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Birdsall et al.

[11] **3,894,480**

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[54] **LABORATORY BENCH ASSEMBLY**

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[73] Assignee: **WARF Institute, Inc.,** Madison, Wis.

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[52] **U.S. Cl.** ..... **98/115 LH;** 55/467

[51] **Int. Cl.**[2] **F23J 11/00**

[58] **Field of Search**..... 98/115 R, 115 LH, 115 K, 98/36; 55/467, DIG. 29, DIG. 18

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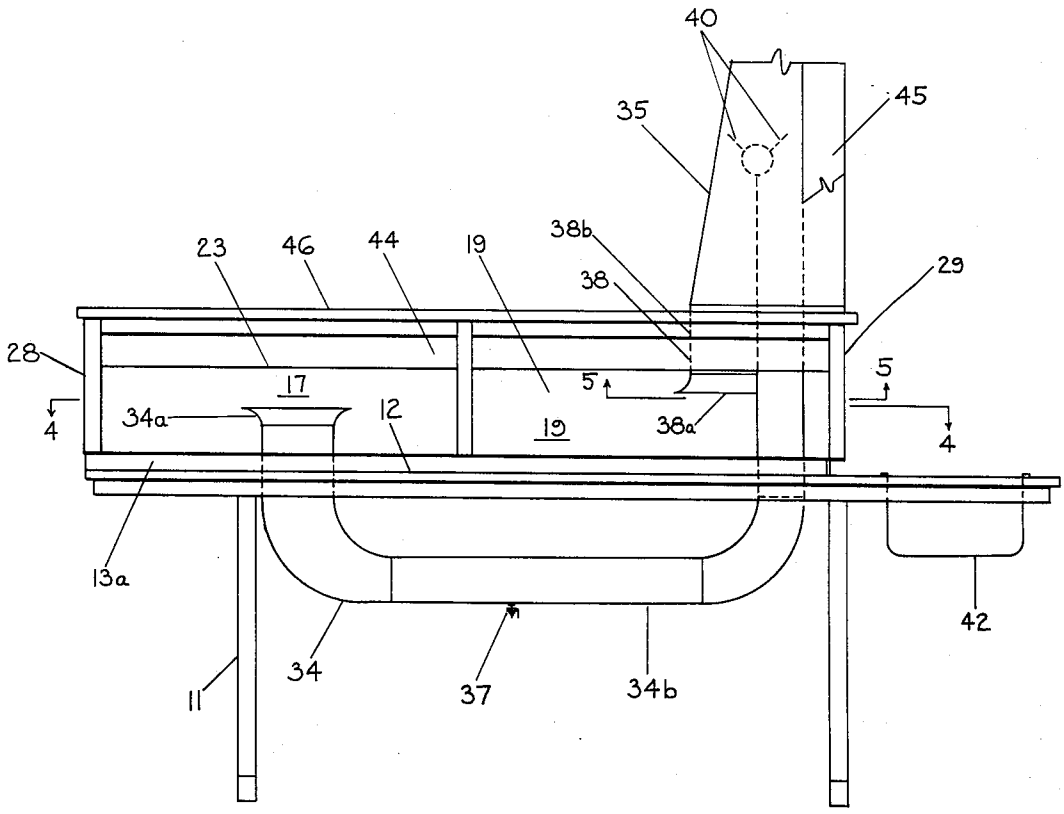
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Attorney, Agent, or Firm—Theodore J. Long; John M. Winter; Harry C. Engstrom

[57] **ABSTRACT**

A laboratory bench assembly having an exhaust plenum with an inlet vent extending along the bottom thereof just above the bench top. The plenum may be divided into one or more exhaust chambers each of which has an exhaust conduit having an intake mouth disposed within the chamber at an elevation higher than the inlet vent. The bench top extends substantially beyond at least one end of the exhaust plenum and has a sink opening in the extending end. A second inlet vent extends across the end of the plenum adjacent to the sink opening for exhausting the sink area. An umbilical box extends over the exhaust plenum to accomodate service facilities for the bench assembly.

8 Claims, 5 Drawing Figures



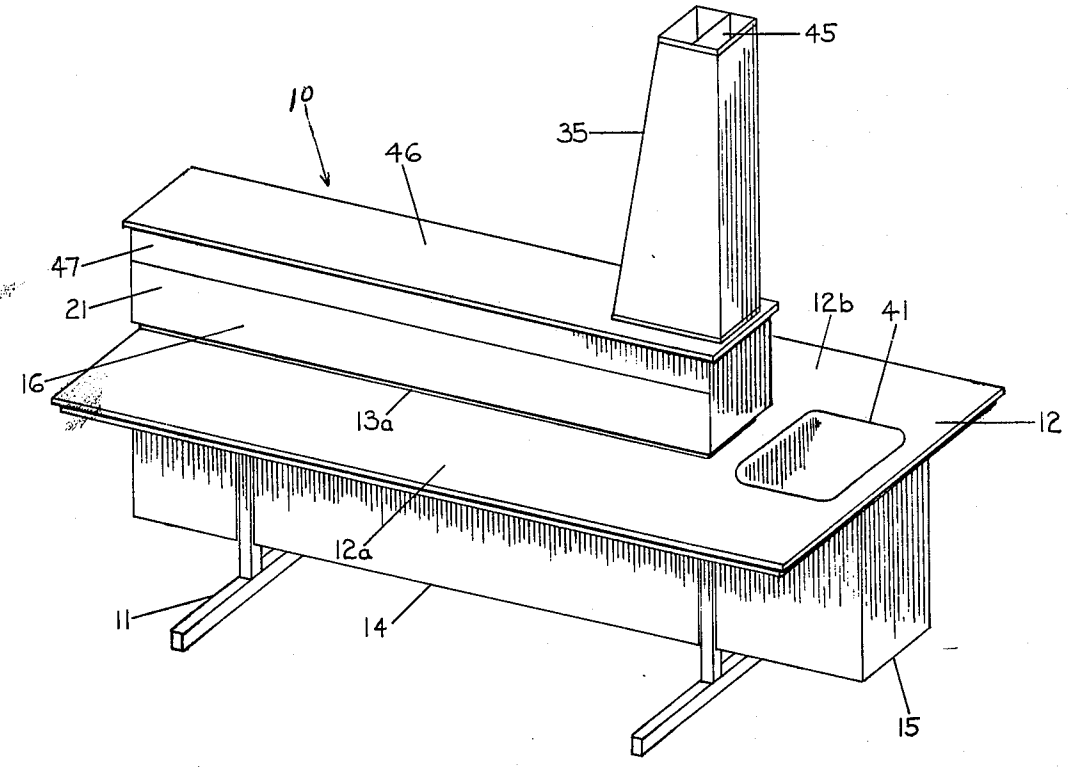

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46
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21
12b
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16
13a
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12a
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FIG. 1

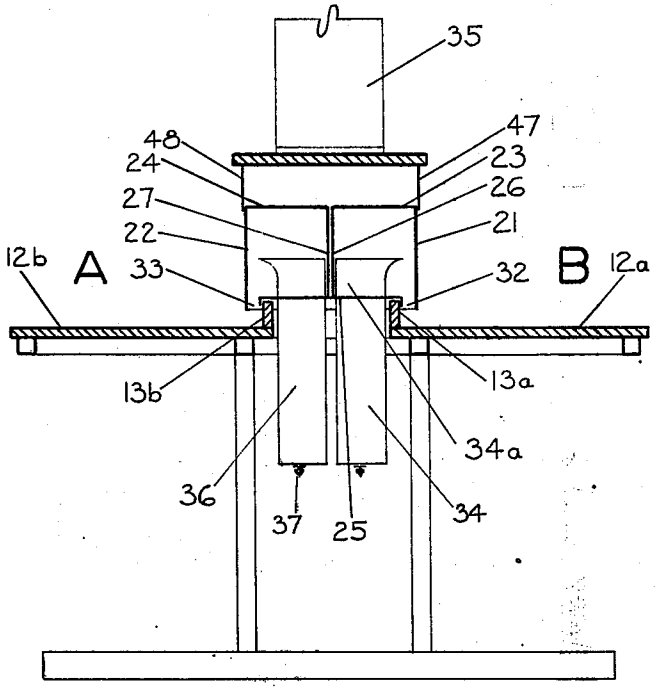

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FIG. 3

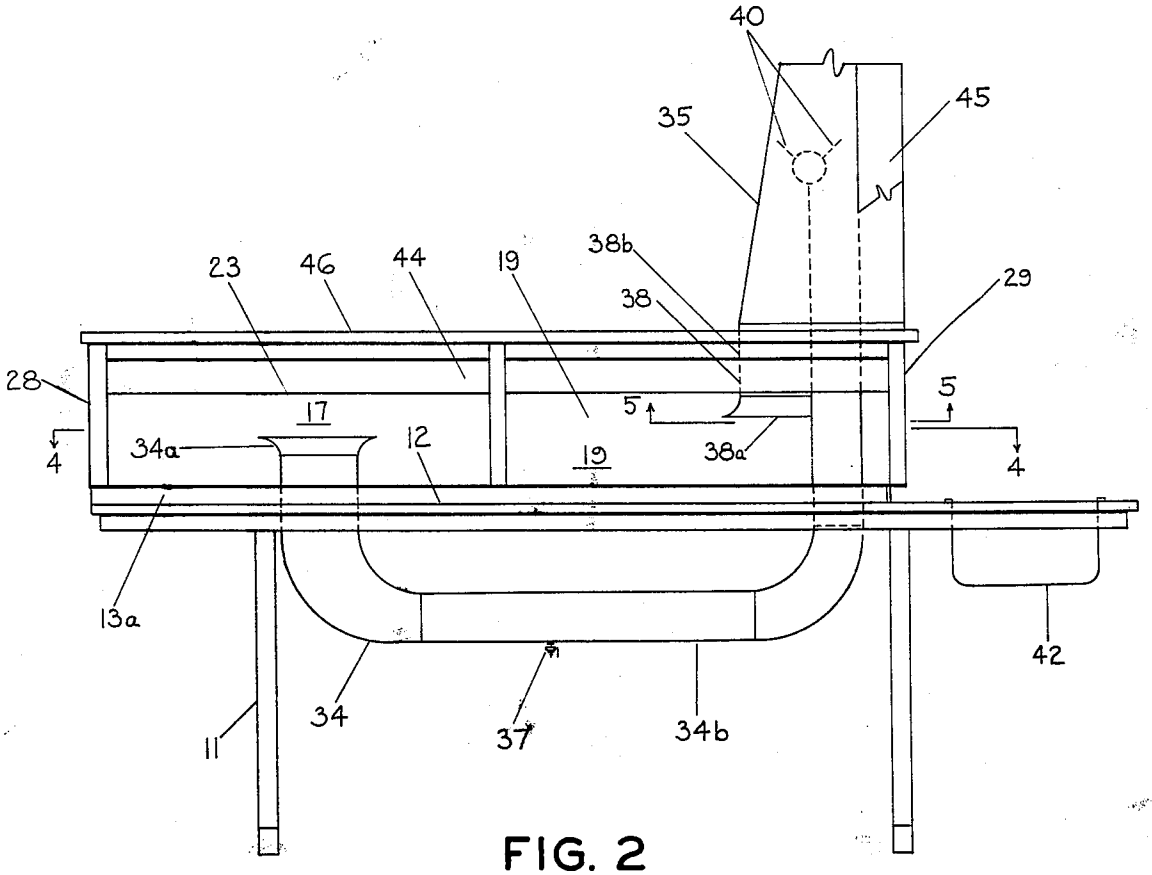


FIG. 2

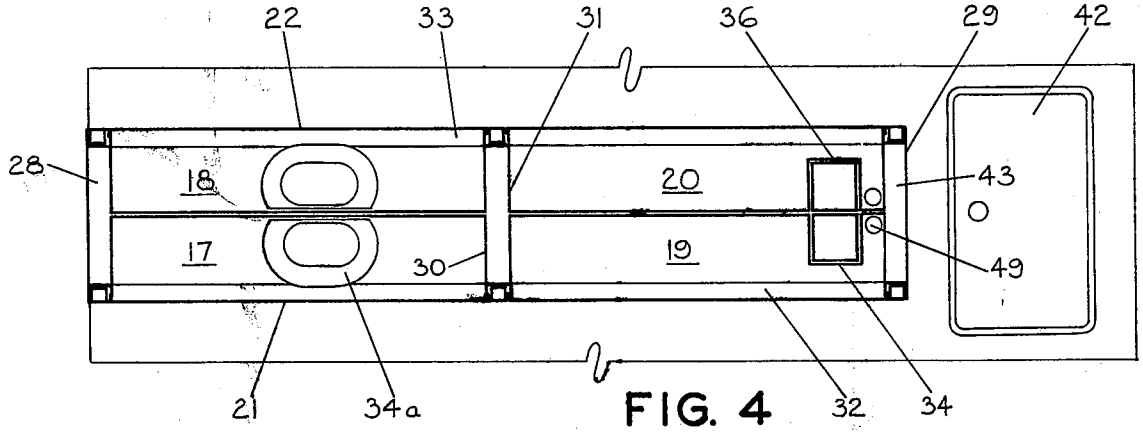


FIG. 4

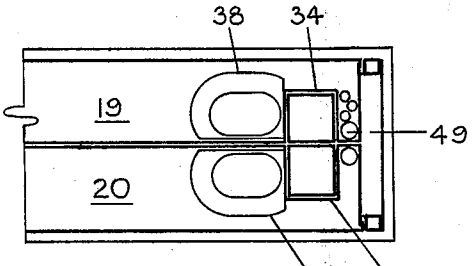


FIG. 5

LABORATORY BENCH ASSEMBLY

SUMMARY OF THE INVENTION

This invention relates generally to laboratory bench assemblies having a built-in exhaust conduit system and defined umbilical areas for service facilities.

A laboratory bench assembly having an exhaust plenum with an inlet vent extending along the bottom thereof just above the bench top. The plenum may be divided into one or more exhaust chambers each of which has an exhaust conduit having an intake mouth disposed within the chamber at an elevation higher than the inlet vent. The bench top extends substantially beyond at least one end of the exhaust plenum and has a sink opening in the extending end. A second inlet vent extends across the end of the plenum adjacent to the sink opening for exhausting the sink area. An umbilical box extends over the exhaust plenum to accomodate service facilities for the bench assembly.

Our invention provides a new and improved laboratory bench assembly wherein the work space above the bench top is exhausted through a longitudinal inlet vent extending along the inner or rear edge of the bench top only a few inches above the top, thus eliminating typically obstrusive overhanging hoods. The sink area is likewise exhausted by a transverse inlet vent also opening into the same exhaust plenum as the longitudinal vents.

The intake mouths of the exhaust conduits located within the substantially enclosed exhaust plenum at a point substantially above the level of the inlet vents provide a flow pattern whereby the ambient work space well above and forwardly of the inlet vent is exhausted.

Our assembly also combines a defined umbilical area for discreetly accomodating service conduits, cords, wires, and the like for water, other liquids, gases, and electricity.

The entire system may be employed with a single-sided bench or easily adapted to a two-sided bench by applying back to back systems as shown in the drawings.

The system comprises a compartmentalized exhaust plenum for improved operation with the longer bench sizes and two-sided bench units.

Further objects, features and advantages of our invention will be apparent from the following detailed description taken in conjunction with the accompanying drawings showing a preferred embodiment of our invention for exemplification.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an isometric view diagrammatically showing a laboratory bench assembly exemplifying the principles of our invention.

FIG. **2** is a diagrammatic front elevation view of the laboratory bench assembly shown in FIG. **1**, with several panels removed.

FIG. **3** is a diagrammatic end view of the laboratory bench assembly shown in FIG. **1**, with several panels removed.

FIG. **4** is a section view taken along line **4—4** of FIG. **2**.

FIG. **5** is a section view taken along line **5—5** of FIG. **2**.

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring now more particularly to the drawings

wherein like numerals refer to like parts throughout the several views, our laboratory bench assembly is generally depicted at **10** in FIG. **1.** The bench assembly shown is of the two-sided free-standing type wherein work areas are provided on both sides of the exhaust plenum **16** which extends longitudinally over the middle of the bench top **12** and separates the two work areas designated as A and B in FIG. **3.** As shown in this two-sided free-standing type bench, the sides are substantially back to back mirror images of one another. The principles of our invention can, however, also be employed in a single-sided bench assembly by utilizing basically one-half of the assembly shown in the drawings, the back of which would usually then be placed against a wall of the laboratory room.

The bench assembly is adapted to be typically employed in connection with an overhead exhaust system (not shown) such as is commonly found in buildings with "suspended" room ceilings, wherein the exhaust system conduits and service facilities are located above the ceiling but are readily accessible by removal of ceiling panels. Suitable ventilating with our assembly has been experienced in connection with such centralized exhaust systems drawing about **200–250** CFM of air.

The laboratory bench assembly shown in FIGS. **1–3** comprises a suitable tubular metal framework **11** supporting the horizontal elongate bench top **12** having two sides **12***a* and **12***b*. These sides have upright rear walls **13***a* and **13***b* respectively mounted on and extending along their rear or inner edges. Side and end skirt panels **14** and **15** respectively are mounted to the framework.

The substantially enclosed exhaust plenum **16** extends longitudinally over the rear walls **13***a* and **13***b*. The exhaust plenum preferably is comprised of sheet metal with suitable tubular metal support structure (not shown). The plenum shown for exemplification encompasses four exhaust chambers **17, 18, 19,** and **20** provided by front walls **21** and **22,** top walls **23** and **24,** bottom wall **25,** rear walls **26** and **27,** end walls **28** and **29,** and intermediate walls **30** and **31.**

As shown in FIGS. **3** and **4,** spacing between the front wall **21** and bottom wall **25** and between front wall **22** and bottom wall **25** provides elongate inlet vents **32** and **33** in the bottom of the exhaust plenum. The inlet vents extend along and just forwardly of the top of the upright rear walls **13***a* and **13***b* several inches above the bench top for admitting ambient fumes from the work areas into the chambers of the exhaust plenum.

Plenum chamber **17** is exhausted by a conduit **34** having an oval bell-shaped intake mouth **34***a* extending upwardly into the chamber to an elevation several inches higher than the inlet vent **32** located on that side of the exhaust plenum. The exhaust conduit **34** has a duct portion **34***b* connecting to intake mouth **34***a* and extending downwardly therefrom, longitudinally under the exhaust plenum, and then upwardly to an exhaust chimney **35.** As mentioned hereinbefore, the exhaust chimney is connected into a central overhead exhaust system (not shown). Plenum chamber **18** is serviced by a similar exhaust conduit **36** as shown in FIG. **3.** Each of conduits **34** and **36** has a drain cock **37** positioned at its lowest point.

Plenum chamber **19** is exhausted via a conduit **38** having an oval bell-shaped mouth **38***a* extending downwardly into the chamber to an elevation several inches higher than the inlet vent **33** located on that side of the

exhaust plenum. Exhaust conduit **38** has a duct portion **38***b* connecting to intake mouth portion **38***a* and extending upwardly therefrom to the exhaust chimney **35.** Plenum chamber **20** is serviced by a similar exhaust conduit **39** as shown in FIG. **5.**

While a four compartment or chambered exhaust plenum is described hereinabove and shown in the drawings in a two-sided type bench assembly, it is understood that a single-chamber plenum with a downwardly or outwardly opening exhaust conduit intake mouth might be suitably employed, particularly in a relatively short single-sided bench assembly. The number of plenum chambers best utilized depends on the size, type, and use of the particular bench assembly.

As shown in FIG. **2,** suitable dampeners **40** may be utilized in a chimney which is sectionalized to adjust the intake flow from the various exhaust plenum chambers as desired.

For best results the oval bell-shaped intake mouths in the exhaust plenum are each disposed with the length of the oval extending in the direction of the length of the plenum chamber in which it is disposed.

The bench top of the assembly shown extends substantially beyond one end of the exhaust plenum and has a sink opening **41** formed therein for accomodating a sink such as depicted at **42** in FIGS. **2** and **4.** The sink area is ventilated through an inlet vent **43** shown in FIG. **4,** extending across the end of the exhaust plenum adjacent the sink. The inlet vent **43** may open into either or both of the chambers **19** and **20** at that end of the exhaust plenum.

Our invention also incorporates as substantially enclosed umbilical box **44** and chute **45** for accomodating service facilities for the bench assembly. The umbilical box is defined by a top panel **46,** walls **47** and **48,** the ends of the exhaust plenum, and the top walls **23** and **24** of the exhaust chambers provide the bottom of the box. The box opens at one end into the umbilical chute **45** which extends upwardly adjacent to the exhaust chimney. As shown in FIGS. **4** and **5,** the bench top **12** and top panel **46** are provided with a desired number and size of openings such as shown at **49** for receiving service ducts for water, other liquids, gases, electricity and the like.

It is understood that the present invention is not confined to the particular construction and arrangement of parts herein illustrated and described for exemplification, but embraces all such modified forms thereof as come within the scope of the following claims.

We claim:

1. A laboratory bench assembly comprising:

a. a horizontal elongate bench top having front and rear edges;

b. an upright rear wall extending along the rear edge of said bench top;

c. a substantially enclosed exhaust plenum extending above said upright rear wall, said exhaust plenum having;

1. bottom, top, front and back walls, and a pair of end walls, and

2. an elongate inlet vent defined between said upright rear wall and the front wall of said plenum extending along and forwardly of the top of said upright rear wall above said bench top for exhausting ambient fumes from the work area of said bench assembly into said plenum;

d. an exhaust conduit having;

1. an intake mouth extending into said plenum to an elevation higher than said inlet vent, and

2. a duct portion connecting to said intake mouth; and

3. an exhaust chimney connecting to said duct portion.

2. The laboratory bench assembly as specified in claim **1** having an umbilical box extending over said exhaust plenum, the top wall of said exhaust plenum forming the bottom of said umbilical box, and an umbilical chute extending substantially upright adjacent said exhaust chimney, said umbilical chute at its bottom end opening into said umbilical box.

3. The laboratory bench assembly as specified in claim **1** wherein the bench top extends substantially beyond at least one end wall of said exhaust plenum, and said assembly has an opening for receiving a sink in the extending end of said bench top and a second inlet vent in the bottom of said exhaust plenum extending across the end thereof adjacent said sink opening, said second inlet vent being in open communication with said exhaust plenum for exhausting ambient fumes from the area of the sink into said plenum.

4. The laboratory bench assembly as specified in claim **1** wherein said intake mouth has an oval bell-shaped configuration with the length of the oval extending in the direction of the length of said exhaust plenum.

5. A laboratory bench assembly comprising:

a. a horizontal elongate bench top having front and rear edges;

b. an upright rear wall extending along the rear edge of said bench top;

c. a substantially enclosed exhaust plenum extending above said upright rear wall, said exhaust plenum having;

1. a bottom, top, front and back wall and a pair of end walls,

2. at least one intermediate wall dividing said plenum into at least first and second exhaust chambers, and

3. an elongate inlet vent in the bottom thereof extending along and forwardly of the top of said upright rear wall above said bench top for exhausting ambient fumes from the work area of said bench assembly into said exhaust chambers;

d. a first exhaust conduit extending through the bottom of said exhaust plenum into said first chamber, said first conduit having;

1. an intake mouth extending upwardly into said first chamber to an elevation higher than said inlet vent, and

2. a duct portion connecting to said intake mouth and extending downwardly therefrom and longitudinally under said exhaust plenum;

e. a second exhaust conduit having;

1. a second intake mouth extending downwardly into the second chamber of said exhaust plenum to an elevation higher than said inlet vent, and

2. a second duct portion connecting to said second intake mouth and extending upwardly therefrom; and

f. an exhaust chimney connecting to said first and second duct portions.

6. The laboratory bench assembly as specified in claim **5** having: an umbilical box extending over said exhaust plenum, the top wall of said exhaust plenum

forming the bottom of said umbilical box; and an umbilical chute extending substantially upright adjacent said exhaust chimney, said umbilical chute at its bottom end opening into said umbilical box.

7. The laboratory bench assembly as specified in claim **5** wherein the bench top extends substantially beyond at least one end wall of said exhaust plenum, and said assembly has a sink opening in the extending end of said bench top and a second inlet vent in the bottom of said exhaust plenum extending across the end thereof adjacent said sink opening, said second inlet vent being in open communication with at least one of said chambers of said exhaust plenum for exhausting ambient fumes from the area of said sink opening into said plenum.

8. The laboratory bench assembly as specified in claim **5** wherein said intake mouths have an oval bell-shaped configuration with the length of the oval extending in the direction of the length of the exhaust chamber in which it is disposed.

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