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NOTICE OF ENTITLEMENT

WE, CUTINCOAL PTY LIMITED, 12 Walker Street, New South Wales, 2282, Australia being the applicant in respect of Application No. 64214/94, state the following:-

1. CUTINCOAL PTY LIMITED is the Nominated Person in respect of the application.
2. The actual inventor, the subject of the application, is KIERON DENZ.
3. The Nominated Person, CUTINCOAL PTY LIMITED, is entitled to the grant of the patent in respect of the application because the Nominated person derived title to the invention from the said inventor by way of Assignment.
4. The Nominated Person is entitled to claim priority from the application listed in the Declaration under Article 8 of the PCT because the Nominated Person is the Assignee of the Applicant in respect of the application listed in the Declaration under Article 8 of the PCT, and because the application was the first application made in a Convention country in respect of the invention the subject of the application.

Peter Steame

16 April, 1996

A member of the firm of DAVIES COLLISON CAVE
for and on behalf of the applicant



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- (56) Prior Art Documents
EP 231107
GB 2101657
WO 91/10807
- (57) Claim

1. A coal or rock pick including a body with a cone shaped head and shank extending therefrom, a securing clip housed in a circumferential groove adjacent the end of the shank remote from the head, an open ended longitudinal axial bore extending from the apex of the cone and closed at its inner end, said bore constituting a magazine for an array of pick points sequentially housed therein which in use are adapted to be exposed for cutting action when the outermost pick point is worn away or broken.



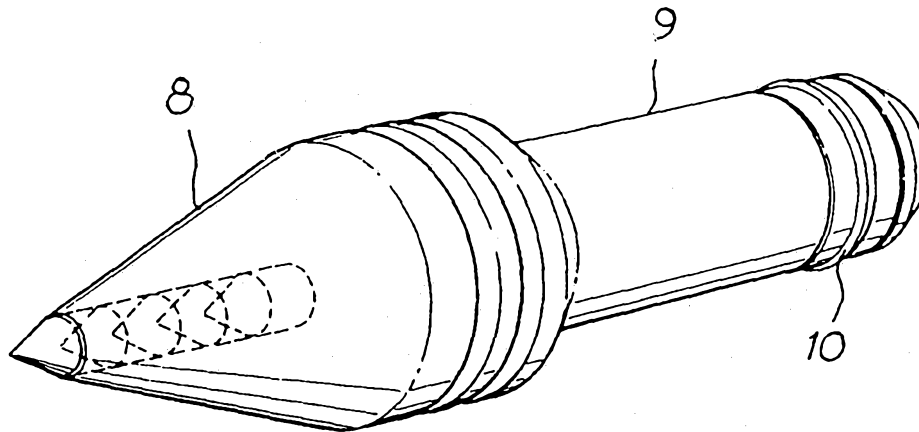
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(21) International Application Number: PCT/AU94/00183 (22) International Filing Date: 13 April 1994 (13.04.94) (30) Priority Data: PL 8811 14 May 1993 (14.05.93) AU (71) Applicant (for all designated States except US): CUTINCOAL PTY LIMITED [AU/AU]; 12 Walker Street, Warners Bay, NSW 2282 (AU). (72) Inventor; and (75) Inventor/Applicant (for US only): DENZ, Kieron [AU/AU]; 60 Harrison Street, Belmont North, NSW 2280 (AU). (74) Agent: SMEETON, Anthony, Richard; Davies Collison Cave, Level 10, 10 Barrack Street, Sydney, NSW 2000 (AU).	(81) Designated States: AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, ES, FI, GB, GE, HU, JP, KG, KP, KR, KZ, LK, LU, LV, MD, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SI, SK, TJ, TT, UA, US, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published With international search report. 669623		

(54) Title: IMPROVEMENTS IN COAL AND ROCK PICKS

(57) Abstract

The invention relates to a coal or rock pick which consists of a pick body with a cone shaped head (8) having a shank (9) extending therefrom and a securing clip (18) housed in a circumferential groove (11) adjacent the end of the shank remote from the head (8). An open ended longitudinal axial bore (12) extends into the pick body from the head (8) which constitutes a magazine for an array of



pick points (13, 14) or an elongated pick point housed therein. Preferably the securing clip (18) comprises a sleeve formed of plastic elastomeric material having a smooth internal bore (19) and an external circumferential flange (20) intermediate its ends. The inner diameter and length of the sleeve being such that it can be force fitted over the shank and accommodated in the circumferential groove (11).

IMPROVEMENTS IN COAL AND ROCK PICKS

This invention relates to picks for use with mining machines and whilst not limited thereto is particularly applicable to picks for use in coal mining machines.

The mining machines with which such picks are used include a circular elongated
5 cutting head having spiral rows of picks mounted thereon. The cutter is rotatably driven from an appropriate power source and is brought into contact with a coal seam. As the head is rotated the picks cut coal from the seam which is subsequently removed by a conveyor and transport means. The number of picks on a cutter head varies however a typical head would have any where from 100 to 300 picks mounted thereon.

10 Mining machines of the aforementioned type are well known in the mining industry and are generally referred to as continuous miners and long wall shearers.

The picks used in such machines include a body or head having a pick point and a shank. The shank has a circumferential groove or channel adjacent its end remote from the pick point which accommodates a clip thereon whereby the pick is mounted in a
15 holder on the cutter head.

A further circumferential groove or grooves is or are located in the head of the pick, the purpose of which will be explained later.

The pick point is formed of a relatively small tungsten carbide or hardened steel insert which is housed in a bore in the pick body and secured thereto by suitable means
20 e.g. silver solder.

A problem exists in connection with such picks in that notwithstanding the prolonged wearing characteristics of such inserts, experience has shown that these inserts still wear out and in some cases are completely worn away. The softer metal of the pick body rapidly wears away resulting in a shortening of the life of the pick and a slowing
25 down of mining operations caused by the time taken to detect a faulty pick and fit a replacement. Additionally damaged picks produce more coal dust and lead to sparking at the coal face which is dangerous.

The securing clip is made of spring steel and is of the split ring type. A number of dimples are pressed outwardly from the surface of the clip to effectively increase its
30 overall thickness dimension.

In order to permit the pick to be secured in a holder in the cutter head the diameter of the clip has to be compressed so as to be accommodated wholly within the mentioned groove. Once in the holder the clip expands to its original diameter and the

dimples lock into a circumferential groove in the holder and so retain the pick therein.

Being of spring steel considerable force is required to cause the securing clip to be accommodated wholly within the groove in the shank and the mounting of the pick within the holder is effected by hammer blows. It sometimes happens that the securing clip is distorted or twisted during installation of the pick. This does not become apparent until mining operations are commenced. The result is the pick is not properly mounted in its holder and is quickly damaged and worn with consequential wear and damage to the holder itself. Also broken or damaged clips could prevent rotation of the pick and allow it to become more easily dislodged from the holder and lost before they are worn out.

The number of picks mounted in a cutter head vary in accordance with the type of head used. As previously stated the number varies from 100 to 300 picks and it is not uncommon to replace up to 75 worn, damaged or lost picks in a normal mining shift.

The removal of worn or damaged picks and the replacement with new ones is a laborious and time consuming operation.

In particular, when a clip is distorted or twisted part of the clip extends down the shank of the pick causing an interference fit between the pick and the holder. Removal of such a pick from its holder is difficult and requires the use of a punch and heavy blows with a seven pound hammer which is both dangerous and time consuming.

In the installation process the shank of the pick has to be driven into the bore in the cutter head and in a removal operation a tool is engaged in the peripheral groove or grooves in the cutter head. In both mounting and dismounting operations force is applied to the pick and tool by hammer blow.

In consequence, securing clips as presently used suffer from a number of disadvantages and there has been a need to provide a securing clip which will not be damaged during installation, which will not damage the holder in the cutting head, which will properly, and securely retain the pick in its holder which will permit the pick to freely rotate in its holder and which leads to ease of operation in the installation and removal of the pick as circumstances dictate.

The present invention provides a pick and a securing clip which overcomes the aforementioned problems and which provides a pick and a securing clip which will last the duration of a mining shift and only has to be replaced during normal maintenance shifts when the machine is not in operation.

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The pick of the invention therefore improves production, is more cost effective than picks currently in use and is safer to install, replace and use.

The invention comprises a coal or rock pick including a body with a cone shaped head and a shank extending therefrom, a securing clip housed in a circumferential groove adjacent the end of the shank remote from the head, an open ended longitudinal bore extending from the apex of the cone and closed at its inner end, said bore constituting a magazine for an array of pick points sequentially housed therein which in use are adapted to be exposed for cutting action when the outermost pick point is worn away or broken.

Preferably the pick point is formed of tungsten carbide or hardened steel and preferably the securing clip comprises a sleeve formed of plastic elastomeric material having a smooth internal bore and an external circumferential flange intermediate its ends, the inner diameter and length of the sleeve being such that it can be force fitted over the shank and accommodated in said groove, the external circumferential flange when the pick is inserted in a holder being accommodated in an internal circumferential flange in the holder to retain the pick therein.

The securing clip is more effective than the spring steel clips as currently used. It effectively retains the pick in its holder until its replacement becomes necessary and it permits the pick to freely rotate in its holder throughout its working life.

The invention will now be described with reference to the accompanying drawings in which:

Fig. 1 is a perspective view of a typical pick currently in use;

Fig. 2 is a perspective view of a typical pick currently in use and showing how the pick body and spring clip are damaged as a result of wearing away of the tungsten carbide insert;

Fig. 3 is a perspective view of a preferred embodiment of the invention;

Fig. 4 is a side elevation of the pick illustrated in Fig. 3, and

Fig. 5 is a perspective view of a securing clip in accordance with the invention.

As illustrated in Fig. 1 the conventional pick includes a cone shaped body or head 1 and a shank 2. The head 1 has a pick point 3 housed in a bore (not shown) in the head and on extraction groove 4. The pick point is secured in a position by any suitable means e.g. silver solder.

The shank 2 forms an integral part of the body 1 which is provided at its rear end with a clip 5 seating in a circumferential groove 6 on the shank whereby the pick is connected to a holder in a cutter head (not shown).



Fig. 2 illustrates the wear and damage caused to the body 1 after the pick point 2 is worn away leaving a typical flattened end 7 which greatly reduced cutting efficiency

The wearing of the pick point and body can occur very rapidly particularly if harder than expected coal and rock formation is encountered during cutting.

In accordance with the preferred embodiment of the invention the pick includes a cone shaped body or head 8 having an integral shank 9 and a clip 10 housed in a circumferential groove 11 in the shank.

The head 8 has an axial bore 12 which forms a magazine and positioned within the magazine are a number of pick points 13, one positioned in front of the other as illustrated in Figs. 3 and 4.

It will be appreciated that as the outer point 13 and associated part of the body 8 is worn away the next point is exposed and so the life the pick is greatly prolonged.

The pick points are of hollow arrow head shape in cross section as illustrated in Fig. 4 however the last point 14 in the array is triangular shaped with a flat base 15 which seats against the blind end of the axial bore 12 to provide solid support for the array of points.

The pick points 13 are formed of tungsten carbide or hardened steel depending on the purpose to which the pick is to be put and secured in the bore 12 by heat shrinkage or silver solder or a combination of these.

The clip 5 in conventional picks is manufactured from spring steel. It is of the split ring type as illustrated in Figs. 1 and 2 and has a number of dimples 16 pressed outwardly therefrom which when the pick is mounted in a holder in the cutter head of a mining machine are accommodated in an internal groove in a holder (not shown).

Fig. 2 illustrates a conventional pick with a damaged spring steel clip 5 thereon. It will be noted that the clip has opened and the wall 17 of the clip has twisted and has been forced over the rear end of the shank 4. This prevents rotation of the pick in the holder and makes it extremely difficult and dangerous to extract it.

Figs. 3, 4 and 5 illustrates securing clip in accordance with this invention.

The clip illustrated in the figures is made from plastic elastomeric material preferably polyurethane and comprises a sleeve 18 having a smooth internal wall 19 and a circumferential flange or bead 20. The inner diameter and length of the sleeve of the



sleeve is such that it can be force fitted over the rear end of shank 4 and accommodated in groove 11. The flange 20 when the pick is mounted in its holder being accommodated in a circumferential groove therein to retain the pick in the holder in a freely rotatable manner.

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The claims defining the invention are as follows:

1. A coal or rock pick including a body with a cone shaped head and shank extending therefrom, a securing clip housed in a circumferential groove adjacent the end of the shank remote from the head, an open ended longitudinal axial bore extending from
5 the apex of the cone and closed at its inner end, said bore constituting a magazine for an array of pick points sequentially housed therein which in use are adapted to be exposed for cutting action when the outermost pick point is worn away or broken.
2. A coal or rock pick as claimed in claim 1 wherein the pick points are formed of tungsten carbide or hardened steel.
- 10 3. A coal or rock pick as claimed in claim 1 wherein the pick points are secured in said bore by heat shrinkage or similar solder or a combination thereof.
4. A coal or rock pick as claimed in claim 1 wherein the securing clip comprises a sleeve formed of plastic elastomeric material having a smooth internal bore and an external circumferential flange intermediate its ends, the inner diameter and length of the
15 sleeve being such that it can be force fitted over the shank and accommodated in said groove, the external circumferential flange when the pick is inserted in a holder being accommodated in an internal circumferential groove in the holder to retain the pick thereon.
5. A coal or rock pick as claimed in claim 4 wherein the sleeve is formed of
20 polyurethane.
6. A coal or rock pick as claimed in claim 1 or 4 wherein the body of the pick has an extraction groove or grooves adjacent its rear end.
7. A coal or rock pick substantially as hereinbefore described with reference to Figs.
3, 4 or 5 of the accompanying drawings.

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ABSTRACT

The invention relates to a coal or rock pick which consists of a pick body with a cone shaped head having a shank extending therefrom and a securing clip housed in a circumferential groove adjacent the end of the shank remote from the head. An open
5 ended longitudinal axial bore extends into the pick body from the head which constitutes a magazine for an array of pick points housed therein.

Preferably the securing clip comprises a sleeve formed of plastic elastomeric material having a smooth internal bore and an external circumferential flange intermediate its ends.
10 The inner diameter and length of the sleeve being such that it can be force fitted over the shank and accommodated in the circumferential groove.



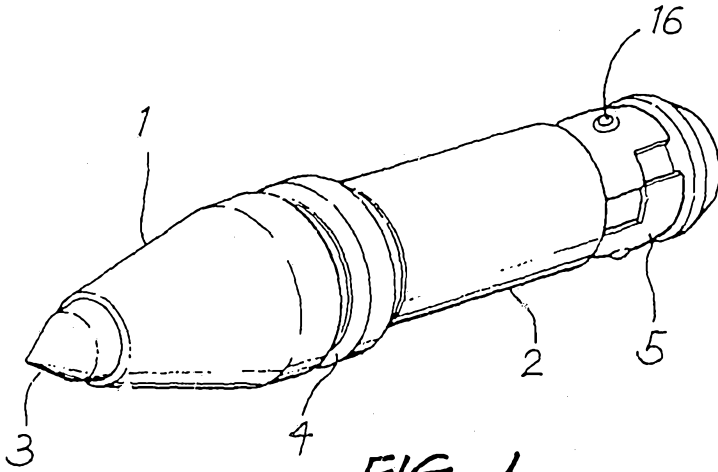


FIG. 1
PRIOR ART

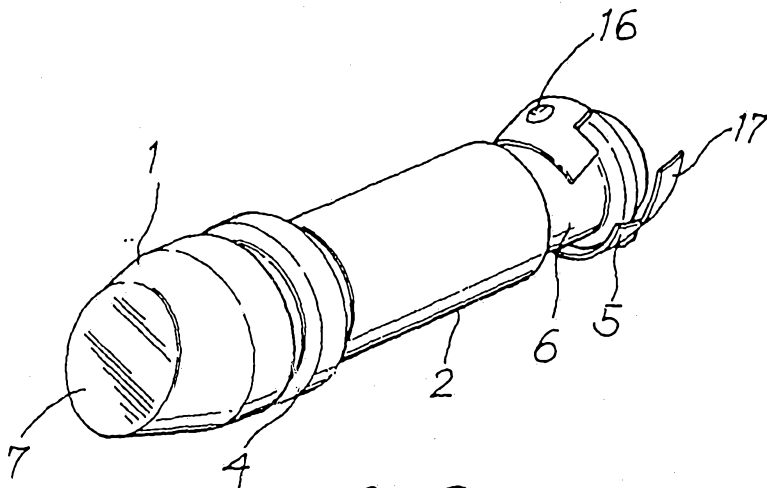


FIG. 2
PRIOR ART

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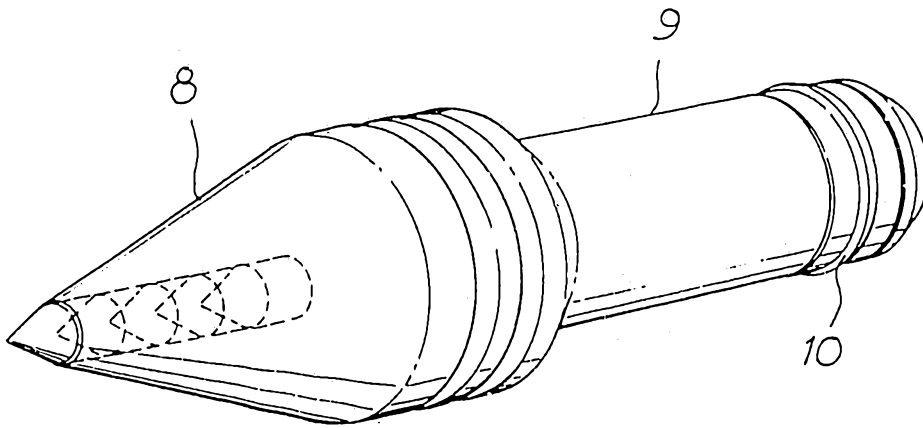


FIG. 3

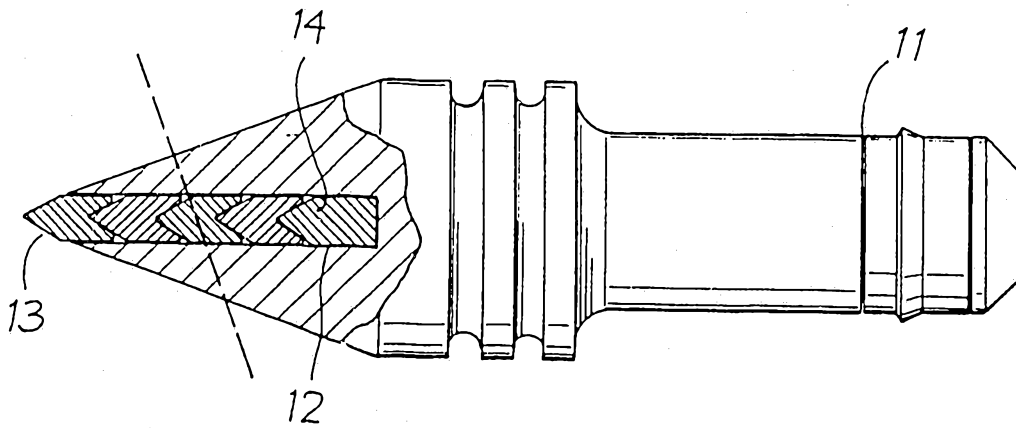


FIG. 4

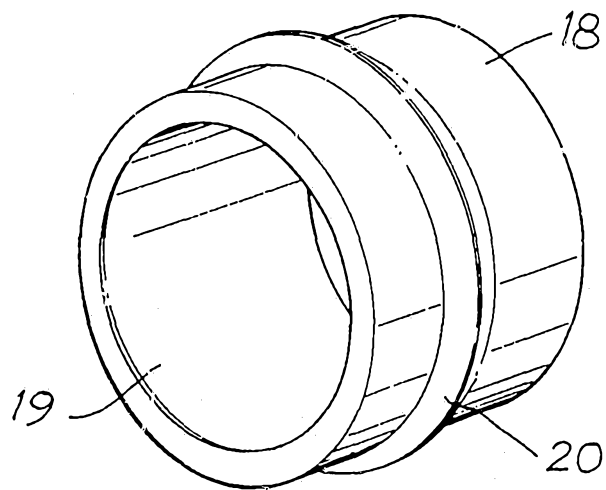


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU 94/00183

A. CLASSIFICATION OF SUBJECT MATTER Int. Cl. ⁵ E21C 35/18; E02F 9/28 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) Int. Cl. ⁵ : E21C 35/18; E02F 9/28 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched AU: IPC as above Electronic data base consulted during the international search (name of data base, and where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
X	EP,A, 231107 (ANDERSON STRATHCLYDE) 5 August 1987 (05.08.87) See figures 1 and 3	1-3
X	GB,A, 2101657 (STAGGS) 19 January 1983 (19.01.83) See figure 1 and 6	1-3
X	WO,A, 91/10807 (KENNAMETAL INC) 25 July 1991 (25.07.91) See figures 2 and 3.	1-3
X	US,A, 5067775 (D'ANGELO) 26 November 1991 (26.11.91) See figure 1.	1-3
X	US,E, Re. 29900 (KNIFF) 6 February 1979 (06.02.79) See figure 1.	1-3
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
* Special categories of cited documents :		
"A"	document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E"	earlier document but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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"O"	document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P"	document published prior to the international filing date but later than the priority date claimed	
Date of the actual completion of the international search 29 June 1994 (29.06.94)		Date of mailing of the international search report 15 July 1994 (15.07.94)
Name and mailing address of the ISA/AU AUSTRALIAN INDUSTRIAL PROPERTY ORGANISATION PO BOX 200 WODEN ACT 2606 AUSTRALIA Facsimile No. 06 2853929		Authorized officer David Lee Telephone No. (06) 2832107

INTERNATIONAL SEARCH REPORTInternational application No.
PCT/AU 94/00183

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate of the relevant passages	Relevant to Claim No.
X	AU,B, 65579/74 (481678) (KENNAMETAL INC) 14 August 1975 (14.08.75) See figures 1 and 2	1-3

INTERNATIONAL SEARCH REPORT

Information on patent family memb

International application No.

PCT/AU 94/00183

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
EP	231107	AU	68027/87	GB	2186011	ZA	8700649
GB	2101657						
WO	9110807	AU	69659/91	BR	9100137	CA	2033858
		ZA	9010131				
US	5067775						
US	RE29900						
AU	65579/74	CA	994373	DE	2409629	FR	2219996
		GB	1453374	US	3830546	ZA	7400921