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(54) **Title:** TABLE

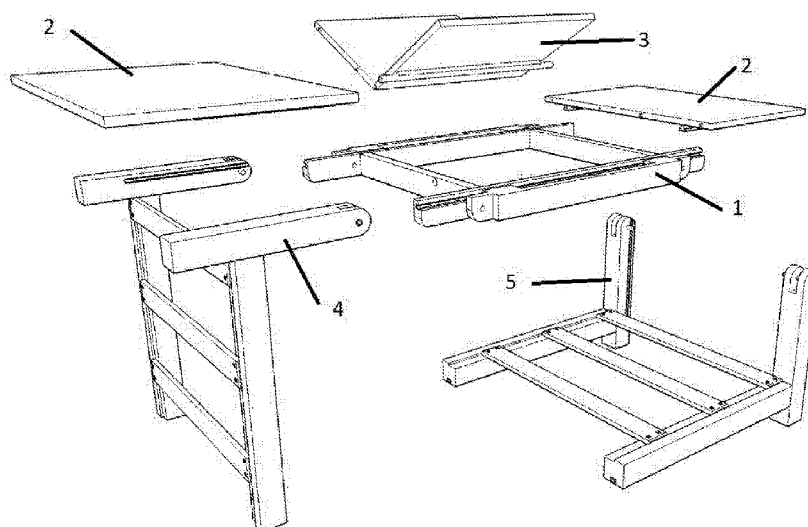


Figure 1.

(57) **Abstract:** There is proposed a table of adjustable height and length. The table comprises a table top supported by a frame; a butterfly leaf mechanism attached to the frame; and first and second leg assemblies. The table top is adapted to be moveable between an expanded and contracted configuration, and in the expanded configuration the table is of an extended length; and in the contracted configuration the table is of a contracted length, said contracted length being shorter than the extended length. Furthermore, the first and second leg assemblies are adapted to be moveable between first and second configurations; and in the first configuration the table is at a first height; and in the second configuration the table is at a second height, said second height being different from the first height.



TABLE

Field of the invention

This present invention concerns an adjustable table.

Background of the invention

Convertible tables for domestic use come in many different forms with a large variety in their mechanisms. However, the functionality of many of the existing designs for convertible tables are limited by the mechanisms they employ. The use of these mechanisms results in limitations on the size of the table, to prevent instability, and reduced customisability in table size and height as a result of converting the tables from one configuration to another. Furthermore, other types are more complex and compromise their looks and strength either as a dining table or as a coffee table in order to have this dual function.

An object of this invention is to provide a convertible table with a simple mechanism for raising and lowering that is functional, rigid, strong and normal looking both as a coffee table and as a dining table.

Summary of the invention

According to the present invention, there is provided a table as defined in the independent claim. Embodiments therefore may provide a table which can to be configured as a low table, such as a coffee table, or as a high table, such as a dining table.

Embodiments may offer a solution to the problem of maintaining the looks and characteristics of both a normal coffee table and a normal dining table. This may be accomplished by using a pair of moveable leg assemblies to alter the height of the table, combined with an extending butterfly leaf table top to alter the size of the table. Furthermore, the frame may provide a platform for a butterfly leaf mechanism, which provides the table with a high degree of stability and support. It is this additional stability and customisability with the combination of the frame, butterfly leaf mechanism and movable leg, which may allow for a far greater variety of styles and possible material usage in the designs than with any other types of convertible tables.

In addition, the use of the butterfly mechanism combined with the frame and the movable leg assemblies may allow the conversion from a larger table at a higher height, to a smaller table at a lower height and combinations thereof; therefore, affording the user a large degree of customisability, without the necessity of additional parts for the table, or compromising on stability through use without a frame.

In one example, the frame may comprise first and second parallel members rigidly connected by two supporting members.

In another example, each leg assembly may comprise a long leg attached substantially perpendicular to a short leg; and each leg assembly may be rotatably connected to the frame and rotatable between the first and second configurations. The combination of the butterfly leaf, the frame and the leg assemblies being attached to the frame necessarily dictates that the relative position of the leg assemblies remains the same in both the extended position and the contracted position thereby providing a solid base, central base for the table.

In another example, the table may further comprise a support member connected between each leg assembly and the frame thereby increasing the stability of the table.

In yet another example, the support member between each leg assembly and the frame may be collapsible.

In another example, the leg assemblies are rotatably connected to the frame and rotatable between the first and second configurations.

In another example, the table may further comprising a first table top portion and a second table top portion slideably connected to the frame so as to move between the expanded and contracted configurations wherein in the expanded configuration the butterfly leaf mechanism forms a third table top portion located between the first and second table top portions and in the contracted configuration the butterfly leaf mechanism is situated below the first and second table top portions.

In another example, in the expanded configuration, the extended length is defined by the length of the first, second and third table top portions and in the contracted configuration, the contracted length is defined by the length of the first and second table top portions.

In another example, in the first configuration each leg assembly is arranged such that the long leg is aligned substantially perpendicular to the table top and in the second configuration each leg assembly is configured such that the short leg is aligned substantially perpendicular to the table top.

In another example, the butterfly leaf mechanism is located laterally and longitudinally between the first and second leg assemblies.

Brief description of the drawings

Figure 1 is an exploded perspective view showing the major component assemblies of the 'type A' table

Figure 2 is a perspective view of the underside of the 'type A' table in the raised dining table position

Figure 3 is a perspective view of the 'type A' table in transition

Figure 4 is a perspective view of the 'type A' table in transition

Figure 5 is a perspective view of the 'type A' table in the lowered coffee table position

Figure 6 is an exploded perspective view showing the major component assemblies of the 'type B' table

Figure 7 is a perspective view of the 'type B' table in the lowered coffee table position

Figure 8 is a perspective view of the 'type B' table in transition

Figure 9 is a perspective view of the 'type B' table in transition

Figure 10 is a perspective view of the 'type B' table in transition

Figure 11 is a perspective view of the 'type B' table in the raised dining table position

Figure 12 is a multiple view of 'type B' table for the Abstract

Detailed description

There is proposed a table that can be adjusted in both height and length. The table comprises a frame, a butterfly leaf mechanism and first and second leg assemblies. The butterfly leaf mechanism, by necessity, is supported by the frame, without which it could not function. The table is adapted such that it can be extended in length, or contracted in length depending on the user's requirements. The first and second leg assemblies are adapted to be moved between a first position and a second position. The orientation of the leg assemblies dictates the height of the table as either the first height, where the leg assemblies are oriented in the first position, or the second height, where the leg assemblies are oriented in the second position.

In a first embodiment there is a convertible table comprising a rigid frame which supports an extendable table top, using a butterfly leaf extension system, and a pair of leg assemblies which are attached to pivot points at opposing ends of the frame and allow the height of the table to be raised or lowered between two different levels by their rotation and where the leg assemblies each comprise of a pair of short legs, which support the table in the lowered position, and attached perpendicular to each short leg is one of a pair of long legs, along with a method of cross support bracing, so that swinging out the leg assemblies raises the table, combined with lengthening the table top by the use of a butterfly leaf extension system and conversely to lower the table the leg assemblies are folded inward and the butterfly leaf is folded away into the frame and the top contracted. The convertible table could optionally include the action of the table top being extended locks the leg assemblies in the raised position by using the runners, which the table top slides upon, to prevent their rotation around the pivot point. The convertible table could also optionally include cross bracing members of the leg assemblies which form a lower level deck to the coffee table.

The present invention will further be exemplified in detail purely by way of two non-limiting examples. In order to show a variety styles possible with this invention these two designs, 'type A' (Figures 1 to 5) & 'type B' (Figures 6 to 11), are presented with different characteristics. Both types share the same mechanism of a frame (1,6) supporting an extending butterfly leaf (3, 8) table top (2, 7) and with two opposing rotating leg assemblies (4,5,9) made from a pair of long legs (15,27)

braced together and attached perpendicular to a pair of short legs (16, 26) , the tops of which pivot on the frame.

Type A' Table (Figures 1 to 5) is an embodiment of the invention, in the form of a coffee table with straight legs, a rectangular top and a lower slatted level that is convertible into a dining table with straight ladder braced legs and a more elongated rectangular top. Type B is shown in figures 6 through 11 and are of a coffee table with tapered legs and an elliptical top , that is convertible into a dining table with "X" legs and a stretched out oval top.

Both embodiments share the main characteristics of using leg assemblies which, when rotated, alter the table height between two different levels, and at the same time use a butterfly leaf table top extension system to alter the size of the table top. The butterfly leaf is similar to the ones used in a great many extending dining tables. Although, in one embodiment, it is wider than most such leafs due to the way the table top needs to be extended to cover the short leg section of the leg assemblies, which also act as a support for the extended table top. However, this will depend on the size and height of the table.

The Type A table, as shown in Figures 1 to 5.

The Type A table can be adapted for various styles and made using a variety of different materials. The table comprises a frame (1), a butterfly leaf mechanism (3) and a pair of leg assemblies (4, 5). The pair of leg assemblies (4, 5), in this embodiment, each have two long legs (15) connected substantially perpendicular to two short legs (16), and supporting members (17) extending between the two long legs (15). As such, the main distinguishing features compared with the type B (see below) is the supporting members (17), which create slatted lower level (Figure 5) when the leg assemblies (4,5) are arranged such that the short legs (16) support the table, for example when being used as a coffee table, the ladder style cross supports of the dining table legs (not present in type B) and the lack of a folding leg brace (10) to lock and steady the dining table legs.

The frame (1) consists of two main beams (11), two pivot point supports (13) and two cross beams (12) connecting the two parallel main beams (11) together. The main beams (11) are nearly as long as the table top (2) when in the lower, coffee table position and along the length of them are grooves (19) in which the table

top runners (18) ride allowing a first and second table top portion to slidably move thereby converting the table from a first length to a second length. Attached to the outside and inboard from each end of the main beams (11) are the pivot point supports (13) for the leg assemblies (4, 5). The pivot point (14) is such that the leg assemblies (4, 5) can only rotate through the desired 90° before hitting stops and therefore allows the leg assemblies (4, 5) to move between the positions where the short legs (16) support the table in the lower position (a second height) and where the long legs (15) support the table in the higher position (a first height). The cross beams (12) support the frame (1) and enclose the area in which the butterfly leaf system (3) is stored.

Each of the two opposing sets of leg assemblies (4, 5) are made up a pair of long legs (15) rigidly attached at 90° to a pair of short legs (16) towards the foot end, of the short legs (16). In other words, each leg assembly (4, 5) comprises two long legs (15) arranged parallel to one another with each long leg (15) having a short leg (16) attached perpendicular. In this embodiment, the point at which the long legs (15) and the short legs (16) are connected is towards the lower end of the short legs (16) when in the second configuration (second height). The paired up long legs (15) are held together by three cross braces (17) which serve both to hold the leg assemblies (4,5) together and, when in the lower coffee table position (second height), are interspaced with the cross bracing of the opposing leg assembly to form a slatted lower level (Figure 5) The top of the short legs (16) in the leg assemblies (4,5) have pivot point (14) at which they are attached to the frame (1). Each opposing sets of leg assemblies (4,5) have the long legs (15) attached in slightly different positions along the length of the short legs (16) to allow one set of the long legs (15) to lie on top of, and parallel to, the other set when they are folded inward to the lower position (second height, Figure 5).

The main table top (2) is in two halves across the face of the table top, which represent first and second table top portions. These halves are held together by latches situated underneath the table top (2), and when unlatched can slide apart from each other on runners (18) attached to their underside which sit in grooves (20) along the side of the frame (1). These runners (18) are T-shaped in profile. The Short legs (16) on the leg assemblies (4,5) have a groove (19) in them on their opposing faces and matching the groove (20) in the frame (1) in which the runners

(18) slide to allow the table top portions to slidably move and form the table of second length.

The Butterfly leaf table top extension (3) which is the same as the butterfly leaf system commonly found in a great many extending dining tables. It is made up of two halves, hinged together so that they can fold out from the stowed position where they lie together, to the extended position, where they fold out flat and sit between the two halves of the main table top. The edges of the leaves have dowel pins and holes which mate with the ones in the main table tops and keep the butterfly leaf from folding. On the underside of one of the butterfly leaf halves is a pivot (21) which is attached to the cross beams (12) so the assembly can rotate to be folded away and stored within the frame (1) when the table is in the lowered position (second height), and then folded out when the table is raised to the first height and the main table top (2) is slid apart. When the first and second table top portions are slidably moved apart, the butterfly leaf (3) can fold out and form a third table top portion and together the three portions make up the second length of the table top in an expanded configuration.

To raise the table from the lower height (second height), where the short legs (16) support the table, to the higher height (first height), where the long legs support the table, the latches (22) locking the leg assemblies (4, 5) are unlocked and the legs swung out one at a time from the stowed position (where the long legs (15) are parallel with the table top (2)) to the position shown in Figure 4. Then the main table top (2) halves are unlatched and slide apart as in figure 3. Sliding the tops apart will lock the legs in position when one side of the runners (18) sits in the grooves in the short legs (19) while the other side is in the grooves on the frame (20). The butterfly leaf system (3) is now exposed and is rotated out from storage within the frame (1) as shown in Figure 3. The two main top halves of the table top (the first and second table top portions) are moved inward and are latched to lock the butterfly leaf (3) in position and the table is now as per figure 2. The process is reversed to lower the table from the higher height (first height) to the lower height (second height).

Type B' table, as shown in figures 6 through 11

Another embodiment, type B, is shown in Figures 6 to 11. Type B' differs from the previous type in that, in the leg assemblies (9), the long legs (27) are attached to

the short legs (26) higher up near the pivot point (29) and so does not have a lower level, equivalent to the slatted level shown in figure 5 for Type A', when configured at the lower height (second height), for example as a coffee table. It also requires the use of folding table leg stays (10) as collapsible support members to fix the leg assemblies (9) in place when raised. The different layout allows for far more options with the style of legs than that of Type A. In the embodiment shown the legs (27) for the higher height (first height) dining table are X shaped and for the lower height (second height) coffee table are tapered and splayed out slightly. This further demonstrates the degree of customisation that is available when this mechanism is employed. The table is shown with an oval top (7), but this could be any other shape. The mechanism can be completely hidden from casual view when the table is in either position, helped by the optional valence skirt (30) around the underneath of the edge of the table top (7).

The frame (6) consists of two main beams (33), and two cross beams (28) and an additional beam (29) between the cross beams (28) to support the leg stays (10). The main beams (33) have grooves (24) in which the table top runners (23) ride and inboard from each end are the pivot points (32) for the leg assemblies (9). The grooves (24) allow a first and second table top portion to slide between a contracted configuration where the table is of a first length and an expanded configuration where the table is of a second length, said second length being longer than the first. The leg assemblies (9) are attached to the frame (6) via the pivot points (32), which are located towards the ends of the main beams (33). The pivot point (32) is such that the leg assemblies (9) can only rotate through the desired 90° before hitting stops and therefore allows the leg assemblies (9) to move between the positions where the short legs (26) support the table (second configuration) and where the long legs (27) support the table (first configuration). The cross beams (28) support the frame (6) and enclose the area in which the butterfly leaf system (8) is stored. Midway between the underside of the cross beams (28) is a beam (29) to support the leg stays (10) and thus provide additional stability for the leg assemblies (9), and is situated so as not to interfere with the rotation of the butterfly leaf (8).

The leg assemblies (9) for the type B table have a pair of short legs (26) to which are attached at 90° the long legs (27) at a point near to where the short legs (26) pivot on the main frame (6). In other words, each leg assembly (9) comprises

two long legs (27) with each long leg (27) having a short leg (26) connected at a substantially perpendicular angle. In this embodiment, the join between the long legs (27) and the short legs (26) is located towards the end of the short legs (26) nearest the leg assembly (9) and frame (6) pivot point (32). Leg assemblies (9) can have a huge variety of styles, from a pair of straight legs to a single central leg with widely splayed out feet. Shown in this example are X style long legs and where the legs cross over (31) provides the support to keep the paired up legs rigid as well as an attachment point for the leg stays (10).

In operation the table is raised from the lowered position where the short legs (26) support the table, to the higher position, where the long legs (27) support the table, by unlatching (25) the two halves of the table top (the first and second table top portions) (7) and sliding them fully apart. This automatically unlocks the leg assemblies (9) by allowing them to be rotated out one at a time to the point where the folding leg stays (10) go over-centre and lock the leg assemblies (9) in place. The butterfly leaf (8) is then rotated out from storage and the main table tops are slid back a little way and latched to the extension leaves to lock the table in the higher position (first height) with the short legs (26) now acting as supports for the outer parts of the table top. To lower the table to the second height the operation is reversed.

In a third embodiment, the table comprises a frame, a butterfly leaf mechanism and a pair of leg assemblies. The pair of leg assemblies, in this embodiment, each have two long legs connected to two short legs wherein the long and the short leg are rotatable relative to the table, as in the previous two embodiments, and relative to each other. In this embodiment, when in the higher height (first height) the long legs and optionally the short legs are perpendicular to the table top and the long legs support the frame and the table top. When converting the table from the higher height (first height) to the lower height (second height) the long legs are rotated from a position perpendicular to the table top (first configuration), to a position parallel to the table top and the short legs are rotated (if they are not already in a perpendicular position) to a configuration perpendicular to the table top (second configuration); thus, the short legs support the frame and the table top. Furthermore, due to the independent movement of the legs, the table can

be converted to a third configuration wherein the long legs and the short legs are parallel to the table top and the table is in a configuration which allows for storage of the table. In any of the configurations, the table top can be in the expanded or contracted configurations as in the previous embodiments.

In a forth embodiment, the table comprises a frame, a butterfly leaf mechanism and a pair of leg assemblies. The frame consists of two main beams, four pivot point supports, each pivot point support being moveable along the length of each main beam, and two cross beams connecting the two parallel main beams together. Each main beam further comprises four holes located along its length, each hole being located such that the pivot points can be aligned with the holes.

Each of the two opposing sets of leg assemblies comprises two long legs arranged parallel to one another with each long leg having a short leg attached perpendicular. In this embodiment, the point at which the long legs and the short legs are connected is towards the lower end of the short legs when in the second configuration (second height). The paired up long legs are held together by three cross braces which serve both to hold the leg assemblies together and, when in the lower coffee table position (second height), are inter-spaced with the cross bracing of the opposing leg assembly to form a slatted lower level. The top of the short legs in the leg assemblies have pivot which connects the leg assemblies to the pivot point supports and can engage with the holes in the main beams. The engaging of the pivot on each short leg locks the pivot point supports in position (and therefore the connected leg assemblies) thus securing the leg assemblies in position along the main beams while still allowing rotation of the leg assemblies. This allows the position of the leg assemblies relative to the frame to be changed thereby increasing the range of sizes of table tops that the mechanism can support.

In the examples above, the number of legs in the leg assemblies can be any number and the mechanism by which the invention works is not limited to a particular number. Any number of cross supporting members could be used. In addition, the table top portions do not have to be split into halves and the shape of the table can be any shape, including the shape of the butterfly leaf portion. The shapes and configurations of the legs are not limited to the shapes disclosed in the above examples.

Other variations to the disclosed embodiments can be understood and effected by those skilled in the art in practicing the claimed invention, from a study of the drawings, the disclosure, and the appended claims. In the claims, the word "comprising" does not exclude other elements or steps, and the indefinite article "a" or "an" does not exclude a plurality. The mere fact that certain measures are recited in mutually different dependent claims does not indicate that a combination of these measures cannot be used to advantage. Any reference signs in the claims should not be construed as limiting the scope.

For example, the skilled person would appreciate that the mechanism for moving the axis about which a leg assembly rotates could be achieved by a number of alternative means including a mechanism wherein the main beam of the frame provides a mechanism for sliding the pivot point support but the pivot does not extend through the main beam.

Claims

1. A table of adjustable length and height, comprising:
 - a table top supported by a frame;
 - a butterfly leaf mechanism attached to the frame; and
 - first and second leg assemblies,wherein the table top is adapted to be moveable between an expanded and contracted configuration, and
wherein:
 - in the expanded configuration the table is of an extended length; and
 - in the contracted configuration the table is of a contracted length, said contracted length being shorter than the extended length, andwherein the first and second leg assemblies are adapted to be moveable between first and second configurations; and
wherein:
 - in the first configuration the table is at a first height; and
 - in the second configuration the table is at a second height, said second height being different from the first height.
2. The table according to claim 1, wherein the frame comprises first and second parallel members connected by two supporting members.
3. The table according to claims 1 or 2, wherein each leg assembly comprises a long leg and a short leg, the long leg being attached substantially perpendicular to the short leg; and
wherein each leg assembly is rotatably connected to the frame and is rotatable between the first and second configurations.
4. The table according to claims 1 or 2, wherein each leg assembly comprises a long leg and a short leg; and

wherein each long leg and short leg is rotatably connected to the frame; so as to be movable between the first and second configurations and wherein the long and short legs are rotatable relative to one another.

5. The table according to any preceding claim, further comprising a support member connected between each leg assembly and the frame.
6. The table according to claim 5, wherein the support member between each leg assembly and the frame is collapsible.

7. The table according to any preceding claim, further comprising first and second table top portions slideably connected to the frame so as to be moveable between the expanded and contracted configurations, wherein:

in the expanded configuration the butterfly leaf mechanism forms a third table top portion located between the first and second table top portions; and

in the contracted configuration the butterfly leaf mechanism is situated below the first and second table top portions.

8. The table according to claim 7, wherein:

in the expanded configuration, the extended length is defined by the length of the first, second and third table top portions; and

in the contracted configuration, the contracted length is defined by the length of the first and second table top portions.

9. The table according to any of claims 3 to 8, wherein:

in the first configuration each leg assembly is arranged such that the long leg is aligned substantially perpendicular to the table top; and

in the second configuration each leg assembly is configured such that the short leg is aligned substantially perpendicular to the table top.

10. The table according to any preceding claim, wherein the butterfly leaf mechanism is located laterally and longitudinally between the first and second leg assemblies.
11. The table according to any preceding claim, wherein an axis about which a leg assemblies is adapted to rotate is movable along at least a portion of the length of the frame.

Seymore Hicks

Table

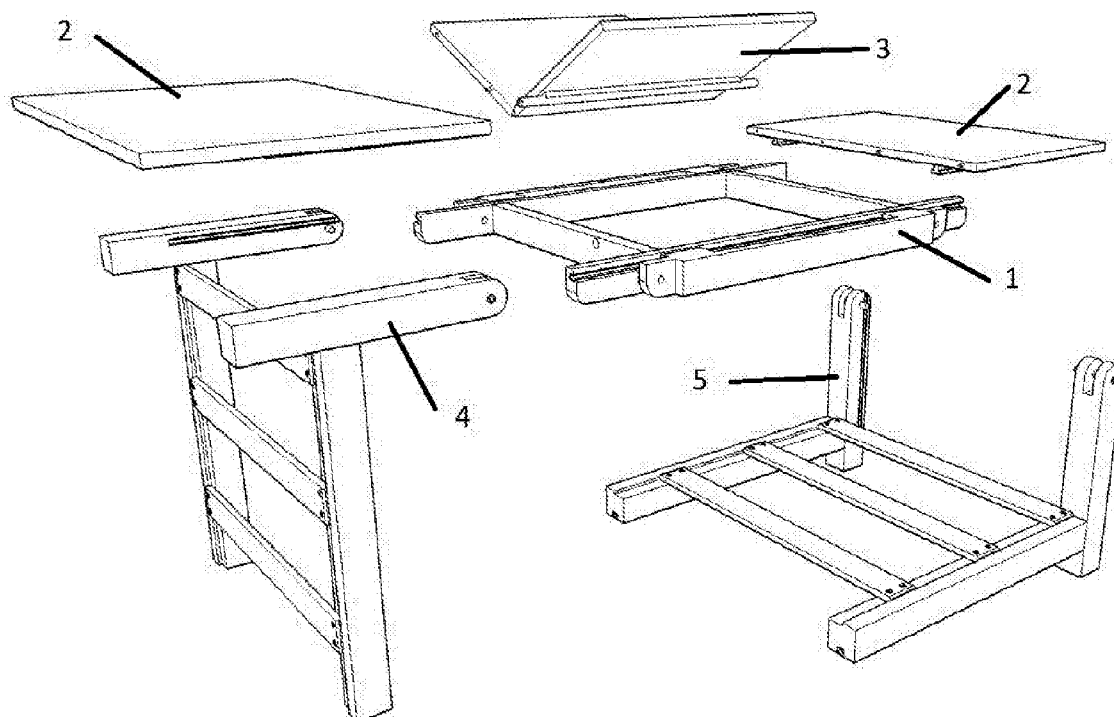


Figure 1.

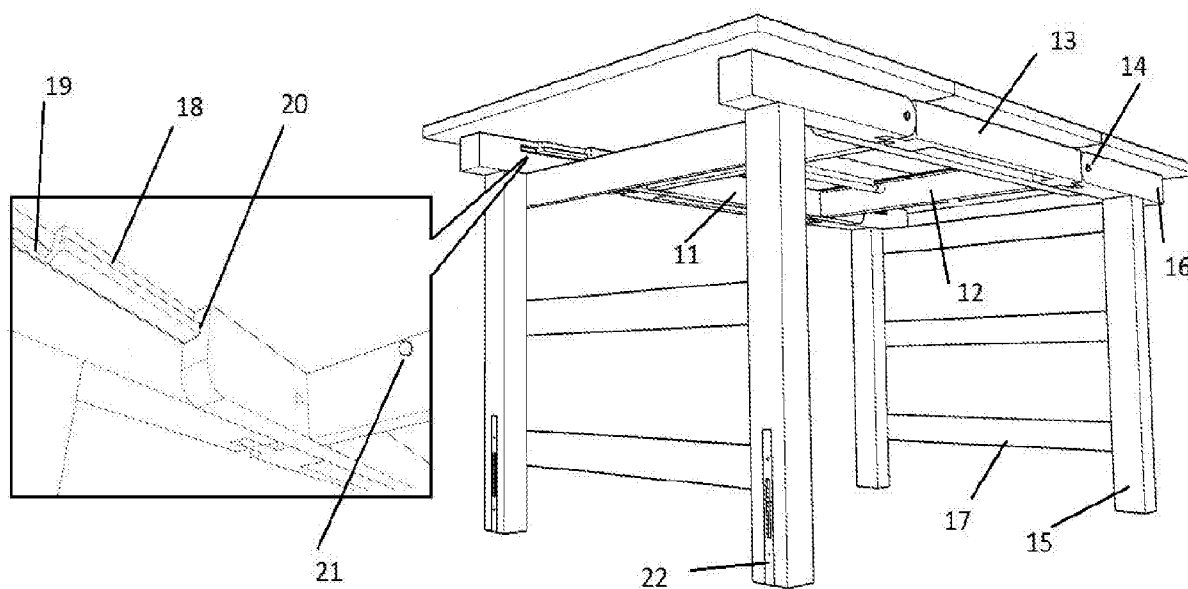


Figure 2.

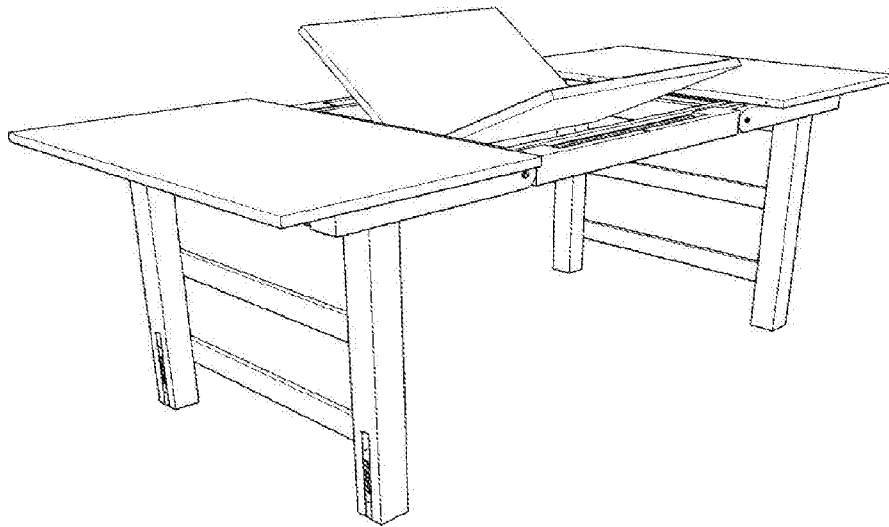


Figure 3.

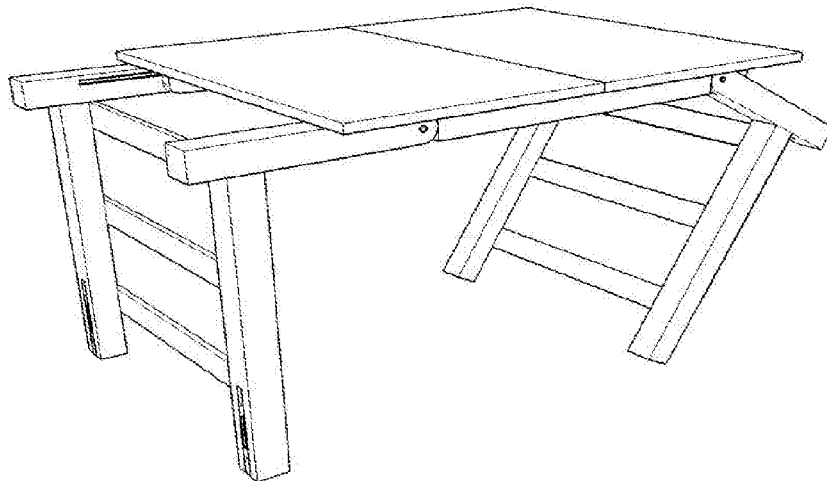


Figure 4.

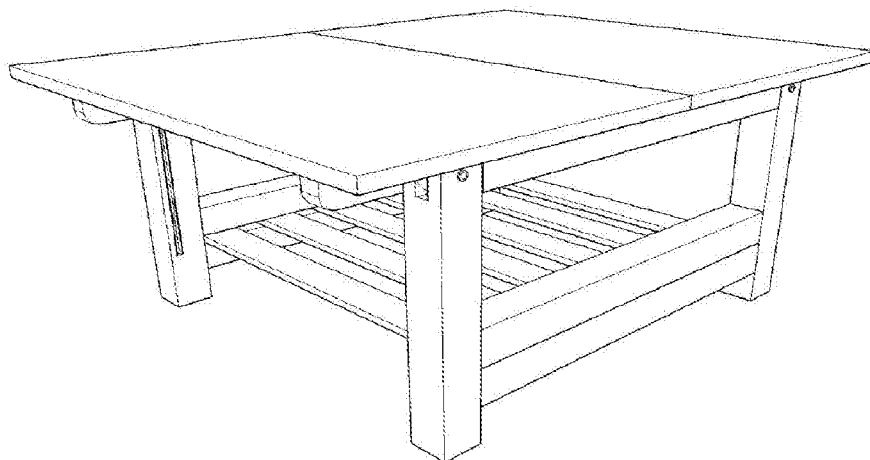


Figure 5.

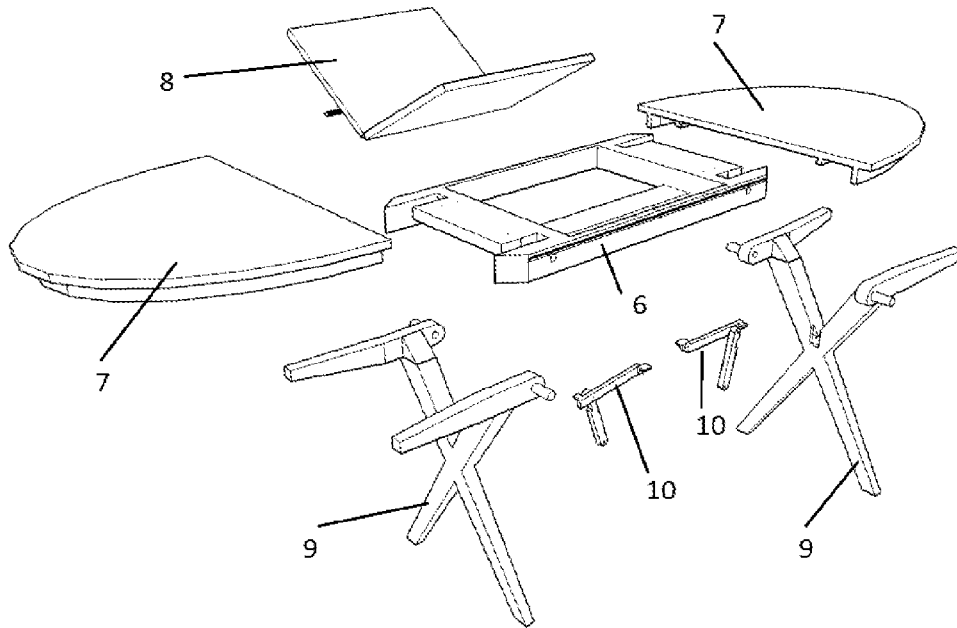


Figure 6.

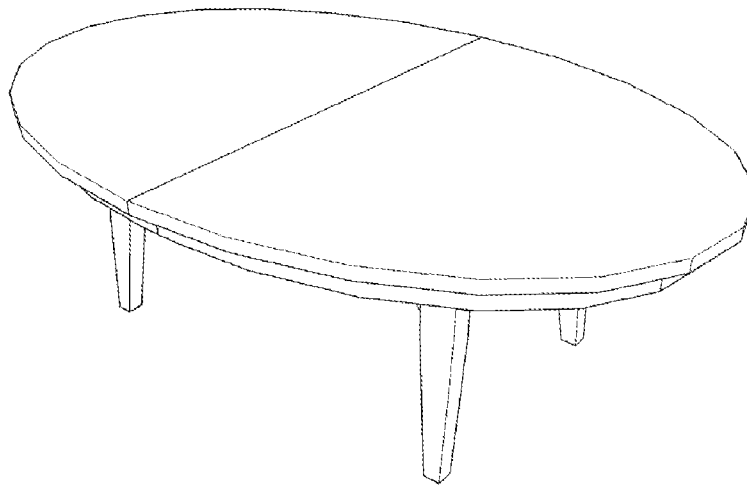


Figure 7.

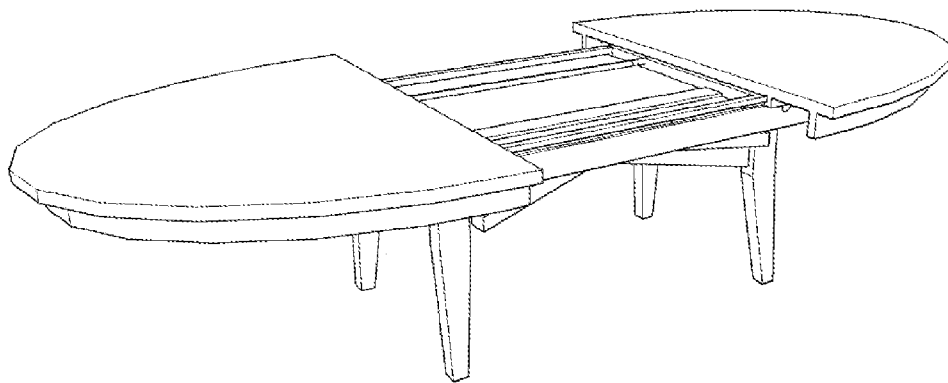


Figure 8.

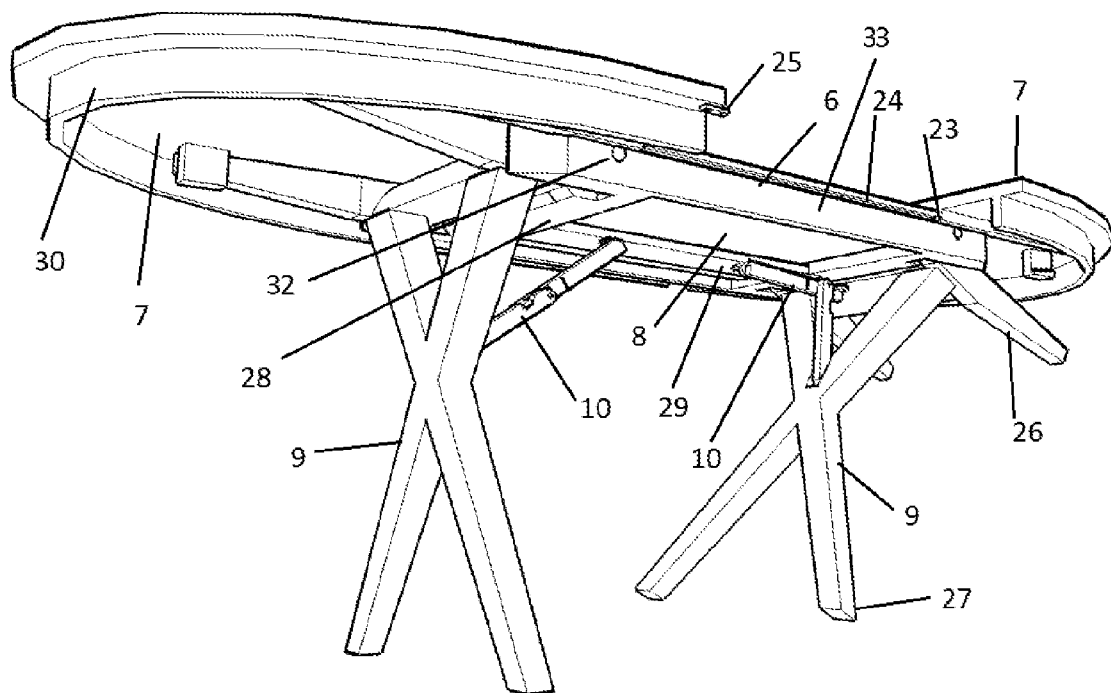


Figure 9.

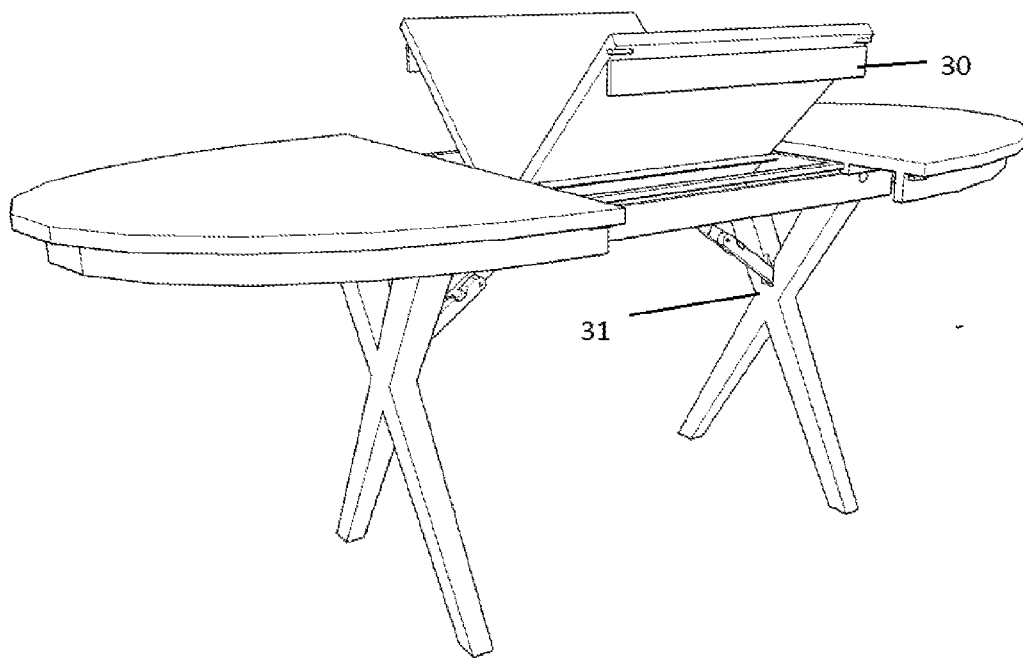


Figure 10.

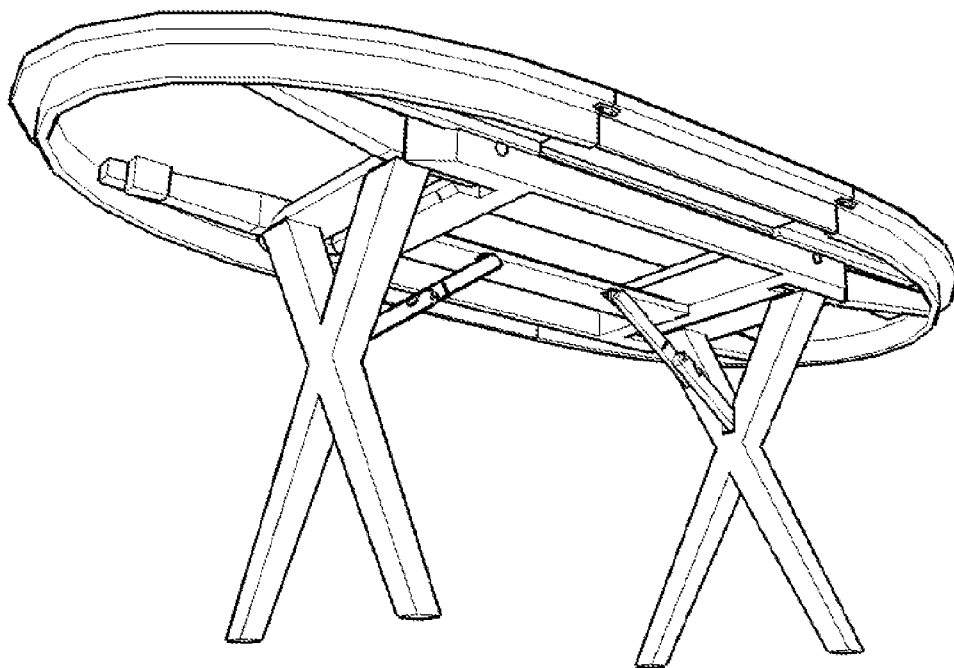


Figure 11.

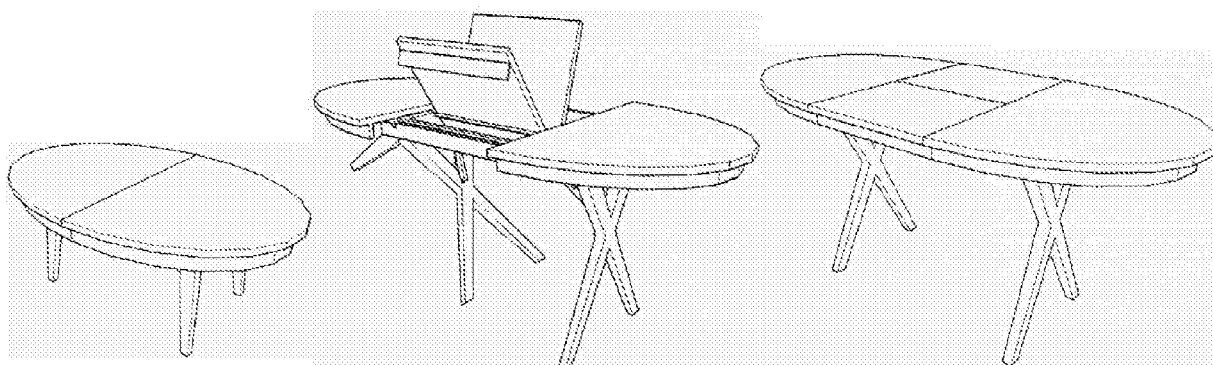


Figure 12.

INTERNATIONAL SEARCH REPORT

International application No

PCT/GB2012/053271

A. CLASSIFICATION OF SUBJECT MATTER
 INV. A47B1/02 A47B1/03
 ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 A47B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal , WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2007/012226 A1 (CHEN LIAN-SHUN [TW]) 18 January 2007 (2007-01-18) page 1 - page 4; figures 1-5 -----	1-10
Y	AU 18123 76 A (ZEPIDIS V) 6 April 1978 (1978-04-06) page 1 - page 7; figures 1-5 -----	1-10
A	GB 379 064 A (COOP WHOLESALE; ALBERT AUGUSTUS BURGESS) 25 August 1932 (1932-08-25) page 1 - page 3; claims 1-3; figures 1-4 -----	1-11



Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2012/053271

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2007012226	A1	18-01-2007	NONE

AU 1812376	A	06-04-1978	NONE

GB 379064	A	25-08-1932	NONE
