United States Patent [19]

Hoag

[11] **3,917,757**

[45] **Nov. 4, 1975**

BEST AVAILABLE COPY

[54] **PORTABLE HUMIDIFIER CASE CONSTRUCTION**

[75] Inventor: **Kip J. Hoag**, Concord, Mich.

[73] Assignee: **McGraw-Edison Company**, Elgin, Ill.

[22] Filed: **Mar. 13, 1974**

[21] Appl. No.: **450,798**

[52] **U.S. Cl.** ..... **261/30**; 220/4 F; 261/92; 312/210; 312/263; 312/284

[51] **Int. Cl.**[2] **B01F 3/04**

[58] **Field of Search** ..... 261/24, 28, 29, 92, 80, 261/30; 220/62, 76, 4 C, 4 F; 312/204, 247, 7 R, 210, 263, 284; 285/305

[56] **References Cited**

UNITED STATES PATENTS

2,316,404	4/1943	Carter, Jr.	220/4 C X
2,584,618	2/1952	Robic	261/92
2,934,184	4/1960	Moser	285/305 X
3,231,247	1/1966	Goettl	261/24
3,348,821	10/1967	Martin et al.	261/91 X
3,437,318	4/1969	Abbott et al.	261/24
3,588,212	6/1971	Gersch et al.	312/204
3,596,886	8/1971	Trautman	261/92
3,598,370	8/1971	Hoag	261/30 X
3,637,194	1/1972	Swimmer et al.	261/92 X
3,696,960	10/1972	Smirle	220/62 X
3,721,484	3/1973	Macioge et al.	312/247 X
3,730,497	5/1973	Schmitt et al.	261/24

Primary Examiner—Tim R. Miles
Assistant Examiner—Richard L. Chiesa
Attorney, Agent, or Firm—Charles F. Lind

[57] **ABSTRACT**

A portable humidifier having a case formed of separate panels of plastic that are held together by cooperating tongue and groove configurations and by detent tabs and screws, thereby allowing panel fabrication and easy case set up at separated sites and the compact shipment of stacked panels therebetween; and further where one case panel is provided with the mounting means for all operative humidifier components, such that the same can be assembled onto the one case panel and then operated as a working unit while yet being exposed for debuging and/or final calibration of same, all prior to final assembly of the humidifier.

1 Claim, 7 Drawing Figures

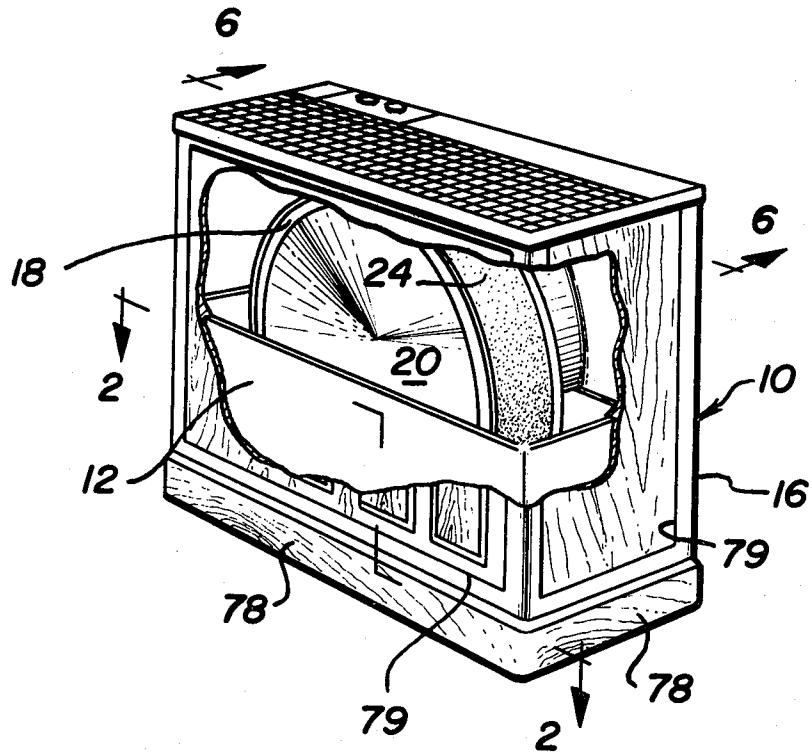


FIG. 1

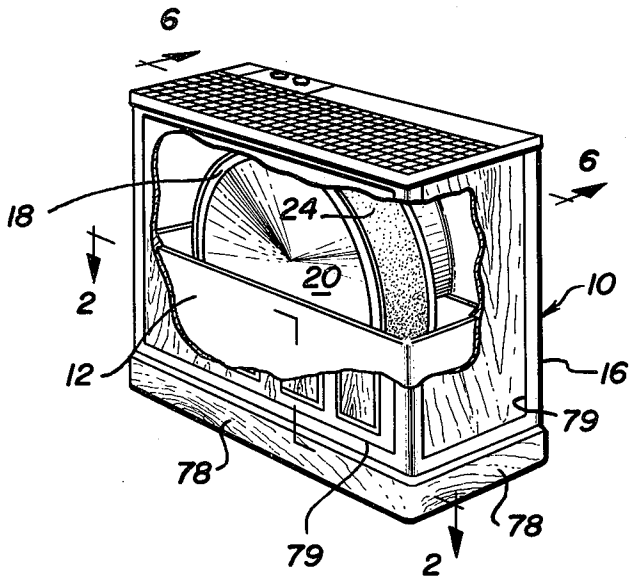


FIG. 4

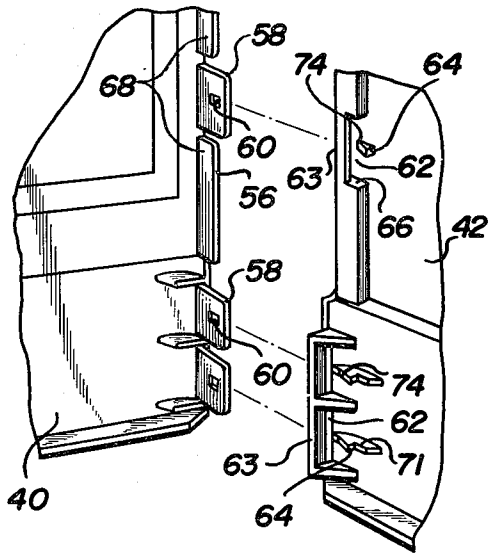


FIG. 2

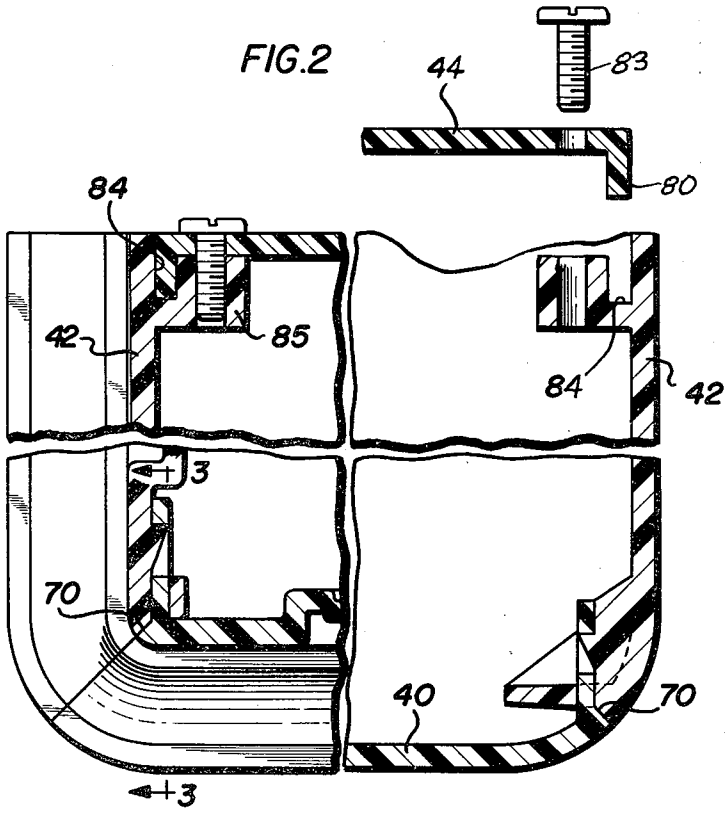


FIG. 3

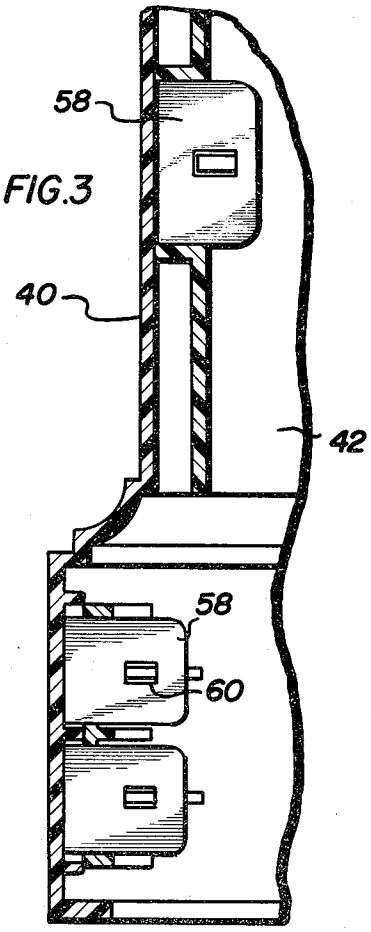


FIG.5

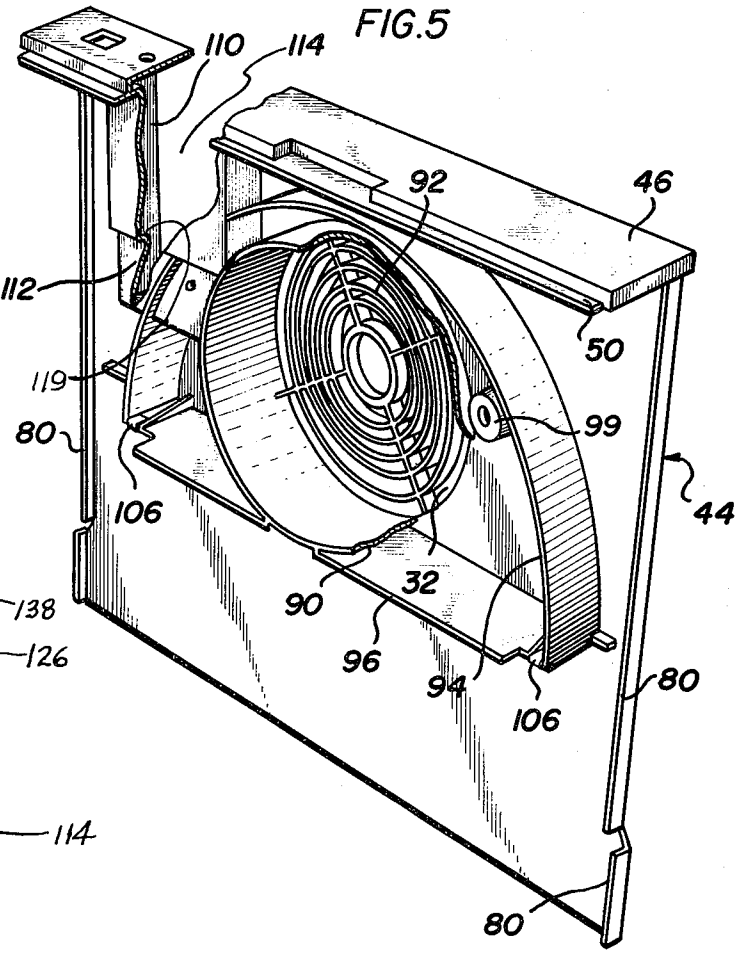


FIG.7

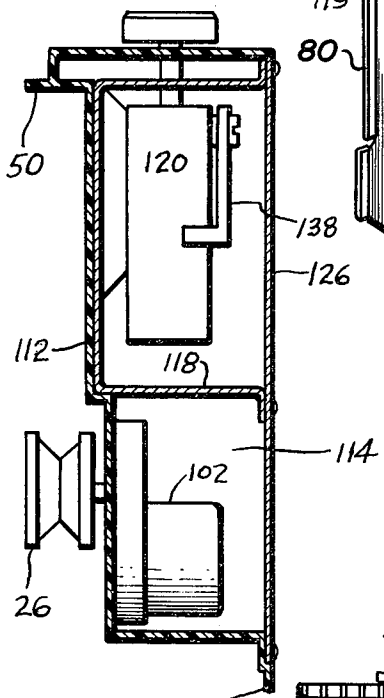
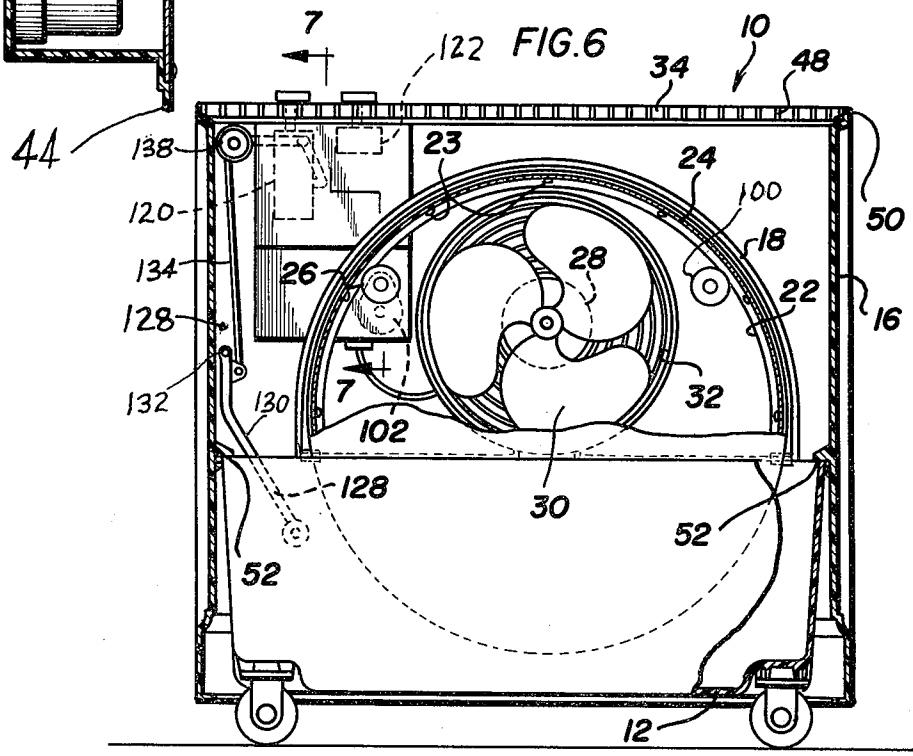


FIG.6



PORTABLE HUMIDIFIER CASE CONSTRUCTION

This invention relates to a portable humidifier or the like and particularly to the case construction of same having snap together interlocking panels, and moreover to the operative support on one of the panels of substantially all working humidifier components. This application is related to my pending application Ser. No. 412,710 entitled PORTABLE HUMIDIFIER filed Nov. 5, 1973.

A portable humidifier typically has a case enclosing a pan-like water container, and humidifying mechanism is supported within the case effective to dissipate container water as vapor to the surrounding environment. The trend is toward decorative cases simulating quality pieces of furniture, and such cases are typically fabricated of metal or plastic, frequently also having certain of the panels grained and/or vinyl covered to give a decorative wooden appearance. The fabrication of certain decorative plastic cases frequently is by a molding specialist, who then ships the cases to the humidifier manufacturer who then in turn installs the working humidifier components in place. Since most such box-like cases cannot properly be nested together or stacked to form compact packages, this practice is expensive. Moreover, the working humidifier components, when operatively united to the case as intended, are most commonly quite inaccessible for testing, recalibration and/or repair or replacement.

One main object of this invention is to provide a case construction comprised of fabricated generally flat panels which can be snapped and/or bolted together and interlocked quite easily to form the case, thereby economically allowing the separated fabrication of the panels and assembly thereof to form the case.

Another main object of this invention is to provide, in the design of a portable humidifier, for the total support of substantially all working humidifier components from only a single case panel, and the ready assembly of this panel to the remainder of the case, thereby allowing the assembly and exposed testing as a unit of all components even before the final assembly of the humidifier.

The many advantages of this invention will be more fully understood and appreciated after reference to the accompanying drawings, wherein:

FIG. **1** is a perspective view, broken away for greater clarity, of a humidifier construction utilizing this invention;

FIG. **2** is an enlarged sectional view as seen generally from line **2—2** in FIG. **1**;

FIG. **3** is a sectional view as seen generally from line **3—3** in FIG. **2**;

FIG. **4** is an enlarged exploded perspective view showing adjacent panels and typical cooperating locks for holding same together;

FIG. **5** is a perspective view, partly broken away for greater clarity, of the rear case wall;

FIG. **6** is an elevational sectional view as seen from lines **6—6** in FIG. **1**; and

FIG. **7** is a sectional view as seen generally from line **7—7** in FIG. **6**.

Referring to the drawings, the disclosed humidifier **10** has a container **12** for water, a case **16** encloses the container **12**, and a drum **18** is rotatably supported within the case partly in and partly out of the container water. The drum has one closed end **20**, an annular

open end **22**, and thin spaced bars **23** connecting the ends and providing support for a covering mat **24** of porous material. The drum support includes a motor-powered roller **26** which engages the inner edge of the drum end **22** to rotate the drum, so that the mat **24** is wetted as it passes through the container water and is exposed to the air above the container. A motor **28** supports and rotates a fan **30** in a rear case wall opening **32** operable to draw in outside ambient air and force it through the wetted mat **24** for discharge from the case vent **34** to the surrounding atmosphere.

The case **16** is generally rectangular in shape and is comprised on a front wall **40**, a pair of side walls **42**, and a rear wall **44**. An upper lip **46** from the rear wall **44** forms part of the top case wall, and an open grill **48** is removably supported on ledges **50** from the front, side and rear walls and defines the air outlet vent **34** and completes the top case wall. The case **16** has no bottom wall, and thus can be vertically positioned over the container to virtually hide same. Case wall ledges **52** project beyond and rest on the container to support the case at or slightly above the supporting surface. My above mentioned co-pending application discloses and claims this particular combination.

The front panel **40** has at each end rearwardly projecting parallel flanges or tongues **56** and **58**, and each tongue **58** has an opening **60** therein. Each side panel **42** correspondingly has a forwardly open channel or groove **62** defined between the main panel portion and an inwardly spaced track portion **63**. When the adjacent side and front panels are fitted together properly with the corners butted, the tongues **56** and **58** fit within the receiving grooves **62**, and moreover a detent **64** located on the side wall snaps into the tongue opening **60** to hold the adjacent panels together. Webs **66** connect the track elements **63** to the main panel portion for stiffening the construction and further for locating the tongues and restraining shifting of the connected panels. The adjacent tongues **56** and **58** are parallel and can be coplaner for ease of fabrication separated only by a cutout **68** that receives the strenghtening web **66**.

The adjacent side and front panels overlap at butted edge portions **70** which are preferably sloped relative to the main panel sections to meet tightly and hide the juncture line between them, when the panels are secured together. By sloping them to meet flush when the panels are angled at just less than the normal interior corner angle after the detents are snapped in place, the edge portions are pinched even tighter together after the panels are spread apart to the proper interior angle which more effectively hides the exposed juncture line. Each detent preferably further has a sloping lead face **74** to cam the lead end of the cooperating tongue inwardly until when the adjacent panels are butted tightly together and the detent falls into the tongue opening **60**; and the build up flat **71** on the detent or the panel wall itself is then engaged by the tongue to limit angling of the connected panels.

The tongue and groove cooperation hold the panels relative to one another to simulate almost a one-piece structure, but the panel fabrication and set up need not be at the same site to give more manufacturing flexibility to this type case construction.

The front panel **40** and/or the side panels **42** can have decorative raises **78** or recesses **79** which gives the appearance of a structured wood cabinet, and the panels

can be embossed and colored to correspond to wood grain, as is known in the molding art. When the adjacent panels are secured together, the decorative raised portions **78** blend together at the corners to give the desired overall pleasing case appearance.

The rear wall **44** is formed preferably as a one-piece plastic molding having forwardly directed side flanges or tongues **80** and spaced openings for connecting bolts **83.** The tongues **80** fit within corresponding rearwardly open channels or grooves **84** formed on the adjacent side wall by the main portion of the wall and inwardly spaced flanges, and enlarged boss areas **85** on each side wall form seats for the securing bolts **83.** Consequently, the rear panel can be removably secured to the U-shaped snapped together side and front wall assembly, but preferably only upon some slight outward angling of the side walls relative to the front wall to close the corner juncture as noted above.

The rear wall **44** also has integrally molded therewith a number of cowls or guides for diverting air through the wetted mat **24** and supporting the operating humidifier components. Thus cylindrical cowl **90** defines the air inlet opening **32,** and an integral protective grill **92** of spaced radial and circumferential ribs at the outer end of the cowl supports the fan motor **28** and also protects against accidental touching of the fan blade **30.** The positioned drum matches up with and lies closely adjacent a semi-cylindrical cowl **94,** and ledge **96** between the terminal ends of the drum cowl **94** projects slightly into the drum; and these serve to direct air flow through the mat **24** and to minimize leakage merely past the drum and case. A forwardly formed cylindrical boss area **99** forms a mounting support for a shaft upon which a drum supporting idle roller **100** is journaled; and the drum supporting powered drum roller **26** is keyed to the output shaft of a motor powered speed reduction unit **102** in turn secured to the rear panel wall **112.** The drum is vertically supported by its open end **22** riding in the rollers **26** and **100,** and is horizontally restrained by anti-friction clips **106** snapped onto the baffle ledge **96** adjacent the drum cowl **94.** This provides for the drum support solely from structure associated with the rear panel, and the lower drum portion merely extends into the water container but does not receive any support therefrom.

The rear panel **44** also defines a rearwardly open cavity **114,** formed by inward directed walls **110** and rearwardly offset wall **112,** which cavity is suitable for receiving the electrical controls. Thus, a metal control box **118** is supported in the cavity on ledge **119,** and combination on-off and humidistat control switch **120** and fan speed control switch **122** are located in this control box in appropriate electrical connection with the fan motor **28** and drum drive motor **102.** A plate **126** is secured to the rear panel and to the control box to enclose the controls and hold the box within the cavity. A water level control **128** is provided on the rear panel and includes a float arm **130** pivoted at pin **132** to the panel and a link **134** connected betweeen the arm and an indicator drum **138** pivoted to the upper lip and visible through an opening therein. A water level safety control can be provided with a linkage connection **138** between the humidistat and the indicator drum, where operation of the humidifier components is terminated when an inadequate supply of water is in the container **12.**

It is thus noted that the disclosed humidifier has a readily fabricated case comprised of a snapped together front and side panel generally U-shaped subassembly, and a bolted on removable rear panel. Also the disclosed humidifier has a design where the rear wall supports all of the working humidifier components, including all controls therefor.

This particular humidifier construction has great utility, for example, in regard to the manner and ease of assembly. The front wall and the two adjacent side walls can be fabricated by a plastic specialist and shipped flat with like relatively well nested parts to a humidifier manufacturer and thereat can be snapped and interlocked together to the generally U-shaped subassembly. The rear wall can be supported in an appropriate fixture (not shown) and to it each of the working components, both electrical and mechanical, can be installed in place. The working components as then supported exposed on the fixtured rear panel can be operated as an actual humidifier unit. Any necessary adjustments can be made or any malfunction can likewise be easily corrected at this time since all parts are exposed and accessible. Thereafter, the rear wall with the secured working humidifier components (except for the drum which should be removed) and the U-shaped front and side wall subassembly can be connected together to define the finished humidifier case. The drum can then be located in place, and the case positioned over the water container to complete the assembly.

I claim:

1. A portable humidifier combination comprising a case, water container, and a humidifying mechanism; said case being formed of four separate plastic side wall panels meeting at corner junctures thereof, three of the adjacent case side wall panels having between adjacent pairs of side panels interlocking tongue and groove means and cooperating interlocking detent means at the respective corner junctures thereof operable to orient and to hold the adjacent panels relative to one another in a generally U-shaped subassembly, the remaining one case side wall panel being separably connected to this subassembly of three case side wall panels to define a generally tubular configuration and means for releasably securing the one case side wall panel in place, said case further having spaced openings for the inlet and outlet of ambient air and an internal air flow path therebetween, said inlet opening being formed in the one side wall panel and open grill structure integral with the one side wall panel transversely across the opening, fan means supported directly from the one side wall panel inwardly adjacent the grill means operable for moving ambient air from the inlet through the case and out the outlet, a cylindrical cowl integral with the one side wall panel and surrounding the air inlet opening and the fan means, said one case wall panel further having integrally defined therewith inwardly extended wall portions and an inwardly offset connecting wall portion which define a cavity open to the side of the wall panel opposite the tubular configuration, and control means in the cavity for operating the humidifying mechanism; the container being located in the case and being readily separable therefrom; and said humidifying mechanism being disposed in part in the water container and in part in the air flow path but being supported solely from the one case wall panel and being operable thereon for electrical and mechanical check-

ing of operation with the one case wall panel separated from the U-shaped subassembly, said humidifying mechanism including a drum and a circumferential mat of porous material supported thereon, and supporting means for the drum including a pair of horizontally spaced rollers mounted from the one side wall panel and a pair of horizontally spaced anti-friction means disposed also on the one side wall panel whereby the drum is supported solely by the rollers and the anti-friction means, said one case side wall panel also having formed integrally therewith a semi-cylindrical cowl projected inwardly from said wall panel in closely spaced concentric adjacent relation with the supported drum and a ledge between opposite ends of the semi-cylindrical cowl, whereby the cowls and ledge serve to direct air flow to within the case and through the humidifying mechanism mat and to minimize leakage past the drum and case.

* * * * *