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9100960-5 2 April 1991 (02.04.91) SE(71) Applicant (for all designated States except US): AB VOLVO
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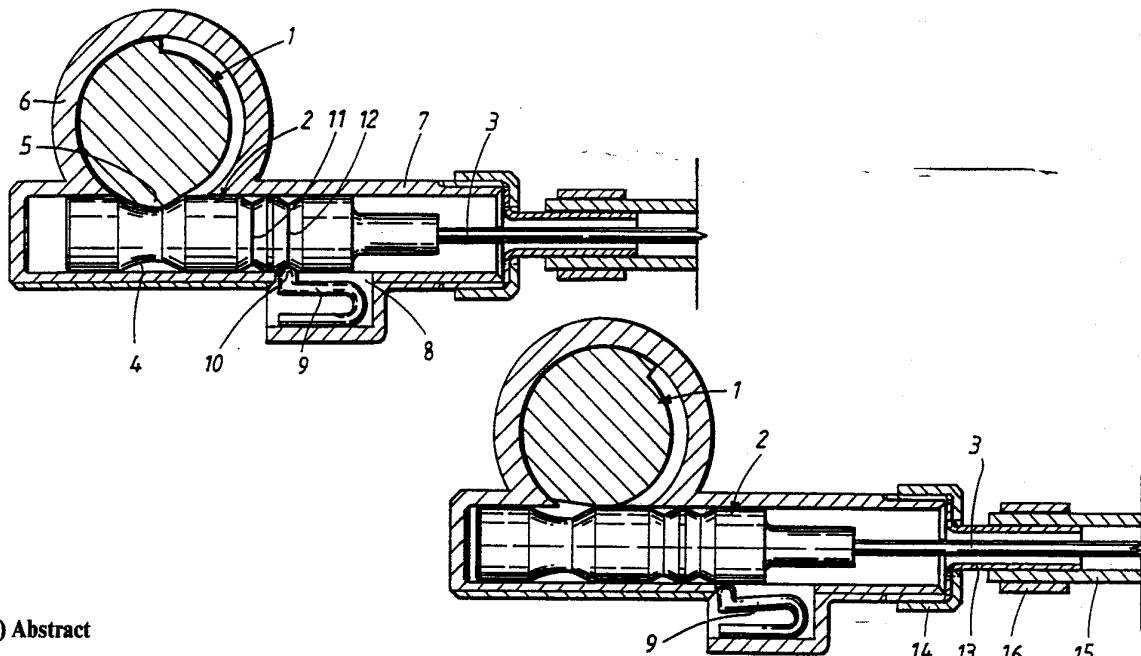
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(54) Title: IGNITION LOCK WITH BLOCKING MECHANISM



(57) Abstract

The present invention concerns an ignition lock with blocking mechanism, in particular for motor vehicles with automatic gearboxes for preventing the ignition being switched off if the gear change lever is not in the park position, whereby the ignition lock comprises an outer lock cylinder (1) with a slot (26) for an ignition key, and the blocking mechanism comprises a sliding body (2) which, via a mechanical connection element (3), can be caused to take up different positions depending on the position in the gear change gate or the like as well as cooperating means (4, 5) between said lock cylinder (1) and said sliding body (2), which means only allow positioning of the lock cylinder (1) in the ignition switch-off position if the sliding body (2) is located in a particular predetermined position, which position corresponds to the park position for vehicles with automatic gearboxes. The construction of the invention is cost-minimising and increases the reliability since it involves a minimum of moving and separately manufactured parts.

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Title:

5 Ignition lock with blocking mechanism

Technical background:

10 The present invention relates to an ignition lock with blocking mechanism for motor vehicles, in particular motor vehicles which are equipped with automatic gearboxes. The construction of the ignition lock and the blocking mechanism on vehicles with automatic gearboxes means that the key can only be taken out if the gear change lever is in the park position and also that the gear change lever cannot be moved out of the park position when the key is not in the ignition position, which results in increased safety.

State of the art and problem:

20 Most of today's motor vehicles which are equipped with automatic gearboxes have the disadvantage that the ignition can be switched off independently of the position in which the gear change lever is placed. This means a safety risk since it is only when the gear change lever is in the park position that a mechanical blocking device stops the car from moving.

30 Thus the invention concerns an ignition lock with blocking mechanism for motor vehicles, in particular for motor vehicles with automatic gearboxes to prevent the ignition being switched off if the gear change lever is not in the park position, whereby the ignition lock comprises an outer lock cylinder with a slot for an ignition key, and the blocking mechanism comprises a sliding body which, via a mechanical connection element, can be caused to take up different positions depending on the position in the gear change gate or the like as well as cooperating means

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between said lock cylinder and said sliding body which means only allow positioning of the lock cylinder in the ignition switch-off position if the sliding body is located in a certain predetermined position, which position corresponds to the park position for vehicles with automatic gearboxes. Such an ignition lock prevents therefore that the ignition can be switched off, if special conditions have not been fulfilled, for example if the gear change lever is not in the park position in a vehicle equipped with an automatic gearbox.

From DE-A-34 25 189 an ignition lock is certainly already known which meets the above mentioned criteria. This known ignition lock however presents certain disadvantages. This well known arrangement presents thus a radially movable element which, depending on the position at the lock cylinder, is either in an inner position or an outer position, which occurs due to the effect of a cam on a rotatable element inside the same lock cylinder. The outer position can however only be occupied if a sliding body is in its innermost position, to where it has been displaced by means of a wire if the gear change lever has been put in the park position. This known solution means therefore that a plurality of intermediate elements are necessary in order that the desired conditions can be fulfilled in a mechanical way. In general one can say the greater the number of moving elements, the higher the costs and the lower the reliability obtained.

The solution and advantages:

It is a principal object of the present invention to solve the above mentioned problems and, at least to a large degree, eliminate disadvantages which are present in currently known arrangements of this type. The invention concerns a blocking arrangement for ignition locks of the above mentioned type, which is characterized in that said

means comprises a first member secured against rotation with respect to said lock cylinder, which member directly cooperates with part of said sliding body which conforms at least partly to this member, so that the ignition lock can
5 only be put into the switch-off position if said sliding body is located in a certain predetermined position.

Such a construction provides a solution which, in comparison to known solutions, reduces the costs and at the
10 same time increases the reliability, which primarily is due to the fact that the construction according to the invention eliminates the need for a movable element in comparison to the known solution which is evident from the closest state of the art, see
15 DE-A-34 25 189.

A further object of the invention is to shape certain parts in such a way that they are able to be combined with ignition locks of differing constructions. In this way one
20 should preferably be able to use the same sliding body, wire and associated connections for example on both the Volvo 940 and the Volvo 960 even though the ignition locks in both these car types have large differences.

25 Description of the Figures:

The invention will be described more closely in the following description with the help of the accompanying drawings, in which:

30 Fig. 1a

shows a first embodiment of the blocking arrangement in section along the sliding body, in a blocking position,

Fig. 1b

35 shows the same section as in Fig. 1a but in a non-blocking position,

Fig. 2a

shows a preferred embodiment of a blocking arrangement according to the invention in a blocking position,

5 Fig. 2b

shows a non-blocking position,

Fig. 3

shows an ignition lock seen from within the vehicle interior,

10 Fig 4

shows a first marked section in Fig. 3,

Fig 4b

is an enlargement of chosen parts from Fig. 4a, and

15 Fig.5

shows a second marked section in Fig. 3, which section depicts a longitudinal cross-section through the blocking arrangement seen from above.

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In Fig. 1a there is shown a first embodiment of an ignition lock with a blocking mechanism according to the invention. The Figure shows, in section, a lock cylinder 1 operable by means of a key (see fig. 3), which lock cylinder cooperates with a sliding body 2. The sliding body 2 is movable transversely with respect to the cylinder lock and is caused to be displaced by a wire 3. In Fig. 1a the sliding body 2 is positioned in such a way that the lock cylinder 1 has been able to rotate to an angular position where the key can be taken out of the ignition lock. In Fig. 1b on the other hand, the sliding body 2 has moved out of the above mentioned position due to which the lock cylinder 1 cannot rotate to an angular position where the key can be removed, i.e. to the position corresponding to the engine being switched off.

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The sliding body 2 is cylindrical and has a plurality of rotationally-symmetrical recesses 4, 11, 12. The largest of these recesses is, in a given position, intended to cooperate with a cam 5 on the lock cylinder 1. The lock cylinder 1 is rotatably arranged in a cylinder block 6 in relation to which a casing 7 for the sliding body 2 is fixed. In said housing 7 there is a recess 8 inside of which a spring has been arranged. Said spring 9 has a pin-like front part 10 intended to cooperate with the tracks 11, 12 in the sliding body 2. Said spring 9 holds, under particular circumstances, the sliding body 2 in certain predetermined positions. When the spring 9 cooperates with the recess 12 which is positioned closest to the wire holder 3, the sliding body 2 is positioned so that the lock cylinder 1 can rotate to the position which corresponds to switching off the ignition. The second track 11 defines the position at the sliding body 2, where the gear change lever has moved out of the P-position. The sliding body 2 is thus connected with the gear change lever (not shown) by means of the wire 3. In fig. 1b it is shown how the sliding body is positioned when the gear change lever is in the drive-position. Further fig. 1b shows how a wire-holding casing 13 is fixed, with the help of a nut 14, to the housing 7. The wire casing 15 has then been fixed to the casing 13 by means of appropriate fastening means 16.

In figs. 2-5 there is shown a preferred embodiment according to the invention. In Figs 2a and 2b this embodiment is shown in longitudinal cross-section. In Fig. 2a there is shown the position where the sliding body 2 is located so that the recess 4 cannot accommodate the cam 5 in the lock cylinder 1. This cam-like part 5 consists not only of a radially outwardly extending part, but also of a flange-like part 17 which extends rearwardly in an axial direction, so that a ring-formed segment 17 is formed. It is this ring-formed segment 17 which cooperates with

sliding body 2 and which, if the sliding body is positioned at either side of the locking cooperating predetermined position, prevents the lock cylinder 1 being able to be additionally rotated (to switch-off the ignition), since this segment contacts here the reverse side of the sliding body 2, in accordance with what is shown in Fig. 2a. Further it is clear from Fig. 2 that the lock cylinder 1, in a similar way to the previous embodiment, is arranged inside a cylinder block 6. Contrary to the embodiment of Fig. 1 the sliding body 2 is urged, by a spring force, in its rotational direction by a spring 21 which is mounted inside the housing 7 at the end where the wire 3 enters. Consequently this spring 21 pushes the sliding body 2 inwardly into the housing 7. In the bottom surface the sliding body presents a step 22. An opposing step 23 is arranged in the housing 7. These steps 22, 23 however never come into contact with each other, since the rear end of the sliding body 2 contacts the cylinder block 6 before then. Thus said spring 22 will urge the sliding body to rest against the cylinder block 6 (see Fig. 2b). This is also the position which corresponds to the gear change lever (not shown) being in the park-position.

Fig. 2 shows further that the casing 13 for attachment of the wire casing 15 is of the "snap-in" fastening type. Inside the same lock cylinder 1 there is a spiral spring element 18 which acts against a pin-like rotating element 19. This latter element is in turn connected, centrally and in a rotationally-fixed manner, by means of a male/female coupling 20, with the inner end of the lock cylinder 1. This latter mechanism 18, 19, 20 ensures that the lock cylinder 1 springs back after positioning in the ignition position.

Fig. 3 shows an ignition lock according to the invention seen from inside the passenger cabin. The figure shows the

different markings which are found on such an ignition lock together with the slot 26 for the ignition key (not shown). Further, Fig. 3 shows two section markings for Fig. 4 and 5.

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Fig. 4a thus shows a cross-section through the centrally-extending axis of the lock cylinder, in a vertical direction.

10 Fig. 4b is a partial enlargement of the aforementioned section. This enlargement shows distinctly how the flange-like segment 17 of the lock cylinder 1 is shaped. Further it is clear that the sliding body has a rectangular cross-section. The figure shows a situation in which the sliding
15 body is in a position which corresponds to switching-off the ignition.

In Fig. 5 there is shown the sliding body 2 positioned in a non-blocking position, in section and seen from above.
20 The gear change selector is thus in the park position and the sliding body 2 is displaced inwardly into the housing 7 and bears against the cylinder block 6. When the ignition key is rotated forwards so that the cam 5 occupies a position in the recess 4 it is not possible to move the
25 gear change lever out of the park position before the key is rotated backwards.

The invention is not limited to the above described embodiment, but can be varied within the scope of the
30 appended claims. Thus the wire 3 can be replaced by a chain, or similar flexible force-transmitting element or, by a specially chosen placing of the ignition lock, by a rod. The skilled man will also realise that cross-sectional shapes of the sliding body other than circular and
35 rectangular can be used. Other modifications which are encompassed by the scope of the invention are for example

that instead of an integrated cam element one can have a rotatably-fixed disc or the like on the lock cylinder.

Claims:

- 5
1. Ignition lock with blocking mechanism, in particular for motor vehicles with automatic gearboxes for preventing the ignition being switched off if the gear change lever is not in the park position, whereby the ignition lock comprises an outer lock cylinder (1) with a slot (26) for an ignition key, and the blocking mechanism comprises a sliding body (2) which, via a mechanical connection element (3), can be caused to take up different positions depending on the position in the gear change gate or the like as well as cooperating means (4,5) between said lock cylinder (1) and said sliding body (2), which means only allow positioning of the lock cylinder (1) in the ignition switch-off position if the sliding body (2) is located in a particular predetermined position, which position corresponds to the park position for vehicles with automatic gearboxes characterized in that said means (4,5) comprises a first member (5) secured against rotation with respect to said lock cylinder (1), which member directly cooperates with part (4) of said sliding body (2) which conforms at least partly to this member, so that the ignition lock can only be put into the switch-off position if said sliding body (2) is located in a certain predetermined position.
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2. Ignition lock with blocking mechanism according to claim 1, characterized in that said cooperating member (5) is fixed to said cylinder, preferably integrated therewith.
3. Ignition lock with blocking mechanism according to claim 1 or 2, characterized in that said cooperating member (5) is composed of a cam-like element which cooperates with

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a recess (4), adapted to the cam-like member, in said sliding body (2).

5 4. Ignition lock with blocking mechanism according to claim 1 or 2, characterized in that said sliding body (2) has a non-circular cross-section, preferably rectangular.

10 5. Ignition lock with blocking mechanism according to claim 1 or 2, characterized in that said sliding body (2) cooperates with position-defining members (9, 11, 12), which at least in said predetermined position hold the sliding body (2) in a particular given position.

15 6. Ignition lock with blocking mechanism according to claim 5, characterized in that said position-defining member (9, 11, 12) comprises a spring biased projecting element (10) which cooperates with at least one recess (11,12), which recess is preferably arranged in said sliding body(2).

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7. Ignition lock with blocking mechanism according to claim 1 or 2, characterized in that said sliding body (2) is biased in one movement direction by a spring force (21).

25 8. Ignition lock with blocking mechanism according to claim 1 and 2, characterized in that said cooperating member (5) comprises a segment (17) which extends both radially and axially from the main body of said lock cylinder (1).

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9. Ignition lock with blocking mechanism according to claim 1 and 2, characterized in that said sliding body (2) is displaceable in a direction which is perpendicular with respect to the centre line of the lock cylinder (1).

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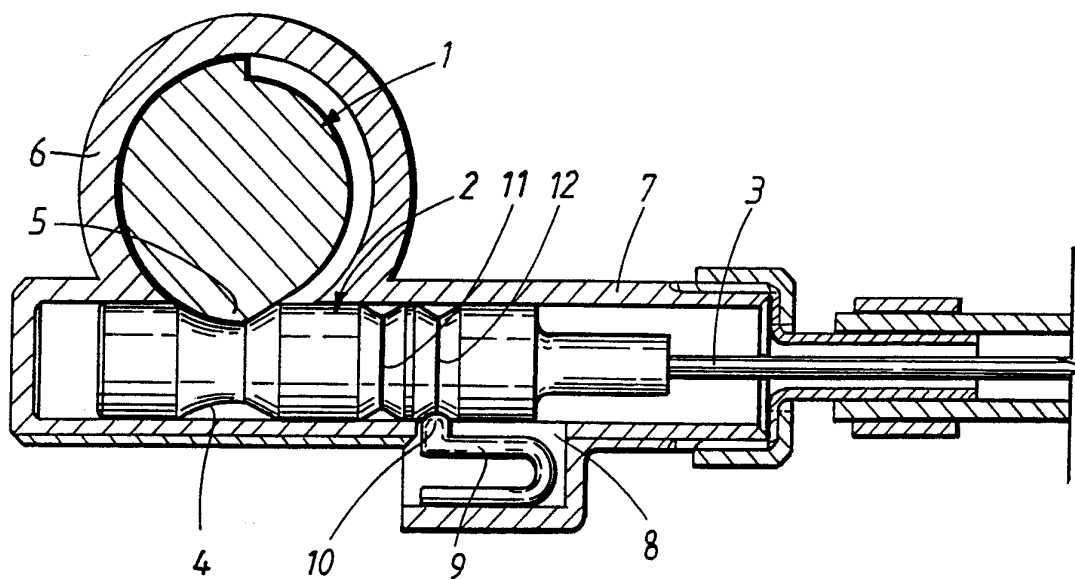


FIG.1a

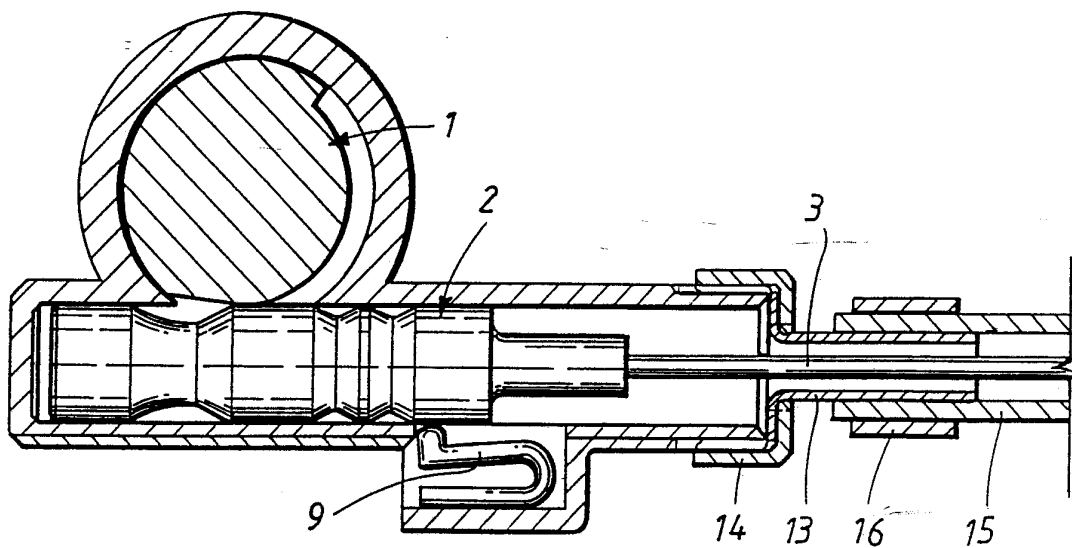
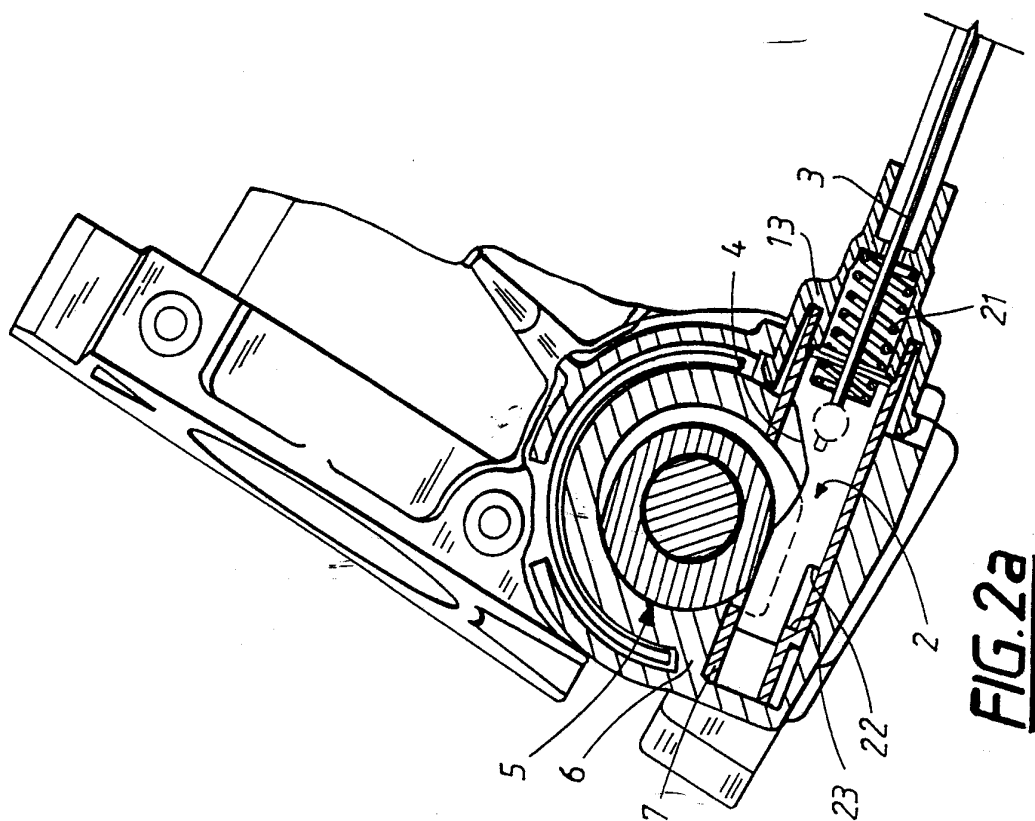
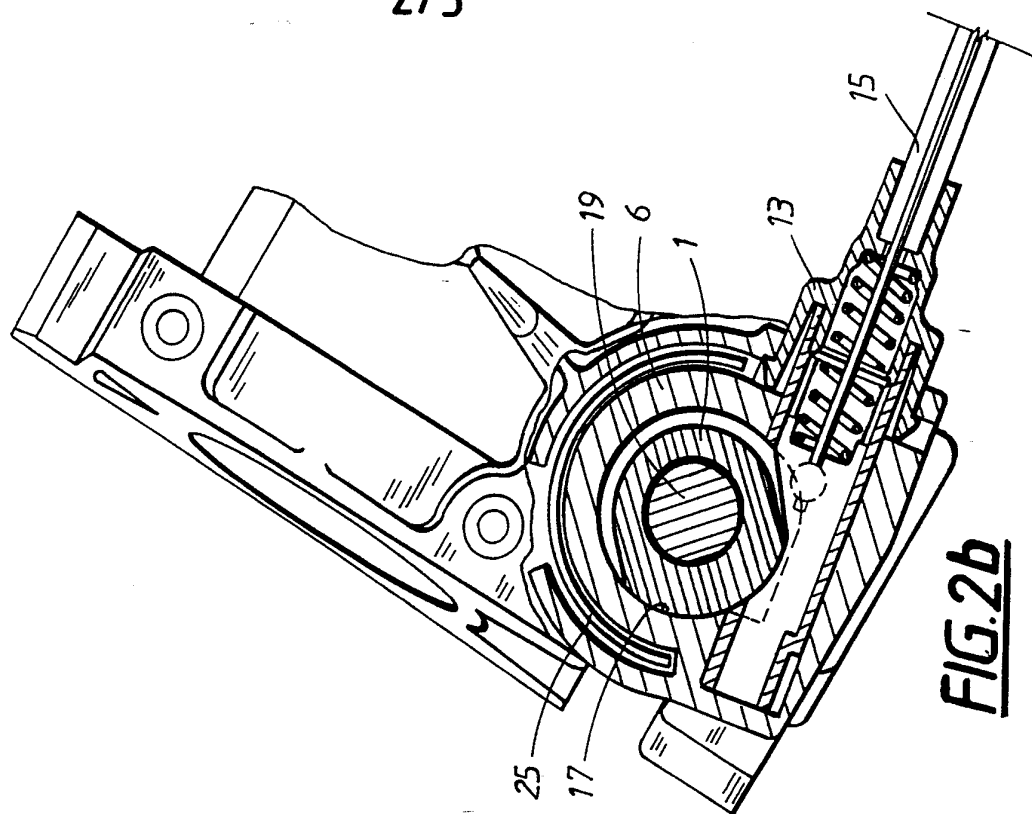


FIG.1b

2/3



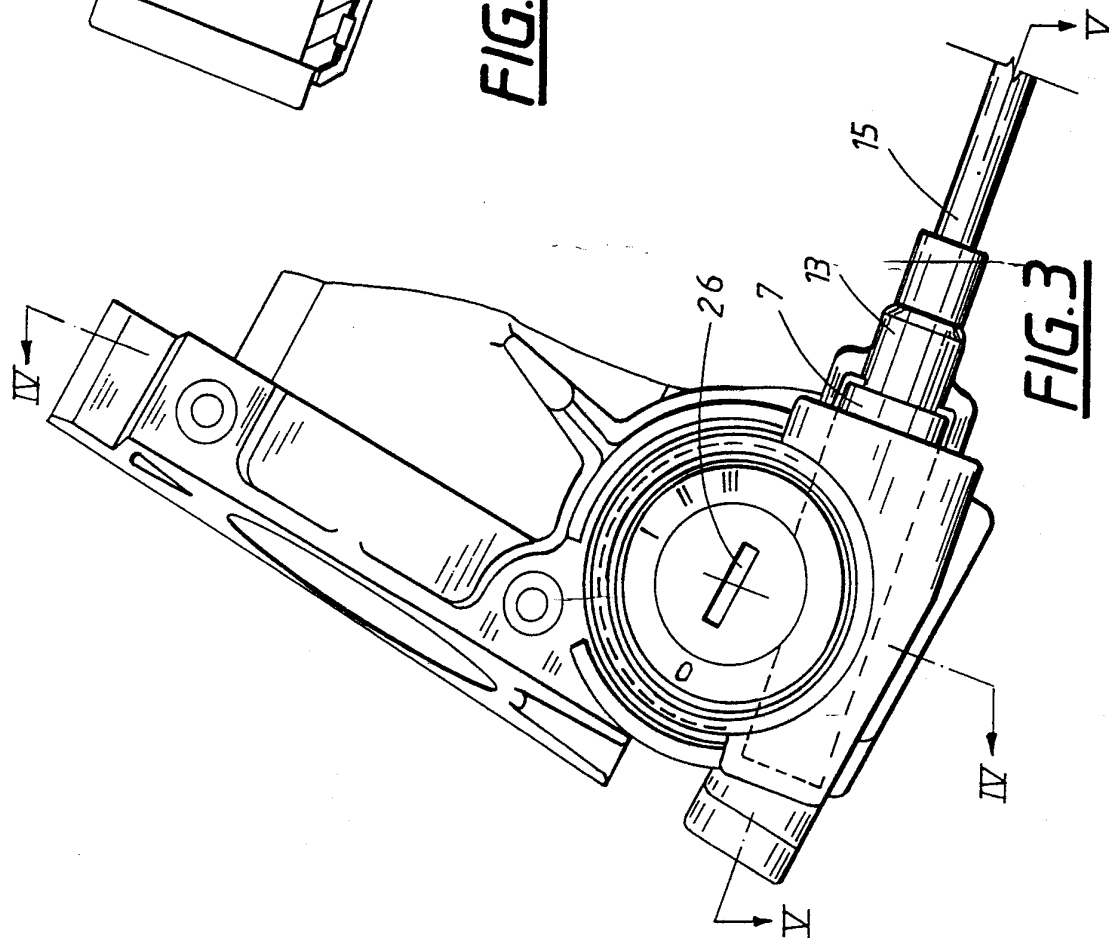


FIG. 3

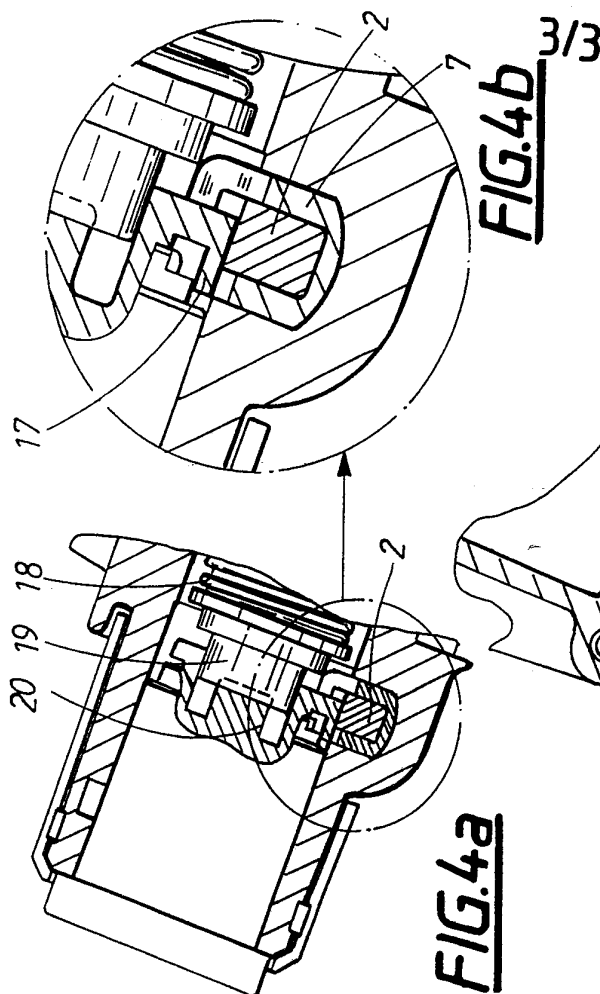


FIG. 4a

FIG. 4b 3/3

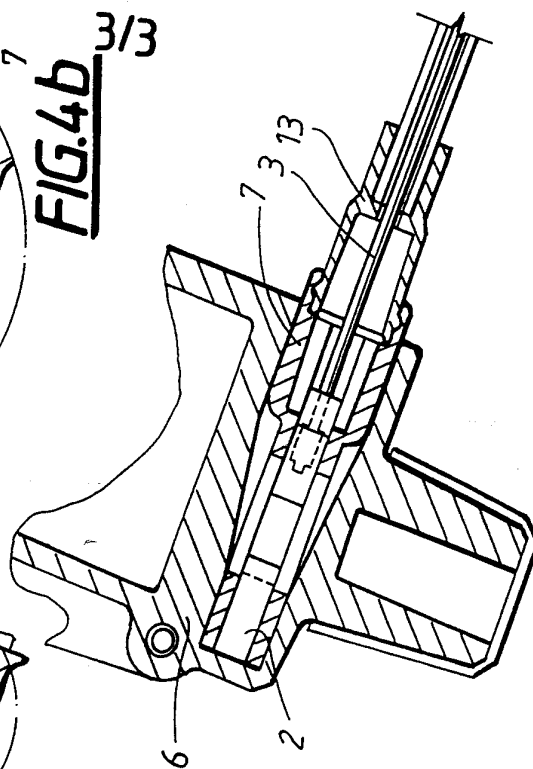
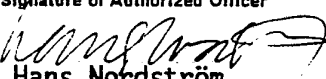
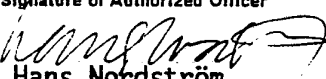
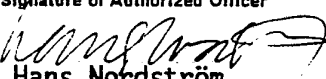


FIG. 5

INTERNATIONAL SEARCH REPORT

International Application No PCT/SE 92/00213

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶ According to International Patent Classification (IPC) or to both National Classification and IPC IPC5: B 60 R 25/06														
II. FIELDS SEARCHED Minimum Documentation Searched⁷ <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 25%; border-bottom: 1px solid black;">Classification System</th> <th style="border-bottom: 1px solid black;">Classification Symbols</th> </tr> <tr> <td style="height: 40px; vertical-align: bottom;">IPC5</td> <td style="vertical-align: bottom;">B 60 R</td> </tr> </table> Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched⁸ SE,DK,FI,NO classes as above			Classification System	Classification Symbols	IPC5	B 60 R								
Classification System	Classification Symbols													
IPC5	B 60 R													
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹ <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 10%; border-bottom: 1px solid black;">Category *</th> <th style="width: 60%; border-bottom: 1px solid black;">Citation of Document,¹¹ with indication, where appropriate, of the relevant passages¹²</th> <th style="width: 30%; border-bottom: 1px solid black;">Relevant to Claim No.¹³</th> </tr> <tr> <td style="text-align: center; vertical-align: top;">X</td> <td>EP, A2, 0373320 (DAIMLER-BENZ AKTIENGESELLSCHAFT) 20 June 1990, see column 4, line 21 - line 31 -- </td> <td style="text-align: center; vertical-align: top;">1-5,7-9</td> </tr> <tr> <td style="text-align: center; vertical-align: top;">A</td> <td>US, A, 4724722 (BEAUCH ET AL.) 16 February 1988, see the whole document -- </td> <td style="text-align: center; vertical-align: top;">1-9</td> </tr> <tr> <td style="text-align: center; vertical-align: top;">A</td> <td>DE, C2, 3425189 (ISUZU MOTORS LTD.) 1 February 1990, see the whole document -- ----- </td> <td style="text-align: center; vertical-align: top;">1-9</td> </tr> </table>			Category *	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³	X	EP, A2, 0373320 (DAIMLER-BENZ AKTIENGESELLSCHAFT) 20 June 1990, see column 4, line 21 - line 31 --	1-5,7-9	A	US, A, 4724722 (BEAUCH ET AL.) 16 February 1988, see the whole document --	1-9	A	DE, C2, 3425189 (ISUZU MOTORS LTD.) 1 February 1990, see the whole document -- -----	1-9
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IV. CERTIFICATION <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; border-bottom: 1px solid black;">Date of the Actual Completion of the International Search</td> <td style="width: 50%; border-bottom: 1px solid black;">Date of Mailing of this International Search Report</td> </tr> <tr> <td style="height: 40px; vertical-align: bottom;">11th June 1992</td> <td style="vertical-align: bottom; text-align: center;">1992 -07- 0 1</td> </tr> <tr> <td style="border-bottom: 1px solid black;">International Searching Authority</td> <td style="border-bottom: 1px solid black;">Signature of Authorized Officer</td> </tr> <tr> <td style="text-align: center; vertical-align: bottom;"> SWEDISH PATENT OFFICE </td> <td style="text-align: center; vertical-align: bottom;">  Hans Nordström </td> </tr> </table>			Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	11th June 1992	1992 -07- 0 1	International Searching Authority	Signature of Authorized Officer	SWEDISH PATENT OFFICE	 Hans Nordström				
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ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO.PCT/SE 92/00213

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
The members are as contained in the Swedish Patent Office EDP file on 30/04/92
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
EP-A2- 0373320	90-06-20	DE-C-	3842332	89-11-30
		JP-A-	2216345	90-08-29
		US-A-	4959982	90-10-02

US-A- 4724722	88-02-16	NONE		

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		GB-A-B-	2160485	85-12-24
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