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(71) Applicant (for all designated States except US): **SANDVIK INTELLECTUAL PROPERTY AB** [SE/SE]; ., ., SE-811 81 Sandviken (SE).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **MONYAK, Kenneth** [US/US]; 17270 Mary Lee Drive, Abingdon, Virginia 24210 (US). **FADER, Joseph** [US/AT]; Wartinger-gasse 46, Top 6, Graz, A-8010 Steiermark (AT).

(74) Agent: **CARLSSON, Lars-Åke**; ., Sandvik Intellectual Property AB, S-811 81 Sandviken (SE).

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(54) Title: HOLDER BLOCK, HOLDER BLOCK AND PICK ASSEMBLY, MACHINE AND METHOD FOR EXCAVATING

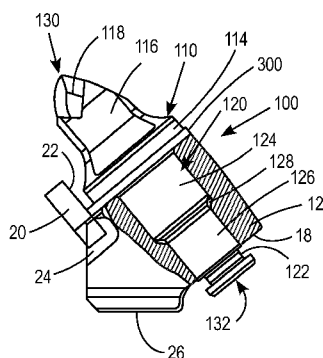


FIG. 4

(57) Abstract: A holder block and pick assembly including a pick, a washer, and a block body. The pick includes a shoulder and a shank extending rearwardly from the shoulder and having a diameter smaller than the diameter of the shoulder. The washer has a central opening adapted to fit about the shank adjacent to the shoulder and a substantially flat edge disposed substantially perpendicular to a radius of the central opening. The block body includes a bore for receiving the shank, a base surface at a lower end of the body for mounting the body to a rotatable element of a rotary cutting machine, and a stop extending frontwardly from the front face of the body and having a surface located substantially perpendicularly to a radius of the bore such that when the pick shank is inserted into the bore with the washer disposed about the shank adjacent to the shoulder, the flat edge of the washer engages the surface of the stop to substantially prevent the washer from rotating with respect to the block.



Holder block, holder block and pick assembly, machine and method for excavating

FIELD

[0001] The present disclosure relates to a holder block for holding a cutting tool pick in a rotary cutting machine, and assemblies of a holder block with a cutting pick. More particularly, the present disclosure relates to a holder block adapted for interchangeably holding either a non-rotating radial pick or a rotating conical pick, and assemblies of a radial pick and a conical pick with the holder block. The disclosure also relates to a machine incorporating such a holder block and to a method using such a holder block and assemblies in a machine, particularly in a machine for mining, excavating, tunneling, road planning, and/or construction.

BACKGROUND

[0002] In the discussion of the background that follows, reference is made to certain structures and/or methods. However, the following references should not be construed as an admission that these structures and/or methods constitute prior art. Applicant expressly reserves the right to demonstrate that such structures and/or methods do not qualify as prior art.

[0003] Two types of picks are commonly used in rotary cutting tools and machines: a radial pick and a conical pick. Each type of pick requires a different mounting arrangement to optimally perform its job. A radial pick has a unidirectional cutting head designed to always face the same orientation with respect to the target material, and functions like a rake. Therefore, a radial pick must be mounted so as to be non-rotating within its mounting block. A common radial pick mounting block is shown FIG. 1. The shape of the bore through the radial pick mounting block is generally rectangular to correspond to a generally rectangular shank on a common radial pick. A machine incorporating a plurality of radial picks mounted on a rotating drum is most effective at cutting through softer materials such as soil, coal, and potash.

[0004] In contrast, a conical pick has a radially symmetric cutting head that performs the same in any cutting direction, and functions like a scraper. Therefore, to maximize the wear life and performance of a conical pick, the pick is mounted so that it can freely rotate within its mounting block. A common conical pick mounting block is shown in FIG. 2. The shape of the bore through the conical pick mounting block is generally circular to correspond to a generally circular shank on a common conical pick. A sleeve retainer may be provided between the shank and the bore in a conical pick arrangement to reduce wear of the block bore and to ensure a snug fit of the shank in the bore. A washer may be provided between the shoulder of the conical pick and the face of the block to decrease wear on the block and also to compress the sleeve retainer during installation of the sleeve retainer and pick into the block. In some designs, the washer is non-rotating. A machine incorporating a plurality of conical picks mounted on a rotating drum is most effective at grinding into harder, less compressive rock.

[0005] Very frequently, an excavator encounters a situation in which the surface layers of earth are composed of softer soil-like materials that are best dug or cut into using a radial tool machine, while lower layers of earth are composed of harder rock-like materials that are best dug or cut into using a conical tool machine. For example, in excavating the foundation for a dam, which must be anchored in bedrock, soil-like materials must first be removed to expose the bedrock and then bedrock must be removed to create a foundation for the dam. As can be seen from FIGS. 1 and 2, a typically radial pick cannot be installed into a typically conical pick mounting block, and a typical conical pick cannot be installed into a typical radial pick mounting block. For that reason, dedicated drums are assembled for use with a rotary cutting tool machine, each drum having either radial pick blocks or conical pick blocks.

[0006] As a result, to change between radial picks and conical picks, the entire rotating drum of the machine must be changed. In a situation such as the excavation described above, an excavator either must use an improper cutting system for one or the other phase of excavation (*i.e.*, a radial pick system for cutting rock or a conical pick system for cutting soft earth) or must endure substantial downtime in order to convert

from one cutting system to another. Changing drums on a rotary cutting machine is very time consuming and can take a machine out of service for three days or more, including a day or more to extract the machine from its work location to a location in which the drum can be removed and replaced, a day or more to replace the drum, and a day or more to put the machine back into service.

SUMMARY

[0007] An exemplary holder block for both radial and conical tool picks includes a body having a bore for receiving a shank of a pick, the bore extending rearwardly from a front face of the body and having a substantially circular cross-sectional shape. The holder block further includes a base surface at a lower end of the body for mounting the body to a rotatable element of a rotary cutting machine, and a stop extending frontwardly from the front face of the body. The stop has a surface located substantially perpendicularly to a radius of the bore at a distance from the center of the bore, the stop being adapted to engage a substantially flat edge of a washer included in a pick assembly.

[0008] An exemplary holder block and pick assembly includes a pick including a shoulder, a shank extending rearwardly from the shoulder and having a diameter smaller than the diameter of the shoulder, and a cutting head extending frontwardly from the shoulder. The assembly further includes a washer having a central opening adapted to fit about the shank adjacent to the shoulder, the washer having a substantially flat edge disposed substantially perpendicular to a radius of the central opening at a distance from the center of the central opening. The assembly also includes a block body having a bore for receiving the shank of the pick, the bore extending rearwardly from a front face of the body and having a substantially circular cross-sectional shape, a base surface at a lower end of the body for mounting the body to a rotatable element of a rotary cutting machine, and a stop extending frontwardly from the front face of the body. The stop has a surface located substantially perpendicularly to a radius of the bore at a distance from the center of the bore such

that when the pick shank is inserted into the bore with the washer disposed about the shank adjacent to the shoulder, the flat edge of the washer engages the surface of the stop to substantially prevent the washer from rotating with respect to the block. When the pick is a radial pick having the washer integrally formed with the shoulder of the radial pick, the radial pick is substantially prevented from rotating with respect to the block. When the pick is a conical pick free to rotate with respect to the washer, the shank of the conical pick is free to rotate with respect to the block while the washer is substantially prevented from rotating with respect to the block.

[0009] An exemplary machine for mining, excavating, tunneling, road planning, and/or construction includes a rotatable element and an exemplary holder block and pick assembly, as set forth above, mounted to the rotatable element.

[0010] An exemplary method of excavating uses a rotary cutting machine including a rotatable element having mounted thereto a holder block including a bore for receiving a shank of a pick, the bore extending rearwardly from a front face of the body and having a substantially circular cross-sectional shape. The holder block further includes a base surface at a lower end of the body for mounting the body to the rotatable element, and a stop extending frontwardly from the front face of the body. The stop has a surface located substantially perpendicularly to a radius of the bore at a distance from the center of the bore, the stop being adapted to engage a substantially flat edge of a washer included in a pick assembly. The method includes installing a first pick into the holder block by inserting a shank of the first pick into the bore, the first pick being one of a radial pick having a washer integrally formed therewith and a conical pick having a washer positioned to freely rotate with respect to the pick shank, the washer having an edge positioned to engage the surface of the stop such that the washer is substantially prevented from rotating with respect to the block; causing the rotatable element to rotate to enable the first pick to perform a digging or cutting action; causing the rotatable element to stop rotating; removing the first pick from the bore of the holder block; installing a second pick into the holder block by inserting a shank of the second pick into the bore, the pick being the other of a radial pick having a washer integrally formed therewith and a conical pick having a washer positioned to freely rotate with

respect to the pick shank, the washer having an edge positioned to engage the surface of the stop such that the washer is substantially prevented from rotating with respect to the block; and causing the rotatable element to rotate to enable the second pick to perform a digging or cutting action.

[0011] An exemplary holder block for both radial and conical tool picks includes a body, a base surface, and a stop. The body has a bore for receiving a shank of a pick, the bore extending rearwardly from a front face of the body and having a substantially circular cross-sectional shape. The base surface is located at a lower end of the body for mounting the body to a rotatable element of a rotary cutting machine. The stop extends frontwardly from the front face of the body, the stop having a surface located substantially perpendicularly to a radius of the bore at a distance from the center of the bore. A radial pick inserted into the bore of the block body is substantially prevented from rotating with respect to the block by a washer integrally formed with a shoulder of the radial pick, the washer having a flat edge adapted to engage the surface of the stop. A conical pick inserted into the bore of the block is free to rotate with respect to the block about an axis of the shank of the conical pick, while a washer disposed about the shank of the conical pick adjacent to a shoulder of the conical pick is substantially prevented from rotating with respect to the block, the washer having a flat edge adapted to engage the surface of the stop.

[0012] It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWING

[0013] The following detailed description can be read in connection with the accompanying drawings in which like numerals designate like elements and in which:

[0014] FIG. 1 is a perspective view of a prior art radial pick mounting block.

[0015] FIG. 2 is a perspective view of a prior art conical pick mounting block.

[0016] FIG. 3A is a cross-sectional view of an exemplary embodiment of a holder block for use with a radial pick or a conical pick.

[0017] FIG. 3B is a top end view of the embodiment of a holder block of FIG. 3A.

[0018] FIG. 4 is a partial cross-sectional view of an exemplary embodiment of a non-rotating radial pick mounted in the holder block of FIGS. 3A and 3B.

[0019] FIG. 5 is a partial cross-sectional view of an exemplary embodiment of a rotating conical pick and non-rotating washer mounted in the holder block of FIGS. 3A and 3B.

[0020] FIGS. 6A and 6B are a side view and a top view, respectively, of the radial pick with washer of FIG. 4.

[0021] FIGS. 7A and 7B are a side view and a top view, respectively, of the conical pick and washer of FIG. 5.

[0022] FIG. 8 is a top view of a washer for incorporation into the radial pick of FIGS. 4, 6A, and 6B, and for use with the conical pick of FIG. 5, 7A, and 7B.

DETAILED DESCRIPTION

[0023] FIGS. 3A and 3B illustrate an exemplary embodiment of a holder block 10 for interchangeably holding a radial pick or a conical pick. An exemplary embodiment of a radial pick assembly 100 including the holder block 10 and an exemplary embodiment of a radial pick 110 is shown in FIG. 4, and detailed views of the radial pick 110 are shown in FIGS. 6A and 6B. An exemplary embodiment of a conical pick assembly 200 including the holder block 10 and an exemplary embodiment of a conical pick 210 is shown in FIG. 5, and detailed views of the conical pick 210 are shown in FIGS. 7A and 7B.

[0024] As illustrated, the holder block 10 has a body 12 and a bore 14 extending rearwardly from a front face 16 of the block 10. The bore 14 can extend completely through the body 12 to a rear face 18 of the block, or the bore 14 can extend partially through the body 12. The bore 14 can be of a single diameter or multiple diameters. In the embodiment depicted in FIG. 3A, the bore 14 includes a step 32 separating a larger

diameter section 30 toward the front face 16 from a smaller diameter section 34 toward the rear face 18. The bore 14, including both sections 30 and 34, is substantially circular in cross-section.

[0025] A base surface 26 of the holder block 10 is located at a lower side of the block 10, below the bore 14, and is adapted for mounting the block 10 on a surface of a rotatable element, such as a drum, of a machine for mining, excavating, tunneling, road planning, and/or construction. Typically, many holder blocks 10 are mounted on an outer surface of the rotatable element. When the block 10 is mounted to a rotatable element, both the front face 16 and the back face 18 of the body 12 are accessible for installation, removal, and replacement of a pick in the bore 14.

[0026] A stop 20 is located a distance D1 from the center of the bore 14. The stop 20 extends outwardly in a frontward direction from the front face 16 of the block body 12. The stop 20 having a generally flat surface 22 disposed substantially perpendicularly to a radius of the bore 14. In other words, the flat surface 22 lies in a plane that is substantially parallel to the centerline of the bore 14 and substantially perpendicular to the front face 16 of the block body 12. As depicted, the stop 20 is positioned lower on the block body 12 than the junction between the bore 14 and the front face 16, so that it is disposed generally between the bore 14 and the rotatable element to which the block 10 is mounted. In this arrangement, the distance between the stop 20 and the base surface of the block 10 is relatively small compared with other possible mounting locations of the stop 20, which minimizes the torsional loads imposed on the mounting junction between the base surface 26 and the rotatable element of the cutting machine when loads are applied to the stop 20 by a pick installed in the block 10. Alternatively, the stop 20 can be positioned on the block body 12 in any radial direction with respect to the bore 14 provided the torsional loads transmitted from the stop 20 to the mounting junction between the base surface 26 and the rotatable element of the cutting machine are taken into account.

[0027] The stop 20 can be integrally formed into the body 12 of the block 10, or can be securely affixed to the body 12 by welding or other structurally secure mechanism.

As shown in FIG. 3A, the stop 20 is securely welded to the body 12 of the block 10 along two sides, as indicated by a weld bead 24.

[0028] The holder block 10, including the bore 14 and the stop 20, is adapted to interchangeably accommodate a radial pick or a conical pick, as disclosed herein. FIG. 4 shows a radial pick assembly 100 including a radial pick 110 mounted in the block 10. FIG. 5 shows a conical pick assembly 200 including a conical pick 210 mounted in the block 10.

[0029] An exemplary radial pick 110 is shown in FIGS. 6A and 6B. The radial pick 110 spans from a front end 130 to a rear end 132 and includes a frontwardly extending cutting head 116 and a rearwardly extending shank 120. The cutting head 116 supports a unidirectional cutting tip 118. The shank 120 is sized to fit within the bore 14 in the body 12 of the holder block 10. In the depicted embodiment, the shank 120 has a stepped diameter, including larger diameter section 124 toward the cutting head 116 and a smaller diameter section 126 away from the cutting head 116, the sections 124 and 126 being separated by a step 128. A groove 122 is provided at the rear end 132 of the shank 120 for receiving a retaining means such as a C-clip (not shown).

[0030] An enlarged shoulder 114 is disposed between the cutting head 116 and the shank 120, the shoulder 114 having an outer diameter larger than that of the larger diameter section 124 of the shank 120, and therefore also larger than the inside diameter of the larger diameter section 30 of the bore 14. A washer 300 integrally formed with the shoulder 114 of the radial pick 110 such that the washer 300 cannot rotate with respect to the radial pick 110. In one embodiment, the washer 300 is integrally formed with the shoulder 114 by welding the washer 300 to the shoulder 114. In another embodiment, the washer 300 is integrally formed with the shoulder 114 by forging the washer 300 into the shoulder 114. It is understood that other methods for integrally forming the washer 300 into the shoulder 114 can alternatively be used. The radial pick 110 can be retained in the block 10 by any known retaining means. For example, in the depicted embodiment, the shank 120 of the radial pick 110 extends out the bore 14 beyond the rear face 18 of the block 10 and the groove 122 in the shank 120 receives an external C-clip.

[0031] An exemplary washer 300 is shown in FIG. 8. The washer 300 has a central opening 306 with an inner diameter sufficient to allow the washer 300 to slide over the shank 120 of the radial pick 110, but smaller than the outer diameter of the shoulder 114 of the radial pick 110. The washer 300 has an outer D-shaped perimeter including a flat edge 302 and a remaining curved edge 304. The flat edge 302 of the washer 300 is located at a distance D2 from the center of the central opening 306 of the washer 300 and is formed to be substantially perpendicular with respect to a radius of the central opening 306. In other words, the flat edge 302 lies in a plane that is substantially parallel to the centerline of the bore central opening 306. The distance D2 is approximately equal to or slightly less than the distance D1 from the center of the bore 14 of the block 12 to the surface 22 of the stop 20.

[0032] When the radial pick 110 is installed in the block 12, the shank 120 is received into the bore 14 and the flat edge 302 of the washer 300 is located adjacent to, and in contact with or nearly in contact with the surface 22 of the stop 20. The surface engagement between the flat edge 302 of the washer 300 and the surface 22 of the stop 20 substantially prevents the radial pick 110 from rotating with respect to the block 10, so that the cutting tip 118 of the radial pick 110 is maintained in a desired cutting orientation, regardless of the forces imposed on the cutting tip 118 from contact with the material being dug or cut into by the rotary cutting machine. The radial pick 110 can be readily removed for replacement, if desired, by removing the retaining means, such as an external C-clip inserted into the groove 122, and sliding the shank 120 frontwardly from the bore 14.

[0033] An exemplary conical pick 210 is shown in FIGS. 7A and 7B. The conical pick 210 spans from a front end 230 to a rear end 232 and includes a frontwardly extending cutting head 216 and a rearwardly extending shank 220. The cutting head 216 supports a radially symmetric cutting tip 218. The shank 220 is sized to fit within the bore 14 in the body 12 of the holder block 10. An enlarged shoulder 214 is disposed between the cutting head 216 and the shank 220, the shoulder 214 having an outer diameter larger than that of the larger diameter section 124 of the shank 120 and

therefore also larger than the inside diameter of the larger diameter section 30 of the bore 14.

[0034] In the depicted embodiment, the shank 220 has a smaller diameter section 226 away from the cutting head 216 corresponding to the smaller diameter section 34 of the bore 14. The shank 220 further includes a reduced diameter section 224 toward the cutting head 216, the reduced diameter section being bounded by a shoulder 228 located between the reduced diameter section 224 and the smaller diameter section 226 and a shoulder 229 located between the reduced diameter section 224 and the enlarged shoulder 214. The shoulders 228 and 229 each have an outer diameter sized to fit in the larger diameter section 30 of the bore, and the reduced diameter section 224 has an outer diameter smaller than that of the shoulders 228 and 229. The reduced diameter section 224 is adapted for receiving a sleeve retainer 240. A groove 222 is provided at the rear end 232 of the shank 220 for receiving a retaining means such as a C-clip (not shown).

[0035] The sleeve retainer 240 can be any suitable generally cylindrical hollow sleeve retainer having a longitudinal slit 242 to allow for radial compression of the sleeve retainer 240 against its own spring force. When the conical pick 210 with the sleeve retainer 240 is installed in the bore 14, the spring force of the sleeve retainer 240 presses sleeve retainer 240 against the inner surface of the bore 14 so that the sleeve retainer 240 remains substantially non-rotating with respect to the bore 14, while the shank 220, and thus the conical pick 210, is permitted to rotate freely within the sleeve retainer 240 and within the bore 14. As the cutting tip 218 contacts the material being dug or cut into, the conical pick 210 can freely rotate, providing for uniform wear and continual sharpening of the cutting tip 218. In addition the sleeve retainer 240 protects the bore 14 of the block 12 from wear due to the rotation of the shank 220.

[0036] When the sleeve retainer 240 is compressed within the bore 14, the sleeve retainer 240 is held captive around the reduced diameter section 224 of the shank 220 by the shoulders 228 and 229, so that the sleeve retainer 240 cannot move in an axial direction with respect to the pick 220. The frictional engagement between the sleeve retainer 240 and the bore 14, combined with the engagement between the sleeve

retainer 240 and the shoulder 228, helps to retain the conical pick 210 within the bore 14. Alternatively, or in addition to the retention force provided by the sleeve retainer 240, the shaft 220 of the conical pick 210 extends out the bore 14 beyond the rear face 18 of the block 10 and the groove 222 in the shank 220 receives an external C-clip.

[0037] The washer 300 serves multiple purposes when used with the conical pick 210. As shown in FIG. 7A, the washer 300 is used to radially compress the sleeve retainer 240 to enable the shank 220 with the sleeve retainer 240 to be inserted into the bore 14. In addition, the washer 300 protects the front face 16 of the mounting block 10 from wear by a rear face 212 of the shoulder 214 as the conical pick 210 rotates during use.

[0038] When the conical pick 210 is fully installed into the bore 14 of the block 10, the washer 300 is in contact on one side with the rear face 212 of the shoulder 214 and on the other side with the front face 16 of the block 10. In this position, the central opening 306 of the washer 300 is disposed about the shoulder 229 of the shank 220 frontward of the location of the sleeve retainer 240, so that the sleeve retainer 240 is free to spring radially outward against the inside of the bore 14.

[0039] To most effectively protect the front face 16 of the block 10 from wear due to rotation of the shoulder 214 of the conical pick 210, the washer 300 is held stationary by the same mechanism that holds the rotary pick 110 stationary when a rotary pick 110 is used. In particular, the flat edge 302 of the washer 300 engages the surface 22 of the stop 20 to substantially prevent the washer 300 from rotating. Because the washer 300 is merely disposed about the shank 220 and is not affixed to the shoulder 214, in contrast to the arrangement of the radial pick 110, the conical pick 220 is free to rotate within the bore 14 while the washer 300 remains substantially non-rotating.

[0040] Although described in connection with preferred embodiments thereof, it will be appreciated by those skilled in the art that additions, deletions, modifications, and substitutions not specifically described may be made without department from the spirit and scope of the invention as defined in the appended claims.

CLAIMS

What is claimed is:

1. A holder block for both radial and conical tool picks, the block comprising:
a body having a bore for receiving a shank of a pick, the bore extending rearwardly from a front face of the body and having a substantially circular cross-sectional shape;
a base surface at a lower end of the body for mounting the body to a rotatable element of a rotary cutting machine; and
a stop extending frontwardly from the front face of the body, the stop having a surface located substantially perpendicularly to a radius of the bore at a distance from the center of the bore, the stop being adapted to engage a substantially flat edge of a washer included in a pick assembly.
2. The holder block of claim 1, wherein the pick assembly includes a radial pick having a washer integrally formed therewith, the washer having an edge positioned to engage the surface of the stop when the pick shank is installed in the bore such that the radial pick is substantially prevented from rotating with respect to the block.
3. The holder block of claim 2, wherein the washer is integrally formed with the radial pick by forging.

4. The holder block of claim 2, wherein the washer is integrally formed with the radial pick by welding.
5. The holder block of claim 1, wherein the pick assembly includes a conical pick having a washer rotatably disposed about the pick shank between a shoulder of the pick and the front face of the body, the washer having an edge positioned to engage the surface of the stop when the pick shank is installed in the bore such that the conical pick can freely rotate with respect to the block while the washer is prevented from rotating with respect to the block.
6. The holder block of claim 1, wherein the stop is located lower on the body than a junction between the bore and the front face of the body.
7. A holder block and pick assembly comprising:
 - a pick including a shoulder, a shank extending rearwardly from the shoulder and having a diameter smaller than the diameter of the shoulder, and a cutting head extending frontwardly from the shoulder;
 - a washer having a central opening adapted to fit about the shank adjacent to the shoulder, the washer having a substantially flat edge disposed substantially perpendicular to a radius of the central opening at a distance from the center of the central opening; and
 - a block body having:

a bore for receiving the shank of the pick, the bore extending rearwardly from a front face of the body and having a substantially circular cross-sectional shape;

a base surface at a lower end of the body for mounting the body to a rotatable element of a rotary cutting machine; and

a stop extending frontwardly from the front face of the body, the stop having a surface located substantially perpendicularly to a radius of the bore at a distance from the center of the bore such that when the pick shank is inserted into the bore with the washer disposed about the shank adjacent to the shoulder, the flat edge of the washer engages the surface of the stop to substantially prevent the washer from rotating with respect to the block;

wherein when the pick is a radial pick having the washer integrally formed with the shoulder of the radial pick, the radial pick is substantially prevented from rotating with respect to the block; and

wherein when the pick is a conical pick free to rotate with respect to the washer, the shank of the conical pick is free to rotate with respect to the block while the washer is substantially prevented from rotating with respect to the block.

8. The assembly of claim 7, wherein the stop is located lower on the body than a junction between the bore and the front face of the body.

9. A machine for mining, excavating, tunneling, road planning, and/or construction comprising:

a rotatable element; and

the assembly as in claim 7 mounted on the rotatable element.

10. A method of excavating using a rotary cutting machine including a rotatable element and a holder block as in claim 1 mounted to the rotatable element, the method comprising:

installing a first pick into the holder block by inserting a shank of the first pick into the bore, the first pick being one of a radial pick having a washer integrally formed therewith and a conical pick having a washer positioned to freely rotate with respect to the pick shank, the washer having an edge positioned to engage the surface of the stop such that the washer is substantially prevented from rotating with respect to the block;

causing the rotatable element to rotate to enable the first pick to perform a digging or cutting action;

causing the rotatable element to stop rotating;

removing the first pick from the bore of the holder block;

installing a second pick into the holder block by inserting a shank of the second pick into the bore, the second pick being the other of a radial pick having a washer integrally formed therewith and a conical pick having a washer positioned to freely rotate with respect to the pick shank, the washer having an edge positioned to engage the surface of the stop such that the washer is substantially prevented from rotating with respect to the block; and

causing the rotatable element to rotate to enable the second pick to perform a digging or cutting action.

11. A holder block for both radial and conical tool picks, the block comprising:

a body having a bore for receiving a shank of a pick, the bore extending rearwardly from a front face of the body and having a substantially circular cross-sectional shape;

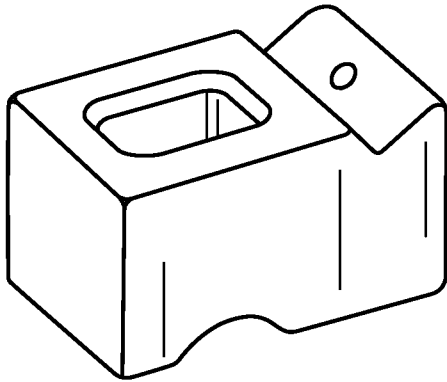
a base surface at a lower end of the body for mounting the body to a rotatable element of a rotary cutting machine; and

a stop extending frontwardly from the front face of the body, the stop having a surface located substantially perpendicularly to a radius of the bore at a distance from the center of the bore;

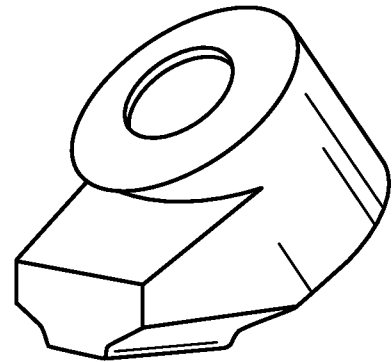
wherein a radial pick inserted into the bore of the block body is substantially prevented from rotating with respect to the block by a washer integrally formed with a shoulder of the radial pick, the washer having a flat edge adapted to engage the surface of the stop; and

wherein a conical pick inserted into the bore of the block is free to rotate with respect to the block about an axis of the shank of the conical pick, while a washer disposed about the shank of the conical pick adjacent to a shoulder of the conical pick is substantially prevented from rotating with respect to the block, the washer having a flat edge adapted to engage the surface of the stop.

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PRIOR ART
FIG. 1



PRIOR ART
FIG. 2

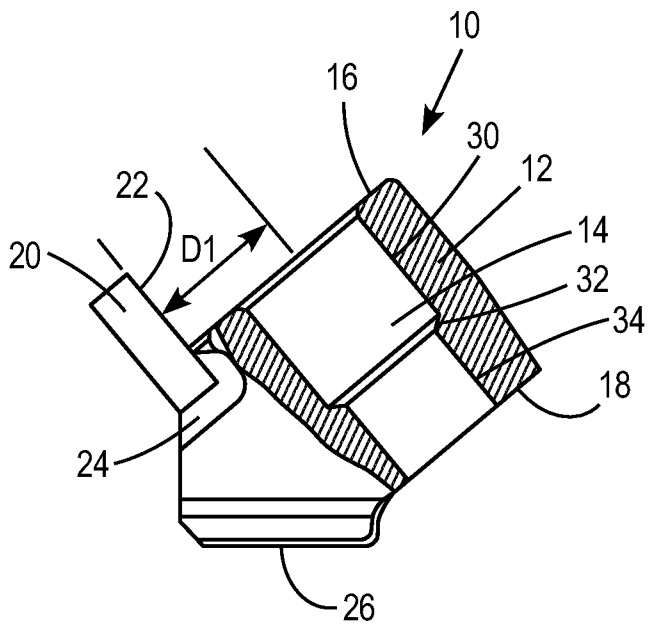


FIG. 3A

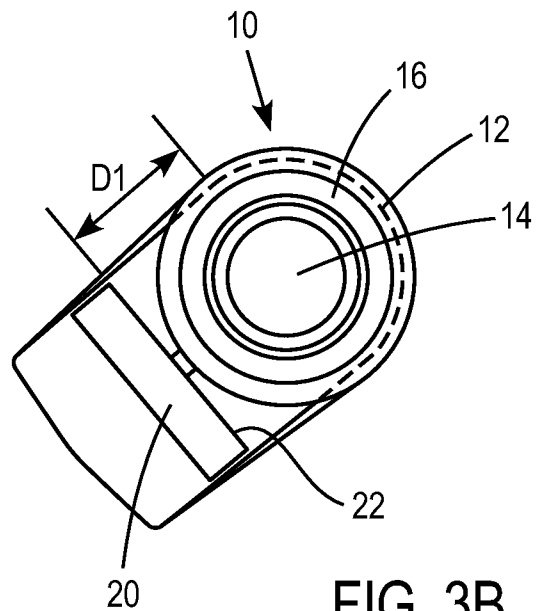


FIG. 3B

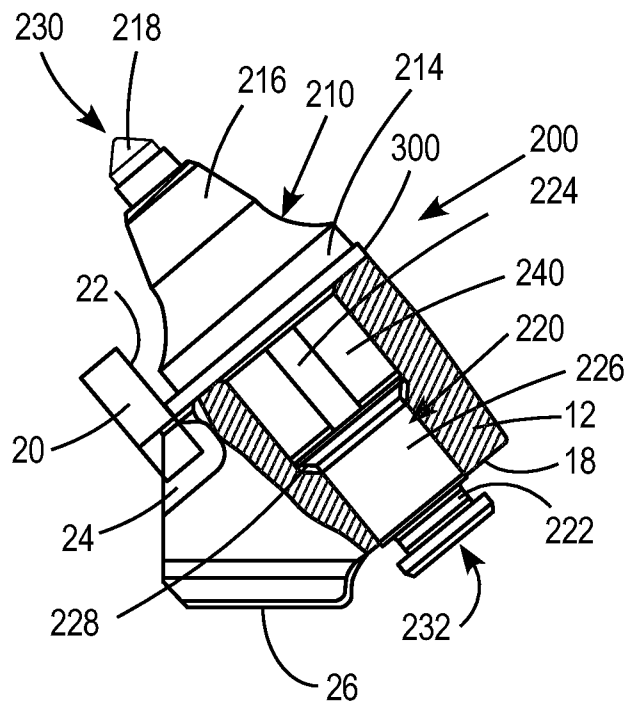


FIG. 5

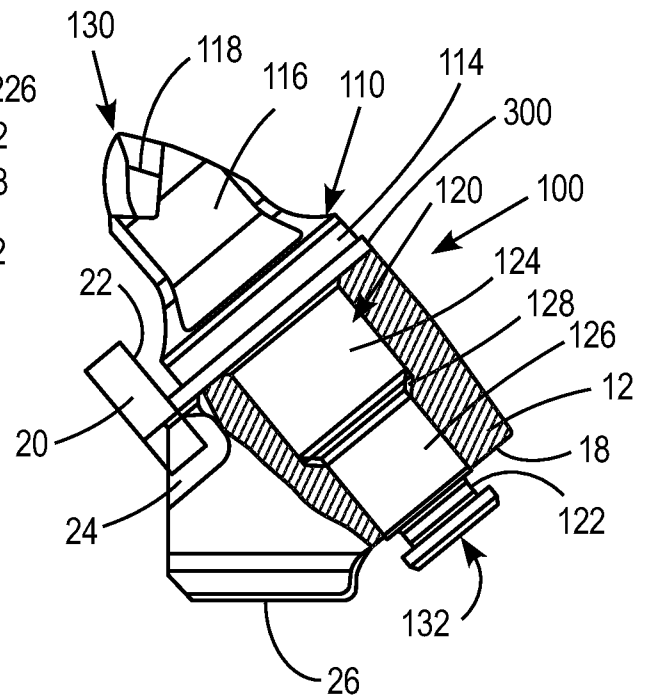


FIG. 4

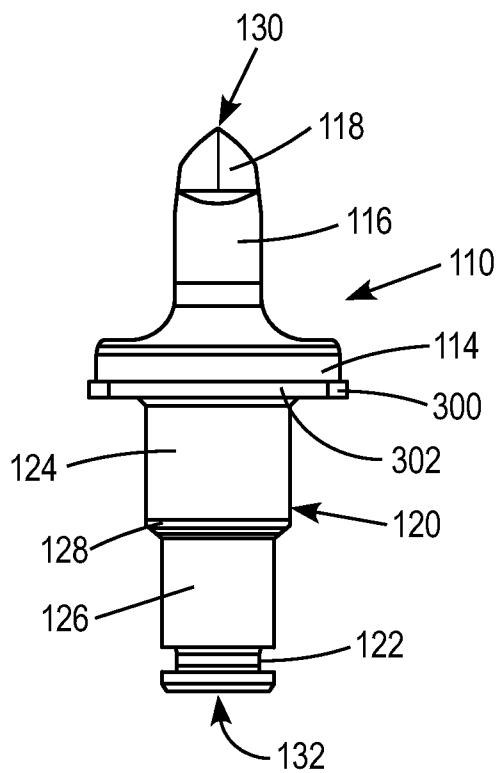


FIG. 6A

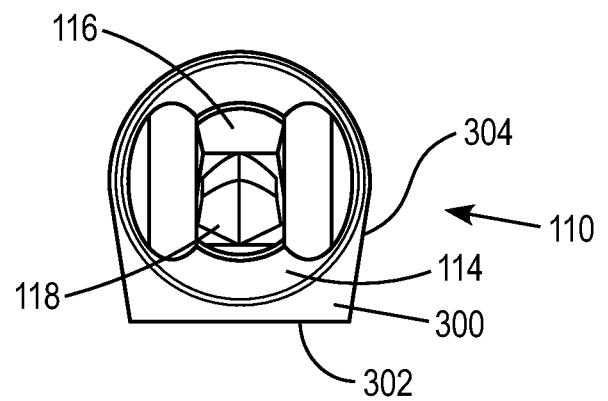


FIG. 6B

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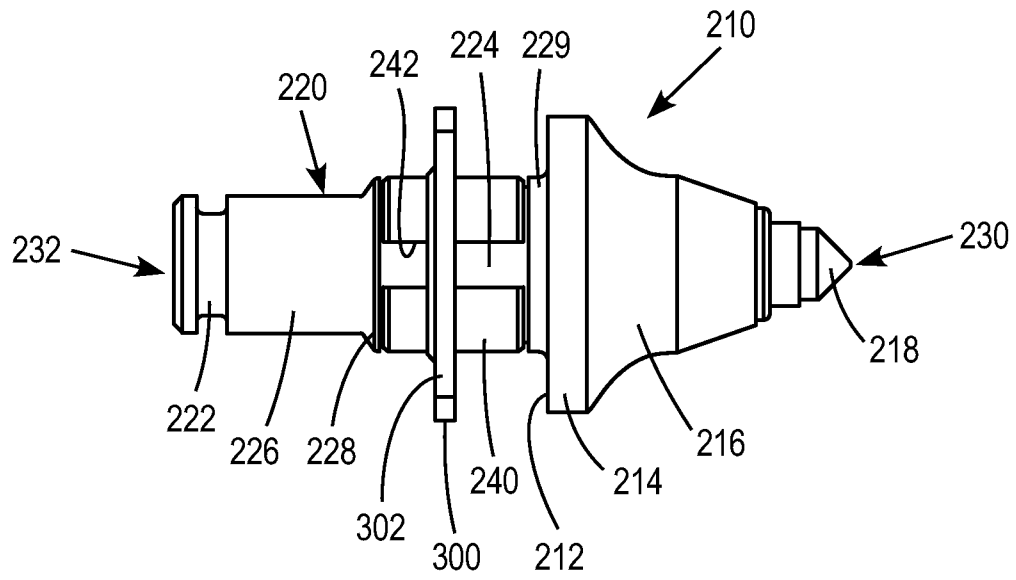


FIG. 7A

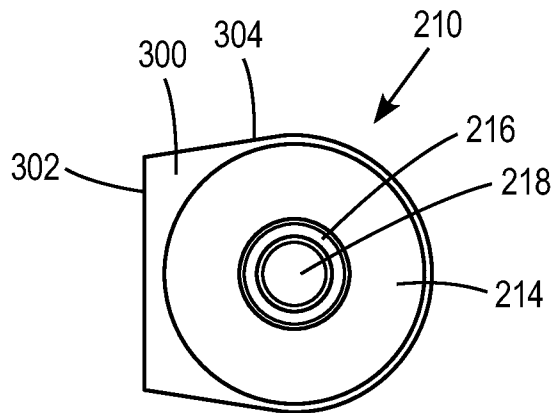


FIG. 7B

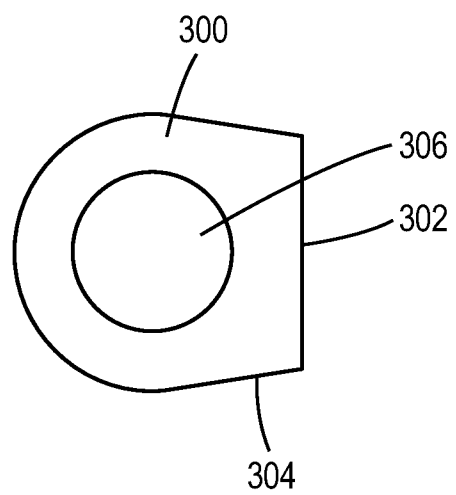


FIG. 8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE2011/050544

A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet

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: E02F, E21C

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

SE, DK, FI, NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, PAJ, WPI data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4727664 A1 (HEMPHILL CHARLES W), 1 March 1988 (1988-03-01); figures 1-17; claims 1-18 --	1-4, 7, 9, 11
A	US 4915454 A1 (SOUTHERN PHILIP W), 10 April 1990 (1990-04-10); figures 1b,3 --	1-11
A	WO 2009139691 A1 (SANDVIK INTELLECTUAL PROPERTY ET AL), 19 November 2009 (2009-11-19) --	1-11
A	US 20090200855 A1 (HALL DAVID R ET AL), 13 August 2009 (2009-08-13); whole document --	1-11



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Date of the actual completion of the international search

01-11-2011

Date of mailing of the international search report

14-11-2011

Name and mailing address of the ISA/SE

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Box 5055

S-102 42 STOCKHOLM

Facsimile No. + 46 8 666 02 86

Authorized officer

Christer Bäcknert

Telephone No. + 46 8 782 25 00

INTERNATIONAL SEARCH REPORTInternational application No.
PCT/SE2011/050544

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 1915152 A1 (EICKHOFF GEB), 1 October 1970 (1970-10-01); whole document -- -----	1-11

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International Patent Classification (IPC)

E21C 35/19 (2006.01)

E21C 35/18 (2006.01)

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/SE2011/050544

US	4727664	A1	01/03/1988	NONE		
US	4915454	A1	10/04/1990	NONE		
WO	2009139691	A1	19/11/2009	AU	2009247004	A1 19/11/2009
				CA	2723278	A1 19/11/2009
				DE	112009001038	T5 28/04/2011
				PL	393049	A1 26/04/2011
				US	20110109147	A1 12/05/2011
US	20090200855	A1	13/08/2009	US	7992944	B2 09/08/2011
				US	20090200857	A1 13/08/2009
DE	1915152	A1	01/10/1970	NONE		