



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11) **EP 0 997 610 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**03.05.2000 Bulletin 2000/18**

(51) Int. Cl.<sup>7</sup>: **E21C 35/19**

(21) Application number: **99119903.5**

(22) Date of filing: **07.10.1999**

(84) Designated Contracting States:  
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU  
MC NL PT SE**  
Designated Extension States:  
**AL LT LV MK RO SI**

(30) Priority: **28.10.1998 US 181305**

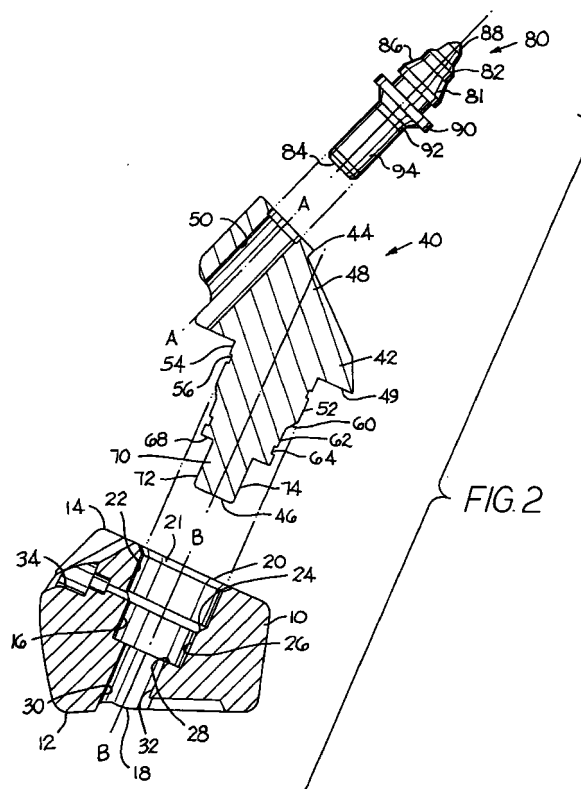
(71) Applicant: **KENNAMETAL INC.  
Latrobe, PA 15650 (US)**

(72) Inventor: **Beach, Wayne H.  
Roaring Spring, Pennsylvania 16673 (US)**

(74) Representative:  
**Kitzhofer, Thomas, Dipl.-Ing.  
Patentanwälte Prinz & Partner GbR  
Manzingerweg 7  
81241 München (DE)**

(54) **Ejectable holder for a cutting bit and cutting bit assembly**

(57) A cutting bit holder for use in conjunction with a base having a central bore defined by a bore wall. The cutting bit holder comprises an axially forward end and an axially rearward end. The holder contains a bit bore adjacent to the axially forward end thereof wherein the bit bore receives the cutting bit. The holder has a shank adjacent to the axially rearward end thereof wherein the central bore of the base receives the shank. A volume is defined between the shank and the bore wall. The shank presents a pressure surface that defines in part the volume. The volume communicates with a source of pressurized fluid so that upon entry of the pressurized fluid into the volume the fluid acts on the pressure surface so as to urge the holder axially forward in the central bore of the base. The shank and the bore together form a key and keyway so that the key engages the keyway so as to correctly position the holder relative to the base and to prevent the holder from rotating relative to the base.



EP 0 997 610 A1

## Description

### BACKGROUND OF THE INVENTION

[0001] The invention pertains to a cutting bit assembly for use in the impingement of an earth strata, e.g., an asphalt roadway. The cutting bit assembly includes a base attached, such as by welding, to a road planing drum, a holder which is removably connected to the base, and a cutting bit which is removably connected to the holder.

[0002] Heretofore, there exist cutting bit assemblies which comprise a holder which connects to a base via a bolt or other fastener. The holder carries a rotatable cutting bit. Exemplary of this type of cutting bit arrangement are U.S. Patent No. 5,573,308 to Simons et al. and a corresponding German Gebrauchsmuster No. G 93 10 022.1, both of which show the use of a pressure screw which threadedly connects to the base and presses against the holder so as to retain the holder to the base. German Gebrauchsmuster No. G 92 11 739.2 also shows an arrangement in which a bolt functions to connect the holder to the base. U.S. Patent No. 3,992,061 to Rollins shows an arrangement in which a bolt engages a threaded hole in the forward face of the base and contacts the holder. U.S. Patent No. 3,498,677 to Morrow also shows an arrangement in which a threaded bolt passes through a threaded hole into engagement with the holder.

[0003] There are at least two disadvantages with the above types of cutting bit assemblies. One disadvantage is that due to the great amount of loading on the cutting bit assembly, it is not unusual for the bolt or fastener to work itself loose. In those instances where the bolt works itself loose, the holder may disengage from the base and/or there may be excessive wear at the points of contact between the holder and the base. It is apparent that it is advantageous for the cutting bit assembly to maintain the integrity of the connection between the base and the holder.

[0004] Another disadvantage which exists in these earlier cutting bit assemblies which use a bolt or other fastener to connect the holder to the base is that the distal end of the bolt may deform under the severe loads that exist in certain applications such as road planing. In this regard, it is the distal end of the bolt that engages (or contacts) the holder, and thus, experiences a great amount of loading. The surface of the distal end of the bolt is typically relatively small so that during operation the small surface area of the bolt experiences a high pressure which can lead to deformation of the bolt. Such a deformation will place at risk the integrity of the connection between the holder and the base. In addition, deformation of the bolt can make it difficult to remove the bolt from the base, and hence, make it difficult to remove the holder from the base.

[0005] U.S. Patent No. 5,738,415 to Parrott for a PICK HOLDER AND FIXING SLEEVE FOR AN

EXTRACTION MACHINE pertains to a pick box, sleeve and cutter pick assembly. The Parrott patent describes a sleeve that is hydraulically ejectable from the pick box.

[0006] In view of the drawbacks associated with the earlier cutting bit arrangements, it becomes apparent that it would be desirable to provide a cutting bit assembly in which the holder easily disconnects from the base. Because it is important to maintain a connection of high integrity between the holder and the base, it would be highly desirable to provide a cutting bit assembly in which the holder may easily disconnect from the base, and yet, the connection between the holder and the base has a high degree of integrity.

### SUMMARY

[0007] In one form thereof, the invention is a cutting bit holder for use in conjunction with a base having a central bore defined by a bore wall and the bore presenting a keyway. The cutting bit holder comprises an axially forward end and an axially rearward end. The holder contains a bit bore adjacent to the axially forward end thereof wherein the bit bore receives the cutting bit. The holder has a shank adjacent to the axially rearward end thereof wherein the central bore of the base receives the shank. A volume is defined between the shank and the bore wall. The shank presents a pressure surface that defines in part the volume. The volume communicates with a source of pressurized fluid so that upon entry of the pressurized fluid into the volume the fluid acts on the pressure surface so as to urge the holder axially forward in the central bore of the base. The shank and the bore together form a key and keyway so that the key engages the keyway so as to correctly position the holder relative to the base and to prevent the holder from rotating relative to the base.

[0008] In another form thereof, the invention is a cutting bit holder and base assembly for retaining a cutting bit wherein the assembly comprises a base which has a central bore defined by a bore wall and a holder. The holder has an axially forward end and an axially rearward end, as well as a bit bore therein adjacent to the axially forward end thereof wherein the bit bore receives a cutting bit. The holder has a shank adjacent to the axially rearward end thereof. The shank is received within the central bore of the base. A volume is defined between the shank and the bore wall. The shank presents a pressure surface that defines in part the volume. The volume communicates with a source of pressurized fluid so that upon entry of the pressurized fluid into the volume the fluid acts on the pressure surface so as to urge the holder in an axially forward direction. The shank and the bore together forming a key and keyway wherein the key cooperates with the keyway so as to position the holder with respect to the base and prevent the holder from rotating with respect to the base.

[0009] In still another form thereof, the invention is a

cutting bit assembly comprising a base, a holder and a cutting bit. The base has a central bore defined by a bore wall. The holder has an axially forward end and an axially rearward end as well as a bit bore therein adjacent to the axially forward end thereof wherein the bit bore receives a cutting bit. The holder has a shank adjacent to the axially rearward end thereof. The shank is received within the central bore of the base. A volume is defined between the shank and the bore wall. The shank presents a pressure surface that defines in part the volume. The volume communicates with a source of pressurized fluid so that upon entry of the pressurized fluid into the volume the fluid acts on the pressure surface so as to urge the holder in an axially forward direction. The shank and the bore together form a key and keyway wherein the key cooperates with the keyway so as to position the holder with respect to the base and prevent the holder from rotating with respect to the base. A cutting bit is received within the bit bore.

**[0010]** In another form thereof, the invention is a cutting bit holder and base assembly for retaining a cutting bit wherein the assembly comprises a base and a holder. The base has a central bore defined by a bore wall and the base further includes a stop member. The holder has an axially forward end and an axially rearward end. The holder has a bit bore therein adjacent to the axially forward end thereof wherein the bit bore receives a cutting bit. The holder has a shank adjacent to the axially rearward end thereof. The holder has a head portion with an abutment. The shank is received within the central bore of the base. A volume is defined between the shank and the bore wall. The shank presents a pressure surface that defines in part the volume. The volume communicates with a source of pressurized fluid so that upon entry of the pressurized fluid into the volume the fluid acts on the pressure surface so as to urge the holder in an axially forward direction. The shank abutment abutting against the stop member so as to position the holder with respect to the base and prevent the holder from rotating with respect to the base.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0011]** The following is a brief description of the drawings which form a part of this patent application:

**FIG. 1** is an isometric view of a specific embodiment of the invention wherein a portion of the base is cut away to expose the holder positioned within the bore of the base and wherein the holder does not have a cutting bit positioned in the bore thereof; **FIG. 2** is an exploded view of the specific embodiment of **FIG. 1** in which the holder carries a cutting bit, and wherein a cutting bit is exploded from the holder and the holder is exploded from the base and the O-ring seals of the holder are removed from the grooves in the shank of the holder; and

**FIG. 3** is a side view of another specific embodiment of the invention wherein the holder and the base are illustrated in cross-section and a rotatable cutting bit is in the bit bore of the holder.

#### DETAILED DESCRIPTION

**[0012]** Referring to the drawings, there is shown a base 10 wherein the base 10 has a bottom surface 12 and an axially forward surface 14. Typically, the base 10 is affixed, e.g., by welding, at its bottom surface 12 to the surface of a rotating (or moving) member such as, for example, a road planing drum of a road planing machine.

**[0013]** Base 10 contains a central bore 16 with a central bore longitudinal axis B-B. Central bore 16 has an axially rearward end 18 and an axially forward end 20. The central bore 16 is defined by a bore wall which has a frusto-conical portion 21 at the axially forward end 20 of the central bore 16. A cylindrical first portion 22 is contiguous with and axially rearward of the frusto-conical portion 21. A bevelled portion 24 is contiguous with and axially rearward of the cylindrical first portion 22. A cylindrical second portion 26 is contiguous with and axially rearward of the bevelled portion 24.

**[0014]** A shoulder 28 separates the cylindrical second portion 26 from a partially cylindrical third portion 30 of the bore wall wherein the partially cylindrical third portion 30 is axially rearward of the cylindrical second portion 26. The portion of the bore wall opposite from the partially cylindrical third portion 30 is a flat portion 32 which has a generally planar surface. As will become apparent hereinafter, the partially cylindrical third portion 30 and the flat portion 32 of the bore wall may be considered to be a keyway.

**[0015]** The base 10 further contains a fluid port 34 which is in direct communication with the central bore 16.

**[0016]** The drawings also illustrate a holder generally designated as 40. Holder 40 has a holder body 42 which has an axially forward end 44 and an axially rearward end 46. The holder body 42 has a head portion 48 adjacent the axially forward end 44 thereof. Head portion 48 presents an axially rearwardly facing shoulder 49. Holder 40 contains a bit bore 50 in the head portion 48. The bit bore 50 has a bit bore longitudinal axis A-A. It should be appreciated that the central bore longitudinal axis B-B is not coaxial with the bit bore longitudinal axis A-A. Holder body 42 also has a shank 52 adjacent to the axially rearward end 46 of the holder body 42.

**[0017]** The shank 52 presents a stepped-style of configuration. In this regard, the shank 52 has an axially forward cylindrical first portion 54. Shank 52 contains a groove 56 in the cylindrical first portion 54. Groove 56 carries a resilient seal 58, e.g., an O-ring. Shank 52 further has a bevelled portion 60 which is contiguous with and axially rearward of the cylindrical first portion 54. Contiguous with and axially rearward of the bevelled

portion 60 is a cylindrical second portion 62 which contains a groove 64. Groove 64 carries a resilient seal 66, e.g., an O-ring.

**[0018]** A shoulder 68 separates the cylindrical second portion 62 from a tail portion 70 of the shank 52. One surface of the tail portion 70 is generally cylindrical in shape so as to define a partially cylindrical third portion 72 and the opposite surface of the tail portion 70 is a flat surface 74 which presents a generally planar surface. As will become apparent hereinafter, the partially cylindrical third portion 72 and the flat surface 74 (i.e., the tail portion 74) may be considered to be a key.

**[0019]** Referring to FIG. 2 there is shown a cutting bit generally designated as 80. Cutting bit 80 has a cutting bit body 81 with an axially forward end 82 and an axially rearward end 84. Bit body 81 has a head portion 86 adjacent to the axially forward end 82 and a shank portion 92 adjacent to the axially rearward end 84. A hard insert 88 is at the axially forward end 82 of the cutting bit body 81. A flange 90 is between the head portion 86 and the shank portion 92. A resilient split ring retainer 94 is carried in a reduced diameter portion of the shank 92. A typical split ring retainer is shown and described in U.S. Patent No. 4,201,421 to Den Besten et al., which is hereby incorporated by reference herein.

**[0020]** In regard to the assembly of the holder 40 to the base 10, the shank 52 of the holder 40 is inserted, typically by hand, into the central bore 16 of the base 10 until the surface of the cylindrical first portion 22 of the bore 16 comes into contact with the surface of the cylindrical first portion 54 of the holder 40. The diameter of the cylindrical first portion 22 of the bore 16 relative to the diameter of the cylindrical first portion 54 of the holder 40 is such that there is an interference fit between the surfaces defined by these two portions. At this point in the assembly process, the insertion of the holder 40 into the base 10 typically requires the operator to strike the holder 40 with a mallet or the like so as to force the holder 40 the remainder of the way into the bore 16 until the shoulder 49 contacts the axially forward surface 14 of the base 10 so as to achieve full insertion of the holder 40 into the base 10. This interference fit prevents the axial movement of the holder 40 in the bore 16 relative to the base 10 during the operation of the apparatus to which the base and holder are attached.

**[0021]** In order for the holder 40 to be fully inserted into the bore 16 of the base 10, the shoulder 49 contacts the axially forward surface 14 of the base 10, and the flat surface 74 of the holder 40 must register with the flat portion 32 of the bore 16. In other words, the key must register with the keyway. This registration ensures that the holder correctly aligns with the base. This registration also ensures that the holder cannot rotate with respect to the base.

**[0022]** When the holder 40 is fully inserted into the bore 16 of the base 10, a portion of the shank of the holder and the corresponding portion of the bore wall

define a volume therebetween. More specifically, this volume exists between the bevelled portion 60 of the shank and the frusto-conical portion 24 of the bore due to the fact that the transverse dimension of the bevelled portion 60 of the shank 52 is less than the transverse dimension of the frusto-conical portion 24. This volume also exists between the portion of the cylindrical second portion 62 of the shank 52 and the corresponding portion of the bore wall axially forward of the fluid-tight seal between the bore wall and the shank created by the resilient seal 66 due to the fact that the transverse dimension, i.e., diameter, of the cylindrical second portion 62 is less than the diameter of the cylindrical second portion 26. Because of the above-described interference fit, there is essentially no volume between the cylindrical first portion 22 of the bore and the cylindrical first portion 54 of the shank 52. The axially rearwardmost point of contact of the interference fit between the shank and the bore wall defines the axially forwardmost point of the volume. The fluid tight seal between the shank and the bore wall created by resilient seal 66 defines the axially rearwardmost point of the volume. The resilient seal 58 also creates a fluid tight seal between the shank and the bore wall so as to prevent the passage of fluid axially forward of the seal 66 in the event any fluid travels as far as the seal 66 along the surfaces of contact of the interference fit between the shank and the bore wall.

**[0023]** It should be appreciated that the holder is securely attached to the base. The interference fit prevents the axial movement of the holder relative to the base. The registration of the flat portion of the bore with the flat surface of the holder prevents the rotation of the holder relative to the base. It should also be appreciated that in the specific embodiment of FIGS. 1 and 2 when the holder 40 is attached to the base 10, the head portion 48 of the holder 40 essentially covers (or protects) the axially forward surface 14 of the base 10.

**[0024]** In regard to the assembly of the cutting bit 80 to the holder 40, the rearward shank 92, which carries the resilient retainer 94, of the cutting bit 80 is positioned in the bit bore 50 of the holder 40. The resilient retainer 94 expands radially outwardly to create a frictional fit between the retainer 94 and the wall of the bore 50. The retainer 94 is captive on the shank 92 of the bit 80 so that the cutting bit 80 is rotatably maintained within the bit bore 50 of the holder 40. Although the drawing illustrates a rotatable cutting bit, it should be appreciated that a non-rotatable cutting bit may be positioned within the bit bore of the holder. One style of non-rotatable cutting bit is depicted in U.S. Patent No. 3,116,052 to Osgood, which is hereby incorporated by reference herein.

**[0025]** In a road planing operation, the road planing drum rotates so as to drive the axially forward end of the cutting bit 80 into the substrate, e.g., asphalt roadway, that is to be operated upon. The hard insert 88 impinges the substrate so as to break up the substrate. At some

point in time during the operation of the road planing machine, it may become desirable to disengage the holder from the base. The purpose may be to inspect the holder or the base or to replace the holder.

**[0026]** The holder 40 may be removed from the base 10 by attaching a grease gun or the like, i.e., a source of pressurized fluid, to the fluid port 34. Fluid at a pressure between about 2000 pounds per square inch (psi) to about 5000 psi then passes into the fluid port 34 and then into the volume defined between the bore wall and the portions of the shank 52. The pressurized fluid acts upon the surface of the shank 52, and especially upon the bevelled portion 60, so as to force the holder 40 axially forward in the central bore 16 of the base 10 out of the interference fit between the cylindrical first portion 22 of the bore 16, the holder 40. Once the holder 40 clears the interference fit between the cylindrical first portion 22 of the bore 16, the holder 40 can be removed by hand from the central bore. Another holder (or the same holder depending upon the reason for the removal) can then be inserted into the central bore of the base as described above.

**[0027]** Referring to FIG. 3., there is illustrated another specific embodiment of a base 100, a holder 102 and a rotatable cutting bit 104 wherein these structural elements are shown as assembled together. The structure of the cutting bit 104 is the same as that of cutting bit 80 so that the description of the cutting bit 80 will suffice for a description of the cutting bit 104.

**[0028]** Still referring to FIG. 3, the base 100 presents a structure similar to the structure of base 10, except for two aspects. First, the base 100 has a bottom surface 110 and an axially forward surface 112. The axially forward surface 112 has a projection (or stop member) 114 projecting axially forwardly therefrom. The projection 114 presents a generally planar stop surface 116. Second, the cylindrical third portion 120 of the central bore 122 of the base 100 is cylindrical about its entire circumference so as to not include a flat surface (or portion). Because the remainder of the structural features of the base 100 are the same as those of base 10, further description thereof is not necessary.

**[0029]** The specific embodiment of FIG. 3 also presents a holder 102 which has a structure that is similar in many respect to the structure of holder 40, except for two features. First, the head portion 126 of the holder 102 presents a flat face (or abutment) 128. When the holder 102 is assembled to the base 100 (as shown in FIG. 3), the flat face 128 of the holder 102 abuts against the stop surface 116 of the base 100. This abutting relationship prevents the holder 102 from being rotatable with respect to the base 100 when the holder 102 is assembled to the base 100. Second, the holder 102 does not have a cylindrical third portion of the shank. Because the remainder of the structural features of the holder 102 are the same as those of holder 40, further description thereof is not necessary; however, it should be appreciated that holder 102 has an axially forward

channel 130 with an O-ring 133 therein and an axially rearward channel 134 with an O-ring 136 therein.

**[0030]** In operation, the second specific embodiment functions that same as the first embodiment in regard to the assembly, use and disassembly of the holder from the base. One difference between the first embodiment and the second embodiment resides in the fact that in the second embodiment there is an abutment between the flat face 128 of the holder 102 and the stop surface 116 of the base 100 which prevents the relative rotational movement between the base and the holder (i.e., renders the holder non-rotatable) while in the first embodiment there is no such abutting structural relationship between the head portion of the holder and the base.

**[0031]** The instant invention provides a cutting bit assembly in which the holder which carries the cutting bit is securely held by the base by an interference fit. By using an interference fit, the possibility that the connection may work loose or that a part of the assembly which forms the connection deforms becomes slight.

**[0032]** The instant invention also provides for the registration between the holder and the base so as to provide for correct alignment between the holder and the base and to prevent rotation between the holder and the base.

**[0033]** The instant invention also allows for the relatively easy removal of the holder from the bore of the base by the use of a pressurized fluid acting upon a surface of the holder so as to urge it axially forward out of engagement of the interference fit. After which, the holder can be removed from the central bore by hand.

**[0034]** By providing a holder which is securely retained by the base, and yet, is easily removed from the base by the operator, time and expense has been saved over base-holder assemblies in which either the holder-base connection does not have a high degree of integrity or it is difficult to remove the holder from the base.

**[0035]** The patents and other documents identified herein are hereby incorporated by reference herein.

**[0036]** Other embodiments of the invention will be apparent to those skilled in the art from a consideration of the specification or practice of the invention disclosed herein. It is intended that the specification and examples be considered as illustrative only, with the true scope and spirit of the invention being indicated by the following claims.

## Claims

1. A cutting bit holder for use in conjunction with a base having a central bore defined by a bore wall, wherein the cutting bit holder comprises:

an axially forward end and an axially rearward end, the holder containing a bit bore adjacent to the axially forward end thereof wherein the

bit bore receives the cutting bit, and the holder having a shank adjacent to the axially rearward end thereof wherein the central bore of the base receives the shank;

a volume being defined between the shank and the bore wall; 5

the shank presenting a pressure surface that defines in part the volume;

the volume communicating with a source of pressurized fluid so that upon entry of the pressurized fluid into the volume the fluid acts on the pressure surface so as to urge the holder axially forward in the central bore of the base; and 10

the shank and the bore together forming a key and keyway whereby the key engages the keyway so as to correctly position the holder relative to the base and to prevent the holder from rotating relative to the base. 15

2. The cutting bit holder of claim 1 wherein when the holder is in the central bore, the pressure surface faces in a generally axially rearward direction. 20

3. The cutting bit holder of claim 1 wherein the shank carrying a first seal that forms a first fluid tight seal between the wall of the bore and the shank. 25

4. The cutting bit holder of claim 3 wherein the shank carrying a second seal axially rearwardly of the first seal, and the second seal forming a second fluid-tight seal between the wall of the bore and the shank. 30

5. The cutting bit of claim 4 wherein the shank presents a beveled surface between the first seal and the second seal, and the beveled surface comprising the pressure surface. 35

6. The cutting bit of claim 1 wherein the keyway of the bore comprises a flat portion, and the key of the shank presents a flat surface, and the flat surface of the key engages the flat portion of the keyway so as to position the holder relative to the base and to prevent the holder from rotating relative to the base. 40 45

7. The cutting bit holder of claim 1 wherein a portion of the shank engages the bore wall when the holder is received within the central bore so as to create an interference fit between the shank and the bore wall. 50

8. The cutting bit holder of claim 1 wherein the shank presents the key and the bore contains the keyway. 55

9. A cutting bit holder and base assembly for retaining a cutting bit, the assembly comprising;

a base having a central bore defined by a bore wall;

a holder having an axially forward end and an axially rearward end, the holder having a bit bore therein adjacent to the axially forward end thereof wherein the bit bore receives a cutting bit, and the holder having a shank adjacent to the axially rearward end thereof;

the shank being received within the central bore of the base;

a volume being defined between the shank and the bore wall;

the shank presenting a pressure surface that defines in part the volume;

the volume communicating with a source of pressurized fluid so that upon entry of the pressurized fluid into the volume the fluid acts on the pressure surface so as to urge the holder in an axially forward direction; and

the shank and the bore together forming a key and keyway wherein the key cooperates with the keyway so as to position the holder with respect to the base and prevent the holder from rotating with respect to the base. 10

10. The cutting bit holder of claim 9 wherein the central bore contains the keyway and the shank presents the key.

11. The cutting bit holder and base assembly of claim 9 wherein when the holder is in the central bore, the pressure surfaces in a generally axially rearwardly direction.

12. The cutting bit holder and base assembly of claim 11 wherein the shank carrying a first seal that forms a first fluid tight seal between the wall of the bore and the shank.

13. The cutting bit holder and base assembly of claim 12 wherein the shank carrying a second seal axially rearwardly of the first seal, and the second seal forming a second fluid-tight seal between the wall of the bore and the shank.

14. The cutting bit holder and base assembly of claim 13 wherein the shank presents a beveled surface between the first seal and the second seal, and the pressure surface comprising the beveled surface.

15. The cutting bit holder and base assembly of claim 9 wherein the keyway comprises a flat portion, and the key comprises a flat surface, and the flat surface of the key engages the flat portion of the keyway so as to position the holder relative to the base and to prevent the holder from rotating relative to the base.

16. The cutting bit holder and base assembly of claim 9 wherein the base contains a port in direct communication with the volume.
17. The cutting bit holder and base assembly of claim 9 wherein a portion of the shank engages the bore wall when the holder is received within the central bore so as to create an interference fit between the shank and the bore wall.
18. A cutting bit assembly comprising:
- a base having a central bore defined by a bore wall;
  - a holder having an axially forward end and an axially rearward end, the holder having a bit bore therein adjacent to the axially forward end thereof wherein the bit bore receives a cutting bit, and the holder having a shank adjacent to the axially rearward end thereof;
  - the shank being received within the central bore of the base;
  - a volume being defined between the shank and the bore wall;
  - the shank presenting a pressure surface that defines in part the volume;
  - the volume communicating with a source of pressurized fluid so that upon entry of the pressurized fluid into the volume the fluid acts on the pressure surface so as to urge the holder in an axially forward direction;
  - the shank and the bore together forming a key and keyway wherein the key cooperates with the keyway so as to position the holder with respect to the base and prevent the holder from rotating with respect to the base; and
  - a cutting bit being received within the bit bore.
19. The cutting bit assembly of claim 18 wherein the central bore contains the keyway and the shank presents the key.
20. The cutting bit assembly of claim 18 when the holder is in the central bore, the pressure surface faces in a generally axially rearward direction.
21. The cutting bit assembly of claim 18 wherein the cutting bit is rotatable with respect to the holder.
22. The cutting bit assembly of claim 18 wherein the cutting bit is non-rotatable with respect to the holder.
23. The cutting bit assembly of claim 18 wherein a portion of the shank engages the bore wall when the holder is received within the central bore so that there is an interference fit between the shank and the bore wall.
24. A cutting bit holder and base assembly for retaining a cutting bit, the assembly comprising:
- a base having a central bore defined by a bore wall, and the base further including a stop member;
  - a holder having an axially forward end and an axially rearward end, the holder having a bit bore therein adjacent to the axially forward end thereof wherein the bit bore receives a cutting bit, the holder having a shank adjacent to the axially rearward end thereof, and the holder having a head portion with an abutment;
  - the shank being received within the central bore of the base;
  - a volume being defined between the shank and the bore wall;
  - the shank presenting a pressure surface that defines in part the volume;
  - the volume communicating with a source of pressurized fluid so that upon entry of the pressurized fluid into the volume the fluid acts on the pressure surface so as to urge the holder in an axially forward direction; and
  - the shank abutment abutting against the stop member so as to position the holder with respect to the base and prevent the holder from rotating with respect to the base.
25. The cutting bit holder and base assembly of claim 24 wherein when the holder is in the central bore, the pressure surfaces in a generally axially rearwardly direction.
26. The cutting bit holder and base assembly of claim 24 wherein the shank carrying a first seal that forms a first fluid tight seal between the wall of the bore and the shank.
27. The cutting bit holder and base assembly of claim 26 wherein the shank carrying a second seal axially rearwardly of the first seal, and the second seal forming a second fluid-tight seal between the wall of the bore and the shank.
28. The cutting bit holder and base assembly of claim 27 wherein the shank presents a beveled surface between the first seal and the second seal, and the pressure surface comprising the beveled surface.

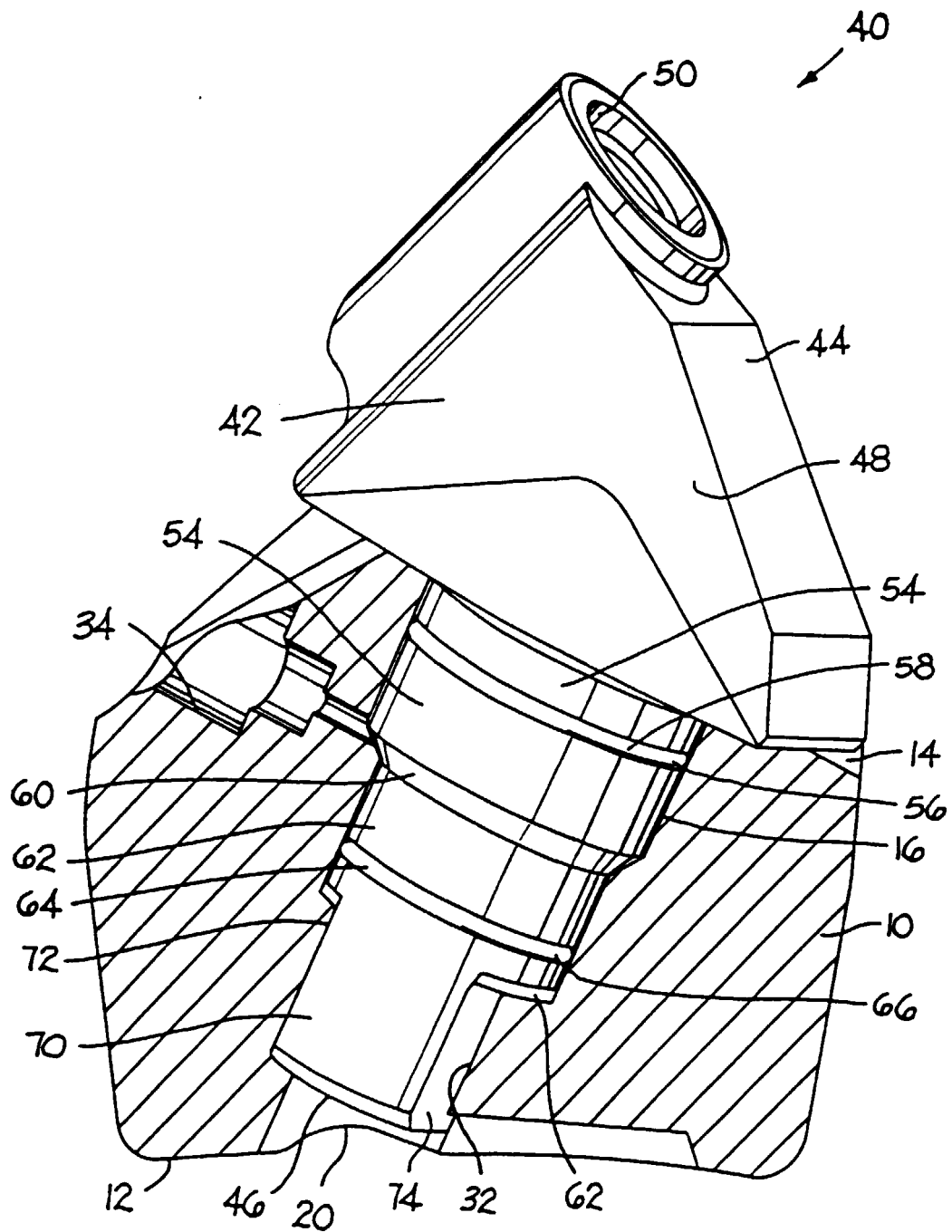
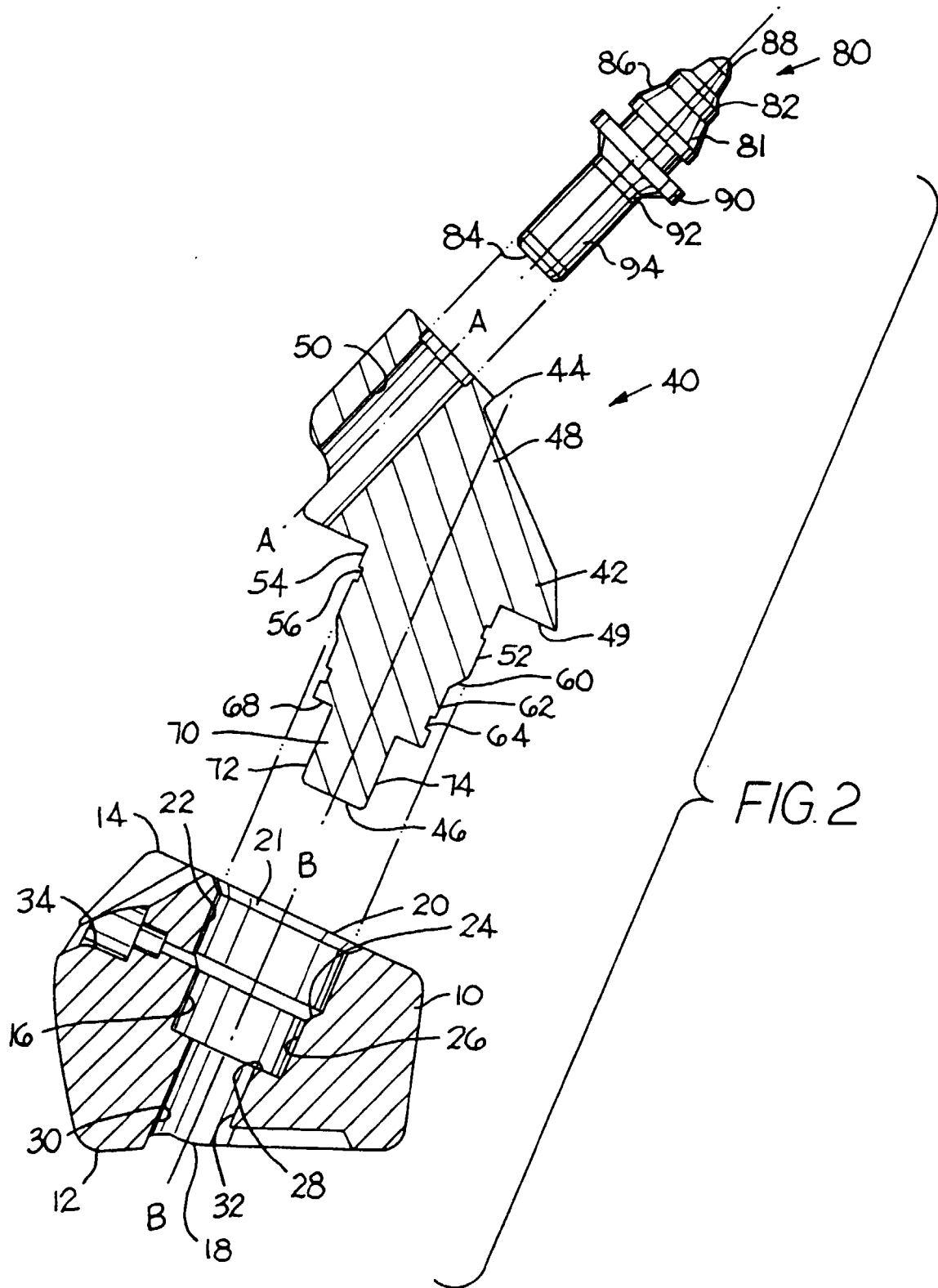


FIG. 1





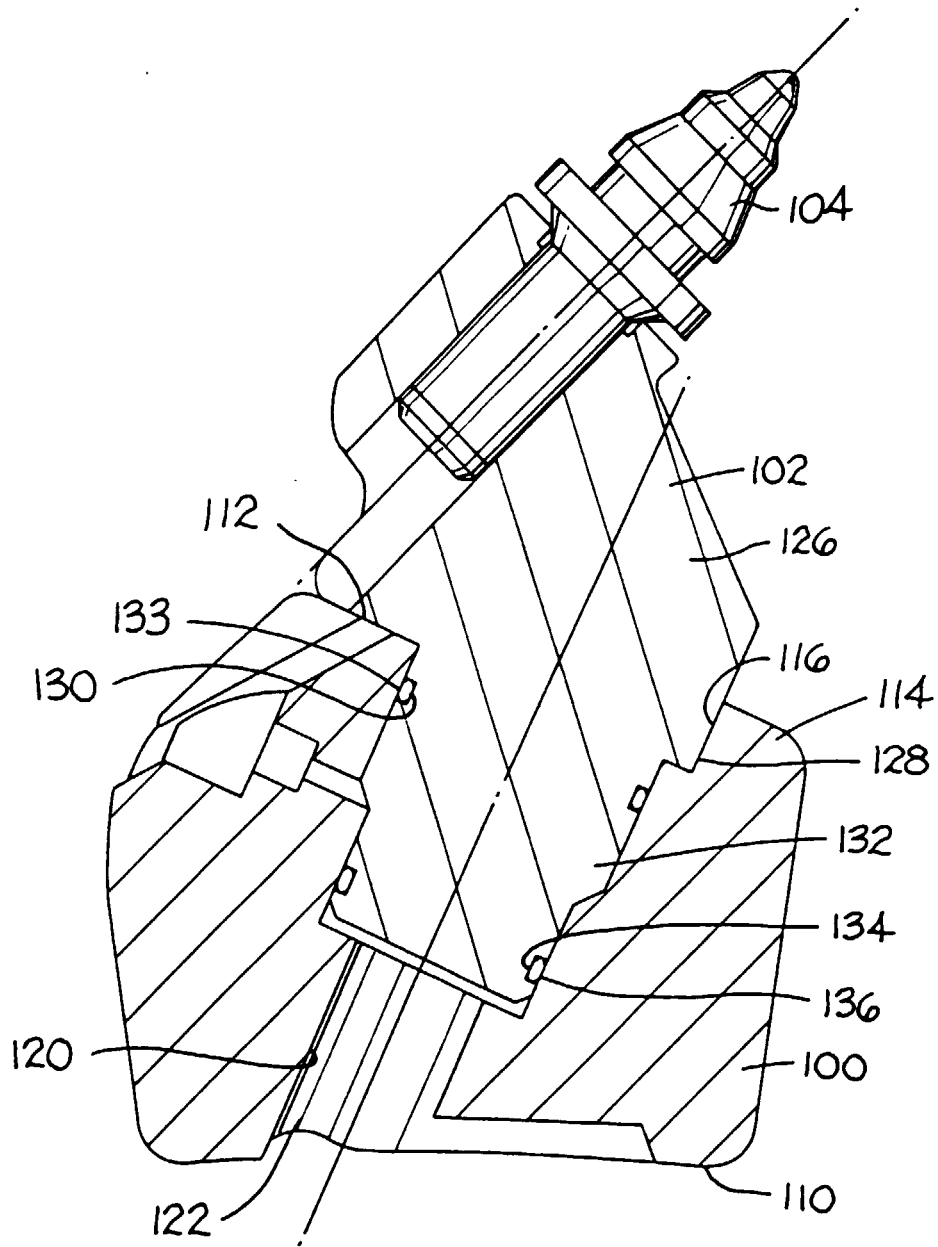


FIG. 3



European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 99 11 9903

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	US 5 738 415 A (PARROTT GEORGE ALBERT) 14 April 1998 (1998-04-14) * the whole document *	1-28	E21C35/19
A	US 4 337 980 A (KREKELER CLAUDE B) 6 July 1982 (1982-07-06) * the whole document *	1, 9, 18, 24	
A	US 5 725 283 A (O'NEILL MICHAEL LEE) 10 March 1998 (1998-03-10) * claim 1; figure 6 *	1	
A	US 5 088 797 A (O'NEILL MICHAEL L) 18 February 1992 (1992-02-18) * figure 1 *	1	
A	GB 1 209 374 A (H.M. MORROW) 21 October 1970 (1970-10-21) * page 2, line 67 - line 80 *	1, 9, 18, 24	
A	US 4 333 687 A (BARNSTORF INGO) 8 June 1982 (1982-06-08) * figures *	1	TECHNICAL FIELDS SEARCHED (Int.Cl.7) E21C
A	US 5 302 005 A (O'NEILL MICHAEL L) 12 April 1994 (1994-04-12)		
A	US 4 247 150 A (WRULICH HERWIG ET AL) 27 January 1981 (1981-01-27)		
A	US 5 106 166 A (O'NEILL MICHAEL L) 21 April 1992 (1992-04-21)		
A	US 4 678 238 A (EMMERICH KENNETH C) 7 July 1987 (1987-07-07)		
D, A	US 5 573 308 A (SIMONS DIETER ET AL) 12 November 1996 (1996-11-12) -/--		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 8 February 2000	Examiner Fonseca Fernandez, H
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)



European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 99 11 9903

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
D, A	US 5 378 050 A (KAMMERER KARL ET AL) 3 January 1995 (1995-01-03) ----		
A	GB 2 092 205 A (MANNESMANN AG) 11 August 1982 (1982-08-11) -----		
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
The present search report has been drawn up for all claims			
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>8 February 2000</b>	Examiner <b>Fonseca Fernandez, H</b>
<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone  Y : particularly relevant if combined with another document of the same category  A : technological background  O : non-written disclosure  P : intermediate document</p> <p>T : theory or principle underlying the invention  E : earlier patent document, but published on, or after the filing date  D : document cited in the application  L : document cited for other reasons  .....  &amp; : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03.82 (P4/C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 99 11 9903

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

08-02-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5738415 A	14-04-1998	AU 677750 B	01-05-1997
		AU 1321995 A	01-08-1995
		DE 4480466 T	16-01-1997
		WO 9518914 A	13-07-1995
		GB 2285464 A,B	12-07-1995
		ZA 9500061 A	07-02-1996
US 4337980 A	06-07-1982	AU 565475 B	17-09-1987
		AU 3566884 A	28-03-1985
		AU 564079 B	30-07-1987
		AU 542087 B	07-02-1985
		AU 5961880 A	15-10-1981
		CA 1148571 A	21-06-1983
		CA 1159477 A	27-12-1983
		DE 3026930 A	15-10-1981
		ZA 8004731 A	26-08-1981
		GB 2051184 A,B	14-01-1981
US 5725283 A	10-03-1998	AU 712045 B	28-10-1999
		AU 2449797 A	07-11-1997
		CN 1216594 A	12-05-1999
		DE 19781717 T	25-03-1999
		GB 2327446 A	27-01-1999
		WO 9739221 A	23-10-1997
US 5088797 A	18-02-1992	AU 652168 B	18-08-1994
		AU 8173891 A	12-03-1992
		CA 2050871 A,C	08-03-1992
		DE 4127433 A	12-03-1992
		GB 2247706 A,B	11-03-1992
		MX 173896 B	07-04-1994
US 5302005 A	12-04-1994	US 5088797 A	18-02-1992
		AU 652168 B	18-08-1994
US 4247150 A	27-01-1981	AU 8173891 A	12-03-1992
		CA 2050871 A,C	08-03-1992
		DE 4127433 A	12-03-1992
		GB 2247706 A,B	11-03-1992
		MX 173896 B	07-04-1994
		AT 437878 A	15-06-1979

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 99 11 9903

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

08-02-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4247150 A		AT 354385 B	10-01-1980
		AU 4654479 A	20-12-1979
		BE 876355 A	17-09-1979
		CA 1098551 A	31-03-1981
		DE 2915510 A	20-12-1979
		DE 2954400 A	21-02-1985
		ES 480965 A	16-01-1980
		FR 2428735 A	11-01-1980
		GB 2024287 A, B	09-01-1980
		HU 179654 B	29-11-1982
		JP 1127623 C	14-12-1982
		JP 55002188 A	09-01-1980
		JP 57016238 B	03-04-1982
		PL 215720 A	25-02-1980
		RO 83790 A	02-04-1984
		ZA 7901825 A	28-05-1980
US 5106166 A	21-04-1992	AU 8173991 A	19-03-1992
		CA 2050864 A	08-03-1992
		DE 4127434 A	12-03-1992
		GB 2247705 A	11-03-1992
		MX 9100981 A	04-05-1992
US 4678238 A	07-07-1987	NONE	
US 5573308 A	12-11-1996	DE 4322402 A	12-01-1995
		DE 59405173 D	05-03-1998
		WO 9502113 A	19-01-1995
		EP 0656989 A	14-06-1995
US 5378050 A	03-01-1995	DE 9211739 U	05-11-1992
		IT 1266591 B	09-01-1997
GB 2092205 A	11-08-1982	DE 3102884 A	05-08-1982
		FR 2498677 A	30-07-1982