(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number : **0 468 704 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number : **91306548.8**

(51) Int. Cl.^{5} : **F21M 7/00**

(22) Date of filing : **18.07.91**

(30) Priority : **25.07.90 GB 9016293**

(43) Date of publication of application :
29.01.92 Bulletin 92/05

(84) Designated Contracting States :
DE ES FR GB IT

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(54) Lamp assembly.

(57) A motor vehicle headlamp assembly has a reflector body (10) with a rear bulb-receiving aperture (14) surrounded by an external sleeve (16). A bulb-retaining pressing (34) is anchored to the sleeve (16) and includes a ring (36) having slots (48) in its inner periphery to enable the passage of mounting lugs (24) on a flange of the bulb. The mounting lugs (24) are urged by spring arms 42 on the ring (36) against respective abutment surfaces (22,23) in the sleeve (16). The abutment surfaces (22,23) are peripherally spaced from the respective slots (48) and are disposed between respective stops (26) and ramp surfaces (30,32) on the pressing (34).

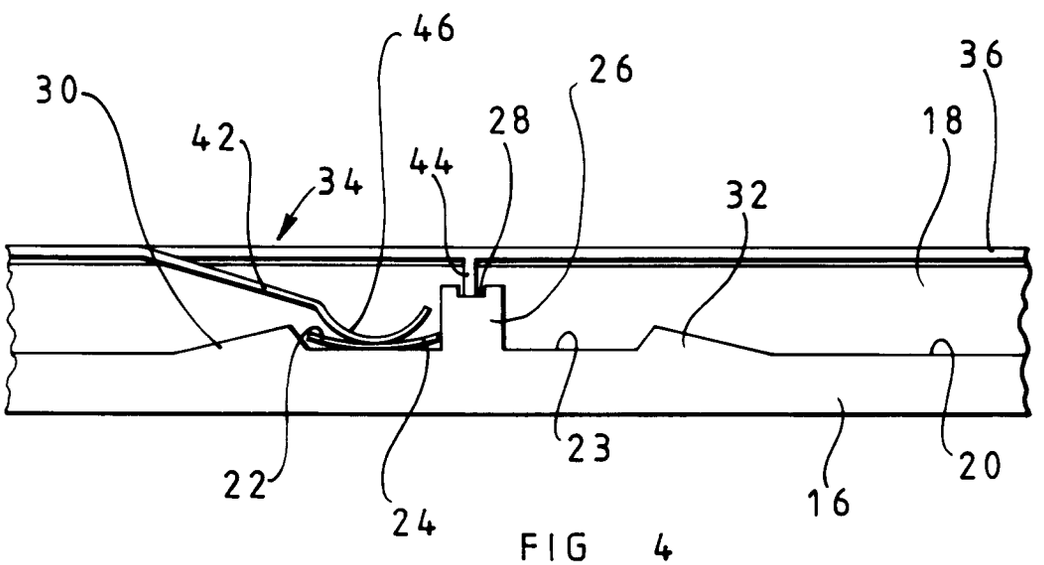

FIG 4

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This invention relates to a lamp assembly and is more particularly, though not exclusively, concerned with a motor vehicle headlamp assembly into which a conventional quartz halogen H4 bulb is fitted in use. The quartz halogen H4 bulb is one having an annular mounting flange furnished with three outwardly projecting bulb-locating lugs.

In motor vehicle headlamp assemblies, there is usually a dished reflector body having a front opening, an internal reflective surface and a rear bulb-receiving aperture surrounded by an external sleeve, said sleeve having circumferentially spaced abutment surfaces for engagement by the respective bulb-locating lugs on the mounting flange of the bulb. In the case where the dished body and the external sleeve are moulded out of a suitably heat-resistant synthetic resin composition, it has been the practice in the past to mould circumferentially spaced slots in the rear end of the wall of the sleeve, the dimensions and mutual dispositions of the slots being such as to receive respective ones of the bulb-locating lugs. However, such moulded-in slots tend to disrupt the mould flow characteristics of the synthetic resin material during moulding, with the result that it is difficult to maintain a consistent quality of moulding. It is particularly important to ensure that the slots are moulded accurately because the bases of such slots define the abutment surfaces against which the bulb-locating lugs engage and which serve to position the filament of the bulb accurately relative to the optics of the reflective surface. Additionally, many types of previously proposed headlamp assembly employ removable or hinged springs or other retainers which are engaged with the sleeve and which engage against the bulb to retain it in position with the lugs engaging the respective abutment surfaces. Very often, such removable or replaceable springs or other retainers require additional features on the sleeve to enable them to be secured thereto and, in any case, do not lend themselves easily to automated insertion of the bulb into the lamp assembly. Such additional features also disrupt mould flow and thereby lead to inaccuracies in the reflector surface.

It is an object of the present invention to obviate or mitigate at least some of the above disadvantages.

According to the present invention, there is provided a lamp assembly comprising a dished body having a front opening, an internal reflective surface and a rear bulb-receiving aperture surrounded by an external sleeve, said sleeve having circumferentially spaced abutment surfaces for engagement by respective bulb-locating lugs on a mounting flange of a bulb, and retaining means for retaining the lugs in engagement with the respective abutment surfaces of the sleeve in use, wherein the retaining means includes a ring which is fixedly mounted relative to the sleeve and which has circumferentially spaced slots in its inner periphery, each slot being offset relative to a respective one of the abutment surfaces in the circumferential direction and being of a size to allow passage of a respective one of the bulb-locating lugs when the mounting flange is passed through the ring with the lugs aligned with the slots, and wherein the retaining means further includes a resilient member anchored to the ring and biassed towards a respective one of the abutment surfaces, said resilient members serving to urge the lugs against the respective abutment surfaces in use.

The retaining means used in the lamp assembly according to the present invention obviates the need for slots in the rear end of the wall of the sleeve and also obviates the need for hinged or removable retaining springs or other retaining elements which have to be pivoted out of the way or removed completely before the bulb can be inserted into the bulb-receiving aperture.

In a preferred embodiment, the resilient members are formed integrally with the ring.

In a further preferred arrangement, the ring is provided with a collar which embraces the sleeve, the collar being provided with a plurality of inwardly directed barbs or sprags which engage against the outer surface of the sleeve to resist disengagement of the ring from the sleeve.

In a convenient embodiment, each abutment surface is defined between a stop and an inclined ramp surface disposed between the abutment surface and the respective slot in the ring, the ramp surface and the stop serving to restrict circumferential movement of the associated lug when urged into engagement with the abutment surface by the respective resilient member.

Most conveniently, the ring and the resilient members are formed out of a suitably resilient sheet metal, and each resilient member is preferably in the form of a spring arm anchored at one end to the ring and extending away from the respective slot and towards and overlying the associated abutment surface.

To provide for correct location of the ring relative to the sleeve, it is preferred to provide mutually interengaging formations on these two parts. Such mutually interengaging formations preferably take the form of one or more interengaging ribs and recesses provided on the respective parts.

It is preferred for there to be twice as many abutment surfaces as bulb-retaining lugs on the bulb. Thus, for a standard quartz halogen H4 bulb, where there are three lugs, it is preferred for there to be six abutment surfaces, the abutment surfaces being arranged in two sets of three, one of the sets being orientated so as to hold the bulb in a position suitable for driving on the left hand side of the road and the other set being arranged to hold the bulb in a position suitable for driving on the right hand side of the road. In this way, it is possible to have a single reflector body moulding which is usable irrespective of the rule

of the road. Under these circumstances, two types of retaining means are provided and it is merely necessary to select and fit to the reflector body that retaining means which is appropriate to the rule of the road in the country for which the headlamp is destined to be mainly used.

An embodiment of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:-

Fig 1 is an axial section through part of a headlamp assembly embodying the present invention,

Fig 2 is a sectional view on the larger scale of part of Fig 1,

Fig 3 is a plan view of part of the lamp assembly, and

Fig 4 is a larger scale side elevation of part of the lamp assembly.

Referring now to the drawings, the headlamp assembly illustrated therein is for producing a dipped or passing beam which satisfies the appropriate ECE regulations for an asymmetric beam pattern.

The headlamp assembly comprises a dished reflector body 10 (only partly shown) having the usual front opening (also not shown), an internal reflective surface 12 and a rear bulb-receiving aperture 14. The headlamp assembly further comprise, in a manner known per se, a housing containing the body 10 and fitted with a light-transmitting front cover which lies across the front opening of the dished body 10.

The dished body 10 is injection moulded out of a suitably temperature-resistant synthetic resin composition and includes an external sleeve 16 which is integrally molded at the same time as the body 10 and which surrounds the bulb-receiving aperture 14. The sleeve 16 is of stepped configuration at is rear end (the upper end as viewed in Figs 1 and 2) so as to define a continuous annular rim 18 and an annular surface 20 disposed inwardly of the rim 18 and facing rearwardly. The surface 20 is disposed in a plane which is generally perpendicular to the optical axis X (see Fig 1) of the dished reflector body 10.

The surface 20 is moulded with a series of features thereon, such features including a first set of three abutment surfaces 22 and a second set of three abutment surfaces 23. The abutment surfaces 22 of the first set are spaced apart in the circumferential direction about the axis of the sleeve 16 (which coincides with optical axis X) by distances which correspond to the spacing between the bulb-locating lugs 24 (only one shown- see Fig 4) on an annular mounting flange of a conventional quartz halogen H4 bulb. The dimension of each of the abutment surfaces 22 in the circumferential direction is such that it is capable of receiving the appropriate lug 24, it being appreciated that, in a conventional H4 bulb, one of the lugs is wider than the remaining two lugs and that the lugs are not equally-angularly spaced about the periphery of the mounting flange. This asymmetric arrangement of the lugs ensures that the bulb can only be fully mounted in the bulbholder in a unique orientation so as to ensure that the filament and the filament shield (which also forms an integral part of the bulb) are correctly positioned relative to the optics of the reflector. The abutment surfaces 23 of the second set are mutually arranged in a similar manner to that described above for the abutment surfaces 22, but the set of abutment surfaces 23 is displaced by an angle of 15° about the circumference of the surface 20 relative to the set of abutment surfaces 22. The object of this is to enable the same reflector body 10 to be used irrespective of the rule of the road prevailing. Thus, depending upon the rule of the road, the lugs 24 of the standard H4 bulb are either engaged with the abutment surfaces 22 of the first set or with the abutment surfaces 23 of the second set. In the embodiment illustrated in Figs 1 to 4, the headlamp is intended to be used with the lugs 24 engaged with the abutment surfaces 22 of the first set.

Each abutment surface 22 and its adjacent abutment surface 23 is separated by a rearwardly extending projection 26 having a recess 28 (only shown in Fig 4) in its rear end. The projection 26 does not extend as far rearwardly as the rim 18. At the opposite side of the abutment surfaces 22 and 23 to the projection 24, the surface 20 is formed with respective ramps 30 and 32 thereon which are oppositely directed circumferentially of the surface 20. These ramps are only shown in Figs 3 and 4.

The lamp assembly further includes a retaining device in the form of a pressing 34 of suitably resilient sheet metal. The pressing 34 includes a ring 36 provided with an integrally formed outer annular collar 38 of a size to embrace the sleeve 16. The collar 38 is provided with a plurality of barbs 40 (only one shown - See Fig 2) which extend inwardly relative to the collar 38 and which are directed towards the ring 36. The dimensions of the collar 38 and the barbs 40 relative to the outer periphery of the sleeve 16 are such that the collar 38 can be forced over the sleeve 16 so that the barbs 40 bite into the material of the sleeve 16 and thereby hold the pressing 34 firmly against removal once fitted. When fully fitted, the ring 36 abuts against the rear face of the rim 18 and is thereby held in spaced relationship relative to the surface 20. The ring 36 has a series of three spring arms 42 which are formed integrally from the material of the ring 36 by means of a cutting and bending operation. Each spring arm 42 projects forwardly of the ring 36 towards a respective one of the abutment surfaces 22. Each ring 36 is also formed with three radially extending ribs 44 (only one shown - see Fig 4) which engage respective ones of the recesses 28 in the projections 26. The engagement of the ribs 44 in the recesses 28 ensures that, once the pressing 34 has been fitted, it is fixed in the desired position against rotation relative to the sleeve 16. Each spring arm 42 has a convexly

curved free end 46 which engages against the respective lug 24 to urge it resiliently against its associated abutment surface 22. The ring 36 is further provided with a series of three slots 48 (only one shown - See Fig 3) which open onto its inner periphery. The slots 48 are so dimensioned and mutually spaced apart circumferentially of the ring 36 that the lugs 24 can be passed therethrough during fitting of the bulb into the lamp assembly. Each slot 48 is, however, circumferentially staggered relative to the respective abutment surface 22 so as to be disposed on the opposite side of the ramp surface 30 thereto.

Thus, during fitting of the bulb into the lamp assembly, it will be appreciated that the bulb is first angularly orientated and moved so as to pass the lugs 24 through the respective slots 48 until the lugs 24 engage against the surface 20. Then the bulb is axially rotated in a clockwise direction as viewed in Fig.3 so that the lugs 24 pass along the surface 20 and ride up the ramp 30. Further rotation of the bulb causes the respective spring arms 42 to be contacted by the lugs 24 and biassed upwardly until the lugs 24 lie opposite the respective abutment surfaces 22, whereupon the spring arms 42 are free to flex back and urge the lugs 24 against the respective abutment surfaces 22 as illustrated in Fig 4.

When it is desired to replace a faulty bulb, it is merely necessary to apply an axially rearward force to the bulb which deflects the spring arms 42 and then to rotate the bulb in the opposite direction to the fitting direction so as to bring the lugs 24 clear of the ramps 30. The bulb can then be manipulated so that the lugs are aligned with the respective slots 48, whereupon the bulb can be removed.

Where the headlamp assembly is to be used in the country with a different rule of the road, then a slightly different pressing is used which is the pressing 34 described hereinabove but with the spring arms 42 and slots 48 respectively positioned so as to enable the lugs 24 to be engaged with the respective abutment surfaces 23 after riding over the ramps 32 upon axial rotation of the bulb in an anti-clockwise direction as viewed in Fig.3.

Claims

1. A lamp assembly comprising a dished body (10) having a front opening, an internal reflective surface (12) and a rear bulb-receiving aperture (14) surrounded by an external sleeve (16), said sleeve (16) having circumferentially spaced abutment surfaces (22,23) for engagement by respective bulb-locating lugs (24) on a mounting flange of a bulb, and retaining means (34) for retaining the lugs (24) in engagement with the respective abutment surfaces (22,23) of the sleeve in use, characterized in that
   (a) the retaining means (34) includes a ring (36) which is fixedly mounted relative to the sleeve (16) and which has circumferentially spaced slots (48) in its inner periphery,
   (b) each slot (48) is offset relative to a respective one of the abutment surfaces (22,23) in the circumferential direction and is of a size to allow passage of a respective one of the bulb-locating lugs (24) when the mounting flange is passed through the ring (36) with the lugs (24) aligned with the slots (48), and
   (c) the retaining means (34) further includes a resilient member (42) anchored to the ring (36) and biassed towards a respective one of the abutment surfaces (22,23), said resilient members (42) serving to urge the lugs (24) against the respective abutment surfaces (22,23) in use.

2. A lamp assembly as claimed in claim 1, wherein the resilient members (42) are formed integrally with the ring (36).

3. A lamp assembly as claimed in claim 1 or 2, wherein the ring (36) is provided with a collar (38) which embraces the sleeve (16), the collar (38) being provided with a plurality of inwardly directed barbs (40) or sprags which engage against the outer surface of the sleeve (16) to resist disengagement of the ring (36) from the sleeve (16).

4. A lamp assembly as claimed in any preceding claim, wherein each abutment surface (22,23) is defined between a stop (26) and an inclined ramp surface (30,32) disposed between the abutment surface (22,23) and the respective slot (48) in the ring (36), the ramp surface (30,32) and the stop (26) serving to restrict circumferential movement of the associated lug (24) when urged into engagement with the abutment surface (22,23) by the respective resilient member (42).

5. A lamp assembly as claimed in any preceding claim, wherein the ring (36) and the resilient members (42) are formed out of a suitably resilient sheet metal.

6. A lamp assembly as claimed in any preceding claim, wherein each resilient member (42) comprises a spring arm anchored at one end to the ring (36) and extending away from the respective slot (48) and towards and overlying the associated abutment surface (22,23).

7. A lamp assembly as claimed in any preceding claim, wherein, to provide for correct location of the ring (36) relative to the sleeve (16), mutually interengaging formations (28,44) are provided on

such two parts (36 and 16).

8. A lamp assembly as claimed in claim 7, wherein the mutually interengaging formations take the form of one or more interengaging ribs (28) and recesses (44) provided on the ring (36) and sleeve (16) respectively.

9. A lamp assembly as claimed in any preceding claim, wherein there are twice as many abutment surfaces (22,23) as bulb-retaining lugs (24) on the bulb, the abutment surfaces being arranged in two sets (22 and 23), one of the sets (22) being orientated so as to hold the bulb in a position suitable for driving on the left hand side of the road, and the other set (23) being arranged to hold the bulb in a position suitable for driving on the right hand side of the road.

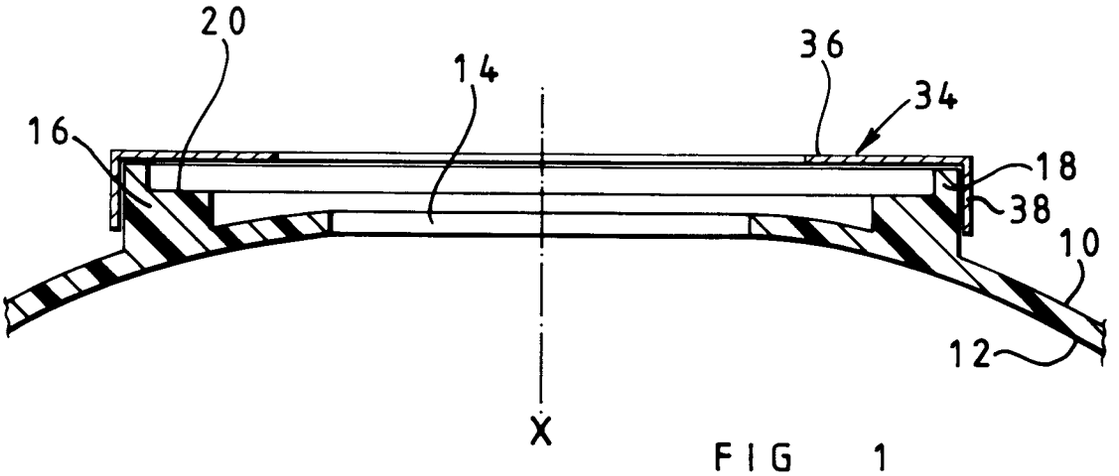

FIG 1

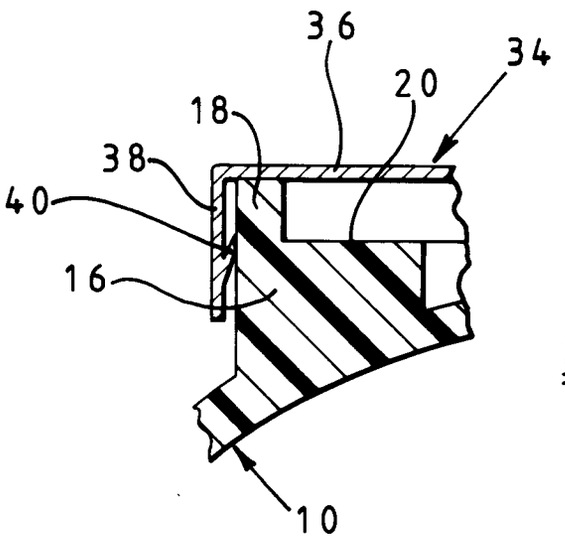

FIG 2

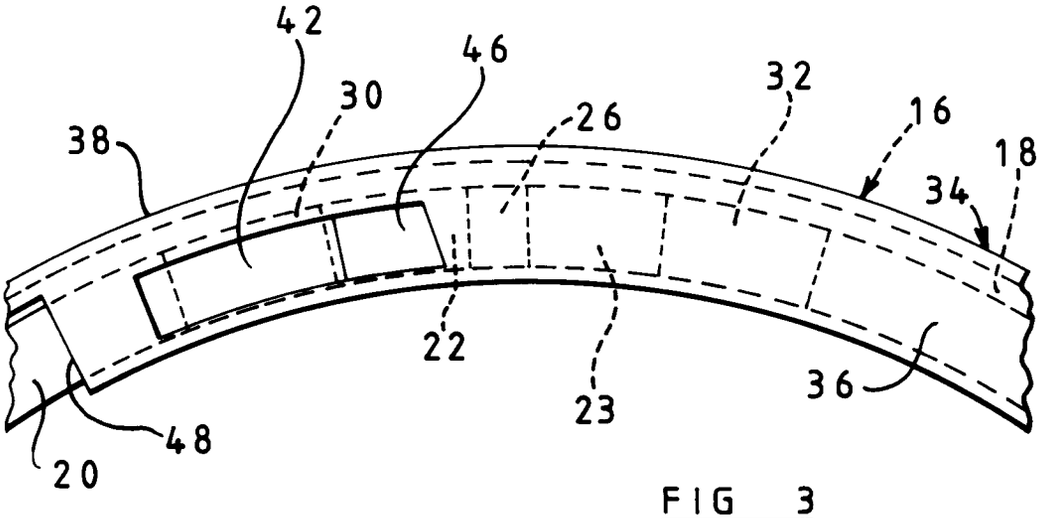
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FIG 3

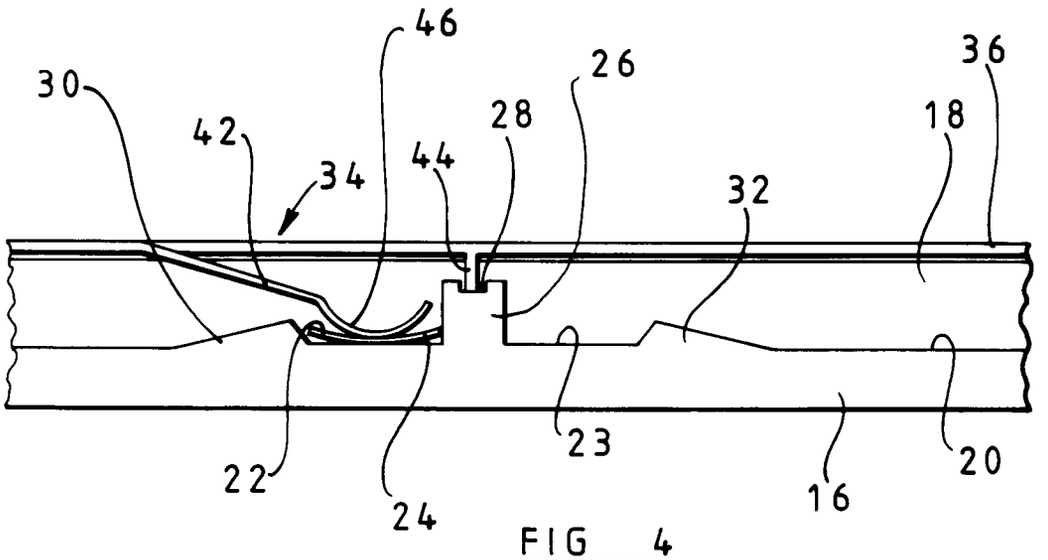
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FIG 4

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 30 6548

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.5)
X	US-A-4 682 274 (FREUDENREICH ET AL) * the whole document *	1-3,5,6	F21M7/00
A		4,7	
X	EP-A-0 292 200 (FORD MOTOR COMPANY) * the whole document *	1-3,6,7	
A	DE-U-8 535 949 (CARELLO INDUSTRIALE) * page 3, line 13 - page 4, line 14; figures 4-6 *	9	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			F21M

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	10 OCTOBER 1991	VAN OVERBEEKE J.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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