United States Patent

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[54] MODULAR LAYOUT METHOD

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[52] **U.S. Cl.** .....**35/16,** 35/7 A, 96/43

[51] **Int. Cl.** **G09b 25/04**

[58] **Field of Search** .....35/7 R, 7 A, 16; 96/43

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[57] **ABSTRACT**

A method and system for planning the layout of commercial space comprising forming a modular layout of the space by selectively arranging a plurality of thin modules representing objects to be placed within the space over a planning surface to which the modules are magnetically attracted, said modules having indicia contrasting with the planning surface and making a clear and distinct shadow free photographic reproduction of the layout at any desired scale.

10 Claims, 3 Drawing Figures

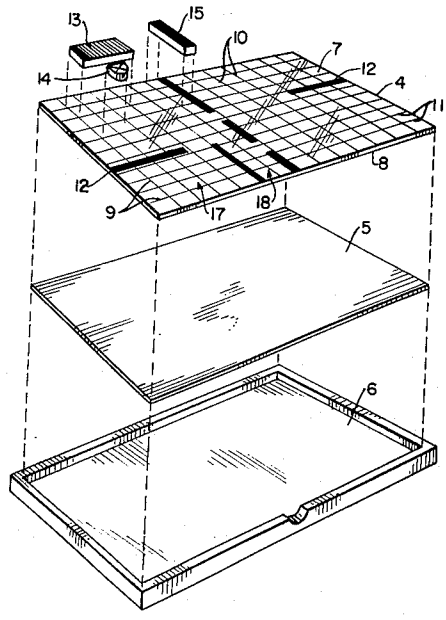


FIG. 1

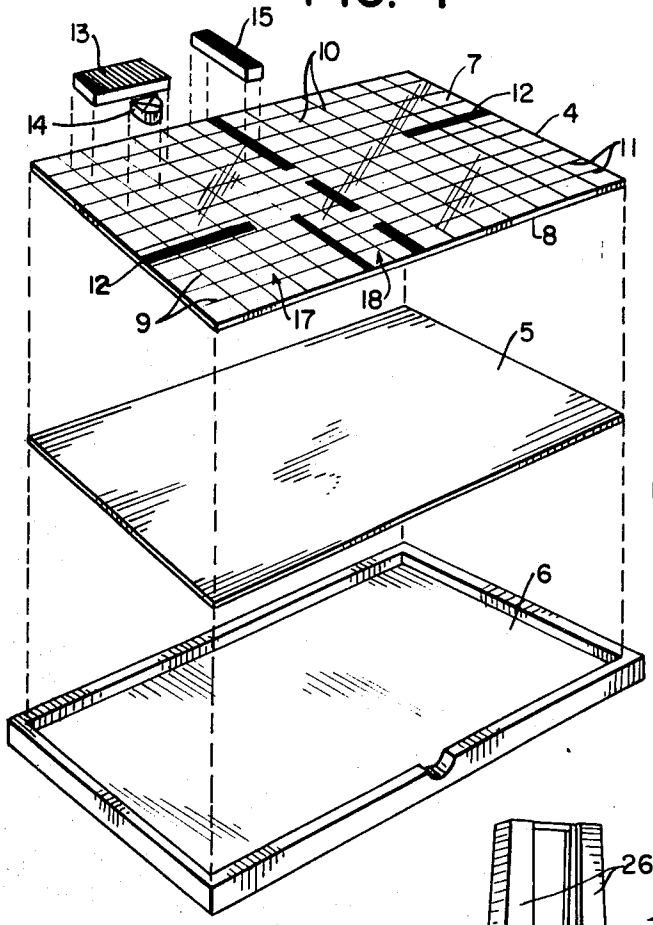


FIG. 2

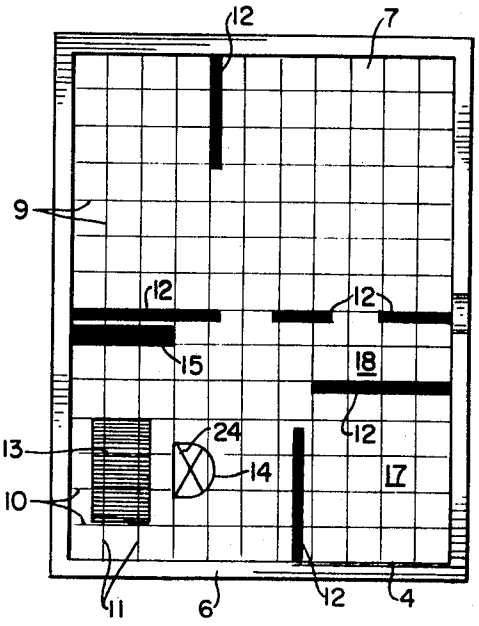
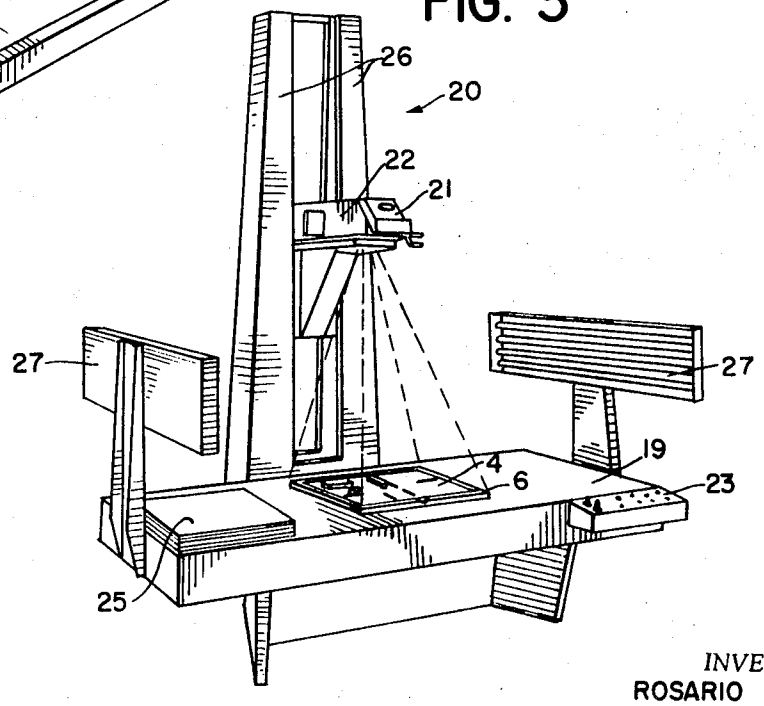


FIG. 3



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MODULAR LAYOUT METHOD

BACKGROUND OF THE INVENTION

In a myriad of industrial and commercial settings, the optimum utilization of available space both from a functional and aesthetic standpoint becomes of prime importance for the efficient and successful operation of the particular business involved. For example, in the context of an office building two layout phases are involved; first the removable partitions commonly employed for defining individual offices, conference rooms, file rooms, etc. must be properly arranged to capitalize on available space; and, secondly the office decor, including the placement of furniture and fixtures must be planned to promote productivity while at the same time offering maximum comfort to personnel within the confines of commercial reasonableness. In the context of retail stores and other merchandising operations, saleable commodities must be strategically displayed within available floor space so as to satisfy consumer demand and convenience while also effecting sales staff efficiency. In a manufacturing situation, layout planning involves the placement of production equipment to facilitate the ends of ultimate production efficiency.

In large commercial enterprises, such as large corporate retail chain operations, the function of planning internal layouts to achieve maximum utilization of available space is generally assigned to a planning committee or an individual on the staff of management. It is the responsibility of this committee or individual to present proposals outlining viable space planning alternatives to higher management for review and approval. Very often the heads of those departments or sectors directly involved in a physical organization or reorganization must be consulted for their comments before the ultimate layout is determined.

In the past the method for presenting physical layout proposals of the type described to the appropriate personnel have taken a variety of forms all of which, for various reasons fail to meet the standards of efficiency which it is hoped that the ultimate physical layout will provide. The use of inefficient methods to obtain efficient results is somewhat of an anomaly which to some extent renders attainment of the ultimate goal difficult. The final layout generally conforms to the weak link in the process of determining that layout; namely, the planning stage.

In one method commonly employed for planning purposes, a draftsman makes a fairly detailed drawing of a proposed layout. The specifications for this drawing usually consist of no more than sketchy mental formulations of some official reduced to "tangible" expression in the form of a rough sketch. This procedure generally involves extended communication for clarification purposes between the draftsman and the individual whose conception he is attempting to reproduce in a form readily perceptible by other personnel whose approval must be sought. As a result a large amount of man hours are expended merely to arrive at an initial proposal. In addition, the first proposal is rarely accepted without substantial modifications thus entailing the repetition of the same inefficient and time consuming procedures extending, in some cases, over a period of many months. When a final solution is determined it may be then obsolete due to other events ensuing in the meantime.

Another method commonly employed for changing the physical layout entails the use of a blueprint of the existing layout which is red lined by the appropriate personnel to indicate an acceptable new layout. This procedure is also time consuming, inefficient, and confusing especially when alternative proposals must be compared with each other.

Yet another method presently used for planning the internal physical layout of available space, involves the use of a scale model of the particular area. In order to obtain the intended result, these models must be accurate and realistic involving the use of complex and costly components representing various objects to simulate the actual layout as it will appear in reality. Also valuable time must be spent in viewing the model,

getting appropriate personnel away from other pressing duties to do so, and in making necessary modifications once the views of all interested personnel has been solicited and considered.

SUMMARY OF THE INVENTION

In accordance with the teachings of the present invention, a simple, efficient, and economical system and method is provided for planning physical layouts including architectural layouts and the physical relationship between bounded spaces within an architectural structure such as offices, elevator shafts, hallways and the interspace relationship of various objects within these spaces such as furniture, fixtures, and in general, other types of equipment designated for containment within a particular space.

Generally, the method disclosed by the present invention entails the use of a modular layout of the area in which the arrangement or rearrangement of the physical objects therein is contemplated. The modular layout is photographed by making a negative of the modular layout and then, by the use of standard photographic projection techniques, sensitizing a sheet of photosensitive paper with an optical image of the negative to produce a positive print of the layout at any desired scale.

The modular layout is constructed so that the positive print obtained by photographing the layout is substantially the full equivalent of a drawing made by a draftsman. In construction, the modular layout includes a first sheet of magnetically permeable material which rests on a supporting surface comprising a second sheet of magnetically attractive material. The exposed surface of the first sheet defines a planning surface on which modules representing various objects are adjustably positioned. The modules are made of magnetically attractive material as for example steel or iron and these modules are held in place on the planning surface by reason of magnetic attraction between the magnetically attractive sheet and the modules. Advantageously the planning surface is provided with gradations, as for example spaced horizontal and vertical lines forming a grid and the modules are dimensioned in proportion to the scale of the squares of the grid so that a dimensionally accurate representation of actual space relationships is reflected in the positive print.

The modules are provided with indicia contrasting with the planning surface and they are relatively thin having a thickness such that shadows are virtually nonexistent under normal lighting conditions. With this arrangement a clear and distinct shadow-free photographic reproduction of the modular layout is obtained.

The modules representing elongated objects such as walls, partitions, display counters, etc. within the subject area may be represented by selectively affixing thin strips of adhesive coated material in the proper position on the planning surface. Like the magnetically attractive modules, the strips are made of material having indicia contrasting with the planning surface for the reasons discussed above.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an exploded perspective view of the modular layout used for practicing the method of the present invention.

FIG. 2 is a top plan view of the modular layout, in assembled condition, used to practice the teachings of the present invention.

FIG. 3 is a schematic view, in perspective, of a suitable photographic reproduction apparatus for making a positive photographic print of the modular layout showing also the modular layout in its operative position on the work table of the apparatus.

DETAILED DESCRIPTION OF THE INVENTION

As the first step of the method disclosed by the present invention, a sheet 4 of magnetically permeable material is placed upon a relatively thin and flexible sheet 5 of magnetically attractive material as shown in the drawings. As shown,

the sheet 5 defines a supporting surface for the sheet 4. The sheet 5 is in turn supported by a rigid frame member 6 so that the sheets 4 and 5 may be easily transported and moved to any desired position or location, all of which will be described in more detail below.

The exposed surface 7 of the sheet 4 which is the surface opposite to the surface 8 facing the sheet 5 serves as a planning surface and is advantageously provided with gradations 9. These gradations permit the planning surface to be graded in proportion to the dimensions of the actual area which is being planned. In the presently preferred embodiment of this invention the gradations 9 comprise a series of parallel spaced lines 10 and a series of parallel spaced lines 11 extending in a direction perpendicular to the lines 10 to form a planning grid facilitating the desired arrangement of modules 12, 13, 14 and 15 on the planning grid.

The modules 12 represent stationary elongated objects such as partitions, walls or display counters which define bounded spaces 16 such as offices, hallways, aisles, etc. within the subject area. The modules 13, 14 and 15 represent various objects such as furniture and fixtures which are to be placed within the space bounded by modules 12. In the construction shown in the drawings, the modules 12 represent walls defining offices 17 and hallway 18 while the modules 13, 14 and 15 represent a desk, chair, and credenza respectively. The modules 12, 13, 14 and 15 are proportionally dimensioned to the scale of the individual squares defining the planning grid surface so that an accurate and realistic picture of the actual space relationship between the various objects represented by the modules is obtained as it will appear in reality. The modules 12, 13, 14 and 15 are made of a magnetically attractive material so that when placed on the planning surface they are adjustably held in position by magnetic forces set up between the magnetically attractive sheet 5 and the modules.

As shown in FIG. 1, the modules 12 representing elongated objects may alternatively be made of thin strips of adhesive coated material which may be affixed to the planning surface in the desired positions.

After sheets 4 and 5 have been assembled and the modules selectively arranged on the planning grid to form a proposed layout, a photographic reproduction of the entire layout is made. For this purpose the modular layout, in assembled condition, is placed on the work table 19 of a conventional photographic reproduction apparatus 20 of the type capable of making a photographic negative and projecting an optical image of the negative at any desired scale. The apparatus shown includes generally a camera 21 which is suspended vertically above the work table 19 by camera boom 22 so that upon activation, a two dimensional top plan representation of the layout is obtained. The reproduction apparatus 20 shown in the drawings is conveniently activated by manipulation of control panel 23.

In order to obtain a clear and distinct negative and a distinct positive from the negative, the exposed surface of sheet 1 defining the planning grid is advantageously made to optically contrast with the modules 12, 13 14 and 15. In the presently preferred embodiment of the invention optical contrast is achieved by making the planning surface and the modules of contrasting colors. For example, the planning grid surface may be white and the modules black. Alternatively, optical contrast may be accomplished by providing the modules with suitable contrasting indicia as for example the lines 24 shown on module 14. The modules are also relatively thin in the sense that they have a thickness such that substantially no shadows of the modules are formed on the planning grid background under normal lighting conditions. The thinness of the modules insures a clear and distinct photograph of the layout since it will be substantially shadow free. Lighting banks 27 of the photographic reproduction apparatus provided the necessary lighting.

After the negative of the modular layout has been made, the modular layout is removed from the work table 19 and replaced by a photosensitive sheet of paper 25. The optical image of the negative is then projected back onto the work table 19 to sensitize the photosensitive paper thereby producing a positive print of the layout. The camera boom is advantageously adjustably mounted for vertical movement along upstanding guideway 26 so that the image may be projected onto the photosensitive paper at any desired scale. A photographic reproduction apparatus suitable for practicing the teachings of the present invention is the MICRO-MASTER 105 mm. camera-projector produced by the Keuffel & Esser Co.

The positive print produced in accordance with the teachings of the present invention may be conveniently used to make numerous duplicate prints by means of conventional duplicating processes such as the Ozalid duplicating process, the Xerox duplicating process, etc.

Layout planning performed according to the present invention provides several advantages over heretofore known methods used for this purpose. First of all the necessity for making hand drawn detailed drawings or blueprints of the proposed layout is eliminated without sacrificing the accuracy and clarity of hand drawn prints. Duplicate prints of the layout may be conveniently made from the positive print and economically distributed to the appropriate personnel for review and approval without materially disrupting their other business responsibilities. Also changes and modifications to a proposed layout can be made quickly, conveniently, and economically simply by rearranging the modules on the planning surface. Moreover, due to the optical contrast between the modules and the planning surface and due to the thinness of the modules, the positive prints of proposed layouts obtained by using the method of the present invention are clear and accurate and shadow free. Also, the efficiency of the method itself aids achievement of the ultimate purpose, i.e. to provide the most efficient utilization of available space.

I claim:

1. A method for planning the physical layout of objects within a predetermined area comprising:

a. forming a modular layout comprised of thin modules representing said objects adjustably disposed on the planning surface of the modular, said modules having optical properties contrasting with the optical properties of said planning surface by:

i. placing a first sheet of magnetically permeable material upon a second sheet of magnetically attractive material defining an underlying supporting surface for the first sheet with the exposed surface of the first sheet defining said planning surface; and

ii. selectively arranging said modules on the exposed surface of the first sheet, said modules being made of magnetically attractive material whereby they are adjustably held in place on the exposed surface of the first sheet by magnetic forces between the modules and the second sheet; and

b. photographing the modular layout to produce a clear and distinct shadow free reproduction of the modular layout.

2. The method according to claim 1 wherein the step of photographing the modular layout is accomplished by:

a. photographing the modular layout to produce photographic negative thereof; and

b. projecting an optical image of said negative at a predetermined scale upon a sheet of photosensitive material to produce a photographic positive print of the modular layout.

3. The method according to claim 2 wherein the exposed surface of the first sheet is provided with gradations.

4. The method according to claim 3 for planning an architectural layout including the step of:

a. selectively affixing thin strips of adhesive coated material on the exposed surface of the first sheet to represent elongated objects defining bounded spaces within said predetermined area, said strips having optical properties contrasting with the optical properties of the planning surface.

5. The method according to claim 4 wherein:

a. the gradations on the exposed surface of the first sheet include spaced vertical and horizontal lines forming a planning grid; and

b. said modules and said strips are dimensioned in proportion to the scale of the squares defined by said grid.

6. A system for planning the physical layout of objects within a predetermined area comprising:

a. a modular layout of thin modules representing said objects adjustably disposed on the planning surface of the modular layout, said modules having optical properties contrasting with the optical properties of the planning surface, said modular layout including a first sheet of magnetically permeable material and a second sheet of magnetically attractive material disposed beneath the first sheet, said second sheet defining a supporting surface for the first sheet with the exposed surface of the first sheet defining said planning surface, said modules being made of magnetically attractive material whereby said modules are held adjustably in place on the exposed surface of the first sheet by magnetic forces between the modules and the second sheet; and

b. means for photographing the modular layout to produce a clear and distinct shadow free reproduction of the modular layout.

7. The system according to claim 6 wherein said means for photographing the modular layout includes:

a. means for producing a photographic negative of the modular layout;

b. means for projecting an optical image of the negative upon a sheet of photosensitive paper to produce a photographic positive print of the modular layout.

8. The system according to claim 7 for planning an architectural layout wherein:

a. thin strips of adhesive coated material having optical properties contrasting with the optical properties of said planning surface are affixed to the exposed surface of the first sheet, said strips representing elongated objects defining bounded spaces within said predetermined area.

9. The system according to claim 8 wherein the planning surface is provided with gradations.

10. The system according to claim 9 wherein:

a. said gradations include spaced horizontal and spaced vertical lines forming a planning grid; and

b. said modules and said strips are dimensioned in proportion to the scale of the squared defined by said planning grid.

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