISTIAN WILLIAM C [US] ET AL) 28 March 1995 (1995-03-28) column 3, line 24 - column 4, line 10; figure 1	1-4,6-9
A	WO 98/01259 A2 (DAREX CORP [US]) 15 January 1998 (1998-01-15) page 5, line 8 - page 7, line 2; figures 5,6,7A,7B,8,9	1-4,6-9
A	FR 1 020 523 A (M.JACQUES GRIVEAU) 6 February 1953 (1953-02-06) * abstract; figures 1,3,4,9	1
A	US 4 016 680 A (MOORES JR ROBERT GORDON ET AL) 12 April 1977 (1977-04-12) figures 1,3A column 2, line 51 - column 3, line 52	5

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2010/001134

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 202005005859 U1	07-07-2005	NONE	
US 2007243801 A1	18-10-2007	NONE	
EP 2006052 A1	24-12-2008	NONE	
US 7473163 B1	06-01-2009	NONE	
US 5400546 A	28-03-1995	NONE	
WO 9801259 A2	15-01-1998	DE 69717105 D1	19-12-2002
		DE 69717105 T2	31-07-2003
		DE 69729396 D1	08-07-2004
		DE 69729396 T2	08-09-2005
		EP 0912291 A2	06-05-1999
		US 5735732 A	07-04-1998
		US 6626745 B1	30-09-2003
FR 1020523 A	06-02-1953	NONE	
US 4016680 A	12-04-1977	NONE	