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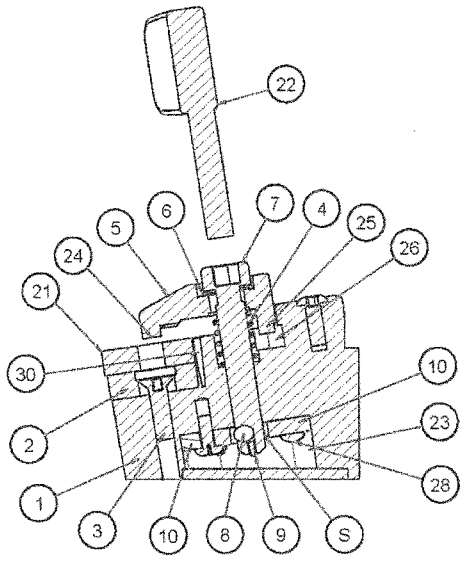
(54) **Title**: TOOL HOLDER, IN PARTICULAR TURNING TOOL HOLDER, WITH RAPID LOCKING SYSTEM FOR INTERCHANGEABLE INSERTS

Fig. 1

TOOL HOLDER IN OPEN POSITION

Section A-A



(57) **Abstract**: A tool holder, in particular a turning tool holder, is equipped with a rapid locking system (4 to 10 inclusive) for the mechanical fastening of interchangeable inserts (21) to the tool holder body (1). The inserts may be made of Tungsten Carbide, Cermet, Ceramics, PCBN (Diamond Cubic Boron Nitride) or PCD (Polycrystalline Diamond). The rapid locking system (4 to 10) consists of a clamp (5), a drive pin (7) and a cylindrical pin (8) mounted on the drive pin (7). The cylindrical pin (8) extends radially with respect to the drive pin (7) and cooperates with two cams (10), each of which is equipped with a helical section (S) developed on an arc of 90 degrees. The cams (10) and the cylindrical pin (8) of the rapid locking system (4 to 10) are located inside a housing seat (23) formed in the tool holder body (1). The rapid locking system (4 to 10) allows an interchangeable insert (21) to be locked to the tool holder body (1) through a rapid action that allows a reduction of the time needed to index or to replace the insert (23).

TOOL HOLDER, IN PARTICULAR TURNING TOOL HOLDER, WITH RAPID LOCKING SYSTEM FOR INTERCHANGEABLE INSERTS

DESCRIPTION

TECHNICAL FIELD

The subject of the present patent application relates to metal cutting tools, and particulary to a turning tool holder configured for turning machinings.

The said turning tool holder is equipped with a rapid locking system for mechanical fastening of interchangeable inserts in the tool holder body of Carbide Tungsten, Cermet, Ceramics, PCBN (Diamond Cubic Boron Nitride) and PCD (Polycrystalline Diamond), allowing a reduction of the times needed to restore the turning tool holder, consequently reducing the latch time of production and possibly increasing production capacity for a company.

To date, the most widespread of insert locking systems, fastening of an insert on the tool holder body, is carried out mechanically by the closing of a threaded screw and manually using of a tool key. The closure of the screw acts on a clamp that when the closure of the fixing screw is completed, it presses and locks the insert in the tool holder.

When the edge is worn, the rotation of the cutting edge of the insert or the replacement of the insert itself is needed. By unscrewing the screw, the insert can be released and free to be replaced by a number of key rotations which have to be carried out.

The number of necessary rotations is directly proportional to the pitch of the screw threading and the necessary height of the clamp allowing the insert to be released and free to remove. To date, this operation requires time that is directly bound to the type of system adopted by different manufacturers, the organization and the operator's manual ability.

BACKGROUND ART

State of the art notes some solutions subject to previous patent applications:

US7153069

According to the invention described in the patent US7153069, by pushing the release button, mechanically the clamp/lever that locks the insert raises, disengaging the insert and allowing the operation of restoring on the tool. A rotated cutting edge or replaced insert, the insert clamping takes place by pressing the clamp at the top. This, activates the internal mechanism composed of levers and springs and the clamp goes to rest on the upper surface of the insert. During this operation, the operator does not have the same perception of the insert clamped as in the conventional screw system.

Tests performed on this system, have shown that the pressure generated by the system on the insert, does not guarantee the necessary strength to make the whole system stable and rigid in roughing machining with removal of material medium - high.

This condition, may cause the triggering of vibrations during machining forcing the insert edge to withstand abnormal stress which often leads to chipping, limiting the possibilities of use. Furthermore, the system does not provide for the use of tools key and requires a operation by using the fingers. Since the mechanical machining for chip removal on ferrous and non-ferrous materials, there run a risk that small metal particles on the points remain where the operator has to act to perform on restoring operations of the tool.

Bearing in mind the limited size of the tool holders and inserts, the possible and proper use of protective anti-cut gloves will limit the operator's manual ability.

PCT / EP2013070796

State of the art is also present in the patent application PCT / EP2013070796, the said system provides that the action of the insert which has to be replaced is carried out through the pressure on the back part of the clamp that locks the insert.

This operation, is poorly accessible due to the positioning of the tool holder on the toolhead of the machine tool.

In order to achieve maximum rigidity of the whole system to the external turning machining, normally the tool holder is installed on the toolhead of machine, with the shorter overhang possible, a condition that limits the manual access on the clamp that locks the insert and is placed behind the clamp, limiting the possibility to exercise the necessary pressure to activate the system.

Even in this system, the pressure exerted on the insert is directly proportional to the loading force of the spring, and the clamping of insert takes place without transferring to operator, the belief of locking as through a screw.

In order to increase the stability of the insert, more pressure on the insert will be needed and more pressure force on the lever will be required by the operator.

Furthermore, the system does not provide for the use of tools key and requires a operation by using the fingers. Since the mechanical machining for chip removal on ferrous and non-ferrous materials, there run a risk that small metal particles on the points remain where the operator has to act to perform on restoring operations of the tool.

Bearing in mind the limited size of the tool holders and inserts, the possible and proper use of protective anti-cut gloves will limit the operator's manual ability.

US3787024

According to the invention described in patent US3787024, the locking system provides the use of a threaded pin which is used to drive the clamp with a movement that is spread only along the axis of pin.

The said pin, is provided with a cylindrical pin extended in a radial position with respect to the axis of the threaded pin and cooperating with two cam sections equipped with a detent recess of the cylindrical pin, arranged near to the threaded pin. In order to speed up the locking and unlocking action, through the rotation of the nut provided with the cam sections, the threaded pin is cooperates with a threaded nut that allows to register the height required for movement, is secured to the engine block by the nut without allowing its rotation.

This system, could be seen as not find application in a turning tool holder due to the clamp that should ensure a flexion to keep the parts locked.

Does not having a centring button, a chute on least one of the two ends of support and the related sliding seat on the said clamp, an angular sliding movement cannot be done to lock an interchangeable insert on the its seat, thus eliminate possible tolerances due to the manufacturing process.

According to the invention written, the application of this rapid locking system is directely addressed to locking or the removal of a distributor from a automotive engine block.

GB2090627

According to the invention described in patent GB2090627, the clamping action and release of the system is apt to unite and lock two panel elements between them without the possibility to have a movement between of them. Such a locking system develops the closing and opening action only along the axis of the drive pin.

The system cannot be installed on a turning tool holder, because the clamp cooperating with the drive pin is not provided, the movement would not be guaranteed of a interchangeable insert in order to enter securely in its seat by eliminating possible tolerances generated by the production process. Furthermore, the system does not provide for the eventual interchangeability of the panel elements involved in the complex of system.

GB1404997

According to the patent application GB1404997, the locking action occurs through the sliding of an element with a conical surface along the axis of the drive pin. The sliding of the conical surface, which is located in the opposite position to the surface parallel to the axis of the drive pin and cooperating with an appropriate sliding seat provided in the milling cutter body, generates a pressure action on the insert in its seat.

According to the invention written, the application of this rapid locking system is specifically directed to milling tools with interchangeable inserts for milling machining. The system is not applicable on an turning tool due to the locking wedge, that necessarily needs to scroll inside a guide that has to ensure three contact points on the wedge, the tool holder body should necessarily be provided with a seat for the sliding of wedge, placed over the insert. The large dimensions of components needed for applying this system on top of insert, does not allow an easy and correct chip evacuation, and it could have limited application on the machine tools aimed to produce small components.

GB1417434

According to the patent application GB1417434, the locking action takes place through the sliding parallel of the insert to the surface of the drive pin along its axis and cooperating with a cylindrical pin radial installed on the pin itself. The head of the drive pin is provided with a cam profile which, once is reached the receiving seat formed in the insert, through

the rotation of the drive pin, the cam profile presses the insert into its seat.

According to the invention written, the application of this rapid locking system is specifically studied for a milling cutter with interchangeable inserts for milling machining. The system is not applicable on a turning tool in that, the head of the drive pin equipped with a cam profile, acts directly and perpendicularly to the receiving seat formed in the insert and does not provide for the use of a clamp. In a turning tool holder, the positioning of the drive pin has to be in radial position than to the insert surface. Moreover, the said system has some application limits on the milling cutters with small diameters due to the positioning of this locking system, placed between the clamping hole of milling cutter to the chuck and the internal side of the insert seat.

DE2720249

According to the patent application DE2720249, the clamping of the insert in a turning tool holder, takes place through the rotation of a drive pin which slides axially with respect to the tool holder body. The said drive pin, has one end with a spherical profile in contact and cooperating with the clamp for locking the insert equipped with a radial pin in respect to the axis of the drive pin and providing the same spherical profile.

During rotation of the drive pin and through the sliding of the two spherical profiles, the locking or unlocking action of the system is generated.

To date, the said tool holder would be only used on manuals machine tools, as parallel lathe or semi-automatic lathe, where the tool holder head is placed on the operator side with respect to the axis of the spindle. On this type of machine tool, the lack of fairings would permit an easy access to the rear side of the tool holder body.

The said tool holder, would not find an application on the current CNC lathe machine because the tool holder head is positioned on the opposite of operator side compared the axis of rotation.

On replacement of the insert, the access to the rear side of the tool holder body in order to activate the drive pin would be at the farthest point to the operator, not allowing an easy access and making the replacement operation of insert, potentially dangerous due to the necessity to go beyond the rotation axis with the body of the operator.

CH409588

According to the patent application CH409588, the said insert locking system for the turning tool holder provides that the locking action or release of the system takes place manually and by means of the pressure exerted on the drive pin head placed on the bottom side of tool holder body.

The said drive pin, at the opposite end is equipped with a screw with a tapered head cooperating with the conical surface present in the hole of the insert, allowing the scrolling in the receiving seat.

On the said system is not being provided the use of a key tool, the pressure exerted on the insert is directly proportional to the loading force of the spring, and the clamping of insert is performed without transferring to operator, the belief of the locking as through a screw.

Since the mechanical machining for chip removal on ferrous and non-ferrous materials, may occur the risk that they remain small metal particles on the points where the operator have to act to perform the restore operations of the tool.

The subject matter of the present patent application provides that, an insert positioned in the tool holder body, manually and mechanically allows the locking and unlocking of the insert, with a movement of only 90 degrees, for restoring of the turning tool holder and make it ready for the turning machining.

The rotation of the insert edge or its replacement, necessarily forces to stop the lathe machine and the related production.

With the aim of speeding up the restoring operation of the turning tool holder, it is possible to reduce the times needed to restore the turning tool holder, consequently reducing the latch time of production and increasing the production capacity for a company.

The "savings" that can be generated is directly proportional to the hourly cost of the lathe machine tool.

In the standard process for restoring a turning tool holder, the following steps are performed:

A. Unlocking of the clamping system through the screw rotation.

B. Removing of insert

C. Blowing, checking and cleaning the receiving seat of insert

D. Positioning of insert

E. Closing of the clamping system through the screw rotation.

The study carried out, it does not change the normal procedure but speeds up and allows the reduction of time needed on the steps A and E.

Tests carried out, allows one to estimate a possible reduction of time needed to restore the turning tool holder between -50% and -70%.

DISCLOSURE OF THE INVENTION

The subject matter of this patent application, the locking and unlocking action of the insert (21), takes place mechanically and in just 90 degrees, by using of a tool key (22) and through the rotation of the drive pin (7) that by rotating, generates a contemporary movement on the clamp (5) downward along the axis of the drive pin (7), pressing on the upper surface of the insert (21) and pulling, due to the sliding of chute (25) in the sliding seat (26) formed on the the tool holder body (1).

Turning of 90 degrees in the opposite direction, the drive pin (7) cooperating with the clamp (5), due to the thrust of the compression spring (4), releases the insert (21) and allows its replacement or the rotation of the cutting edge.

To begin the detailed description of the object solution, we theoretically have to start a turning machining and prepare the tool holder.

With reference to Fig. 1, 2, 3, 4, the tool holder is in the open position with the clamp (5), cooperating with the drive pin (7), which is located in the raised position thanks to the thrust of the compression spring (4). In this way, the insert (21) can be placed in the insert seat (30) of the tool holder body (1).

By inserting the tool key (22) into the seat formed in the drive pin (7) and performing a rotation of between 0 and 90 degrees, the cylindrical pin (8) placed in radial position compared of the drive pin (7) and secured to the said drive pin through the grub screw (9), is forced to follow the helical section (S) tangent present on the two cams (10) arranged in the proximity of the drive pin (7) secured to the tool holder body (1) by the cam screw (28) and placed on the housing seat (23) formed on the tool holder body (1).

The cylindrical pin (8), following the helical section (S) of the cam (10), allows the clamp (5) to move downwards along the axis of the drive pin (7) exerting a pressure on the upper surface of the insert (21) and the lower surface of insert (21) coincident with the upper surface of support (2) assured by the tool holder body (1) through the support screw (3).

The centring pin (24) present and formed on the clamp (5) is located inside the hole of the insert (21).

The chute (25) placed on the back part of the clamp (5), slides in the sliding seat (26) formed on the tool holder body (1), allowing a radial movement of the clamp (5) in relation to the axis of the drive pin (7), which pulls the insert (21) against the insert seat (30) formed in the tool holder body (1) in order to keep the perimeter surfaces of the insert (21) positioned correctly in its seat eliminating any tolerances from the manufacturing process.

To this point, the system is located with the insert (21) installed, properly held in its seat and with the lower surface of the clamp (5) resting on the top surface of the insert (21).

The next movement which allows the definitive locking of the insert (21) to the tool holder body (1), takes place by exerting further force needed to compress the elastic element (6) placed between the lower surface of head to the drive pin (7) and the upper surface of the clamp (5), allowing the cylindrical pin (8) to entering in the detent recess (27) present and formed in the cam (10). The length of compression to the elastic element (6) allows to reduce the necessary forces which, in case of absence of the said elastic element (6), would act directly on the components of the mechanism. Furthermore, when the positioning of cylindrical pin (8) is completed on the detent recess (27) present on the cam (10), the elastic element (6) allows to take pressed between them the clamp (5) and the cylindrical pin (8) avoiding the possibility to unlock the system under the effect of the stress of a turning machining.

At completed action, the rapid locking system allows to lock the insert (21) in its insert seat (30) formed in the tool body (1), developing a compression which extends in the upper, lower and the perimeter surfaces of the insert (21).

With reference to Fig. 5, the tool holder for turning is ready to perform the turning machining.

With the need to replace or rotate the insert (21) edge, the reverse operation must be

done.

The operator, through the use of a tool key (22) and with a reverse rotation between 90 and 0 degrees, allows the compression of the elastic element (6) and allows to the cylindrical pin (8), exit from the detent recess (27) releasing the centring pin (24) from the insert (21) hole and the chute (25) from the sliding seat (26). During the rotation of the drive pin (7), the compression spring (4) pushes the clamp (5) upwards and along the axis of the drive pin (7), unlocking the entire system.

Allowing to the clamp (5) of keeping the centring button (24) always aligned with the hole axis of the insert (21), and not allow any rotation movement to the clamp (5), is placed an upper guide (16) assured to the tool holder body (1) through the upper guide screw (17) that oblige the clamp (5) at a movement along the axis of the drive pin (7) without possibility to rotation.

Through a subsequent modification of internal drilling of the upper guide (16) and the tool holder body (1), it is possible to equip the turning tool holder with the internal coolant. Concentrating the lubricant directly on the cutting edge area, it is possible to increase the tool life performance of the insert (21) edge.

In order to limit the overall dimensions of the turning tool holder, the rapid locking system is housed within the tool holder body (1) through the manufacturing of a housing seat (23) subsequently closed with a bottom closure (11) to the protection of the system.

The subject matter of this patent application are therefore to simplify and speed up the restoring process of the turning tool holder, in order to reduce the latch time of production and consequently, increasing the production capacity of a company.

BRIEF DESCRIPTION OF DRAWINGS

The subject of the present patent application, is represented in the attached drawings in which:

Fig. 1: TOOL HOLDER IN OPEN POSITION

The said figure shows the turning tool holder in open position where it possible to remove or replace the insert (21) from the tool holder body (1). The clamp (5) is in release position due to the compression spring (4).

1 Toolholder body
2 Support
3 Support screw
4 Compression spring
5 Clamp
6 Elastic element
7 Drive pin
8 Cylindrical pin
9 Grub screw
10 Cam
21 Insert
22 Tool key
23 Housing seat
24 Centring pin
25 Chute
26 Sliding seat
28 Cam screw
30 Insert seat
S Helical section

Fig. 2: LOCKING SYSTEM IN OPEN POSITION

The said figure shows the rapid locking system in release position.

The cylindrical pin (8) mounted with radial extension than to drive pin (7) and secured by the grub screw (9) is positioned between the two cams (10) and its surface is coincident and tangential to the base of housing seat (23).

5 Clamp
7 Drive pin
8 Cylindrical pin
9 Grub screw
10 Cam
21 Insert

24 Centring pin
27 Detent recess
S Helical section

Fig. 3: SIMULATION OF MOVEMENT

The said figure shows the action of a rapid locking system.
Through the rotation of the drive pin (7), the cylindrical pin (8) extended in a radial position and fixed by a grub screw (9) to the drive pin (7) it is following the helical section (S) and so, it moves the drive pin (7) cooperating with the clamp (5) along its axis.

5 Clamp
7 Drive pin
8 Cylindrical pin
9 Grub screw
10 Cam
21 Insert
24 Centring pin
25 Chute
27 Detent recess
S Helical section

Fig. 4: LOCKING SYSTEM IN CLOSED POSITION

The said figure shows the rapid locking system in a closed position.
The cylindrical pin (8) enteres in the detent recess in order to determine the end of the locking action.

5 Clamp
7 Drive pin
8 Cylindrical pin
9 Grub screw
10 Cam
21 Insert
24 Centring pin
25 Chute

27 Detent recess

S Helical section

Fig. 5: TOOL HOLDER IN CLOSED POSITION

The said figure shows the turning tool holder in the closed position.

The insert (21) is locked in the insert seat (30) of the tool holder body (1) through the combined movement of the descent of the drive pin (7) and parallel movement due to the chute (25) that slides on the sliding seat (26).

1 Toolholder body

2 Support

3 Support screw

4 Compression spring

5 Clamp

6 Elastic element

7 Drive pin

8 Cylindrical pin

9 Grub screw

10 Cam

11 Bottom closure

16 Upper guide

17 Upper guide screw

21 Insert

22 Tool key

23 Housing seat

24 Centring pin

25 Chute

26 Sliding seat

28 Cam screw

30 Insert seat

S Helical section

BEST MODE TO CARRYING OUT THE INVENTION

Since the subject of the present patent application is linked to the mechanism of movement, the main components that will be produced myself will be:

A) Production of the tool holder body (1)

B) Production of the drive pin (7)

C) Production of the cam (10) with the helical section (S) and the detent recess (27)

D) Production of the bottom closure (11)

E) Production of the upper guide (16)

F) Production of the clamp (5)

CLAIMS

1. Device tool holder, in particular a turning tool holder equipped with a rapid locking system for mechanical fastening of interchangeable inserts (21) in the tool holder characterized in that, the said rapid locking system is constituted by a clamp (5), inserted on a drive pin (7), a cylindrical pin (8) inserted in the seat of the drive pin (7) which extends radially relative to the axis of drive pin (7) and fixed to the drive pin (7) through the grub screw (9). The cylindrical pin (8) cooperates with two cams (10) equipped with a helical section (S) developed on an arc of between 5 and 175 degrees in order to allow the movement of the drive pin (7) in the direction of its axis and so moving the clamp (5) at the same time.

2. Device tool holder as claimed in claim 1 characterized in that, the bidirectional rotation of the drive pin (7) through the key tool (22) activates the rapid locking system.

3. Device tool holder as claimed in claim 1 characterized in that, the cylindrical pin (8) cooperates with two cam (10) elements equipped with helical section (S) arranged in the proximity of the drive pin (7).

4. Device tool holder as claimed in claim 1 characterized in that, each cam (10) is provided with a detent recess (27) for housing the cylindrical pin (8) in order to determine the end of the locking action.

5. Device tool holder as claimed in claim 1 characterized in that, each cam (10) is provided with helical section (S) and a detent recess (27) arranged in the proximity of the drive pin (7) is apt to be fixed by the cam screw (28) to the tool body (1) inside of the housing seat (23).

6. Device tool holder as claimed in claim 1 characterized in that, the position of the cylindrical pin (8) is secured to the drive pin (7) from the grub screw (9), the said grub screw (9) being in axial position to the drive pin (7) and in radial position with respect to the cylindrical pin (8).

7. Device tool holder as claimed in claim 1 characterized in that, the said rapid locking system is installed in the housing seat (23) formed within the tool body (1) closed by the bottom closure (11) to the protection of the mechanism.

8. Device tool holder as claimed in claim 1 characterized in that, the said rapid locking system ensures the insert (21) to the insert seat (30) formed in the tool holder body (1), developing a compression which extends between the upper surface of the insert (21) coinciding with the bottom surface of the clamp (5), between the bottom surface of the insert (21) coinciding with the upper surface of the support (2) and between the peripheral surfaces of the insert (21) coincident with the perimeter surfaces of the insert seat (30).

9. Device tool holder as claimed in claim 1 characterized in that, on the drive pin (7) is inserted a compression spring (4) placed between the tool holder body (1) and the clamp (5), the said compression spring (4) forces the clamp (5) to follow the axial movement of the drive pin (7) during its rotation, allowing the centring button (24) to exit from the hole or blind seat present in the insert (21).

10. Device tool holder as claimed in claim 1 characterized in that, in the drive pin (7) is inserted an elastic element (6) placed between the drive pin (7) and the clamp (5). With the locking device in closed position, the elastic element (6) is cooperating with the compression spring (4). The resulting elastic action of the thrust on the drive pin (7) ensures the cylindrical pin (8) to stop in its detent recess (27).

11. Device tool holder as claimed in claim 1 characterized in that the clamp (5) is provided with a chute (25) cooperating with the sliding seat (26) formed in the tool holder body (1), the said chute (25) allows a sliding movement of the clamp (5) parallel to the surface of insert (21) contemporary to the axial movement of the drive pin (7).

12. Device tool holder as claimed in claim 1 characterized in that the tool holder body (1) is provided with an upper guide (16) placed in proximity of the clamp (5), the said upper guide (16) allows the centring axis of the button (24) present in the clamp (5) to be aligned to the axis of the through hole or blind seat present in the insert (21) during the axial movement of the drive pin (7).

13. The upper guide as claimed in claim 12 characterized in that the said upper guide (16) can be secured to the tool holder body (1) through the upper guide screw (17), or directly manufactured on the tool holder body (1).

14. The upper guide as claimed in claim 12 characterized in that the upper guide (16) can be equipped with internal drilling in order to allow the passage of internal coolant.

AMENDED CLAIMS
received by the International Bureau on 28 August 2016 (28.08.16)

1. Tool holder, in particular a turning tool holder equipped with a rapid locking system for the mechanical fastening of interchangeable inserts (21) in the tool holder, wherein the said rapid locking system is constituted by a clamp (5), through which a drive pin (7) extends, and the drive pin (7) itself, characterised in that, the rapid locking system further comprises a cylindrical pin (8) inserted in a seat of the drive pin (7), the cylindrical pin extends radially relative to the axis of drive pin (7) and being fixed to the drive pin (7) by means of a grub screw (9), wherein the bidirectional rotation of the drive pin (7) can activate the rapid locking system, wherein the cylindrical pin (8) cooperates with two cams (10) equipped with a helical section (S) developed on an arc of between 5 and 175 degrees, in order to allow the movement of the drive pin (7) in the direction of its axis, thereby moving the clamp (5) at the same time.

2. Tool holder as claimed in claim 1, wherein the bidirectional rotation of the drive pin (7) happens by means a key tool (22) such that activates the rapid locking system.

3. Tool holder as claimed in claim 1, wherein the cam (10) arranged in the proximity of the drive pin (7) it such can be formed integrally with the tool holder body (1) inside to the housing seat (23).

4. Tool holder as claimed in claim 1, wherein the cam (10) is provided with a detent recess (27) for housing the cylindrical pin (8) in order to determine the end of the locking action.

5. Tool holder as claimed in claim 1, wherein the cam (10) arranged in the proximity of the drive pin (7) may tend to be secured by the cam screw (28) to the tool holder body (1) inside of the housing seat (23).

6. Tool holder as claimed in claim 1, wherein a grub screw (9), is arranged axially with respect to the axis of the drive pin (7) and radially with respect to the cylindrical pin (8).

7. Tool holder as claimed in claim 1, wherein a part of drive pin (7), the cylindrical pin (8) installed to the drive pin (7) and secured by a grub screw (9), cooperating with two cams (10) equipped with a helical section (S) and secured to the tool holder body (1), are places internally to a housing seat (23) formed within the tool body (1) closed by a bottom closure (11) by means the bottom closure screw (12) for the protection of the mechanism.

8. Tool holder as claimed in claim 1, wherein the said rapid locking system secures the insert (21) to the insert seat (30) formed in the tool holder body (1), developing a compression which extends between the upper surface of the insert (21) and the bottom surface of the clamp (5), between the bottom surface of the insert (21) and the upper surface of the support (2) mounted within the insert seat (30), between the peripheral surfaces of the insert (21) and the perimeter surfaces of the insert seat (30).

9. Tool holder as claimed in claim 1 wherein a compression spring (4) is fitted on the drive pin (7), said compression spring being located between the tool holder body (1) and the clamp (5) such that it biases the clamp (5) to follow the axial movement of the drive pin (7) during its rotation, allowing the centring button (24) formed on the clamp (5) to exit from the hole or blind seat present in the insert (21).

10. Tool holder as claimed in claim 4 and 9, wherein an elastic element (6) is placed on the drive pin (7) between the drive pin (7) and the clamp (5) such that when the rapid locking system is in a closed position, the elastic element (6) and the compression spring (4) cooperate with the compression spring (4) to provide a resultant elastic action of thrust on the drive pin (7) the resultant elastic action serving to ensures the cylindrical pin (8) is retained whitin detent recess (27).

11. Tool holder as claimed in claim 1, wherein the clamp (5) is provided with a inclined sliding surface (25) cooperating with a sliding seat (26) formed in the tool holder body (1), the said inclined sliding surface (25) allows a sliding movement of the clamp (5) parallel to the surface of insert (21) thereby, moves in the same time to the axial movement of the drive pin (7).

12. Tool holder as claimed in claim 1, wherein the tool holder body (1) is provided with an upper guide (16) placed in proximity of the clamp (5), the said upper guide (16) allowing the centring axis of a button (24) present on the clamp (5) to be aligned to the axis of a through hole or blind seat present in the insert (21) during the axial movement of the drive pin (7).

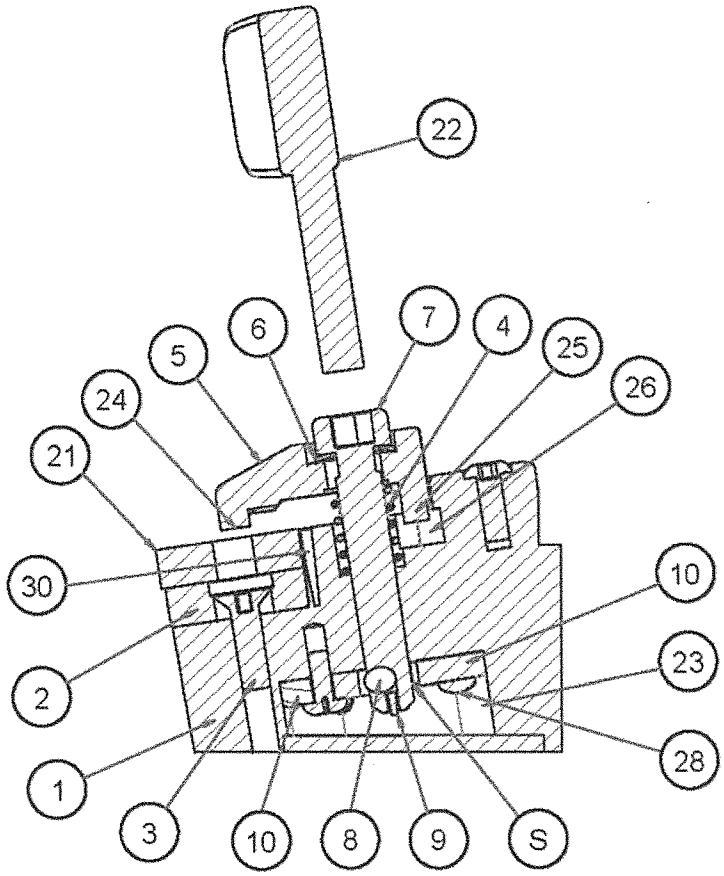
13. Tool holder as claimed in claim 1 and 12, wherein the said upper guide (16) is either secured to the tool holder body (1) by means of an upper guide screw (17), or formed integrally with the tool holder body (1).

14. Tool holder as claimed in claim 1 and 12, wherein the upper guide (16) is equipped with an internal passages in order to allow the passage of coolant.

Fig. 1

TOOL HOLDER IN OPEN POSITION

Section A-A



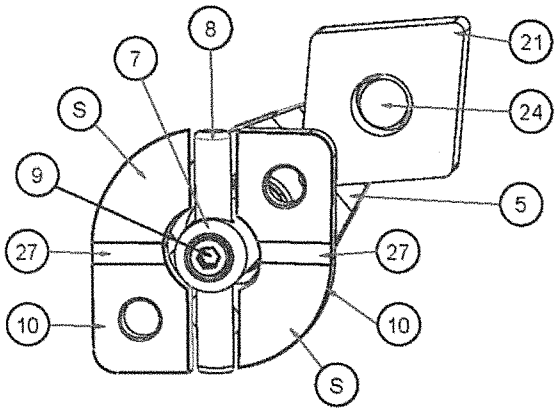


Fig. 2

LOCKING SYSTEM IN OPEN POSITION

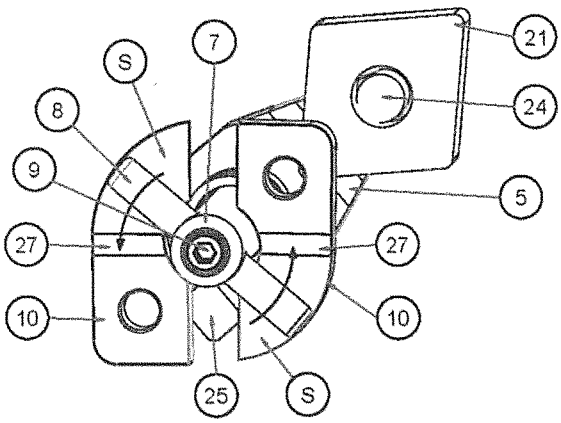


Fig. 3

SIMULATION OF MOVEMENT

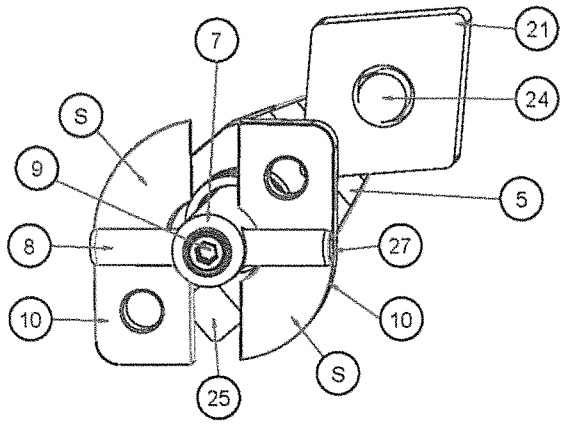


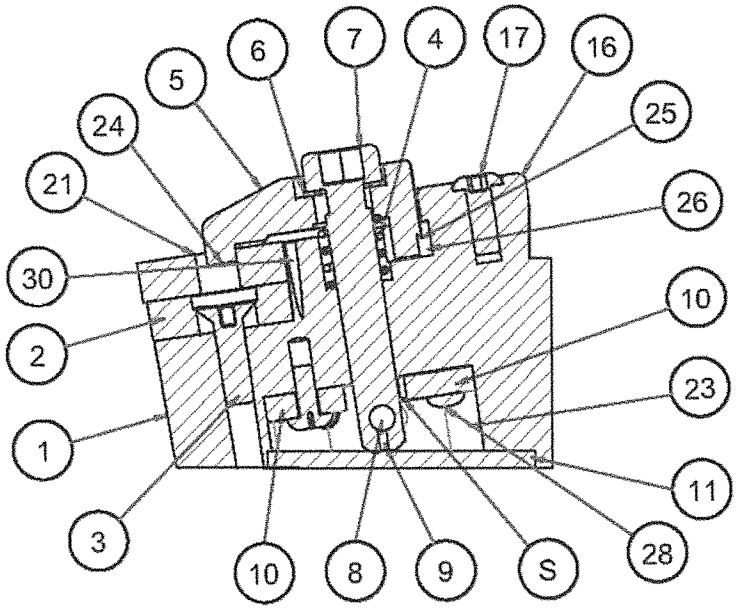
Fig. 4

LOCKING SYSTEM IN CLOSED POSITION

Fig. 5

TOOL HOLDER IN CLOSED POSITION

Section B-B



INTERNATIONAL SEARCH REPORT

International application No
PCT/IT2016/000069

A. CLASSIFICATION OF SUBJECT MATTER
INV. B23B27/16 B25B5/08
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)
B23B B23C B25B F16B

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 practicable, 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.
X	US 2014/294520 A1 (HENZLER UWE [DE] ET AL) 2 October 2014 (2014-10-02) paragraphs [0028], [0029], [0052] figures 2c, 7, 8a-8d	13,14
A	WO 2014/056830 A1 (SECO TOOLS AB [SE]) 17 April 2014 (2014-04-17) cited in the application page 3, line 14 - page 9, last line figures	1
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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
28 July 2016	09/08/2016

Name and mailing address of the ISA/	Authorized officer
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