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(54) Abstract Title: **Tool holder for a hand held power tool**

(57) A tool holder, particularly for a hammer drill or similar portable power tool, has a body 11, with an aperture 19 therein and a guide ring 20 displaceable thereon. Locking member 15 is held by the apertures in guide ring 20 and body 11 and is radially displaceable. Locking ring 25 holds locking member 15 in its locked position. Guide ring 20 and locking ring 25 are connected to slide 16 which is axially moveable on body 11 against the influence of spring 18. The locking members may comprise rollers, oriented transversely to the insertion direction of the tool shaft (see below) and having a length substantially the same as the width of that shaft.

In use, a suitably shaped tool shaft 13 having axial channels 14 is pushed into the tool holder, where it pushes the locking body rearwardly. This in turn displaces slide 16 and guide ring 20 rearwardly, which causes the locking body to slide under locking ring 25 and be displaced radially away from the tool shaft into cavity 32, allowing the tool shaft to be fully inserted, at which point, spring 18 urges slide 16 forwardly, causing the locking member to engage with channels 14 where it is held by locking ring 25. To remove the tool, slide 16 is manually displaced rearwardly, which again causes the radial displacement of locking body 15 and the release of the tool shaft.

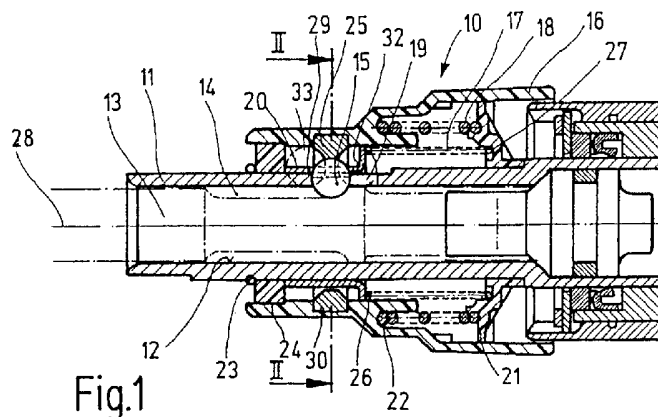


Fig.1

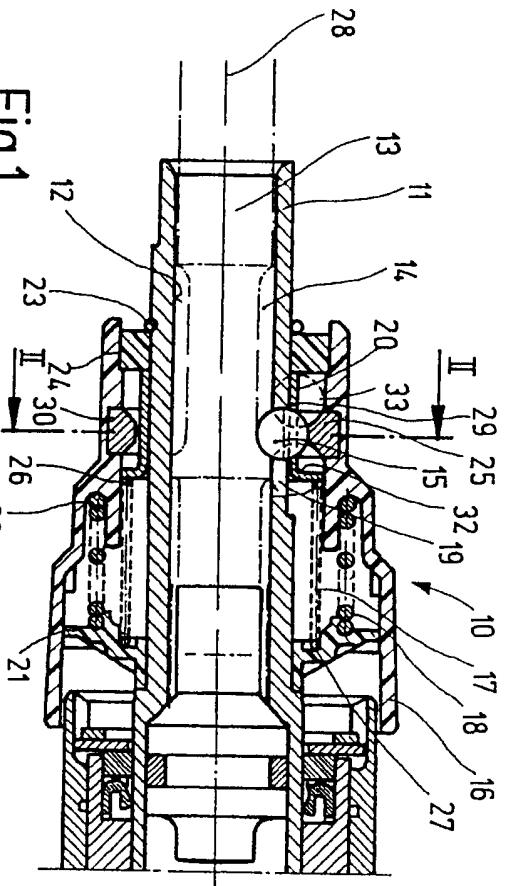


Fig. 1

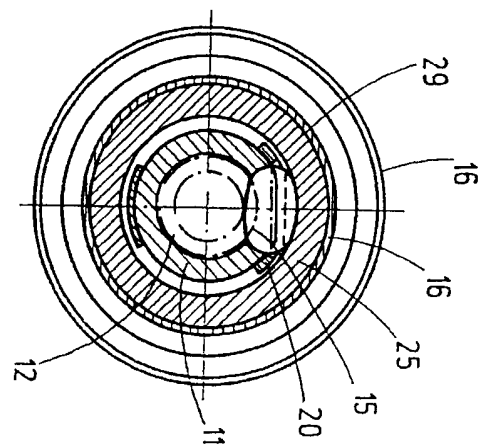


Fig. 2

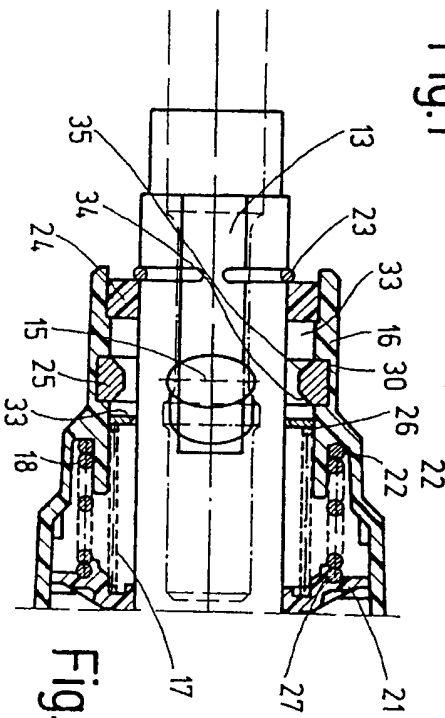


Fig. 3

5 Tool holder and hand-held machine tool

Prior art

The invention takes as its starting point a tool holder
10 according to the precharacterising clause of Claim 1 and a
hand-held machine tool according to the precharacterising
clause of Claim 10.

For reasons of stability, automatic locking devices such as
15 those known in light drill hammers have hitherto not been
used for heavy drill and chisel hammers. In heavy drill or
chisel hammers, the insert tool which is inserted in each
case into the tool holding means is locked and unlocked
manually using a blocking device which can be actuated from
20 the outside of the tool holding means.

DE 101 05 406 A1 has proposed a tool holder having an
automatic locking device, which is particularly suitable
for drill and/or chisel hammers. The tool holder has a
25 blocking pin as a locking body, which is arranged
transversely to the longitudinal axis of a base body of the
tool holder, and is movably mounted in a guideway in which
the blocking pin can move towards a tool shaft for the
purpose of locking said tool shaft and away from the tool
30 shaft for the purpose of releasing and removing the tool
shaft. The guideway extends in the base body and continues
in a sliding sleeve which surrounds the base body. The
blocking pin locks the tool shaft by engaging in a cutout
in the tool shaft. For release purposes, the mutual

alignment of the sliding sleeve and the base body is such that the blocking pin can deflect outwards out of the cutout along the guideway.

5 Advantages of the invention

The invention takes as its starting point a tool holder for a hand-held machine tool, particularly a drill hammer and/or chisel hammer which can be driven in striking and/or
10 rotating manner, having a tool holder body with a receiving bore for a tool shaft of an insert tool with at least one cutout, at least one locking body, which is capable of latching in the cutout of the tool shaft, being radially
15 displaceably mounted in the tool holder body and being in operative communication with a sliding sleeve, which is spring-mounted in the axial direction, such that, when the sliding sleeve moves in opposition to a spring force, the locking body is deflected out of the receiving bore.

20 It is proposed that the locking body be held in a first opening of the tool holder body and in a second opening of a guide ring which is displaceably mounted on the tool holder body, said second opening at least partially overlapping the first opening. This produces an automatic
25 tool holder particularly for hammers with a spline shaft or hexagonal insert tools with a diameter of greater than 15 mm. The tool holder is economical, simple and lightweight. The invention combines the simplicity of an automatic tool holder with a locking ball and the wear
30 resistance of a blocking-pin tool holder. By setting the locking body in the guide ring, the locking body is reliably prevented from tilting. It is possible to prevent the locking body from sliding in a sloping guide channel of

the tool holder body and the sliding sleeve. The locking body can be smaller in size than a locking pin. The risk of jamming is reduced.

5 Stable automatic locking of the insert tool is achieved if, in the locking position of the tool shaft, the locking body is held in the first and second opening by a locking ring. The locking ring here is preferably arranged in a groove in the sliding sleeve. On its outer faces facing the locking
10 body, the locking ring favourably has flanks whereof at least the inclination is adapted to the locking body in its particular assembly position, i.e. when the tool shaft of the insert tool is guided into the receiving bore or when the insert tool is removed.

15

If, for the purpose of locking the tool shaft, the locking body can be displaced with the guide ring in the insertion direction of the tool shaft, the insert tool can be inserted simply, as with an automatic tool holder having a
20 locking ball. The guide ring here is advantageously displaceable in opposition to the spring force of a locking spring. A suitable projection on the tool shaft can push the locking body in the insertion direction with the guide ring without the sliding sleeve having to be actuated,
25 until the locking body can deflect outwards into a cavity provided for this.

To remove the tool, the sliding sleeve is preferably displaceable in the insertion direction of the tool shaft
30 so that the locking body deflects into a cavity freed by the locking ring carried along by the sliding sleeve. The tool can be removed easily with little effort.

The locking body is preferably a locking roller extending transversely to the longitudinal axis of the tool holder body. This is substantially elliptical in shape, which means that its contours are well rounded. Thus, when the
5 guide ring and/or locking ring and/or sliding sleeve move, the locking body can slide easily into its intended position. This makes handling during a tool change more comfortable for the operator. In its longitudinal extent perpendicular to the longitudinal axis, the locking body
10 advantageously corresponds approximately to the diameter of the receiving bore.

The invention furthermore takes as its starting point a hand-held machine tool, particularly a drill hammer and/or
15 chisel hammer, having a tool holder, which can be driven in striking and/or rotating manner, having a tool holder body with a receiving bore for a tool shaft of an insert tool with at least one cutout, at least one locking body, which is capable of latching in the cutout of the tool shaft,
20 being radially displaceably mounted in the tool holder body and being in operative communication with a sliding sleeve, which is spring-mounted in the axial direction, such that, when the sliding sleeve moves in opposition to a spring force, the locking body is deflected out of the receiving
25 bore.

It is proposed that the locking body be held in a first opening of the tool holder body and in a second opening of a guide ring which is displaceably mounted on the tool
30 holder body, said second opening at least partially overlapping the first opening.

Drawings

Independently of its summarisation in the claims and without restricting the generality, further embodiments, 5 aspects and advantages of the invention are also revealed in an exemplary embodiment of the invention, which is illustrated below with reference to drawings.

The following show:

10

Fig. 1 a longitudinal section through a region of a preferred hand-held machine tool with a preferred tool holder;

15 Fig. 2 a section through the preferred tool holder along the line II-II in Fig. 1; and

Fig. 3 a plan view of the preferred tool holder of Fig. 1.

20

Description of the exemplary embodiment

Fig. 1 shows, in a longitudinal section, a preferred tool holder 10 for a hand-held machine tool, particularly a 25 heavy drill hammer and/or chisel hammer which can be driven in striking and or rotating manner. The tool holder 10 has a tool holder body 11 with a receiving bore 12 for a tool shaft 13 of an insert tool. At least one cutout 14 is provided in the tool shaft 13, in which a locking body 15, 30 which is radially displaceably mounted in the tool holder body 11, can engage or latch. The locking body 15 is in operative communication with a sliding sleeve 16, which is spring-mounted in the axial direction by means of a spring

18, such that, when the sliding sleeve 16 moves in opposition to the spring force of the spring 18, the locking body 15 is deflected out of the receiving bore 12 into a cavity 33. The spring 18, which is constructed as a helical spring, lies between a depression 22 in the sliding sleeve 16 and an abutment 21 on an element 36 surrounding the tool holder body 11.

The locking body 15 is held in a first opening 19 of the tool holder body 11 and in a second opening 29 of a guide ring 20 which is displaceably mounted on the tool holder body 11, said second opening at least partially overlapping the first opening 19. In the axial direction with respect to the longitudinal axis 28 of the tool holder body 11, the second opening 29 is of a smaller construction than the first opening 19.

The locking body 15 is constructed as a locking roller which extends transversely to the longitudinal axis 28 of the tool holder body 11 and is approximately elliptical in shape. In its longitudinal extent perpendicular to the longitudinal axis 28, the locking body 15 is approximately as long as the diameter of the receiving bore 12. The sliding sleeve 16 can therefore be of a rotationally symmetrical construction internally and externally, since the locking body 15 does not engage in the sliding sleeve 16. The curve of the locking body 15 constructed as a locking roller nestles against the inner circumference of the locking ring 25 (Fig. 2).

30

Towards the tool-side end, the hand-held machine tool is terminated by a closing element 24 which is fixed axially on the tool holder body 11 by a locking ring 28.

In the locking position of the tool shaft 13, the locking body 15 is enclosed by a locking ring 25 and the edges of the first and the second opening 19, 29. The locking ring 25 is arranged in a groove 30 in the sliding sleeve 16 so that it is carried along when the sliding sleeve 16 moves axially.

On its outer faces facing the locking body 15, the locking ring 25 has flanks 34, 35 whereof at least the inclination is adapted to the locking body 15 in its particular assembly position to facilitate the deflection out of the cutout 19 and the sliding movement back into the cutout 14 when the locking body 15 is actuated accordingly.

The locking body 15 can move in the manner of a simple locking ball in a simple SDS tool holder. The original meaning of SDS is "Special Direct System" as used particularly in hammers having a 10 mm shaft diameter for drilling and/or striking insert tools for light hand-held machine tools of up to 4 kg. When the insert tool or its tool shaft 13 is locked automatically, a projection 31 on the tool shaft 13 pushes the locking body 15 with the guide ring 20 in the insertion direction, i.e. rearwards, in opposition to the spring force of a locking spring 17. The locking spring 17 lies between an outwardly directed collar 26 of the guide ring 20, which serves as an abutment, and a depression 27 of the same element 36 that also forms the abutment 21 of the spring 18. The locking body 15 here slides away under the locking ring 25 and is released in that it can deflect into a cavity 32 downstream of the locking ring 25, as seen in the insertion direction. The tool shaft 13 can thus be guided unhindered into the

receiving bore 12. Once the tool shaft 13 is fully inserted, the locking body 15 is pushed forwards again, in opposition to the insertion direction, between the locking ring 25 and the cutout 14 in the tool shaft 13 and thus
5 locks the insert tool.

To remove the insert tool, the operator pushes the sliding sleeve 16 rearwards, in the insertion direction. The locking ring 25 is carried along with it. The locking body
10 15 is thus released and can deflect outwards into the cavity 33 which, as seen in the insertion direction, lies upstream of the locking ring; the projection 31 on the tool shaft 13 can pass without difficulty and the insert tool can be removed.

15

To illustrate the arrangement of the preferred tool holder 10, Fig. 2 shows a cross-section along the line II-II in Fig. 1, whilst Fig. 3 shows a plan view from above. The advantageously small dimensions of the locking body 15
20 constructed as a locking roller and its rounded, elliptical form are clearly shown. It is likewise clear that the locking body 15 does not engage in the sliding sleeve 16, which can therefore be manufactured with lower assembly costs than if a guideway had to be incorporated. The walls
25 of the sliding sleeve 16 can furthermore be relatively thin, since it does not need to have the minimum wall thickness necessary for a stable guideway.

Claims

- 5 1. A tool holder for a hand-held machine tool,
particularly a drill hammer and/or chisel hammer,
which can be driven in striking and/or rotating
manner, having a tool holder body (11) with a
receiving bore (12) for a tool shaft (13) of an insert
10 tool with at least one cutout (14), at least one
locking body (15), which is capable of latching in the
cutout (14) of the tool shaft (13), being radially
displaceably mounted in the tool holder body (11) and
being in operative communication with a sliding sleeve
15 (16), which is spring-mounted in the axial direction,
such that, when the sliding sleeve (16) moves in
opposition to a spring force, the locking body (15) is
deflected out of the receiving bore (12),
characterised in that the locking body (15) is held in
20 a first opening (19) of the tool holder body (11) and
in a second opening (29) of a guide ring (20) which is
displaceably mounted on the tool holder body (11),
said second opening at least partially overlapping the
first opening (19).
- 25
2. A tool holder according to Claim 1, **characterised in
that**, in the locking position of the tool shaft (13),
the locking body (15) is held in the first and second
opening (19, 29) by a locking ring (25).
- 30
3. A tool holder according to Claim 2, **characterised in
that** the locking ring (25) engages in a groove (30) in
the sliding sleeve (16).

4. A tool holder according to Claim 3, **characterised in that**, on its outer faces facing the locking body (15), the locking ring (25) has flanks (34, 35) whereof at least the inclination is adapted to the locking body (15) in its particular assembly position.
- 5
5. A tool holder according to one of the preceding claims, **characterised in that**, for the purpose of locking the tool shaft (13), the locking body (15) can be displaced with the guide ring (20) in the insertion direction of the tool shaft (13).
- 10
6. A tool holder according to Claim 5, **characterised in that** the guide ring (20) can be displaced in opposition to the spring force of a locking spring (17) in the insertion direction of the tool shaft (13).
- 15
7. A tool holder according to one of Claims 2 to 6, **characterised in that**, for the purpose of removing the tool, the locking body (15) can be released by displacing in the insertion direction of the tool shaft (13) the sliding sleeve (16), whereby the locking body (15) is deflected into a cavity (33) freed by the locking ring (20).
- 20
- 25
8. A tool holder according to one of the preceding claims, **characterised in that** the locking body (15) is a locking roller extending transversely to the longitudinal axis (28) of the tool holder body (11).
- 30

9. A tool holder according to Claim 8, **characterised in that** the locking body (15) corresponds approximately to the diameter of the receiving bore (12) in its longitudinal extent perpendicular to the longitudinal axis (28).
5
10. A hand-held machine tool, particularly a drill hammer and/or chisel hammer, having a tool holder (10), which can be driven in striking and/or rotating manner,
10 having a tool holder body (11) with a receiving bore (12) for a tool shaft (13) of an insert tool with at least one cutout (14), at least one locking body (15), which is capable of latching in the cutout (14) of the tool shaft (13), being radially displaceably mounted
15 in the tool holder body (11) and being in operative communication with a sliding sleeve, which is spring-mounted in the axial direction, such that, when the sliding sleeve (16) moves in opposition to a spring force, the locking body (15) is deflected out of the receiving bore (12), **characterised in that** the locking
20 body (15) is held in a first opening (19) of the tool holder body (11) and in a second opening (29) of a guide ring (20) which is displaceably mounted on the tool holder body (11), said second opening at least
25 partially overlapping the first opening (19).
11. A tool holder for a hand-held machine tool, substantially as herein described with reference to the accompanying drawing.
30
12. A hand-held machine tool substantially as herein described with reference to the accompanying drawings.



For Innovation

12

Application No: GB0604224.6

Examiner: Dr Richard Gregson

Claims searched: 1-12

Date of search: 19 June 2006

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1, 2, 5, 6 and 10.	US 2003/006566 A1 (BELOW et al.) - see whole document.
X,E	1, 5, 6 and 10	WO 2005/089989 A1 (WIENHOLD) - see diagrams and abstract in particular.
A	n/a	GB 2405114 A (BOSCH) - see diagrams and abstract in particular.
A	n/a	GB 2401817 A (BOSCH) - see diagrams and abstract in particular.
A	n/a	GB 2360240 A (BOSCH) - see diagrams and abstract in particular.

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category	P	Document published on or after the declared priority date but before the filing date of this invention
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X:

B3B; B4C

Worldwide search of patent documents classified in the following areas of the IPC

B23B; B25D

The following online and other databases have been used in the preparation of this search report

EPODOC, WPI