United States Patent

Wasson et al.

[15] **3,699,235**

[45] **Oct. 17, 1972**

[54] **HOSPITAL OVERHEAD SERVICE MODULE**

[72] Inventors: **John H. Wasson**, Portage; **John S. Sherry**, McFarland; **John P. Kayser**, Madison, all of Wis.

[73] Assignee: **Airco, Inc.**, New York, N.Y.

[22] Filed: **Sept. 1, 1971**

[21] Appl. No.: **177,060**

[52] **U.S. Cl.**.....**174/48**, 98/40 D

[51] **Int. Cl.**.....**H02g 3/08**

[58] **Field of Search**.....174/48, 49; 98/40 D, 33 R; 240/78 R, 2 R, 2 FD, 2 U; 128/1 R, 1 B

[56] **References Cited**

UNITED STATES PATENTS

3,570,385	3/1971	Heisterkamp	98/40 D
3,135,469	6/1964	Hanson	174/48
3,084,247	4/1963	Bobrick	174/48 X
3,267,955	8/1966	Logan et al.	98/33 R

Primary Examiner—Lewis H. Myers
Assistant Examiner—D. A. Tone
Attorney—Roger M. Rathbun et al.

[57] **ABSTRACT**

An overhead service module for use in hospital facilities to supply medical gases, vacuum and electrical services within the convenient reach of attending personnel. The module is constructed of easily assembled components and, when installed, is an elongated unit having an inverted tear drop design cross section to allow a laminar flow of air to pass downwardly past the module without seriously interrupting the smooth continuous flow.

7 Claims, 8 Drawing Figures

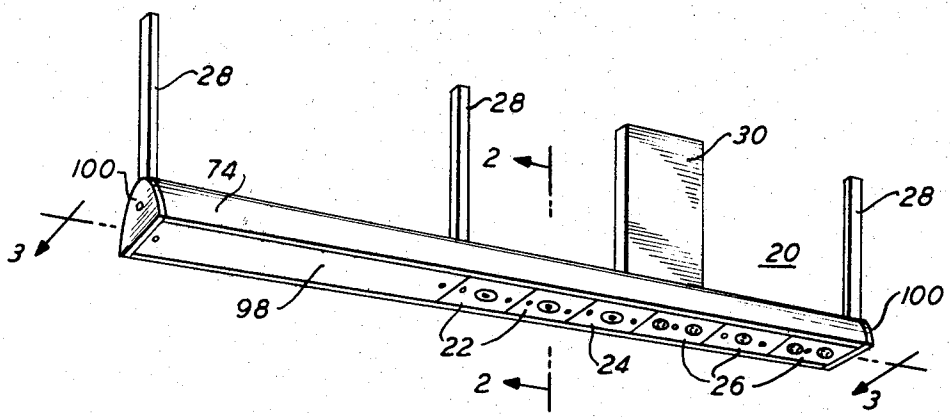


FIG. 1

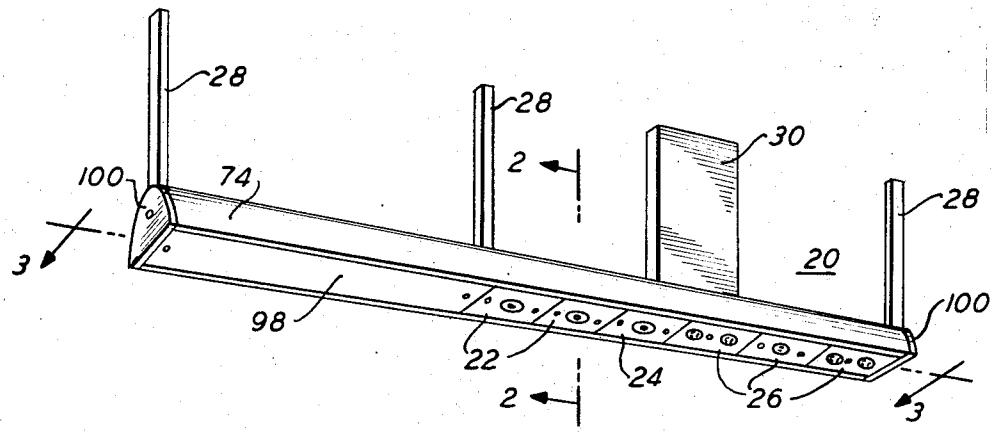
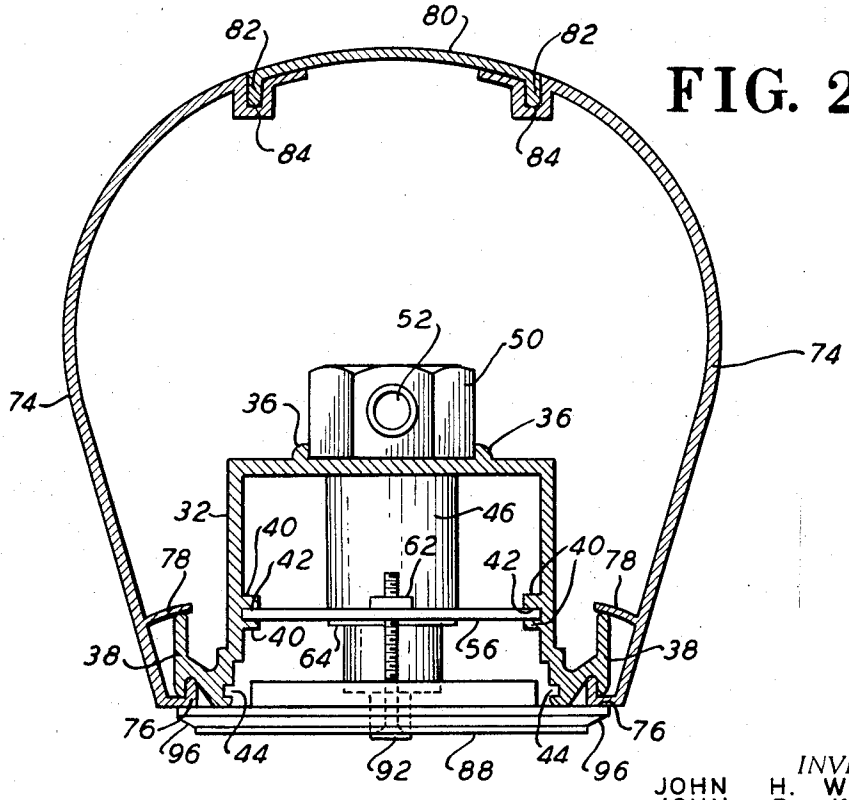
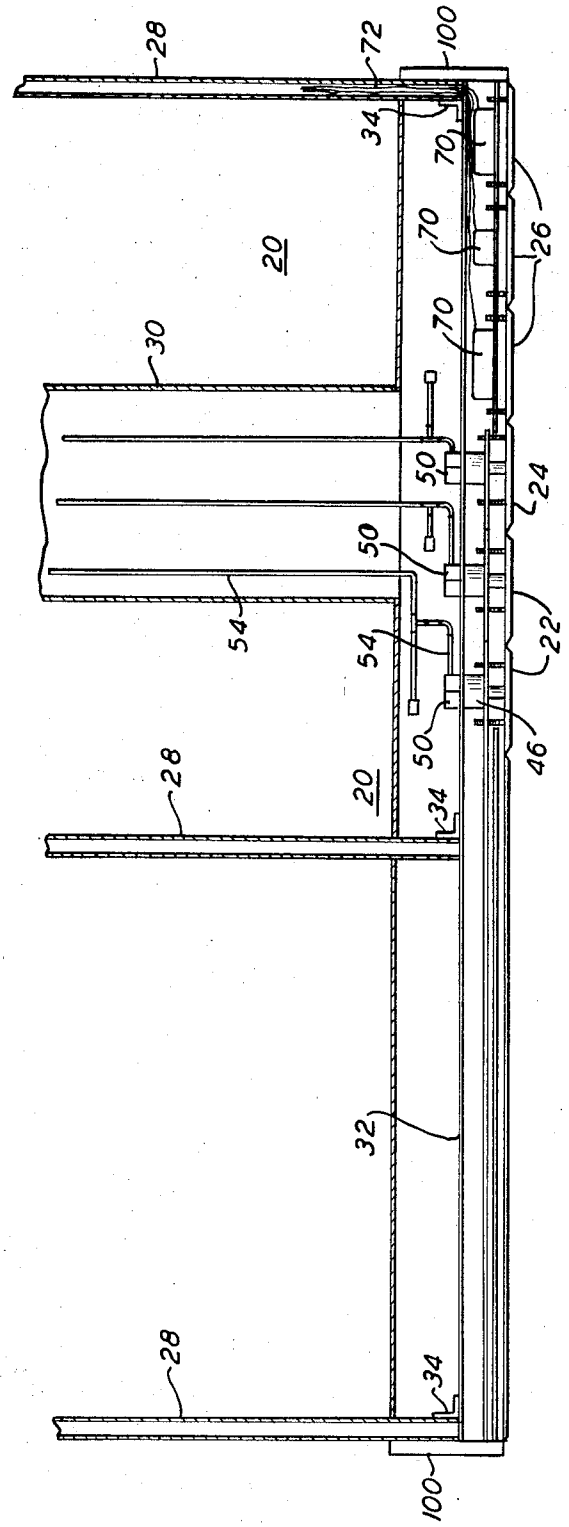


FIG. 2



INVENTORS
JOHN H. WASSON
JOHN P. KAYSER
BY JOHN S. SHERRY
ATTORNEY

FIG. 3



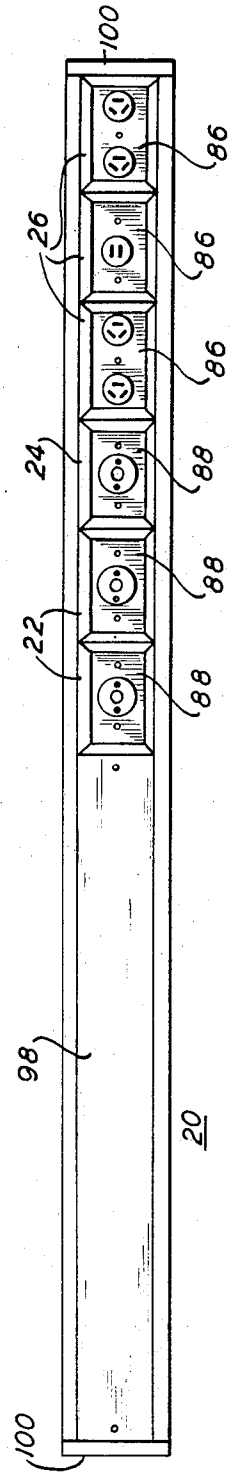


FIG. 4

INVENTORS
JOHN H. WASSON
JOHN P. KAYSER
BY JOHN S. SHERRY

ATTORNEY

FIG. 5

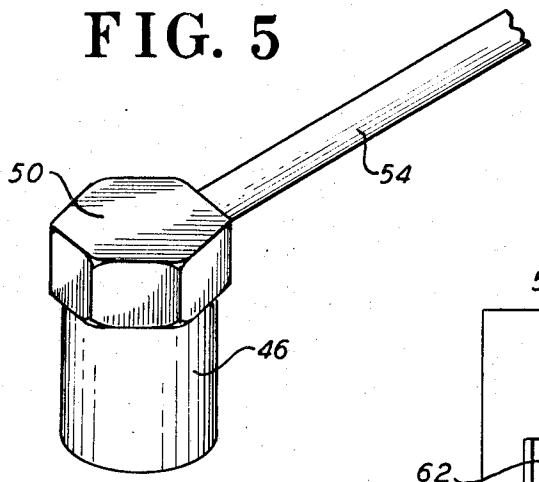


FIG. 6

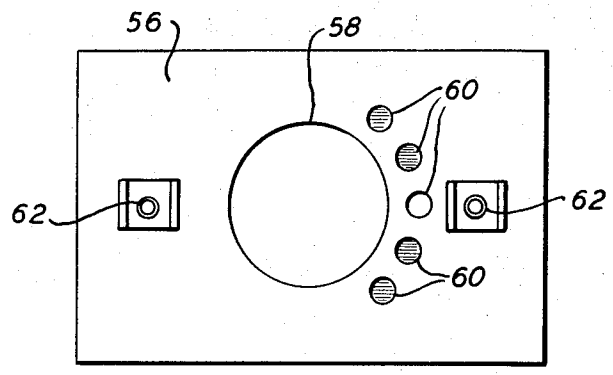


FIG. 8

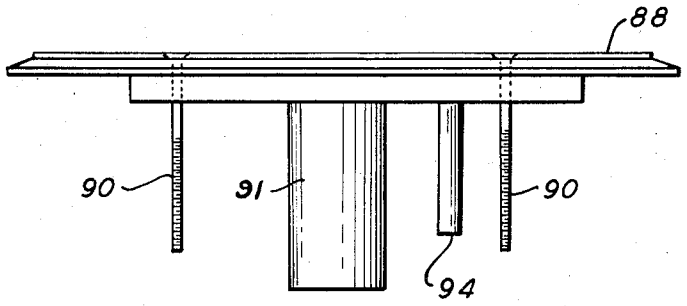
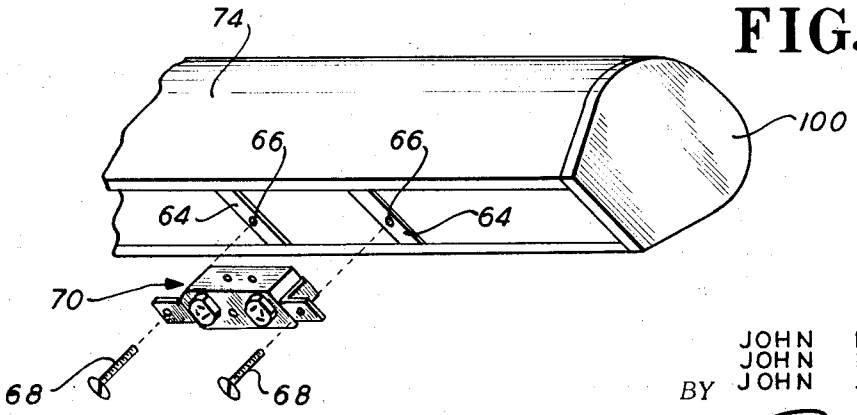


FIG. 7



INVENTORS
JOHN H. WASSON
JOHN P. KAYSER
BY JOHN S. SHERRY

ATTORNEY

HOSPITAL OVERHEAD SERVICE MODULE

BACKGROUND OF THE INVENTION

This invention relates to a service module for supplying electricity and fluids and more particularly to a streamlined service module specially adapted for use in hospital rooms and which provides a convenient overhead location for medical gases, vacuum and/or electrical service.

Presently in hospital rooms, there are several methods of providing electrical and/or service of gases or vacuum for use by attending personnel.

One method is in providing a recessed or surface mounted wall console which contains the utility outlets as well as miscellaneous collection bottles or suction apparatus; however, in a relatively large room, a wall mounted unit is generally inaccessible from areas near the center of the room without stringing wire or tubing across spaces in the room, thereby creating hazards to the free movement of personnel.

To reach the maximum area in the hospital room without experiencing the difficulty of exposed tubing, electrical wiring, or the like, impeding traffic, various overhead consoles have been devised. One type of overhead console used is the ceiling flush mounted multi-outlet module from which a plurality of gas hoses or electrical outlets are downwardly suspended. The gas hoses, for example, are generally coiled on retractable reels and can, therefore, be pulled down from the ceiling fixture and strung to various locations throughout the room. Installation of such flush mounted modules is relatively complex, however, and the overall aesthetic view of the room is cluttered by various hoses or electrical cables which dangle from the ceiling to within the grasp of a user thereof. In addition, the console is again somewhat limited in the ability to reach a large area in an orderly fashion and normally results in a cluster of medical equipment, such as incubators, to be close to the services, while other, more remote parts of the room, remain unused.

Suspended service modules have also been used in the form of ceiling columns which are retractable or fixed in the ceiling. These columns contain a plurality of gas, vacuum or electrical service receptacles which may be plugged to the receiver and connected to the plug connectors from various equipment. Again, however, hospital equipment becomes cluttered or extremely dense around the ceiling column and orderly rows of incubators are not feasible without utilizing a large number of ceiling columns; a difficult construction problem.

BRIEF SUMMARY OF INVENTION

The present invention relates to a novel suspended service module which is easily constructed and installed. The unit is elongated such that incubators or other hospital equipment may be orderly aligned to achieve the maximum utilization of valuable hospital space. Installation is conveniently located to be within the normal reach of hospital personnel for ease in connecting equipment to gas, vacuum or electrical service. The module may be adapted to provide the desired services in specific locations along its length and in any predesigned order. In addition, a streamlined inverted tear drop cross section design is provided for use in specially designed clean rooms where laminar air continuously flows downwardly from the ceiling. By the special design, the flow of laminar air is not interrupted sufficiently to cause eddy currents or other disruptions in the laminar flow and, therefore, no dead air spaces are created where dirt or other impurities might be removed from the effective laminar stream.

IN THE DRAWINGS

FIG. 1 is a perspective view of the overall service module installed in a ceiling.

FIG. 2 is a vertical cross sectional view of the present service module, taken along the lines 2—2 of FIG. 1.

FIG. 3 is a side sectional view of the module, taken along the lines 3—3 of FIG. 1.

FIG. 4 is a bottom view of the module showing the service outlets in their installed positions.

FIG. 5 is a perspective view of a typical gas outlet usable with the present invention.

FIG. 6 is a top view of an indexing plate for the gas outlet of FIG. 5.

FIG. 7 is an exploded view, in perspective, showing the assembly of an electrical service outlet.

FIG. 8 is a side view of a gas service cover plate for the gas outlet of FIG. 5. In FIG. 1, there is shown a ceiling suspended service module **20** having easily accessible outlets such as for medical gas **22**, vacuum **24** or electrical power **26**. The module **20** is suspended from a hospital room ceiling by a plurality of tubes **28** which insure rigidity of the installed module **20** as well as selectively provide wiring channels to the electrical outlets **26** as will later be explained. A rectangular cover **30** extends upwardly from the module **20** to the ceiling and serves to conceal the tubing for the various medical gas and vacuum outlets.

The detailed construction of the service module **20** is shown in FIG. 2-4 and includes an elongated channel **32** which runs the entire length of the service module **20**. The channel **32** is suspended from the ceiling by the tubes **28** which are affixed to the top surface of the channel **32** by conventional means such as angle braces **34**. For reasons which will be later explained, at least some of the tubes **28** are hollow and preferably are of square configuration.

The channel **32** is generally an inverted U-shape having a pair of oppositely disposed, parallel ridges **36** located along the top of the channel **32** as shown in FIG. 2. Along each of the bottom edges of channel **32** is a canted T-shaped flange **38** which projects therefrom, extending along the entire length of the channel **32**. On each lateral inner surface of channel **32** is provided a pair of inwardly facing projections **40** which form a groove **42** therebetween. Each groove **42** is oppositely located on the lateral surfaces of channel **32** and are parallel throughout the length of the channel **32**. A second, lower groove **44** is provided in each internal lateral surface of channel **32** near the lower ends thereof. Like grooves **42**, the lower grooves **44** extend along the entire length of channel **32**.

The gas or vacuum outlets are fitted within the channel **32** in a similar manner, therefore, for explanation, a cross sectional view of one typical installation is shown in FIG. 2 which is applicable for medical service gases, such as nitrogen, nitrous oxide, oxygen and air or for providing connection to a central source of vacuum. The gas outlet described herein and which may be used

in the present ceiling module is shown and described in U.S. Pat. No. 3,563,267 however, various conventional service outlets may be used without departing from the intent of the present invention.

As shown in FIGS. 2, 3 and 5, the gas outlet 46 includes a main body which is fitted through an opening in the upper surface of the channel 32. A hexagonal shaped upper head 50 on the main body 48 receives the gas through an opening 52 to which is brazed a supply tubing 54. Opposite disposed flat surfaces of the hexagonal cap 50 are retained within ridges 36 on the channel 32 and restrain the gas outlet 46 against rotational movement. The main body 48 extends through an indexing plate 56, shown in FIG. 6, through an opening 58. The indexing plate 56 includes a plurality of indexing positions 60 only one of which has an opening therein, and has two spaced retainer nuts 62 which are affixed to the plate 56. In assembly, the indexing plate 56 is slid along the channel 32 retained within the opposed grooves 42. The indexing plate 56 is moved to its predetermined position having its opening 58 generally in alignment with the hole in the upper surface of channel 32. The gas outlet 46 is inserted through the channel hole as well as the indexing plate opening 58 and is retained in position by means such as a spring clip 64 which prevents the outlet 46 from being withdrawn from its position within the indexing plate 56.

The electrical service outlets 26 are assembled within the channel 32 as shown in FIG. 7. A pair of spaced metal strips 64 are slid into predetermined position within the lower groove 44, each of the metal strips 64 having a hole 66 sized to receive mating screws 68 to retain the electrical receptacle 70 positioned within the channel 32.

As shown in FIG. 3, the supply tubing 54 and electrical wiring 72 can be easily be facilitated during assembly of the ceiling module 20. The supply tubing 54 is carried along the ceiling module 20 exterior of the elongated channel 32 and connects to the individual service outlets at the upper heads 50 of gas outlets 22. The supply tubing 54 is conveniently grouped for vertical access to main supply tubing (not shown) in the ceiling of the hospital room. Electrical wiring 72 is carried from the individual service outlets 26 within the elongated channel 32 and is connectable to electrical service through one or more of the suspension tubes 28 to the hospital room ceiling. In this manner, the service tubing 54 and electrical wiring 72 is, at all times, carried in separate isolated compartments through the entire length of the ceiling module 20.

When the service tubing 54 and electrical wiring 72 have been installed, a pair of side cover plates 74 are fitted to cover the exposed horizontal supply tubing 54 and to form a part of the overall unique inverted tear drop design configuration. At the bottom of each of the side cover plates, 74, there is formed a hook 76, which, when installed, fits underneath the T-shaped flange 38 of the elongated channel 32. A curved projection 78 on each of the side cover plates 74 acts in cooperation with the hooks 76 to forcibly engage the top of the T-shaped flanges 38. In this manner, each of the side cover plates 74 are firmly pivoted to the T-shaped flanges 38. A top cover plate 80 is fitted to the top edges of side cover plates 74 to prevent their moving pivotally around T-shaped flanges 38. As shown in FIG. 2, the top cover plate is also curved in configuration complementary to the curvature of the upper surfaces of side cover plates 74. A downwardly directed flange 82 on each lateral side of top cover plate 80 is interfitted into a recess 84 along the upper edge of each of side cover plates 74 such that a continuous, smooth surface is formed along the overall upper surface of the ceiling module 20.

Additional support against movement of the side cover plates 74 is provided by the electrical cover plates 86 and the gas or vacuum cover plates 88.

In FIG. 8, a typical gas cover plate 88 is shown having screws 90 which are adapted to be threaded to retainer nuts 62 in indexing plate 56. A central, hollow cylinder 91 fits within the gas outlet 46 when installed, opening a check valve (not shown) in the gas outlet 46 to direct the gas to the service opening 92. An indexing pin 94 is received within the one open indexing position 60 in the indexing plate 56 to provide a safety lock to insure the proper gas cover plate 88 is installed in the appropriate service outlet.

As the gas cover plate is tightly installed, FIG. 2, its outer flange, at 96, fits over the lower surface of hook 76 of each of the side cover plates 74 and more securely retains them in their proper position

The finished construction of the suspended ceiling module 20, as shown in FIG. 1 includes a spacer plate 98 which may be of desired length to cover blank spaces in the module when no service outlets are needed. The aesthetic appearance is further enhanced by end plates 100 which cover each open end of the module 20 and by the rectangular cover 30 which encloses the service tubing 28 extending from the module 20 to the ceiling of the hospital room.

As may be easily seen, the overall configuration of the ceiling module is of an inverted tear drop shape which is particularly adapted for use in hospital rooms utilizing the laminar flow clean air concept. In such a clean air concept, a laminar flow of clean air is continuously caused to flow downward through the room and is removed at floor level. It is then necessary to eliminate, as much as possible, the formation of eddy currents or other swirling patterns which might caused dust or bacteria settling in areas of the room. The presence of jutting surfaces tend to cause the dust to settle by upsetting the laminar air flow and, therefore, the suspended ceiling module of the present invention is designed to present an overall inverted tear drop configuration to the downwardly flowing laminar clean air. The laminar pattern is thus not interrupted or disturbed by the overall surface of the module.

There is thus shown a unique suspended ceiling module which affords easy access to a plurality of service outlets for hospital services in any area of the hospital room without clustering or cluttering of equipment and which allows an even distribution of such equipment throughout the room.

I claim:

1. An overhead service module for hospital rooms comprising:

a. elongated channel means,

b. means to suspend said elongated channel means horizontally from a ceiling a predetermined distance below the ceiling,

c. electrical outlets affixed within said elongated channel means and adapted to be connected to a source of electrical power,

d. gas outlets affixed within said elongated channel means and adapted to be connected to a source of gas,

e. cover means adapted to enclose said elongated channel means, said cover shaped such as to provide a streamlined cross-section configuration,

f. end cover means adapted to enclose the ends of said elongated channel means and said cover means.

2. An overhead service module as defined in claim 1 wherein said streamlined cross-section is an inverted tear drop design.

3. An overhead service module as defined in claim 1 wherein said electrical outlets include a plurality of outlets spaced in predetermined locations along the length of said elongated channel.

4. An overhead service module as defined in claim 1 wherein said suspension means includes a plurality of tubes, at least one of which contains electrical wiring from said electrical outlets to connect to the source of electrical power.

5. An overhead service module as defined in claim 1 wherein said cover means includes two mirror-image side cover plates and a top cover plate adapted to interfit with said side cover plates, said top cover plate having a complementary curvature to said side cover plates.

6. An overhead service module as defined in claim 5 wherein said elongated channel means is an inverted U-shaped design and has a pair of parallel ridges along each lower edge adapted to interfit with said side cover plates.

7. An overhead service module for hospital rooms comprising:

a. an elongated inverted U-shaped channel,

b. tube means adapted to suspend said elongated channel horizontally from the hospital room ceiling at a predetermined distance below the ceiling,

c. a plurality of electrical service outlets affixed at predetermined intervals along the length of said elongated channel,

d. a plurality of gas service outlets affixed at predetermined intervals along the length of said elongated channel,

e. electrical wiring connected to said electrical outlets and disposed internal of said elongated channel and within said tube means,

f. horizontal and vertical gas service tubing connected to said gas service outlets and disposed external of said elongated channel,

g. side cover plates, interfitted to said elongated channel along each lower edge thereof, said side cover plates extending laterally along the length of the elongated channel,

h. top cover plate, adapted to be interfitted with each of said side cover plates whereby said horizontal gas service tubing is completely enclosed within said side cover plates and said top cover plate, said curvature of said side cover plates and said top cover plate complementarily forming an inverted tear drop design,

i. rectangular cover means extending from the service module to the ceiling and adapted to enclose said vertical gas service tubing.

* * * * *