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(54) Title: ANTI SIPHON TANK INLET AND METHOD

(57) Abstract: A method of fitting an anti-siphon inlet assembly to a fluid tank inlet having an extending neck (14). The inlet assembly comprises a generally tubular body having an inlet aperture (11) at a first end and depending from a mounting means located at or adjacent the first end. The mounting means comprises at least one skirt (31) spaced from a portion of the tubular member to define a gap (33) therebetween which is open to receive the neck of the tank inlet. The tubular body is disposed in to said tank inlet so that the tank inlet neck is slidably received within the gap such that at least a portion of the skirt overlaps at least a portion of the inlet neck. The skirt is then secured to the inlet neck.
ANTI SIPHON TANK INLET

The present invention relates to inlets for fluid tanks such as a vehicle fuel tank. Particularly, but not exclusively the present invention relates to anti-siphon inlet for vehicle fuel tanks.

The theft of fuel by siphoning from the fuel tanks of vehicles, and in particular commercial road vehicles, is a recognised problem. It is conventional to fit vehicles with a lockable fuel tank filler cap to prevent unauthorised access to the tank inlet. However, since the fuel filler cap is accessible it is vulnerable to tampering and can often be forced open by the determined thief. In addition, it is not always practical to fit a vehicle with a lockable fuel filler cap.

This problem has been addressed in the prior art by provision of a fluid tank inlet pipe incorporating a float valve to prevent fuel being drawn off by siphoning from the tank inlet.

For example, French patent FR 2 534 888 discloses a fuel tank inlet pipe assembly provided with a float valve at its inner end. The float valve comprises a ball float retained in an apertured float chamber and which sits against a valve seat defined at the end of the inlet pipe when the fuel level in the tank is above the end of the inlet pipe to thereby prevent fuel flow back through the pipe. A grill is fitted in the inlet pipe a short distance above the valve seat to prevent a siphon tube being used to force the ball valve away from its seat. The grill itself is protected by a gentle S bend in the inlet pipe which prevents insertion of a rigid tool to penetrate the grill. A would be thief would only be able to remove any fuel present in the inlet pipe above the level of the grill.

US Patent US 1 995 007 discloses an anti-siphon inlet assembly comprising an inlet pipe provided with a baffle plate within its inlet portion and a float valve in the disposed in the pipe below the baffle plate. Examples of anti-siphon fuel tank inlet assemblies provided with baffles to prevent insertion of a siphon tube, but which do not have a float valve, are disclosed in US patent numbers 2,145,759 and 3,951,297.

The applicant has now recognised that it is desirable to provide an inlet assembly which can be easily fitted to an existing fluid tank inlet aperture. However, it may be appreciated that in order for such an inlet assembly to provide an effective means for preventing theft it is essential that the assembly can be securely attached to the tank inlet

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aperture to prevent its easy removal. Thus the need for secure attachment must be balanced with the ease and simplicity of installing the inlet in place of an exiting inlet.

For example, the fuel inlet pipe disclosed in French patent FR 2 534 888 appears to be either welded or brazed into position by a fillet around the neck of the tank aperture and in US patent US1 995 007 the inlet pipe is provided with an exterior flange midway along its length for attachment to the tank. Although these arrangements provide a secure attachment they do not allow for ease of attachment and are, therefore, not ideal for an assembly to be fitted to an existing tank.

The anti-siphon inlet assembly as disclosed in US patent numbers 2,145,759 and 3,951,297 are more readily fitted to a tank inlet neck, but in each case the inlet assembly is designed to fit to a specific tank inlet neck size and configuration. For instance, the inlet assembly of US 3,951,297 comprises a tubular member depending from a tank inlet extension 22 which is provided with an internal screw thread for screwing on to a similarly threaded tank inlet (and may then be bonded or welded to the inlet to prevent removal). US 2,145,759 on the other hand discloses an inlet assembly comprising a tubular body having lugs which are designed to interlock with an appropriately configured tank inlet neck provided with an internal flange defining locking tongs which engage with the lugs.

It is an object of the present invention to obviate or mitigate the above problems.

According to the present invention there is provided a method of:

fitting an anti-siphon inlet assembly to a fluid tank inlet having an extending neck;

the inlet assembly comprising a generally tubular body having an inlet aperture at a first end and depending from a mounting means located at or adjacent said first end;

one or more apertures remote from said first end to allow the passage of fluid through the tubular body into said tank;

means disposed within said tubular body to block the passage of a siphon tube through said tubular body;

wherein the mounting means comprises at least one skirt spaced from a portion of the tubular member to define a gap therebetween which is open to receive the neck of the tank inlet;

the method comprising:
passing the tubular body in to said tank inlet so that the tank inlet neck is slidably received within the or each gap such that at least a portion of said at least one skirt overlaps at least a portion of the inlet neck, and securing the or each skirt to the inlet neck.

The present invention thus provides a method of fitting a fuel tank inlet assembly (configured in accordance with the present invention) to the neck of a vehicle fuel tank inlet which is relatively straightforward to perform, provides good security against unauthorised removal, and is not limited to one particular size or configuration of inlet neck. The latter feature is significant in that a single installation method, and inlet assembly, can be fitted to a range of differently sized and configured fluid tank inlet necks. It will for instance be appreciated that the types of fluid tanks which require protection from siphoning come in a variety of sizes and configurations. For example, vehicle fuel tanks, although often standardised for a particular range of vehicles, can vary dependent upon the manufacturer, size and particular model of the vehicle that the fuel tank is fitted to. However, the fuel tank will generally have an inlet with an extending neck portion designed to receive a cap. The method of fitting an anti-siphon inlet assembly according to the present invention is independent of any particular inlet neck configuration. Moreover, with appropriate dimensioning a single inlet assembly can be configured to accept a range of inlet neck sizes. Accordingly, the present invention provides a method of fitting an anti-siphon inlet assembly to a fuel tank which is wider in application than the prior art anti-siphon inlet assemblies and installation methods discussed above.

The mounting means could for instance comprise a plurality of skirts circumferentially spaced around the tubular member, for instance three or four skirts spaced at 120° or 90° angles around the circumference. Each skirt could effectively define a “tab” which can be secured to the inlet neck by riveting etc. However, it is preferable that there is a single annular skirt surrounding the tubular member so that the gap receiving the inlet neck is an annular recess.

One preferred anti-siphon inlet assembly according to the present invention comprises:

a fluid tank inlet assembly adapted for fitting to a tubular neck of a fluid tank inlet, the inlet assembly comprising:
a generally tubular body having an inlet aperture at a first end and depending from a mounting means located at or adjacent said first end;

one or more apertures remote from said first end to allow the passage of fluid through the tubular body into said tank; and

means disposed within said tubular body to block the passage of a siphon tube through said tubular body, wherein

the mounting means comprises at least one skirt spaced from a portion of said tubular body, a gap being defined between said portion of tubular body and said at least one skirt, the or each gap having an open end for slidably receiving a portion of the neck of a tank inlet, the or each gap having a radial width and a length extending from said open end to receive a neck portion of the same length, wherein the length of the or each gap is not less than half its radial width.

This ensures that the skirt (which is preferably annular) will overlap the top of the inlet tank neck to a degree sufficient to enable secure attachment between the two in the method according to the present invention. For instance, the inlet assembly disclosed in US 3,951,297 mentioned above has an annular skirt intended to sit around the very top portion of the inlet neck, the skirt defining a recess the length of which is limited by a sealing gasket so that only a very small portion of the inlet neck is received within the recess. This portion is not sufficient for instance to enable secure attachment using rivets or similar fasteners, nor does it provide sufficient contact area between the neck and the skirt to enable secure bonding between the two.

Another preferred anti-siphon inlet assembly according to the present invention comprises:

a fluid tank inlet assembly adapted for fitting to a tubular neck of a fluid tank inlet, the inlet assembly comprising:

a generally tubular body having an inlet aperture at a first end and depending from a mounting means located at or adjacent said first end;

one or more apertures remote from said first end to allow the passage of fluid through the tubular body into said tank; and

means disposed within said tubular body to block the passage of a siphon tube through said tubular body, wherein
the mounting means comprises at least one skirt spaced from a portion of said tubular body, a gap being defined between said portion of tubular body and said at least one skirt, the or each gap having an open end for slidably receiving a portion of the neck of a tank inlet, the or each gap having a radial width and a length extending from said open end to receive a neck portion of the same length, wherein said portion of the tubular body has an enlarged radial thickness relative to the radial thickness of at least the majority of the tubular body depending therefrom.

Such embodiments of the inlet assembly are particularly suitable for fitting to tank inlet necks of a relatively large diameter, the enlarged portion of the tubular member ensuring that the radial width of the gap (which is preferably an annular recess defined by an annular skirt) is not so great as to present a problem in centering the inlet assembly within the inlet neck, whilst on the other hand ensuring that the internal diameter of the tubular body is no greater than necessary to accommodate a standard fuel pump nozzle (which is desirable to prevent backflow of fuel past the nozzle when filling the fuel tank). In addition, the enlarged portion reinforces the tubular member in the region of its attachment to the inlet neck.

Preferably, at least one vent aperture is provided in the inlet pipe adjacent to the collar which, in use, communicates with the inlet of the fluid tank. The vent aperture is provided to allow the gas to escape as the fuel level rises during filling of the fluid tank. Preferably a plurality of vent apertures are provided, for example, spaced circumferentially around the inlet pipe.

Preferably the fluid tank inlet assembly further comprises a cap engagement means at its proximal end. Most preferably the cap engagement means is arranged to receive the same cap as the fluid tank inlet aperture. Thus, upon installation of the fluid tank inlet assembly the original fluid tank cap may continue to be used.

In one preferred embodiment the means to permit the flow of fluid into the tank but block the passage of a siphon tube comprises a valve means disposed at the distal end of the inlet pipe to allow fluid flow from the distal end of the inlet pipe but to prevent return flow through the inlet pipe. The valve means may preferably be a float valve comprising a float trapped in an apertured float chamber which cooperates with a valve seat defined adjacent the distal end of the inlet pipe.
Preferably, the float valve chamber is generally cylindrical and comprises a plurality of fluid flow slots arranged axially relative to the inlet pipe. The float may preferably be a ball float.

Preferably, the float valve is secured to the end of the inlet pipe by a screw thread connection. In a preferred embodiment the float chamber has an axial length no less than half the axial length of the inlet pipe.

Alternatively or additionally the means to permit the flow of fluid into the tank but block the passage of a siphon tube comprises a baffle disposed within the inlet pipe.

As mentioned above, in an arrangement having a valve it is advantageous to provide a baffle between the proximal end and the valve to prevent the valve being forced open mechanically.

In some embodiments, however, it is preferred to provide a baffle but not a valve. Such arrangements are greatly simplified. It will be appreciated that such an arrangement would not prevent siphoning of fluid from above the distal end of the inlet assembly.

However, the applicants have recognised that many commercial road vehicle users routinely only ever partially fill their vehicles' fuel tanks and therefore the provision of a valve is unnecessary.

Other preferred features of the invention will become apparent from the description below.

Specific embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 illustrates schematically an embodiment of the present invention with a float valve;

Figure 2 schematically illustrates an embodiment of the present invention without a float valve;

Figure 3 is a cut away cross sectional view of the mounting arrangement of the embodiments of Figures 1 and 2; and

Figure 4 illustrates a modification of the mounting method described in relation to Figure 3.

With reference to figures 1 and 2, a fluid inlet assembly 1 for fitting to a fluid tank 10 comprises a substantially straight body 5, an attachment means 2 at its proximal end and means 3 to permit the flow of liquid into the tank but block the passage of a siphon tube.
(the "anti-siphon means") at its distal end. The attachment means 2 according to the present invention is discussed in more detail further below with reference to figure 3.

The body 5 and anti-siphon means 3 of the assembly are similar to that disclosed in the applicants co-pending application GB 0 322 594. The attachment means 2, which is provided for attaching the assembly to the inlet aperture 11 of the fuel tank 10, is a novel feature of the present invention and is described in detail below.

In the embodiment of figure 1, the anti-siphon means 3 includes a float valve comprising a float ball 6 held within a float cage 7. The float ball is a spherical hollow plastics ball. Thus, the float valve is arranged to allow the float ball 6 to be movable along the longitudinal axis of the assembly from a first, open, position (as shown in figure 1) to a second, closed position when fuel rises above the distal end of the assembly. In the illustrated embodiment the float valve is manufactured separately from the body 5 of the assembly and is attached by means of a screw thread to the distal end of the body.

It will be appreciated that when the float valve is closed it is still possible to fill the tank with further fuel as the fuel pressure entering the tank opens the valve against its buoyancy.

A baffle plate 8 is provided within the body 5, towards its distal end. The baffle plate comprises a metal plate, provided with a plurality of fuel outlet holes, which is securely attached across the body. The baffle plate 8 protects the float valve and further prevents siphoning when the fuel level is below the level required to close the valve.

The body 5 is provided with a plurality of vent outlets 9 spaced around its circumference adjacent to the attachment means 2. These vents assist the filling of the tank by allowing gas to escape the tank as it is displaced by fuel.

An alternative embodiment of the invention, as shown in figure 2, comprises an anti-siphon assembly as described above but is not provided with a float valve.

This embodiment is intended for use where a tank is generally only filled to a level below the distal end of the assembly. Thus, only a baffle plate 8 is required. The applicant has found that a number of commercial vehicle operators routinely only partially fill their vehicles tanks. This reduces the amount of capital held in fuel at any given time. Such a policy is especially advantageous for companies with large fleets of vehicles which are used for short to medium range transit. Although the amount of fuel held is reduced it is still desirable to protect the fuel from theft.
The body 5 in this embodiment is further provided with a plurality of inlet holes 20 which are advantageous in reducing the tendency of fuel welling up within the assembly during filing. This is undesirable as it can result in either spilling out of the inlet or causing the dispensing nozzle to shut off (most fuel dispensers are designed to shut off when the fluid level reaches the end of the dispensing nozzle).

With reference to figure 3, the attachment means 2 of a preferred embodiment will now be described in detail.

The attachment means 2 provided at the proximal end of the inlet body 5 comprises a mounting flange 30 which extends in the radial direction of the assembly. A depending skirt 31 is provided which extends down from the outer edge of the flange 30 in the longitudinal direction of the inlet pipe. The tubular body 5 has a region of increased thickness, i.e. collar 32, adjacent to the skirt 31 such that the flange, skirt and collar define an annular recess 33 extending around the outside circumference of the body 5. The annular recess 33 defines a mounting seat arranged to be located over the neck 14 of the tank inlet aperture 11 which includes cap engagement means 12 in the form of a recess formed in the neck of the inlet forming part of a bayonet fitting.

The assembly is attached to the inlet aperture 11 by bonding the mounting seat 33 over the neck 14 of the aperture 11. The depending skirt 31 and neck 14 are then drilled and riveted together for additional security.

The collar 32 extends only a limited distance along the body 5 to allow sufficient clearance for any internal rim 13 which may be provided on the tank inlet aperture. The collar 32 is provided so that the tubular body is a reasonably snug fit with the inlet neck to help in centralising the inlet assembly in the tank inlet whilst avoiding a tubular body with an undesirably large internal diameter. That is, it is preferable that the internal diameter of the tubular body is a minimum required to accommodate a fuel filling nozzle to avoid backflow of fuel past the nozzle when filling the tank. Provision of the collar 32 is for instance useful for embodiments of the invention designed for fitting to fuel tank inlet necks of the diameter in the region of 80mm. The collar 32 would not, for example, be necessary for embodiments of the invention intended for fitting to substantially smaller inlet neck diameters, for instance of the order of 60mm.

It will be appreciated that the inlet assembly illustrated in Figures 1 to 3 can be fitted to any inlet neck that can be received within the recess 33. Accordingly, a single
inlet assembly can accommodate inlet necks of a range of sizes. For example, in one particular embodiment the collar 32 has an outside diameter of 77.5mm and the depending skirt has an inside diameter of 107.8mm to provide a mounting seat 33 suitable for tank inlet apertures having a neck with a typical interior diameter of 78-80mm and a typical outside diameter of 104-106.5mm. The depending skirt extends 15.8mm from the lower surface of the mounting flange to provide sufficient area for attaching the assembly to the fuel tank and allowing the assembly to be attached to tanks 10 having a neck 14 of varying sizes. Typically the applicant has found that the neck depth on commercial vehicle fuel tanks varies from 25-50mm. The collar reinforces the inlet assembly in the region of its attachment to the inlet, but is limited to extend less than 37mm from the lower surface of the rim to allow for a typical internal rim location.

The uppermost end of the inlet assembly 1 is provided with a cap engagement means 35. The illustrated engagement means is a bayonet type fitting but other fitting types can be provided as known in the art. The engagement means is arranged so as to allow the original fuel tank cap 36, which prior to fitting of the inlet assembly 1 would be received by engagement means 12, to close the inlet assembly.

In the above description, and in Figures 1 to 3, the inlet assembly according to the present invention is fitted to a fluid tank inlet neck which has a bayonet type fitting to receive a fuel cap. The same embodiment of the invention can similarly be fitted to fuel tank inlet necks having other configurations, including for instance a neck provided with an external, or internal, screw thread to receive a correspondingly screw threaded cap. The existence of the screw thread will have no impact on the method of fitting the inlet assembly according to the invention. However, in such cases it may be desirable to provide an inlet assembly with a screw threaded surface to receive a cap of the same configuration as would be fitted to the unmodified inlet neck (as an alternative to the bayonet fitting 35 described above).

As mentioned above, the preferred method of securing the inlet assembly to the tank inlet neck is to first bond the skirt to the inlet neck and then to rivet the skirt to the inlet neck. The bonding step may provide in some cases initial securement of the inlet assembly for the subsequent riveting operation, but also provides a fluid tight seal to prevent fluid leaking out of the inlet through the annular recess. The riveting step then provides further security against unauthorised removal. In other cases the riveting may be
performed before the adhesive used to bond the skirt to the tubular body has dried or set, in which case the rivets secure the inlet in position whilst the adhesive hardens.

It will be appreciated that alternative fasteners could be used to secure the inlet assembly to the tank inlet neck. For instance, grub screws could be used. In this case appropriate holes would need to be drilled through the inlet assembly skirt, but not through the inlet tank neck. This may be advantageous in some applications, although provides less security against removal than riveting.

As an alternative to the use of bonding to provide a seal between the inlet assembly and the inlet neck, an o-ring or similar annular seal member could be located around the tubular body within the recess, to be received between the tubular body and an internal annular surface of the tank inlet neck. This is illustrated schematically in Figure 4, which shows the inlet assembly of Figures 1 to 3 installed within a screw threaded tank inlet neck 36, with an O-ring 37 located around the collar 32 so as to seal the annular gap between the tubular body of the insert assembly and the inlet neck 36. The skirt 31 can then be secured to the neck by riveting, or using other fasteners such as grub-screws etc. Although not necessary, if desired the skirt 31 could also be bonded to the neck 36.

As another modification to the installation procedure, the skirt 31 could be welded to the inlet neck. This is not preferred, but nevertheless is a possibility contemplated by the present invention.

Other possible modifications will be readily apparent to the skilled person.
CLAIMS

1. A method of:
   fitting an anti-siphon inlet assembly to a fluid tank inlet having an extending neck;
   the inlet assembly comprising a generally tubular body having an inlet aperture at a first end and depending from a mounting means located at or adjacent said first end;
   one or more apertures remote from said first end to allow the passage of fluid through the tubular body into said tank;
   means disposed within said tubular body to block the passage of a siphon tube through said tubular body;
   wherein the mounting means comprises at least one skirt spaced from a portion of the tubular member to define a gap therebetween which is open to receive the neck of the tank inlet;
   the method comprising:
   passing the tubular body into said tank inlet so that the tank inlet neck is slidably received within the or each gap such that at least a portion of said at least one skirt overlaps at least a portion of the inlet neck, and
   securing the or each skirt to the inlet neck.

2. The method according to claim 1, wherein said at least one skirt comprises an annular skirt and said gap is an annular recess defined around said portion of the tubular member.

3. The method of claim 2, wherein securing the annular skirt to the inlet neck comprises bonding the skirt to the inlet neck around the circumference of the skirt.

4. The method according to claim 2 or claim 3, wherein securing the annular skirt to the inlet comprises welding the skirt to the inlet neck around the circumference of the skirt.
5. The method of any preceding claim, wherein securing said at least one skirt to the inlet neck comprises fastening the or each skirt to the inlet neck using fasteners such as rivets, screws or the like.

6. The method according to claim 3, further comprising the step of riveting the annular skirt to the inlet neck subsequent to said bonding.

7. The method according to any preceding claim, wherein an annular seal member is located around said portion of the tubular member so that said tank inlet neck is slidably received over said seal member so that the seal member provides a fluid seal between the inlet neck and the tubular member.

8. A fluid tank inlet assembly adapted for fitting to a tubular neck of a fluid tank inlet, the inlet assembly comprising:

   a generally tubular body having an inlet aperture at a first end and depending from a mounting means located at or adjacent said first end;

   one or more apertures remote from said first end to allow the passage of fluid through the tubular body into said tank; and

   means disposed within said tubular body to block the passage of a siphon tube through said tubular body, wherein

   the mounting means comprises at least one skirt spaced from a portion of said tubular body, a gap being defined between said portion of tubular body and said at least one skirt, the or each gap having an open end for slidably receiving a portion of the neck of a tank inlet, the or each gap having a radial width and a length extending from said open end to receive a neck portion of the same length, wherein the length of the or each gap is not less than half its radial width.

9. A fluid tank inlet assembly according to claim 8, wherein said at least one skirt comprises an annular skirt surrounding said portion of the tubular body, and said gap comprises an annular recess defined between said portion of the tubular body and the annular skirt.
10. A fluid tank inlet assembly according to claim 9, wherein the annular skirt depends from a annular flange extending radially from the tubular body, a surface of the annular flange defining an end of the annular recess opposing said open end.

11. A fluid tank inlet assembly according to any one of claims 8 to 10, wherein said portion of the tubular body has an enlarged radial thickness relative to at least the majority of the tubular body depending therefrom.

12. A fluid tank inlet assembly according to any one of claims 8 to 11, further comprising an annular seal member disposed around said portion of the tubular body, such that the width of the or each gap is defined between said at least one skirt and said seal member.

13. A fluid tank inlet assembly according to any one of claims 8 to 12, wherein the or each gap has a radial width sufficient to accommodate a range of different diameter tank inlet necks.

14. A fluid tank inlet assembly according to anyone of claims 8 to 13, wherein said first end of the tubular inlet is provided with fuel cap engagement means.

15. A fluid tank inlet assembly adapted for fitting to a tubular neck of a fluid tank inlet, the inlet assembly comprising:
   - a generally tubular body having an inlet aperture at a first end and depending from a mounting means located at or adjacent said first end;
   - one or more apertures remote from said first end to allow the passage of fluid through the tubular body into said tank; and
   - means disposed within said tubular body to block the passage of a siphon tube through said tubular body, wherein
     - the mounting means comprises at least one skirt spaced from a portion of said tubular body, a gap being defined between said portion of tubular body and said at least one skirt, the or each gap having an open end for slidably receiving a portion of the neck of a tank inlet, the or each gap having a radial width and a length extending
from said open end to receive a neck portion of the same length, wherein said portion of the tubular body has an enlarged radial thickness relative to the radial thickness of at least the majority of the tubular body depending therefrom.

16. A fluid tank inlet assembly according to claim 15, wherein said at least one skirt comprises an annular skirt surrounding said portion of the tubular body, and said gap comprises an annular recess defined between said portion of the tubular body and the annular skirt.
**INTERNATIONAL SEARCH REPORT**

**A. CLASSIFICATION OF SUBJECT MATTER**

B60K15/04

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)

B60K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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Further documents are listed in the continuation of Box C. See patent family annex.

- "X" 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
- "Y" 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

**Date of the actual completion of the international search**

31 January 2006

**Date of mailing of the international search report**

08/02/2006

**Name and mailing address of the ISA/European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 spo nl. Fax: (+31-70) 340-3016**

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