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(54) Vehicle jack.

(57) A vehicle jack 10 has a body 18 with a ground-engaging foot 24 and a vehicle engaging member 28 mounted on the body 18 for movement relative to the body 18 in the operation of the jack by a drive assembly 12 to engage and move part of a vehicle. The assembly 12 comprises a shaft 14 rotatable about an axis A and a headed member 30 secured to the shaft 14. A handle 36 for rotating the shaft 14 about the axis A is carried by the member 30 with part of the member projecting through a slot in the handle 36 so that the handle 36 can be moved relative to the axis A to adjust the operational position of the handle 36 e.g. to avoid a hand of an operator striking the ground when using the jack.

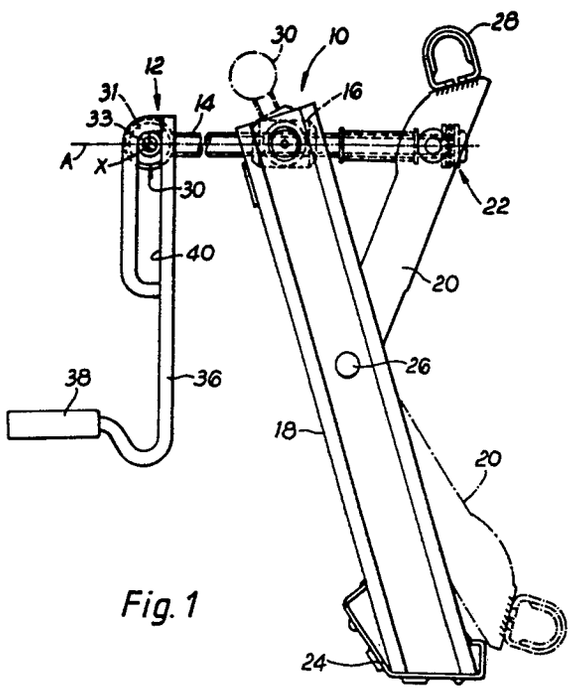

Fig. 1

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VEHICLE JACK

This invention relates to a vehicle jack and especially to a drive assembly for rotating a rotatable member eg. an operating shaft of a vehicle jack.

In providing means for rotating rotatable members which are operable manually for operating vehicle jacks, various handles have been proposed, some of which are detachable and others of which may be permanently connected to the member to be rotated.

In the operation of certain rotatable members it has been found that as the member is rotated to effect a further movement raising a vehicle by means of the jack, the position of the rotatable member changes and the possibility arises of the operating handle fouling a part of the vehicle or approaching the ground closely so that great care has to be exercised by the operator to avoid injuring himself.

It has been proposed in, for example, DE-A-3510196 and US-A-4586696 to provide a vehicle jack having a handle of which the radial distance of a handle portion from the axis of rotation of the rotatable member, is adjustable.

However, the provision of this facility in the previously proposed jacks has increased their complexity and also their manufacturing cost significantly, as well as making them more awkward to use: as jacks are often housed in unfavourable conditions in some vehicles and rarely used, additional complexity may lead to jack failing to function properly, especially when it has not been used properly. For example in DE-A-3510196 a complex type of universal joint between the handle portion and the remainder of the handle is called for: not only will such a construction complicate manufacture but there is a risk that the joint will become non-operational during storage. Likewise in US-A-4586696 there is additional complexity in the manufacture of the jack and there is a risk that the means to adjust the handle at the desired position will become non-operational eg. by seizing of the operational parts of the handle.

In one aspect the invention provides a vehicle jack comprising a ground-engaging portion, a vehicle-engaging portion and means for moving the vehicle-engaging portion relative to the ground-engaging portion, in the operation of the jack, said means including a drive assembly comprising a rotatable member mounted for rotation about an axis, connecting means secured to the rotatable member, and a handle carried by the connecting means for rotating the rotatable member about its axis, the drive assembly being such that the handle can be moved relative to the axis to adjust the radial distance of a handle portion of the handle from the axis wherein the connecting means comprises a connecting member which projects at right angles to the axis of the rotatable member, in that the handle portion projects generally at right angles to a lengthwise direction of the handle and in that the handle comprises a slot remote from the handle portion, extending generally in the lengthwise direction of the handle and within which said member is received and retained.

Preferably the handle is captive with the connecting member.

Preferably the handle can be freely moved relative to the connecting means when the handle is not under load to adjust it to an appropriate operational position but locks in said operational position when the handle is operated to rotate the rotatable member. Suitably the handle locks by frictional engagement between the handle and the connecting means.

Preferably the connecting member comprises an annular groove within which portions of the handle defining the slot are slidingly received. Suitably the connecting member comprises a body portion secured to the rotatable member having a head portion remote from the rotatable member which define the groove in which said portions of the handle are received.

In a preferred assembly, the head portion is in the form of a headed stud secured projecting at right angles to the axis of rotation and passing through the slot. The handle can be moved to slide the stud along the slot to adjust it to an appropriate operational position and is constructed so that the handle portion of the handle, in a desired operational position, is parallel with the axis of rotation. This construction allows the handle to be rotated about the axis of the stud (at right angles to the axis of rotation) so that, in storage, the handle can occupy a position lying substantially parallel with a body of the jack.

The handle of a preferred jack in accordance with the invention is formed of steel rod bent to a desired shape.

There now follows a detailed description to be read with reference to the accompanying drawings of a jack embodying the invention. It will be realised that this jack has been selected for description to illustrate the invention by way of example.

In the accompanying drawings:-

Figure 1 is a view in side elevation of a jack embodying the invention;

Figure 2 is a view in front elevation of the jack shown in Figure 1; and

Figure 3 is a view of part of a handle for a jack, of modified construction.

The jack 10 comprises a drive assembly 12 for rotating a rotatable member namely a screw threaded shaft 14 about an axis A. The shaft 14 is received in a screw threaded nut 16 pivotally mounted in a body portion 18 of the jack 10. Apart from the drive assembly, the jack 10 is of generally known construction and further comprises an arm 20 pivotally mounted by a pivot 26 on the body 18 between a foot portion 24 and the nut 16. An end portion of the shaft 14 is mounted for rotation in a bearing assembly 22 carried on an end portion of the arm 20 remote from its pivot 26. Thus rotation of the shaft 14 in the nut 16 is effective to move the bearing assembly 22 towards or away from the nut 16, whereby to cause the arm 20 to pivot about its pivot 26. At an outermost end portion remote from the pivot 26 is mounted a vehicle engaging member 28. By pivotal movement of the arm 20 about its pivot 26, when the foot 24 is in engagement with the floor, the vehicle engaging member 28 can be moved into engagement with a portion of a vehicle whereby to raise part of the vehicle from the ground for example to permit the changing of a wheel, in known manner.

The drive assembly 12 for rotating the shaft 14 comprises connecting means including a member 30 secured to an outer end portion of the shaft 14 remote from the bearing 22. The member 30 has a head portion 32 arranged to provide an annular groove 34 around the member 30. A central axis X of the annular groove is positioned at right angles to the axis A of rotation of the shaft 14. A handle 36 for rotating the shaft 14 about its axis A is carried by the member 30. The construction and arrangement is such that the handle 36 can be moved relative to the axis of rotation A to move a handle portion 38 (which projects generally at right angles to a lengthwise direction of the handle 36) towards or away from the axis of rotation A, thus to adjust the operational position of the handle portion 38 and to adjust its operational radius about the axis A.

In order to permit this relative movement, the handle 36 is provided with a slot 40 extending generally lengthwise of the handle 36 through which part of the member 30 projects. The handle is retained in place on the member 30 by the head portion 32 with parts of the handle defining the slot 40 received in the groove 34 and the axis X of the member 30 extending through the slot 40 at right angles thereto. The handle 36 may thus be slid, with the member 30 moving along the slot 40, to move the handle portion 38 closer to or further away from the axis X of the member 30. Portions of the handle 36 slide along the groove 34. In Figures 1 and 2, the handle 36 is shown with its handle portion 38 at the maximum radius from the axis X of the member 30 and from the axis of rotation A of the shaft 14. When it is wished to operate the jack 10 by rotating the shaft 14, the handle 36 is positioned with its handle portion 38 in a position lying generally parallel with the axis A (as shown in Figure 1 of the drawings) and the handle portion 38 is rotated about the axis A whereby to rotate the shaft, driving the shaft through the member 30. If it is wished to shorten the radius of operation of the handle portion 36, the handle 36 is moved to slide the projecting portion of the member 30 along the slot 40 to a selected operational position along the slot, whilst still retaining the handle portion 38 parallel with the axis A. Upon applying driving action to the handle portion 38, the frictional engagement between the handle 36 and the various parts of the member 30 is sufficient to prevent the handle 36 sliding relative to the member 30. However, if desired, means can be provided for clamping the handle in an adjusted position.

In the accompanying drawings, the handle is formed of steel rod bent to a desired shape: however, the handle 36 may alternatively be provided by a flat metal member or other means, with a suitably shaped slot cut in it. In the illustrative jacks, where the handle is made of bent steel rod, the rod may be bent in situ around a former, after it has been placed in position along the groove 34 of the member 30. However, the slot 40 may be formed first, if desired, and the handle placed in position on the member 30, the head 32 being secured in place after the handle has been positioned first on a projecting shaft portion 33 projecting from a body 31 of the member 30, the groove 34 being provided by the shaft portion 33 bounded at either side by the body 31 and head 32. In Figure 1 the handle 36 is made of two portions of metal bar welded together, a first part being provided by a generally straight portion but one end portion of which is bent to provide the handle portion, and the second part being provided by a piece of bar, bent to a generally U-shape, the arms of the U being welded to the straight portion to provide the slot 40. In the modified form of handle shown in Figure 3, a single piece of steel rod has been bent to provide the handle 36 and the slot 40. The welded construction may be slightly stronger, as it prevents the slot 40 opening out should an excessive load by applied to the jack.

The handle portion 38 comprises a sleeve carried for rotation on a part of the rod which has been bent so that it lies substantially at right angles to the main straight portion of the handle 36. When the jack is out of use, the arm 20 occupies the position in which it is shown in chain dot line in

Figure 1 and the member 30 and shaft 14 occupy the positions in which they are shown in chain dot line in Figure 1. When in this position, the handle 36 can be rotated about the axis X so that it occupies a position lying substantially parallel with the body 18 of the jack thus ensuring that the jack can be compactly folded away for storage. When it is desired to use the jack, the handle is pivoted about the axis X to rotate it to a suitable operating position where the straight portion of the handle lies substantially at right angles to the axis A of the shaft 14 as shown in Figure 1, with the handle portion 38 parallel to the axis A.

The illustrative jack is cheap and simple in operation and there is no possibility of the handle 36 becoming separated from the remainder of the jack and lost, for example when changing a wheel. Because it is possible to adjust the operating position of the handle 36 and, in particular, the handle portion 38, it is possible for the operator to select an operating position where the risk of injuring himself by contact with the ground or a vehicle which is being jacked up is minimised.

If desired, other jacks including a drive assembly having a rotatable member and a handle by which it is operated may be constructed in accordance with the invention, for example a jack of the type described by way of example in our patent No. 1341363.

Claims

1. A vehicle jack (10) comprising a ground-engaging portion (24), a vehicle-engaging portion (28) and means (12,20) for moving the vehicle-engaging portion relative (28) to the ground-engaging portion (24), in the operation of the jack (10), said means (12,20) including a drive assembly (12) comprising a rotatable member (14) mounted for rotation about an axis (A), connecting means (30) secured to the rotatable member (14), and a handle (36) carried by the connecting means (30) for rotating the rotatable member (14) about its axis (A), the drive assembly (12) being such that the handle (36) can be moved relative to the axis (A) to adjust the radial distance of a handle portion (38) of the handle (36) from the axis (A) characterised in that the connecting means (30) comprises a connecting member (30) which projects at right angles to the axis (A) of the rotatable member (14), in that the handle portion (38) projects generally at right angles to the lengthwise direction of the handle (36) and in that the handle (36) comprises a slot (40) remote from the handle portion (38), extending generally in the lengthwise direction of the handle (36) and within which said member (30) is received and retained.

2. A vehicle jack (10) according to claim 1 characterised in that said connecting member (30) comprises an annular groove (34) within which portions of the handle (36) defining the slot (40) are slidingly received.

3. A vehicle jack (10) according to either one of claims 1 and 2 characterised in that said connecting member (30) comprises a body portion secured to the rotatable member (14) and a head portion (32) remote from the rotatable member between which portions of the handle (36) defining the slot (40) are retained.

4. A vehicle jack according to any one of the preceding claims characterised in that the handle (36) can be freely moved relative to the connecting member (30) when the handle (36) is not under load whereby to adjust it to an appropriate operational position but locks in said operational position when the handle (36) is operated to rotate the shaft (14).

5. A vehicle jack according to claim 4 characterised in that the handle (36) locks by frictional engagement between the handle (36) and the connecting member (30).

6. A vehicle jack according to any one of the preceding claims characterised in that the handle (36) is captive with the connecting member (30).

7. A vehicle jack according to any one of the preceding claims characterised in that for storage, the handle (36) can be rotated about an axis (X) of the connecting member (30) at right angles to the axis (A) of the rotatable member (14) so that it occupies a position lying substantially parallel with a body (18) of the jack (10).

8. A vehicle jack according to any one of the preceding claims characterised in that the handle (36) is formed of steel rod bent to a desired shape.

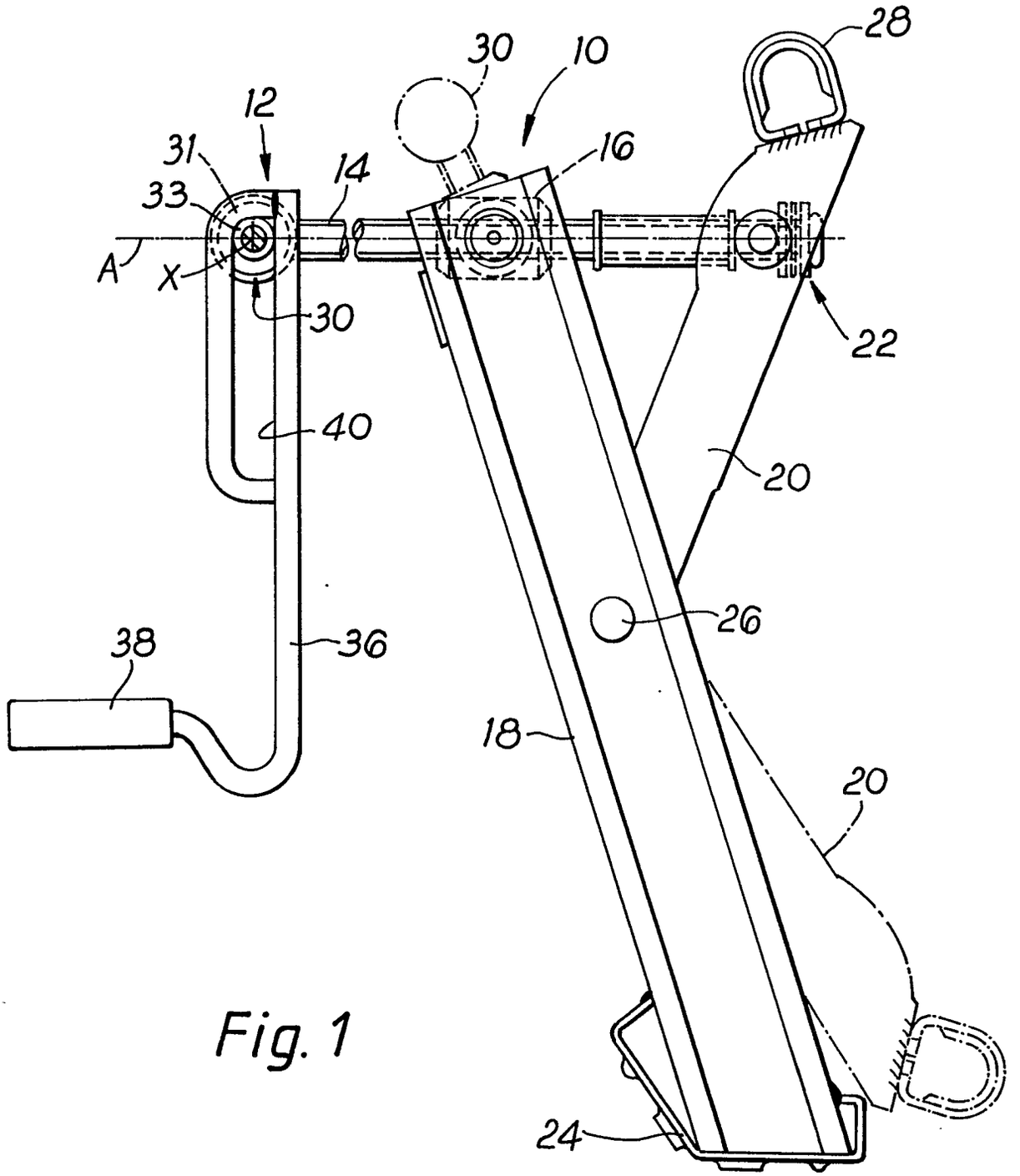

Fig. 1

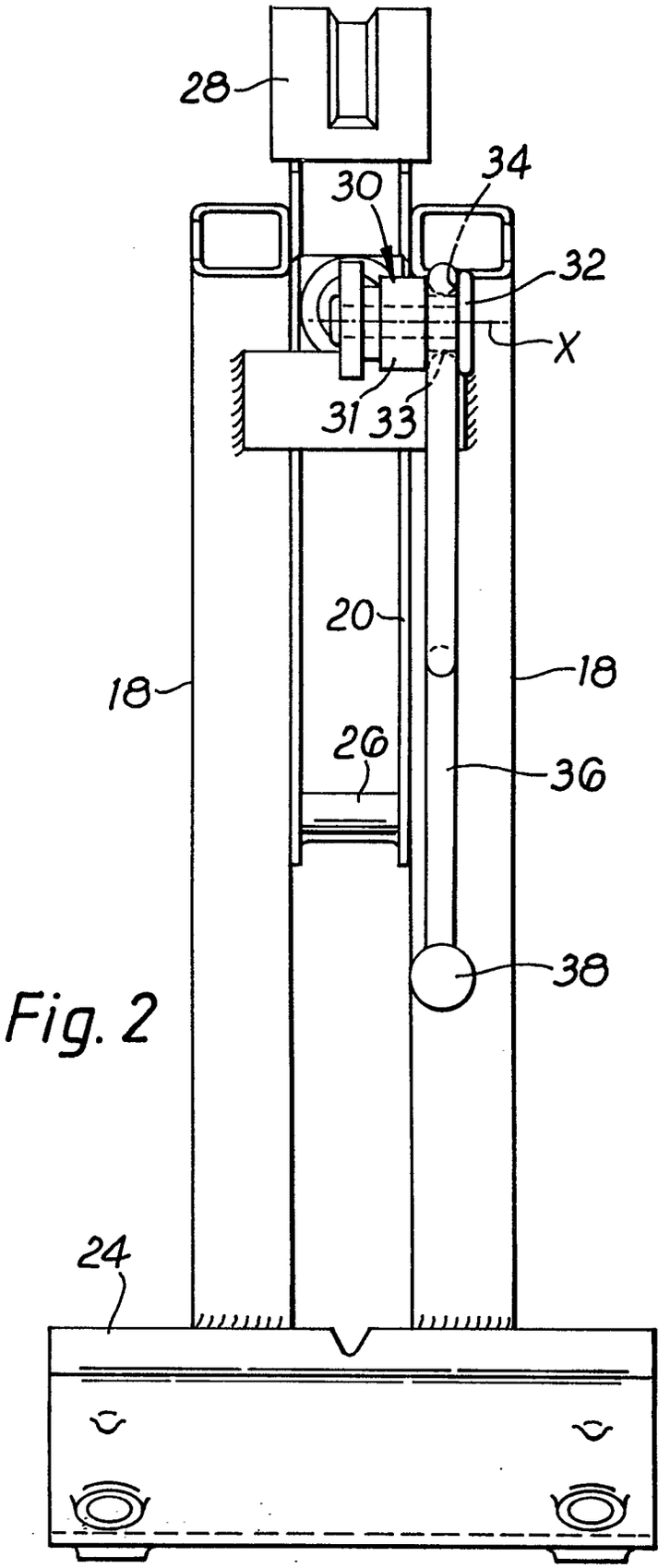

Fig. 2

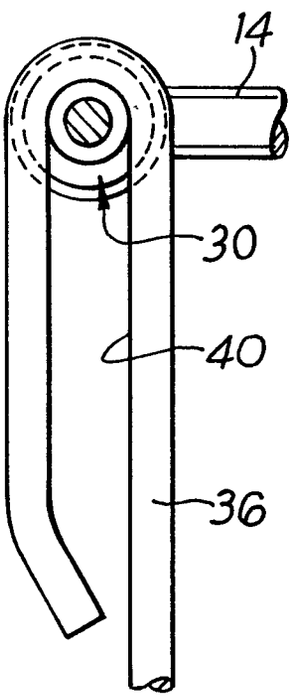

Fig. 3

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EUROPEAN SEARCH REPORT

Application Number

EP 88 31 1719

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.4)
D,Y	DE-A-3 510 196 (E.A. STORZ) * Abstract; figures 1-9 *	1-8	B 66 F 3/12 B 66 F 13/00 G 05 G 1/08
Y	FR-A-1 290 971 (BRETTON) * Page 2, left-hand column, last 3 paragraphs; right-hand column, paragraphs 1-3 *	1-8	
D,A	US-A-4 586 696 (MUGFORD)		
A	US-E- 30 640 (KEILHOLZ)		
A	FR-A-2 558 817 (ETABLISSEMENTS J. FLORIMOND & H. CHABARDES OUTILLAGE 'ASTRA')		
A	BE-A- 388 798 (HAMILTON)		
A	FR-A- 660 610 (CONTAL)		
A	FR-A- 622 867 (GRAVELAIS)		TECHNICAL FIELDS SEARCHED (Int. Cl.4)
A	US-A-1 499 474 (PRICE)		B 66 F G 05 G F 16 C
A	FR-A-2 473 657 (SLYPER)		

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	15-03-1989	VAN DEN BERGHE E.J.J.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
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T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
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