Figure 3

A vacuum pan unit for a central vacuum system, comprising an inlet port (1) provided for sucking up debris from a floor surface, a rigid vacuum passage way element (3,6) connecting the inlet port to an outlet port (2) of the vacuum pan unit, the outlet port being formed as a coupling piece provided to detachably connect to an inlet socket (12), which is provided in the wall and extends from an inlet opening of the pipe (10), in such a way that a passage is provided between the outlet port and the pipe.
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG). Published: national search report (Art. 21(3)) — before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))
Mobile vacuum pan unit

The invention relates to a vacuum pan unit for a central vacuum system, which comprises an inlet port, provided for sucking up debris from a floor surface, a rigid vacuum passage way element, connecting the inlet port to an outlet port of the vacuum pan unit and the outlet port being connectable to a pipe of a central vacuum system integrated in a wall.

Central vacuum systems are quite commonly used in homes and other buildings requiring regular vacuum cleaning. A central vacuum system usually comprises a main central vacuum power unit which is connected to a number of different inlet wall sockets provided in walls of different rooms of a building. These inlet wall sockets are configured to receive a compatible coupling member of a flexible hose, which the user can attach for vacuum cleaning. Each of these inlet wall sockets is connected by a hidden pipe system integrated in the walls to the main central vacuum power unit.

It is further known to provide one or more vacuum pan units in the central vacuum system. Such a vacuum pan unit is for instance known from US-B-6459056. The vacuum pan unit is a rigid unit provided to suck up debris from a floor surface and comprises an inlet port, provided for receiving the debris from the floor surface, and a vacuum passage way element connecting the inlet port to the hidden pipe system. During use, debris is collected by means suitable to the user and located near the inlet port of the vacuum pan unit. After activation of the
vacuum pan unit, the debris is then sucked up by vacuum to the main central vacuum unit. The vacuum pan units known from US-B-6459056 are permanently fixed vacuum pan units, of which the installation is rather complex and has to be performed by a professional installer. Because the cost of such a vacuum pan unit is relatively high, the vacuum pan unit is usually only installed in one room, for instance in the kitchen, of the building.

It is an aim of the present invention to provide a cheaper alternative for a vacuum pan unit in a central vacuum system. This aim is achieved with the vacuum pan unit showing the characteristics of the characterising part of claim 1.

The vacuum pan unit of the invention thereto comprises an outlet port which is formed as a coupling piece provided to detachably connect to an inlet socket provided in the wall, in such a way that a passage is provided between the outlet port and the pipe. With "detachable connection of a vacuum pan unit to an inlet socket" is meant that the connection/removal of the vacuum pan unit to the inlet wall socket can be done in a plug-in/plug-out way or snap-fit way, i.e. without the use of any additional tools such as screw drivers.

As a result of the easy connection/disconnection of the vacuum pan unit to/from the inlet wall, this task does not need to be performed by a professional installer. The connection and disconnection does not require bolts or equivalent attachment means for attaching the vacuum pan unit to the inlet wall socket. As a result, the overall installation cost of the central vacuum system can be decreased.

Moreover, because of the detachable connection between the mobile vacuum pan unit and the inlet wall socket, the vacuum pan unit can be easily removed from one of the inlet wall sockets and connected to another wall socket of the central vacuum
system, creating a mobile vacuum pan unit which can be connected to any wall socket of the central vacuum system. As a result, the central vacuum system according to the present invention only needs to comprise one vacuum pan unit, which may then be used in any of the inlet wall sockets of the central vacuum system. The known vacuum pan units are permanently connected to one inlet wall socket and therefore a separate vacuum pan unit is needed in every room where this application is desired. Because the central vacuum system can have less vacuum pan units when using the vacuum pan unit according to the present invention, the overall cost of the central vacuum system can be decreased without adversely influencing its functionality.

The vacuum pan unit according to the invention also allows for an easy upgrade of the central vacuum system. It is for instance possible to start with only one vacuum pan unit, which is then used for the whole building, and to later upgrade the system with additional vacuum pan units, which can for instance be stored on different floors of the building. With the present vacuum pan unit this is not possible, because the installation of an additional vacuum pan unit usually has to be performed by a professional and requires modifications to the building construction.

Preferably, the rigid vacuum passage way element and the outlet port are shaped for creating a predetermined distance between the inlet port and the wall, for instance a distance of 5-10 cm. Contact between the inlet port and the wall is to be avoided because contact between these elements may damage the wall and/or the vacuum pan unit, which is not desired.

More preferably, the predetermined distance is chosen to create a distance between the inlet port and a skirting board. A skirting board is a finishing board which is usually mounted on the wall adjacent the floor surface. Contact between the inlet port and the skirting
board is to be avoided because contact between these elements may
damage the skirting board and/or the vacuum pan unit, which is not
desired.

Because the walls of a building are rarely
perfectly flat and certain tolerances are permitted and/or because the
height and thickness of a skirting board mounted on the wall may differ in
different rooms in the building, the vacuum passage way element
preferably comprises a distance adjustment element for varying the
predetermined distance between the inlet port and the wall and/or the
skirting board. As a result of this distance adjustment element, it can be
assured that contact between the inlet port and the wall/skirting board is
avoided at all times, independent of the inlet wall socket the vacuum pan
unit is connected to.

Preferably, the vacuum passage way element
further comprises a height adjustment element provided for varying a
distance between the inlet port and the floor surface. The height
adjustment system allows connecting the vacuum pan unit to different inlet
wall sockets, located on different heights above the floor surface, in such
a way that the inlet port is each time located on a suitable height with
respect to the floor surface. Usually, the inlet port should not contact the
floor surface, because debris then cannot be collected underneath the
inlet port and sucked up by the vacuum pan unit. Usually, the inlet port
should not be located too high above the floor surface either, because the
farther away the inlet port is located from the floor surface, the more
difficult it becomes to suck up debris which is collected underneath the
inlet port, i.e. the higher the suction force needs to be to suck up the
debris. The height adjustment system allows connecting the vacuum pan
unit to different inlet wall sockets, located on different heights above the
floor surface, in such a way that the inlet port is each time located
correctly with respect to the floor surface.
The inlet port of the vacuum pan unit according to the present invention preferably comprises a widening tapered shape widening towards the floor in a direction parallel to the wall and a narrowing tapered shape, narrowing towards the floor in a direction perpendicular to the wall. The widening tapered shape towards the floor in a direction parallel to the wall results in an increase of the area covered by the inlet port such that more debris can be sucked up by the inlet port. The narrowing tapered shaped towards the floor in a direction perpendicular to the wall assures that the inlet opening can be kept sufficiently narrow so that sufficient suction force can be applied to the debris.

The invention will be further elucidated by means of the following description with reference to the appended drawings.

Figure 1 shows a front view of a preferred embodiment of a vacuum pan unit according to the present invention.

Figure 2 shows a side view of the preferred embodiment of the vacuum pan unit shown in figure 1.

Figure 3 shows a 3-dimensional view of the preferred embodiment of the vacuum pan unit shown in figures 1 and 2.

Figures 1-3 show a preferred embodiment of a vacuum pan unit for a central vacuum system according to the present invention. The vacuum pan unit comprises an inlet port 1 provided for sucking up debris from a floor surface 15. The vacuum pan unit further comprises an outlet port 2 which is detachably connected to an inlet wall socket 12 of the central vacuum system, provided in a wall 11 and extending from an inlet opening of a pipe 10 leading to the central vacuum power unit (not shown). Thereto, the outlet port 2 is formed as a coupling piece provided to detachably connect to the inlet wall socket 12 in such a way that a passage is provided between the outlet port 2 and the pipe 10.
The vacuum pan unit shown in figures 1-3 further comprises a rigid vacuum passage way element connecting the inlet port 1 to an outlet port 2 of the vacuum pan unit.

The outlet port 2 shown in figures 1-3 comprises a connection cuff which fits on the inlet wall socket and provides the detachable connection between the outlet port 2 and the inlet wall socket 12. However, any other means considered suitable by the person skilled in the art can be used to establish the detachable connection between the outlet port 2 and the inlet wall socket 12. The inlet wall socket 12 and the outlet port 2 may for instance comprise complementary cooperating means, such as a cooperating tongue and groove or a cooperating protrusion and recess. These cooperating means may for instance be provided on the end part of the vacuum passage way element and the inlet wall socket 12.

The rigid vacuum passage way element shown in figures 1-3 comprises a corner section 3 and an upright section 6 connected to the corner section 3, each of the sections having a first end part 4, 7 and an opposite second end part 5, 8.

The corner section 3 is with its first end part 4 connected to the outlet port 2 and with its opposite second end part 5 connected to the first end part 7 of the upright section 6. With "corner section" is meant a section which comprises a bent part.

The upright section 6 is with its first end part 7 connected to the second end part 5 of the corner section 3 and with its opposite second end part 8 connected to the inlet port 1 of the vacuum pan unit. With "upright section" is meant a section which extends in an upright direction with respect to the wall 11, i.e. in a vertical direction parallel to the wall 11, in a slanted direction pointing towards or away from the wall 11.
The corner section 3 shown in figures 1-3 comprises a bent part which is bent at an angle of substantially 90°. The upright section 6 shown in figures 1-3 extends in an upright direction which is substantially parallel to the wall 11. The connection cuff, together with the corner section 3 and upright section 6 as shown in figures 1-3 create a distance between the inlet port 1 and the skirting board 14 which is mounted to the wall 11 adjacent the floor surface. In fact, the distance is created by the connection cuff, which extends substantially perpendicular to the wall 11, and a part of the corner section 3 extending from the connection cuff in substantially the same direction. This distance is higher than the thickness of the skirting board 14, such that contact and possible damage between the inlet port 1 and the skirting board 14 is avoided. The upright section 6, which extends in a direction pointing substantially parallel to the wall 11, will substantially not change the distance to the wall 11, assuring that the inlet port 1 extends behind the skirting board 14.

Alternatively, the corner section 3 may for instance comprise a bent part which is bent at an angle of less than 90°. The upright section 6 which is connected to the corner section 3 will then usually extend in an upright direction away from the wall 11. In order to create a distance between the inlet port 1 and the wall 11/skirting board 14 the second end part 5 of the corner section 3 may already extend behind the skirting board 14, i.e. to a distance which is higher than the thickness of the skirting board 14. Alternatively, the second end part 5 of the corner section 3 may extend to a distance which is equal to or smaller than the thickness of the skirting board 14. In that last case, an additional distance may be created with the wall 11 by the upright section 6 extending in a direction pointing away from the wall 11 and/or by the connection cuff mounted onto the corner section 3 extending in a slanting direction away from the wall 11, to assure that the inlet port 1 does not contact the skirting board 14. Alternatively, the upright section 6 may also
extend in a parallel direction to the wall 11 or in a direction pointing towards the wall 11.

In another embodiment, the corner section 3 comprises a bent part which is bent at an angle of more than 90°. The upright section 6 which is connected to the corner section 3 will then usually extend in an upright direction towards the wall 11. In this embodiment, the second end part 5 of the corner section 3 will usually extend at a distance which is substantially higher than the thickness of the skirting board 14. The upright section 6, usually extending in a direction pointing towards the wall 11, will decrease the distance to the wall 11, but is chosen such that the inlet port 1 extends behind the skirting board 14. Alternatively, the upright section 6 may also extend in a vertical direction parallel to the wall 11 or a slanting direction pointing away from the wall 11.

Any other combination between the corner section 3, upright section 6 and outlet port 2 is possible to assure that contact between the inlet port 1 and the wall 11/skirting board 14 is avoided. The design of a corner section 3 and an upright section 6 is simple and allows for an easy adjustment of the distance between the inlet port 1 and the wall 11 and/or between the inlet port 1 and the floor surface 15. In fact, the corner section 3 usually allows creating a distance between the inlet port 1 and the wall 11, while the upright section 6 allows correctly positioning the inlet port 1 with respect to the floor surface 15. The corner section 3 and upright section 6 may be fixedly or detachably connected to each other and/or to the inlet port 1 and outlet port 2. The corner section 3 and upright section 6 may be two separate elements or one single element. The rigid vacuum passage way element may also be any other type of rigid element, providing a passage between the inlet port 1 and the outlet port 2, wherein the element may be a one-part element as well as a multi-part element.
In general, the outlet port 2 and the vacuum passage way element are preferably shaped for creating a predetermined distance between the inlet port 1 and the wall 11. Preferably, this predetermined distance is equal to or higher than the thickness of the skirting board 14, such that contact between the inlet port 1 and the skirting board 14 is avoided.

The upright section 6 shown in figures 1-3 comprises a height adjustment element 9 provided for varying a distance between the inlet port 1 and the floor surface. The height adjustment element 9 can be any means considered suitable by the person skilled in the art, such as for instance, but not being limited thereto, two upright sections which are connected to each other to form the upright section 6 and which are telescopically displaceable with respect to each other such as to change the height of the upright section 6. This system allows positioning the inlet port 1 on a suitable distance with respect to the floor surface 15, independent on the inlet wall socket 12 the mobile vacuum pan unit is connected to.

In another preferred embodiment of the vacuum pan unit according to the present invention, the vacuum pan unit further comprises a distance adjustment element for varying the predetermined distance between the inlet port 1 and the wall 11. The distance adjustment element can be any means considered suitable by the person skilled in the art, such as for instance, but not being limited thereto, a corner section 3 with an extendable laying portion extendable in a direction pointing away from the wall 11 or an outlet port 2 which comprises an extendable connection cuff. Such a system allows creating a distance between the inlet port 1 and any of the skirting boards 14 on the walls 11 of a building.

The inlet port 1 of the vacuum pan unit according to the present invention as shown in figures 1-3 has a
trapezoidal shape comprising two opposite trapezoidal sides connected to each other by two connecting sides. Each of the two opposite trapezoidal sides widen towards the floor surface in a direction parallel to the wall 11. The two opposite trapezoidal sides point towards each other towards the floor surface in a direction perpendicular to the wall 11. As a result, the top side of the trapezoidal inlet port 1 is broader and shorter in cross section than the bottom side of the trapezoidal inlet port 1. With 'the top side is broader than the bottom side in cross section' is meant that the distance between the top edges of opposite trapezoidal sides is higher than the distance between the bottom edges of opposite trapezoidal sides. With 'the top side is shorter than the bottom side in cross section' is meant that the length of the top edges of both opposite trapezoidal sides is smaller than the length of the bottom edges of both opposite trapezoidal sides.

Because of the widening of the opposite trapezoidal sides towards the floor, the area covered by the inlet port 1 is increased. Because the opposite trapezoidal sides point towards each other towards the floor, the inlet opening can be kept sufficiently narrow, so that sufficient suction force can be applied to the debris.

In general, the inlet port 1 preferably has a widening tapered shape widening towards the floor in a direction parallel to the wall 11 and a narrowing tapered shape, narrowing towards the floor in a direction perpendicular to the wall 11.

Preferably, a switch is located on the vacuum pan unit or any other remote device to activate the vacuum pan unit. The connection between the outlet port 2 and the inlet wall socket preferably comprises actuating means which allow automatically activating the central vacuum system upon connection.

A central vacuum system usually comprises a number of inlet wall sockets 12 provided in a number of walls 11 of a
building, each of the inlet wall sockets 12 being connected to the central vacuum power unit by means of a central vacuum pipe system 10 hidden behind the wall 11. The vacuum pan unit according to the present invention can be connected to any of the inlet wall sockets 12 of the central vacuum system. These inlet wall sockets 12 can also receive flexible hoses which are provided to suck up debris from the floor surface on a distance from the wall 11. The same inlet wall sockets 12 can thus be used to connect to the vacuum pan unit according to the present invention and to connect to known flexible hoses. The connection element used to establish a connection between the inlet port 1 of the vacuum pan unit and the inlet wall socket 12 can be the same as or differ from the connection element used to establish a connection between the inlet of the flexible hose and the inlet wall socket 12. The flexible hose may also comprise, at the side of the inlet, a receiving means complementary to the coupling piece of the vacuum pan unit, such that the vacuum pan unit is detachably connectable to the receiving means of the flexible hose. The vacuum pan unit can then be used to suck up debris at a distance from the wall 11.

The height of the different inlet wall sockets 12 may vary. The height and the thickness of skirting boards, mounted onto the wall 11, adjacent the floor surface 15, may also vary for different rooms in the building. As a result, the vacuum pan unit according to the present invention preferably comprises means for creating a distance between the inlet port 1 and the wall 11/skirting board 14 and means for positioning the inlet port 1 at a suitable height above the floor surface 15.
1. Vacuum pan unit for a central vacuum system, comprising an inlet port (1) provided for sucking up debris from a floor surface (15), a rigid vacuum passage way element (3, 6) connecting the inlet port (1) to an outlet port (2) of the vacuum pan unit, the outlet port (2) being connectable to a pipe (10) of a central vacuum system integrated in a wall (11), characterised in that the outlet port (2) is formed as a coupling piece provided to detachably connect to an inlet socket (12), which is provided in the wall (11) and extends from an inlet opening of the pipe (10), in such a way that a passage is provided between the outlet port (2) and the pipe (10).

2. Vacuum pan unit according to claim 1, characterised in that the rigid vacuum passage way element (3, 6) and/or outlet port (2) are shaped for creating a predetermined distance between the inlet port (1) and the wall (11).

3. Vacuum pan unit according to claim 2, characterized in that the predetermined distance is chosen to create a distance between the inlet port (1) and a skirting board (14) mounted on the wall (11).

4. Vacuum pan unit according to any one of claims 1-3, characterized in that the rigid vacuum passage way element (3, 6) comprises a height adjustment element (9) provided for varying a distance between the inlet port (1) and the floor surface (15).

5. Vacuum pan unit according to any one of claims 2-4, characterized in that the rigid vacuum passage way element (3, 6) comprises a corner section (3) with a first end part (4) connected to the outlet port (2) and with an opposite second end part (5), an upright section (6) with a first end part (7) connected to the second end part (5) of the corner section (3) and with a second end part (8) connected to the
inlet port (1), the upright section (6) extending in an upright direction with respect to the wall (11).

6. Vacuum pan unit according to any one of claims 2-5, characterized in that the rigid vacuum passage way element (3, 6) comprises a distance adjustment element for varying the predetermined distance between the inlet port (1) and the wall (11) and/or skirting board (14).

7. Vacuum pan unit according to any one of claims 1-6, characterized in that the inlet port (1) has a widening tapered shape widening towards the floor surface (15) in a direction parallel to the wall (11) and a narrowing tapered shape, narrowing towards the floor surface (15) in a direction perpendicular to the wall (11).

8. Central vacuum system comprising a main central vacuum power unit, a number of inlet wall sockets (12) provided in a number of walls (11) of a building, each of the inlet wall sockets (12) being connected to the central vacuum power unit by means of a central vacuum pipe system (10) integrated in the walls (11), characterized in that the central vacuum system further comprises at least one vacuum pan unit according to any one of claims 1-7 provided to detachably connect to any one of the number of inlet wall sockets (12).

9. Central vacuum system according to claim 8, characterized in that the central vacuum system further comprises at least one flexible hose with an inlet and an opposite outlet, the inlet being provided for sucking up debris from a floor surface (15), the outlet being formed as a coupling piece provided to detachably connect to any one of the number of inlet wall sockets (12).

10. Central vacuum system according to claim 9, characterized in that the at least one flexible hose comprises, at the side of the inlet, a receiving means complementary to the coupling piece
of the vacuum pan unit, such that the vacuum pan unit is detachably connectable to the receiving means of the flexible hose.
Figure 3
INTERNATIONAL SEARCH REPORT

A CLASSIFICATION OF SUBJECT MATTER

INV. A47L5/38 A47L13/52

According to International Patent Classification (IPC) and/or both national classification and IPC

B FIELDS SEARCHED

Minimum documentation search/ld (classification system followed by classification symbols)
A47L

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)
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Date of the actual completion of the international search 23 June 2009

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INTERNATIONAL SEARCH REPORT
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