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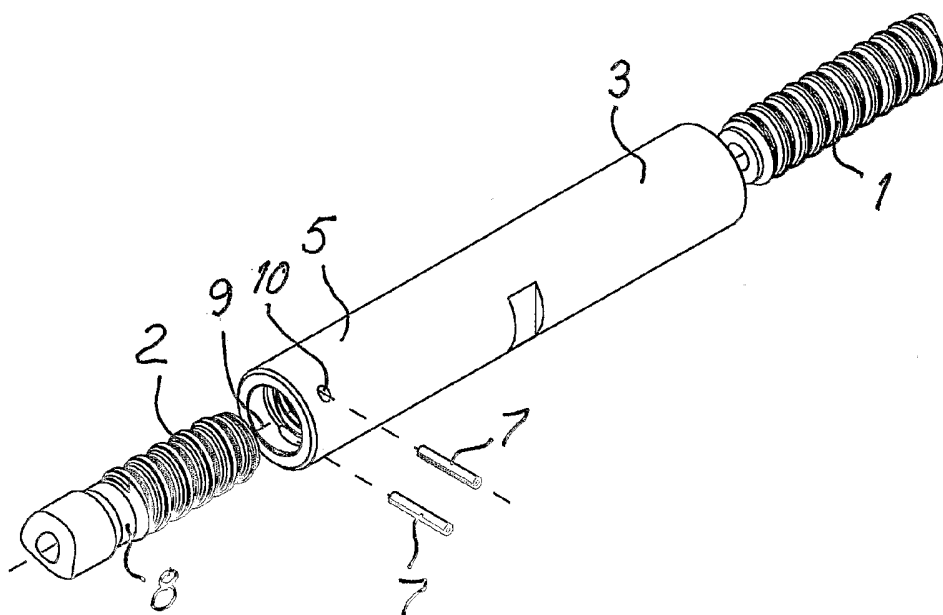
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[Continued on next page]

(54) Title: COUPLING SLEEVE FOR CONNECTION OF A THREADED ROCK BOLT TO AN IMPACT ROCK DRILLING MACHINE



(57) Abstract: Coupling sleeve for connecting a threaded rock bolt (1) to an impact rock drilling machine (2) comprising a first part (3) provided with an internal thread (4) for connection of the rock bolt (1) and a second part (5) provided with an internal thread (6) for connection of the rock drilling machine (2), whereby the second part (5) comprises a transversely to a longitudinal axis (9) on the coupling sleeve arranged locking device (7) which cooperates with a region (8) on the rock drilling machine (2) for preventing that the coupling sleeve and the rock drilling machine (2) are separated.



Published:

— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Coupling sleeve for connection of a threaded rock bolt to an impact rock drilling machine

The present invention relates to a coupling sleeve for connection of a threaded rock bolt to an impact rock drilling machine. more specifically the invention is about a specific design of the coupling sleeve which secures that a certain of the two threaded connections of the coupling sleeve is loosened first when the rock drilling machine is disconnected from the rock bolt.

In a previously known solution for securing that a certain thread connection is loosened first, see SE 433 097, one uses threads with different pitches, different threads or cones in order to achieve a thread connection which is substantially more difficult to loosen than the other. These solutions have the drawback that one must use nonstandard parts. All the time one also must check which end is which in order to achieve correct connection.

In an attempt to solve the above mentioned problem, see WO 02/057591, a sleeve is clamped on the thread which is to be difficult to loosen. It has turned out that this solution has the drawback that it cannot take the shock wave loads to which the thread connection is exerted during drilling.

The present invention, which is defined in the subsequent claim, aims at doing away with the above mentioned drawbacks by providing the coupling sleeve with a locking device which cooperates with a region in the shank adapter of the rock drilling machine in order to prevent that the coupling sleeve and the rock drilling machine are separated when the rock drilling machine and the rock bolt are separated.

An embodiment of the invention is described below with reference to the accompanying drawing in which fig 1 shows a perspective view of a coupling sleeve according to the invention and a shank adapter and a rock bolt for cooperation with the coupling sleeve. Fig 2 shows a section through the device according to fig 1 with rock bolt and rock drilling machine connected to the coupling sleeve.

The coupling sleeve shown in the drawing comprises a first part 3 provided with an internal thread 4 to which a threaded rock bolt 1 is connectable. The threaded rock bolt is provided with a not shown drill bit for drilling of the hole in which the rock bolt is to be anchored. The coupling sleeve comprises also a second part 5 provided with an internal thread 6 to which a rock drilling machine 2 is connectable. In the drawing the shank adapter belonging to the rock drilling machine is shown. The coupling sleeve has a longitudinal axis 9. The coupling sleeve is in its second part 5 provided with two transversely to axis 9 arranged borings 10 in which a locking device 7 in form of two spring pins is arranged. The locking device 7 cooperates with a region 8 in order to prevent that the coupling sleeve and the rock drilling machine 2 are separated.

When setting a rock bolt 1 the shank adapter belonging to the rock drilling machine 2 is rotated at the same time as it is exerted to impacts. Through this a hole is drilled with rock bolt 1 in which hole the rock bolt is to be anchored. During drilling the locking device 7 is unloaded. After drilling the rock bolt 1 is to be separated from the coupling sleeve and left in the rock. Hereby the rock drilling machine is rotated for loosening of the thread connection. Through cooperation between the locking device 7 and region 8 which has a smaller diameter than the thread of the shank adapter it is prevented that the rock drilling machine 2 and the coupling sleeve are separated. After that the drillhole is filled around the rock bolt with cement or resin for anchoring of the rock bolt in the borehole.

Claim:

1. Coupling sleeve for connecting a threaded rock bolt (1) to an impact rock drilling machine (2) comprising a first part (3) provided with an internal thread (4) for connection of the rock bolt (1) and a second part (5) provided with an internal thread (6) for connection of the rock drilling machine (2), characterized in that the second part (5) comprises a transversely to a longitudinal axis (9) on the coupling sleeve arranged locking device (7) which cooperates with a region (8) on the rock drilling machine (2) for preventing that the coupling sleeve and the rock drilling machine (2) are separated.

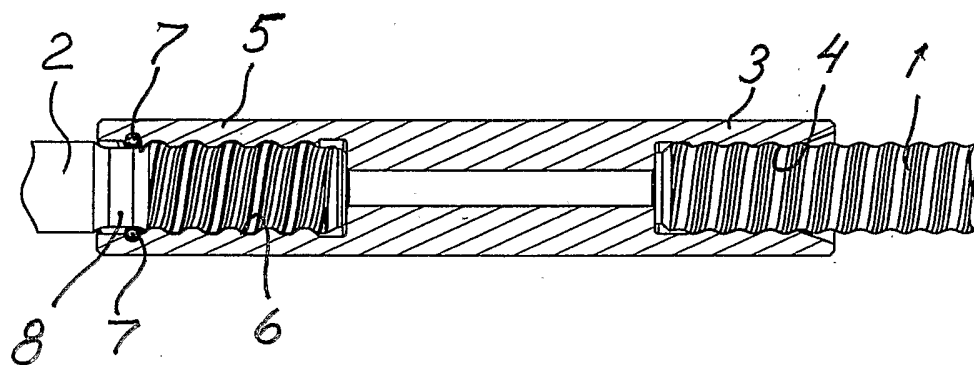


Fig. 2

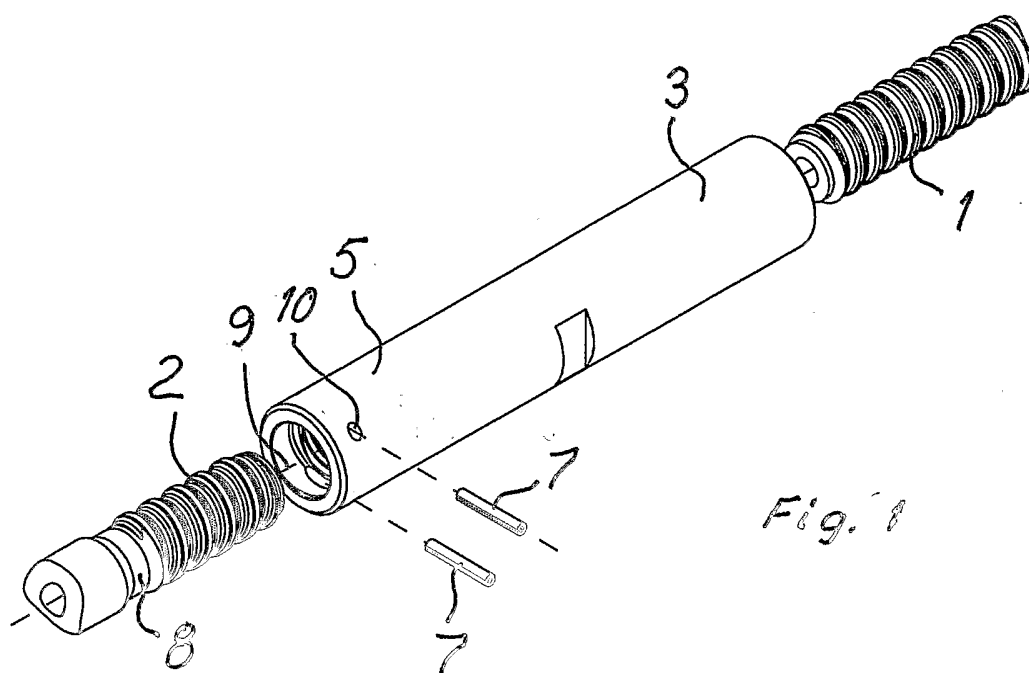


Fig. 8

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 2004/000085

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: E21B 17/043

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)

IPC7: E21B

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	SE 433097 B (ATLAS COPCO AB NACKA), 7 May 1984 (07.05.1984) --	1
A	WO 02057591 A1 (ATLAS COPCO ROCK DRILLS AB), 25 July 2002 (25.07.2002) --	1
A	SE 403926 B (SANDVIK AB), 11 Sept 1978 (11.09.1978) --	1
A	US 771626 A (G.H. GILMAN), 4 October 1904 (04.10.1904) -- -----	1

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

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"E" earlier application or patent but published on or after the international filing date

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"P" document published prior to the international filing date but later than the priority date claimed

"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

"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

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

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Information on patent family members

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SE	433097	B	07/05/1984	SE	7907334	A	05/03/1981

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				EP	1258088	A	20/11/2002
				SE	516995	C	02/04/2002
				SE	0100152	A	02/04/2002

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US	771626	A	04/10/1904	NONE			
