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United States Patent [19]

Sharp et al.

[11] **Patent Number: 6,165,066**

[45] **Date of Patent: *Dec. 26, 2000**

[54] **MULTI-PART FOUNDATION VENTILATOR OF VARIABLE PRESELECTED WIDTH**

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[73] Assignee: **Kaibab Metals, Inc.**, Baldwin Park, Calif.

[*] Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

[21] Appl. No.: **09/273,116**

[22] Filed: **Mar. 19, 1999**

Related U.S. Application Data

[60] Provisional application No. 60/078,876, Mar. 20, 1998, and provisional application No. 60/079,929, Mar. 30, 1998.

[51] **Int. Cl.**[7] **F24F 7/00**

[52] **U.S. Cl.** **454/273**; 52/302.1; 454/271

[58] **Field of Search** 454/270, 271, 454/272, 273, 274; D23/381, 393; 52/302.1, 656.2, 656.8, 745.09, 745.15, 745.16, 220.8; 249/37, 38, 39; 264/35

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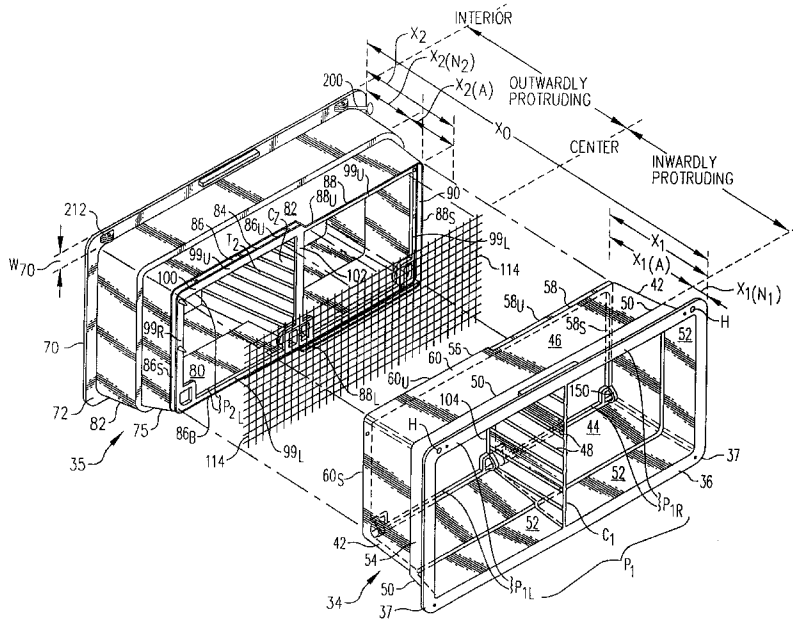
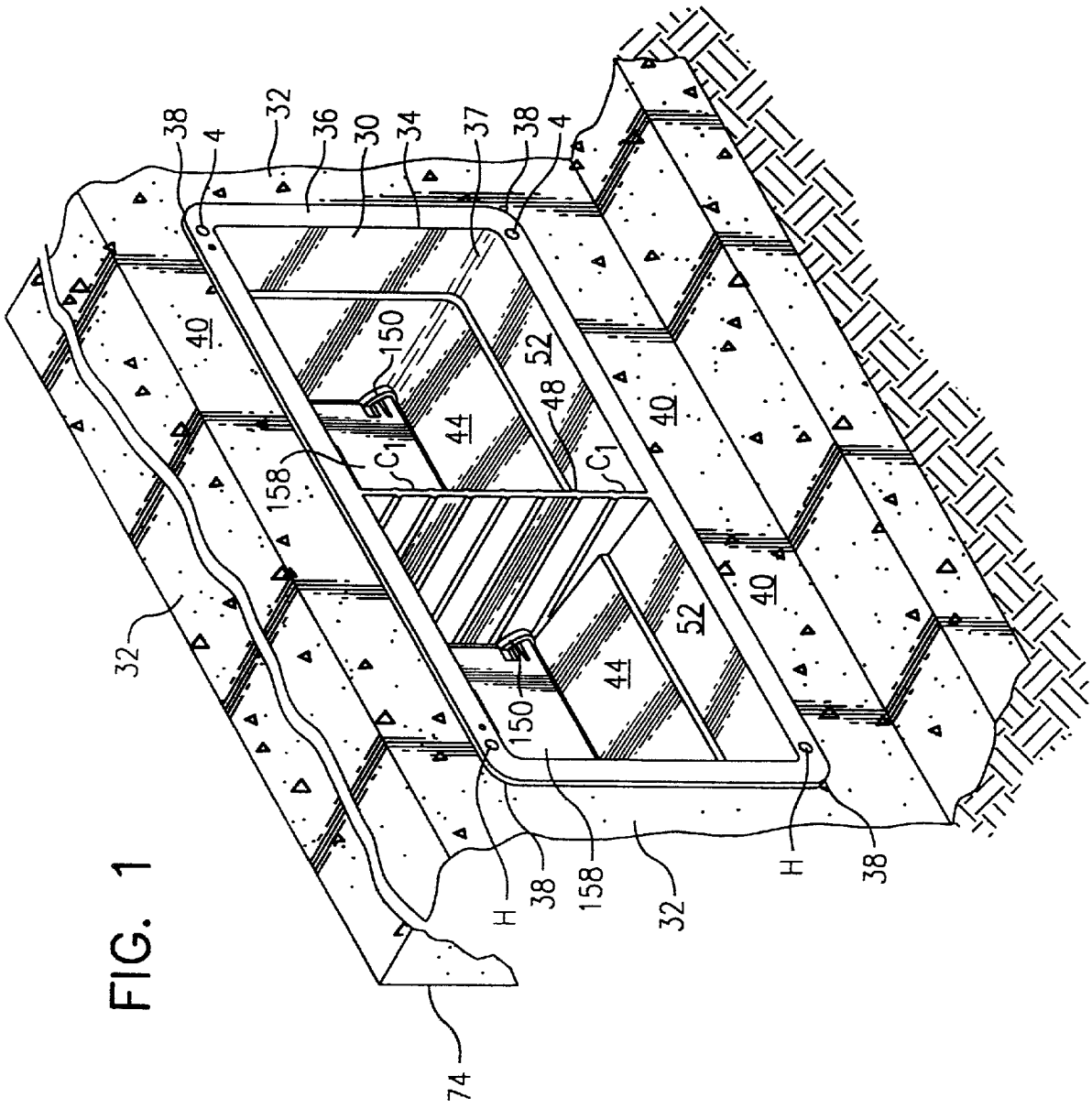
Primary Examiner—Harold Joyce
Attorney, Agent, or Firm—R. Reams Goodloe, Jr.

[57] **ABSTRACT**

A multi-part foundation ventilator. The ventilator has a first frame member with a first exterior peripheral edge flange, and, extending inwardly therefrom, a protruding wall portion of preselected width $X_{1(A)}$. The first inwardly protruding wall portion has an outer surface portion with a first receiving ledge portion and a protruding, first joining flange portion. A second frame member has a second inwardly protruding wall portion of preselected width $X_{2(A)}$. The second inwardly protruding wall portion further includes an outer surface portion, with a second receiving ledge portion and a second joining flange portion. The first joining flange portion of the first frame member is sized and shaped to fit in close fitting, overlying engagement with the second receiving ledge portion of the second frame member. The second joining flange portion of the second frame member is sized and shaped to fit in close fitting, overlying engagement with the first receiving ledge of the first frame member, so that the first frame member and the second frame member are securely joined in mating engagement at a sealed, substantially leafless joint therebetween.

57 Claims, 11 Drawing Sheets

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4
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52
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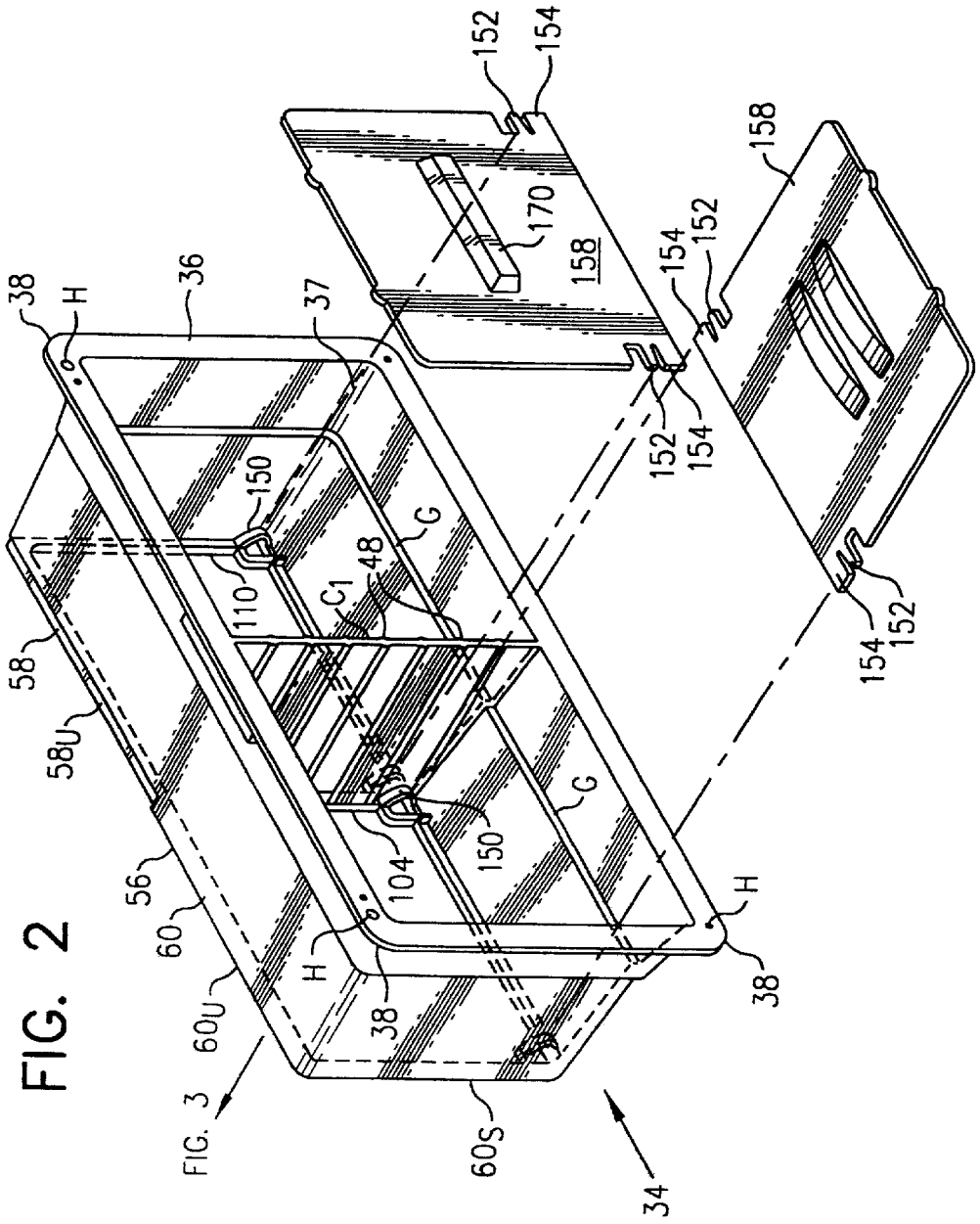
150
44
40
H
38
158
32
H
38
74

FIG. 1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154
158
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158
154
152
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110
C1
48
C
58
58U
56
60
60U
104
150
C
H
38
H
38
60S
34
FIG. 3
154
152

FIG. 2

FIG. 3

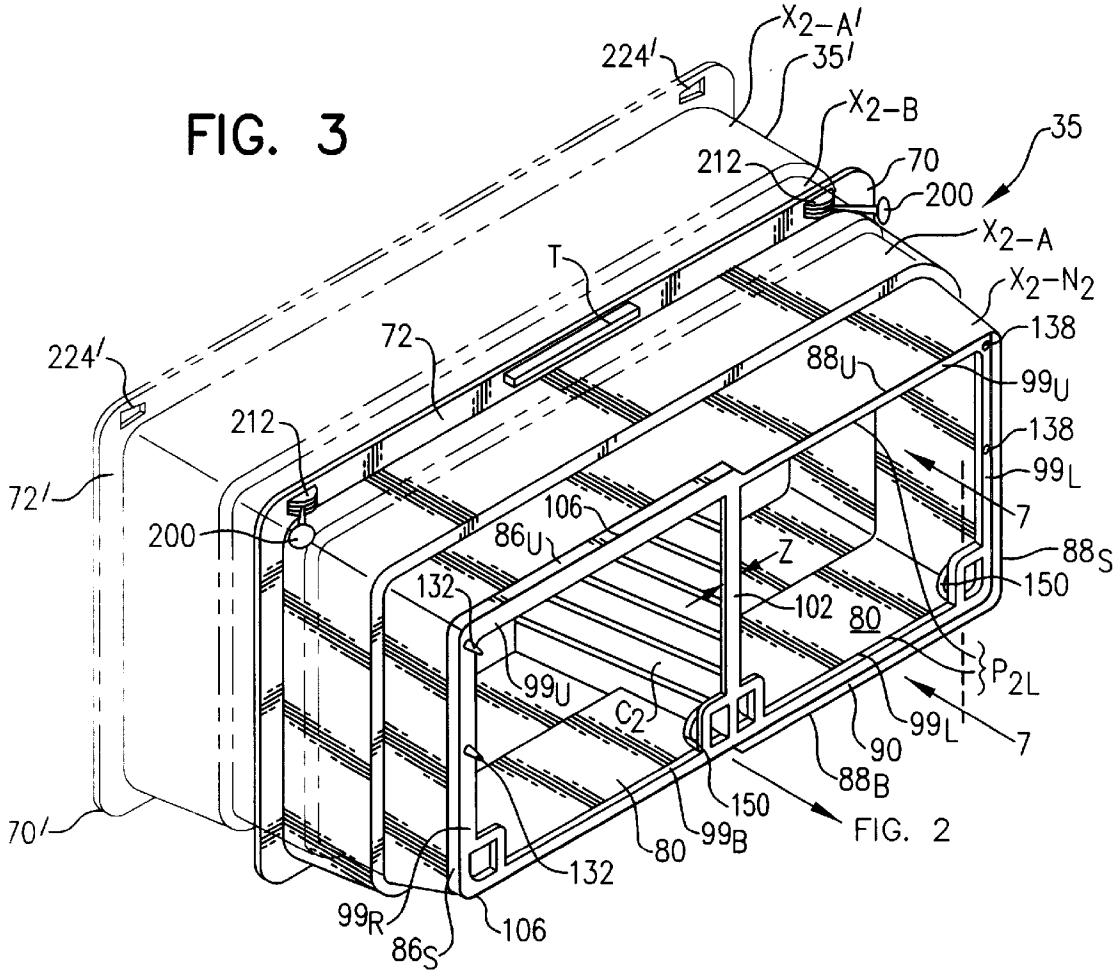


FIG. 6

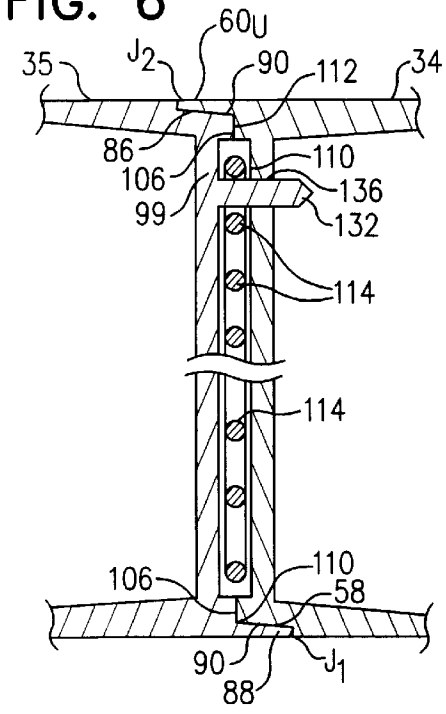


FIG. 7

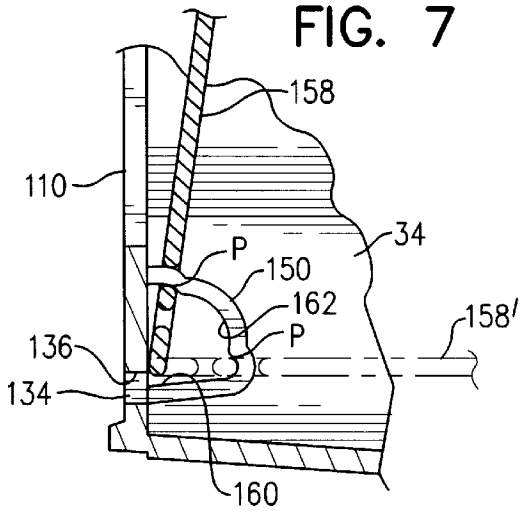


FIG. 4

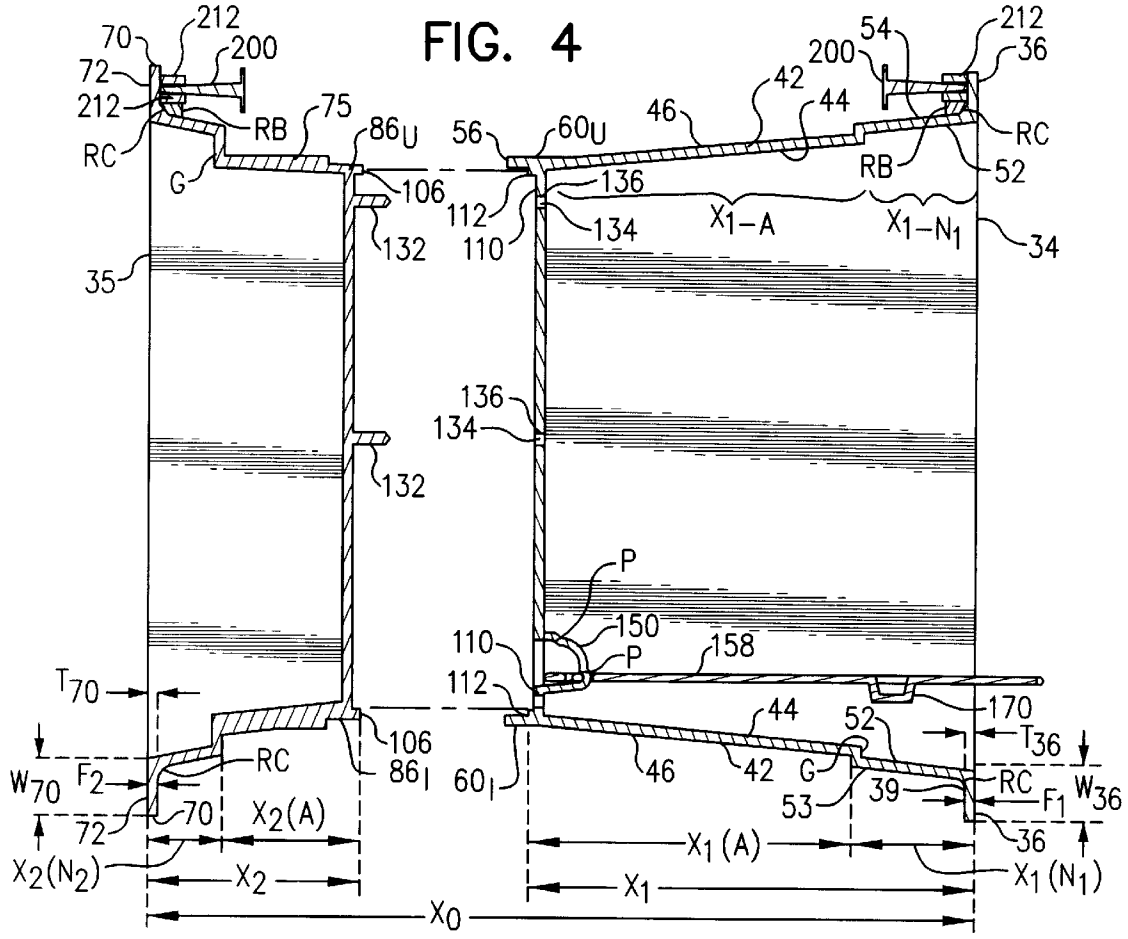

70
212
200
72
212
RB
75
RC
G
86U
106
132
35
56
60U
46
42
44
54
212
200
36
RC
52
RB
136
112
110
134
X1-A
X1-N1
34
136
134
132
P
150
110
P
158
112
170
T70
44
52
T36
106
RC
W70
F2
86I
60I
46
42
G
53
39
RC
F1
W36
70
X2(A)
72
36
X1 (A)
X2(N2)
X2
X1
X1 (N1)
X0

FIG. 21

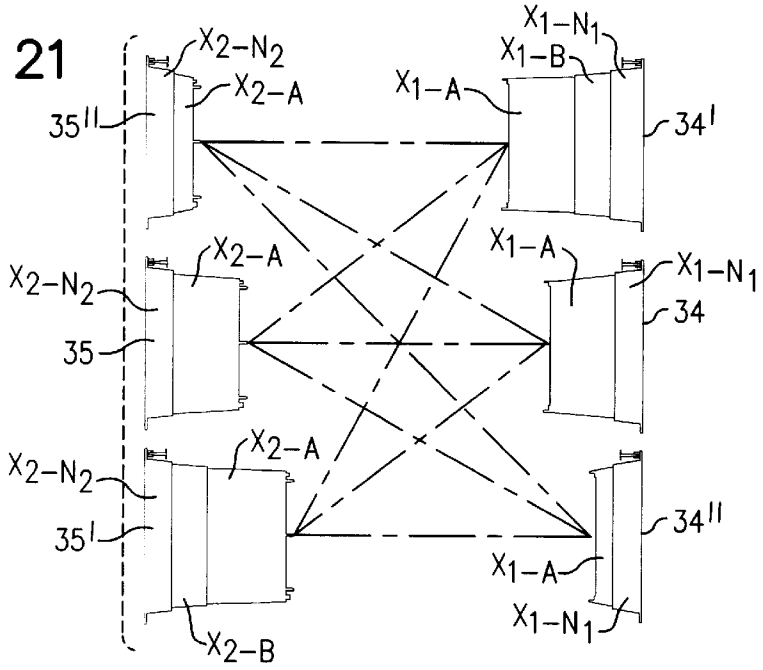
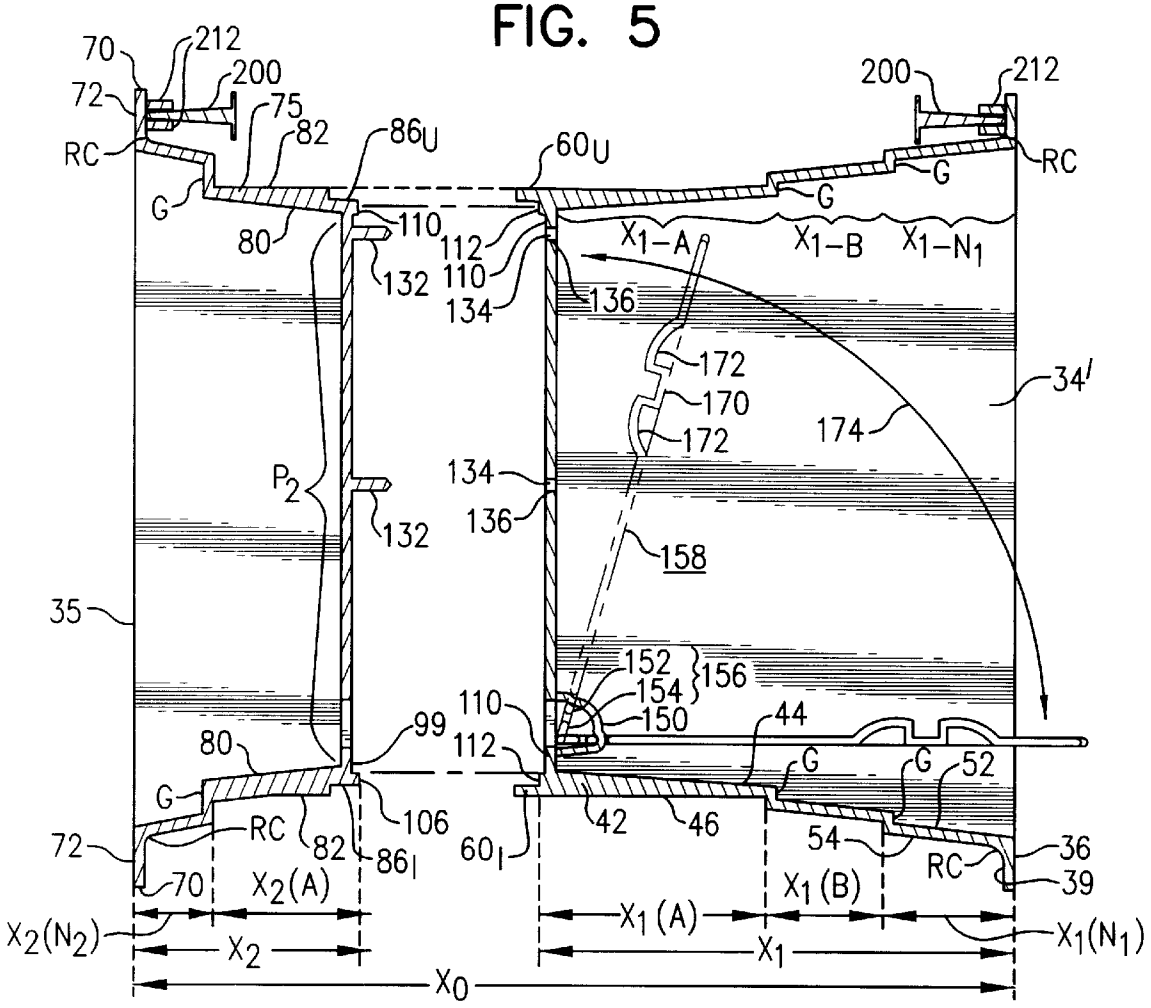

X2-N2
X2-A
X1-N1
X1-B
X1-A
35II
34I
X2-A
X1-A
X2-N2
X1-N1
35
34
X2-A
X2-N2
34II
35I
X1-A
X1-N1
X2-B

FIG. 5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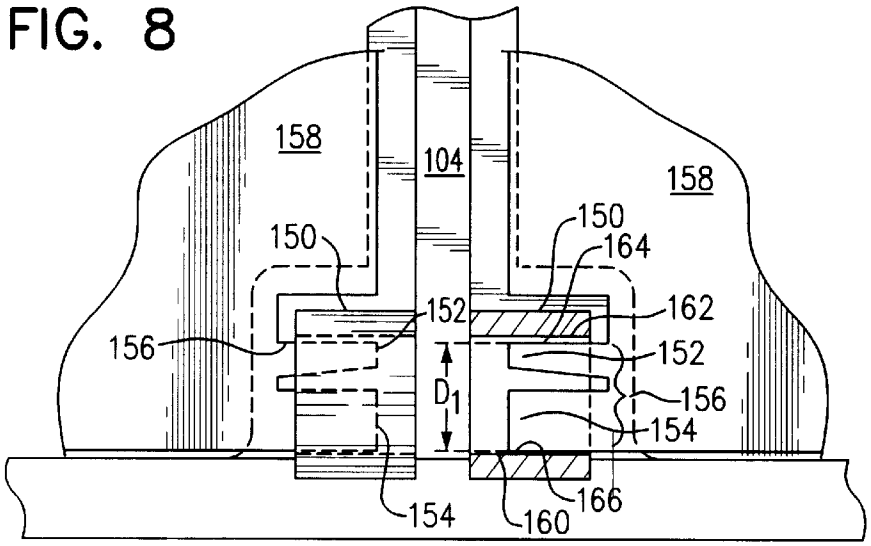
212
200
72
75
82
86U
60U
RC
G
80
110
112
132
110
134
X1-A
X1-B
X1-N1
136
172
170
172
174
34'
P2
134
132
136
158
35
152
154
156
110
150
44
99
112
80
G
G
52
G
106
42
46
72
RC
82
86I
60I
54
36
RC
70
X2(A)
X1 (B)
39
X2(N2)
X1 (A)
X1(N1)
X2
X1
X0

FIG. 8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152
D1
156
154
154
160
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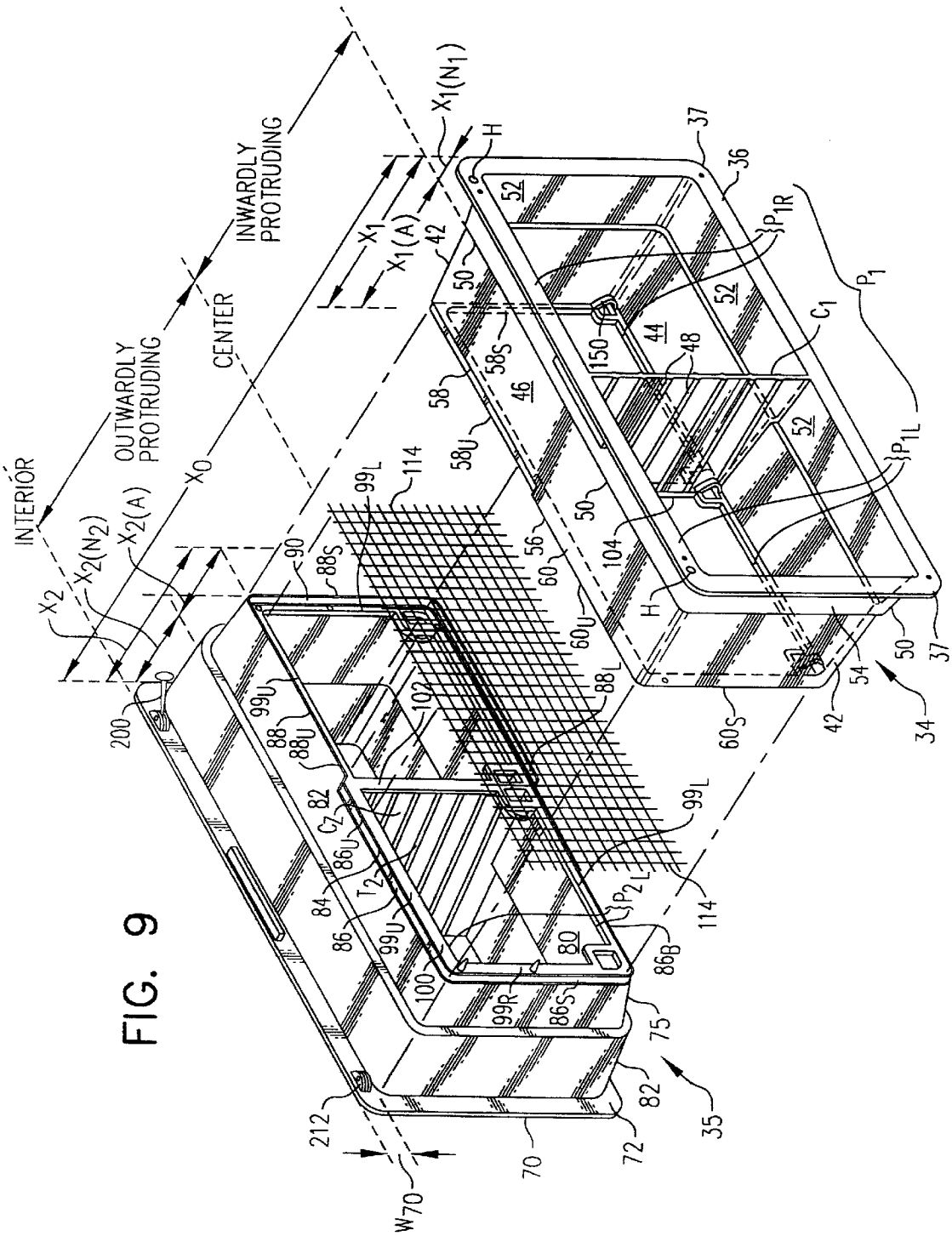
INTERIOR
OUTWARDLY PROTRUDING
CENTER
INWARDLY PROTRUDING
X_2
$X_2(N_2)$
$X_2(A)$
X_0
X_1
$X_1(A)$
$X_1(N_1)$
H
200
212
W_{70}
70
72
75
82
35
34
42
54
37
36
50
52
46
44
48
150
58
58_S
58_U
60_U
60_L
60_S
56
104
114
99_L
99_U
99_R
88
88_U
88_L
88_S
90
102
100
80
82
84
86_U
86_B
86_S
C_2
T_2
P_{2L}
P_1
P_{1R}
P_{1L}
C_1

FIG. 9

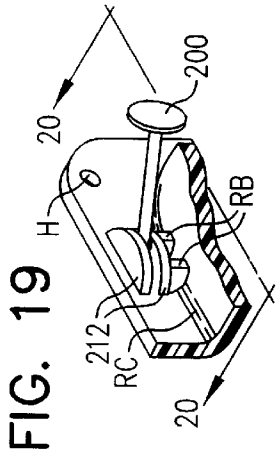

FIG. 19

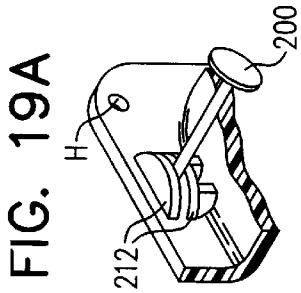

FIG. 19A

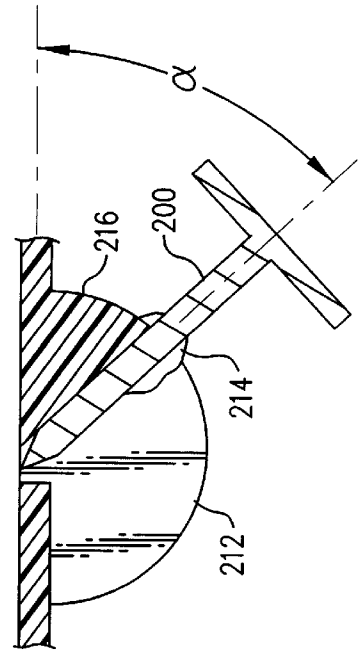

FIG. 20

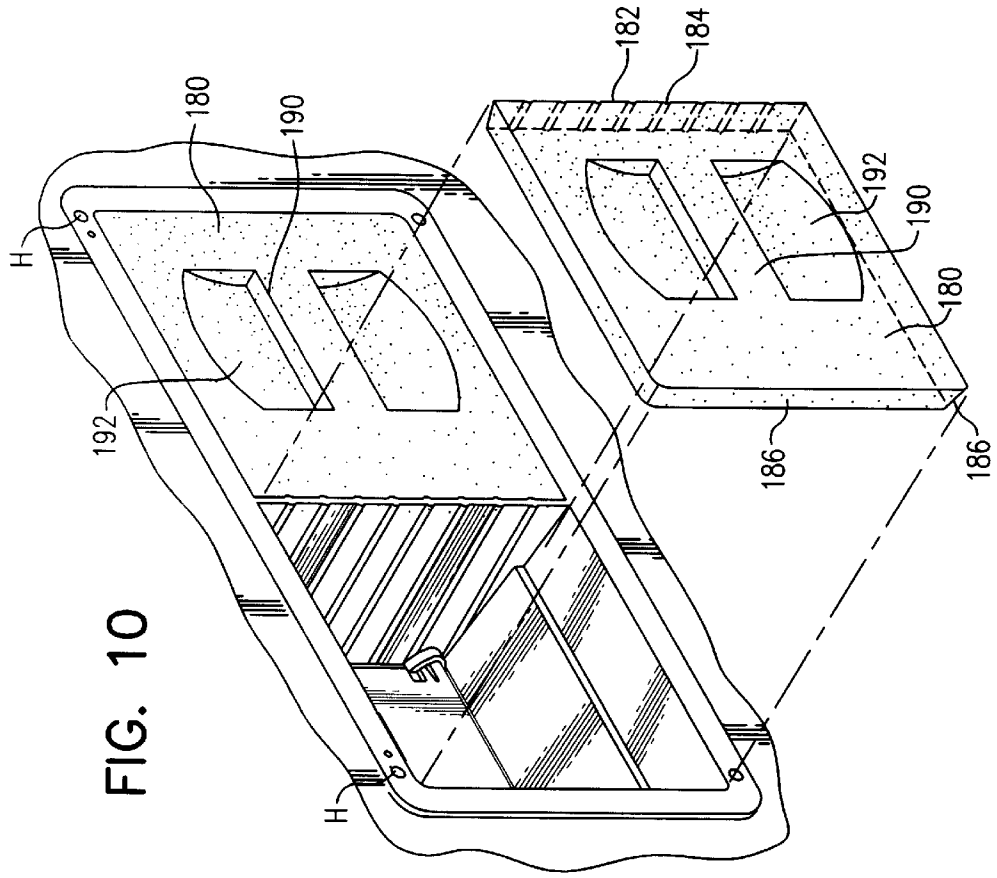

FIG. 10

FIG. 11

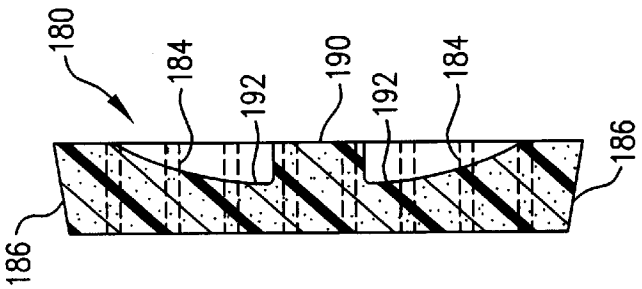
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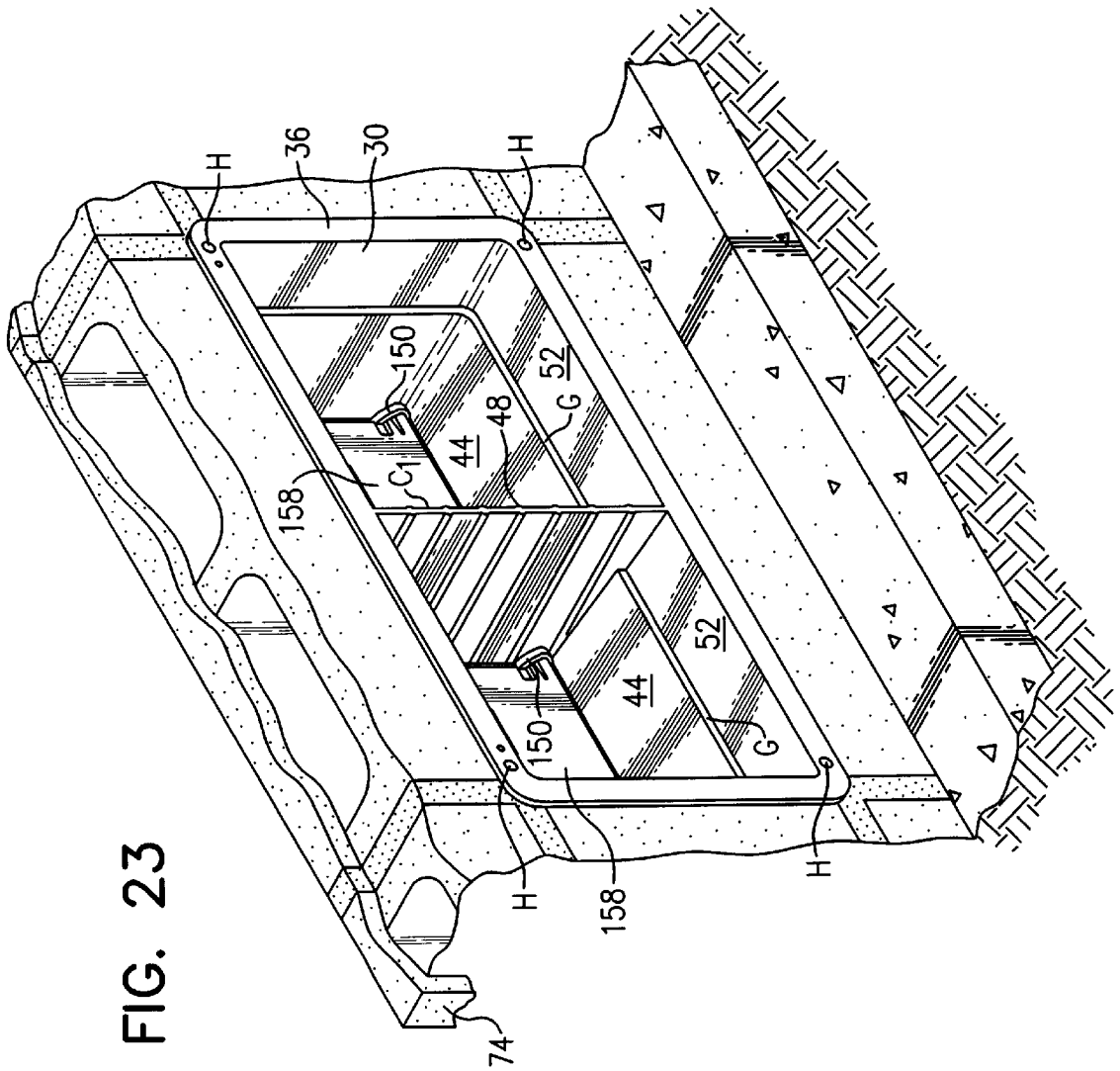
FIG. 23


H
36
30
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52
48
G
158
C1
44
52
44
150
G
158
H
H
74

FIG. 12

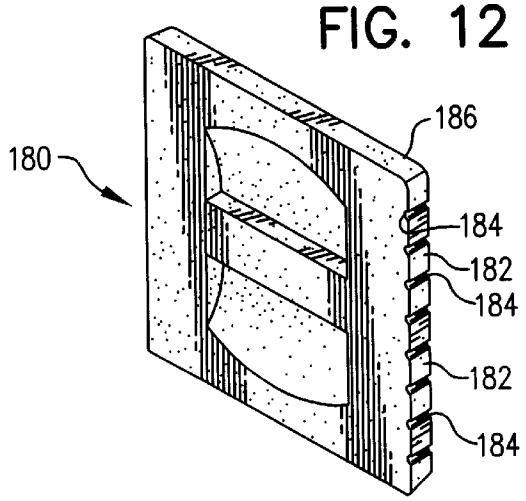


FIG. 13

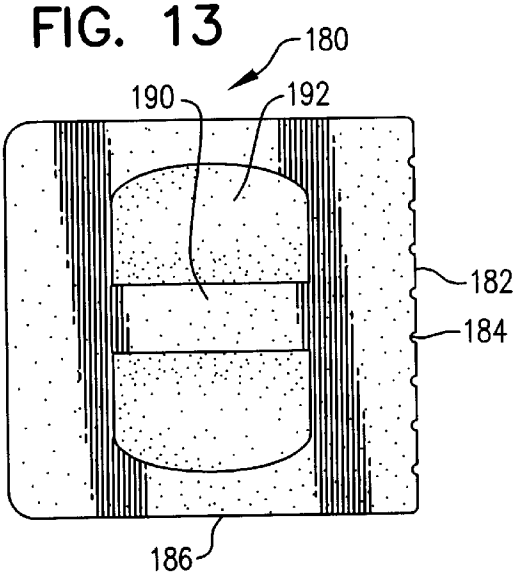
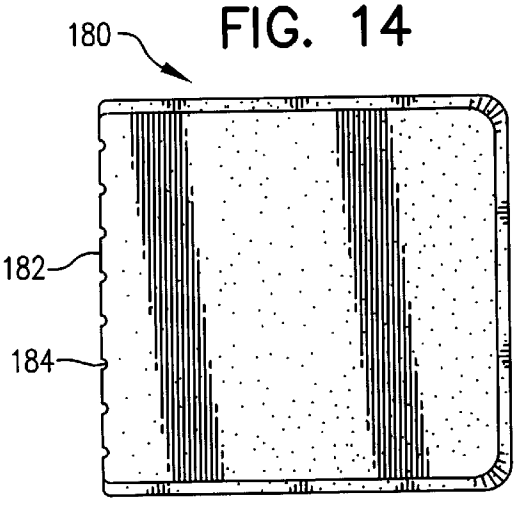


FIG. 14



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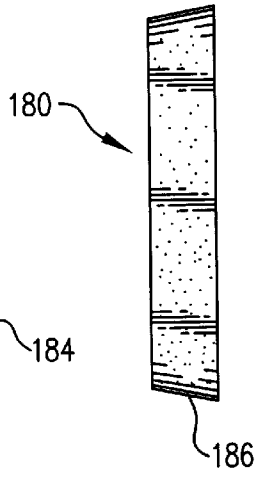


FIG. 16

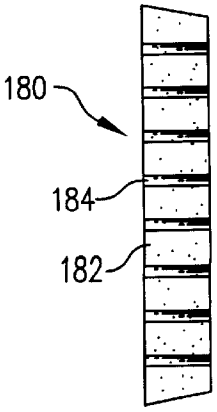


FIG. 17

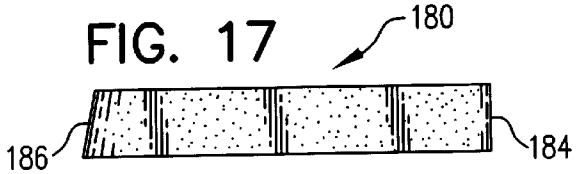


FIG. 18

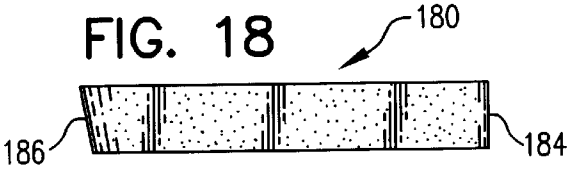


FIG. 20A

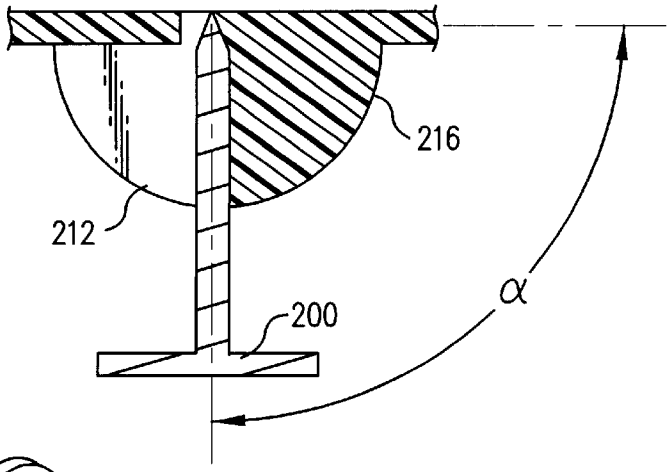


FIG. 24

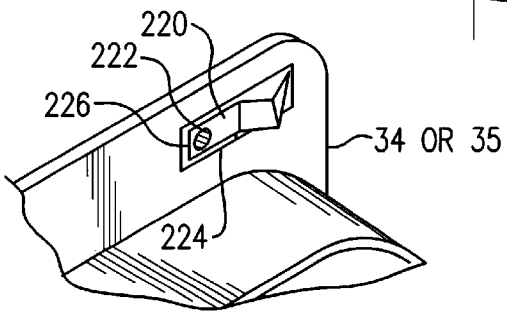


FIG. 25

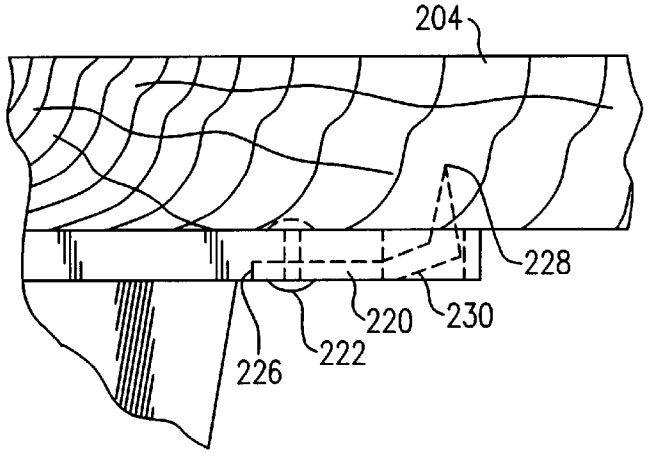


FIG. 26

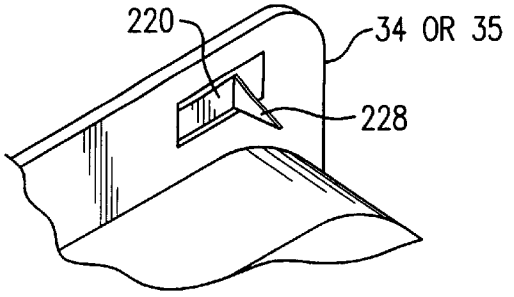
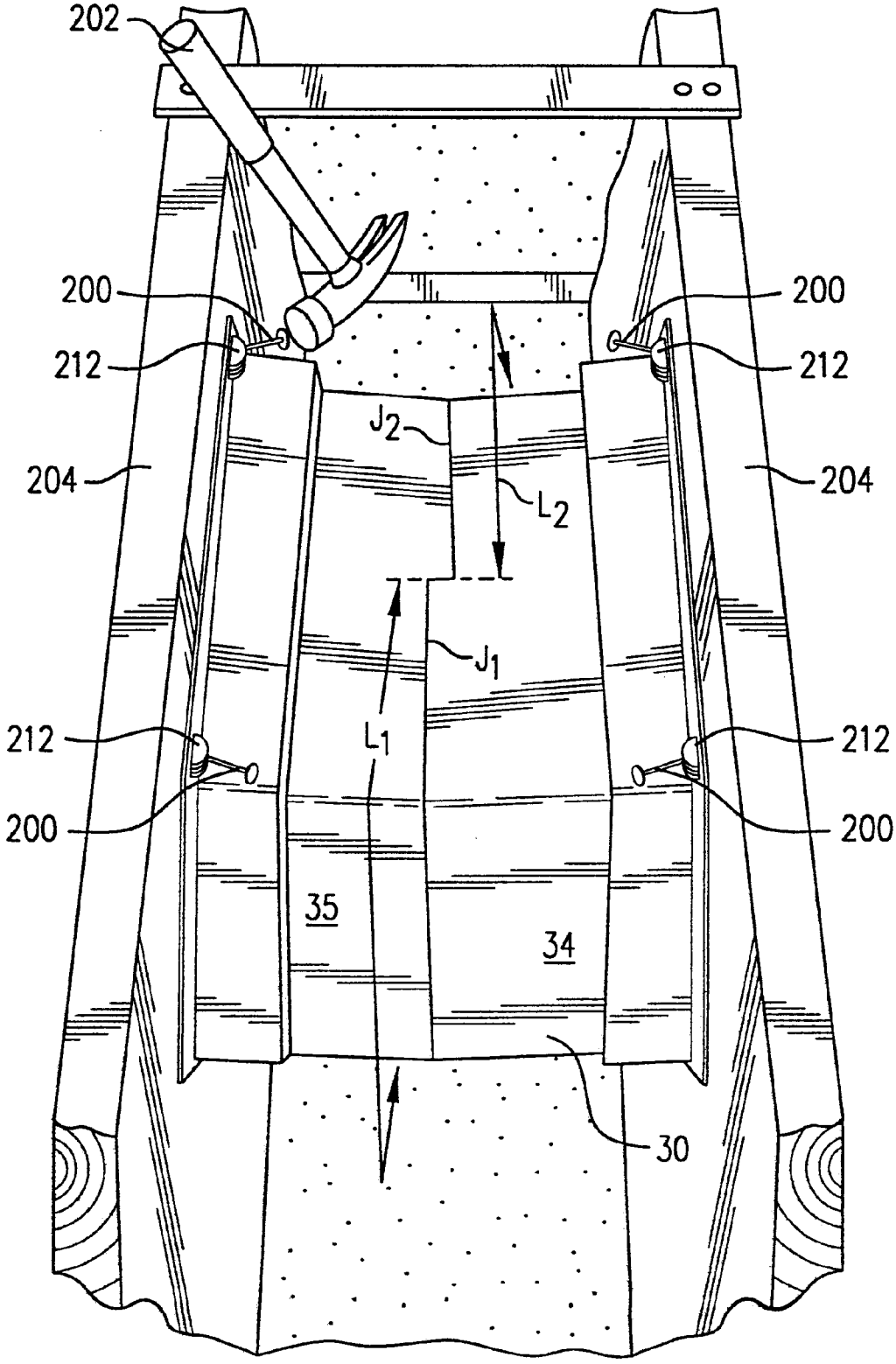


FIG. 22



MULTI-PART FOUNDATION VENTILATOR OF VARIABLE PRESELECTED WIDTH

This application claims benefit of Provisional Appl. 60/078,876, filed Mar. 20, 1998 and Provisional Appl. 60/079,929 filed Mar. 30, 1998.

FIELD OF THE INVENTION

Our invention relates to foundation ventilators, typically used in foundations in residential and light commercial construction, and more particularly, to ventilators which can be easily manufactured in a desired width for use in a foundation wall of preselected thickness.

BACKGROUND

In residential and light commercial construction, it is common practice to provide, either in a poured concrete foundation wall or in a constructed block foundation wall, a ventilator opening to allow air circulation beneath the building structure. Many workable ventilators have been developed thru the years for such applications.

However, it would still be quite desirable to reduce the overall costs which must necessarily be incurred in the manufacture and distribution of such ventilators. Also, labor saving techniques, or changes in the apparatus which would reduce the cost of installation, would be welcome by the contractors charged with installing such ventilators.

We are aware of various attempts in which an effort has been made to provide an improved foundation ventilator. One of the designs which resembles the instant invention to some remote extent is disclosed by Crofoot, in U.S. Pat. No. 3,822,462, issued May 31, 1977, for VENT FRAMES. He shows a foundation ventilator which is fastened together from two identical hollow frame sections. However, he does not provide a design which includes the feature of interlocking flanges for "one-way" mating engagement of frame sections, nor does his method of fastening provide an overhanging lip joined to an underlying ledge to effectively prevent concrete slurry from entering the interior of the vent through the assembly joint, as is provided in our novel foundation ventilator. Thus, the advantages of our simple multi-part foundation ventilator, which is made with interlocking frame members that are designed for assembly in a pre-selected width, to provide a strong, substantially leak resistant through-wall ventilator, are important and self evident.

OBJECTS, ADVANTAGES, AND NOVEL FEATURES

It is the object of our invention to provide a novel foundation ventilator that is easily assembled in "one-way" mating engagement from first and second frame members, each having overlapping flanges that provide resistance against concrete slurry entering the vent during construction of walls. Our foundation ventilator has a first frame member having a first exterior peripheral edge flange, and, extending inwardly therefrom a protruding wall portion of preselected length $X_{1(A)}$. The first inwardly protruding wall portion has

an inner surface portion defining a first thru passageway portion. A second frame member is provided that has a second exterior peripheral edge flange, with a second inwardly protruding wall portion of preselected length $X_{2(A)}$. The second inwardly protruding wall portion has an inner surface portion defining a second thru passageway portion. Thus, the first and second frame members are each designed with flange portions that fit in close fitting, overlying engagement each with the other, so that the first frame member and said second frame member securely joined in mating engagement with an essentially leakless joint therebetween.

From the foregoing, it will be apparent to the reader that one very key, important and primary object of the present invention resides in the provision of a novel, multi-part foundation ventilator which simplifies the manufacture of ventilators of various widths. This is done by providing a first frame member and a second frame member, each of which can be selected in a desired width and with interlocking docking ledges and flanges for precisely and securely interfitting the mating surfaces of each of the first and second frame members, so that they are easily joined into a finished, sealed, substantially leakless foundation ventilator.

Other important but more specific objects of the invention reside in the provision of a multi-part foundation ventilator as described herein which:

- Can be manufactured in preselected widths by joining a chosen first and a chosen second frame member, each of which has been provided in an appropriate preselected size so that their combined width, when joined into a finished foundation ventilator, is of the desired preselected overall width; can be manufactured in a simple, straightforward manner to provide a sturdy, strong, foundation ventilator;
- provide a design which allows assembly from first and second frame member parts, each of which have a strong central vertical column and horizontal beam support members, so that the final, finished foundation ventilator is sturdy, with two high strength central vertical columns and double horizontal beam support members;
- which in a relatively inexpensive manner can reduce inventory costs at the manufacturing level, and can increase the flexibility of the manufacture to provide a distributor with foundation ventilators of various widths;
- can be manufactured in a grey plastic to unobtrusively match concrete;
- can be manufactured with impact-resistant ABS plastic;
- can be provided ready to install, with preset nails included as an integral part of the complete foundation ventilator package;
- can be finished with a substantially liquid tight sealed joint between the first frame member and the second frame member, and thus is sealed to resist leakage of concrete slurry through the joint therebetween;
- is available with releasably attachable doors, so that the foundation ventilator can be used with or without doors;
- has a manually grippable and manipulable finger-bar latch on the doors, for easy opening and closing;
- is provided with a novel friction latch mechanism on the doors, for releasable frictional positioning of the doors at a desired degree of opening;

Other important objects, novel features, and additional advantages of our invention will become apparent to the

reader from the foregoing and from the appended claims and as the ensuing detailed description and discussion proceeds in conjunction with the accompanying drawing.

SUMMARY OF THE INVENTION

We have now invented and disclose herein a novel multi-part foundation ventilator. The foundation ventilator has a first frame member having a first exterior peripheral edge flange, and, extending inwardly therefrom a protruding wall portion of preselected length $X_{1(A)}$. The first inwardly protruding wall portion has an inner surface portion defining a first thru passageway portion. The first inwardly protruding wall portion further includes an outer surface portion having a distal edge, and at least a portion of the outer surface portion adjacent to the distal edge further has a first receiving ledge portion. Also, at least a portion of the first inwardly protruding wall portion further includes, adjacent to the distal edge of the outer surface portion, a protruding, first joining flange portion.

A second frame member is provided that has a second exterior peripheral edge flange, with a second inwardly protruding wall portion of preselected length $X_{2(A)}$. The second inwardly protruding wall portion also has an inner surface portion which defines a second thru passageway portion. Also, the second inwardly protruding wall portion further includes an outer surface portion having a distal edge, and at least a portion of the outer surface portion adjacent to the distal edge has a receiving ledge portion. At least a portion of the second inwardly protruding wall portion further includes, adjacent to the distal edge of the outer surface portion, a protruding, second joining flange portion. The first joining flange portion of the first frame member is sized and shaped to fit in close fitting, overlying engagement with the second receiving ledge portion of the second frame member. The second joining flange portion of the second frame member is sized and shaped to fit in close fitting, overlying engagement with the first receiving ledge of the first frame member, so that the first frame member and the second frame member are securely joined in mating engagement at a sealed, substantially leakless joint therebetween.

Our novel multi-part ventilator provides a simple, foolproof design for assembly of foundation ventilators of various widths. This design provides a significant improvement in the art by reducing complexity of manufacture of ventilators of various widths, and thus reducing inventory costs for carrying the necessary parts to provide various width ventilators.

BRIEF DESCRIPTION OF DRAWING

FIG. **1** is a perspective view of our multi-part ventilator, shown installed in a concrete foundation wall.

FIG. **2** is a perspective view of a first frame member of our multi-part foundation ventilator design, showing how the doors are detachably affixed to the hinges, and also showing two different door handle designs.

FIG. **3** is a perspective view of a second frame member of our multi-part foundation ventilator design, showing the details for joining of the second frame member to a first frame member such as that just illustrated in FIG. **2** above.

FIG. **4** is a vertical cross-sectional view of our multi-part foundation ventilator, showing how the first frame member as shown in FIG. **2** above is jointed with the second frame member as illustrated in FIG. **3** above.

FIG. **5** is a vertical cross-sectional view of another embodiment of our multi-part foundation ventilator, showing a first frame member having three interior ledges, and a second frame member of the design set forth in solid lines in FIG. **3** above.

FIG. **6** is a vertical cross-sectional view showing how a porous screen member is provided between the first frame member and the second frame member.

FIG. **7** is a partial vertical cross-sectional view showing the door hinge mechanism and door.

FIG. **8** is a partial vertical view showing a pair of doors with door hinge mechanism.

FIG. **9** is a perspective view, showing how a first frame member and a second frame member, each of preselected width, are jointed to build a final, assembled foundation ventilator of pre-selected width with a screen therebetween.

FIG. **10** illustrates the use of a removable insulating plug in the foundation ventilators.

FIG. **11** is a vertical cross-sectional view of a removable insulating plug, showing the centrally located handle grip provided.

FIG. **12** is a perspective view of a left hand removable insulating plug.

FIG. **13** is a front elevation view of a left hand removable insulating plug.

FIG. **14** is a rear elevation view of a left hand removable insulating plug.

FIG. **15** is a left side view of a left hand removable insulating plug.

FIG. **16** is a right side view of a left hand removable insulating plug.

FIG. **17** is a top view of a left hand removable insulating plug.

FIG. **18** is a bottom view of a left hand removable insulating plug.

FIG. **19** is a detail showing the molded nail holder and nail assembled for shipment of our foundation ventilator.

FIG. **19A** is a detail showing another configuration for a nail and nail holder, assembled for shipment.

FIG. **20** is a cross-sectional view of the molded nail holder and nail, showing the nail support provided.

FIG. **20A** is a cross-sectional view of a second configuration of a molded nail holder and nail.

FIG. **21** is a graphical representation of the method of assembly of a foundation ventilator of pre-selected size, by affixing a first frame portion to a second frame portion, where each of the first and second frame portions are selected in a width to produce an assembled foundation ventilator of desired thru-wall thickness.

FIG. **22** is a perspective view of a foundation ventilator being installed between a pair of forms during preparation for pouring a concrete foundation wall, and particularly showing how the outwardly angled pre-affixed nails help quickly locate the ventilator and allow it to be attached while minimizing potential for a hammer to damage the ventilator.

FIG. **23** is a perspective view of a our novel foundation ventilator being installed in a block type foundation wall.

FIG. **24** shows a partial perspective view of a nailing clip which is an alternate to using a nail for attachment of the ventilator between form panels prior to pouring concrete.

FIG. **25** shows a partial top view of a foundation ventilator which is using a nailing clip to join the ventilator to a form panel prior to pouring concrete to form a wall.

FIG. **26** is a partial perspective view of the outside of a foundation ventilator, depicting the configuration of a nailing clip before positioning of a ventilator between form panels.

DESCRIPTION

Attention is directed to FIG. **1** of the drawing, where a foundation ventilator **30** is shown as placed in a finished concrete type foundation wall **32**. Foundation ventilator **30** is of multi-part construction, and as more fully revealed in FIG. **4**, it is most advantageously and simply formed by joining a first frame member **34** with a second frame member **35**. The first frame member **34** preferably has a exterior peripheral edge flange **36**. The exterior peripheral edge flange **36** extends around the exterior of the first frame member **34** at the outer extremity thereof. The peripheral edge flange **36** is also preferably integrally molded with the first frame member **34** in a width W_{36}, normally of narrow thickness T_{36}, rather than simply being affixed to frame member **34**. Ideally, a radiused interior corner joint RC is utilized to join the peripheral edge flange **36** to first frame member **34**. A similar radiused interior corner joint RC is utilized to join second frame member **35** to its peripheral edge flange **70**, as better seen in FIG. **4**, for example. For most applications, the ventilator **30** is preferably shaped, when viewed from the side, as a parallelogram, or more preferably, as a rectangle with slightly rounded interior corners **37**. In such cases, the exterior peripheral edge flange **36** has a corresponding rectangular shape with slightly rounded exterior corners **38**. The exterior peripheral edge flange **36** has a rear surface **39** that fits flush within the outer surface **40** of wall **32**.

As more clearly set forth in FIGS. **4**, **5**, and **9**, the foundation ventilator **30** has an overall thickness X_0 in the thru wall direction. This thickness X_0 of ventilator **30** is the sum of the overall thickness X_1 (in the thru-wall direction) of the first frame member **34** and the overall thickness X_2 (in the thru-wall direction) of the second frame member **35**. Although any desired overall thickness X_0 should be possible utilizing the teachings herein, we prefer to provide an overall thickness X_0 which results when using (a) a first frame member with width XI of approximately 2, 4, or 6 inches, and (b) a second frame member with a width X_2 of approximately 2, 4, or 6 inches. In this fashion, we can easily build foundation ventilators of overall thickness X_0 of 6, 8, 10, or 12 inches.

The overall thru-wall thickness X_1 of first frame member **34** is made up of one or more, and preferably at least two of inwardly protruding thru-wall portions. For conceptual purposes, such protruding through-wall portions in the first frame member **34** are described, in sequence from the most interior to the most exterior portion, as $X_{1\text{-}A}$, $X_{1\text{-}B}$, . . . $X_{1\text{-}N1}$, where N_1 corresponds (in order, alphabetically when using the nomenclature described herein) to the number of thru-wall portions provided in the selected frame member, and N_1 is any letter selected in a sequence from A through N, where the total number of letters utilized in the sequence represents the number of thru-wall portions provided. Also, for conceptual purposes, the subscript utilized (in N_1 or in X_2, for example) represents whether the first **34** or second **35** frame member is being referred to by the reference subscript, with the subscript "1" being a reference to the first frame member **34**, and with the subscript "2" being a reference to the second frame member **35**.

In first frame member **34**, the first, most interior, up inwardly protruding thru-wall portion $X_{1\text{-}A}$ (also marked with reference numeral **42** in FIG. **9**) has a preselected thru-wall thickness $X_{1(A)}$. The first inwardly protruding thru-wall portion $X_{1\text{-}A}$ has an inner surface portion **44** and an outer surface portion **46**. The inner surface portion **44** defines a thru passageway portion P_1. The passageway P_1 is further divided into left hand portion P_{1L} to form a first thru passageway, and right hand portion P_{1R} to form a second thru passageway, by a strengthening wall C_1, preferably substantially vertical and centrally located. As necessary, strengthening ribs **48** are provided, in strengthening wall C_1, preferably aligned in the thru-wall direction.

Adjacent the exterior peripheral edge flange **36** of first frame member **34**, the outermost inwardly protruding wall portion $X_{1\text{-}N1}$ is provided in thickness $X_1(N_1)$. The outermost inwardly protruding wall portion $X_{1\text{-}N1}$ is also marked with reference numeral **50** in FIG. **9**. That outermost thru-wall portion $X_{1\text{-}N1}$ has an inner surface portion **52** and an outer surface portion **54**.

As best seen in FIG. **5**, optionally, at least one intermediate inwardly protruding wall portion $X_{1\text{-}B}$ of thru-wall thickness $X_1(B)$ may be provided. In FIG. **3**, a similar configuration is depicted for the second frame member, with reference numeral **35'** indicating a second frame member having an intermediate thru-wall portion $X_{2\text{-}B}$.

As illustrated in FIGS. **4** and **9**, the outer surface portion **46** of the first inwardly protruding thru-wall portion $X_{1\text{-}A}$, also marked with reference numeral **42**, has a distal edge **56**. Importantly, at least a portion of the distal edge portion **56** is configured into a first receiving ledge portion **58**. The other part of the outer surface portion **46** has an outwardly protruding first joining flange portion **60**.

As seen in FIGS. **3**, **4**, and **9**, a second frame member **35** is provided for secure mating attachment and assembly with first frame member **34**. The second frame member **35** has an interior wall peripheral flange **70** that is preferably integrally molded with the second frame member **35**. The interior wall peripheral flange member **70** has an outwardly extending face width W_{70} with thickness T_{70} which is sufficient to effectively cover, with its rear surface **72**, any gap or opening left between the multi-part foundation ventilator **30** and an interior surface of wall **32**.

The second frame member **35** has an overall thru-wall thickness X_2. A series of N through-wall portions in the second frame member may be described, from the centermost portion to the interior portion, by the sequence $X_{2\text{-}A}$, $X_{2\text{-}B}$, . . . $X_{2\text{-}N2}$, where N_2th letter is the number of thru-wall portions provided in the second frame member **35** (in order, alphabetically when using the nomenclature described herein). Each of the thru-wall portions $X_{2\text{-}A}$, $X_{2\text{-}B}$, ... $X_{2\text{-}N2}$, has a corresponding thru-wall thickness $X_{2(A)}$, $X_{2(B)}$, etc. through $X_{2(N2)}$. Therefore, the first outwardly protruding wall portion $X_{2\text{-}A}$, marked with reference numeral **75**, has a preselected thru-wall thickness $X_{2(A)}$.

The first outwardly protruding wall portion **75** has an inner surface portion **80** defining a second thru passageway portion P_2; the second thru passageway area P_2 and the first thru passageway area P_1 are preferably of the same or similar complementary cross-sectional area. As in first frame member **35**, the second thru passageway P_2 is preferably divided by a central strengthening wall C_2 into a left hand portion P_{2L} to provide a third thru passageway, and right hand portion P_{2R} to provide a fourth thru passageway.

The first outwardly protruding wall portion **75** further has an outer surface portion **82** having a distal edge **84**. At least a portion of the outer surface portion **82** adjacent to the distal edge **84** is configured as a second receiving ledge portion **86**. Also, at least a portion of the outer surface portion **82** also has an outwardly protruding joining flange portion **88** with in inward mating surface **90** adapted to snugly join and interfit with ledge **58**.

The inwardly protruding joining flange portion **60** of the first frame member **34** is sized and shaped to fit in close

fitting, overlying mating engagement with the second receiving ledge portion **86** of the second frame member **35**. The outwardly protruding joining flange portion **88** of the second frame member **35** is sized and shaped to fit in close fitting, overlying mating engagement with the first receiving ledge **58** of the first frame member **34**. Preferably, the first frame member **34** and the second frame member **35** are securely joined in sealed, leakless, mating engagement, so that liquids, such as from wet cement when wall **32** is being poured, are substantially prevented from migrating through the joint J formed between the first **34** and the second **35** frame members (see FIG. **6** or FIG. **22** below, for example) . To assure such leakless mating engagement, it is preferable that the inwardly protruding joining flange **60** and the second receiving ledge **84** are each provided in a complementary, matching joint J_1 of length L_1 around at least a portion of the perimeter of passageways P_1 and P_2. Also, in similar fashion, it is desirable that joint J_2 be provided by an outwardly protruding joining flange **88** and the first receiving ledge **58** in complementary, matching length L_2 around at least a portion of the perimeter of passageways P_1 and P_2. Ideally, inwardly protruding flange **60** is provided in a sideways opening, horizontally oriented U-shaped configuration with complementary receiving ledge **84**, and the outwardly protruding flange **88** is provided in an opposing sideways opening, horizontally oriented U-shaped configuration with complementary receiving ledge **58**. In such a fashion, flange **88** is made up of an upper part 88_u, a side part 88_s and a lower part 88_u, which parts together form the U-shaped flange **88**. Flange **60** is of similar construction with an upper part 60_u, a side part 60_s, and a lower part 60_1. In complementary fashion, the ledge **58** has an upper part 58_u, a side part 58_s, and a lower part 58_l. Likewise, ledge **86** of second frame member **58** has an upper part 86_u, a side part 86_s, and a lower part 86_B. The joint J_1 is thus of length L_1 corresponding to the length of flange **60**, and joint J_2 is thus of length L_2 corresponding to the length of flange **88**. The joint J, made up of joints J_1 and J_2, is sealed via use of an appropriate glue or sealing adhesive that is compatible with or as a solvent glue for the plastic or other material in which the ventilator **34** is manufactured. Ideally, the joint J results in the first frame member **34** being joined with the second frame member **35** in sealed, leakless engagement. However, the exact shape of the opposing mating flange and ledge portions as just described in this paragraph (flange **60** over ledge **86**, and flange **88** over ledge **58**) can be provided in any desired perimeter section, in the alternative, along an appreciable portion of each of the opposing distal end edges **56** and **84** of frame members **34** and **35**, respectively. More explicitly, in the preferred embodiment, a flange **60** on the first frame member **34** can be provided in any desired length so long as a complementary ledge portion **86** is provided on the second frame member **35**, and so long as the flange **88** in the second frame member **35** is provided along the remainder of the distal end edge **84** of second frame member, with complementary ledge **58** provided in first frame member **34**.

As seen in FIG. **3**, in second frame member **35** a narrow, thin, peripheral flange **99** is provided which projects, transversely, into the passageway P_2, normally to define its perimeter at minimum cross-section, preferably from around the entire interior surface **80** of second frame member **35**. For most purposes, a flange **99** of about one-quarter inch (¼") in width is adequate. Also, a thin, vertical column flange **102** is provided along the inner reaches **103** of wall C_2. A matching vertical column flange **104** is provided along the inner reaches of wall C_1 in first frame member **34**. Vertical column flanges **102**, and **104** are usually provided in a width Z of about one-half inch (½"). Peripheral flange **99** is provided with a spacing lip **106** to allow spacing of flange **99** apart from a similar narrow thin peripheral flange **110** on first frame member **34**, by means of contact between spacing lip **106** and spacing lip **112**. In this manner, the thin raised ridge spacing lip **112** and the thin raised ridge spacing lip **106** each define a generally L-shaped peripheral caging surface to accommodate, between flange **99** and **110**, and interior of spacing lips **106** and **112**, a porous screen member **114**.

The two-piece ventilator construction of the type just described provides some important improvements over earlier two-piece ventilators known to us. Primarily, the utilization of a flanged joint J provides a large surface area along the "flange to ledge" joints, as described, which allows a large contact area between the first **34** and second **35** frame members when they are glued together. That allows a strong joint J to be created, and such a joint can be easily and reliably sealed to substantially prevent, if not entirely eliminate, the passage of liquids therethrough. This is important as it prevents watery concrete mixtures from reaching the interior surfaces of the ventilator **30**.

More specifically, to provide a strong joint J in the foundation ventilator as set forth in FIG. **9**, the first frame member **34** has a first receiving ledge **58** and a first joining flange **60**, each preferably provided, in the alternative, along an appreciable portion of the distal end **56** of the inwardly protruding wall portion **46**. Correspondingly, the second frame member **35** has a second receiving ledge **86** and a second joining flange **88**, in the alternative, complementary in location to the corresponding mating parts in the first frame member **34**. We prefer to provide a first frame member **34** which has a left side (corresponding to the left side passageway P_{1L}) on which a portion 60_s of the first joining flange member **60** is located, and in preferably a mirror image complementary fashion, a right side on which a portion 58_s of the first receiving ledge **58** is located. In such cases, then the second frame member **35** has a right side (looking outwardly, as indicated in FIG. **9**) on which a portion 86_s of the second receiving edge **86** is located, and a left side on which a portion 88_s of the second joining flange member **88** is located. Of course, the frame of reference just used to describe the ventilator first and second frame members is arbitrary, and the reverse scheme, where left and right locations are switched, are equally viable, as well as other schemes which utilize such mating members for joining the first and second frame members **34** and **35**.

For simplicity, we prefer to provide ventilators **30** in which the first joining flange member **60** substantially forms the first one-half of a rectangle, and where the second receiving ledge member **86** forms a second one-half rectangle substantially conforming in size and shape complementary to the first one-half rectangle, so that the first joining flange member **60** and the second receiving ledge member **86** are brought together in close fitting complementary mating engagement. Likewise, it is preferred that the second joining flange member **88** substantially form a third one-half of a rectangle, and that the first receiving edge member **58** forms a fourth one-half rectangle substantially conforming in size and shape complementary to the third one-half rectangle, so that said second joining flange **88** and said first receiving ledge **58** are brought together in close fitting complementary mating engagement.

As is most evident in FIGS. **3** and **9** which illustrate the second frame member **35**, an important and strengthening feature provided in our ventilator design is the use of the

narrow, thin, peripheral flange **99**, which also serves as a retaining flange, and which extends transversely, substantially perpendicular from the inner surface **80** of the outwardly protruding wall portion **75** into the second thru passageway P_{2R}, from at or near the distal end **84** of said the second inwardly projecting wall portion **80**. The peripheral flange **99** has a right portion 99_R, a left portion 99_L, an upper portion 99_U, and a lower portion, 99_B. Similarly, in the first frame member **34**, a thin, narrow, retaining flange **110** extends transversely and substantially perpendicular from the inner surface **44** of the first inwardly projecting wall portion **46** into the first thru passageway P_1, from at or near the distal end of the first inwardly projecting wall portion **46**.

The interior peripheral flange **110** of the first frame member **34** ideally includes one or more first guide pin members **130** which are rigidly affixed or integrally molded with flange **110**, and which extend therefrom substantially along the axis of the thru passageway P_1. Similarly, the interior peripheral flange **99** of the second frame member **35** includes one or more second guide pin members **132** which are rigidly affixed or integrally molded with flange **99**, and which extend therefrom along the axis of the thru passageway P_2. In flange **110** are also located one or more first guide pin receiving apertures **134**, each of which is defined by edge portions **136**, for accommodating and locating second guide pin members **132**. In complementary fashion, in flange **99**, there are located one or more second guide pin receiving apertures **138**, each of which is defined by edge portions **140**. The combination of strong guide pins and tight receiving apertures also help to create a strong joint between the first **34** and second **35** frames, since the receiving apertures are adapted to receive therein in snug fitting mating engagement the guide pin members **130** and **132**.

We prefer to provide the interior peripheral flange **99** in the second frame member **34**, and the interior flange **110** in the first frame member **35**, with a pair of laterally spaced apart, complementary door pivot receiving cage members **150**. The door pivot receiving cage members **150** are preferably provided at the lower lateral margins of passageways P_{1R}, P_{1L}, P_{2R}, and P_{2L}, and extending at least a short distance laterally into the same. The door pivot receiving cage member **150** are preferably provided each in about one-quarter inch width, or slightly smaller in width than the lateral extension width W_{156} of the frictional ears **152** and **154** of latch tabs **156** of doors **158**. Also, cage member **150** is preferably provided in a somewhat horizontal or inverted shape V-shaped ledge fashion, with a working diameter between the inner bottom **160** and the inner top **162** complementary to the working diameter D_1 of upper **152** and lower **154** frictional ears of latch tab **156** at the lateral edges of doors **158**. In this manner, frictional ear **152** has an upper edge **164** that rubs against inner top **162** to provide frictional positioning of the doors **158**, while the lower edge **166** of lower ear **154** rubs against inner bottom **160** of the cage member **150**.

Preferably, the tabs **156** in doors **158**, or alternately the entire door **158**, are provided in a relatively soft plastic, compared to the material used for forming the cage member **150**, so that the doors **158** are flexibly but reliably positionable at one or more pinch points P in the inner bottom **160** of cage member **150**. Generally, we prefer to make the first and second frame members of ABS plastic, and the door **158** of high density polyethylene plastic.

To further assist in opening and closing of door **158**, the door is provided with a pinchable grasping ridge **170**, either raised and protruding as is shown in FIG. **4**, or recessed, with dimples **172**, as is illustrated in FIG. **5**. As illustrated, door **158** may be opened, as shown in FIG. **5** in the horizontal position, or closed, by moving the door **158** in the upward direction indicated by reference arrow **174** in FIG. **5**, where the door finally effectively closes passageways P_{1L}, and P_{1R}, in first frame section **34**. Alternately, and uniquely in our design, doors **158** can also be provided for passageways P_{2R} and P_{2L} in second frame member **35**.

In colder climates, it is sometimes advantageous to further provide insulating plugs **180**, for completely and effectively shutting down the air flow thru vent **30**, as is illustrated in FIGS. **10** thru **18**. We prefer to use a unique reversible plug **180** which has a serrated inner edge **182** with indentations **184** corresponding to ribs **48** in center column C_1, wherein the edge **182** is sized for complementary meshing engagement with the ribs **48**. Likewise, an inwardly sloping outer edge **186** of plug **180** is provided for complementary snug fitting engagement with inner surface **52** of first frame **34**. It is important to note that at the lower reaches of first frame member **34**, the surface **52** has an upward gradient, so the inward sloping outer edge **186** would be upwardly sloping, so that the interior wall surface **52** would allow any fluid impinging thereon to drain outward. Also, it should be noted that the first G or any subsequent inward ledge portions further define a barrier against inward migration of a fluid.

For handling reversible plugs **180**, note that grips **190** can be provided in recessed fashion between dimples **192**. Thickness of plugs **180** in the air passageway direction can be as necessary or desired for the particular climate, but we prefer a thickness of about one inch, more or less.

Turning now to FIGS. **19** and **20**, it can be seen that we prefer to provide a set of pre-glued nails **200** with ventilator **30**. In this manner the ventilator **30** is ready for nailing via hammer **202** to a selected substrate, normally a wooden form **204**, as is further depicted in FIG. **22**. As shown in FIG. **19**, in one preferred embodiment, at least on nail socket **210** is provided, which structurally includes a pair of opposing, preferably substantially semicircular, spaced apart upper and lower lips **212**. The upper and lower lips **212** are spaced and adapted to frictionally secure therebetween a nail **200** of preselected size. Ideally, an easily releasable adhesive **214** is used to secure the nail **200** in place, and an angle alpha (α) as provided by angular wedge **216** between lips **212**. To provide the necessary strength to assure that lips **212** do not break off when nail **200** is pounded into the adjacent form, one or more, and preferably two strengthening ribs RB are provided between lower surface 212_L of the lower of lips **212** and the upper surface **54** of first portion X_1-N_1 of first frame member X_1. Substantially identical strengthening ribs RB are provided in corresponding parts in second frame member X_2. See FIG. **4** and FIG. **19** to view details. As shown in FIGS. **19A** and **20A**, nails **200** may be provided with a simple friction fit, and oriented perpendicular to flange **34** or **35** by wedge **216'**.

Alternately, an angular nailing tab **220** may be provided, as illustrated in FIGS. **24–26**. Tab **220** is affixed to first frame **34** and second frame **35** of ventilator **30** via rivet **222** or other suitable fastener. Ideally, a recessed preferably rectangular slot **224** is provided to accommodate a preferably generally rectangular shaped nailing tab **220**. The nailing tab, while being affixed at a first end **226** by the rivet **222**, is flexible at the second end which preferably terminates at a generally triangularly shaped chisel point **228**, and which is crimped and shaped so as to be adapted to be driven along a rear surface **230** thru aperture defined by edge **232** thru a peripheral flange of frame **34** or **35**, and into wooden form **204**.

It is to be appreciated that the novel foundation ventilator provided by the present invention is a significant improve-

ment in the state of the art of foundation ventilators, especially for providing foundation ventilators of various widths without taking up excess inventory space. It is thus clear from the heretofore provided description that our novel multi-part foundation ventilators, is an appreciable improvement in the state of the art of of building foundation ventilators. Although only a few exemplary embodiments of this invention have been described in detail, it will be readily apparent to those skilled in the art that the our novel ventilator device may be modified from those embodiments provided without materially departing from the novel teachings and advantages provided by this invention, and may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. Therefore, the embodiments presented herein are to be considered in all respects as illustrative and not restrictive. As such, the claims are intended to cover the structures described herein, and not only structural equivalents thereof, but also equivalent structures. Thus, the scope of the invention, as indicated by the appended claims rather than by the foregoing description, is intended to include variations from the embodiments provided which are nevertheless described by the broad meaning and range properly afforded to the language of the claims, or to the equivalents thereof.

We claim:

1. A foundation ventilator, said ventilator comprising:

(a) a first frame member, said first frame member comprising:

(i) a first exterior peripheral edge flange, and

(ii) extending from said first exterior peripheral edge flange, a first inwardly protruding wall portion of preselected length $X_{1(A)}$, said first inwardly protruding wall portion having an inner surface portion defining a first thru passageway portion, said first inwardly protruding wall portion further comprising an outer surface portion having a distal edge,

(A) wherein at least a portion of said outer surface portion adjacent to said distal edge further comprises a first receiving ledge portion, and

(B) wherein at least a portion of said first inwardly protruding wall portion further comprises, adjacent to said distal edge of said outer surface portion, a protruding, first joining flange portion;

(b) a second frame member, said second frame member comprising:

(i) a second exterior peripheral edge flange, and

(ii) extending from said second exterior peripheral edge flange, a second inwardly protruding wall portion of preselected length $X_{2(A)}$, said second inwardly protruding wall portion having an inner surface portion defining a second thru passageway portion, said second inwardly protruding wall portion further comprising an outer surface portion having a distal edge,

(A) wherein at least a portion of said outer surface portion adjacent to said distal edge further comprises a second receiving ledge portion, and

(B) wherein at least a portion of said second inwardly protruding wall portion further comprises, adjacent to said distal edge of said outer surface portion, a protruding, second joining flange portion;

(c) wherein said first joining flange portion of said first frame member is sized and shaped to fit in close fitting, overlying engagement with said second receiving ledge portion of said second frame member, and

(d) wherein said second joining flange portion of said second frame member is sized and shaped to fit in close fitting, overlying engagement with said first receiving ledge of said first frame member,

(e) said first frame member and said second frame member securely joined in mating engagement at a joint therebetween.

2. The ventilator as set forth in claim **1**, wherein said first frame member and said second frame member are joined in sealed, leakless, mating engagement, so that liquids are substantially prevented from migrating through said joint between said first and said second frame members.

3. The ventilator as set forth in claim **1**, wherein said first joining flange and said second receiving ledge are each provided in complementary, matching lengths.

4. The ventilator as set forth in claim **3**, wherein said second joining flange and said first receiving ledge are each provided in complementary, matching lengths.

5. The ventilator as set forth in claim **4**, wherein said first joining flange and said first receiving ledge of said first frame member are each provided, in the alternative, along an appreciable portion of said distal end of said inwardly protruding wall portion of said first frame member.

6. The ventilator as set forth in claim **5**, wherein said second joining flange and said second receiving ledge of said second frame member are each provided, in the alternative, along an appreciable portion of said distal end of said inwardly protruding wall portion of said second frame member.

7. The ventilator as set forth in claim **6**, wherein said first frame member has a left side on which said first joining flange member is located.

8. The ventilator as set forth in claim **7**, wherein said first frame member has a right side on which said first receiving ledge is located.

9. The ventilator as set forth in claim **6**, wherein said second frame member has a left side on which said second joining flange member is located.

10. The ventilator as set forth in claim **9**, wherein said second frame member has a right side on which said second receiving ledge is located.

11. The ventilator as set froth in claim **10**, wherein said first joining flange member substantially forms first one-half of a rectangle, and where said second receiving edge member forms a second one-half rectangle substantially conforming to said first one-half rectangle, so that said first joining flange and said second receiving ledge may be brought together in close fitting complementary mating engagement.

12. The ventilator as set froth in claim **11**, wherein said second joining flange member substantially forms third one-half of a rectangle, and where said first receiving edge member forms a fourth one-half rectangle substantially conforming to said third one-half rectangle, so that said second joining flange and said first receiving ledge may be brought together in close fitting complementary mating engagement.

13. The ventilator as set forth in claim **12**, wherein said first frame member further comprises a first interior peripheral flange, said first interior peripheral flange extending substantially perpendicular from said inner surface of said first inwardly projecting wall portion into said first thru passageway, from at or near the distal end of said first inwardly projecting wall portion.

14. The ventilator as set forth in claim **13**, wherein said second frame member further comprises a second interior peripheral flange, said second interior peripheral flange extending substantially perpendicular from said inner surface of said second inwardly projecting wall portion into said second thru passageway, from at or near the distal end of said second inwardly projecting wall portion.

15. The ventilator as set forth in claim 13, wherein said first interior peripheral flange further comprises a first pair of laterally spaced apart, complementary door pivot receiving cage members.

16. The ventilator as set forth in claim 14, wherein said second interior peripheral flange further comprises a second pair of laterally spaced apart, complementary door pivot receiving cage members.

17. The ventilator as set forth in claim 16, wherein said first frame member further comprises a first structural reinforcing divider, said first structural reinforcing divider defining in said first frame member

(a) a first end of said first thru passageway, and

(b) in cooperation with at least a portion of said interior wall surface of said first inwardly projecting wall portion, a third thru passageway.

18. The ventilator as set forth in claim 17, wherein said second frame member further comprises a second structural reinforcing divider, said second structural reinforcing divider defining in said second frame member

(a) a first end of said second thru passageway, and,

(b) in cooperation with at least a portion of said interior wall surface of said second inwardly projecting wall portion, a fourth thru passageway.

19. The ventilator as set forth in claim 17, wherein said first interior peripheral flange further comprises a third pair of laterally spaced apart, complementary door pivot receiving cage members.

20. The ventilator as set forth in claim 14, wherein said second interior peripheral flange further comprises a fourth pair of laterally spaced apart, complementary door pivot receiving cage members.

21. The ventilator as set forth in claim 13, wherein said interior peripheral flange of said first frame member further comprises:

(a) one or more first guide pin members, said one or more first guide pin members rigidly affixed to said lip and extending therefrom substantially along the axis of said thru passageway, and

(b) one or more first guide pin receiving apertures, said one or more first guide pin receiving apertures defined by edge portions.

22. The ventilator as set forth in claim 14, wherein said second interior peripheral flange of said second frame member further comprises:

(a) one or more second guide pin members, said one or more second guide pin members rigidly affixed to said lip and extending therefrom substantially along the axis of said thru passageway, and

(b) one or more second guide pin receiving apertures, said one or more second guide pin receiving apertures defined by edge portions and adapted to receive therein in snug fitting mating engagement said first guide pin members.

23. The ventilator as set forth in claim 1, wherein said distal end of said inwardly projecting wall of said first frame portion further comprises a first thin raised ridge portion, said thin raised ridge portion located at the outer periphery of said inwardly projecting lip so as to define a generally L-shaped peripheral caging surface.

24. The ventilator as set forth in claim 23, wherein said distal end of said inwardly projecting wall of said second frame portion further comprises a second thin raised ridge portion, said thin raised ridge portion located at the outer periphery of said inwardly projecting lip, so as to define a generally L-shaped peripheral caging surface.

25. The ventilator as set forth in claim 24, further comprising a porous screen member, said porous screen member affixed

(a) interior of said first and said second thin raised ridge portions, and

(b) between said first interior lip of said first frame member, and said second interior lip of said second frame.

26. The ventilator as set forth in claim 1, further comprising a first door for said first thru passageway, said first door further comprising a first door hinge, said first door hinge adapted to interface with said first pair of said laterally spaced apart, complementary door pivot receiving cage members, so that said first door hinge is frictionally positionable at a desired position.

27. The ventilator as set forth in claim 26, further comprising a second door for said second thru passageway, said second door further comprising a second door hinge, said second door hinge adapted to interface with said first pair of said laterally spaced apart, complementary door pivot receiving cage members, so that said second door hinge is frictionally positionable at a desired position.

28. The ventilator as set forth in claim 27, wherein said complementary door pivot receiving cage members each comprises a generally inverted V-shaped ledges, said generally inverted V-shaped ledges extending at least a short distance transversely inwardly into said thru passageway.

29. The ventilator as set forth in claim 28, wherein said first frame member and said second frame member are each comprised of a relatively hard plastic, and wherein said door is comprised of a relatively soft plastic, and where said first door hinge is flexibly but reliably positionable along said complementary door pivot receiving cage members.

30. The ventilator as set forth in claim 29, wherein said first and said second frame members are comprised of ABS plastic.

31. The ventilator as set forth in claim 29, wherein said door is comprised of polyethylene plastic.

32. The ventilator as set forth in claim 1, wherein said first inwardly projecting wall portion of said first frame member further comprises:

(a) a third inwardly projecting wall portion, and

(b) a first inward ledge portion,

(c) and wherein said third inwardly projecting wall portion is of preselected length $X_1(B)$ and extends from said first exterior peripheral edge flange to said first inward ledge portion, and wherein said first inwardly projecting wall portion continues inwardly from said first inward ledge portion.

33. The ventilator as set forth in claim 1, wherein said second inwardly projecting wall portion of said second frame member further comprises

(a) a fourth inwardly projecting wall portion, and

(b) a second inward ledge portion,

(c) and wherein said fourth inwardly projecting wall portion is of preselected length $X_2(B)$ and extends from said second exterior peripheral edge flange to said second inward ledge portion, and wherein said second inwardly projecting wall portion continues inwardly from said second inward ledge portion.

34. The ventilator as set forth in claim 32, wherein said first inwardly projecting wall portion has a upward gradient, whereby said interior wall surface allows a fluid impinging thereon to drain outward.

35. The ventilator as set forth in claim 34, wherein said first inward ledge portion further defines a barrier against

inward migration of a fluid impinging on said third inwardly projecting wall portion.

36. The ventilator as set forth in claim **1**, wherein said first exterior peripheral edge flange further comprises at least one nail socket, said at least one nail socket adapted to secure a nail therein, so that a nail may be placed in said at least one nail socket at time of manufacture, ready for nailing to a selected substrate in the field.

37. The ventilator as set forth in claim **36**, wherein said at least one nail socket comprises a pair of opposing, substantially semicircular, spaced apart lips, said lips spaced and adapted to frictionally secure therebetween a nail of preselected size.

38. The ventilator as set forth in claim **37**, further comprising a nail, said nail provided in said at least one nail socket.

39. The ventilator as set forth in claim **26**, or in claim **27**, wherein said door further comprises a gripping bar, said gripping bar comprising a laterally extending and vertically approachable manually grippable pinch point, said manually grippable pinch point adapted to allow said door to be opened and closed.

40. The ventilator as set forth in claim **1**, wherein said first frame member further comprises a first flanged handle portion, said first flanged handle portion extending inwardly from the upper portion of said said peripheral flange, said first flanged handle portion adapted to allow said ventilator to be manually grasped and lifted.

41. The ventilator as set forth in claim **1**, wherein said second frame member further comprises a second flanged handle portion, said second flanged handle portion extending inwardly from the upper portion of said said peripheral flange, said second flanged handle portion adapted to allow said ventilator to be manually grasped and lifted.

42. The ventilator as set forth in claim **1**, further comprising a first insulating plug, said first insulating plug comprising a tight fitting insert adapted to fit into said first thru passageway.

43. The ventilator as set forth in claim **1**, further comprising a second insulating plug, said second insulating plug comprising a tight fitting insert adapted to fit into said second thru passageway.

44. The ventilator as set forth in claim **43**, wherein said first frame member of said ventilator is fabricated using a first frame member with a width X_1 overall selected from the group consisting of, approximately: 2, 4, or 6 inches.

45. The ventilator as set forth in claim **44**, wherein said second frame member of said ventilator is fabricated using a second frame member with a width X_2 overall selected from the group consisting of, approximately: 2, 4, or 6 inches.

46. The ventilator as set forth in claim **45**, wherein the width of the ventilator, in the thru passageway direction, is approximately six (6) inches.

47. The ventilator as set forth in claim **45**, wherein the width of the ventilator, in the thru passageway direction, is approximately eight (8) inches.

48. The ventilator as set forth in claim **45**, wherein the width of the ventilator, in the thru passageway direction, is approximately ten (10) inches.

49. The ventilator as set forth in claim **45**, wherein the width of the ventilator, in the thru passageway direction, is approximately twelve (12) inches.

50. The ventilator as set forth in claim **26** or claim **27** above, wherein said hinge has an interior hinge pivot engaging portion, said hinge pivot engaging portion further comprising a plurality of hinge catch portions, said hinge catch portions adapted to engage said hinge pivot to allow said door to be securely positioned at an angle of opening defined by any one of said hinge catch portions.

51. The ventilator as set forth in claim **26** or **27**, wherein said door is adapted to be removably attached to said ventilator.

52. The ventilator as set forth in claim **50** above, wherein said hinge pivot engaging portion of said door further comprises a first, laterally extending pivot prong, and spaced vertically thereabove, a second, laterally extending catch prong, and wherein said catch prong is adapted to be releasably secured in said hinge catch portions of said hinge pivot engaging portion.

53. The apparatus as set forth in claim **52**, wherein each of said hinge catch portions further comprises a multiple keyed catch portion, said multiple keyed ketch portion defined by multiple keyed flange edges to locate multiple catch positions, so that any one of the multiple catch positions locates therein said catch portion of said door.

54. The apparatus as set forth in claim **1**, wherein said first exterior peripheral edge flange and said first inwardly protruding wall portion are joined at a radiused interior corner joint.

55. The apparatus as set forth in claim **1**, wherein said second exterior peripheral edge flange and said second inwardly protruding wall portion are joined at a radiused interior corner joint.

56. The apparatus as set forth in claim **37**, further comprising one or more reinforcing ribs, and wherein said spaced apart ribs comprise a lower lip having a lower surface, wherein said one or more reinforcing ribs (a) extend below said lower surface of said lower lip to said first inwardly protruding wall portion, and (b) extend from said first exterior peripheral edge flange inward along the lower surface of said lower lip.

57. The apparatus as set forth in claim **37**, further comprising one or more reinforcing ribs, and wherein said spaced apart ribs comprise a lower lip having a lower surface, wherein said one or more reinforcing ribs (a) extend below said lower surface of said lower lip to said first inwardly protruding wall portion, and (b) extend from said first exterior peripheral edge flange inward along the lower surface of said lower lip.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 6,165,066
APPLICATION NO. : 09/273116
DATED : December 26, 2000
INVENTOR(S) : Thomas G. Sharp et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Title page, item [56]
IN REFERENCES CITED:

Under "U.S. Patent Documents", **after** the reference "2,843,035 7/1958 Jacks."
Add --3,220,079 11/1965 Aggson--

Under "Foreign Patent Documents", **after** the reference "278221", **delete** "10/1955" and substitute therefore --10/1951--.

Column 2, line 11, after the word "joint", delete "ther-ebetween" and substitute therefore --there-between--.
Column 5, line 38, after the word "width", delete "XI" and substitute therefore --X_1--.
Column 7, line 12, after the words "below, for", delete "example) ." and substitute therefore --example).--.
Column 10, line 34, after the words "at least", delete "on" and substitute therefore --one--.

Column 12, line 46, after the words "as set", delete "froth" and substitute therefore --forth--.
Column 16, line 27, after the word "keyed", delete "ketch" and substitute therefore --catch--.

Signed and Sealed this

Ninth Day of February, 2010

David J. Kappos

David J. Kappos
Director of the United States Patent and Trademark Office