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(54) Cutter picks for mineral cutting

(57) For use in mineral cutting the invention provides a point attack pick (20) which can be used in a forward attack pick box (18) alternatively to a forward attack pick (2). The point attack pick is made in two parts comprising an adaptor part (22) and a cutter part (32). The adaptor part fits the pick box and has a socket (30) in its forward end. The point attack cutter part has a shank which is received rotatably in the socket. The radial projection distance of the heads of the alternative picks in the pick box is substantially the same. The two forms of pick can thus be exchanged easily to suit changes in cutting conditions without adjusting the settings of the cutting machine.

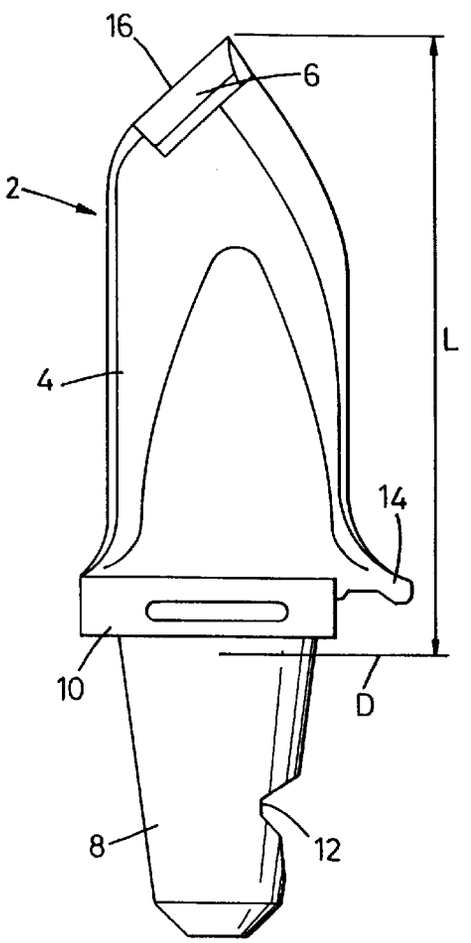

Fig. 2

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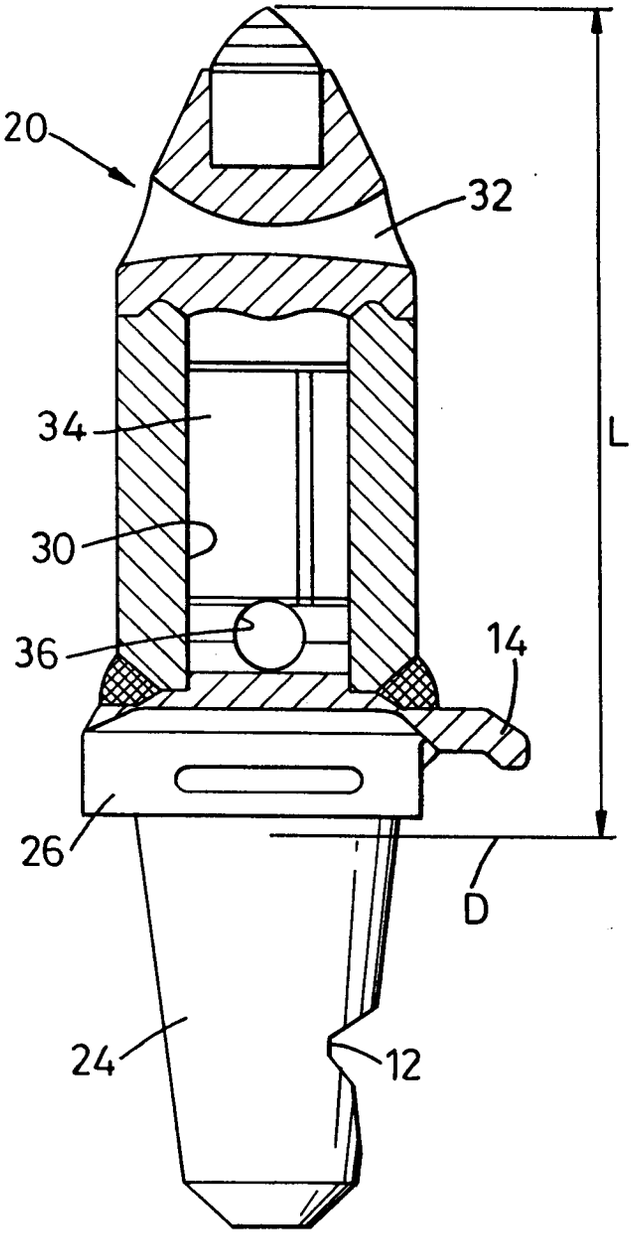

Fig. 5

This invention relates to tooling, to be used on cutter drums or chain cutters for example, for mineral cutting, which may include such applications as mining, earth and rock cutting and trenching.

Drum or chain cutters carry a large number of cutter picks which are held replaceably in pick boxes on the machine. For coal cutting in particular these picks fall into three general types known as radial attack, forward attack and point attack picks. A radial attack pick projects generally perpendicular to the direction of advance and is suitable for use in softer conditions but the pick shank is subject to large bending moments. The forward attack pick has its shank inclined forwards in the direction of advance to avoid this weakness. The point attack pick, unlike the first two types, is rotatable in the pick box; it also projects forwards of the pick box and is more effective in harder cutting conditions.

It is often necessary to change over from radial or forward attack picks to point attack picks and vice versa because of changing cutting conditions. This requires considerable time because it is necessary to replace the drum or chain and reset the machine. There is the additional complication that different pick boxes must also be made available to hold the alternative fixed and rotatable picks.

It is true that GB 2207691A illustrates a radial attack pick box provided with a two-part pick carrying a point attack head that can be used in place of a radial attack pick. This avoids the need to change the drum or chain, but lengthy resetting of the machine is still necessary. In other respects the effort required to make the changeover is not reduced. This known arrangement also leaves the problem that substantial bending loads imposed at the transition between the radial pick shank received in the pick box and the forwardly angled outer portion of the pick limits the conditions in which the advantages of the point attack configuration can be used.

According to the present invention, there is provided a combination of a forward attack pick box and pick with a two-part point attack pick comprising an adaptor part fitting said pick box and having a socket in its forward end to receive a cutter part having a point attack head and a shank locatable rotatably in the socket, the radial projection distance of said point attack head when assembled in the pick box being substantially the same as that of the head of the forward attack pick.

Such an arrangement can produce substantial savings of time when it is required to change over a cutting machine from one type of pick to the other. It is merely necessary to remove one set of picks, whether the forward attack type or point attack type, and insert the other set of picks. No resetting is needed because the replacement picks are then at the correct position in the cutting machine to resume the cut that may have been interrupted to make the changeover.

Preferably, the box has a tapering circular cross-section opening for the shank of either form of pick and locking means to hold the pick in the box.

In another preferred feature, the socket of the point attack adaptor part terminates outwardly of a shoulder portion of said part adapted to bear against the exterior of the pick box.

The invention also includes a two-part point attack pick for use with a forward attack pick box.

An embodiment of the invention will be described in more detail with reference to the accompanying drawings, in which:

Figs. 1 and 2 are front and side views of a forward attack pick for use in a combination according to the invention,

Fig. 3 illustrates the pick of Figs. 1 and 2 in its pick box, and

Figs. 4 and 5 are partly sectional views in the same directions of a point attack pick providing another part of the combination.

The forward attack pick 2 of Figs. 1 and 2 comprises a body 4 having a cutting tip 6 brazed into its forward end and at its rear a conically tapered shank 8 to be received in a pick box 18 (Fig. 3) having a complementary taper bore and terminating at a shoulder portion 10 which lies close to the outer face of the pick box. The outer tip of the pick terminates close to the central axis of the shank 8.

The shank 8 and the pick box bore both have a circular cross-section but a recess 12 is provided in the shank to receive a locking device 19 projecting into the recess from the pick box to hold the pick in the box.

The shoulder portion 10 is adapted to seat in a recess on the exterior of the pick box which holds the pick non-rotatably. A spur 14 is spaced from the pick box to provide a purchase for levering the pick from the box. The pick box will be so arranged on the cutting machine that the front face 16 of the insert is substantially perpendicular to its direction of advance.

In the point attack pick 20 of Figs. 4 and 5, an adaptor part 22 has an identical conically tapered shank 24, with recess 12, and shoulder portion 26 to the corresponding parts 8,10 of the forward attack pick 2 but the portion 28 of the adaptor projecting forwards of the shoulder portion 26 has a cylindrical cross-section. A central circular bore 30 in the front of the adaptor part 22 forms a socket receiving the cutter part 32 of the pick, the shank which is provided with a spring clip 34 to hold it in place in the adaptor part while allowing it to rotate in known manner. A cross-bore 36 in the adaptor part allows a drift (not shown) to be inserted to release the cutter part.

The locking device engaging with the recess 12 in either tool 2 or 20 draws the tool into the pick box 18 and the shoulder portion 10 or 26 close to the front face of the box in a conventional manner. The two

tools illustrated have an identical length L from a location datum D on the conically tapered shank to the tip of the tool, although they have very different forms of these regions forward of the shank. The location datum D represents the outer end of the pick box bore and is shown slightly spaced from the shoulder 10 or 26 so as to allow some wear to occur the pick box bore without affecting the fit of the tapered shank in it.

In use, if it has been necessary to stop a cutting operation using forward attack picks, because the conditions have become too hard for those picks to be used effectively, the picks can be simply removed from the pick boxes to be replaced by the two-part point attack picks and the machine restarted. No resetting is needed as a result of the change of tooling. Return to the use of the forward attack picks can be made equally easily when required.

Claims

1. A pick box (18) in combination with a plurality of picks, characterised in that said picks comprise a forward attack pick (2) and a point attack pick (20) alternatively receivable in the pick box, the point attack pick comprising adaptor and cutter parts (22,32), the adaptor part (22) having a shank (24) fitting said pick box and a socket (30) in its forward end to receive the cutter part (32) which has a point attack head, a shank of the cutter part being locatable rotatably in the adaptor part socket, the distance of projection of said point attack head from the pick box when received in the pick box being substantially the same as that of the head of the forward attack pick of the combination.

2. The combination of claim 1 wherein the pick box (18) has a tapering circular cross-section opening, the shanks (8,24) of both said picks having a complementary cross-section fitting said opening, and locking means (19) are provided to fix the shank of either pick against rotation in the box.

3. The combination of claim 1 or claim 2 wherein the point attack pick adaptor part (22) has a shoulder portion (26) adapted to bear against the exterior of the pick box and the socket (30) of said adaptor part terminates radially outwardly of said shoulder portion.

4. The combination of any one of claims 1 to 3 wherein the socket (30) and shank (24) of the point attack pick adaptor part are substantially coaxial.

5. The combination of any one of claims 1 to 4 wherein the forward attack pick cutting face has its radially outer extremity close to the central axis of the pick shank.

6. A two-part point attack pick having an adaptor part (32) according to claim 3 or claim 4.

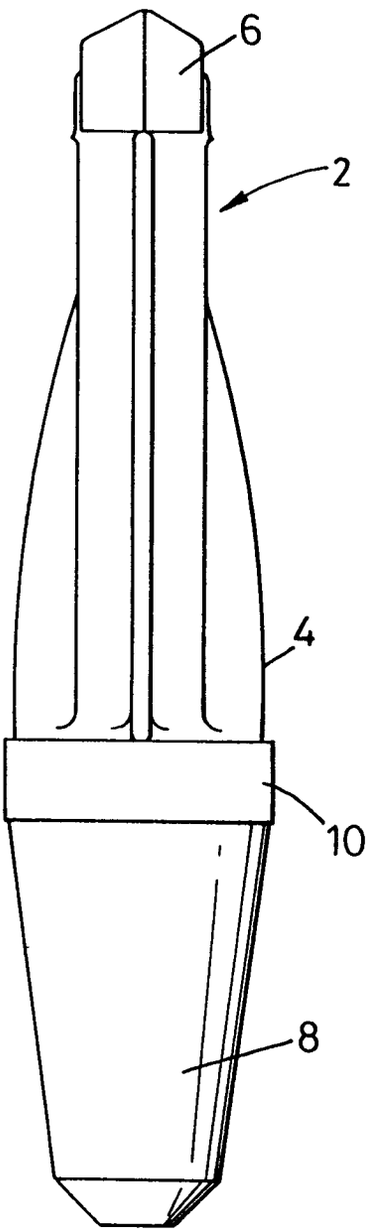

Fig. 1

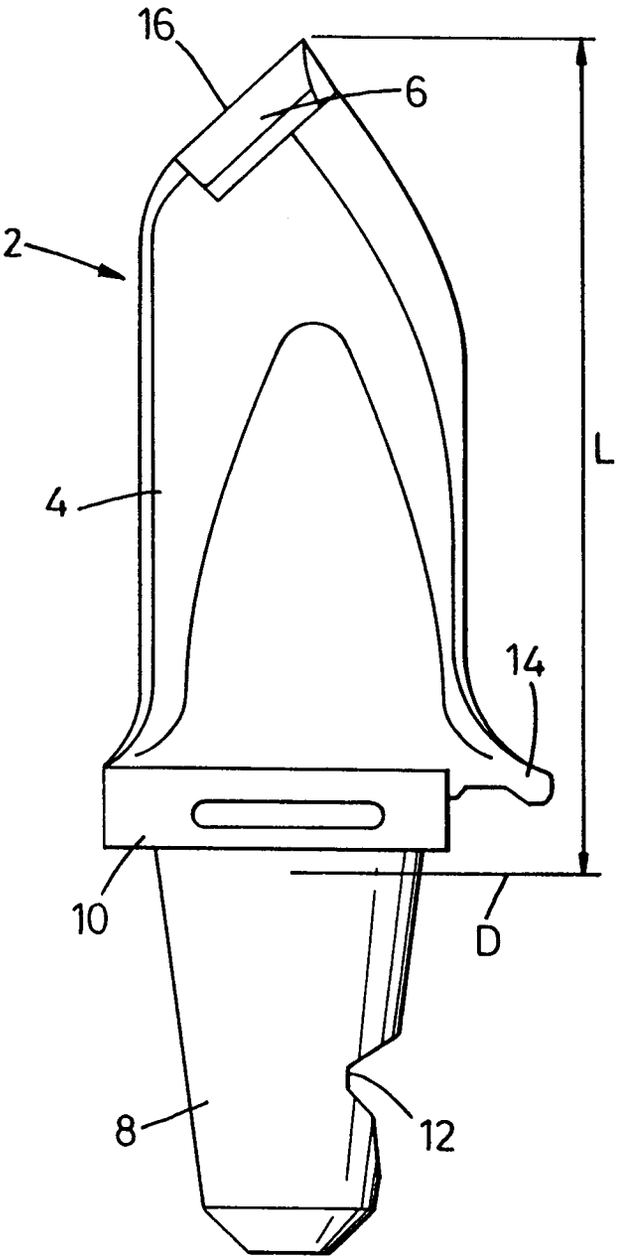

Fig. 2

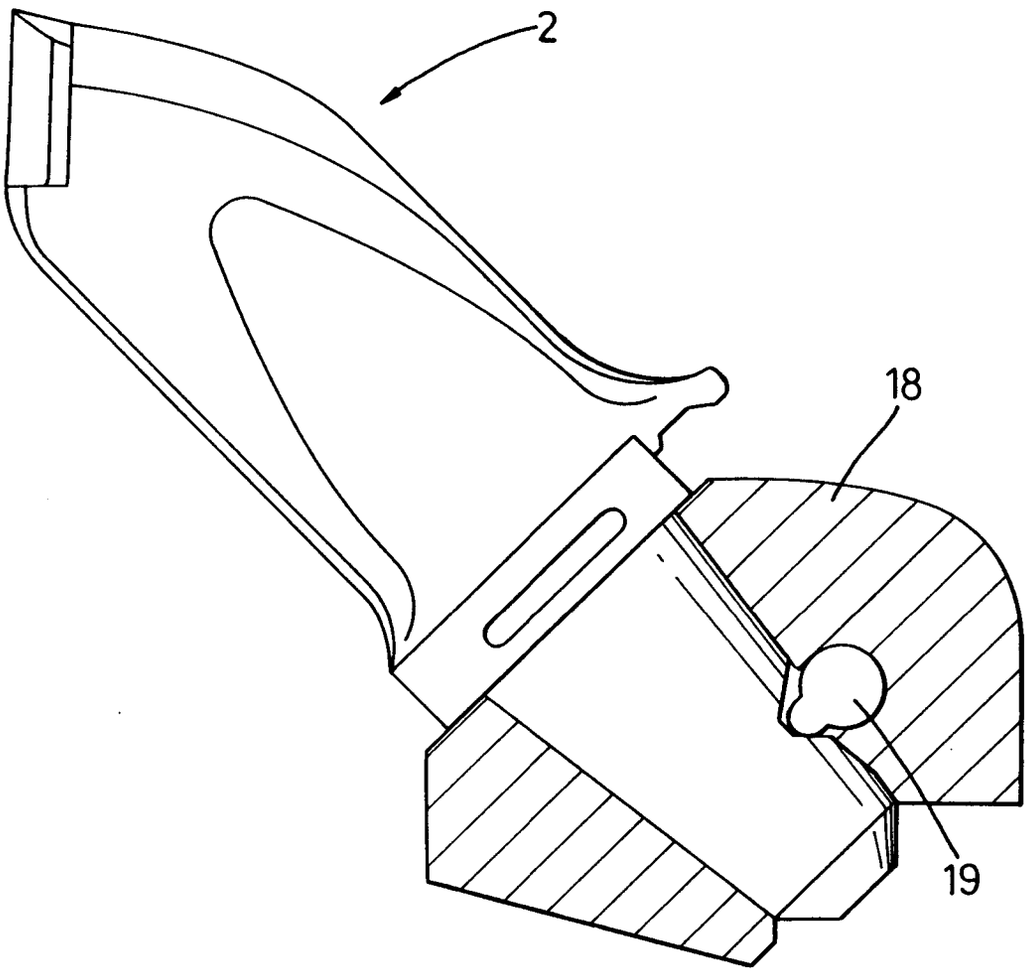

Fig. 3

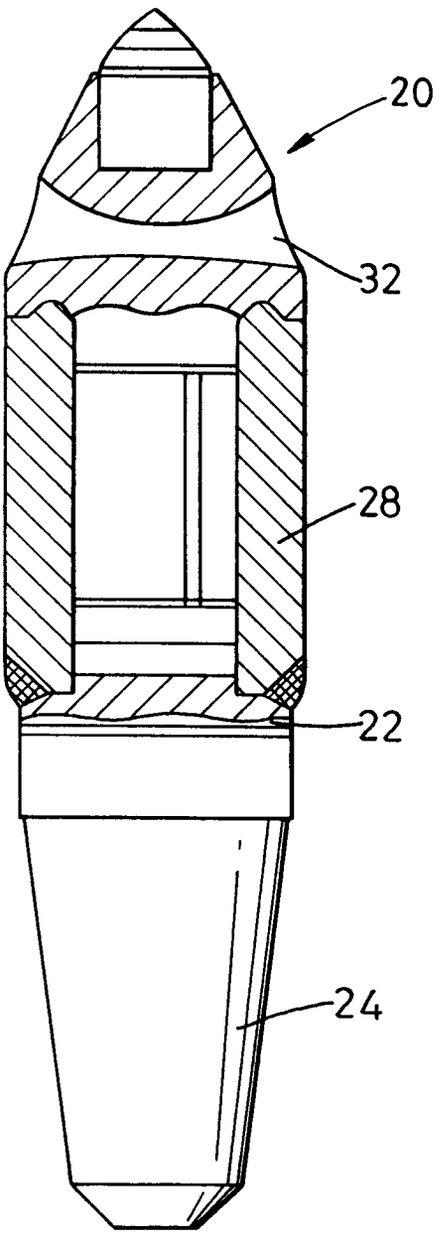

Fig. 4

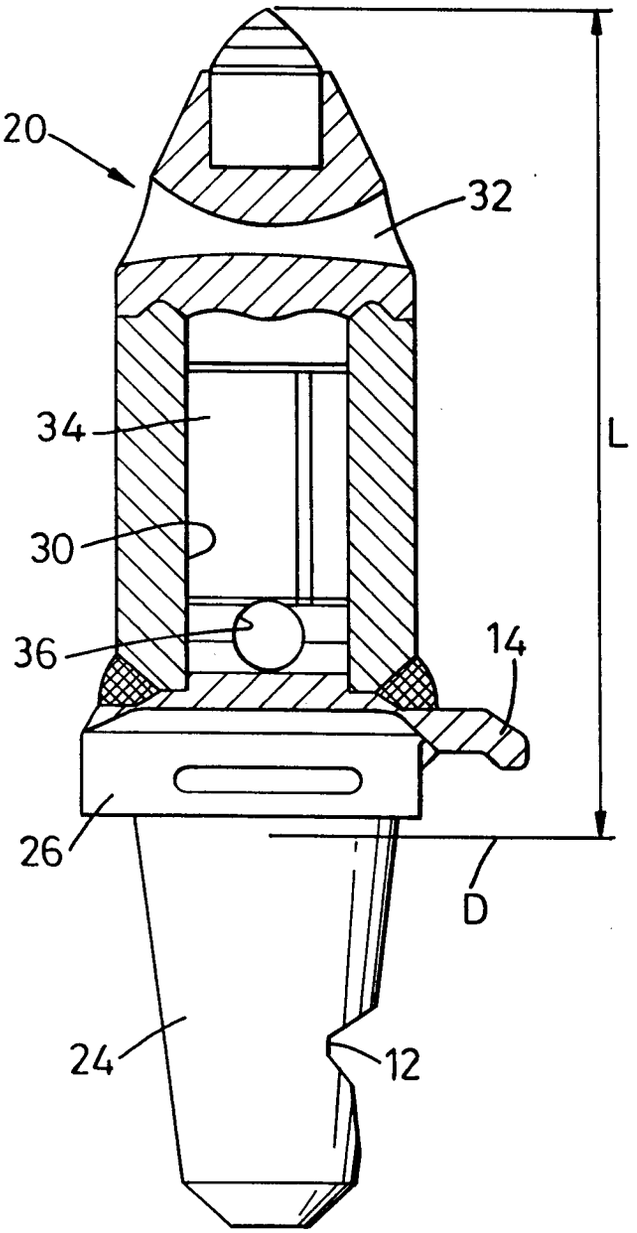

Fig. 5

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 30 4051

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.6)
Y	US-A-3 519 309 (E.W.ENGLE) * column 4, line 28 - line 52; figure 6 *	1-6	E21C35/19
Y	GB-A-2 129 853 (WIMET MINING LTD.) * the whole document *	1-6	
A	DE-A-29 38 453 (W.HARTMETALL GMBH) * figures 1,4 *	1,3,5	
A	US-A-4 084 856 (K.C.EMMERICH) * the whole document *	1,3,4	
A	GB-A-2 223 045 (SANDVICK AUSTRALIA) * figures 2,3 *	1	
A	DE-A-38 15 249 (F.M.KOMOTZKI)		
A	GB-A-2 111 558 (THE CINCINNATI MINE)		

TECHNICAL FIELDS SEARCHED (Int.Cl.6)
E21C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	28 September 1995	Fonseca Fernandez, H

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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