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(71) Applicant (for all designated States except US): **PREC-IMED S.A.** [CH/CH]; 7, l'Echelette, CH-2534 Orvin (CH).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **LECHOT, Andre** [CH/CH]; 24, Sous l'Eau-Belle, CH-2534 Orvin (CH). **FEHLBAUM, Philippe** [CH/CH]; Fin de Forel 4, CH-2523 Lignières (CH).

(74) Agent: **MOETTELI, John**; Moetteli & Associés, Case Postale 486, CH-1211 Genève 12 (CH).

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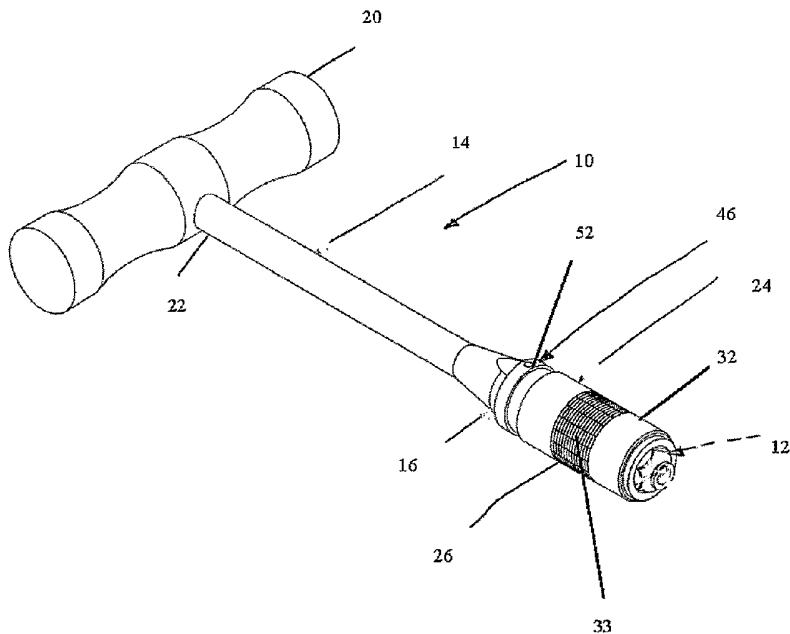
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Declarations under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ,

[Continued on next page]

(54) Title: HAND-HELD INSTRUMENT HOLDER FOR SURGICAL USE



(57) Abstract: A surgical instrument holder has a shank having a coupling end, a handle attached to an opposite end of the shank, a coupling device, and a locking mechanism. The coupling end has an interface thereon for receiving an instrument. The locking mechanism has an annular locking component, a spring, a ring which slides on the shank, and a locking device. The annular locking component is mounted so as to slide along the shank. The locking device cooperates with the locking component so as to lock the instrument onto the interface. The spring biases the locking component in a locking direction and bears on the ring. The ring is disengageably lockable to the shank via a connection device so as to enable quick disassembly for cleaning and component sterilization.

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- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

HAND-HELD INSTRUMENT HOLDER FOR SURGICAL USE

CROSS REFERENCE TO RELATED APPLICATIONS

For the purposes of the US only, this PCT application is a continuation of US Patent Application Serial No. 10/429,897, which is a continuation-in-part of US patent application serial
5 no 10/391,464, entitled Instrument Holder for a Surgical Instrument, filed on March 18, 2003, which is in turn continuation of Ser. No. 09/902,369 filed on July 9, 2001, which in turn is a continuation of Ser. No. 602,341 filed June 24, 2000 and now U.S. Patent No. 6,264,647 issued July 24, 2001, the contents of which are incorporated herein by reference thereto.

BACKGROUND OF THE INVENTION

10 This invention relates to surgical instrument holders, and more particularly, to hand-held holders of rotary surgical cutting tools.

Surgical instruments and their respective holders have to be kept clean and sterile before any use in a hospital environment in order to minimize risk of transfer of disease or infection from patient to patient following the emergence of certain "prions" that are not killed by normal
15 hospital sterilization and thus need to be physically removed through washing and rinsing. A surgical instrument, for example for preparing for the fitting of a hip prosthesis, works in a medium which causes considerable soiling of the instrument and of the instrument holder. Despite the importance of doing so, the thorough cleaning of these devices is difficult. Surgical instrument holders of the prior art are designed such that washing and rinsing are generally not an
20 effective way of cleaning the instrument. This is due to the small spaces left between component parts which allow only minimal access by cleaning agents.

What is needed therefore is a surgical instrument holder which is quickly and simply disassembled for cleaning and sterilization.

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SUMMARY OF THE INVENTION

The surgical instrument holder of the invention has a shank having first driveable end and second coupling end, a coupling device mounted on the coupling end, and a locking mechanism. The coupling end has an interface thereon for receiving an instrument. The locking mechanism in made up of an annular locking component, a spring, a ring which slides on the shank, and a
30 locking device. The annular locking component is mounted so as to slide along the shank. The

locking device cooperates with the locking component so as to lock the instrument onto the interface. The spring biases the locking component in a locking direction and bears on the ring. The ring is disengageably lockable to the shank via a connection device.

5 The object of the invention is to enable quick disassembly for cleaning and component sterilization.

In a feature of the invention, the holder is adapted to hold a large AO fitting.

In another feature of the invention, the holder is adapted to hold a small AO fitting.

BRIEF DESCRIPTION OF THE DRAWINGS

10 The attached drawings show embodiments of the invention by way of example.

FIG. 1 is a perspective view of a first embodiment of the instrument holder of the invention, in a locked position.

FIG. 2 is a longitudinal cross section of the instrument holder of FIG. 1.

15 FIG. 3 is a perspective view of the instrument holder, in an unlocked position, ready for cleaning.

FIG. 4 is a top plan view of a second embodiment of the instrument holder of the invention, in a locked position.

FIG. 5 is a perspective view of the second embodiment, exposing a bayonet slot.

FIG. 6 is a cross sectional view taken along line A-A of FIG. 4, in a locked position.

20 FIG. 7 is a side view of the second embodiment of the invention, in an unlocked position, ready for cleaning.

FIG. 8 is a perspective view of a kit of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

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Referring now to FIGs. 1 to 3, in which a first embodiment of the surgical instrument holder 10 of the invention is shown, the holder connects to a surgical instrument 12 to enable controlled manipulation of that instrument. The holder 10 has a shank 14 having a coupling end 16, a T-bar handle 20 attached to an opposite end 22 of the shank, a coupling device 24, and a locking mechanism 26. The coupling end 16 has an internal recess 30 therein, co-axial with the central axis of the shank, for receiving the instrument 12. The locking mechanism 26 is made up of an annular locking sleeve 32, a helical compression spring 34, a ring 36 which slides on the shank 14, and ball-detents 40. Preferably, to ensure that the instrument 12 is retained in an axially aligned relationship with the holder 10, three, circumferentially spaced apart ball-detents 40 are disposed in the coupling end 16 of the shank 14. It should be noted that the balls 44 are held in their respective detents via any known means of doing so, such as by deforming of an edge of the detent so as to prevent the ball from being able to drop out or by use of a ball-detent pre-assembly that threads in a threaded hole.

The annular locking sleeve 32 mounts so as to slide along the shank 14. The ball-detent 40 is disposed in the coupling end 16 of the shank 14 and is received into an annular recess 42 in the instrument. The locking sleeve 32 slides over the ball-detent 40 to bias balls 44 into the recess 42 in order to minimize play in the connection. The spring 34 biases the locking sleeve 32 in a locking direction and bears on the ring 36. The ring 36 is disengageably lockable to the coupling end 16 of the shank 14 via a bayonet mechanism 46. The bayonet mechanism 46 includes a bayonet slot 50 and a locking pin 52. The bayonet slot 50 is cut in the coupling end 16 of the shank 14.

The ring 36 locks over the coupling end 16, and the shank 14 has a smaller diameter than the coupling end, so that when the ring is unlocked and slid back along the shank, cleaning access to all surfaces of the locking mechanism 26 is facilitated.

Optionally, the shank is hollow along its length so as to provide a channel facilitating chip removal, or to allow passage of a guide wire.

Referring in particular to FIG. 2, a chamfered surface 54 is disposed within the recess 30 to align the instrument axially. The chamfered surface 54 is disposed on an annular piston 56. The piston 56 is free to slide within the recess 30, biased toward the instrument 12 by an internal spring 60. A locking element 62 prevents the piston 56 from exiting the recess 30. The piston 56 contacts the instrument 12 as the instrument enters the recess 30 prior to and as the instrument is

aligned with the ball-detent 40, so as to enable locking of the instrument in an axially aligned configuration.

The recess 30 includes a hexagonal female portion 64 for engaging a corresponding surface of the instrument in a manner so as to be able to transmit torque thereto. The ball-detents
5 40 are located in the coupling end 16 of the shank 14 adjacent the hexagonal female portion 64.

The holder 10 of the first embodiment is adapted to a large AO fitting 12.

Referring now to FIG. 3, the instrument holder 10 is shown in an unlocked, partially disassembled position, ready for cleaning. To unlock the holder 10, the ring 36 is urged against the bias of spring 34 so as to be lifted out of a bayonet seat 35, and then twisted so as to move the
10 pin 52 out of the bayonet slot 50 in the coupling end 16 of the shank 14. The ring 36 may then be slid back along the shank 14, releasing the spring 34 and the sleeve 32, and thereby providing cleaning and sterilization access to the recesses that might otherwise not be accessible. The instrument 12 is shown in dashed lines, as it is not part of the invention 10. A knurled surface 33 is apparent on the sleeve 32. Such surface 33 improves the grip of the user on the sleeve 32 when
15 the user pulls back on the sleeve to release the instrument 12.

Referring now to FIGs. 4-7, in which is shown a second embodiment of the instrument holder 10' of the invention, the holder has a shank 14' having a coupling end 16', a T-bar handle 20' attached to an opposite end 22' of the shank, a coupling device 24', and a locking mechanism 26'. The coupling end 16' has an internal recess 30' therein, co-axial with the central axis of the
20 shank, for receiving an instrument 12', which is a small AO fitting (shown most clearly in FIG. 7). The locking mechanism 26' is made up of an annular locking sleeve 32', a helical spring 34', a ring 36' which slides on the shank 14', and a ball-detent 40'. The annular locking sleeve 32' mounts so as to slide along the shank 14'. The ball-detent 40' is disposed in the coupling end 16' of the shank 14' and received into an annular recess 42' in the instrument 12'. The locking sleeve
25 32' slides over the ball-detent 40' to bias the ball 44' into the recess 42' in order to lock the instrument 12' in place as well as to minimize play in the connection. The spring 34' biases the locking sleeve 32' in a locking direction and bears against the ring 36'. The ring 36' is disengageably lockable to the coupling end 16' of the shank 14' via a bayonet mechanism 46'. The bayonet mechanism 46' includes a bayonet slot 50' (best shown in FIG. 5) and a locking pin
30 52'. The bayonet slot 50' is cut in the coupling end 16' of the shank 14', and includes a seat 35'. Note that in this embodiment, the internal diameter of the ring 36' is only just larger than the

external diameter of the shank 14' in its mid portion, and that a flat 53 provides clearance for the pin 52', so that it is able to slide out of the bayonet slot 50' and then along the shank.

Referring now to FIG. 6, showing the holder 10' in a locked position, locking the instrument 12', the coupling end 16' includes a transverse slot 70 which penetrates into the recess 30', axially offset therefrom so as to create an offset wall 72 which engages a corresponding flat surface 74 of an instrument 12'. At the end of the recess 30', a D-shaped seat 76 interfacing with the instrument 12' about its entire circumference is provided. Essentially, the seat 76 is a D-shaped blind hole shaped to closely interface with the circumference of the instrument 12'. It should be noted that this seat 76 is either cut with a carbon electrode in an EDM process or is broached in a subcomponent of the shank and then welded to a shank body to create the shank 14'. The ball-detent 40' enters an annular groove 66' in the instrument 12' along an axis perpendicular to the flat surface 74 (shown in FIG. 7) of the instrument. The locking sleeve 32' slides over the ball detent 40' to bias a ball 44' into the recess 30' in order to lock the instrument 12' in place and to minimize play in the connection.

Referring now to FIG. 7, a side view of the holder 10' is shown, in an unlocked position, ready for cleaning. Note that the slot 70 not only provides the wall which locks the instrument 12' against rotation, but also provides better access for cleaning of the coupling end 16' of the holder 10'.

Referring now to FIG. 8, a kit 150 is shown, including the ratchet 10, a drill bit tool 130, a torx extension tool 132, a long drill bit tool 134, a tap tool 136, a T-bar 138 adapted to mount into the rear end of the drive of the handle, in a corresponding female square plug receptacle (not shown), and a guide pin or wire 139. The components of the kit 150 are organized in a case 160 for convenience and in a manner best suited to the type of surgery for which they will be used.

In an advantage of the invention, the bayonet mechanism 46 or 46' holding the ring 36' and thus the spring 34' in an operational position, enables quick disassembly for cleaning and component sterilization.

In another advantage of the invention, the large differences in diameter between the ring 36 and the shank 14 permit better access to otherwise inaccessible recesses for more thorough cleaning.

In another advantage of the invention, the holder is adapted to hold many different instrument interfaces.

In another advantage, the holder 10, 10' of the invention minimizes play and maximizes alignment with the turning axis.

In another advantage, a kit is provided which presents the ratchet 10 and related components to the surgeon in a convenient, organized fashion.

5 Although illustrative embodiments of the invention have been shown and described a wide range of modification, change and substitution is contemplated in the foregoing disclosure and in some instances, some features of the present invention may be employed without a corresponding use of the other features. Further, the small and large AO fittings 12 and 12' are only examples of the types of instruments that the invention may be adapted to hold. In fact,
10 there are many different varieties of fittings to which the invention is easily adaptable. For example, the invention may be adapted to hold a "ZIMMER-HALL" ("STRYKER"), a "ZIMMER", "HARRIS", "HUDSON", "TRIPAN", "JACOBS", and "QUEUES", to name a few. The elastic devices used of course can be selected from a large variety of equivalents to a helical, compression spring, including, for example, leaf springs, flat springs, multiple compression
15 springs, just to name a few. Further, the ball-detent can be substituted with any sort of mechanical retention system, for example, a moving finger or a twisting cam shaft, etc. Still further, the connection mechanism can be substituted for a variety of connection mechanisms such as a threaded connection mechanism, a clasp, spring detents, or even magnetic retention devices. Accordingly it is appropriate that the appended claims be construed broadly and in a
20 manner consistent with the scope of the invention.

What is claimed is:

1. A surgical instrument holder comprising a shank having first driveable end and second coupling end, the second end comprising a coupling device having an interface for receiving a surgical instrument and held in functional assembly to the shank by a releasable locking mechanism comprised of a ring slideably disposed about the shank, a spring biased against the coupling device by the ring, and a connection device retaining the ring in a fixed position during use, whereupon release of the connection device enables quick disassembly of the ring, spring and coupling device for cleaning and component sterilization.
2. The surgical instrument holder of claim 1, wherein the interface has a locking device for locking the instrument onto the interface.
3. The surgical instrument holder of claim 1, wherein the coupling device comprises a coupling sleeve against which the spring is biased by the ring, the sleeve being slideable about the shank so as to operate a ball-detent mechanism.
4. The surgical instrument holder of claim 1, wherein a handle is attached to the first end of the shank.
5. The surgical instrument holder of claim 1, wherein the ring locks over the coupling end of the shank, and the shank has a smaller diameter than the coupling end, so that when the ring is unlocked and slid back along the shank, cleaning access to all surfaces of the locking mechanism is facilitated.
6. The surgical instrument holder of claim 1, wherein the interface is a recess in the coupling end of the shank.

7. The surgical instrument holder of claim 6, wherein the recess is cylindrical and coaxial with a central axis of the shank.
8. The surgical instrument holder of claim 7, wherein a chamfered surface is disposed within the recess to align the instrument axially.
9. The surgical instrument holder of claim 8, wherein the chamfered surface is disposed on an annular piston which slides within the recess, biased toward the instrument by an elastic device, wherein further, a locking element prevents the annular piston from exiting the recess, the piston contacting the instrument as the instrument enters the recess prior to and as the instrument is aligned with the ball-detent, so as to enable locking of the instrument in an axially aligned configuration.
10. The surgical instrument holder of claim 1, wherein the spring is a helical compression spring.
11. The surgical instrument holder of claim 2, wherein the locking device is disposed in the coupling end of the shank.
12. The surgical instrument holder of claim 2, wherein the locking device comprises at least one ball-detent.
13. The surgical instrument holder of claim 12, wherein the locking device comprises at least three circumferentially spaced apart ball-detents.
14. The surgical instrument holder of claim 1, wherein the locking direction is toward the coupling end of the shank.
15. The surgical instrument holder of claim 1, wherein the connection device is a bayonet mechanism.
16. The surgical instrument holder of claim 15, wherein the bayonet mechanism is comprised of a bayonet slot and a locking pin.
17. The surgical instrument holder of the claim 16, wherein the bayonet slot is disposed on the shank.
18. The surgical instrument holder of claim 12, wherein the interface is a recess including a hexagonal female portion for engaging a corresponding surface of the instrument.

19. The surgical instrument holder of claim 18, wherein the ball-detent is adjacent the hexagonal female portion.
20. The surgical instrument holder of claim 19, wherein the ball-detent is received into an annular recess in the instrument, the locking component sliding over the ball detent to bias the ball into the recess to minimize play in the connection.
21. The surgical instrument holder of claim 20, wherein the holder is adapted to hold a large AO fitting.
22. The surgical instrument holder of claim 1, wherein the interface is a recess intersected by a transverse slot wherein a wall of the slot engages a corresponding flat surface of the instrument.
23. The surgical instrument holder of claim 22, wherein the recess includes a seat shaped to receive the end of the instrument about its entire circumference.
24. The surgical instrument holder of claim 23, wherein the ball-detent enters an annular groove in the instrument along an axis perpendicular to the flat surface of the instrument.
25. The surgical instrument holder of claim 24, wherein the locking component slides over the ball detent to bias the ball into the recess in order to minimize play in the connection.
26. The surgical instrument holder of claim 1, wherein the holder is adapted to hold a small AO fitting.
27. The surgical instrument holder of claim 7, wherein the shank is hollow along its length so as to provide a channel facilitating chip removal.
28. A surgical instrument holder providing a connection to a surgical instrument, comprising a shank a shank having first driveable end and second coupling end,, a T-bar handle attached to the first end of the shank, a coupling device, and a locking mechanism, wherein the coupling end has an internal recess therein for receiving an instrument, wherein the locking mechanism comprises an annular locking sleeve, a helical spring, a ring which slides on the shank, and a ball-detent, the annular locking sleeve mounted so as to slide along the shank, the ball-detent being disposed in the coupling end of the shank and received into an annular recess in the instrument, the locking sleeve sliding over the ball detent to bias the ball into the recess to minimize play in the connection, wherein the spring biases the locking sleeve in a locking direction and bears on the ring, the ring being disengageably lockable to the coupling end of the shank via a bayonet

mechanism comprised of a bayonet slot and a locking pin so as to enable quick disassembly for cleaning and component sterilization.

29. A tool kit for surgical use, the tool kit including at least the following components:

(a) a surgical instrument holder comprising a shank having first driveable end and second coupling end, the second end comprising a coupling device having an interface for receiving a surgical instrument and held in functional assembly to the shank by a releasable locking mechanism comprised of a ring slideably disposed about the shank, a spring biased against the coupling device by the ring, and a connection device retaining the ring in a fixed position during use, whereupon release of the connection device enables quick disassembly of the ring, spring and coupling device;

(b) at least one tool bit selected from a group of tool bits consisting of drills, taps, guide pins, screwdrivers, reamer drivers, and wire introducers; and

(c) a case for receiving the surgical instrument holder and the at least one tool bit.

AMENDED CLAIMS

[received by the International Bureau on 15 October 2004 (15.10.2004);
original claims 1, 28 and 29 amended; original claims 6 and 7 cancelled ;
remaining claims unchanged (4 pages)]

What is claimed is:

1. (amended) A surgical instrument holder comprising a shank having first driveable end and second coupling end at which the shank is substantially cylindrical, having a central axis, the second end comprising a coupling device having a substantially cylindrical interface whose center is substantially aligned with the central axis of the shank, which interface is adapted for receiving and holding a surgical instrument in functional assembly to the shank by a releasable locking mechanism comprised of a ring slideably disposed about the shank, a spring biased against the coupling device by the ring, and a connection device retaining the ring in a fixed position during use, whereupon release of the connection device enables quick disassembly of the ring, spring and coupling device for cleaning and component sterilization
2. The surgical instrument holder of claim 1, wherein the interface has a locking device for locking the instrument onto the interface.
3. The surgical instrument holder of claim 1, wherein the coupling device comprises a coupling sleeve against which the spring is biased by the ring, the sleeve being slideable about the shank so as to operate a ball-detent mechanism.
4. The surgical instrument holder of claim 1, wherein a handle is attached to the first end of the shank.
5. The surgical instrument holder of claim 1, wherein the ring locks over the coupling end of the shank, and the shank has a smaller diameter than the coupling end, so that when the ring is unlocked and slid back along the shank, cleaning access to all surfaces of the locking mechanism is facilitated.
6. (cancelled).
7. (cancelled).
8. The surgical instrument holder of claim 7, wherein a chamfered surface is disposed within the recess to align the instrument axially.

9. The surgical instrument holder of claim 8, wherein the chamfered surface is disposed on an annular piston which slides within the recess, biased toward the instrument by an elastic device, wherein further, a locking element prevents the annular piston from exiting the recess, the piston contacting the instrument as the instrument enters the recess prior to and as the instrument is aligned with the ball-detent, so as to enable locking of the instrument in an axially aligned configuration.
10. The surgical instrument holder of claim 1, wherein the spring is a helical compression spring.
11. The surgical instrument holder of claim 2, wherein the locking device is disposed in the coupling end of the shank.
12. The surgical instrument holder of claim 2, wherein the locking device comprises at least one ball-detent.
13. The surgical instrument holder of claim 12, wherein the locking device comprises at least three circumferentially spaced apart ball-detents.
14. The surgical instrument holder of claim 1, wherein the locking direction is toward the coupling end of the shank.
15. The surgical instrument holder of claim 1, wherein the connection device is a bayonet mechanism.
16. The surgical instrument holder of claim 15, wherein the bayonet mechanism is comprised of a bayonet slot and a locking pin.
17. The surgical instrument holder of the claim 16, wherein the bayonet slot is disposed on the shank.
18. The surgical instrument holder of claim 12, wherein the interface is a recess including a hexagonal female portion for engaging a corresponding surface of the instrument.

19. The surgical instrument holder of claim 18, wherein the ball-detent is adjacent the hexagonal female portion.

20. The surgical instrument holder of claim 19, wherein the ball-detent is received into an annular recess in the instrument, the locking component sliding over the ball detent to bias the ball into the recess to minimize play in the connection.

21. The surgical instrument holder of claim 20, wherein the holder is adapted to hold a large AO fitting.

22. The surgical instrument holder of claim 1, wherein the interface is a recess intersected by a transverse slot wherein a wall of the slot engages a corresponding flat surface of the instrument.

23. The surgical instrument holder of claim 22, wherein the recess includes a seat shaped to receive the end of the instrument about its entire circumference.

24. The surgical instrument holder of claim 23, wherein the ball-detent enters an annular groove in the instrument along an axis perpendicular to the flat surface of the instrument.

25. The surgical instrument holder of claim 24, wherein the locking component slides over the ball detent to bias the ball into the recess in order to minimize play in the connection.

26. The surgical instrument holder of claim 1, wherein the holder is adapted to hold a small AO fitting.

27. The surgical instrument holder of claim 7, wherein the shank is hollow along its length so as to provide a channel facilitating chip removal.

28. (amended) A surgical instrument holder providing a connection to a surgical instrument, comprising a shank having first driveable end and second coupling end, at which the shank is substantially cylindrical having a central axis, a T-bar handle attached to the first end of the shank, a coupling device, and a locking mechanism, wherein the coupling end has an internal recess therein the recess having a center that is substantially aligned with the central axis of the shank and adapted for receiving and holding an instrument, wherein the locking mechanism comprises an annular locking sleeve, a helical spring, a ring which slides on the shank, and a ball-detent, the annular locking sleeve mounted so as to slide along the shank, the ball-detent being disposed in the coupling end of the shank and received into an annular recess in the instrument, the locking sleeve sliding over the ball detent to bias the ball into the recess to minimize play in

the connection, wherein the spring biases the locking sleeve in a locking direction and bears on the ring, the ring being disengageably lockable to the coupling end of the shank via a bayonet mechanism comprised of a bayonet slot and a locking pin so as to enable quick disassembly for cleaning and component sterilization.

29. (amended) A tool kit for surgical use, the tool kit including at least the following components:

(a) a surgical instrument holder comprising a shank having first driveable end and second coupling end at which the shank is substantially cylindrical having a central axis, the second end comprising a coupling device having an interface having a center that is substantially aligned with the central axis of the shank and adapted for receiving and holding a surgical instrument and held in functional assembly to the shank by a releasable locking mechanism comprised of a ring slideably disposed about the shank, a spring biased against the coupling device by the ring, and a connection device retaining the ring in a fixed position during use, whereupon release of the connection device enables quick disassembly of the ring, spring and coupling device;

(b) at least one tool bit selected from a group of tool bits consisting of drills, taps, guide pins, screwdrivers, reamer drivers, and wire introducers; and

(c) a case for receiving the surgical instrument holder and the at least one tool bit.

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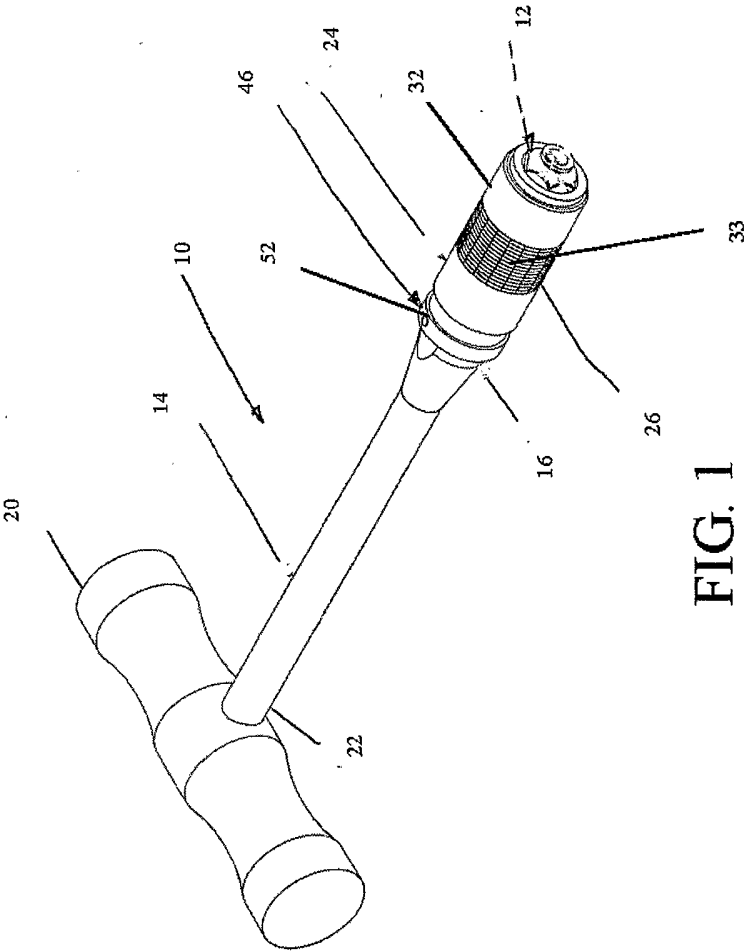


FIG. 1

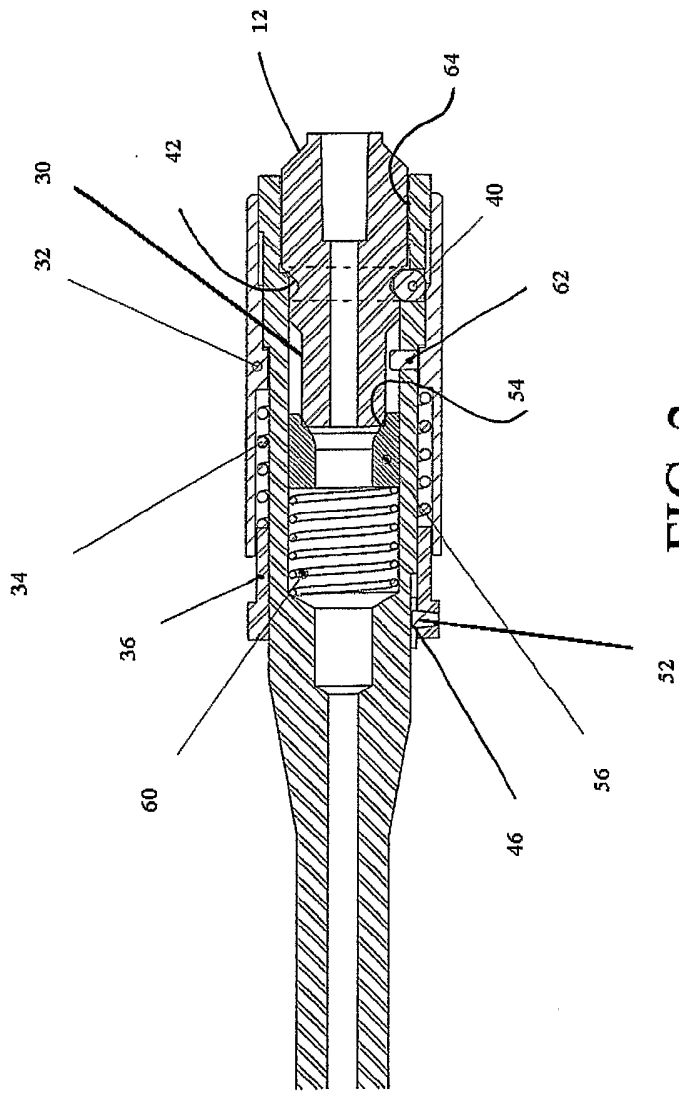


FIG. 2

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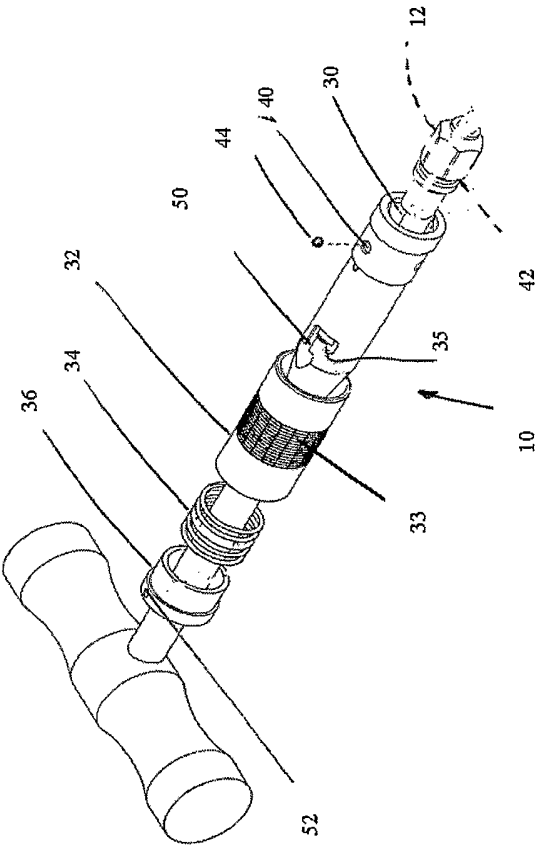


FIG. 3

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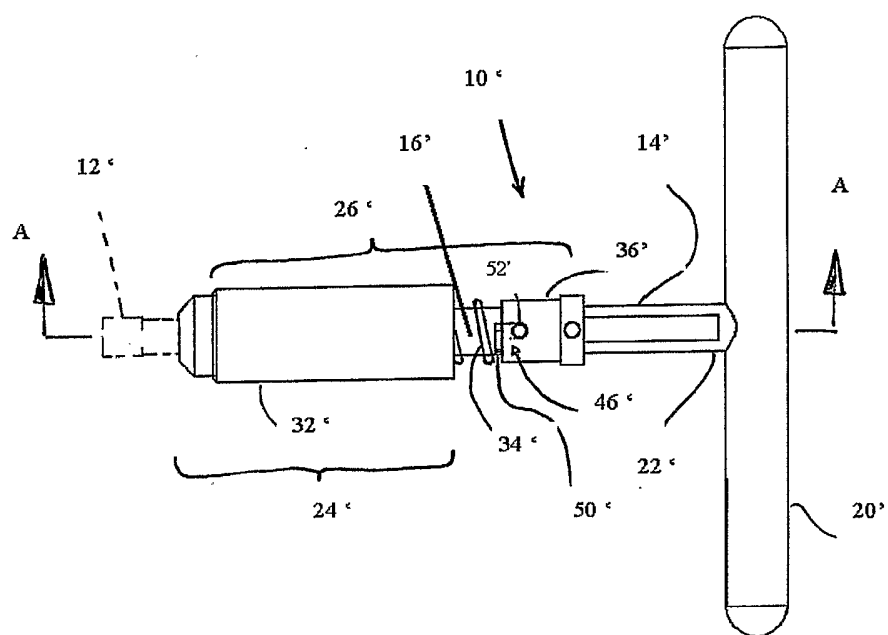


FIG. 4

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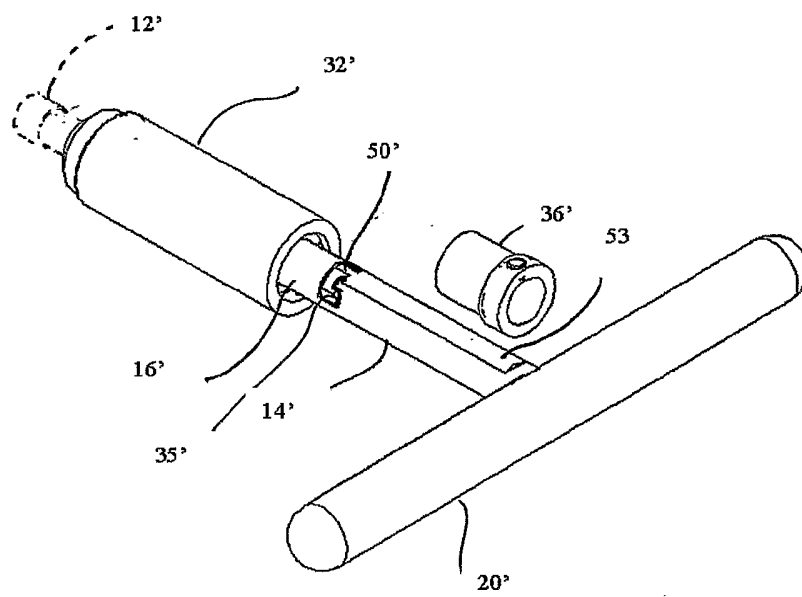


FIG. 5

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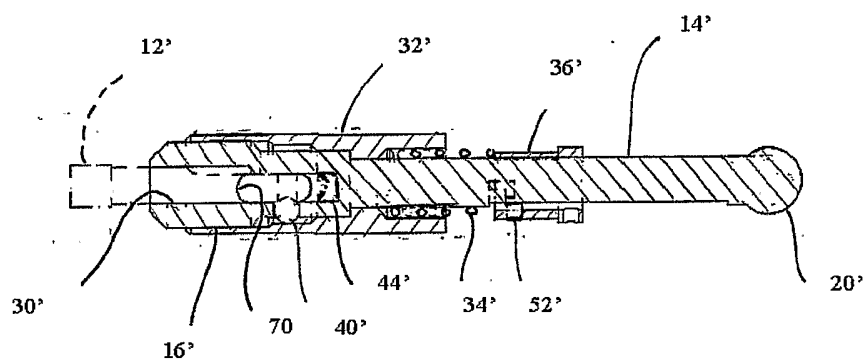


FIG. 6

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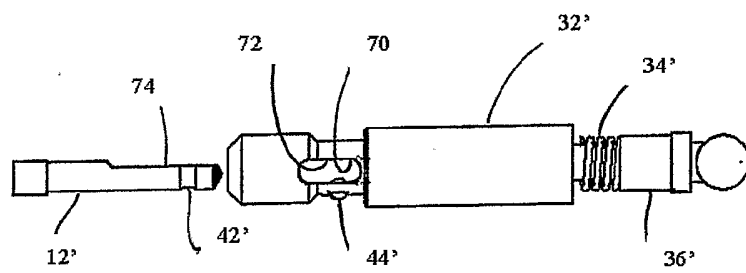


FIG. 7

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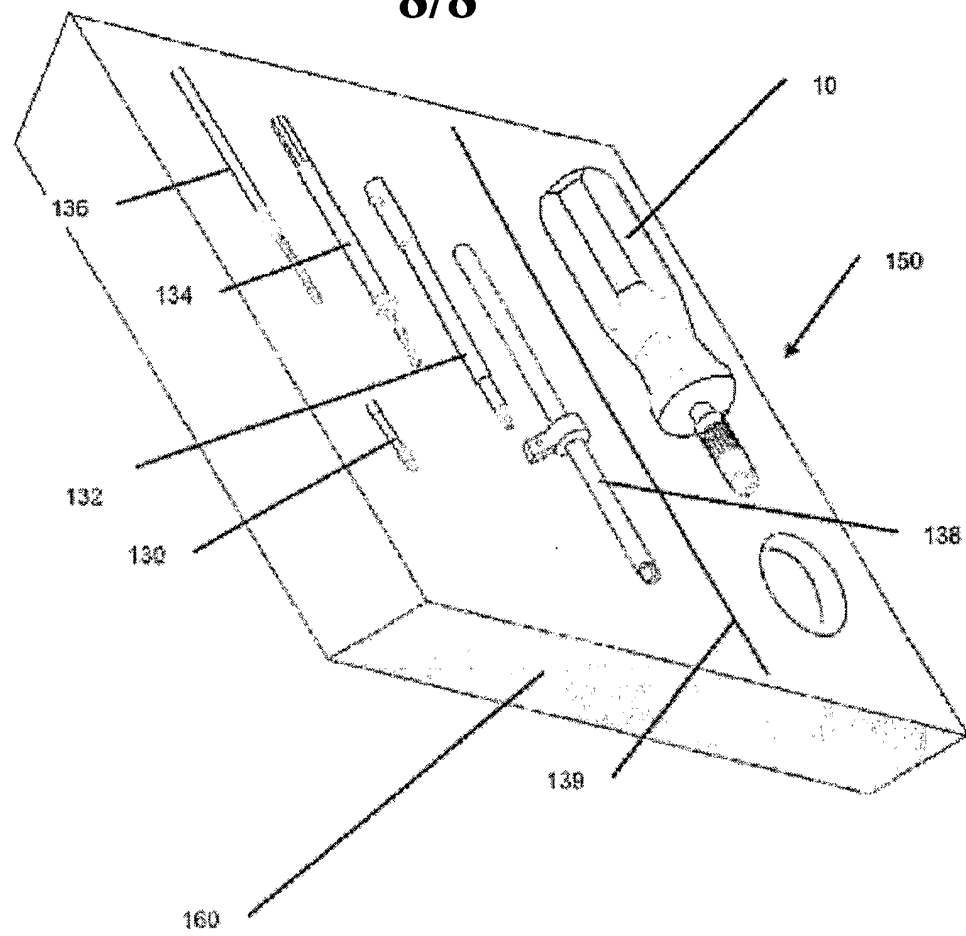


FIG. 8

INTERNATIONAL SEARCH REPORT

International Application No
PCT/IB2004/001405

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A61B17/16

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)

IPC 7 A61B

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 264 647 B1 (LECHOT ANDR EACUTE) 24 July 2001 (2001-07-24) cited in the application column 1, line 38 - column 2, line 67 -----	1,2,5,6, 10,11, 14-17,29
X	WO 02/49516 A (PRECIMED SA ; LECHOT ANDRE (CH)) 27 June 2002 (2002-06-27) page 7, line 1 - page 8, line 22; figures 4-9 -----	1-4,6-28
A	DE 39 34 610 A (AESCULAP WERKE AG) 25 April 1991 (1991-04-25) abstract; figures 1,2 -----	3,9,12, 28
A	US 6 129 392 A (SAUER MICHAEL ET AL) 10 October 2000 (2000-10-10) abstract; figures 1-4 -----	3,9,12, 13,28
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

10 August 2004

Date of mailing of the international search report

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Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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