Title: MOBILE GENERATOR UNIT WITH REMOVABLE BREAKER ASSEMBLY

Abstract: The mobile generator unit includes a container having a peripheral wall enclosing a power generating motor assembly. A wall opening is made in the peripheral wall. A breaker box can be installed from the interior of the container and attached on the container wall inside the container, with a front wall of the breaker box fitting inside the wall opening. The breaker box front wall is removable to allow the breaker assembly located within the breaker box to be removed from the breaker box through the wall opening from outside the container.
Published:  
— with international search report

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MOBILE GENERATOR UNIT WITH REMOVABLE BREAKER ASSEMBLY

CROSS-REFERENCE DATA
The present application is a continuation-in-part application of co-pending United States patent application No. 09/664,792 filed on September 19, 2000 and allowed on September 7, 2001.

FIELD OF THE INVENTION
The present invention relates to mobile generator units, and more particularly to a removable breaker assembly for a mobile generator unit.

BACKGROUND OF THE INVENTION
High power output mobile generator units are used to provide electricity where the regular electric grid is not accessible, where a power shortage occurs, or as a fall-back option in combination with the regular electric grid. These generator units include a power generating motor, and other affiliated devices such as a flywheel, a drive, a radiator, a muffler, etc., these elements being generally referred in the present specification as the power generating motor assembly which allows power to be fed through power outlet socket connectors to an outside load. The power generating motor assembly is carried in a container, the latter usually in the form of a semi-trailer that can be releasably attached to a truck, thus facilitating the transport thereof.

It is known to provide on the semi-trailer a breaker box which is linked to the power generating motor assembly to prevent excessive power output. The breaker box is installed inside the semi-trailer. The breaker box includes power outlet socket connectors in which the wire plugs of the load to be fed with electricity, are to be connected. Additional power inlet socket connectors are provided on the breaker box, wherein the wire plugs from the power generating motor assembly are connected. The
electric current from the inlet socket connectors passes through a breaker before being dispatched to the outlet sockets. Thus, excessive current demand can be prevented with the breaker, as known in the art. The breaker can be reset in a known fashion after it has opened the electric circuit under the bias of excessive power demand.

A problem with the breaker box in conventional generator semi-trailers is that it is difficult to install and remove. Indeed, the rather heavy breaker box has to be carried into the semi-trailer through its rear doors, and then maintained in the correct position while it is fixed to the semi-trailer wall. This operation can be tedious, especially considering the limited space available inside the semi-trailer which is loaded with the power generating motor assembly. In addition to the initial installation of the breaker box, the breaker box has to be removed and reinstalled when the power generating motor has to be taken out from the semi-trailer for maintenance or replacement purposes, or when the breaker box itself has to be repaired or replaced.

SUMMARY OF THE INVENTION

The present invention relates to a mobile generator unit comprising:

- a container having a generally closed peripheral wall and defining an inner chamber;
- a power generating motor assembly carried inside said container inner chamber;
- a wall opening in said peripheral wall, with said wall defining a wall edge portion circumscribing said wall opening;
- a breaker box located in said container inner chamber and comprising a front wall being removable to form an outwardly-facing box opening in said breaker box in facing register with said wall opening, and a box edge portion being in close proximity to said peripheral wall edge portion, with said front wall comprising an outlet port;
- a breaker assembly located inside said breaker box and comprising:
  a) an inlet socket connector that is releasably connectable to said motor assembly and that is accessible inside said container inner chamber;
  b) an outlet socket connector for releasable connection to an outside
load and accessible through said outlet port; and

c) an accessible breaker linking said inlet socket connector and said
outlet socket connector;
said breaker assembly being removable from said breaker box through said box opening
when said front wall is removed, and through said wall opening; and

- breaker box attachment means attaching said breaker box to said container.

In one embodiment, said box edge portion is attached to said wall edge portion.

In one embodiment, said box edge portion is linked in water-tight fashion
to said wall edge portion with a seal.

The present invention also relates to a mobile generator unit comprising:

- a container having a generally closed peripheral wall and defining an inner
chamber;
- a power generating motor assembly carried inside said container inner chamber;
- a wall opening in said peripheral wall, with said peripheral wall defining a wall
edge portion circumscribing said wall opening;
- a breaker box located in said container inner chamber and comprising a front wall
being removable to form an outwardly-facing box opening in said breaker box in facing
register with said wall opening, and a box edge portion circumscribing said front wall and
abutting against an inwardly-facing side of said wall edge portion, with said front wall
comprising an outlet port;

- attachment means attaching said box edge portion to said wall edge portion; and
- a breaker assembly located inside said breaker box and comprising:
  a) an inlet socket connector that is releasably connectable to said
motor assembly and that is accessible inside said container inner chamber;
  b) an outlet socket connector for releasable connection to an outside
load and accessible through said outlet port; and
  c) and an accessible breaker linking said inlet socket connector and
said outlet socket connector;
said breaker assembly being removable from said breaker box through said box opening when said front wall is removed, and through said wall opening.

In one embodiment, the mobile generator unit further comprises a breaker frame located within said breaker box and carrying said breaker assembly, said breaker frame and consequently said breaker assembly carried by said breaker frame being removable from said breaker box through said box opening when said breaker box front wall is removed and through said wall opening.

In one embodiment, said breaker box front wall comprises a pair of access doors selectively closable over said outlet port.

The present invention further relates to a method of installing a breaker box in the container of a power-generating unit, the container having an inner chamber enclosing a motor assembly, and a generally closed peripheral wall comprising a wall opening, with said wall defining a wall edge portion circumscribing the wall opening, the breaker box comprising a front wall being removable to form an outwardly-facing box opening in said breaker box and comprising an outlet port, and a box edge portion circumscribing said front wall, the breaker box enclosing a breaker assembly comprising an inlet socket connector, an outlet socket connector accessible through the front wall outlet port for releasable connection to an outside load, and an accessible breaker linking said inlet socket connector and said outlet socket connector, said method comprising the following steps:

a) moving the breaker box inside the container, until the breaker box front wall becomes aligned with the wall opening;

b) fixing the breaker box to the container; and

c) connecting the breaker box power inlet socket connectors to the motor assembly.

In one embodiment, in step (a) the breaker box is carried by carrying members.

In one alternate embodiment, in step (a) the breaker box is attached to the motor assembly and the motor assembly is inserted inside the container until the breaker box front wall becomes aligned with the container wall opening.
In one embodiment, step (b) is accomplished by fixing the breaker box edge portion to the wall edge portion.

The invention further relates to a method of removing a breaker box from the container of a power-generating unit, the container having an inner chamber enclosing a motor assembly, and a generally closed peripheral wall comprising a wall opening, with the wall defining a wall edge portion circumscribing the wall opening, the breaker box comprising a front wall being removable to form an outwardly-facing box opening in said breaker box and comprising an outlet port, and a box edge portion circumscribing the front wall, the breaker box enclosing a breaker assembly comprising an inlet socket connector releasably connected to the motor assembly, an outlet socket connector accessible through the outlet port for releasable connection to an outside load, and an accessible breaker linking said inlet socket connector and said outlet socket connector, said method comprising the following steps:

a) disconnecting the breaker box power inlet socket connectors from the motor assembly;

b) removing the breaker box front wall from the breaker box; and

c) moving the breaker assembly out of the breaker box through the box opening and through the wall opening.

In one embodiment, in step (b), the removal of the front wall is accomplished by unbolting it from the breaker box and then moving it away.

In one embodiment, the breaker assembly is carried in a breaker frame, and in step (c), the breaker frame is moved out of the breaker box thus carrying the breaker assembly out of the breaker box.

The present invention also relates to a method of installing a breaker box in and removing a breaker assembly from the container of a power-generating unit, the container having an inner chamber enclosing a motor assembly, and a generally closed peripheral wall comprising a wall opening, with said wall defining a wall edge portion circumscribing the wall opening, the breaker box comprising a front wall being removable to form an outwardly-facing box opening in said breaker box and comprising an outlet
port, and a box edge portion circumscribing said front wall, the breaker box enclosing a breaker assembly comprising an inlet socket connector, an outlet socket connector accessible through the front wall outlet port for releasable connection to an outside load, and an accessible breaker linking said inlet socket connector and said outlet socket connector, said method comprising the following steps:

a) moving the breaker box inside the container, until the breaker box front wall becomes aligned with the wall opening;
b) fixing the breaker box to the container;
c) connecting the breaker box power inlet socket connectors to the motor assembly;
d) disconnecting the breaker box power inlet socket connectors from the motor assembly;
e) removing the breaker box front wall from the breaker box; and
f) moving the breaker assembly out of the breaker box through the box opening and through the wall opening.

The invention also relates to a mobile generator unit comprising:
- a container having a peripheral wall defining an interior side and an exterior side, said wall having a wall opening;
- a power generating motor assembly located on the interior side of said peripheral wall;
- a breaker box installed from and attached to the interior side of said peripheral wall, said breaker box comprising a front wall fitting inside said wall opening, said breaker box front wall being removable to allow a breaker assembly located within the breaker box to be removed from the breaker box through the wall opening from the exterior side said peripheral wall.

DESCRIPTION OF THE DRAWINGS

In the annexed drawings:

Figure 1 is a partial side elevation of a mobile generator unit including a semi-trailer container, with part of the semi-trailer side wall being cut-away;
Figure 2 is a rear elevation of the mobile generator unit of figure 1, with the rear tail gate doors of the semi-trailer container being partly cut-away;

Figures 3, 3A and 4 sequentially show the installation of the breaker box onto the semi-trailer side wall by means of a pair of carrying members, with only a portion of the semi-trailer wall neighbouring the breaker box wall opening being shown, and more particularly:

Figure 3 is a perspective view of the breaker box being brought towards the interior side of the semi-trailer wall, in facing register with the semi-trailer breaker box wall opening;

Figure 3A is a side elevation, at a smaller scale, of the breaker box being positioned in close proximity to the interior side of the semi-trailer wall; and

Figure 4 is a perspective view of the breaker box being abutted against the semi-trailer wall;

Figures 5, 6, 6A and 7 sequentially show the removal of the breaker box from the semi-trailer wall by means of a pair of carrying members, with only a portion of the semi-trailer wall neighbouring the breaker box wall opening being shown, and more particularly:

Figure 5 is a perspective view of the breaker box being installed onto the semi-trailer wall, and showing the removal of the breaker box front wall;

Figure 6 is a perspective view of the breaker frame being engaged by the carrying members;

Figure 6A is a side elevation, at a smaller scale, of the breaker box, semi-trailer wall and carrying members of figure 6;

Figure 7 is a perspective view of the breaker frame being removed from the breaker box; and

Figure 8 is a perspective view of the power generating motor assembly, shown operatively connected to the breaker assembly by a number of wires.
DETAILED DESCRIPTION OF THE EMBODIMENTS

Figures 1 and 2 show a mobile generator unit 10 according to the present invention, which includes the rear end portion of a semi-trailer container 12 carried over ground by means of rear wheels 14 mounted by pairs on axles 16. A pivotable front foot member (not shown) allows container 12 to be upheld in a horizontal position when semi-trailer 12 is not moving, and a front tow hitch (not shown) is provided for releasable attachment to a truck for pulling semi-trailer 12.

Semi-trailer container 12 further comprises a peripheral wall including a reinforced floor 22, two side walls 24, 26, a front end wall (not shown), a rear end or tail gate wall 28, and a ceiling 30. Tail gate 28 is provided in the form of a pair of pivotable doors. The peripheral wall encloses an inner chamber in which there is provided a power generating motor assembly generally referred to with numeral 32, including a motor, a flywheel, a drive, a muffler, exhaust pipes, a fuel tank, a cooling radiator, cooling fans, and other elements known in the art.

As shown in figures 1-7, mobile generator unit 10 also comprises a breaker box 34 which is installed inside semi-trailer container 12. Breaker box 34 is generally L-shaped in side elevation, and comprises a front wall 36, a rear wall 38, two side walls 40, 42, an L-shaped top wall 44 and a bottom wall 46. Breaker box 34 further comprises a rectangular box edge portion 48 circumscribing front wall 36, with the latter being removably attached, for example bolted, to box edge portion 48.

A breaker box opening 50 is provided in the container side wall 24, with a rectangular wall opening edge portion 52 circumscribing opening 50. Attachment means such as bolts allow the removable attachment of box edge portion 48 to wall opening edge portion 52. Thus, breaker box can be removably attached to wall 24.

Alternately, breaker box 24 could be attached to another structure integral to the semi-trailer container 12 or even integral to the motor assembly 32, instead of being attached to wall edge portion 52. However, in such a case, wall 36 should remain engaged within wall opening 50 and a seal should then be provided between box edge portion 48 and wall edge portion 52 to prevent water, moisture, debris or small animals from seeping or...
entering into container 12.

Breaker box 40 further includes a pair of front power outlet access doors 54, that are positioned over an outlet access port (concealed by doors 54 in the drawings) that provides access to the power outlet socket connectors 62 (figure 8) in which the different wire plugs are to be connected to provide power to an outside load from the power generating motor assembly 32. An opening 64 in breaker box 34 allows access to power inlet socket connectors 66 (figure 8) which are operatively and releasably connected to power generating motor assembly 32 in a known fashion by means of appropriate wires 68. As known in the art, a breaker 70 links outlet socket connectors 62 to inlet socket connectors 66. Breaker 70, outlet socket connectors 62 and inlet socket connectors 66, together with the circuitry interconnecting these elements, form a breaker assembly.

Thus, to connect the motor assembly to an outside load, the breaker box doors, that are accessible since they are located in wall opening 50, can be opened for the outside load to be connected to the outlet socket connectors. Figure 8 shows the breaker assembly 62, 66, 70 devoid of any breaker box, to illustrate how the outlet connectors 62 may provide power from motor assembly 32 to an outside load.

A side door 56 is provided on the breaker box side wall 40 facing the semi-trailer tailgate doors 28, for allowing access to the breaker 70 located inside breaker box 40, for example for resetting breaker 70 if excessive power demand has changed the breaker from a closed condition (the circuit is closed and electric current can flow freely to the outside load requiring electricity) to an opened condition (the circuit is opened to prevent electric current to flow to the outside load). A see-through closed window 58 in side door 56 allows visual inspection of the status of the breaker, i.e. if the breaker is in opened or closed condition.

The breaker assembly is carried inside a breaker circuit frame 60. Breaker circuit frame 60 is in turned removably carried within breaker box 34. Breaker frame 60 may be releasably fixed inside breaker box 34.

In use, breaker box 34 is to be installed from the inner chamber of
container 12, while the breaker assembly 62, 66, 70 may be removed from box 34 from the outside of container 12. This is particularly useful, since breaker box 34 may be initially integrally attached to motor assembly 32 during the installation thereof inside container 12. This facilitates the initial installation, since both motor assembly 32 and breaker box 34 may be installed in container 12 in a single step. Thereafter, however, breaker assembly 62, 66, 70 remains easily accessible for removal thereof from the outside of container 12. Use of carrying members 72, such as forks from a forklift truck or an overhead crane, facilitates the handling of breaker box 34 and of breaker frame 60.

A method of installing breaker box 34 on semi-trailer container 12 comprises the following steps:

a) moving breaker box 34 inside container 12, until its front wall 36 becomes aligned with opening 50 of container 12;
b) fixing breaker box 34 to container 12; and
c) connecting the generator power wires 68 to the breaker box power inlet socket connectors 66.

Step (a) may be accomplished with carrying members 72 such as forks, may be accomplished manually if breaker box 34 is light enough, or alternately may be accomplished by inserting the motor assembly 32 into container 12 with breaker box 34 being attached to motor assembly 32. In the event that forks or other carrying members are used to install breaker box 34 in container 12, breaker box 34 can then be provided with rear openings 74 (figure 3A) to allow the carrying members 72 to be inserted therein.

Step (b) may be accomplished by fixing, e.g. bolting, the breaker box edge portion 48 to the opening edge portion 52. Alternately, breaker box 34 may be fixed in any other suitable manner to the container 12 or to the motor assembly 32 so that it will remain motionless relative to opening 50, with a seal or other linking element being provided to close an eventual gap between breaker box front wall edge portion 48 and container wall opening edge portion 52.

A method of removing breaker box 34 from container 12 comprises the followings steps:
a) disconnecting the generator power wires 68 from the breaker box power inlet socket connectors 66;

b) removing breaker box front wall 36 from breaker box 34; and

c) moving the breaker assembly out of breaker box 34.

In step (b), the removal of front wall 36 is accomplished according to the manner in which it is attached to breaker box 34. For example, if it is bolted to breaker box 34, then the removal of front wall 36 is accomplished by unbolting it from breaker box 34 and then moving it away.

In step (c), the breaker assembly is moved out of breaker box 34 in any suitable way. In the embodiment of the invention shown in the drawings, the breaker assembly 62, 66, 70 is carried in breaker frame 60. Consequently, to remove the breaker assembly from breaker box 34, breaker frame 60 may be manually grasped or engaged with carrying members 72 such as forks from a forklift truck or an overhead crane, and then moved out of breaker box 34. It is understood that the opening created in breaker box 34 by the removal of front wall 36 is sized to allow breaker frame 60 and breaker assembly 62, 66, 70 to be removed from breaker box 34.
WE CLAIM:

1. A mobile generator unit comprising:
   - a container having a generally closed peripheral wall and defining an inner chamber;
   - a power generating motor assembly carried inside said container inner chamber;
   - a wall opening in said peripheral wall, with said wall defining a wall edge portion circumscribing said wall opening;
   - a breaker box located in said container inner chamber and comprising a front wall being removable to form an outwardly-facing box opening in said breaker box in facing register with said wall opening, and a box edge portion being in close proximity to said peripheral wall edge portion, with said front wall comprising an outlet port;
   - a breaker assembly located inside said breaker box and comprising:
     a) an inlet socket connector that is releasably connectable to said motor assembly and that is accessible inside said container inner chamber;
     b) an outlet socket connector for releasable connection to an outside load and accessible through said outlet port; and
     c) an accessible breaker linking said inlet socket connector and said outlet socket connector;
   - said breaker assembly being removable from said breaker box through said box opening when said front wall is removed, and through said wall opening; and
   - breaker box attachment means attaching said breaker box to said container.

2. A mobile generator unit as defined in claim 1, wherein said box edge portion is attached to said wall edge portion.

3. A mobile generator unit as defined in claim 1, wherein said box edge portion is linked in water-tight fashion to said wall edge portion with a seal.
4. A mobile generator unit comprising:
   - a container having a generally closed peripheral wall and defining an inner chamber;
   - a power generating motor assembly carried inside said container inner chamber;
   - a wall opening in said peripheral wall, with said peripheral wall defining a wall edge portion circumscribing said wall opening;
   - a breaker box located in said container inner chamber and comprising a front wall being removable to form an outwardly-facing box opening in said breaker box in facing register with said wall opening, and a box edge portion circumscribing said front wall and abutting against an inwardly-facing side of said wall edge portion, with said front wall comprising an outlet port;
   - attachment means attaching said box edge portion to said wall edge portion; and
   - a breaker assembly located inside said breaker box and comprising:
     a) an inlet socket connector that is releasably connectable to said motor assembly and that is accessible inside said container inner chamber;
     b) an outlet socket connector for releasable connection to an outside load and accessible through said outlet port; and
     c) and an accessible breaker linking said inlet socket connector and said outlet socket connector;

5. A mobile generator unit as defined in claim 4, further comprising a breaker frame located within said breaker box and carrying said breaker assembly, said breaker frame and consequently said breaker assembly carried by said breaker frame being removable from said breaker box through said box opening when said breaker box front wall is removed and through said wall opening.

6. A mobile generator unit as defined in claim 4, wherein said breaker
box front wall comprises a pair of access doors selectively closable over said outlet port.

7. A method of installing a breaker box in the container of a power-generating unit, the container having an inner chamber enclosing a motor assembly, and a generally closed peripheral wall comprising a wall opening, with said wall defining a wall edge portion circumscribing the wall opening, the breaker box comprising a front wall being removable to form an outwardly-facing box opening in said breaker box and comprising an outlet port, and a box edge portion circumscribing said front wall, the breaker box enclosing a breaker assembly comprising an inlet socket connector, an outlet socket connector accessible through the front wall outlet port for releasable connection to an outside load, and an accessible breaker linking said inlet socket connector and said outlet socket connector, said method comprising the following steps:
   a) moving the breaker box inside the container, until the breaker box front wall becomes aligned with the wall opening;
   b) fixing the breaker box to the container; and
   c) connecting the breaker box power inlet socket connectors to the motor assembly.

8. A method as defined in claim 7, wherein in step (a) the breaker box is carried by carrying members.

9. A method as defined in claim 7, wherein in step (a) the breaker box is attached to the motor assembly and the motor assembly is inserted inside the container until the breaker box front wall becomes aligned with the container wall opening.

10. A method as defined in claim 7, wherein step (b) is accomplished by fixing the breaker box edge portion to the wall edge portion.

11. A method of removing a breaker box from the container of a power-generating unit, the container having an inner chamber enclosing a motor
assembly, and a generally closed peripheral wall comprising a wall opening, with the wall
defining a wall edge portion circumscribing the wall opening, the breaker box comprising
a front wall being removable to form an outwardly-facing box opening in said breaker
box and comprising an outlet port, and a box edge portion circumscribing the front wall,
the breaker box enclosing a breaker assembly comprising an inlet socket connector
releasably connected to the motor assembly, an outlet socket connector accessible through
the outlet port for releasable connection to an outside load, and an accessible breaker
linking said inlet socket connector and said outlet socket connector, said method
comprising the following steps:
a) disconnecting the breaker box power inlet socket connectors from the motor
assembly;
b) removing the breaker box front wall from the breaker box; and
c) moving the breaker assembly out of the breaker box through the box opening and
through the wall opening.

A method as defined in claim 11, wherein in step (b), the removal
of the front wall is accomplished by unbolting it from the breaker box and then moving
it away.

A method as defined in claim 11, with the breaker assembly being
carried in a breaker frame, wherein in step (c), the breaker frame is moved out of the
breaker box thus carrying the breaker assembly out of the breaker box.

A method of installing a breaker box in and removing a breaker
assembly from the container of a power-generating unit, the container having an inner
chamber enclosing a motor assembly, and a generally closed peripheral wall comprising
a wall opening, with said wall defining a wall edge portion circumscribing the wall
opening, the breaker box comprising a front wall being removable to form an outwardly-
facing box opening in said breaker box and comprising an outlet port, and a box edge
portion circumscribing said front wall, the breaker box enclosing a breaker assembly comprising an inlet socket connector, an outlet socket connector accessible through the front wall outlet port for releasable connection to an outside load, and an accessible breaker linking said inlet socket connector and said outlet socket connector, said method comprising the following steps:

a) moving the breaker box inside the container, until the breaker box front wall becomes aligned with the wall opening;
b) fixing the breaker box to the container;
c) connecting the breaker box power inlet socket connectors to the motor assembly;
d) disconnecting the breaker box power inlet socket connectors from the motor assembly;
e) removing the breaker box front wall from the breaker box; and
f) moving the breaker assembly out of the breaker box through the box opening and through the wall opening.

15. A mobile generator unit comprising:
- a container having a peripheral wall defining an interior side and an exterior side, said wall having a wall opening;
- a power generating motor assembly located on the interior side of said peripheral wall;
- a breaker box installed from and attached to the interior side of said peripheral wall, said breaker box comprising a front wall fitting inside said wall opening, said breaker box front wall being removable to allow a breaker assembly located within the breaker box to be removed from the breaker box through the wall opening from the exterior side said peripheral wall.
**INTERNATIONAL SEARCH REPORT**

### A. CLASSIFICATION OF SUBJECT MATTER

**IPC 7** H02B1/52

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)

**IPC 7** H02B

**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, WPI Data

### C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<tr>
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<th>Relevant to claim No.</th>
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<td>X</td>
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- **Further documents are listed in the continuation of box C.**
- **Patent family members are listed in annex.**

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

24 September 2002

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

01/10/2002

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