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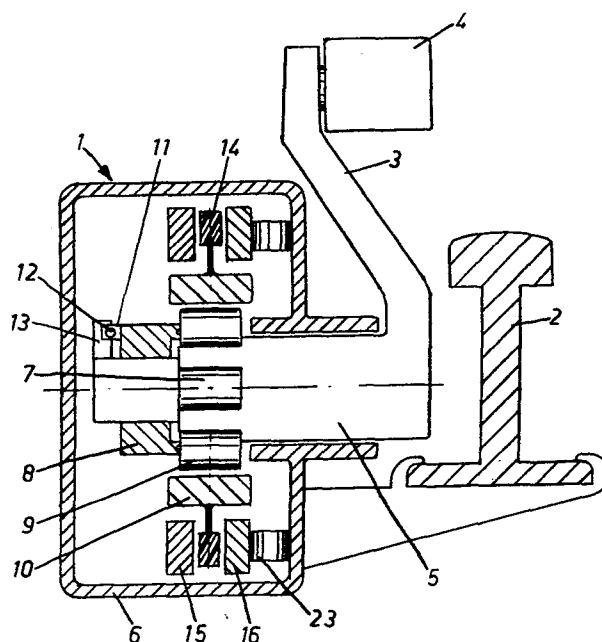
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GÖTEBORGS PATENTBYRA AB Box 5005,
S-402 21 Göteborg (SE)**(64) **A railway car retarder for shunting purposes.**

(57) The invention refers to a brake for rolling railway cars preferably for shunting purposes and it incorporates an actuating member (3) adapted to be given a movement by a passing railway car wheel, which movement via a speed dependent coupling (7, 8, 9, 10) is transferred to a mechanical braking device (14, 15, 16) when the speed of the movement exceeds a certain pre-set value.

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A railway car retarder for shunting purposes

Background of the invention

5 The present invention refers to a railway car retarder for shunting purposes and of the type used as one or more units anchored along a railway track, each unit being provided with an actuating member, which when contacted by wheels of passing railway cars will exert a retarding effect on these
10 provided the speed of said wheels exceed an adjustable value pre-set for each retarder unit.

Braking units of this type are known in several structurally different embodiments. A common feature of the embodiments
15 which in recent years have been used ever more is that they are of hydraulic type, at which the passing wheel via a pedal, a ramp or the like is urged to pump a hydraulic liquid in a closed circuit in the braking unit. The liquid passes thereby a flow depending throttling device, which
20 means that the work will be big at high flow speeds and neglectably small at low flow speeds.

Hydraulic systems with the energy absorption here concerned require qualified material and precision manufacture whereby
25 they will also be expensive. It is also difficult to make e.g. inlets for shafts and piston rods thus that they during several years and in severe working environment will be leak-proof. The demands for leakproofness and cleanness furthermore mean that inspection and adjustment of the inner
30 components of the brake can not be accomplished on the field but must take place on especial workshops by particularly trained personnel. The hydraulic brakes furthermore give a certain unintended braking effect even when the cars pass at such a low speed that it is desired that they are not
35 subjected to any braking effect whatsoever.

The hydraulic brake units are also marred with other problems, which make i desirable with a practically useful solution, which does not utilize hydraulics, e.g. in the form of a simple mechanical friction brake, but development
5 in this direction has been hampered by the fact that the brake force must be so accurately balanced that a maximum braking effect is achieved without therefore risking that the brake will lift a light car wheel from the track. A hydraulic pressure can be adjusted very accurately whereas
10 friction coefficient variations at e.g. a disc brake can give considerable variations in the braking ability due to temperature and moisture variations, material wear etcetera. A well designed hydraulic brake has consequently a long life span and mainly constant braking characteristics as this
15 brake will get adequate lubrication and is subjected only to a minimum of wear as the braking work is transferred into heat due to flow losses in the liquid and not by mechanical friction. At mechanical brakes it is on the contrary inevitable that the friction surfaces are subjected to a
20 certain wear, which necessitates a continuous re-adjustment of the positions of the braking surfaces concurrently with the wear. Finally it is rather simple to design a hydraulic brake thus that the flow speed of the hydraulic liquid constitutes a representative measure of the speed of the car
25 wheel passing the brake, and it is hereby no problem to provide the system with a flow depending valve, which controls the relation between the car speed and the throttling effect. At disc brakes or similar mechanical brakes there is on the contrary no real relationship between
30 speed and braking moment, but the braking moment is quite independent of the speed.

The purpose and most essential features of the invention

35 The purpose of the invention is to provide a railway car retarder for shunting purposes and of the type used as one or more units anchored along a railway track, each unit being provided with an actuating member, which when

contacted by wheels of passing railway cars will exert a retarding effect on these provided the speed of said wheels exceed an adjustable value pre-set for each retarder unit, and the intention is to provide a car retarder with the
5 basic good features of the mechanical friction brake, but which is made in such a manner that it can match the hydraulic brake in the above-mentioned important details, and such a solution has been achieved thereby that the actuating member is connected to a pivotable, mainly
10 horizontal shaft, provided with a speed depending freewheel coupling semi-detached to the hub of a braking device in such a manner that the shaft is coupled to the braking device if a car passes in the intended braking direction at a speed exceeding said adjustable value, whereas coupling
15 fails to occur if the car has a lower speed or passes in the opposite direction.

Description of the drawings

20 The invention will hereinafter be further described with reference to embodiments shown in the accompanying drawings.

Figure 1 shows in a schematic cross-section an embodiment of a railway car retarder according to the invention,

25 Figure 2 is a schematic side view of the braking part of the car retarder shown in an alternative embodiment,

Figures 3 and 4 show schematically different self-adjusting means for the car retarder shown in figure 1, and

Figure 5 shows in a schematic cross-sectional view a part of
30 an actuating member forming part of the car retarder according the invention.

Description of the preferred embodiments

35 The railway car retarder 1 according to the invention is located on the inner side of railway rail 2, and it incorporates an actuating member 3, in the embodiment shown shaped as a lever, which in neutral position is directed

mainly straight upwards and which at its upper end is provided with a pedal roller 4 arranged to be hit by a passing, not shown, railway car wheel. The actuating member 3 is at its end remote from the pedal roller 4 non-pivotally
5 connected to a mainly horizontal shaft 5, which is pivotably supported in the car retarder housing 6, and which, when the pedal roller 4 is hit by the flange of a passing car wheel, causing the lever 3 to be pushed down to a mainly horizontal position, will make a pivoting of about a quarter of a
10 revolution. On the shaft 5 there is arranged a speed dependent coupling, which resembles to a common freewheel coupling and consists of a hub 7 formed on the shaft, rollers or locking bodies 9 which are guided in a rolling body retainer 8, and an outer sleeve 10 located outside said
15 retainer and being shaped thus that the locking bodies can be wedged between hub and outer sleeve and thereby transfer a moment between them. The rotational speed of the shaft is at the beginning of its rotation directly proportional to the speed of the car wheel, and the movement starts
20 instantaneously. It is this movement which is sensed by the speed depending coupling and in the same manner as in a freewheel coupling this transfer of moment can take place when the shaft is pivoted in one direction only. At the device according to figure 1 such a connecting action is
25 achieved when the pedal roller 4 is moved in a direction inwards into the paper.

There is however an important difference between a common freewheel coupling and the coupling according to the
30 invention in that the former has spring-loaded locking bodies, which make the moment transfer start immediately when the shaft is rotated in its working direction, whereas the coupling forming part of the car retarder is instead provided with the heavy roller retainer 8, which is readily
35 rotatable on the shaft 5. The roller retainer is maintained in a certain position of rest thereby that a projection 11 by means of a spring 12 is pressed against a shoulder 13 on the shaft. The locking bodies 9 are in this position held by

the retainer 8 in such a position relative to the hub 7 that the locking bodies can not span the gap between hub and outer sleeve 10, whereby the coupling can not catch.

- 5 For allowing this to occur is it necessary that the roller retainer 8 is rotated a certain, small angle backwards relative to the shaft.

As earlier mentioned the rotating of the shaft begins almost
10 instantaneously when a car passes the retarder in braking direction. Due to the gravity of the roller retainer 8 and the suitably chosen biasing force of the spring 12 the retainer 8 will not start to rotate as swift but will lag behind somewhat just at start, whereupon it will swiftly
15 again take up its resting position relative to the shaft. The retainer will thus make a short movement backwards in relation to the shaft, whereby the maximum angular movement is a measure on the speed of the passing car. By using a correctly chosen design and force of the spring 12 in
20 relation to the mass of the roller retainer is it possible to achieve that the maximum angular deflection at a certain car speed corresponds to the position where the locking bodies contact both hub 7 and outer sleeve 10.

- 25 Thus the desired coupling function has been achieved, i.e., the coupling catches as a freewheel coupling only if a car passes in the braking direction and has a speed exceeding a certain level. Cars having a lower speed or cars passing in the opposite direction will not cause the coupling to catch.

30

The braking part is shown in figure 1 in a simplified embodiment from which is shown that the outer sleeve 10 is rigidly connected to a brake disc 14 provided with brake linings which can be squeezed between two non-rotating discs
35 15 and 16. This constitutes the main principle for how braking is effected when the speed sensing coupling catches and urges the outer sleeve 10 to take part in the rotation of the shaft.

There are different ways to design the braking part thus that it will function in the intended manner. Figures 2 and 3 show different embodiments thereof.

5

Figure 2 thus shows a braking part in the form of a conventional strap brake, which incorporates a brake drum 17 and a brake strap 18 surrounding the drum, which strap via a lever arrangement 19 is held tightened by the power of a
10 pneumatic cylinder 20, which acts upon the brake strap with a force F_a . The opposite end of the strap is fixedly attached and it is loaded with a reaction force F_o . Due to the rotational direction of the brake disc and the dimensions given to the brake it is possible to let the
15 braking force be substantially equal to the actuation force F_a of the pneumatic cylinder, whereby a well defined braking power can be achieved even if the friction coefficient varies. In the figure is also intimated a compensating device made as a wedge 21, which is biased by a spring 22
20 which automatically is pressed in forward direction if the power source is interrupted and wear tends to give play in the transfer. In this manner is it possible to obtain an automatic wear compensation by turning off the brake.

25 In figure 3 is schematically shown the actuation principle for the braking part according to the embodiment shown in figure 1, and from this figure it can be seen how the outer sleeve 10 with the associated brake linings 14 is squeezed between the fixed brake disc 15 and the adjustable brake
30 disc 16. The actuation power from a pneumatic cylinder (not shown in the figure) or the like is allowed to act tangentially on the adjustable disc 16, which thereby is adjusted with a helical movement. The outer sleeve 10 is presupposed to rotate in the opposite direction in relation
35 to the adjustable disc 16. If the pitch of the helical movement is small and the thread friction is neglectably low balance is achieved between the actuation moment and the braking moment, as the friction moment directly counteracts

the actuation moment. If the friction force exceeds the actuation moment the disc 16 is automatically screwed outwards until the squeezing force against the brake linings have been reduced thus that balance is reached, and if the
5 actuation moment is bigger this will adjust the disc 16 until balance is reached.

In order to eliminate the friction of the helical movement it is possible as shown in figure 4 to substitute the thread
10 with a number of eccentrics 23, which support the disc 16 axially. When the disc is rotated in the direction shown, the eccentrics will rise and press the disc axially against the brake linings (not shown). Due to the fact that the eccentrics are biased by means of springs 24 it is also
15 obtained such a wedge action which gives an automatic wear compensation, which allows the actuation movement of the power source (e.g. the pneumatic cylinder) to be very short.

In figure 5 is shown in cross-section and schematically the
20 upper part of the actuating member 3 and particularly the pedal roller 4 thereof. By means of the car retarder according to the invention it is achieved that the above mentioned tendency of unintended braking occurring at hydraulic brakes is eliminated, but this can in stead give
25 rise to bounces at impact between car wheel and pedal roller. In order to provide a solution on this problem the shaft 3a extending from the pedal arm of the actuating member 3 is provided with a bush 25, which at its outer envelope surface is provided with two parallel and spaced
30 apart annular grooves 26, in each of which is arranged an O-ring 27 of suitable size.

The pedal roller 4 is then arranged on the outside of the bush 25, and it can be locked to the bush with aid of a stop
35 screw 28 or the like. In the annular gap space formed between the two O-rings 27, the inner envelope surface of the pedal roller 4 and the outer envelope surface of the bush 25, is introduced a volume of oil filling up said

space. Due to this measure the pedal roller will get a sufficient damping effect for eliminating bounces of the above mentioned type without the need of maintaining the unintended braking effect of the hydraulic brake.

5

The invention thus provides a railway car retarder, which despite its simple basic structure has properties fully comparable to those of hydraulic braking units, at the same time as certain evident advantages are at hand as compared
10 to these older hydraulic brakes, not least regarding weight, price and possibilities of inspection and service also at the place of use.

The braking action of the brake is directly dependent of an
15 adjustment force, which can be generated by a pneumatic cylinder. By evacuating the air pressure it is possible very swiftly to put out the braking function of the retarder in order to allow e.g. unbraked passage of a locomotive, which is not possible at known hydraulic brakes, which must
20 thereby be folded away, which is a complication. The lever of the actuating member must after it has been pressed down by a passing car be raised again in order to be ready to perform the braking, and this can be achieved by aid of return springs or the like, but it is also possible to use a
25 pneumatic cylinder which is supplied with pressurized air from the same source as that generating the adjusting power in order to maintain the pedal in upright position. In this case it is also gained that the braking pedal is folded down if the air supply to the brake is cut off.

30

The invention is not limited to the embodiments shown in the accompanying drawings and described in connection thereto but modifications and variations are possible within the scope of the following claims.

35

CLAIMS

1. A railway car retarder for shunting purposes and of the type used as one or more units anchored along a railway track, each unit being provided with an actuating member, which when contacted by wheels of passing railway cars will exert a retarding effect on these provided the speed of said wheels exceed an adjustable value pre-set for each retarder unit,
- 10 c h a r a c t e r i z e d t h e r e b y
that the actuating member (3) is connected to a pivotable mainly horizontal shaft (5), provided with a speed depending freewheel coupling (7,8,9,10) semi-detached to the hub of a braking device (14,15,16;17,18,19) in such a manner that the
15 shaft is coupled to the braking device if a car passes in the intended braking direction at a speed exceeding said adjustable value, whereas coupling fails to occur if the car has a lower speed or passes in the opposite direction.
- 20 2. A railway car retarder as claimed in claim 1,
c h a r a c t e r i z e d t h e r e b y
that the member (10) exerting a braking moment on the shaft (5) is adapted to be retarded by actuation of an outer actuation force (Fa) having a well defined magnitude,
25 whereby the adjustable part (16;18) of the brake is adjustably suspended and arranged to receive the actuation force in such a manner that the braking force (Fo) to a suitable portion counter-acts the actuation movement, whereby the resulting braking force will have mainly the
30 desired value independent of varying in friction conditions.
3. A railway car retarder as claimed in claim 2,
c h a r a c t e r i z e d t h e r e b y
that the actuation force is provided from a pneumatic
35 cylinder (20).

4. A railway car retarder as claimed in anyone of claims 1 to 3,
c h a r a c t e r i z e d t h e r e b y
that the actuating member is a lever (3), which in initial
5 position is directed mainly vertically upwards, above the upper edge of the rail, whereas it at wheel passage is pushed down to a mainly horizontal position thereby bringing about a corresponding pivoting of the shaft (5), the lever being biased in order thereupon automatically to resume its
10 initial position.

5. A railway car retarder as claimed in claim 2 provided with braking means comprising a rotating disc (14) which is squeezed axially between a fixed (15) and a adjustable disc
15 (16),
c h a r a c t e r i z e d t h e r e b y
that the adjusting movement is guided by rolling bodies (23) arranged between the adjustable disc (16) and a fixed base in such a manner that axial adjusting is effected if the
20 adjustable disc (16) is rotated in a pre-determined direction about the brake shaft, whereby the rolling bodies (23) by aid of resilient members (24) always are maintained in contact with the adjustable disc (16) and with the base, irrespective of in which direction the adjustable disc (16)
25 is rotated.

6. A railway car retarder as claimed in claim 1,
c h a r a c t e r i z e d t h e r e b y
that the locking member (9) of the freewheel coupling
30 (7,8,9,10) is adapted in normal position to be prevented from entering into locking position by means of retainer means (8), whereas a sufficiently big angular acceleration of the shaft (5) relative to the masses of the retainer (8), the locking members (9) and the biasing force, entails a
35 sufficient displacement of the retainer for moving the locking members (9) to locking position.

7. A railway car retarder as claimed in claim 6,
c h a r a c t e r i z e d t h e r e b y
that the retainer is a spring-biased rolling body retainer
(8).

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FIG. 1

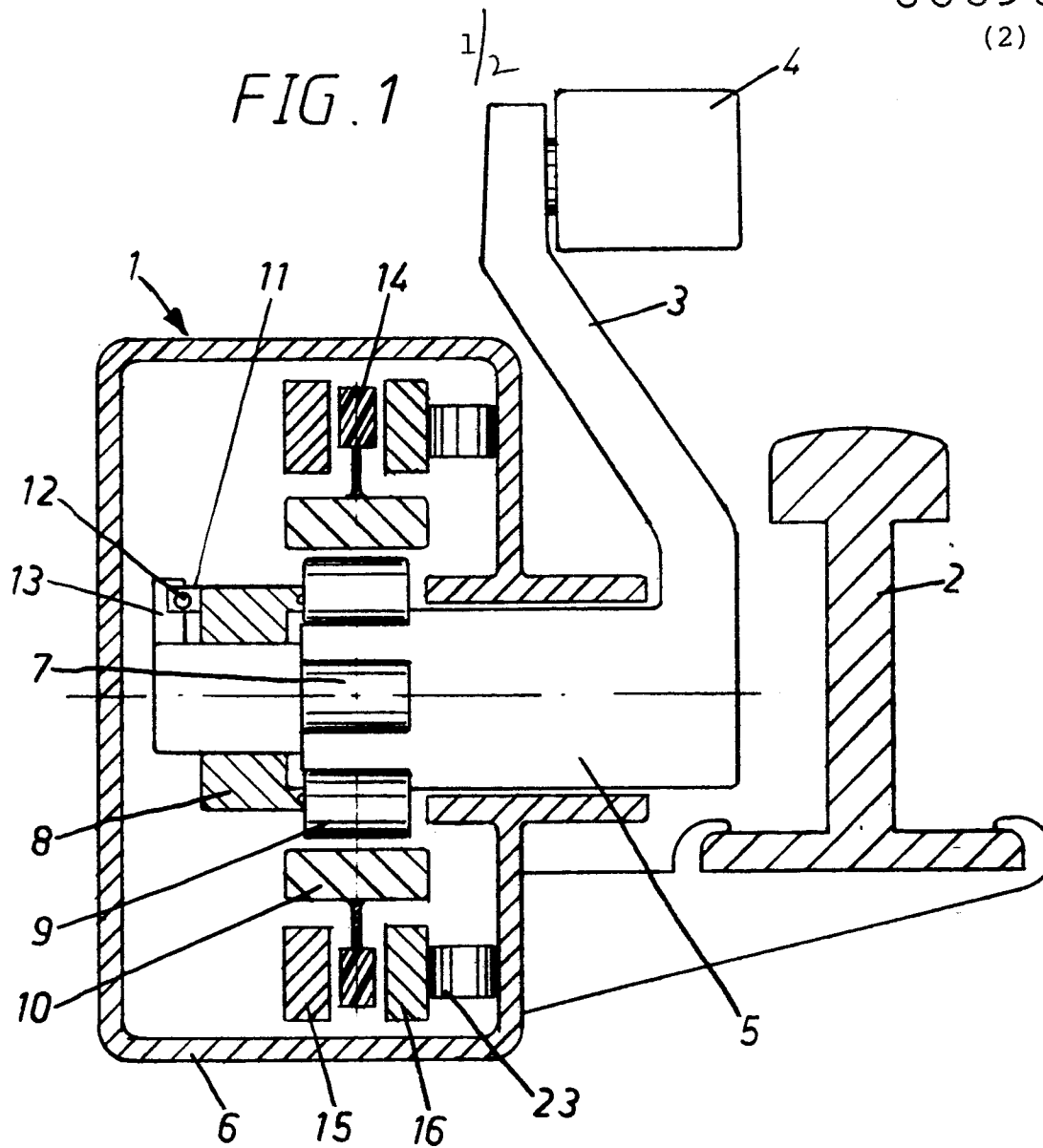
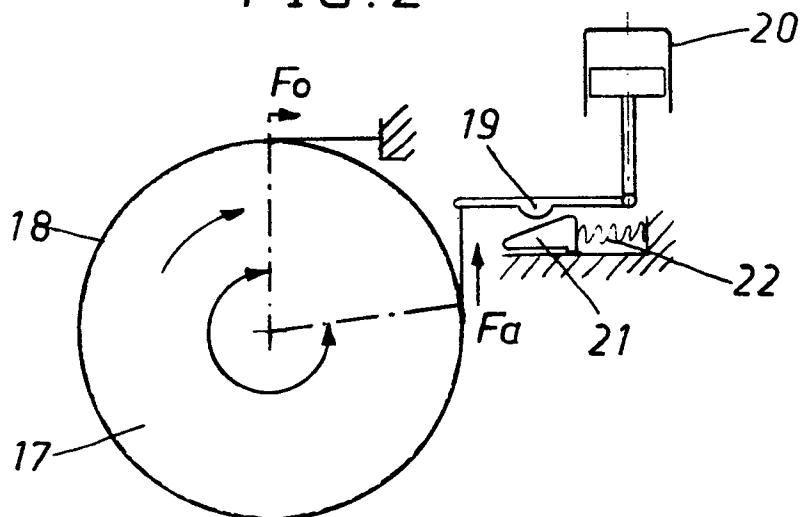


FIG. 2



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FIG. 3

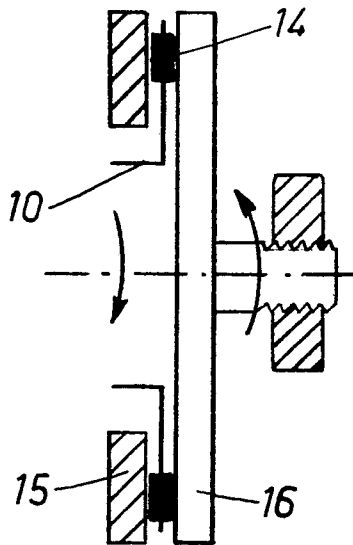


FIG. 4

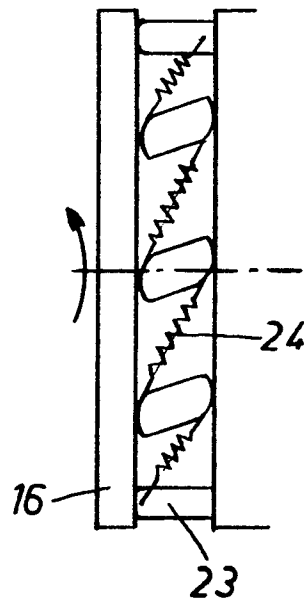
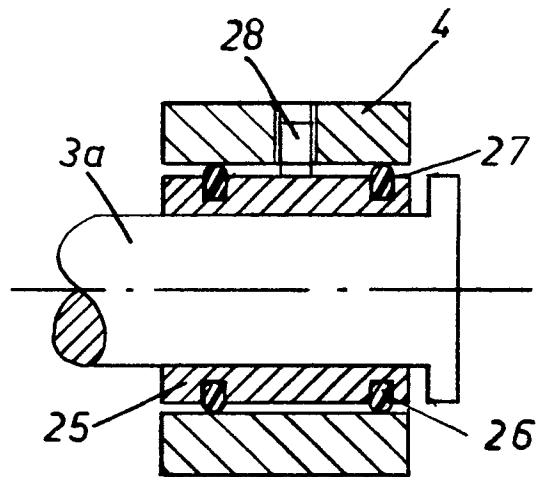


FIG. 5





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EUROPEAN SEARCH REPORT

0069099

Application number

EP 82 85 0139

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. ³)												
A	--- GB-A- 733 207 (STRQCHAN & MENSRAW) *The whole document. Figures 1-15*	1,4,5	B 61 K 7/02												
A	--- US-A-2 588 798 (BONE) *The whole document. Figures 1,2* -----	1,4													
			TECHNICAL FIELDS SEARCHED (Int. Cl. ³)												
			B 61 K 7/00												
The present search report has been drawn up for all claims															
Place of search THE HAGUE		Date of completion of the search 05-11-1982	Examiner BRAEMS C.G.I.												
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