

PREFABRICATED WORK DESK WITH INTEGRATED CABLE MANAGEMENT AND VENTILATION, AND WORKSTATION SYSTEM ASSEMBLED THEREFROM

FIELD OF THE PRESENT DISCLOSURE

[0001] The present disclosure relates to a table or desk assembly, and more particularly to a prefabricated work desk, and workstation assembled therefrom, having cable or wire management as well as ventilation capabilities. The present disclosure further provides a method of manufacturing a workstation system with integrated cable or wire management as well as ventilation capabilities.

BACKGROUND

[0002] Various settings, whether in a classroom, business or other institution, increasingly utilize computers or other electronic equipment. Many table or desk systems have been designed to be especially suited for such type of settings, in which a computer or other electronic device is placed on a work surface. Typically, modular desk units are manufactured off-site and fitted on-site to form a work space area in which individual components are attached to the desk units to form a personalized work space. Such combination of off-site and on-site work is preferred as it leads to significant cost and labor savings. In a traditional method to execute a commercial fit-out works, although the independent work desks or a cluster of work desks are made off-site but to make it operational on-site a lot of services works are required. For example, at the outset of the project, locations of all the work desks needs to be marked to firstly mark the cable raceways and secondly to ascertain the point of entry for electrical and data cables. Then during the project HVAC air distribution needs to be done to maintain a normal air-conditioned environment around the work desks. Once the work desks are installed at site, wiring, cabling and termination needs to be done in order make the power and networking sockets operational.

[0003] However, such desk systems are disadvantageous in that since, holes for cables and grooves for wiring must be provided on the floor or below the floor surface, which in turn lead to considerable time and expense required for wiring preparation and for the actual

wiring. All these inter-dependencies create a bunch of reworks, finishing issues and stretches the timeline multifold. In other words, there is a need of extensive on-site timeline to carry out the allied activities for the work desk and additional time required for reworks and further to resolve the finishing issues. Generally, for a commercial interior project, with the traditional method, timeline ranges from 90 to 180 days. Within these 90 to 180 days, a considerable time and effort goes into the co-ordination between the interdependent fabrication and services activities. Moreover, these activities are carried out at different locations (i.e. some are offsite and some are onsite), at different time period and being done by multiple agencies. This leads to a lot of inefficiency, coordination errors which is a cause of lot of re-works, additional time and improper finishing.

[0004] There have been some concepts and ideas to integrate the services with the work desks. For instance, U.S. Patent No. 5,358,444 (Helm et al.) discloses a ventilation system adapted to suit a furniture unit. The system comprises a conduit fixed onto the furniture unit and a collection/distribution unit with an overhead duct positioned over the collection/distribution unit. Air expelled from the overhead duct is downwardly focused into a columnar stream into an opening of the collection/distribution unit and then dispersed to a work area through the conduit. Although this document addresses the problems of below floor air delivery, it introduces other problems into the office environment. Specifically, this ventilation system introduces exposed drafts or air currents in the work area. Furthermore, the collection/distribution unit includes a fan that “sucks” air into the unit; this in turn creates a noisy and distractive work environment. In addition, the need to incorporate the collection/distribution unit with the modular furniture unit creates an unsightly addition to the overall office block ambience, and requires additional effort and time during assembly of the said furniture unit, which is undesirable.

[0005] Therefore, there is a need of a table or a desk assembly which may include all the services components pre-fabricated off-site and will be self-sufficient, can avoid these co-ordination issues, bring down the inefficiencies due to interdependent activities, reduce the reworks and finishing issues and can further bring down the timeline for assembling the same on-site.

SUMMARY

[0006] In an aspect, a work desk is provided. The work desk includes a cable management raceway extending along, at least partially, a length of the work desk. The work desk also includes one or more of electrical wires and data cables laid within the cable management raceway. Herein, the one or more of electrical wires and data cables are terminated into one or more connectors at one of their ends at an accessible side of the work desk, in order to be inserted into one or more corresponding connectors of one or more of a corresponding main supply electrical lines and main supply data lines available at the accessible side. Further, herein, the one or more of electrical wires and data cables are further terminated into one or more sockets at other of their ends at a personnel side of the work desk, in order to provide one or more of electrical and data supply for one or more personnel occupying the work desk.

[0007] In one or more embodiments, the work desk further includes a ventilation raceway extending along, at least partially, a length of the work desk. The ventilation raceway is adapted to be arranged in fluid communication with an air distribution duct to receive treated air therefrom. The work desk also includes one or more diffusers distributed along and in fluid communication with the ventilation raceway. The one or more diffusers are configured to disperse treated air from the ventilation raceway towards the one or more personnel occupying the work desk. The one or more diffusers are also adaptable to be partially and fully opened and closed to regulate the dispersion of the treated air.

[0008] In one or more embodiments, each of the one or more diffusers is a linear diffuser.

[0009] In one or more embodiments, the ventilation raceway is made of one of aluminum, mild steel and galvanized iron.

[0010] In one or more embodiments, the ventilation raceway is provided with a nitrile insulation to avoid condensation of treated air thereon.

[0011] In one or more embodiments, the ventilation raceway is rectangular in cross-section, with a height of approximately 300 millimeters and a width of approximately 100 millimeters.

[0012] In one or more embodiments, the work desk further comprises one or more flip top boxes built therein. The one or more flip top boxes are adapted to accommodate the one

or more sockets therein.

[0013] In one or more embodiments, the one or more of electrical wires and data cables are terminated into one or more male connectors at one of their ends at an accessible side of the work desk, in order to be inserted into one or more female connectors of one or more of a corresponding main supply electrical lines and main supply data lines available at the accessible side.

[0014] In one or more embodiments, the work desk further comprises at least one organization stand built therein, wherein the organization stand comprises one or more of a pen stand, a book stand and a file stand.

[0015] In one or more embodiments, a tabletop extending along the length thereof.

[0016] In another aspect, a workstation system is provided. The workstation system comprises a cluster of work desks connected to each other to be arranged in a predefined configuration. The workstation system also comprises a cable management raceway extending along, at least partially, a length of the predefined configuration of the connected work desks. The workstation system further comprises one or more of electrical wires and data cables laid within the cable management raceway. Herein, the one or more of electrical wires and data cables are terminated into one or more connectors at one of their ends at an accessible side of one of the work desks, in order to be inserted into one or more corresponding connectors of a corresponding main supply electrical lines and main supply data lines available at the accessible side. Further, herein, the one or more of electrical wires and data cables are further terminated into one or more sockets at other of their ends at a personnel side of each of the work desk, in order to provide one or more of electrical and data supply for one or more personnel occupying the cluster of work desks.

[0017] In one or more embodiments, the workstation system further comprises a ventilation raceway extending along, at least partially, a length of the predefined configuration of the connected work desks. The ventilation raceway is adapted to be arranged in fluid communication with an air distribution duct to receive treated air therefrom. The workstation system further comprises one or more diffusers distributed along and in fluid communication with the ventilation raceway. The one or more diffusers are configured to disperse treated air from the ventilation raceway towards the one or more personnel occupying the cluster of work desks. The one or more diffusers are also adaptable to be partially and fully opened and closed to regulate the

dispersion of the treated air.

[0018] In one or more embodiments, the workstation system further comprises one or more flip top boxes built into one or more of the work desks, the one or more flip top boxes adapted to accommodate the one or more sockets therein.

[0019] In one or more embodiments, the workstation system further comprises a tabletop extending along the length of the predefined configuration of the connected work desks.

[0020] In yet another aspect, a method of assembling a workstation system is provided. The method comprises providing a cluster of pre-fabricated work desks with ventilation channels and cable management channels formed therein. The method further comprises connecting the cluster of work desks to each other to be arranged in a predefined configuration, such that the ventilation channels are coupled together to form a ventilation raceway extending along, at least partially, a length of the predefined configuration of the connected work desks and adapted to be disposed in fluid communication with an air distribution duct to receive treated air therefrom, and the cable management channels are coupled together to form a cable management raceway extending along, at least partially, a length of the predefined configuration of the connected work desks. The method further comprises providing one or more diffusers distributed along and in fluid communication with the ventilation raceway such that the one or more diffusers are configured to disperse treated air from the ventilation raceway towards one or more personnel occupying the work desks. The one or more diffusers are adaptable to be partially and fully opened and closed to regulate the dispersion of the treated air. The method further comprises laying one or more of electrical wires and data cables within the cable management raceway, with the one or more of electrical wires and data cables being terminated into one or more connectors at one of their ends at an accessible side of one of the work desks in order to be inserted into one or more corresponding connectors of one or more of corresponding main supply electrical lines and main supply data lines available at the accessible side and further terminated into one or more sockets at other of their ends at a personnel side of each of the work desks in order to provide one or more of electrical and data supply for the one or more personnel occupying the cluster of work desks.

[0021] The foregoing summary is illustrative only and is not intended to be in any way limiting. In addition to the illustrative aspects, embodiments, and features described above, further aspects, embodiments, and features will become apparent by reference to the drawings and

the following detailed description.

BRIEF DESCRIPTION OF THE FIGURES

[0022] For a more complete understanding of example embodiments of the present disclosure, reference is now made to the following descriptions taken in connection with the accompanying drawings in which:

[0023] FIG. 1 illustrates a diagrammatic perspective view of a work desk, in accordance with one or more embodiments of the present disclosure;

[0024] FIG. 2 illustrates a diagrammatic side planar view of the work desk, in accordance with one or more embodiments of the present disclosure;

[0025] FIG. 3 illustrates a diagrammatic perspective view of a functional assembly unit for the work desk, in accordance with one or more embodiments of the present disclosure;

[0026] FIG. 4 illustrates a diagrammatic sectioned perspective view of the work desk, in accordance with one or more embodiments of the present disclosure;

[0027] FIG. 5 illustrates a diagrammatic perspective view depicting two work desks being connected to each other, in accordance with one or more embodiments of the present disclosure;

[0028] FIG. 6 illustrates a diagrammatic perspective view of a workstation system with two work desks connected to each other, in accordance with one or more embodiments of the present disclosure;

[0029] FIG. 7 illustrates a diagrammatic perspective view of a workstation system with multiple work desks connected to each other, in accordance with one or more embodiments of the present disclosure;

[0030] FIG. 8 illustrates a diagrammatic top planar view of the workstation system of FIG. 7, in accordance with one or more embodiments of the present disclosure.

DETAILED DESCRIPTION

[0031] In the following description, for purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the present disclosure. It will be apparent, however, to one skilled in the art that the present disclosure is not limited to these specific details.

[0032] Reference in this specification to “one embodiment” or “an embodiment” means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment of the present disclosure. The appearance of the phrase “in one embodiment” in various places in the specification are not necessarily all referring to the same embodiment, nor are separate or alternative embodiments mutually exclusive of other embodiments. Further, the terms “a” and “an” herein do not denote a limitation of quantity, but rather denote the presence of at least one of the referenced item. Moreover, various features are described which may be exhibited by some embodiments and not by others. Similarly, various requirements are described which may be requirements for some embodiments but not for other embodiments.

[0033] Certain terminology is used in the following description for convenience only and is not limiting. The words "right," "left," "lower," and "upper" designate directions in the drawings to which reference is made. The words "inwardly" and "outwardly" refer to directions toward and away from, respectively, the geometric center of the personalized air conditioning system and designated parts thereof. The terminology includes the words above specifically mentioned, derivatives thereof and words of similar import.

[0034] The present invention relates to an integrated work desk, and workstation system assembled therefrom, which aim to solve these interdependencies and cut down the timeline for assembling and completing furnishing work on-site. The proposed work desks include all the service components pre-fabricated off-site and is self-sufficient, once assembled on-site, for personnel (hereinafter, interchangeably referred to as a “user” or sometimes an “end user”) to start using the same. In particular, the proposed work desks include a ventilation raceway and diffusers to circulate air distribution, and electrical wires and data cables laid within a cable management raceway with male and female connectors (connections) at either ends to easily connect in series with adjacent work desks to form the workstation system with required electrical and data supply ready to be used. The proposed work desks, and workstation system assembled therefrom, further

include or have provisions of self-sufficient and inbuilt lighting, USB ports, HDMI ports, pen stand, book stand and the like for perusal of the user.

[0035] Referring to FIG. 1, illustrated is a diagrammatic perspective view of a work desk (generally referred by the numeral 100), in accordance with one or more embodiments of the present disclosure. Further, FIG. 2 illustrates a diagrammatic side planar view of the work desk, in accordance with one or more embodiments of the present disclosure. Hereafter, the term “work desk” has been interchangeably used with the term “desk” or a “table”, with the understanding that the work desk 100 could also be designated a desk or a table in that it performs a similar function by providing a work surface supported above a floor or other supporting surface. The work desk 100 is well suited for use in an educational environment, such as in a school or university setting and further in a corporate or other institutional training facility, as the work desk 100 defines a surface which is well suited to support a computer or other electronic or electrical device used in an educational or training setting, and the like. Alternatively, the work desk 100 is equally well suited as a stand-alone unit in an office or work place environment.

[0036] As illustrated in FIGS. 1 and 2, the work desk 100, generally, includes a work surface or a tabletop 102. In some examples, the tabletop 102 is supported, optionally, above a base surface 104. Herein, the base surface 104 may provide a rigid support for mounting the tabletop 102 thereon. The tabletop 102 defines an upper surface and a lower surface and spaced side edges for the work desk 100. The length and width of the tabletop 102, and thereby overall dimensions of the work desk 100, is selected according to the work application, site layout and area, and requirements of the end user. In one example, the tabletop 102 may generally be about 25 millimeters thick. The tabletop 102 may be constructed of any suitable material based on requirement and aesthetics of the on-site work environment where the table would be installed. For example, the tabletop 102 may be constructed of plywood material, premium wood material like teakwood or rosewood, or even hardened plastic, and the like without any limitations. The tabletop 102 can be further finished in various shades of pre laminated particle boards, Medium-density Fiber-board (MDF) and various other material used traditionally. As may be appreciated, the base surface 104, and thereby the tabletop 102, is raised above a floor area or any other supporting area by two or more leg members 106. Although, in the illustrated embodiments, the work desk 100 is shown to include four number of leg members 106, it may be appreciated that in other examples, the work desk 100 may have less (for example, two) or more (for example, six)

number of leg members 106 without any limitations.

[0037] According to embodiments of the present disclosure, as illustrated, the work desk 100 includes an integrated functional assembly unit 110. The functional assembly unit 110 is designed to integrate various service components off-site and reduces a lot of time during assembly of the work desk 100 on-site, by reducing or completely eliminating the need of interdependent service works otherwise required to install such components. In the present embodiments, the functional assembly unit 110 is primarily configured to provide ventilation capabilities, as well as electrical and data supply capabilities to the work desk 100. In one or more examples, the functional assembly unit 110 extends along, substantially, a middle of length of the tabletop 102. In such case, the functional assembly unit 110 may also function as a partition or a privacy panel for the work desk 100 to enable two or more pair of users to sit on opposite sides of the tabletop 102, and thereby providing better utilization of productive area from the work desk 100. The use of partition panels and various designed arrangements thereby are well known in the art and the present functional assembly unit 110 can be adapted in a similar manner (if required) without any limitations.

[0038] According to embodiments of the present disclosure, the work desk 100 includes, or specifically the functional assembly unit 110 defines, a cable management raceway 112 and a ventilation raceway 114 therein. FIG. 3 illustrates a detailed perspective diagrammatic view of the functional assembly unit 110 (as separated from the work desk 100), in accordance with one or more embodiments of the present disclosure. Further, FIG. 4 illustrates a diagrammatic sectioned perspective view of the work desk 100 with the functional assembly unit 110 also sectioned to show inner components and arrangement thereof, in accordance with one or more embodiments of the present disclosure. Referring now to FIGS. 1-4 in combination, as illustrated, the cable management raceway 112 extends along, at least partially, a length of the work desk 100. Similarly, the ventilation raceway 114 extends along, at least partially, a length of the work desk 100. In general, the cable management raceway 112 is extending below the surface of the tabletop 102 in the work desk 100, and the ventilation raceway 114 is extending above the surface of the tabletop 102 in the work desk 100. As may be contemplated, the height of the ventilation raceway 114 extending above the surface of the tabletop 102 is generally equivalent to a usual height of a partition panel in a typical work desk, if the ventilation raceway 114 may be designed to function as the partition panel for the work desk 100 (as discussed in preceding paragraph).

[0039] As illustrated generally in FIGS. 1-4, the work desk 100 includes one or more of electrical wires 116 and data cables 118 laid within the cable management raceway 112. It is to be understood that according to embodiments of the present disclosure, the electrical wires 116 and data cables 118 are pre-laid into the work desk 100 off-site (during fabrication of the work desk 100). This is done so in order to save significant time and labor that may otherwise be involved with and needed for running of the electrical wires and data cables into the work tables during on-site assembly thereof (as achieved conventionally). In the illustrated examples, the work desk 100 is shown to include both the electrical wires 116 and the data cables 118 therein. In some example, the work desk 100 may only implement electrical wires 116 and not data cables 118, or vice-versa, without departing from the scope of the present disclosure. As may be seen, the electrical wires 116 and the data cables 118 are generally extending throughout the length of the cable management raceway 112. Herein, the electrical wires 116 and the data cables 118 may be any commercially available wires and cables of suitable type and configuration as required from the implementation of the work desk 100 at the site.

[0040] According to embodiments of the present disclosure, the electrical wires 116 and the data cables 118 are terminated into one or more connectors (such as, male connectors 120 as shown) at one of their ends at an accessible side of the work desk 100. Further, herein, the male connectors 120 of the electrical wires 116 and the data cables 118 can be inserted into one or more female connectors (not shown) of one or more of a corresponding main supply electrical lines and main supply data lines available at the accessible side of the work desk 100. It may be contemplated that, in an alternative embodiment, the electrical wires 116 and the data cables 118 may be terminated into one or more female connectors at one of their ends at an accessible side of the work desk 100, and such female connectors of the electrical wires 116 and the data cables 118 may be inserted into one or more male connectors of one or more of a corresponding main supply electrical lines and main supply data lines available at the accessible side of the work desk 100, without any limitations. Herein, it may be appreciated that the accessible side of the work desk 100 may be considered as the side of the work desk 100 which is closest to the main supply electrical lines and main supply data lines when the work desk is appropriately placed and oriented (as desired) at the site of installation.

[0041] Further, in the present embodiments, the electrical wires 116 and the data cables 118 are further terminated into one or more sockets (not shown) at other of their ends at a

personnel side of the work desk 100. The sockets, thereby, may be implemented to provide one or more of electrical and data supply for one or more personnel occupying the work desk 100. Herein, by “personnel side” of the work desk 100 is meant the location with respect to tabletop 102 of the work desk 100 where the personnel may be sitting for carrying out various tasks associated therewith. In one example, as depicted in FIG. 1, the sockets may be made available on the tabletop 102 for the personnel (users) to plug in their electronic devices for withdrawing electrical power (via the electrical wires 116) and further their network devices to connect to the data network (via the data cables 118). It may be appreciated that the sockets may be implemented as any suitable one of various standards known in the art, as per the requirement of the work environment where the work desk 100 would be installed.

[0042] It may be understood that for assembly and installation purposes, the worker at the site may only have to bring the work desk 100 to the appropriate location therein, ensure that the female (or male) connectors of the main electrical supply and main data supply are available at the accessible side of the work desk 100 (i.e. closer to the main supply electrical lines and/or main supply data lines), connect (e.g., insert) the male (or female) connectors 120 into the female (or male) connectors of the main supply electrical line and main supply data line available nearby; thus providing electrical and data connection at the socket accessible to the personnel at the work desk 100. Thereafter, the personnel (users) of the work desk 100 may simply have to connect their respective electronic and network devices to the sockets available at the personnel side of the work desk 100. Such arrangement allows for plug and play based quick and easy connectivity option for the users of the work desk 100 of the present disclosure.

[0043] In one or more embodiments, as illustrated, the work desk 100 further includes one or more flip top boxes 124 built therein. Specifically, the flip top boxes 124 are built into the tabletop 102 of the work desk 100. The flip top boxes 124 are adapted to accommodate the one or more sockets therein. The flip top boxes 124 with electrical and data terminations are known, and are similar to the boxes which are used traditionally used for a conference table set up as known in the art. The flip top boxes 124 may house required or desired number of electrical sockets (e.g., 3 pin sockets) with data ports (if required) on the front (user side) with female plugs of said sockets and other required input-output (IO) interfaces on the back side to connect them with the source or main supply coming through the electrical wires 116 and the data cables 118. Herein, the flip top boxes 124 are aligned to the rear part of one side of the tabletop 102 of the

work desk 100, towards the ventilation raceway 114. It may be appreciated that the flip top boxes 124 may be implemented for all types of the work desks 100, and not be limited to the conference or meeting room tables depending on the requirement.

[0044] It may be appreciated that in a traditional scenario, a similar set up of flip top box is provided by the work desk manufacturer in which then the electrical partner does the wiring, installs the sockets and commissions the whole line. With the work desk 100 of the present disclosure, the flip top box 124 are to be in-built with all the sockets (with the required female plugs and IO interfaces) and properly terminated at the personnel side of the work desk 100 with a pre-commissioned main electrical supply line and main data supply line from pre-terminated male connectors 120 at the accessible side of the work desk 100 via the electrical wires 116 and the data cables 118 for electrical and data supply, respectively.

[0045] Further referring to FIG. 1-4, as may be seen, the ventilation raceway 114 is located above the tabletop 102 extending generally along the length thereof. In the present embodiments, the ventilation raceway 114 acts as an air distribution duct. In particular, the ventilation raceway 114 is adapted to be arranged in fluid communication with an air distribution (HVAC) duct to receive treated air therefrom (as illustrated in FIG. 6 and explained later in the description). In general, the ventilation raceway 114 may be considered a part of the air distribution duct. In one or more examples, the ventilation raceway 114 is preferably made of aluminum profile, such as extruded aluminum sheets and the like. In other examples, the ventilation raceway may be made of one of mild steel and galvanized iron without any limitations. Further, the ventilation raceway 114 is provided with a nitrile insulation to avoid condensation of the treated air thereon. In one example, the ventilation raceway 114 is insulated with 9 millimeters thick nitrile insulation to avoid any condensation of the treated air thereon. As may be seen better from FIG. 2, the ventilation raceway 114 is generally rectangular in cross-section. In the present examples, the ventilation raceway 114 may have a height of approximately 300 millimeters and a width of approximately 100 millimeters.

[0046] The work desk 100 also includes one or more diffusers 128 distributed along and in fluid communication with the ventilation raceway 114. The diffusers 128 are configured to disperse treated air from the ventilation raceway 114 towards the one or more personnel occupying the work desk 100. Herein, the diffusers 128 acts as the grills fixed with the ventilation raceway

to diffuse the treated air on the personnel occupying the work desk. In one or more embodiments, the each of the one or more diffusers 128 is a linear diffuser. Such linear diffusers 128 extend generally in the same direction as the extension of the ventilation raceway 114 to which those are integrated. In other embodiments, the one or more diffusers 128 may be circular or any other suitable shape without departing from the scope of the present disclosure. In the present examples, the diffusers 128 are also adaptable to be partially and fully opened and closed to regulate the dispersion of the treated air. In the present embodiments, the diffusers 128 are provided at an accessible height with the option of partial opening and closing that works similar to a mechanism seen with the AC grills of a car. The diffusers 128 are calibrated at the maximum required dispersion to reach a designed temperature and can be adjusted by the users to partially or fully close the same as per their comfort.

[0047] In one or more embodiments, the work desk 100 further includes at least one organization stand (generally referred by the numeral 130 in FIGS. 1-4) built therein. The organization stand 130 may generally be provided on the upper surface of the tabletop 102 and towards the rear side (i.e. close to the ventilation raceway 114) to be aesthetically pleasing while being easily accessible by the user. In the present examples, the organization stand 130 may include one or more of a pen stand, a book stand and a file stand; however, other such add-ons may be included depending on the work application and requirements of the user. It may be appreciated that the organization stand 130 may generally be an add-on in terms of the design to make the work desk 100 more organized by eliminating the need of adding separate accessories thereto, when in use by the personnel. In some examples, the work desk 100 may also be provided with supply and installation of the light fixtures to maintain nominal lux levels around for the personnel occupying the work desk.

[0048] FIG. 5 illustrates a diagrammatic perspective view depicting two work desks 100 being connected to each other, in accordance with one or more embodiments of the present disclosure. As discussed, the utility electrical wires 116 and the data cables 118 are an integral part of the work desk 100. The work desk 100, in addition to having the cable management raceway 112 as a provision to carry the electrical wires 116 and the data cables 118, also integrate and install the electrical wires 116 and the data cables 118 off-site together with the fabrication thereof. For the electrical and data supply, each of the work desk 100 has individual electrical wires 116 with male and female connectors terminated at each end, and further the data cables 118 with

required male IO interfaces and female IO interfaces. As illustrated, these male and female connectors and IO's (such as, of the work desk 100 as shown in FIG. 5) then connect to female and male connectors and IO's of the adjacent work desk (such as the work desk 150, as shown in FIG. 5) to form a series connection and power all work desks 100, 150 and so on in a cluster of work desks, with the male connectors of the first work desk (such as, the male connectors 120 of the work desk 100) being connected to the female connectors (not shown) terminated to the main supply. Such arrangement provides a workstation system as illustrated in FIGS. 6-8 and discussed in the proceeding paragraphs.

[0049] Referring now to FIGS. 6-8, illustrated are various configuration of a workstation system in accordance with various embodiments of the present disclosure. The workstation system includes a cluster of work desks connected to each other to be arranged in a predefined configuration. For instance, FIG. 6 illustrates an exemplary workstation system 600 formed by connecting two work desks 602 and 604 with each other. Herein, the two work desks 602 and 604 are connected with each other in a linear fashion. The two work desks 602 and 604 may be connected with each other as discussed above to provide a series electrical and data connection; for example, the work desk 604 may be disposed in electrical and data connection via the work desk 602 which in turn may be connected to the main electrical supply line and the main data supply line. In one or more embodiments, the workstation system (such as, the workstation system 600) further comprises each of the work desk 602 and 604 includes an adjustable locking mechanism (not shown) to allow connecting with another work desk in the cluster of work desks. Specifically, the beams of the understructure of the work desks 602 and 604 are provided with an antenna like opening and locking mechanism that can be reset to any lesser length and hence a bigger cluster can be arranged as a smaller cluster as well in the same or a new space. In some examples, the work desk 100 may have foldable or collapsible beams in the understructure to increase the modularity of the complete work desk. Otherwise, generally, understructure of work desks is similar to understructure of a traditional modular work desk.

[0050] The workstation system 600 also includes a cable management raceway 606 extending along, at least partially, a length of the predefined configuration of the connected work desks 602 and 604. The workstation system 600 also includes a ventilation raceway 608 extending along, at least partially, a length of the predefined configuration of the connected work desks 602 and 604. It may be seen that the workstation system 600 further includes a tabletop 610 extending

along the length of the predefined configuration of the connected work desks 602 and 604. The workstation system 600 further includes one or more of electrical wires and data cables (not shown) laid within the cable management raceway 606. Herein, the electrical wires and the data cables are terminated into one or more male connectors (not shown) at one of their ends at an accessible side of one of the work desks (such as, the work desk 602), in order to be inserted into one or more female connectors (not shown) of a corresponding main supply electrical lines and main supply data lines available at the accessible side. Further, herein, the electrical wires and the data cables are further terminated into one or more sockets (not shown) at other of their ends at a personnel side of each of the work desk 602 and 604, in order to provide one or more of electrical and data supply for one or more personnel occupying the cluster of work desks 602 and 604, providing the workstation system 600. The workstation system 600 further comprises one or more flip top boxes 612 built into one or more of the work desks (e.g., 602 and 604), with the flip top boxes 612 adapted to accommodate the one or more sockets therein. Further, herein, the ventilation raceway 608 is connected to an air duct 614 to receive the treated air therefrom to be dispersed (via diffusers 616) for the personnel occupying the work desk 600.

[0051] It may be understood that the workstation system may have more than two work desks (unlike the workstation 600) without any limitations. FIG. 7 illustrates a diagrammatic perspective view of a workstation system 700 with multiple work desks connected to each other, and FIG. 8 illustrates a diagrammatic top planar view of the workstation system 700, in accordance with one or more embodiments of the present disclosure. As may be seen, the workstation system 700 includes six number of work desks 702, 704, 706, 708, 710 and 712 arranged in a linear fashion. The workstation system 700 includes a cable management raceway 714 formed by combining of the respective cable management channels (similar to the cable management raceways 112) of the work desks 702, 704, 706, 708, 710 and 712. The workstation system 700 further includes a ventilation raceway 716 formed by combining of the respective ventilation channels (similar to the ventilation raceway 114) of the work desks 702, 704, 706, 708, 710 and 712. Further, the workstation system 700 includes a tabletop 718 formed by joining of the tabletops (similar to the tabletops 102) of the work desks 702, 704, 706, 708, 710 and 712.

[0052] The present disclosure further provides a method of assembling a workstation system (such as, the workstation system 700). The method comprises providing a cluster of pre-fabricated work desks (such as, work desks 702, 704, 706, 708, 710 and 712) with ventilation

channels and cable management channels formed therein. The method further comprises connecting the cluster of work desks to each other to be arranged in a predefined configuration, such that the ventilation channels are coupled together to form a ventilation raceway (such as, the ventilation raceway 716) extending along, at least partially, a length of the predefined configuration of the connected work desks and adapted to be disposed in fluid communication with an air distribution duct to receive treated air therefrom, and the cable management channels are coupled together to form a cable management raceway (such as, the cable management raceway 714) extending along, at least partially, a length of the predefined configuration of the connected work desks. The method further comprises providing one or more diffusers distributed along and in fluid communication with the ventilation raceway 716 such that the one or more diffusers are configured to disperse treated air from the ventilation raceway towards one or more personnel occupying the work desks. The one or more diffusers are adaptable to be partially and fully opened and closed to regulate the dispersion of the treated air. The method further comprises laying one or more of electrical wires and data cables within the cable management raceway 714, with the one or more of electrical wires and data cables being terminated into one or more male connectors at one of their ends at an accessible side of one of the work desks (such as, the work desk 702) in order to be inserted into one or more female connectors of one or more of corresponding main supply electrical lines and main supply data lines available at the accessible side and further terminated into one or more sockets at other of their ends at a personnel side of each of the work desks in order to provide one or more of electrical and data supply for the one or more personnel occupying the cluster of work desks.

[0053] It may be appreciated that the cable management raceway 112 (or the cable management raceway 714) is primarily used to run efficiently, hide and manage the electrical wires 116 and the data cables 118, with the electrical wires 116 connected to the main electrical supply line and the data cables 118 connected to the main data supply line (connected to the nearest network rack and powering the switch sockets and data IO's on the work desks). In traditional and on-going practices, the method of laying the cables and powering the sockets and IO's are as follows. First, a pre-designed network of raceways and conduits with the junction boxes are laid on the base floor; then these raceways and conduits are then covered on top with a minimum layer of concrete screeding; thereafter all the electrical wires and data cables are laid from the laid floor raceway and conduits, and are stored/stacked near the riser of every cluster; and thereafter it is

required to wait until the delivery and installation of the work desks; subsequently after the installation of these work desks, the already laid cables are taken through the riser and cable manager of the cluster and terminated at each and every work desk to power the desk with electrical and networking.

[0054] In embodiments of the present disclosure, the system of wires and cables laying and termination becomes more effective and less time consuming. Herein, the proposed method of laying the electrical wires 116 and the data cables 118, and thereby powering the work desk 100 is as follows. First, the proposed concept aims to avoid the raceways and conduits on the floor, the main supply electrical wires and the main supply data cables are bunched and laid directly on the floor. Herein, instead of floor screeding, the proposed concept uses access false flooring that is faster and reusable. At the foot of each work desk cluster, the main supply electrical wires and the main supply data cables 118 are terminated into female connectors (such as, network switch for main supply data cables). In parallel to this, with the fabrication of the work desks, the electrical wires 116 and the data cables 118 are laid, terminated into switch sockets at each workstation on the user end and terminated into male connectors (like plugs and IO's) on the rear end in order to be able to connect with the pre-terminated female connectors of the main supply electrical wires and the main supply data cables at the foot. After installation of the workstation system, it may simply be required to connect the male and female connectors at the foot of the cluster to power the workstation system.

[0055] Further, it may be appreciated that in a traditional model, air distribution ducts are made of galvanized steel and hung from the true ceiling and are installed with the grills and diffusers to disperse the treated air. These ducts are generally fabricated off-site but are installed, connected, tested and commissioned on-site. Main purpose of these ducts is to carry the conditioned or treated air from the source (i.e. an air handling unit) to various locations throughout the space to maintain a uniform comfort temperature for the personnel working in the space. In the conventional method of ducting, first step is to mark these ducts on-site on the ceiling to avoid any clash with other services and elements coming on the ceiling; then to resolve the clashes with possible revisions and start the fabrication of duct off-site; then to install these ducts on-site, connect all the branches, do the necessary tests to ascertain zero leakage; further finish the ducts as per approved finish; thereafter wait for other services and finishes to complete on-site; subsequently when the other finishes are completed install the grills and diffusers; and finally

commission the system and do the air balancing. Such process on-site takes around 60 days to complete which may be substantially long duration in many cases.

[0056] Further, in the conventional systems, the diffusers are fixed on the false ceiling or on the ducts itself in case there is no false ceiling. Such diffusers are generally at a height of not less than 8 feet from the finished floor level, and hence they diffuse the air centrally much above the height of a general work desk. Common issue with these grills and ducts faced after the commissioning is the air balancing. In such systems, the ducts create a network of stem and branches, wherein the stem is a main duct that supplies the air to the branches. These branches then are installed with the grills to diffuse a set volume of air as per the pre designed duct and grill sizes and cross sections. Generally, the branches are controlled by the volume control dampers that helps to balance and manage the flow of air at nominal levels and as per the design parameters. If these dampers are not calibrated properly or are missing at certain locations, there is an unbalance in the volume of air, where some branches and their diffusers disperse more volume of air and the other operate on lesser volume than designed for. This creates an issue of improper air balancing where in there is always a condition of discomfort among some of the users.

[0057] On the other hand, the ventilation raceway 114 (or the ventilation raceway 716) according to embodiments of the present disclosure are fabricated and finished with the diffusers off-site with individual work desks. The ventilation raceway 114 are also connected and mock tested off-site for any possible leakages. It may be appreciated that the installation of the ventilation raceway 114 with the work desk 100 may thus be easier and faster than the conventional method due to the modularity of the desks and major work at normal heights, instead of major work being required on the ceiling in conventional method. The proposed concept of the ventilation raceway 114 can be executed on-site in about 25 days, hence cutting down the timeline of installation of ventilation system to less than half of conventional techniques. The ventilation raceway 114 may constitute to approximately 65-70% of the air distribution ducts. In contrast to a conventional ducting system which is custom designed for each space as per the layout and varying heat loads, the ventilation raceway 114 may be fabricated at fixed size and shape as per the requirement and can be used in same configuration on any site. Furthermore, the designed ventilation raceway 114 can be reused efficiently as compared to the conventional ducts which are very rarely re-used and that also with a huge calculation to replicate the sizes as per the new loads. With the total cross section of the ventilation raceway 114 being about 300 mm (height) x 100 mm

(width) outer to outer, this size is optimum to disperse the volume of air sufficient enough to cater to 12 personnel assuming the requirement of volume by each personnel is 44 CFM. Hence these are designed for a cluster of 6 back to back work desks (such as in the workstation system 700) with a total air volume requirement of 528 CFM.

[0058] The work desk 100 as disclosed in the present disclosure is integrated with services components off-site which reduces a lot of time on-site due to interdependent service works and further a lot of rework and finishing issues due to need of collaboration of services on-site. In the present embodiments, the fabrication of the work desk and interdependent activities will be done together, off-site by a single agency hence avoiding the co-ordination issues and bringing down the inefficiencies. By fabricating the work desks off-site and under one roof, firstly on-site timeline goes down substantially, and secondly risk of re-works due to tolerance and compatibility issues are avoided and hence the time otherwise wasted towards the same is also saved. This is achieved as time required for raceway and conduit laying on the floor is completely saved, time required for civil works for screeding and the like is completely saved by doing false flooring instead, on-site time for electrical wires and data cables and their termination on the work desk after they arrive for installation at site is reduced drastically as the electrical wires and the data cables are pre-installed in the work desk and just needs to be plugged in at site. Further, the work desk 100 also provides economic savings in the sense that the extra length of the electrical wires and the data cables which is generally kept to be on the safer side in the traditional method for workstation can be saved as in the present work desk 100, the electrical wires and the data cables are terminating precisely at both ends i.e. at site as well as on the work desks. It may further be appreciated that the raceways 112 and 114 with the work desk 100 can be refurbished and reused with minimum finishes touch up for different work desks.

[0059] The present disclosure provides that the work desks can be generally made self-sufficient requiring only minimum work at site to commission the same for usage. Such work desks bring the allied MEP services' works also under the same roof while fabricating the work desks itself and avoid any issues due to interdependencies between the works. These factors, in turn, cut down the delivery timeline of the project by cutting down on-site dependency works for the commissioning of these work desks.

[0060] The foregoing descriptions of specific embodiments of the present disclosure

have been presented for purposes of illustration and description. They are not intended to be exhaustive or to limit the present disclosure to the precise forms disclosed, and obviously many modifications and variations are possible in light of the above teaching. The exemplary embodiment was chosen and described in order to best explain the principles of the present disclosure and its practical application, to thereby enable others skilled in the art to best utilize the present disclosure and various embodiments with various modifications as are suited to the particular use contemplated.

WE CLAIM

What is claimed is:

1. A work desk 100 comprising:

a cable management raceway 112 extending along, at least partially, a length of the work desk 100 and below the surface of a tabletop 102; and

one or more of electrical wires 116 and data cables 118 laid within the cable management raceway 112;

a ventilation raceway 114 extending along, at least partially, a length of the work desk 100; and

one or more diffusers 128 distributed along and in fluid communication with the ventilation raceway 114,

characterized in that the one or more of electrical wires 116 and data cables 118 are terminated into one or more connectors 120 at one of their ends at an accessible side of the work desk 100, in order to be inserted into one or more corresponding connectors 120 of one or more of a corresponding main supply electrical lines and main supply data lines available at the accessible side,

the one or more of electrical wires 116 and data cables 118 are further terminated into one or more sockets at other of their ends at a personnel side of the work desk 100, in order to provide one or more of electrical and data supply for one or more personnel occupying the work desk 100,

the ventilation raceway 114 is adapted to be arranged in fluid communication with an air distribution duct 614 to receive treated air therefrom, and

the one or more diffusers 128 is configured to disperse treated air from the ventilation raceway 114 towards the one or more personnel occupying the work desk 100, the one or more diffusers 128 being adaptable to be partially and fully opened and closed to regulate the dispersion of the treated air.

2. The work desk 100 of claim 1, wherein each of the one or more diffusers 128 is a linear diffuser.

3. The work desk 100 of claim 1, wherein the ventilation raceway 114 is made of one of aluminum, mild steel and galvanized iron.
4. The work desk 100 of claim 1, wherein the ventilation raceway 114 is provided with a nitrile insulation to avoid condensation of treated air thereon.
5. The work desk 100 of claim 1, wherein the ventilation raceway 114 is rectangular in cross-section, with a height of approximately 300 millimeters and a width of approximately 100 millimeters.
6. The work desk 100 of claim 1 further comprising one or more flip top boxes built therein, the one or more flip top boxes 124 adapted to accommodate the one or more sockets therein.
7. The work desk 100 of claim 1, wherein the one or more of electrical wires 116 and data cables 118 are terminated into one or more male connectors 120 at one of their ends at an accessible side of the work desk 100, in order to be inserted into one or more female connectors 120 of one or more of a corresponding main supply electrical lines and main supply data lines available at the accessible side.
8. The work desk 100 of claim 1 further comprising at least one organization stand 130 built therein, wherein the organization stand 130 comprises one or more of a pen stand, a book stand and a file stand.
9. The work desk 100 of claim 1 further comprising a tabletop 102 extending along the length thereof.
10. A workstation system 600 comprising:
 - a cluster of work desks 602, 604 connected to each other to be arranged in a predefined configuration;

a cable management raceway 606 extending along, at least partially, a length of the predefined configuration of the connected work desks 602, 604 and below the surface of a tabletop 610;

one or more of electrical wires 116 and data cables 118 laid within the cable management raceway 606;

a ventilation raceway 608 extending along, at least partially, a length of the predefined configuration of the connected work desks 602, 604; and

one or more diffusers 616 distributed along and in fluid communication with the ventilation raceway 608,

characterized in that the one or more of electrical wires 116 and data cables 118 are terminated into one or more connectors 120 at one of their ends at an accessible side of one of the work desks 602, 604, in order to be inserted into one or more corresponding connectors 120 of a corresponding main supply electrical lines and main supply data lines available at the accessible side,

the one or more of electrical wires 116 and data cables 118 are further terminated into one or more sockets at other of their ends at a personnel side of each of the work desk 100, in order to provide one or more of electrical and data supply for one or more personnel occupying the cluster of work desks 602, 604,

the ventilation raceway 608 is adapted to be arranged in fluid communication with an air distribution duct 614 to receive treated air therefrom, and

the one or more diffusers 616 is configured to disperse treated air from the ventilation raceway 608 towards the one or more personnel occupying the cluster of work desks 602, 604, the one or more diffusers 616 being adaptable to be partially and fully opened and closed to regulate the dispersion of the treated air.

11. The workstation system 600 of claim 10 further comprising one or more flip top boxes 612 built into one or more of the work desks 602, 604, the one or more flip top boxes 612 adapted to accommodate the one or more sockets therein.

12. The workstation system 600 of claim 10 further comprising a tabletop 610 extending along the length of the predefined configuration of the connected work desks 602, 604.

13. A method of assembling a workstation system 600, the method comprising:

providing a cluster of pre-fabricated work desks 602, 604 with ventilation channels and cable management channels formed therein;

connecting the cluster of work desks 602, 604 to each other to be arranged in a predefined configuration, such that the ventilation channels are coupled together to form a ventilation raceway 608 extending along, at least partially, a length of the predefined configuration of the connected work desks 602, 604 and adapted to be disposed in fluid communication with an air distribution duct 614 to receive treated air therefrom, and the cable management channels are coupled together to form a cable management raceway 606 extending along, at least partially, a length of the predefined configuration of the connected work desks 602, 604;

providing one or more diffusers 616 distributed along and in fluid communication with the ventilation raceway 608 such that the one or more diffusers 616 are configured to disperse treated air from the ventilation raceway 608 towards one or more personnel occupying the work desks 602, 604, the one or more diffusers 616 being adaptable to be partially and fully opened and closed to regulate the dispersion of the treated air; and

laying one or more of electrical wires 116 and data cables 118 within the cable management raceway 606, with the one or more of electrical wires 116 and data cables 118 being terminated into one or more connectors 120 at one of their ends at an accessible side of one of the work desks 602, 604 in order to be inserted into one or more corresponding connectors 120 of one or more of corresponding main supply electrical lines and main supply data lines available at the accessible side and further terminated into one or more sockets at other of their ends at a personnel side of each of the work desks 602, 604 in order to provide one or more of electrical and data supply for the one or more personnel occupying the cluster of work desks 602, 604.