

A LEG AND BEAM BASED SYSTEM AND METHOD OF ASSEMBLING

FIELD OF THE INVENTION

5 The invention relates to furniture system. More particularly relates to Leg & beam based device, which provides flexibility to the furniture so that the same set of components used in the furniture are capable of configuring various furniture configurations.

BACKGROUND OF THE INVENTION AND PRIOR ARTS

Prior Arts:

* Presently office furniture systems typically consists of panels of various heights and widths which are joined together to create partitions and work surfaces are supported on brackets which are usually hooked onto the vertical members of the frame. Other
15 accessories are normally hung from the partition, panels, wires are passed through the hollow spaces within the vertical members.

*In other type of office furniture systems, desks are made using table tops and suitable understructure. Privacy screens are then mounted on top of the tables to provide
20 privacy. These systems generally lack the wire management capability and have restriction on how high the privacy screens are provided. It also limits the usability as variety of finishes on privacy screens is limited.

*Third type of office partition system consists of poles which are joined together using
25 panels and tabletops are hung on the poles using brackets. Normally external wire carriers are mounted on top of the panel providing limited wire management.

All the above systems have limitation in offering different layouts/configurations to suit various applications. Starting a module perpendicular to a panel from a place where
30 there is no joint is virtually impossible and very limiting when space layout demands such flexibility.

Background:

The invention here addresses these limitations.

This invention relates to Leg & Beam based office furniture system, where a long extruded beam section having provisions for connecting of all four faces of it is supported on legs. This structure in turn supports table tops, wire carriers, privacy screens and storages etc. to configure office furniture required for various application.

- 5 With this system, we can configure linear, 90degree, 120degree workstations, meeting/conference tables and freestanding tables for individual use. It is also possible to integrate storages using the same support structure. These features make this system unique and different from existing office furniture system.

10 **OBJECTS OF THE INVENTION**

The primary object of the invention is to develop Leg & beam based device, which provides flexibility to the furniture so that the same set of components used in the furniture are capable of configuring various furniture configurations.

- 15 Still another object of the invention is to provide for a method of assembling the furniture system.

STATEMENT OF THE INVENTION

- Accordingly the present invention provides for a beam (1) of predetermined shape for a furniture system, comprising plurality of channels configured on its surface to accommodate nuts to fix other components of the furniture system, wherein said beam (1) is adapted to provide plurality of furniture systems structurally variable in accordance with functional requirements of users of the furniture system, also provides for a furniture system comprises of a beam (1) runs through the system, wherein the beam (1) comprises plurality of channels configured on its surface to accommodate nuts to fix other components of the furniture system and adapted to provide plurality of furniture systems structurally variable in accordance with functional requirements of users of the furniture system, and also provides for a method of assembling a furniture system, said method comprising acts of; connecting plurality of legs (4) to beam (1) using screws at sides facing each other; inserting plurality of nuts into top channel (1a) of the beam (1) and through holes of screen brackets (6) and joining at predetermined locations; connecting plurality of cantilever brackets (7) by hooking at top channel (1a) of the beam (1) and fixing at bottom right channel (2d); placing and joining panels onto the cantilever brackets (7) to configure a furniture system.

BRIEF DESCRIPTION OF ACCOMPANYING DRAWINGS

Figure 1 shows the cross sectional view of the beam of according to the invention

Figure 2 shows the perspective view of the beam of according to the invention

5 **Figure 3** shows the leg in front view

Figure 4 shows the leg in perspective view

Figure 5 shows the leg connected with beam in front view

Figure 6 shows the leg connected with beam in perspective view

Figure 7 shows the leg connected with beam in zoomed front view

10 **Figure 8** shows the screen bracket mounted onto the beam in front view

Figures 9 and 10 shows the screen bracket mounted onto the beam in perspective view

Figure 11 shows the cantilever bracket mounted with beam in front view

Figure 12 shows joining of the cantilever bracket with beam in zoomed front view

15 **Figures 13 and 14** shows the cantilever bracket mounted with beam in perspective view

Figure 15 shows straight leg in perspective view

Figure 16 shows straight leg connected with inline connector in perspective view

Figure 17 shows straight leg connected with beam using inline connector in perspective view

20 **Figure 18** shows cross sectional view of the inline connector

Figure 19 shows perspective view of the inline connector

Figure 20 shows perspective view of the inline connector connected with beam at a point

25 **Figure 21** shows perspective view of the inline connector connected with beam at a point and connecting the other beam perpendicular to it

Figures 22 to 26 shows views of wire management system in the furniture system

Figure 27 shows perspective view of linear furniture system

Figure 28 shows perspective view of the conference table

Figure 29 shows perspective view of the workstation with storages

30 **Figure 30** shows perspective view of workstation with cluster

Figure 31 shows perspective view of workstation with C-cluster

DETAILED DESCRIPTION OF THE INVENTION

Referral Numerals

- 5 1: beam
 - 2a: top side channel
 - 2b: bottom side channel
 - 2c: right side channel at top side
 - 2d: right side channel at bottom side
- 10 2e: left side channel at top side
 - 2f: left side channel at bottom side
 - 3: flanges
 - 4: legs
 - 4a: top connector
- 15 4b: bottom connector
 - 4c: prongs
 - 4d: Leveler
 - 4e: top extrusion
 - 4f: bottom extrusion
- 20 5: inline connectors
 - 6: screen brackets
 - 7: cantilever bracket
 - 8: straight legs
 - 9: Wire management
- 25 9a: horizontal wire carrier
 - 9b: horizontal wire carrier assembly
 - 9c: vertical wire carrier
 - 9d: vertical wire carrier cover
 - 9e: Race brackets
- 30 9f and 17: Raceway connectors
 - 10: raceway bracket
 - 11: socket head
 - 12: side nut beam
 - 14 and 16: race way

- 15: hexagonal bolt
- 18: button socket head
- 19: nut
- 20 and 22: horizontal raceway cover
- 5 21: raceway clip
- 23: wire carrier cap

The present invention is in relation to a beam (1) of predetermined shape for a furniture system, comprising plurality of channels configured on its surface to accommodate nuts to fix other components of the furniture system, wherein said beam (1) is adapted to provide plurality of furniture systems structurally variable in accordance with functional requirements of users of the furniture system.

In still another embodiment of the present invention the channels (2a, 2b, 2c, 2d, 2e, and 2f) of beam (1) comprises flanges (3) extending outside for holding said furniture components.

In yet another embodiment of the present invention said beam is preferably having rectangular cross section extruded using materials selected from a group comprising aluminum, Al 6063(T6), Al 6005(T6) .

In yet another embodiment of the present invention said beam has drilled holes at its surface for nut-rivets to pass through for connecting components of the furniture system.

The present invention is in relation to a furniture system comprises of a beam (1) runs through the system, wherein the beam (1) comprises plurality of channels configured on its surface to accommodate nuts to fix other components of the furniture system and adapted to provide plurality of furniture systems structurally variable in accordance with functional requirements of users of the furniture system.

In yet another embodiment of the present invention said components are plurality of legs (4), plurality of inline connectors (5), plurality of screen brackets (6), plurality of cantilever brackets (7), plurality of straight legs (8), and wire management arrangement (9).

In yet another embodiment of the present invention said leg (4) comprises; a top connector (4a) screwed to top aluminium extrusion at one end and to bottom aluminium extrusion at other end, bottom connector (4b) connecting with other ends of top aluminium extrusion and bottom aluminium extrusion to prongs (4c) of the bottom connector (4b), and leveler (4d) is connected to the bottom of the bottom connector (4b).

In yet another embodiment of the present invention said inline connector (5) is adapted to connect the beam (1), and the straight leg (8) and has tapped holed for connecting with beam (1).

In yet another embodiment of the present invention the screen bracket (6) is mounted at top channel (2a) of the beam (1) and is connected using nuts and screwed into the top channel (2a).

In yet another embodiment of the present invention the cantilever brackets (7) are hooked to top channel (2a) of the beam (1) and screwed using nuts inserted into right bottom channel (2d).

In yet another embodiment of the present invention the beam (1) is connected with cantilever brackets (7), wire carriers, vertical posts, legs, screens, and storages to form furniture system.

In yet another embodiment of the present invention said wire management arrangement (9) comprising, horizontal wire carrier (9a), horizontal wire carrier assembly (9b) with a plastic clip, vertical wire carrier (9c), vertical wire carrier cover (9d), raceway brackets (9e), and raceway connector (9f).

In yet another embodiment of the present invention the raceway brackets (9e) are fixed to the beams (1) using screws.

In yet another embodiment of the present invention the raceway brackets (9e) lower part are connected to the horizontal wire carriers (9a) to manage wires of the furniture system.

The present invention is in relation to a method of assembling a furniture system, said method comprising acts of; connecting plurality of legs (4) to beam (1) using screws at sides facing each other; inserting plurality of nuts into top channel (2a) of the beam (1) and through holes of screen brackets (6) and joining at predetermined locations;
5 connecting plurality of cantilever brackets (7) by hooking at top channel (1a) of the beam (1) and fixing at right bottom channel (2d); placing and joining panels onto the cantilever brackets (7) to configure a furniture system.

In yet another embodiment of the present invention the inline connectors (5) are
10 connected with straight legs (9), wherein said straight legs (9) are configured to form junctions of the furniture system.

In yet another embodiment of the present invention the inline connectors (5) are connected with beam (1) to configure plurality of furniture systems structurally variable
15 in accordance with functional requirements of users of the furniture system.

This beam based device has mainly 4 parts to construct the structure.

Beam (Referring to figures 1 and 2)

20 Beam is an aluminum extrusion, which can be cut to any desired length. Holes can be drilled at all faces of the beam to fix nut-rivets (Rivets with a tapping inside it) by riveting. These nut-rivets are fixed to the beam to connect different parts to the beam by means of screws. All the beams are used horizontally and run through entire configuration.

25 Beam section is designed in such a way that it forms channels on all four sides of the beam, one channel in top side, one channel in bottom side, two channels on left side, and two channels on Right side.

30

Inline Connector (referring to figures 18 to 21)

Inline connector is an aluminum extrusion. The cross section of this extrusion is designed in such a way that it can be screwed to other parts (i.e. Beam & Straight Leg). The extrusion can be machined to have tapped holes so that it can be inserted into the
35 hollow part of the beam and then the beam can be fixed to it by screwing.

Inline connector is used to join beam to beam perpendicular to each other as well as beam to Straight Leg:

5 **Straight Leg** (referring to figure 15)

Straight leg is an aluminum extrusion which can be cut to a desired length. Tapped holes are provided to connect the post to inline connector and then the inline connector is fixed with the beam by means of screws (as shows in figures 15 to 17).

10 **Leg** (referring to figures 4 to 6)

Leg is made up of 5 components,

Top Connector,

Bottom Connector

Top aluminium Extrusion

15 Bottom aluminium Extrusion

Leveler

Top connector is screwed at one end to Aluminum extrusion top and screwed at other end to Aluminum extrusion bottom, the other ends of both Aluminum extrusions are
20 screwed to two prongs of Bottom Connector. A Plastic leveler is connected to bottom of Bottom connector for level adjustment. This leg can be connected to directly to the beam by means of screws. By using these four parts different configuration for workstations, conference tables and free standing tables can be made.

25 **Inline connector** (referring to figures 18 & 19)

The Inline connector which can be screwed to the main beam. The inline connector is then inserted into the hollow portion of the beam and then both are screwed together so that both beams can be connected perpendicular to each other to start another run of
30 beam. This assembly can be done at any point on the main beam provided that the tapped holes are drilled at that point on the main beam.

Wire management in the furniture system (referring to figures 22 to 26)

Wire management consists of following parts.

35 1) Horizontal wire carrier,

- 2) Horizontal wire carrier assembly with a plastic clip
- 3) Vertical wire carrier
- 4) Vertical wire carrier cover
- 5) Raceway brackets
- 5 6) Raceway connector

The raceway brackets are fixed to the beams by means of screws. The lower part of raceway bracket is connected to horizontal wire carriers. Then the adjacent horizontal wire carriers are connected to the beams in same manner. Now, horizontal wire carriers adjacent to each other are connected by raceway connector screwing it to both horizontal wire carriers. The vertical wire carriers are connected to horizontal wire carriers by same raceway connector. After these assemblies, the electrical and data/voice wires can be laid in the horizontal and vertical wire carriers. The vertical wire carrier cover is then screwed to vertical wire carrier and horizontal wire carrier cover assembly is hooked to the wire carrier by means of plastic cap.

Flexibility: Existing system has its rigid/fixed looks and features. For example, panel based systems are thick, heavy and closed, Desk and pole based system are weak, open, and having limited privacy. It is difficult to configure furniture for applications like meeting room tables or conference room tables or reception module and free standing table etc. which form an essential part of any typical office. The proposed system takes care of all the above areas and helps in retaining a uniform visual appeal throughout the office as shown in figures 27 to 28.

Storages: Most of the systems do not integrate storages and leave those to be kept on floor as independent units. It makes the spaces around and below these units difficult to clean and maintain. Also storage kept on floor require person accessing the bottom shelves to bend/lean a lot which is not ergonomic.

For fixing the storages, two different beams are used at two different levels. These are screwed between the legs and straight legs one below the other.

Assembly of storage cantilever bracket is screwed to both the beams and storages are just placed and bolted with the storage cantilever brackets.

The storage hook, which is fixed on the sides of the storage, hooked to the beam to prevent leaning of storages.

Method of assembling

- 5 In this leg and beam based system mainly five types of assemblies that are explained below

1) Leg to Beam (figures 5 to 7)

- Legs are screwed with the beam on wider faces opposite to each other. The lower sides
10 of the legs are screwed with an Aluminum leg connector.

2) Beam to Beam (figures 20 and 21)

- The Inline connector which can be screwed to the main beam. The inline connector is then inserted into the hollow portion of the beam and then screwed to inline connector
15 so that both beams can be connected perpendicular to each other to start another run of beam. This assembly can be done at any point on the main beam provided that the tapped holes are drilled at that point on the main beam.

3) Screen bracket to Beam (Figures 8 to 10)

- 20 Beam section is designed in such a way that it forms channels on all four sides of the beam.

- Special nuts are inserted in to the channels of the beam. For connecting Screen bracket on the top of the beam, two special nuts are inserted into the top channel of the beam
25 then the connector is screwed to the special nuts.

4) Cantilever bracket to Beam (Figures 11 to 14)

- Cantilever bracket is hooked to the top channel of the beam and screwed to the nuts inserted into the bottom channel of side (Left or Right) where the cantilever bracket is
30 hooked.

5) Straight Leg to Beam (Figure 15 to 17)

- Straight leg is an aluminum extrusion which can be cut to a desired length. Tapped holes are provided to connect the post to inline connector and then the inline connector
35 is fixed with the beam by means of screws.

The invention has been described in connection with its preferred embodiments. However, it is not limited thereto. Changes, variations and modifications to the basic design may be made without departing from the inventive concepts in this invention. In
5 addition, these changes, variations and modifications would be obvious to those skilled in the art having the benefit of the foregoing teachings. All such changes, variations and modifications are intended to be within the scope of this invention. The technology of the instant Application explained with the examples should not be construed to limit the scope of the invention.

10

We claim

1. A beam (1) of predetermined shape for a furniture system, comprising plurality of channels configured on its surface to accommodate nuts to fix other components of the furniture system, wherein said beam (1) is adapted to provide plurality of furniture systems structurally variable in accordance with functional requirements of users of the furniture system.
2. The beam (1) as claimed in claim 1, wherein the channels (2a, 2b, 2c, 2d, 2e, and 2f) of beam (1) comprises flanges (3) extending outside for holding said furniture components.
3. The beam (1) as claimed in claim 1, wherein said beam is preferably having rectangular cross section extruded using materials selected from a group comprising aluminum, Al. 6063 (T6), Al. 6005 (T6).
4. The beam (1) as claimed in claim 1, wherein said beam has drilled holes at its surface for nut-rivets to pass through for connecting components of the furniture system.
5. A furniture system comprises of a beam (1) runs through the system, wherein the beam (1) comprises plurality of channels configured on its surface to accommodate nuts to fix other components of the furniture system and adapted to provide plurality of furniture systems structurally variable in accordance with functional requirements of users of the furniture system.
6. The furniture system as claimed in claim 5, wherein said components are plurality of legs (4), plurality of inline connectors (5), plurality of screen brackets (6), plurality of cantilever brackets (7), plurality of straight legs (8), and wire management arrangement (9).
7. The furniture system as claimed in claim 6, wherein said leg (4) comprises;
 - a. a top connector (4a) screwed to top aluminum extrusion at one end and to bottom aluminum extrusion at other end,

- b. bottom connector (4b) connecting with other ends of top aluminum extrusion and bottom aluminum extrusion to prongs (4c) of the bottom connector (4b), and
- c. leveler (4d) is connected to bottom of the bottom connector (4b).

5

8. The furniture system as claimed in claims 6 and 7, wherein said inline connector (5) is adapted to connect the beam (1), and the straight leg (8) and has tapped holed for connecting with beam (1).

10

9. The furniture system as claimed in claim 6, wherein the screen bracket (6) is mounted at top channel (2a) of the beam (1) and is connected using nuts and screwed into the top channel (2a).

15

10. The furniture system as claimed in claim 6, wherein the cantilever brackets (7) are hooked to top channel (2a) of the beam (1) and screwed using nuts inserted into right bottom channel (2d).

20

11. The furniture system as claimed in claim 5, wherein the beam (1) is connected with cantilever brackets (7), wire carriers, vertical posts, legs, screens, and storages to form furniture system.

25

12. The furniture system as claimed in claim 5, wherein the channels (2a, 2b, 2c, 2d, 2e, and 2f) of beam (1) comprises flanges (3) extending outside for holding said furniture components.

30

13. The furniture system as claimed in claim 6, wherein said wire management arrangement (9) comprising, horizontal wire carrier (9a), horizontal wire carrier assembly (9b) with a plastic clip, vertical wire carrier (9c), vertical wire carrier cover (9d), raceway brackets (9e), and raceway connector (9f).

14. The furniture system as claimed in claim 13, wherein the raceway brackets (9e) are fixed to the beams (1) using screws, and its lower part is connected to the horizontal wire carriers (9a) to manage wires of the furniture system.

35

15. A method of assembling a furniture system, said method comprising acts of;

- a. connecting plurality of legs (4) to beam (1) using screws at sides facing each other;
 - b. inserting plurality of nuts into top channel (2a) of the beam (1) and through holes of screen brackets (6) and joining at predetermined locations;
 - 5 c. connecting plurality of cantilever brackets (7) by hooking at top channel (2a) of the beam (1) and fixing at right bottom channel (2d);
 - d. placing and joining panels onto the cantilever brackets (7) to configure a furniture system.
- 10 16. The method as claimed in claim 15, wherein the inline connectors (5) are connected with straight legs (9), wherein said straight legs (9) are configured to form junctions of the furniture system.
- 15 17. The method as claimed in claim 15, wherein the inline connectors (5) are connected with beam (1) to configure plurality of furniture systems structurally variable in accordance with functional requirements of users of the furniture system.