

## AIR CONDITIONING CONDENSATE DRAINAGE

### Field of the Invention

This invention relates to air conditioning condensate drainage and refers particularly, though not exclusively, to apparatus to facilitate the clearing of air conditioning condensate drainage systems.

### Background to the Invention

Many premises are now using split-cycle air conditioning units. They are being used not only in flats, condominiums, apartments and houses, but also in shops and offices.

With split-cycle air conditioning units, a fan-coil unit is placed indoors and receives the cold refrigerant from the main operating unit which is located outdoors. In this way there is almost silent operation indoors.

The problem is that the fan-coil unit causes condensation when the moisture (humidity) in the warm air is reduced on cooling. That condensation must be collected and removed. The collection is normally achieved by a tray under the fan coil. Drainage is by a drainage pipe.

The problem is that the tray also collects dust and other contaminants. These are drawn into the drainage pipe and, over a period of time, the pipe will become blocked such that further drainage is not possible. Blockage can occur due to the nature of the drainage pipe as the growing demands of interior design have meant the location, size, height, angle of inclination, and other factors in the design of the drainage pipe, have been compromised.

Given normal usage, without proper servicing, once a blockage starts, the tray will eventually overflow. This can cause significant

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damage to the ceiling above which the an-coil unit is located, and the room below the ceiling. Regular servicing can cost a not insignificant sum.

It is therefore the principal object of the present invention to facilitate the cleaning of air conditioning condensate drainage pipes.

#### Summary of the Invention

With the above and other objects in mind the present invention provides apparatus to enable suction cleaning of air conditioning condensate drainage, the apparatus including:

- (a) a chamber having a drainage water inlet and a drainage water outlet;
- (b) a suction pipe to which an external suction can be applied;
- (c) the drainage water outlet having valve means moveable between an open position and a closed position so to open and close the drainage water outlet respectively;
- (d) the suction pipe having an inlet end located above the drainage water inlet.

Preferably the chamber has a top, a bottom, and at least one side extending between and connecting the top and the bottom. The chamber may be cuboid, having four mutually perpendicular sides or may be cylindrical. The drainage water outlet may be an outlet opening in the bottom, and there may be a valve means mounted below the bottom. The valve means may be a flap or a butterfly valve.

The valve means may be biased to the closed or open positions. The suction pipe preferably enters the chamber through the top and is substantially J-shaped.

The drainage water inlet may be an inlet pipe which enters the chamber through the bottom, and is in the shape of an inverted J. It may have an outlet end in which is located a sprinkler. The at least one side

wall may have a sight glass adjacent the bottom to enable a user to determine a level of condensate in the chamber. The sight glass may have a maximum level line, the maximum level line being below the outlet end of the drainage water inlet.

#### Description of the drawings

In order that the invention may be better understood and readily put into practical effect there shall now be described by way of non-limitative example only a preferred embodiment of the present invention, the description being with reference to the accompanying illustrative drawings in which:

Figure 1 is a schematic representative view of the apparatus of present invention installed in a home;

Figure 2 is a vertical cross-sectional view of the chamber of Figure 1; and

Figure 3 is a full vertical cross-sectional view along the lines and in the direction of arrows 3-3 on Figure 2.

#### Description of preferred embodiment

To refer to Figure 1, there are shown three fan-coil units 10 each of which has a tray 12 in which condensate water from the fan coils 10 is collected. A drain pipe 14 is operatively connected to each tray 12 to remove all condensate water therein.

Each drain pipe 14 is operatively connected to a drainage pipe 16, which may have a number of elements 18, 20 until it passes through wall 24.

Located adjacent but inside wall 24, or within the wall cavity, may be a chamber 22 operatively connected to drainage pipe 16, 18, 20 by a

drainage water pipe 26, which has an inlet 30 into chamber 22, and an outlet 32 from chamber 22. A suction connection 28 is provided to chamber 22.

Chamber 22 should be located below trays 12 so that gravity will pass all condensate water through pipe 20 and out through wall 24.

Chamber 22 may be cuboid or cylindrical. It has a top 36 and bottom 38. Side wall(s) 34 may be cylindrical or, if desired, four mutually perpendicular walls. Side wall 34 extends between top 36 and bottom 38, and between them they define a chamber interior 40. A further cup-shaped base 42 may be provided below bottom 38, if desired.

Suction connection 28 includes a suction pipe 44 located in and extending into recess 60 in top 36. Pipe 44 is such that a normal vacuum (suction) cleaner hose may be connectable therewith. Pipe 44 enters interior 40 of chamber 22 through top 36, and is somewhat J-shaped when viewed from the side. It has an inlet end 46 adjacent top 36.

A condensate water inlet pipe 48 is provided operatively connected to inlet 30. Pipe 48 is somewhat inverted J-shaped and has an outlet end 50 in which is located a sprinkler 66. In this way drainage water can travel from drainage pipe 16 through to interior 40 of chamber 22.

An outlet opening 52 is provided in bottom 38 and which is openable and closeable by a flap or butterfly valve 54. Valve 54 is pivotally attached to the underneath of bottom 38 by pivot pin 56 and brackets 58. Butterfly valve 54 may be biased to the open or closed position as or if desired by use of, for example, a spring, appropriate weighing of valve 54, or as desired. Other forms of valve may be used, if desired.

Side wall(s) 34 have a sight glass 62 therein adjacent bottom 38 and which is able to be seen by a user. A maximum water level line 64 may be

provided in sight glass 62. If desired, a tray or the like 68 may be provided on base 38.

Outlet 50 should be located well below inlet 46 so prevent water being sucked into inlet 46.

In use, the end of a vacuum cleaner hose is attached to suction connection 28, and the vacuum cleaner operated. This creates reduced pressure inside chamber 22, and thus valve 54 closes outlet 52. The suction effect will then be through inlet pipe 48. This will draw water, air and any other material, in pipes 48, 20, 18, 16 14 into the interior 40 of chamber 22.

When the level of water (and other material) reaches maximum level line 64, the vacuum cleaner should be switched off to prevent water entering suction pipe 44. However, if the vacuum cleaner is a wet/dry cleaner, this not a problem and operation can continue.

Upon the vacuum cleaner being turned off, valve 54 opens, and all water (and other matter) can drain through outlets 52, 32 and into the major drainage system beyond wall 34.

The sprinkler 66 is to disperse water (and also air and other matter) entering chamber 22 under the suction pressure into many directions, to decrease its speed, and generally to assist preventing water from entering suction pipe 44.

In this way, a normal domestic vacuum/suction cleaner can be used to clean the drainage system to reduce the likelihood of a blockage. With regular use, no blockage is likely.

Whilst there has been described a preferred construction of apparatus incorporating the principal features of the present invention, it will be understood by those skilled in the technology that many variations

or modifications in details of design or construction may be made without departing from the present invention.



The claims:

1. Apparatus to enable suction cleaning of air conditioning condensate drainage, the apparatus including:
  - a) a chamber having a drainage water inlet and a drainage water outlet;
  - b) a suction pipe to which an external suction can be applied;
  - c) the drainage water outlet having valve means moveable between an open position and a closed position to respectively open and close the drainage water outlet;
  - d) the suction pipe having an inlet end located above the drainage water inlet.
2. Apparatus as claimed in claim 1, wherein the chamber has a top, a bottom, and at least one side extending between and connecting the top and the bottom.
3. Apparatus as claimed in claim 2, wherein the chamber is cuboid, there being four mutually perpendicular sides;
4. Apparatus as claimed in claim 2 or claim 3, wherein the drainage water outlet is an outlet opening in the bottom.
5. Apparatus as claimed in any of claims 2 to 4, wherein the valve means is mounted below the bottom.
6. Apparatus as claimed in any one of claims 1 to 5, wherein the valve means is a butterfly valve.
7. Apparatus as claimed in any one of claims 1 to 6, wherein the valve means is biased to the open position.
8. Apparatus as claimed in any one of claims 1 to 6, wherein the valve means is biased to the closed position.



9. Apparatus as claimed in any one of claims 2 to 8, wherein the suction pipe enters the chamber through the top.
10. Apparatus as claimed in any one of claims 1 to 9, wherein the suction pipe is substantially J-shaped.
11. Apparatus as claimed in any one of claims 2 to 10, wherein the suction pipe has an inlet end inside the chamber adjacent the top.
12. Apparatus as claimed in any one of claims 1 to 11, wherein the drainage water inlet is a pipe which enters the chamber through the bottom.
13. Apparatus as claimed in claim 12, wherein the pipe is in the shape of an inverted J.
14. Apparatus as claimed in any one of claims 1 to 13, wherein the drainage water inlet has an outlet end in which is located a sprinkler.
15. Apparatus as claimed in any one of claims 2 to 14, wherein the at least one side wall has a sight glass adjacent the bottom to enable a user to determine a level of condensate in the chamber.
16. Apparatus as claimed in claim 15, wherein the sight glass has a maximum level line, the maximum level line being below the outlet end of the drainage water inlet.