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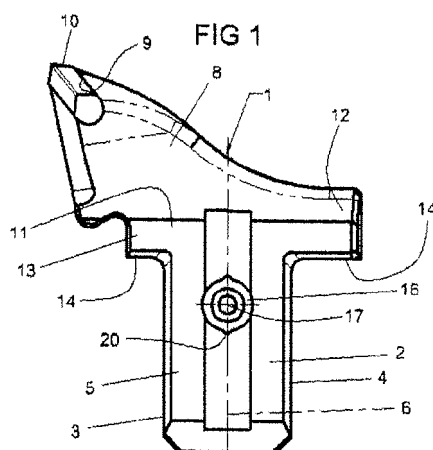
(54) **Mineral winning pick, pick box, and combination**

(57) A mineral cutter pick (1) has an oblong section to define leading (3), trailing (4) and side (5) faces of a shank (2), and hence has longitudinal and transverse axes (6, 7). The shank (2) is provided with a single, circular section through hole (16) extending orthogonally across its side faces (5), in which hole (16) is fitted a resilient member (17) of circular section with an external diameter to match that of the hole (16), the resilient member (17) itself having a coaxial through hole (18) so as to provide an annulus of constant thickness when uncompressed and adapted, in use, after the pick shank (2) has

been inserted into a shank-receiving aperture (22) of a pick box (5), to itself receive, and frictionally retain, a manually insertable, and manually removable, metal pin (23) adapted to project beyond the side faces (5).

The invention also includes a pick box (15), to receive the shank (2) comprising a body (28) provided with a through hole (31) extending orthogonally across the body (28) and adapted, in use, to intersect with the through hole (18) of the resilient member (17).

The invention also includes a pick and box combination.



Description

Field of Invention

[0001] This invention relates to a pick, to a pick box in which is located a shank of a replaceable pick for use in mineral winning operations, and to a combination of pick and box.

Background of the Invention

[0002] In GB 1062752 for instance is illustrated a so-called bayonet lock pick, which has been an industry-standard for the last 40 years or so, particularly for the mining of coal. It will be observed that a bayonet lock pick has a shank provided with an acute angled through hole across its side cheeks, in which hole is secured a resilient bush, in which bush is permanently located a metal pin with projecting ends adapted in use, to engage 'L'-shaped recesses machined into side cheek of a pick box, to releasably latch the pick to the box.

[0003] However, the need to machine the 'L'-slots into both side cheeks of the pick box, the attendant machining costs, and the consequent metal removal from the pick box, result in an inevitable weakening of the pick box, which was, and is, of consequence if the pick is subjected in service to some lateral loading, with the result that cheeks were frequently broken from pick boxes. As the pick boxes are welded around the periphery of a rotary cutting head of a shearer type or continuous type mining machine, with typically 50-70 picks on a shearer head, breakage of a certain number of boxes can be tolerated before broken boxes must be removed, and replaced by fresh boxes, and if this is not as part of scheduled maintenance, then unscheduled loss of production results.

[0004] However, replacement of bayonet lock picks by a simple tool was, and is, an advantage of the bayonet lock tooling system in difficult coal mining conditions, whereas in the winning of other minerals such as potash, the desirability for a simple, screwless means of pick replacement is not as marked.

[0005] In GB 2420360 is described a solution to this problem in providing a pick, pick box and combination for non-coal winning operations in which a non-headed pin could be knocked into, or from, a rubber insert carried by the pick, from either side.

[0006] The rubber insert of GB 2420360 requires the drilling of first and second intersecting holes through the pick shank, as can be seen from Figure 1 of GB 2420360. In addition, it can be seen from Figure 2 of GB 2420360, the support provided to the pin by the rubber insert was asymmetrical in that the available wall thickness of the rubber varied depending on the angular zone under consideration.

Object of the Invention

[0007] A basic object of the present invention is the

provision of an improved pick, pick box and combination, particularly for non-coal mining operations.

Summary of a first aspect of the invention

[0008] According to a first aspect of the invention, there is provided a mineral cutter pick comprising a shank of generally oblong section so as to have leading and trailing faces that are shorter than the resulting longer side faces, and hence to have a longitudinal axis and a transverse axis, an enlarged head formed integrally with the shank and provided at a cutting tip with a carbide insert, with a transition portion between the shank and head incorporating a rear heel and a forward toe, both having under surfaces adapted, in use, to seat on portions of an upper surface of a pick box, wherein the shank has a single, circular section through hole extending orthogonally across its side faces, in which through hole is fitted a resilient member of circular section with an external diameter to match that of the through hole of the shank, the resilient member itself having a coaxial through hole so as to provide an annulus of constant thickness when uncompressed and adapted, in use, after the pick shank has been inserted into a shank-receiving aperture of a pick box, to itself receive, and frictionally retain, a manually insertable, and manually removable, metal pin having ends adapted to project beyond the side faces of the shank, such that the pin is capable of being knocked in from either side of the shank.

Summary of the second aspect of the invention

[0009] According to the present invention, there is provided a pick box, to receive the shank of a pick in accordance with the first aspect, comprising

- (i) a body adapted, in use, to be secured by welding to a shearer drum or other rotary mineral winning/cutting head;
- (ii) a generally rectangular aperture provided in the body and adapted, in use, to receive a generally rectangular shank of a pick in accordance with the first aspect; and
- (iii) a through hole extending orthogonally across the body and adapted to intersect the through hole of the resilient member of the inserted shank of the pick of the first aspect.

Summary of the third aspect of the Invention

[0010] According to a third aspect of the invention there is provided, in combination, a pick in accordance with the first aspect, the shank of which pick is inserted into an aperture of a pick box in accordance with the second aspect, and is releasably retained by a metal pin which is capable of being knocked into the intersecting through hole of the pick box and co-axial through hole of the resilient member from either side of the pick box.

Advantages of the Invention

[0011] With regard to the pick shank, the need to drill two intersecting through holes is eliminated, thereby reducing production costs, whilst the provision of a circular resilient member with a coaxial bore ensures the same wall thickness over 360° is available to support the pin and to accommodate pick wear or fretting.

[0012] As with the knock-in, knock-out pin proposal of GB 2420360, and also as the conditions prevailing in e.g. a potash mine, are less troublesome than a coal mine, operatives are presented with minimal problems in inserting the pins e.g. simply by knocking them in with a hammer, and removing the pins when pick changing is required.

Preferred or optional features

[0013] The pin is non-headed, so that, in addition from being insertable from either side of the shank, the pin is also extractable from either side of the shank e.g. by being knocked out or pulled out with pliers.

[0014] The resilient member is of synthetic rubber.

[0015] The pin is of steel.

Brief Description of the Drawings

[0016] One example of pick, pick box, and combination of pick box and pin are shown in the accompanying drawings, in which:

Figure 1 is a side elevation of a pick in accordance with the first aspect of the invention;

Figure 2 is a plan view of Figure 1 but with a pin inserted;

Figure 3 is a front elevation of Figure 1;

Figure 4 is a side elevation of a pick box in accordance with the second aspect of the invention;

Figure 5 is a plan view of Figure 4;

Figure 6 is a side elevation of a combined pick and box in accordance with the third aspect of the invention; and

Figure 7 is a section on the line VII-VII of Figure 6.

Detailed Description of the Drawings

[0017] In the drawings, a mineral cutter pick 1 comprises a shank 2 of generally oblong section so as to have shorter leading and trailing faces 3,4, and longer side faces 5 and hence to have a longitudinal axis 6 and a transverse axis 7. An enlarged head 8 is formed integrally with the shank 2 and is provided at a recess 9 to house a carbide insert 10. A transition portion 11 between the shank 2 and head 8 incorporates a rear heel 12 and a forward toe 13, both having under surfaces 14 adapted, in use, to engage seating surfaces provided, in the conventional manner, by a pick box 15. The shank 2 has a single, circular section through hole 16 extending orthog-

onally across its side faces 5 with respect to the longitudinal axis 6. The hole 16 is fitted with a resilient member 17 of synthetic rubber, intended to be pushed into place by hand, and itself having a through hole 18, the resilient member 17 being circular section with an external diameter match to match that of the through hole 16 of the shank 2, so that the resilient member 17 provides an annulus of constant thickness when uncompressed. A frusto-conical lead-in portion 19 is provided at each end of the through hole 18, whilst the resilient member 17 is also provided with diametrically opposed ribs 20 which become compressed when the resilient member 17 is pushed into the hole 16, to prevent loss of the resilient member 17 during transportation. The resilient member 17 is adapted, in use, after the pick shank 2 has been inserted into a shank-receiving aperture 22 of the pick box 15, to itself receive, and frictionally retain, a manually insertable, and manually removable, non-headed steel pin 23 having at one end a conical nose 24, and at the other end a circumferential groove 25, engageable by a simple extraction tool such as a screwdriver blade, with the pin 23 being of such overall length that it projects at portions 26, and 27 beyond both side faces 5 of the shank 2.

[0018] The pick box 15, comprises a body 28 having a longitudinal axis 29, and a transverse axis 30. The body 28 is adapted, in use, to be secured by welding to a shear-er drum or other rotary mineral winning/cutting head (not shown). The aperture 22 has of course a profile matching that of the shank 2 of a pick 1. An orthogonal through hole 31 is drilled across the pick box 15/body 28 such that the hole 31 intersects the through hole 18 of the resilient member 17 of the shank 2 of the inserted pick 1, the hole 31 being slightly oversized with respect to the diameter of the pin 23. As can be seen from Figure 7, when the pin 23 is pushed or knocked into place, lower portion 32 of resilient member 17 becomes compressed, urging upper surfaces of the projecting portions 26 and 27 of the pin 23 into engagement with upper surfaces of the hole 31 at each side of the shank-receiving aperture 22.

[0019] In use, the pins 23 are inserted simply by knocking them in with a hammer from either side of the shank 2, or the pick box 15, whichever is more accessible for the operative, and extracted by knocking them out with a hammer and/or pulling them out with pliers, when pick changing is required. Furthermore, if, as is preferred, the pin 23 is not headed, it can also be knocked in, or out, from either side of the shank 2 or the pick box 15, whichever is more accessible to the operative.

Claims

1. A mineral cutter pick(1) comprising a shank (2) of generally oblong section so as to have leading and trailing faces (3, 4) that are shorter than the resulting longer side faces (5), and hence to have a longitu-

dinal axis (6) and a transverse axis (7), an enlarged head (8) formed integrally with the shank and provided at a cutting tip with a carbide insert (10), with a transition portion (11) between the shank (2) and head (8) incorporating a rear heel (12) and a forward toe (13), both having under surfaces (14) adapted, in use, to seat on portions of an upper surface of a pick box (15), **characterised in that** the shank has a single, circular section through hole (16) extending orthogonally across its side faces (3, 4), in which through hole (16) is fitted a resilient member (17) of circular section with an external diameter to match that of the through hole (16) of the shank (2), the resilient member (17) itself having a coaxial through hole (18) so as to provide an annulus of constant thickness when uncompressed and adapted, in use, after the pick shank (2) has been inserted into a shank-receiving aperture (22) of a pick box (15), to itself receive, and frictionally retain, a manually insertable, and manually removable, metal pin (23) having ends (26, 27) adapted to project beyond the side faces (3, 4) of the shank (2), such that the pin (23) is capable of being knocked in from either side of the shank (2).

ber (17), from either side of the pick box (15).

2. A pick as claimed in Claim 1, **characterised in that** the pin (23) is non-headed.
3. A pick as claimed in Claim 1, or Claim 2, **characterised in that** the resilient member (17) is of synthetic rubber.
4. A pick as claimed in any preceding claim, **characterised in that** the pin (23) is of steel.
5. A pick box (15), to receive the shank (2) of a pick (1) in accordance with any one of Claims 1 to 4, comprising
 - (i) a body (28) adapted, in use, to be secured by welding to a shearer drum or other rotary mineral winning/cutting head;
 - (ii) a generally rectangular aperture (22) provided in the body (28) and adapted, in use, to receive a generally rectangular shank (2) of a pick (1); and
 - (iii) a through hole (31) extending orthogonally across the body (28) and adapted to intersect the through hole (18) of the resilient member (17) of the inserted shank (2) of the pick (1).
6. In combination, a pick (1) in accordance with any one of Claims 1 to 4, the shank (2) of which pick (1) is inserted into an aperture (22) of a pick box (15) as defined in Claim 5, and is releasably retained by a metal pin (23) which is capable of being knocked into the intersecting through hole (31) of the pick box (15) and co-axial through hole (18) of the resilient mem-

FIG 6

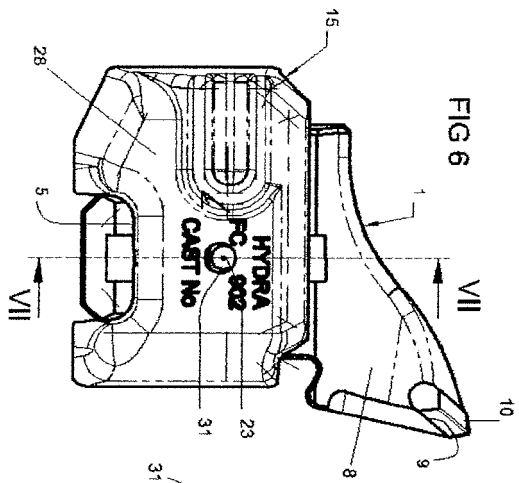


FIG 7

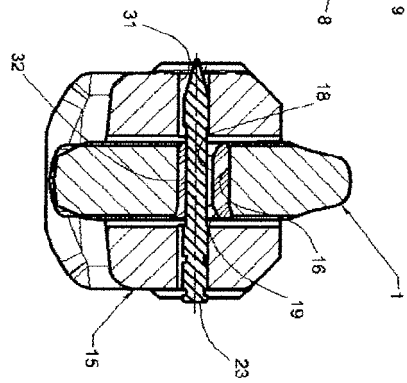


FIG 3

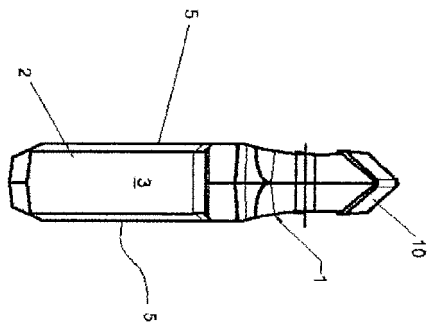


FIG 1

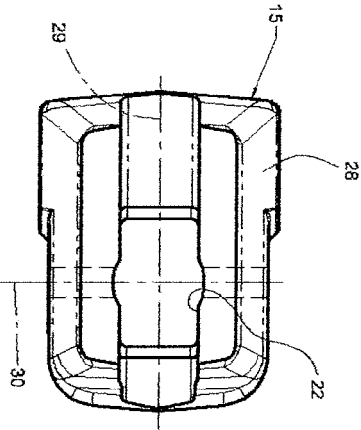
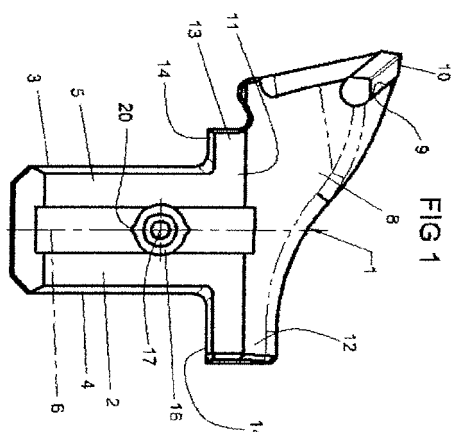


FIG 5

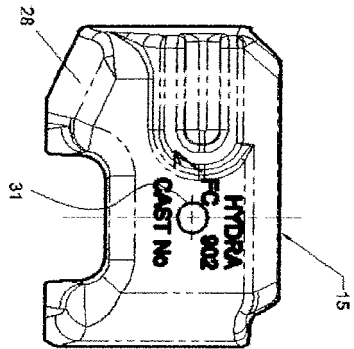


FIG 4

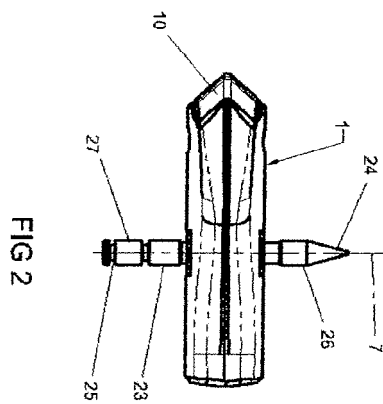


FIG 2

REFERENCES CITED IN THE DESCRIPTION

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