

**“A LOCKING MECHANISM FOR A FURNITURE SYSTEM, A FURNITURE
SYSTEM AND A METHOD OF ASSEMBLING”**

TECHNICAL FIELD

5 The disclosure relates to a furniture system. More particularly related to locking mechanism comprising a beam, wedge nut and bracket. The beam in the locking mechanism forms the main spine of modular office furniture system and allows for easy connectivity of legs & posts at any point on the beam rendering it to be very flexible for configuration/reconfiguration.

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BACKGROUND

Existing technologies in office furniture system typically consist of panel based modular office furniture system in which panels are joined together to create partitions and work surfaces are supported on brackets which are usually hooked on to the vertical members of the frame. Other accessories are normally hung from the partition. Wiring within the system requires wires to be passed through small cutouts in the vertical members and pose a big limitation in maintenance, reconfiguration and up-gradation of technology.

20 In other type of office furniture systems, desk based tables are made with table tops mounted on suitable understructure, and privacy screens are seated on the table top. These systems generally lack the wire management capability and the options of finishes which can be offered for the privacy screen are limited.

25 Another way office furniture system has vertical posts which are attached at either ends of panels and are joined together. The table tops are placed on the brackets which are bolted on the posts. These systems have covers which are mounted externally on the panels giving a limited wire management possibility.

30 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 there is no joint is virtually impossible and very limiting when space layout demands such flexibility. These systems also do not provide for the possibility for easy reconfiguration of systems.

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SUMMARY THE DISCLOSURE

The disclosure provides for a locking mechanism for a furniture system comprising at least one hallow beam (1) configured into a pair of parallel elongate elements serving as beam sides (1a), plurality of guiding channels (1b) at its top and bottom surface, and at least one dovetail element (1c) in between the guiding channels (1b); at least one wedge nut (2) having plurality of through holes (2a) to pass screws (4) for locking; and at least one leg bracket (3) of predetermined shape having plurality of through holes (3a), wherein said screws (4) when pass through the holes (3a) of the leg bracket (3) and the holes (2a) to heave the wedge nut (2) for locking the leg bracket (3) with the beam (1), and provides for a method of assembling locking mechanism, said method comprising acts of inserting wedge nuts (2) into guiding channels (1b) of the beam (1); placing leg brackets (3) onto the beam (1) such that holes (2a) of the wedge nuts (2) align with holes (3a) of the leg brackets (3); and inserting screws (4) into the aligned holes (2a and 3a) and tightening to heave the wedge nuts (4) for locking the leg bracket (3) with the beam (1), and also provides for a furniture system comprising at least locking mechanism for a furniture system comprising at least one hallow beam (1) configured into a pair of parallel elongate elements serving as beam sides (1a), plurality of guiding channels (1b) at its top and bottom surface, and at least one dovetail element (1c) in between the guiding channels (1b); at least one wedge nut (2) having plurality of through holes (2a) to pass screws (4) for locking; and at least one leg bracket (3) of predetermined shape having plurality of through holes (3a), wherein said screws (4) when pass through the holes (3a) of the leg bracket (3) and the holes (2a) to heave the wedge nut (2) for locking the leg bracket (3) with the beam (1), plurality of leg assemblies (5) connected to the dovetail element (1c) for supporting the furniture system, plurality of panels (6) mounted onto the leg assemblies, and wire management arrangement (7) connected to the dovetail element.

BRIEF DESCRIPTION OF ACCOMPANYING FIGURES

The features of the present disclosure will become more fully apparent from the following description and appended claims, taken in conjunction with the accompanying drawings. Understanding that these drawings depict only several
5 embodiments in accordance with the disclosure and are, therefore, not to be considered limiting of its scope, the disclosure will be described with additional specificity and detail through use of the accompanying drawings.

FIG. 1 shows perspective view of beam according to present disclosure,

10 FIG. 2 shows perspective view of wedge nuts according to present disclosure,

FIG. 3 shows cross sectional view of beam with wedge nuts passed through the guiding channels for locking according to the present disclosure,

FIG. 4 shows perspective view of leg brackets in align with the beam for locking according to the present disclosure,

15 FIG. 5 shows perspective view of locking mechanism, wherein screws are in align with the countersunk holes of the bracket according to the present disclosure,

FIG. 6 shows cross sectional view of locking mechanism, wherein the beam, wedge nuts and the leg bracket are in align with each other according to present disclosure,

FIG. 7 shows cross sectional view of locking mechanism, wherein the wedge nuts are
20 being heaved for locking according to present disclosure,

FIG. 8 shows perspective view of assembly of leg brackets with legs and panel mounting brackets,

FIG. 9 shows side view of connectivity of leg assembly with the beam,

FIG. 10 shows perspective view of assembly of panels with the beam structure,

25 FIGS. 11- 13 shows wire management system of furniture system according to present disclosure.

DETAILED DESCRIPTION

In the following detailed description, reference is made to the accompanying drawings,
30 which form a part hereof. In the drawings, similar symbols typically identify similar components, unless context dictates otherwise. The illustrative embodiments described in the detailed description, drawings, and claims are not meant to be limiting. Other embodiments may be utilized, and other changes may be made, without departing from the spirit or scope of the subject matter presented herein. It will be readily understood

that the aspects of the present disclosure, as generally described herein, and illustrated in the figures, can be arranged, substituted, combined, and designed in a wide variety of different configurations, all of which are explicitly contemplated and make part of this disclosure.

- 5 This disclosure is drawn, *inter alia*, to locking mechanism and method of assembling locking mechanism.

In one embodiment of the present disclosure a locking mechanism for a furniture system comprising at least one hollow beam (1) configured into a pair of parallel elongate elements serving as beam sides (1a), plurality of guiding channels (1b) at its
10 top and bottom surface, and at least one dovetail element (1c) in between the guiding channels (1b); at least one wedge nut (2) having plurality of through holes (2a) to pass screws (4) for locking; and at least one leg bracket (3) of predetermined shape having plurality of through holes (3a), wherein said screws (4) when pass through the holes (3a) of the leg bracket (3) and the holes (2a) to heave the wedge nut (2) for locking the
15 leg bracket (3) with the beam (1).

In another embodiment of the present disclosure the guiding channels (1c) are configured provide deliberate gap for sliding of wedge nuts (2).

- 20 In yet another embodiment of the present disclosure the shape of the wedge nut (2) is configured to couple with the guiding channels (1b) for sliding movement.

In yet another embodiment of the present disclosure the beam (1) is configured for mounting module panels.

- 25 In yet another embodiment of the present disclosure the beam (1) is used in devices of modular furniture selected from group comprising, conference tables, reception modules and free standing tables.

- 30 Another embodiment of the present disclosure provides for a method of assembling locking mechanism, said method comprising acts of inserting wedge nuts (2) into guiding channels (1b) of the beam (1); placing leg brackets (3) onto the beam (1) such that holes (2a) of the wedge nuts (2) align with holes (3a) of the leg brackets (3); and

inserting screws (4) into the aligned holes (2a and 3a) and tightening to heave the wedge nuts (4) for locking the leg bracket (3) with the beam (1).

5 In yet another embodiment of the present disclosure the guiding channels (1b) are configured to provide deliberate gap for sliding of wedge nuts (2) at predetermined locations.

10 In yet another embodiment of the present disclosure the tightening of screws (4) reduces gap in between the guiding channel (1b), dovetail element (1c) and the wedge nuts (2) surface for locking.

15 In yet another embodiment of the present disclosure the method is employed in modular office furniture system, leg and beam based furniture system, roll-framed beam section and continuous beam.

20 Another embodiment of the present disclosure provides for a furniture system comprising at least locking mechanism for a furniture system comprising at least one hallow beam (1) configured into a pair of parallel elongate elements serving as beam sides (1a), plurality of guiding channels (1b) at its top and bottom surface, and at least one dovetail element (1c) in between the guiding channels (1b); at least one wedge nut (2) having plurality of through holes (2a) to pass screws (4) for locking; and at least one leg bracket (3) of predetermined shape having plurality of through holes (3a), wherein said screws (4) when pass through the holes (3a) of the leg bracket (3) and the holes (2a) to heave the wedge nut (2) for locking the leg bracket (3) with the beam (1),
25 plurality of leg assemblies (5) connected to the dovetail element (1c) for supporting the furniture system, plurality of panels (6) mounted onto the leg assemblies, and wire management arrangement (7) connected to the dovetail element.

30 In yet another embodiment of the present disclosure the leg assemblies (5) are hooked onto the sides (1a) of the beam (1).

In yet another embodiment of the present disclosure the wire management arrangement (7) has clamps (7a) for hooking to the dovetail element (1c).

FIG. 1 illustrates perspective view of a roll-formed beam section used as a main spine in the modular office furniture system. The beam (1) is configured to for plurality of guiding channels (1b) in between two parallel sides (1a), a dovetail element (1c) in between the guiding channels (1b).

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The beam (1) is so designed that it provides for easy connectivity of top & bottom vertical posts using wedge nuts (2).

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FIG. 2 illustrates wedge nuts (2) being used for locking mechanism. The wedge nuts (2) have plurality of holes for locking mechanism. The shape of wedge nuts is configured in such a way that the wedge nuts are slidable along the guiding channels with ease.

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FIG. 3 illustrates the cross sectional view of the beam (1) and the wedge nuts (2). The wedge nuts (2) are being inserted into the guiding channels (1b). The wedge nuts (2) are slidable along the guiding channels (1b) of the beam (1). The dovetail element (1c) provides for guiding channel along the beam. The wedge nuts (2) are able to slide to any predetermined position along the guiding channel to lock with brackets at any point on the beam (1). Thus the flexibility of slidable locking of wedge nuts (2) is provided.

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FIG. 4 illustrates perspective view of leg brackets in align with the beam for locking according to the present disclosure. The wedge nuts (2) are inserted into the guiding channels (1b). Plurality of leg brackets (3) having counter sunk holes are matched with the holes (2a) of the wedge nuts (2) for locking. The brackets (3) are slidable along the beam (1).

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FIG. 5 illustrates perspective view of locking mechanism, wherein screws are in align with the countersunk holes of the bracket according to the present disclosure. The screws (4) are aligned with the holes of the brackets and the holes of the wedge nuts for locking.

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FIG. 6 shows cross sectional view of the locking mechanism, wherein the beam, wedge nuts and the leg bracket are in align with each other. The wedge nuts are inserted into the guiding channels and the leg brackets holes are aligned with the holes of the wedge nuts. The screws are passed into the aligned for locking the assembly of beam and

bracket. A deliberate gap is provided in the guiding channels when the wedge nuts are inserted into the guiding channels. The gap facilitates sliding of wedge nuts along the guiding channels. At any point of the beam the brackets can be slid and locked. Also, the gap helps in relocating the furniture from one place to another place. The assembling and disassembling of the locking mechanism in the furniture system is easier and requires less effort.

FIG. 7 shows cross sectional view of locking mechanism, wherein the wedge nuts are being heaved for locking according to present disclosure. The aligned holes (2a, 3a) are inserted with the screws for assembling. The locking mechanism involves tightening of screws so that the wedge nuts placed inside the guiding channels are heaved. The wedge nuts which are being heaved slides along the dovetail element which reduces the deliberate gap provided in the guiding channel. The wedge nuts and dovetail elements shape are configured in such a way the upon tightening of screws the wedge nut surface contact the dovetail surface and forms a firm locking joint. Thus the locking mechanism comprising the wedge nuts, the beam and the leg brackets form a firm and stable locking mechanism for a furniture system.

The design of brackets is such that the surface having the counter sunk holes forms contacting surface with the beam and thus the holes of the brackets align with the wedge nuts placed into the guiding channels. The leg brackets have perpendicular surface to attach the leg assemblies or any other parts of the furniture system.

During unlocking or releasing of locking mechanism, the user has to loosen the screws for certain minimal threads and thus can release the locking of wedge nuts with the dovetail element of the beam. The assembly of leg brackets, wedge nuts can be slid along the beam for changing or configuring at any other point along the beam.

Dove-tail construction at top & bottom of the beam section creates an opening/ gap (1d) along the guiding channel in which the screws locking the wedge nuts and the brackets can pass through. This opening thus helps in sliding the entire assembly of brackets and wedge nuts when there are partially tightened by the screws to any location along the beam. This has the advantage of sliding the assembly and tightened at any point along the beam without the need to make a hole in the beam. Top and bottom vertical posts

are attached to the beam using die-cast 'L' shaped brackets. This construction forms the base structure for the whole system. One arm of the die-cast 'L' shaped post brackets is attached to the beam using wedge nuts and other arm is bolted to the post.

- 5 Die cast legs are connected to beam using specially made die cast brackets using a single screw. The locking mechanism is so designed that it can be slid along the length of the beam for easy relocation & necessary support. This happens by not fully tightening the screws which fastens the brackets and the wedges.

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FIG. 8 and FIG. 10 illustrate perspective view of assembly of leg brackets with straight legs and panel mounting brackets. The beam (1) is connected with the brackets (3) through the wedge nuts (2). The said brackets (3) are connected with straight legs or the panel mounting brackets. The straight legs and the panel mountings can be moved
15 along the beam for changing the positions.

The beam (1) is configured for mounting module panels. In this case the top and bottom posts are connected to the top and bottom face of the beam respectively and then the tiles are then mounted on the posts from both front as well as the back side using a set
20 of tile mounting brackets and tile mounting clips. Tile mounting brackets are directly bolted to the posts whereas the tile clips are screwed to the back side of the tiles.

FIG. 9 illustrates side view of connectivity of leg assembly with the beam. The leg assembly (5) is connected by means of hooking the leg assembly onto the sides of the
25 beam (1). The connectivity between the leg assembly and the beam is designed in such a way that it provides very easy and stable support for the furniture system. The panels (6) can be mounted onto the leg assemblies for configuring the furniture system.

FIGS. 11- 13 shows wire management system of furniture system according to present
30 disclosure. The wire management arrangement is clamped to the bottom dovetail of the beam for connectivity. Thus the wire management arrangement is hung from the beam (1). The wires are passed through the passage provided in the wire management arrangement. Thus the wires are suitably arranged and are suitably managed by hanging or improper lying.

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Furniture configuration from main linear layout is supported with a specially fabricated off module steel bracket. This allows perpendicular beam connectivity from potentially any point on the first beam.

- 5 Dovetail construction at bottom of the beam also allows for a snap-in type of open wire carrier trays to be attached below the running beam. These wire carrier trays can be further hanged one below the other to create multiple layer of cable carrying keeping the minimum distance required for non-electromagnetic interference. Open construction of trays and their connectivity parallel to beam along the entire run of the
10 furniture allows for easy lay-in type of wire management.

Dovetail construction at top of beam also allows for clamping of top trim by means of specially designed die cast clamps in desk application where no top extension of frame is required above the table top.

- 15 The beam along with snap-in type of wire carrier trays allows for easy lay-in type of wire management which is quite simple and quick to do and allows for easy maintenance and future adaptability to add or remove wires.

- 20 Off module can be installed at any place along the beam length, and not limiting it to install at only junctions. Add on beam perpendicular to the first beam can be attached at any point on the first beam with the help of a special steel fabricated bracket. This allows the flexibility to offer non-similar layouts on either side of the beam.

- 25 The design of locking mechanism comprises a unique beam cross section design which is made of steel roll-forming process for such a complex beam profile. The beam to post connectivity is made using special wedge lock nuts without the need to make holes in the beam. A snap-on wire carrier tray can be mounted below the beam which allows for easy lay-in type wire management. The beam to top trim clamping uses simple
30 clamps for desk application. The locking mechanism achieves flexibility to configure furniture systems for various applications.

With respect to the use of substantially any plural and/or singular terms herein, those having skill in the art can translate from the plural to the singular and/or from the

singular to the plural as is appropriate to the context and/or application. The various singular/plural permutations may be expressly set forth herein for sake of clarity.

It will be understood by those within the art that, in general, terms used herein, and especially in the appended claims (e.g., bodies of the appended claims) are generally intended as "open" terms (e.g., the term "including" should be interpreted as "including but not limited to," the term "having" should be interpreted as "having at least," the term "includes" should be interpreted as "includes but is not limited to," etc.). It will be further understood by those within the art that if a specific number of an introduced claim recitation is intended, such an intent will be explicitly recited in the claim, and in the absence of such recitation no such intent is present. For example, as an aid to understanding, the following appended claims may contain usage of the introductory phrases "at least one" and "one or more" to introduce claim recitations. However, the use of such phrases should not be construed to imply that the introduction of a claim recitation by the indefinite articles "a" or "an" limits any particular claim containing such introduced claim recitation to inventions containing only one such recitation, even when the same claim includes the introductory phrases "one or more" or "at least one" and indefinite articles such as "a" or "an" (e.g., "a" and/or "an" should typically be interpreted to mean "at least one" or "one or more"); the same holds true for the use of definite articles used to introduce claim recitations. In addition, even if a specific number of an introduced claim recitation *is* explicitly recited, those skilled in the art will recognize that such recitation should typically be interpreted to mean *at least* the recited number (e.g., the bare recitation of "two recitations," without other modifiers, typically means *at least* two recitations, or *two or more* recitations). Furthermore, in those instances where a convention analogous to "at least one of A, B, and C, etc." is used, in general such a construction is intended in the sense one having skill in the art would understand the convention (e.g., "a system having at least one of A, B, and C" would include but not be limited to systems that have A alone, B alone, C alone, A and B together, A and C together, B and C together, and/or A, B, and C together, etc.). In those instances where a convention analogous to "at least one of A, B, or C, etc." is used, in general such a construction is intended in the sense one having skill in the art would understand the convention (e.g., "a system having at least one of A, B, or C" would include but not be limited to systems that have A alone, B alone, C alone, A and

B together, A and C together, B and C together, and/or A, B, and C together, etc.). It will be further understood by those within the art that virtually any disjunctive word and/or phrase presenting two or more alternative terms, whether in the description, claims, or drawings, should be understood to contemplate the possibilities of including one of the terms, either of the terms, or both terms. For example, the phrase "A or B" will be understood to include the possibilities of "A" or "B" or "A and B."

While various aspects and embodiments have been disclosed herein, other aspects and embodiments will be apparent to those skilled in the art. The various aspects and embodiments disclosed herein are for purposes of illustration and are not intended to be limiting, with the true scope and spirit being indicated by the following claims.

Referral Numerals:

- 1: beam
- 15 1a: beam sides
- 1b: guiding channels
- 1c: dovetail element
- 1d: gap for sliding in guiding channel
- 2: wedge nut
- 20 2a: wedge holes
- 3: leg bracket
- 3a: leg bracket holes
- 4: screws
- 5: leg assembly
- 25 6: panel
- 7: wire management arrangement
- 7a: clamp for wire management arrangement.

We claim:

1. A locking mechanism for a furniture system comprising:
 - a. at least one hollow beam (1) configured into a pair of parallel elongate elements serving as beam sides (1a), plurality of guiding channels (1b) at its top and bottom surface, and at least one dovetail element (1c) in between the guiding channels (1b);
 - b. at least one wedge nut (2) having plurality of through holes (2a) to pass screws (4) for locking; and
 - c. at least one leg bracket (3) of predetermined shape having plurality of through holes (3a),
wherein said screws (4) when pass through the holes (3a) of the leg bracket (3) and the holes (2a) to heave the wedge nut (2) for locking the leg bracket (3) with the beam (1).
2. The locking mechanism as claimed in claim 1, wherein the guiding channels (1c) are configured provide deliberate gap for sliding of wedge nuts (2).
3. The locking mechanism as claimed in claim 1, wherein shape of the wedge nut (2) is configured to couple with the guiding channels (1b) for sliding movement.
4. The locking mechanism as claimed in claim 1, wherein said beam (1) is configured for mounting module panels.
5. The locking mechanism as claimed in claim 1, wherein the beam (1) is used in devices of modular furniture selected from group comprising, conference tables, reception modules and free standing tables.
6. A method of assembling locking mechanism, said method comprising acts of:
 - a. inserting wedge nuts (2) into guiding channels (1b) of the beam (1);
 - b. placing leg brackets (3) onto the beam (1) such that holes (2a) of the wedge nuts (2) align with holes (3a) of the leg brackets (3); and
 - c. inserting screws (4) into the aligned holes (2a and 3a) and tightening to heave the wedge nuts (4) for locking the leg bracket (3) with the beam (1).

7. The method as claimed in claim 6, wherein said guiding channels (1b) are configured to provide deliberate gap (1d) for sliding of wedge nuts (2) at predetermined locations.
- 5 8. The method as claimed in claim 6, wherein said tightening of screws (4) reduces gap in between the guiding channel (1b), dovetail element (1c) and the wedge nuts (2) surface for locking.
9. The method as claimed in claim 6, wherein said method is employed in modular
10 office furniture system, leg and beam based furniture system, roll-framed beam section and continuous beam.
10. A furniture system comprising:
- a. at least locking mechanism for a furniture system comprising at least one hallow
15 beam (1) configured into a pair of parallel elongate elements serving as beam sides (1a), plurality of guiding channels (1b) at its top and bottom surface, and at least one dovetail element (1c) in between the guiding channels (1b); at least one wedge nut (2) having plurality of through holes (2a) to pass screws (4) for locking; and at least one leg bracket (3) of predetermined shape having plurality
20 of through holes (3a), wherein said screws (4) when pass through the holes (3a) of the leg bracket (3) and the holes (2a) to heave the wedge nut (2) for locking the leg bracket (3) with the beam (1),
- b. plurality of leg assemblies (5) connected to the dovetail element (1c) for supporting the furniture system,
- 25 c. plurality of panels (6) mounted onto the leg assemblies, and
- d. wire management arrangement (7) connected to the dovetail element.
11. The furniture system as claimed in claim 10, wherein said leg assemblies (5) are hooked onto the sides (1a) of the beam (1).
- 30 12. The furniture system as claimed in claim 10, wherein said wire management arrangement (7) has clamps (7a) for clamping to the dovetail element (1c).