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AIR CONDITIONING UNIT

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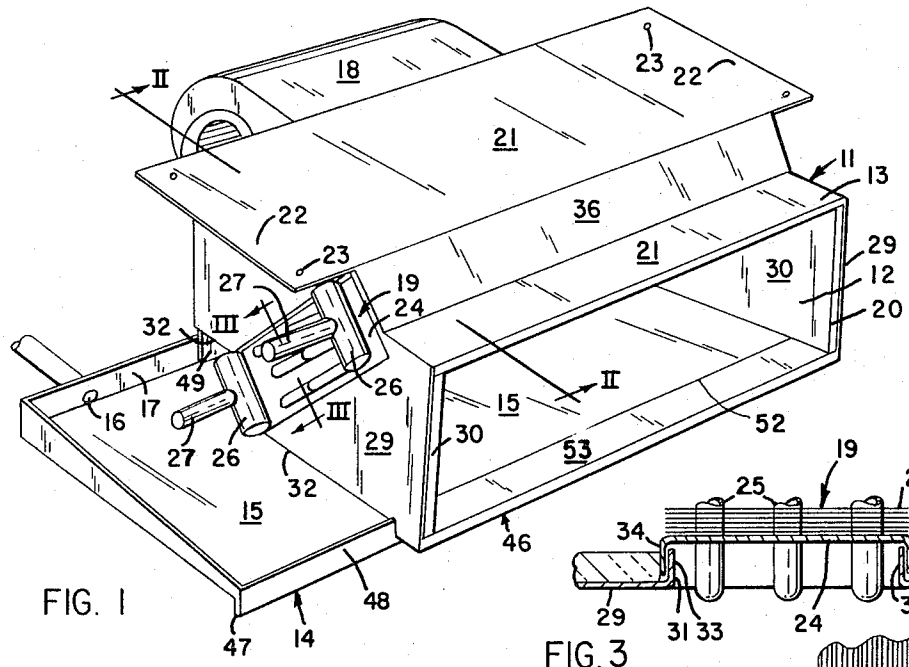


FIG. 1

FIG. 3

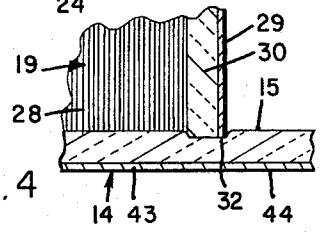


FIG. 4

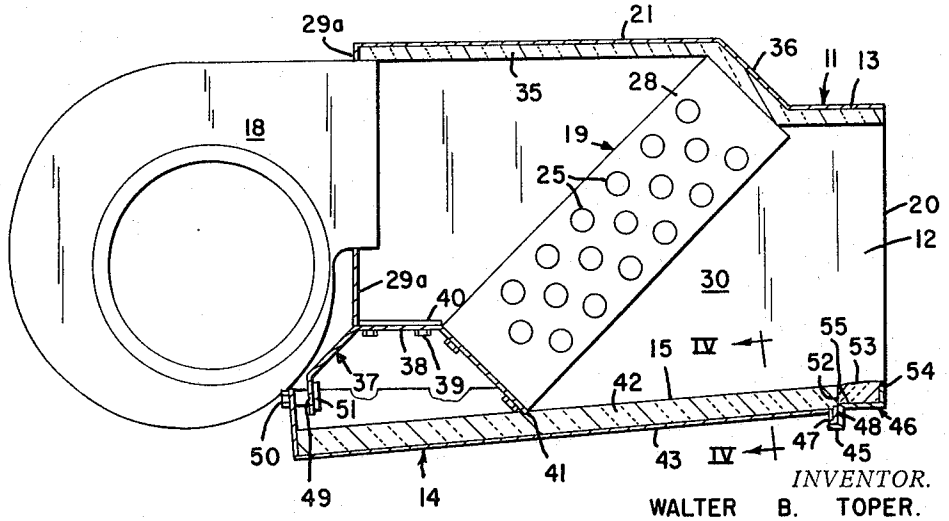


FIG. 2

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AIR CONDITIONING UNIT

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This invention relates to an air conditioning unit and, more particularly, to a room terminal base unit for use in an air conditioning system.

Room terminals may be furred into a wall or mounted in a cabinet suspended from a ceiling for the passage of cool air from the terminal into a space having a cooling requirement. Installation and servicing of such a unit generally involves overhead work. For example, servicing is often complicated because of difficulty in removing and replacing various parts and in some instances dismounting of the entire base unit may be required.

It is a primary object of this invention to provide a new and improved air conditioning unit and, more particularly, a room terminal base unit. A related object is provision of such a unit which is lightweight and may be conveniently installed and serviced. Another related object is provision of such a unit in which various components may be installed and removed from below the mounted unit.

These and other objects and advantages of the invention will be apparent from the following description and the accompanying drawing in which:

FIGURE 1 is a perspective view of a room terminal base unit embodying a features of the invention;

FIGURE 2 is a sectional view taken generally on the line II—II in FIGURE 1; and

FIGURES 3 and 4 are enlarged, fragmentary sectional views taken generally along the lines III—III in FIGURE 1 and IV—IV in FIGURE 2, respectively.

Referring particularly to FIGURE 1 of the drawing, the illustrated room terminal base unit includes a casing **11** having an air passage **12** formed by a body **13** and a drain pan **14** having a bottom surface **15** declining rearwardly and across the body to drain fitting **16** mounted in a rear wall **17** of the pan for disposing of moisture from portions of the unit. Sufficient pitch is provided the drain pan's bottom surface **15** so that only the corner of the pan at the drain fitting **16** need be water tight, rather than all four corners in most pans. Suitable blower means **18** at a rear end of the casing **11** force air through a cooling coil **19** mounted across the passage **12** with the cooled air leaving the passage through a discharge portion **20** at the front of the casing. A top wall **21** of the casing is formed with outwardly extending flanges **22** having suitable apertures **23** for receiving mounting lugs or hangers suspending the base unit from an overhead support, such as a building ceiling (not shown) or the top of a suitable cabinet (not shown) which may encase the base unit.

In the illustrated embodiment the coil **19** includes opposed tube sheets **24**, only one being illustrated. Tubes **25** are mounted in the tube sheets **24** and communicate with headers **26** (FIGURE 1) having nipples **27** for connection with a chilled water line (not shown) to circulate chilled water through the tubes **25**. Fins **28** (FIGURES 2 and 3) are preferably mounted on the tubes **25** within the air passage **12** for optimum heat transfer between the air to be cooled and the coil **19**.

The casing body **13** includes opposed end walls **29** connected by the top wall **21** and a rear wall **29***a* with thermal insulation **30** on their inner surfaces, each end wall having a forwardly inclined slot **31** opening through a bottom edge **32** (FIGURE 4) of the wall. Parallel inwardly directed flanges **33** extend from the sides of

each slot **31**, and parallel flanges **34** (FIGURE 3) extend outwardly from opposite side edges of each tube sheet **24**. The coil flanges **34** slide along and embrace the adjacent end wall flanges **33** as the coil is moved upwardly in the casing body **13** and into tight abutting engagement with pliable thermal insulation **35** (FIGURE 2) on the inside of the top wall **21** of the casing and, more particularly, on a forwardly declining portion **36** of the top wall. The nested flanges **33** and **34** form baffle means which substantially prevent the escape of air from the passage through the slots **31** in the walls **29** and restrain the operatively positioned coil **19** against substantial movement relative to the casing **11**. Portions of the coil **19**, such as return bends of the tubes **25**, the headers **26** and nipples **27** protrude outwardly through the slots **31**.

The coil **19** has a coil support **37** which is suitably secured to the lower ends of the tube sheets **24** and is preferably in substantially abutting engagement with the coil fins **28**. The support **37** extends between the opposed walls **29** with a generally horizontal portion **38** of the support detachably secured at either end inwardly extending flanges **40** at bottom edges **32** of either wall **29**, as by self-tapping metal screws **39** accessible from below the unit with the drain pan **14** removed. A front edge **41** of the coil support **37** is in abutting relationship with and indents (FIGURE 2) a pliable or crushable thermal insulating plate **42** which forms the inner bottom surface **15** of the drain pan **14** and the bottom surface of the air passage **12** through the casing **11**, for substantially preventing passage of air between the bottom of the coil **19** and the casing. The insulating plate **42** rests on a sheet metal bottom wall **43** of the drain pan **14** and caulking is provided extending up the pan walls at the plate end and rear edges for substantially preventing cold moisture on the bottom surface **15** of the pan from reaching and chilling the bottom wall **43** sufficiently for the formation of condensate on the outside surface **44** of the bottom wall.

The drain pan **14** is operatively assembled on the casing body **13** by means of a generally L-shaped rearwardly facing abutment **45** of a structural member **46** connecting the end walls **29** at the bottom of the front or discharge portion **20** of the body **13** and providing an abutment of which rests a depending lower edge portion **47** (FIGURE 2) of a front wall **48** of the drain pan. (Because of substantial pitch of the bottom surface **15**, the front wall **48** need not retain water.) The rear wall **17** of the drain pan **14** is detachabley secured to a depending flange **49** of the coil support **37** by suitable releasable interlocked means such as bolts **50** extending through holes in the rear wall **17** of the drain pan and threadedly engaging nuts **51** fixedly secured on the depending flange **49** of the coil support, thus eliminating need for support members extending through the insulating plate **42**, as in many units. The holes in rear wall **17** are arranged with the hole nearest the drain fitting **16** farther above the surface **15** of insulating plate **42** than the hole farthest away from the drain fitting, and the nuts **51** are mounted on the coil support in the same horizontal plane when the unit is installed, to pitch the bottom surface **15** downwardly toward the drain fitting. The end wall edges **32** are preferably horizontally aligned, and the edge **32** farthest from the drain fitting **16** indents farther into the insulating plate **42** than the end wall edge **32** nearest the fitting **16**. Similarly, the front edge **41** of the coil support **37** indents the plate **42** increasing amounts farther from the fitting **16**. By horizontal mounting of the nuts **51** and by provision of the end wall edges **32** horizontally aligned, a drain pan with its fitting **16** at either end of the body **13** may be mounted on the

same body 13 and coil support 37 with the pan bottom surface 15 properly pitched toward the drain fitting.

The bolts 50 are easily accessible from below the suspended unit and upon tightening the bolts the rear flanges 33 of the opposed walls 29 are moved rearwardly toward the rear tube sheet flanges 34 for retaining the coil 19 in place and substantially preventing leakage of air, and the front wall 48 adjacent the edge portion 47 of the drain pan 14 is tightly clamped against the L-shaped abutment 45. A front edge 52 (FIGURE 2) of the bottom plate 42 is exposed through a recess in the drain pan front wall 48 and is urged into tight engagement with a relatively softer insulating strip 53 extending across the member 46. The strip 53 abuts and extends slightly above a generally vertical front lip 54 of the structural member 46, and extends rearwardly of a horizontal offset 55 adjacent the lip 54. As the strip is compressed, it bulges over the top edge of the lip 54 and the front of the plate 42, and substantially prevents the stream of cold air contacting the lip so that heat conduction through the structural member 46 is sufficiently retarded to substantially prevent formation of condensate on the outside of this member which is kept warm by ambient air. The recess in the pan front wall similarly prevents the stream of chilled air in the passage 12 from contacting and chilling the front wall and the pan bottom wall 43. The bottom edges 32 of the opposed walls 29 forward of the coil 19 indent the insulating plate 42 of the drain pan 14 for substantially preventing air flow from the air passage 12 and securing the forward portion of the walls. The abutment of end wall edges 32 and coil support front edge 41 with the insulating plate 42 holds the insulating plate in place in drain pan 14 without the use of adhesive.

Since the drain pan 14 provides the bottom surface 15 of the casing 11 and the air passage 12, an appreciable savings in weight and material is realized and servicing of the unit is greatly facilitated. For example, in order to remove the drain pan 14, it is merely necessary to release the bolts 50 from below the installed unit, whereupon the pan may be dismounted from the casing body 13. By releasing the screws 39 at either end of the coil support 37, and disconnecting the connections between the chilled water line and the nipples 27, the coil 19 may be slipped downwardly and removed from the casing 11. Upon reassembling the unit, sliding the coil flanges 34 upwardly along the end wall flanges 33 moves the top portion of the coil into sealing engagement with insulation 35 on the inside of the casing body top wall inclined portion 36 and the screws 39 are replaced to secure the coil 19 in place. The front edge portion 47 of the drain pan 14 is rested on the L-shaped abutment 45 and the drain pan securing bolts 50 are tightened in place to move the end wall flanges 33 into proper relationship with the tube sheet flanges 34, and to seat the wall bottom edges 32 and the coil support front edge 41 on the drain pan bottom plate 42, thus operatively positioning the drain pan on the casing body 13.

While a preferred embodiment of the invention has been described and illustrated, it should be understood that the invention is not limited thereto but may be otherwise embodied within the scope of the following claims.

I claim:

1. An air conditioning unit comprising a casing having opposed walls cooperating in providing a passage adapter to pass air through the casing, means including a coil in said passage adapted to cool the air passing through said passage, and mounting means including cooperating nested portions of said walls and said coil detachably mounting said coil operatively positioned in said passage and retarding substantial leakage of air and relative movement between said coil and said opposed walls, said mounting means removably receiving said coil from below the casing and detachably mounting said coil on said body by means releasable from below the unit.

2. A unit according to claim 1 in which said coil has opposed tube sheets, one adjacent each of said opposed walls, and said mounting means includes pairs of cooperating flanges on each said end wall and adjacent tube sheet.

3. A unit according to claim 2 in which the flanges of each opposed wall and the flanges of the adjacent tube sheet are closely nested.

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