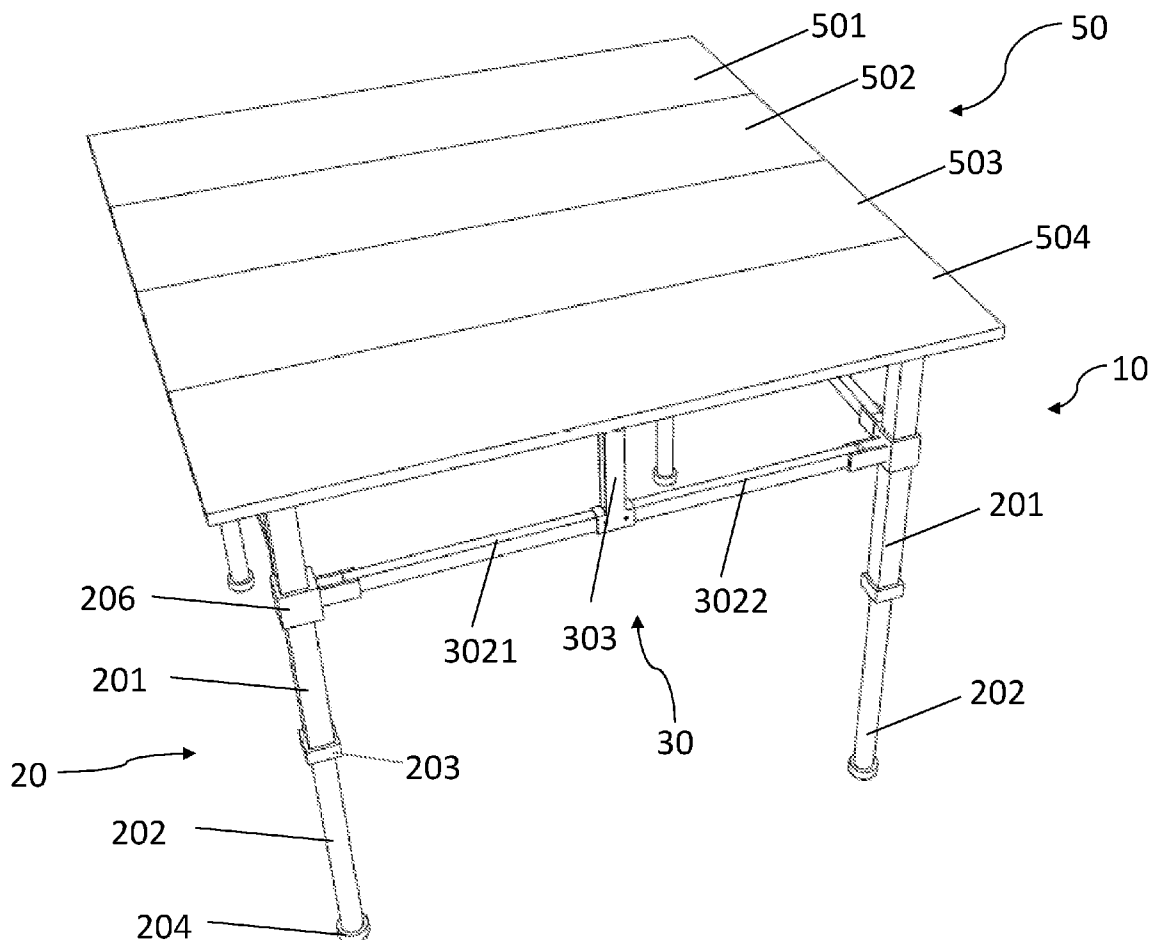




US 20160296004A1

(19) **United States**(12) **Patent Application Publication**
PENG(10) **Pub. No.: US 2016/0296004 A1**(43) **Pub. Date: Oct. 13, 2016**(54) **FOLDING TABLE**(71) Applicant: **CHENG PENG**, Rowland Heights, CA
(US)(72) Inventor: **CHENG PENG**, Rowland Heights, CA
(US)(21) Appl. No.: **15/093,471**(22) Filed: **Apr. 7, 2016****Related U.S. Application Data**(60) Provisional application No. 62/144,262, filed on Apr.
7, 2015.**Publication Classification**(51) **Int. Cl.**
A47B 3/00 (2006.01)
A47B 3/06 (2006.01)(52) **U.S. Cl.**CPC **A47B 3/002** (2013.01); **A47B 3/06**
(2013.01); **A47B 2003/004** (2013.01)(57) **ABSTRACT**

A folding table may include a table top and a supporting frame. The supporting frame may have a leg portion, an interconnecting portion and a central supporting structure; and the table top that is detachable from the supporting frame may have a plurality of connected table pieces. The leg portion includes a plurality of legs and the interconnecting portion is used to connect the legs of the leg portion, and the central supporting structure is located at center portion of the supporting frame to provide additional support to the supporting frame and is configured to start a table folding process.



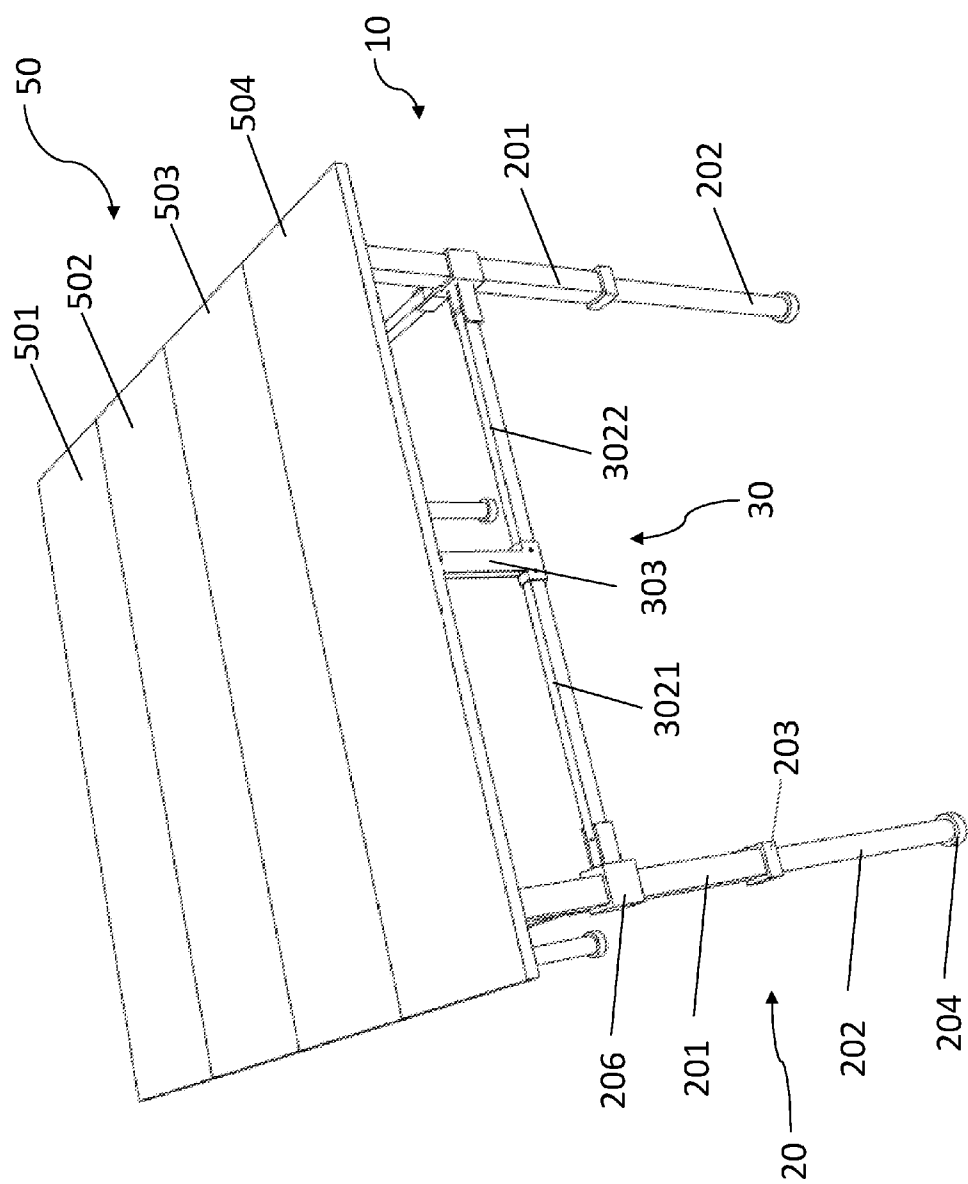


FIG. 1

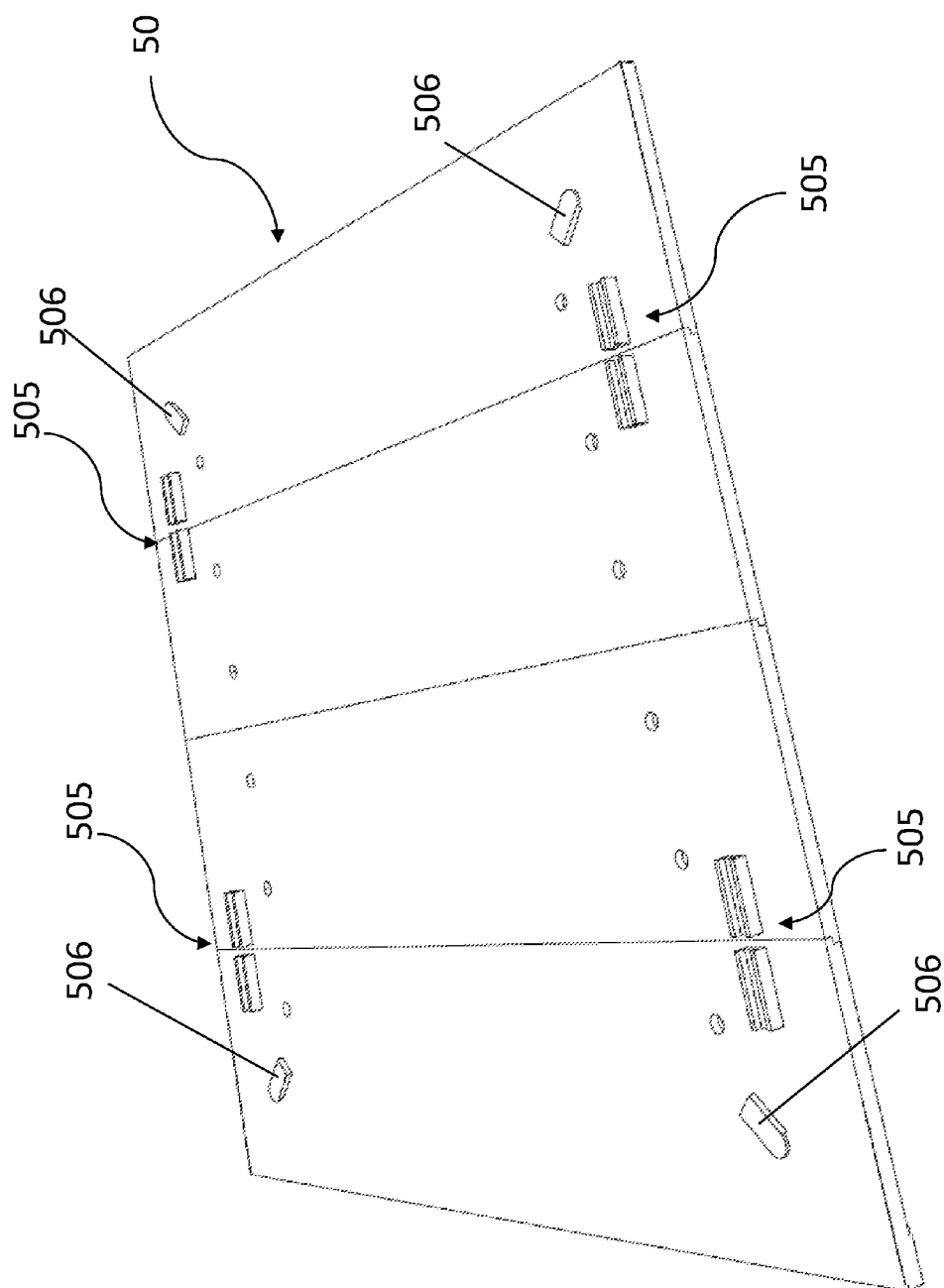


FIG. 2

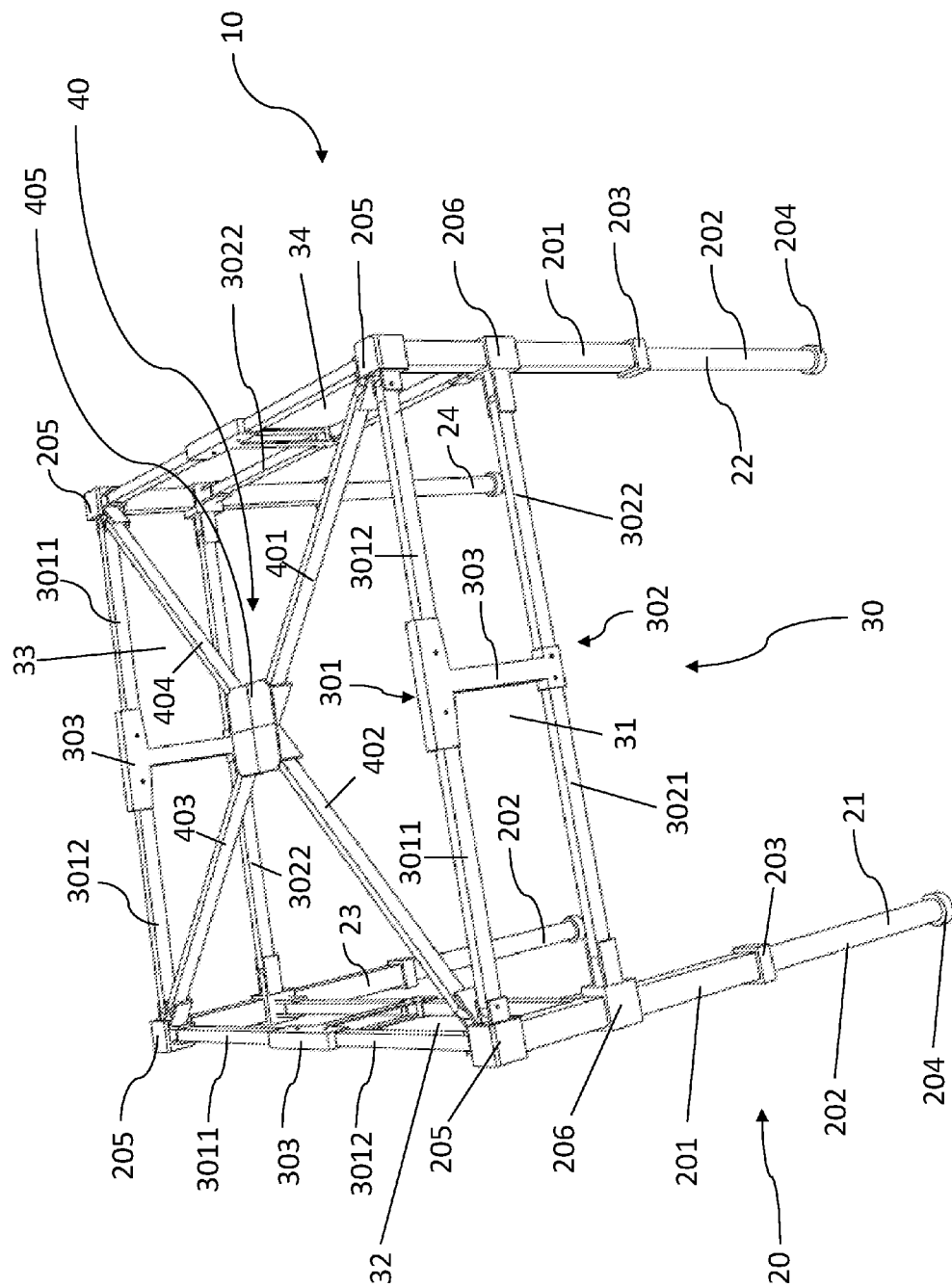


FIG. 3

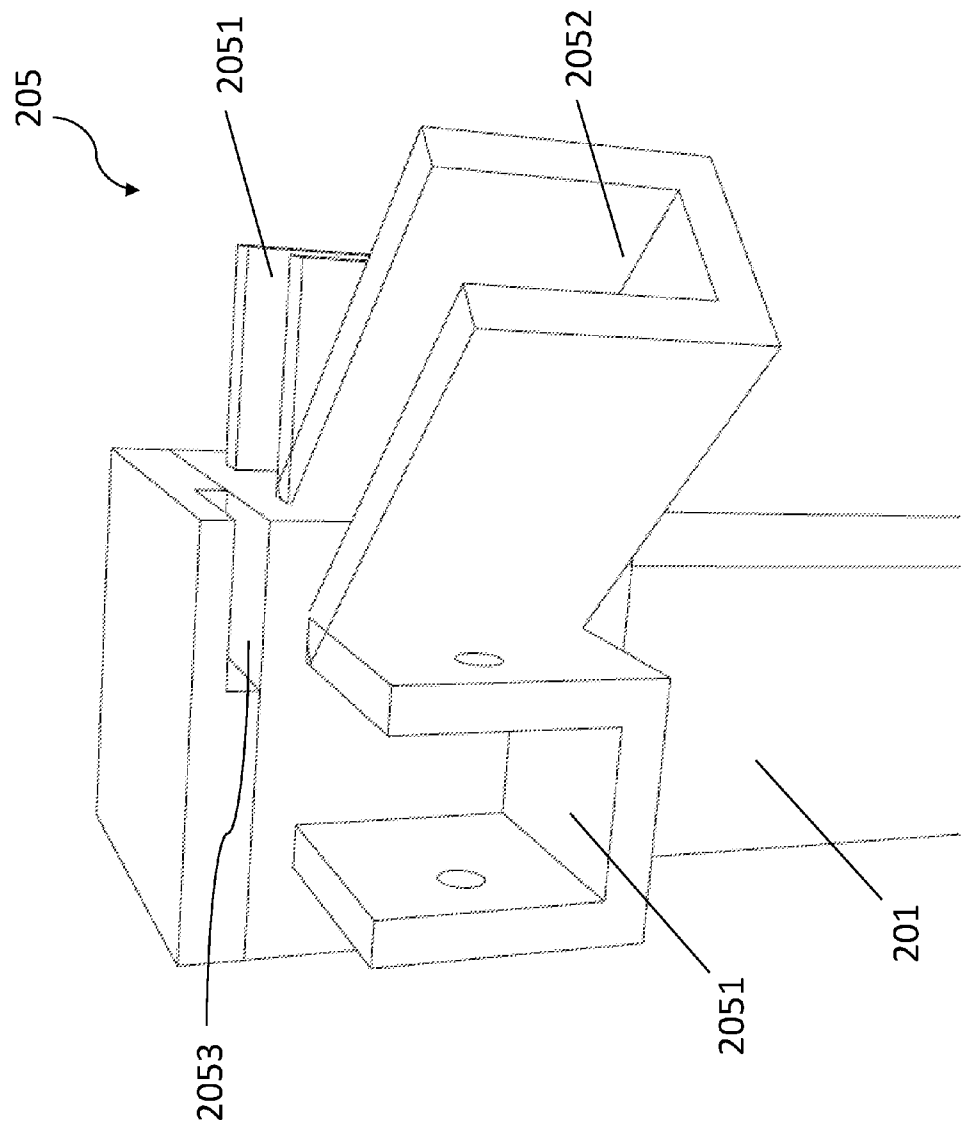


FIG. 4

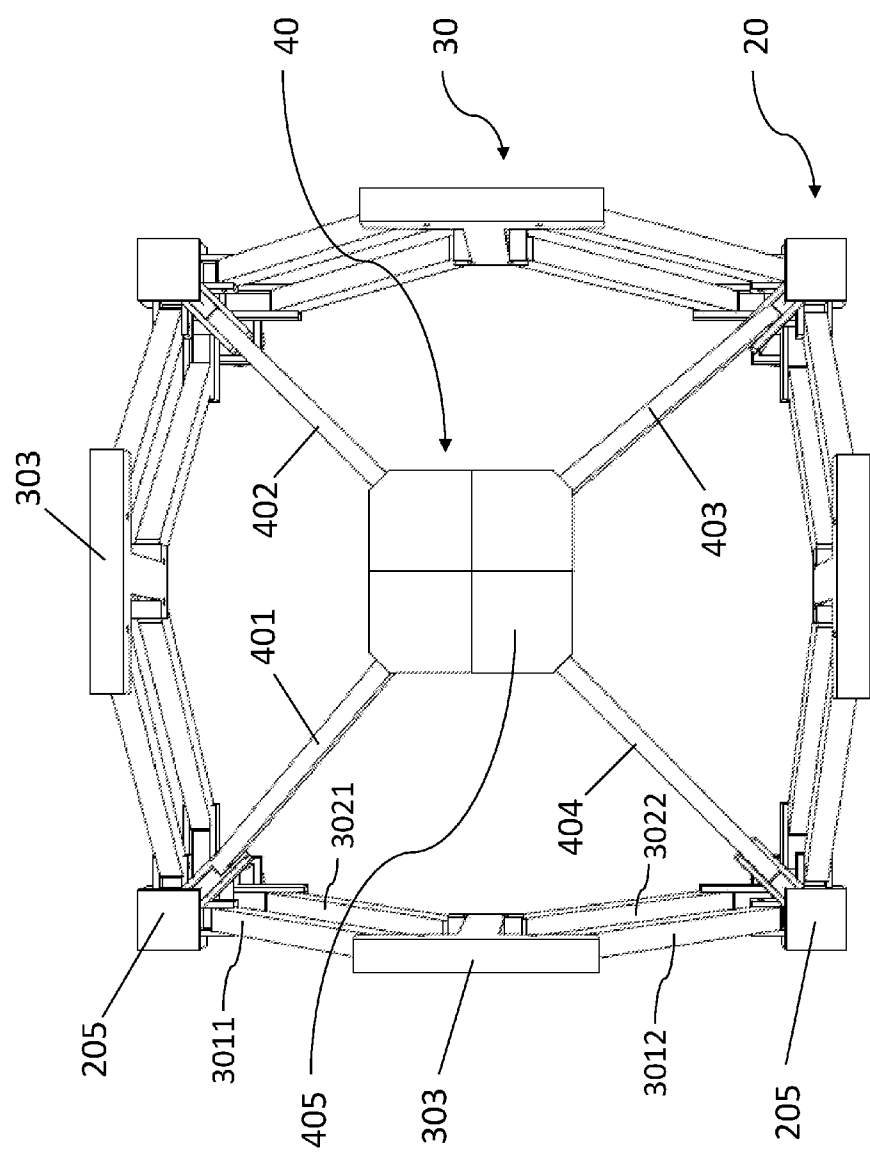


FIG. 5

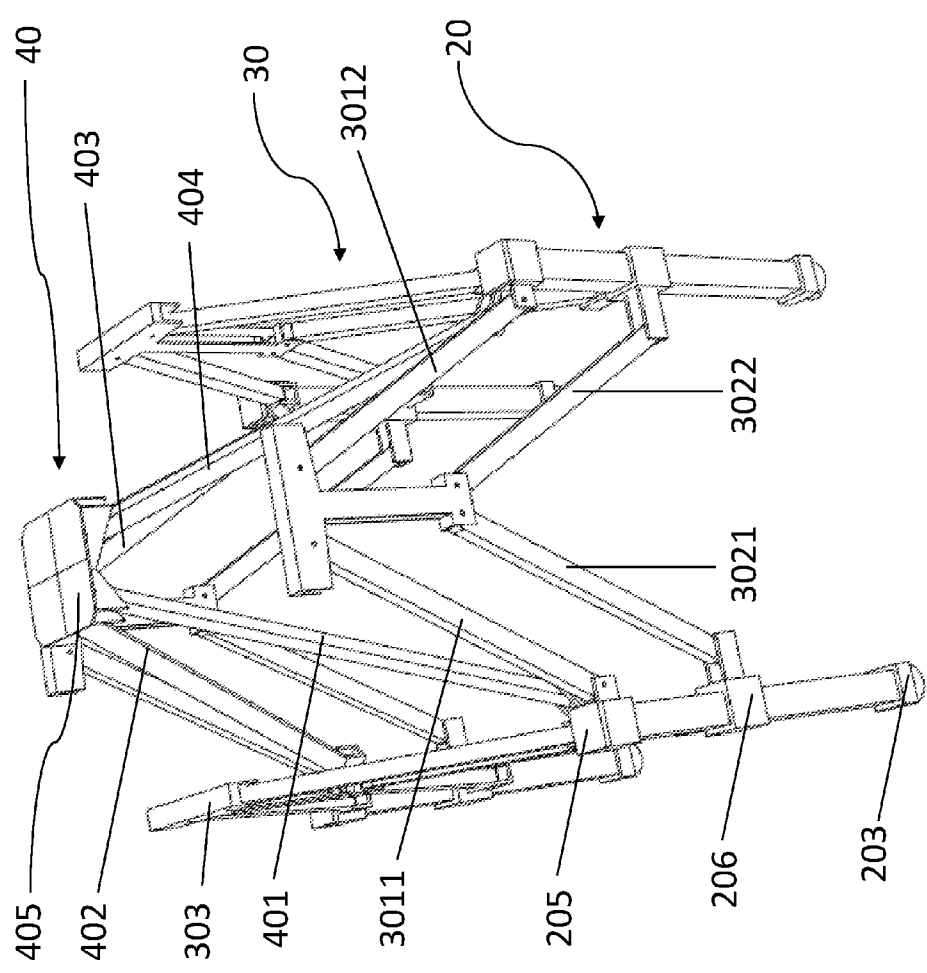


FIG. 6

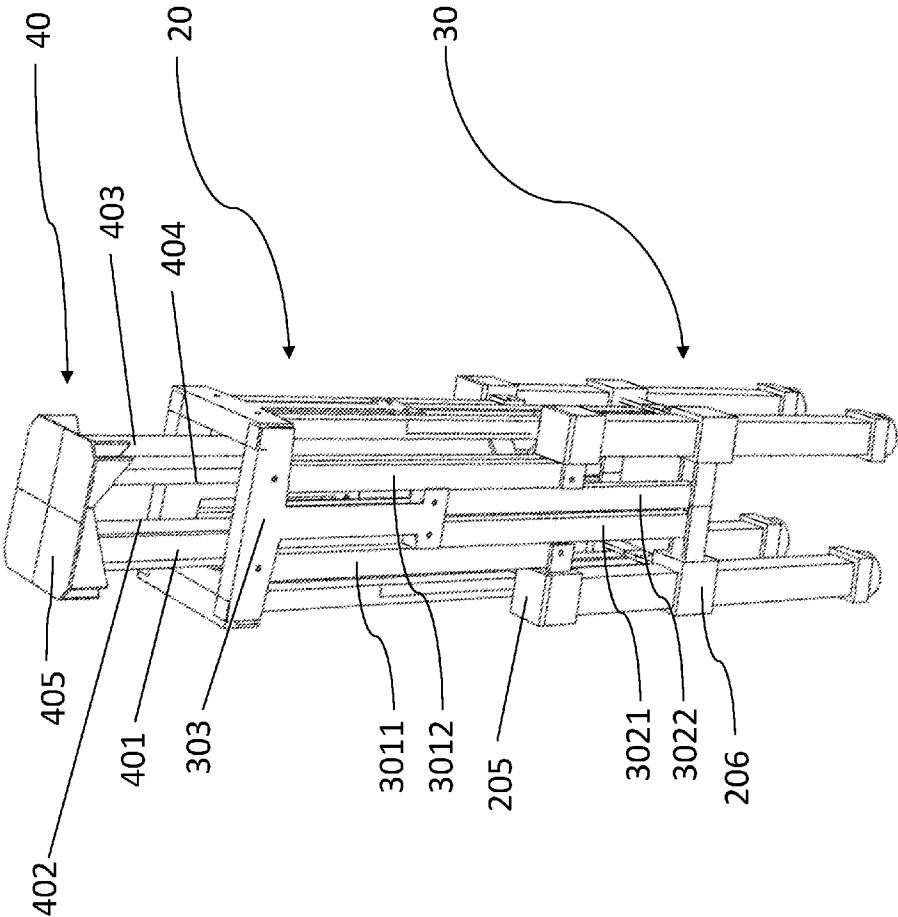


FIG. 7

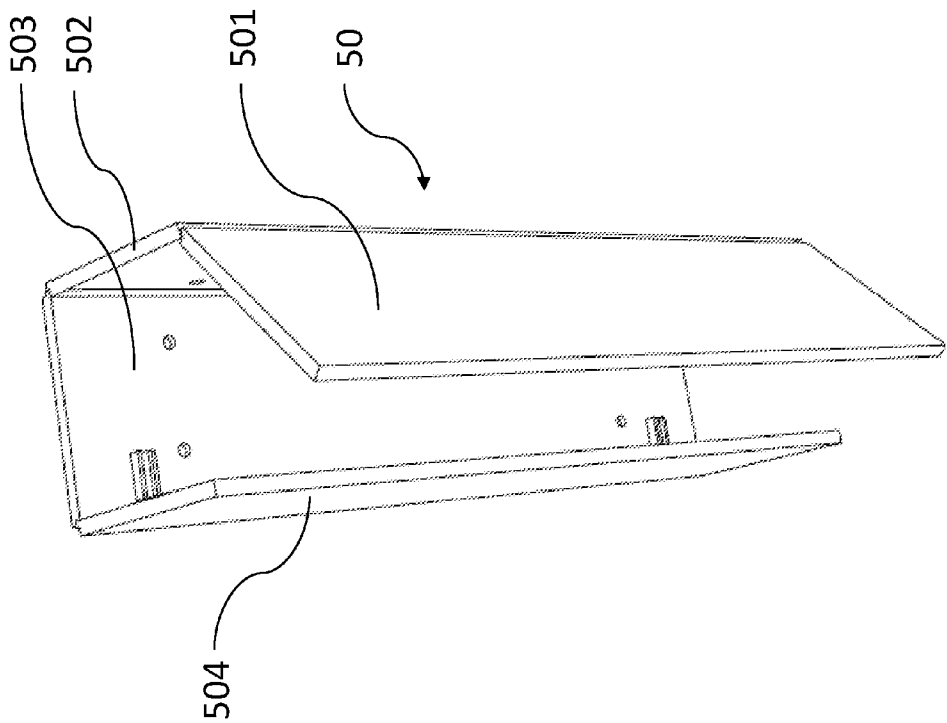


FIG. 8

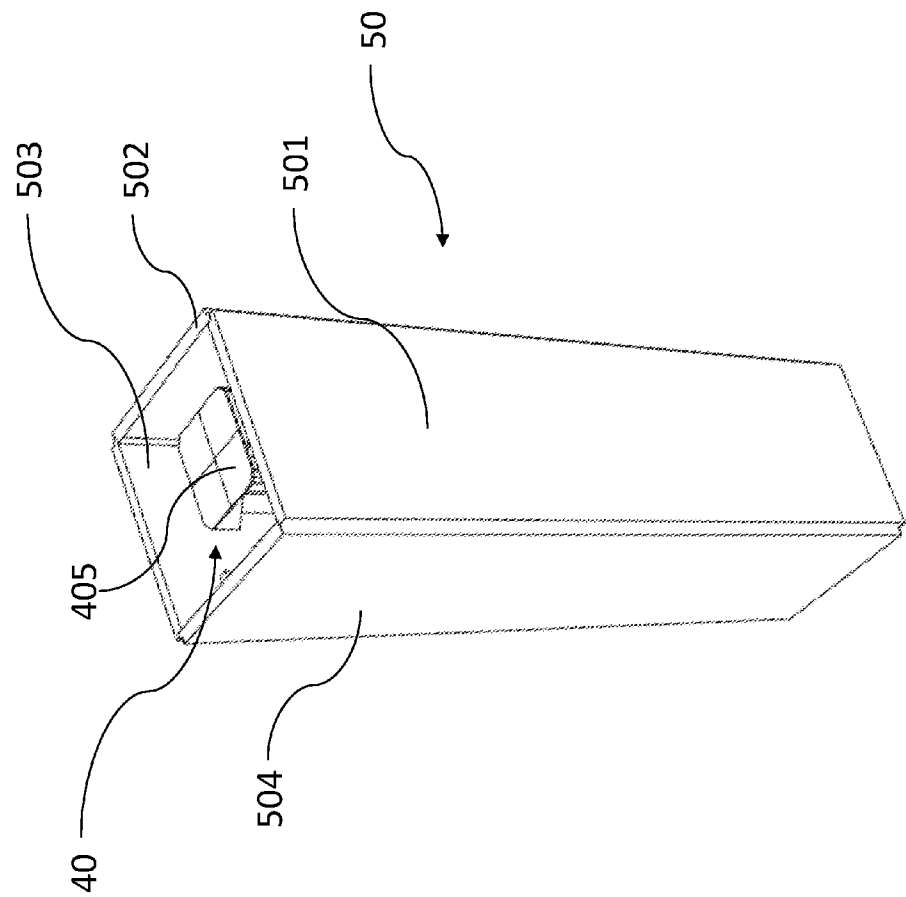


FIG. 9

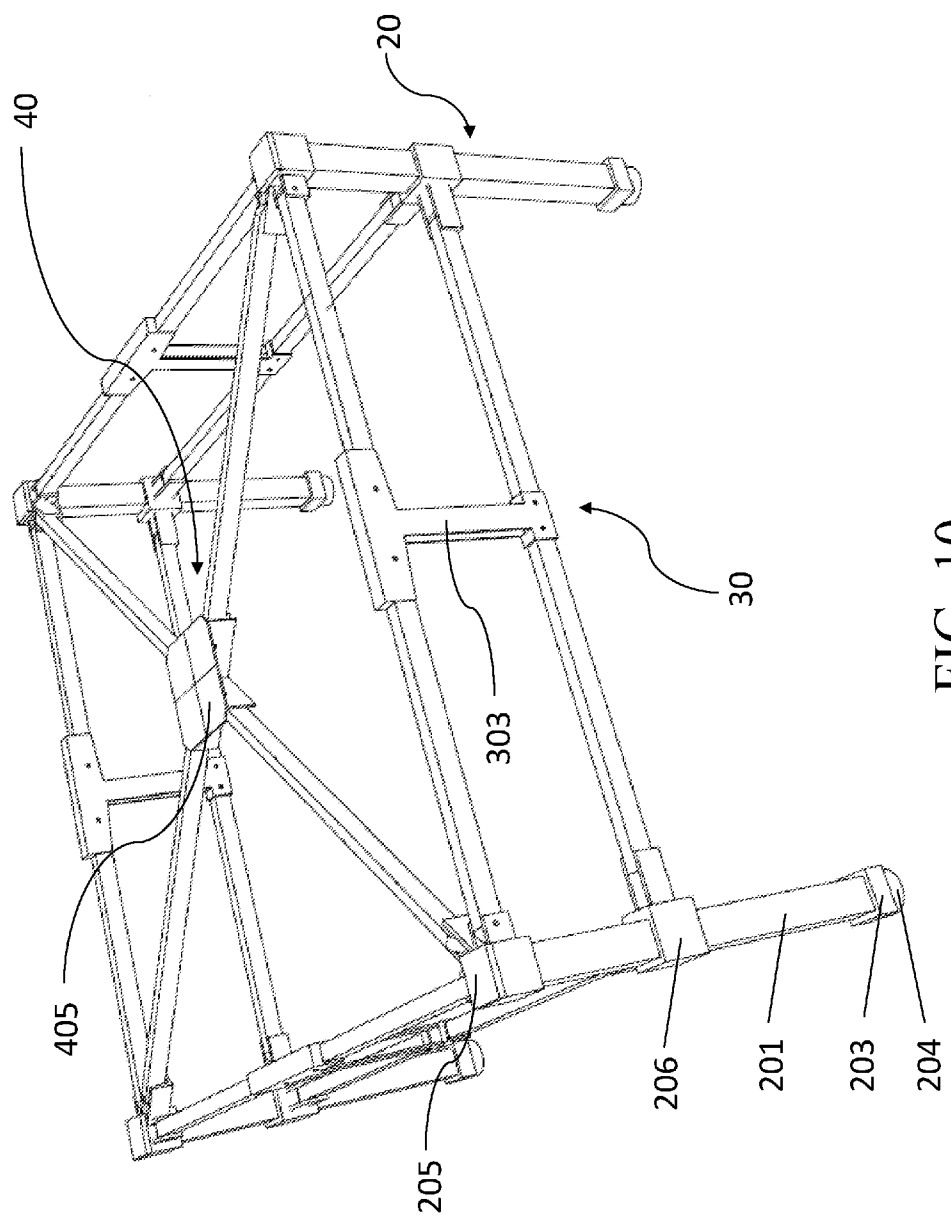


FIG. 10

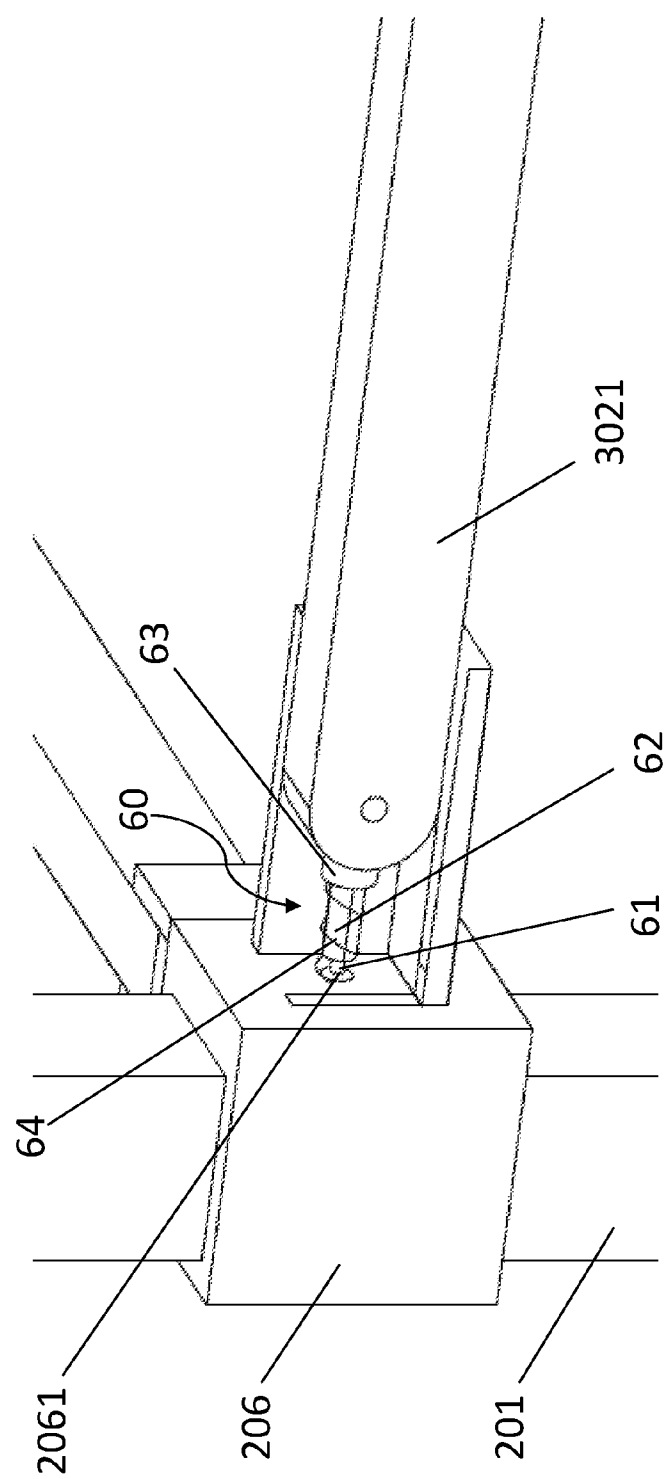


FIG. 11

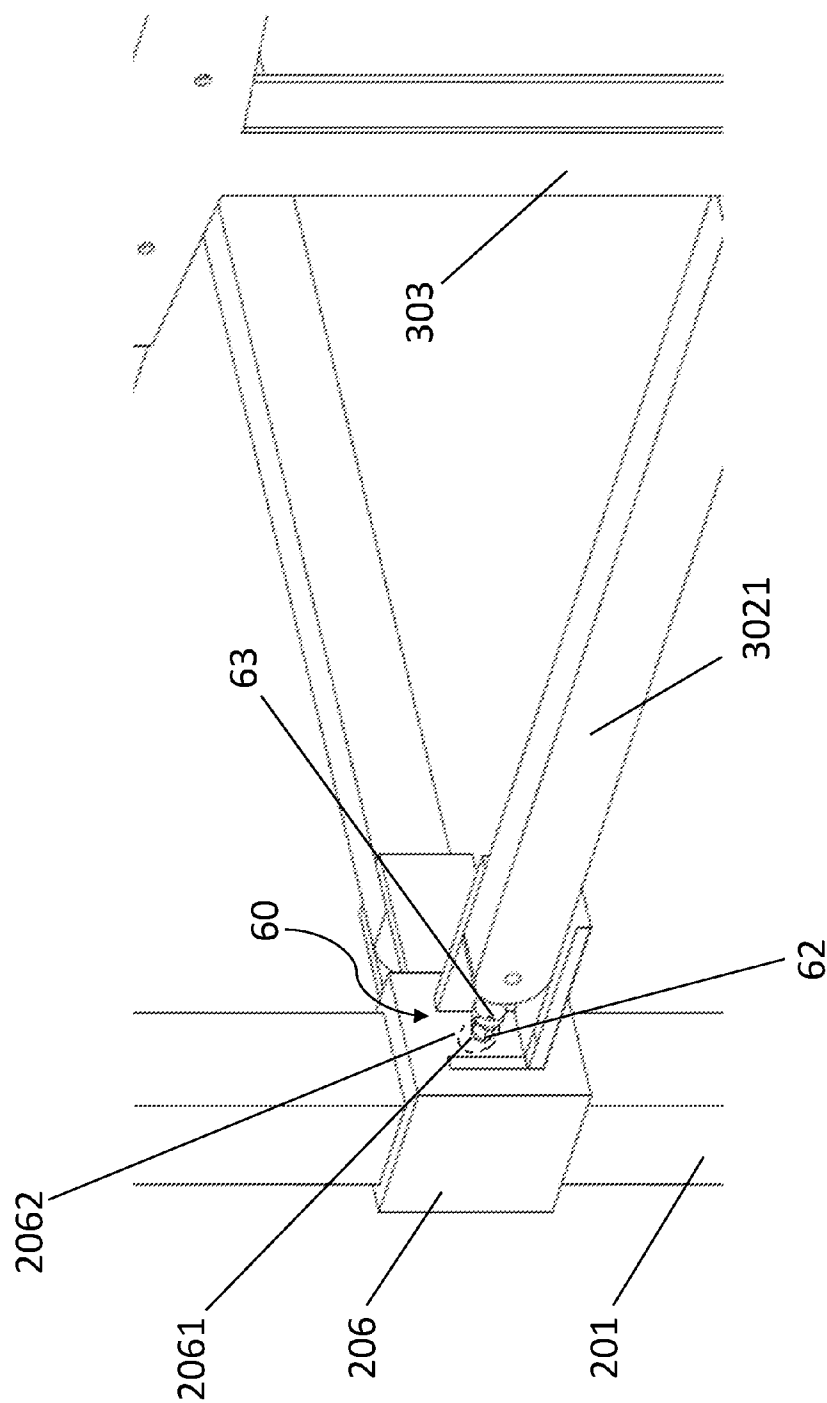


FIG. 12

FOLDING TABLE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority under 35 U.S.C. §119 (e) to U.S. Provisional Patent Application Ser. No. 62/144,262, filed on Apr. 7, 2015, which is a continuous-in-part (CIP) application of Ser. No. 14/176,816, filed on Feb. 10, 2014, now U.S. Pat. No. 9,021,964, which is incorporated herein by reference.

FIELD OF INVENTION

[0002] The present invention relates to a folding table, and more particularly to a folding table having a detachable table top and a collapsible supporting frame that can be more portable and more convenient for storage.

BACKGROUND OF THE INVENTION

[0003] In recent years, more and more people love outdoor and recreational activities such as camping, field trips, or Bar-B-Q during their free time because many people may endure high pressure at work, and have accumulated a lot of tension and stress. Not only can these outdoor activities help people release the stress, but also improve quality of life. Since most places for abovementioned outdoor activities do not have all the facilities, it may be more convenient for people to bring some outdoor furniture such as folding chairs, tables, etc. Thus, making the outdoor furniture light and easy to carry around become important issues for outdoor furniture manufacturers.

[0004] A conventional folding table may include a frame which can be collapsed and a table top that is assembled to the frame. The frame and the table top may be fixed together or they can be separated from each other when the folding table is disassembled. As previously mentioned, a desirable folding table has to be light so the user can easily carry the folding table around, and is expected to be conveniently operated, especially during the folding and unfolding processes. Furthermore, the desired folding table may have to be collapsed to a very compact size to reduce the space used for storage and transportation. Also, a desirable visual design is becoming an increasingly important factor for a folding table to be commercially successful in the current market.

[0005] US 2012/0285351 to Cohen discloses a lightweight folding table having a tabletop and legs that fold into smaller sizes. The tabletop has a main panel, a first side flap panel, and a second side flap panel. The first side flap panel and the second side flap panel are joined to the main panel with hinge connections. The hinge connections enable the first side flap panel and the second side flap panel to rotate from open positions that are coplanar with the main panel to folded positions that are under the main panel. However, the lightweight folding table disclosed by Cohen does not seem sturdy and the folding table includes too many pieces that have to be put together, which decreases the structural strength of the folding table and the assembly process may take long time. Recently, US 2013/0233210 discloses a foldable table including a table top and legs that are movable between an extended position and a collapsed position with better structural strength. However, increasing the structural strength also increases the weight of the folding table, as

well as material and manufacturing costs. In addition, this type of folding tables is not visually desirable for certain situations.

[0006] Therefore, there remains a need for a new and improved folding table that is structural strong, light-weight, visually desirable, and can be easily operated to overcome the problems stated above.

SUMMARY OF THE INVENTION

[0007] It is an object of the present invention to provide a folding table that can be quickly and easily folded and unfolded with strong structural support.

[0008] It is another object of the present invention to provide a folding table that can be folded to a compact unit to be more portable and more convenient for storage.

[0009] It is a further object of the present invention to provide a folding table with adjustable height and is visually desirable for various purposes.

[0010] In one aspect, a folding table in the present invention may include a supporting frame and a table top, and the supporting frame includes a leg portion, an interconnecting portion and a central supporting structure. In one embodiment, the leg portion may include four legs and the interconnecting portion is used to connect these legs to form a square supporting frame. The central supporting structure is located at center portion of the supporting frame to provide additional support to the folding table and more importantly, the central supporting structure is used to start the folding process of the folding table. The table top has one or more table pieces that are connected together and can be arranged to enclose the folded supporting frame therein, or unfolded as a flat surface putting on top of the supporting frame when in use.

[0011] In one embodiment, the leg portion has four legs that are located at four corners of the square supporting frame, and each leg has an upper section and a lower section. The upper section has a receiving space therein to completely and telescopically receive the lower section, so the height of the folding table is adjustable. It is noted that when the lower section is completely pulled out from the upper section, the lower section would be locked by a locking unit on each leg to secure the structure of the supporting frame. Furthermore, bottom portion of each lower section has a padding member which may be made of plastic, rubber or other applicable materials to prevent the folding table from unwanted lateral movements. A first connector is located on top of each leg, and a second connector is located within a predetermined distance below the first connector. Both the first connector and second connector are configured to connect with the interconnecting portion and the central supporting structure to form the supporting frame of the folding table.

[0012] In another embodiment, the first connector may include a pair of interconnecting slots to receive the upper bar members of the interconnecting portion, and a connecting slot located between two interconnecting slots to receive the connecting bars of the central supporting structure.

[0013] The interconnecting portion has four identical sub-portions to connect four legs to form the square supporting frame. Each of the sub-portions has an upper connecting portion and a lower connecting portion, wherein the upper connecting portion is configured to pivotally connect with two first connectors while the lower connecting portion is configured to pivotally connect with two second connectors.

More particularly, the upper connecting portion has two upper bar members and the lower connecting portion has two lower bar members. An interconnector is used to pivotally connect two upper bar members and two lower bar members.

[0014] The central supporting structure includes a plurality of connecting bars and a control piece to control the movement of the central supporting structure. In an exemplary embodiment, the control piece has four connecting slots underneath to pivotally connect with one end of each of the connecting bar, and the other end of each connecting bars is connected to the first connector on each leg to form a diagonal supporting structure.

[0015] The table top has a plurality of table pieces connected together to form a front surface of the table top. On back side of the table top, a plurality of securing units are disposed on two sides of the back side of the table top, and the securing units are aligned with two parallel upper connecting portions (each having with two parallel upper bar members), so the hollow securing units can be engaged with the upper bar members when a certain degree of pressure is applied to the front surface of the table top. It is noted that each of the four corners of the back side of the table top has a conjugating unit that can be inserted to a receiving slot on the first connector to further secure the table top.

[0016] In an exemplary embodiment, the control piece is mechanically connected with the locking unit, so when the control piece is lifted, the locking unit is triggered to unlock the lower section, and the lower section can be received in the receiving space of the upper section. In one embodiment, the lower section can move up automatically into the upper section when the control piece is lifted. It is also noted that the control piece is mechanically connected with the second connector, so the lower section can be locked again by the second connector when the lower section is received in the upper section to prevent the lower section from coming out when the supporting frame is transported.

[0017] In still an exemplary embodiment, a bullet head connector is used to lock the legs. The bullet head connector may include a head unit, a body unit, a base and a spring covering the body unit. An inner spring is received in the body unit, so the head unit is retractable from the body unit. When the table is not in a fully open position, the bullet head connector is not being inserted into the connecting hole. When the table is in the fully opening position but the legs are received in the upper section, the head unit and a portion of the body unit of the bullet head connector are inserted into the connecting hole.

[0018] More specifically, when the table is in the fully open position, the lower bar members pushes the head unit and a portion of the body unit into the connecting hole and the head unit is being pushed into the receiving space of the body unit when the head unit hits an outer surface of the legs. A conjugating hole is formed on the outer surface of the lower section of each leg closed to an upper portion thereof, so that when the lower section of each legs is released from the upper portion, the retractable head unit is configured to automatically come out and insert into the conjugating hole to lock the legs to secure the legs when the connecting hole and conjugating hole are aligned with each other.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] FIG. 1 illustrates a schematic view of a folding table having a supporting frame and a table top in the present invention.

[0020] FIG. 2 is a schematic view of the back side of the table top of the folding table in the present invention.

[0021] FIG. 3 illustrates a schematic view of the supporting frame of the folding table in the present invention.

[0022] FIG. 4 illustrates a schematic view of the first connector of the folding table in the present invention.

[0023] FIG. 5 illustrates a top view of the supporting frame of the folding table when the folding process starts in the present invention.

[0024] FIG. 6 illustrates a front view of the supporting frame of the folding table in the present invention during the folding process.

[0025] FIG. 7 illustrates a front view of the supporting frame of the folding table in the present invention when the supporting frame is totally folded.

[0026] FIG. 8 illustrates a schematic view of the table top when it is folded in the present invention.

[0027] FIG. 9 illustrates a schematic view of the supporting frame enclosed by the table top in the present invention.

[0028] FIG. 10 illustrates a schematic view of the supporting frame when the lower section is still received in the upper section.

[0029] FIG. 11 illustrates a schematic view of a bullet head connector used to lock the legs in the present invention.

[0030] FIG. 12 illustrates a schematic view of a bullet head connector used to lock the legs in the present invention when the table is in a fully open position.

DETAILED DESCRIPTION OF THE INVENTION

[0031] The detailed description set forth below is intended as a description of the presently exemplary device provided in accordance with aspects of the present invention and is not intended to represent the only forms in which the present invention may be prepared or utilized. It is to be understood that the same or equivalent functions and components may be accomplished by different embodiments that are also intended to be encompassed within the spirit and scope of the invention.

[0032] Unless defined otherwise, all technical and scientific terms used herein have the same meanings as commonly understood to one of ordinary skill in the art to which this invention belongs. Although any methods, devices and materials similar to or equivalent to those described can be used in the practice or testing of the invention, the exemplary methods, devices and materials are now described.

[0033] All publications mentioned are incorporated by reference for the purpose of describing and disclosing, for example, the designs and methodologies that are described in the publications that might be used in connection with the presently described invention. The publications listed or discussed above, below and throughout the text are provided solely for their disclosure prior to the filing date of the present invention. Nothing herein is to be construed as an admission that the inventors are not entitled to antedate such disclosure by virtue of prior invention.

[0034] In order to further understand the goal, characteristics and effect of the present invention, an exemplary embodiment of the present invention, and the operation and

benefit of the exemplary embodiment are illustrated along with the drawings as following:

[0035] As illustrated in FIGS. 1 to 3, a folding table in the present invention may include a supporting frame 10 and a table top 50, and the supporting frame 10 includes a leg portion 20, an interconnecting portion 30 and a central supporting structure 40. In one embodiment, the leg portion 20 may include four legs (21, 22, 23, 24), and the interconnecting portion 30 is used to connect these legs to form a square supporting frame 10 as shown in FIG. 3. The central supporting structure 40 is located at center portion of the supporting frame 10 to provide additional support to the folding table and more importantly, the central supporting structure 40 is used to start the folding process of the folding table. The table top 50 has one or more table pieces (501, 502, 503, 504) that are connected together and can be arranged to enclose the folded supporting frame 10 therein as shown in FIG. 9, or unfolded as a flat surface putting on top of the supporting frame 10 when in use.

[0036] More specifically, the leg portion 20 has four legs (21, 22, 23, 24) that are located at four corners of the square supporting frame 10, and each leg has an upper section 201 and a lower section 202. The upper section 201 has a receiving space therein to completely and telescopically receive the lower section 202, so the height of the folding table is adjustable as shown in FIGS. 3 and 10. It is noted that when the lower section 202 is completely pulled out from the upper section 201, the lower section 202 would be locked by a locking unit 203 on each leg to increase structural stability of the supporting frame 10. Furthermore, bottom portion of each lower section 202 has a padding member 204 which may be made of plastic, rubber or other applicable materials to prevent the folding table from unwanted lateral movements. A first connector 205 is located on top of each leg (21, 22, 23, 24), and a second connector 206 is located within a predetermined distance below the first connector 205. Both the first connector 205 and second connector 206 are configured to connect with the interconnecting portion 30 and the central supporting structure 40 to form the supporting frame 10 of the folding table. As shown in FIG. 4, the first connector 205 may include a pair of interconnecting slots 2051 to receive the upper bar members of the interconnecting portion 30, and a connecting slot 2052 located between two interconnecting slots to receive the connecting bars of the central supporting structure 40.

[0037] As shown in FIG. 3, the interconnecting portion 30 has four identical sub-portions (31, 32, 33, 34) to connect with four legs to form the supporting frame 10. Each of the sub-portions (31, 32, 33, 34) has an upper connecting portion 301 and a lower connecting portion 302, wherein the upper connecting portion 301 is configured to pivotally connect with two first connectors 205 while the lower connecting portion 302 is configured to pivotally connect with two second connectors 206. More particularly, the upper connecting portion 301 has two upper bar members (3011 and 3012) and the lower connecting portion 302 has two lower bar members (3021 and 3022). An interconnector 303 is used to pivotally connect two upper bar members 3011 and 3012, and two lower bar members 3021 and 3022. As can be seen in FIGS. 3, 6 and 7, the interconnector 303 can be a T-shaped unit to pivotally connect two upper bar members 3011 and 3012 on top portion of the T-shaped unit,

and to pivotally connect two lower bar members 3021 and 3022 at bottom portion thereof.

[0038] The central supporting structure 40 includes a plurality of connecting bars (401, 402, 403, 404) and a control piece 405 to control the movement of the central supporting structure 40. In an exemplary embodiment, the control piece 405 has four connecting slots underneath to pivotally connect with one end of each of the connecting bars (401, 402, 403, 404), and the other end of each connecting bars (401, 402, 403, 404) is connected to the first connector 205 on each leg to form a diagonal supporting structure as shown in FIGS. 3 and 10.

[0039] The table top 50 has a plurality of table pieces (501, 502, 503, 504) connected together to form a front surface and a back surface of the table top 50. As shown in FIG. 2, on back surface of the table top 50, a plurality of securing units 505 are disposed on two parallel sides of the back surface of the table top 50, and the securing units 505 are aligned with two parallel upper connecting portions 301 (each having with two parallel upper bar members (3011, 3012)), so the hollow securing units 505 can be engaged with the upper bar members (3011, 3012) when a certain degree of pressure is applied to the front surface of the table top 50. It is noted that each of the four corners of the back surface of the table top 50 has a conjugating unit 506 that can be inserted to a receiving slot 2053 on the first connector 205 to further secure the table top 50, as shown in FIGS. 2 and 4.

[0040] When the user wishes to fold the folding table in the present invention, he/she can first remove the table top 50 from the supporting frame 10, as shown in FIGS. 1 to 3. To fold the supporting frame 10, the user can simply hold and lift the control piece 405 of the central supporting structure 40, and due to gravity, the entire supporting frame 10 starts to collapse as shown in FIGS. 5 and 6. More specifically, when the control piece 405 is lifted, four connecting bars (401, 402, 403, 404) that are pivotally connected with the control piece 405 are inwardly moved until each connecting bar becomes parallel with the leg portion 20. Meanwhile, the movement of the connecting bars (401, 402, 403, 404) triggers the movement of the interconnecting portion 30 and the leg portion 20. As stated above, on each side of the supporting frame 10, the interconnecting portion 30 has a T-shaped interconnector 303 used to pivotally connect two upper bar members (3011 and 3012) on the top portion thereof, and to pivotally connect two lower bar members (3021 and 3022) at the bottom portion thereof. When the supporting frame 10 starts to collapse, two upper bar members (3011 and 3012) and two lower bar members (3021 and 3022) start to move downwardly until all upper and lower bar members become parallel with the leg portion 20, as shown in FIGS. 6 and 7.

[0041] It is noted that the control piece 405 is mechanically connected with the locking unit 20, so when the control piece 405 is lifted, the locking unit 203 is triggered to unlock the lower section 202, and the lower section 202 can be received in the receiving space of the upper section 201. In one embodiment, the lower section 202 can move up automatically into the upper section when the control piece 405 is lifted. It is also noted that the control piece 405 is mechanically connected with the second connector 206, so the lower section 202 can be locked again by the second connector 206 when the lower section 202 is received in the upper section 201 to prevent the lower section 202 from

coming out when the supporting frame **10** is transported. Therefore, when the user wishes to fold the supporting frame **10**, the size of the supporting frame **10** can be significantly reduced and the entire structure thereof can be collapsed to become a compact unit as shown in FIG. 7. The table top **50** can be folded and the supporting frame **10** can be enclosed therein when the supporting frame **10** is fully collapsed and folded, as illustrated in FIGS. 8 and 9. It is advantageous for the user because the folding table can be transported as one unit and the size of the folding table has been significantly reduced.

[0042] When the user wishes to use the folding table in the present invention, the unfolding process is as simple as the folding process. The user can simply take the supporting frame **10** out from the folded table top **50** to start the unfolding process. As shown in FIG. 7, the connecting bars (**401**, **402**, **403**, **404**) of the central supporting structure **40**, and the upper bar members (**3011**, **3012**) and the lower bar members (**3021**, **3022**) of the interconnecting portion **30** are parallel with the leg portion **20** when the supporting frame **10** is fully folded. Since the connecting bars (**401**, **402**, **403**, **404**), and the upper bar members (**3011**, **3012**) and the lower bar members (**3021**, **3022**) are pivotally connected with the control piece **405** and the interconnector **303** respectively, the user may not have to use too much effort to move the connecting bars, the upper bar members and the lower bar members until they become perpendicular with the leg portion **20** to fully unfold the supporting frame **10**, as shown in FIG. 10. It is noted that the supporting frame **10** shown in FIG. 10 is ready for use if the user would like to put the table top **50** thereon because sometimes the user may just want to sit on the floor at home with a shorter table, or sit on the lawn or grass when the user is in the park.

[0043] As illustrated in FIG. 10, the lower section **202** of each leg is still received inside the upper section **201**. Since the control piece **405** is mechanically connected with the second connector **206** and if the user wishes to adjust the height of the folding table, he/she can push the control piece **405** down to trigger the second connector **206** to unlock the lower section **202** inside the upper section **201**, and the lower section **202** of each leg can be pulled out to increase the height of the folding table. When the lower section **202** on each leg comes out as shown in FIG. 3, the lower section **202** would be locked again by the locking unit **203** to further secure the structure of the supporting frame **10**.

[0044] In a further embodiment, a bullet head connector **60** is used to lock the legs (**21**, **22**, **23**, **24**). The bullet head connector **60** may include a head unit **61**, a body unit **62**, a base **63** and a spring **64** covering the body unit **62**. An inner spring (not shown) is received in the body unit **62**, so the head unit **61** is retractable from the body unit **62**. When the table is not in a fully open position, the bullet head connector **60** is not being inserted into the connecting hole **2061**, as shown in FIG. 11. As shown in FIG. 10, when the table is in the fully opening position but the legs **21** to **24** are received in the upper section **201**, the head unit **61** and a portion of the body unit **62** of the bullet head connector **60** are inserted into the connecting hole **2061** as shown in FIG. 12.

[0045] More specifically, when the table is in the fully open position, the lower bar members **3021** pushes the head unit **61** and a portion of the body unit **62** into the connecting hole **2061** and the head unit **61** is being pushed into the receiving space of the body unit **62** when the head unit **61** hits an outer surface of the legs **21** to **24**. A conjugating hole

2062 is formed on the outer surface of the lower section **202** of each leg closed to an upper portion thereof, so that when the lower section **202** of each legs (**21** to **24**) is released from the upper portion **201**, the retractable head unit **61** is configured to automatically come out and insert into the conjugating hole **2062** to lock the legs **21** to **24** to secure the legs when the connecting hole **2061** and conjugating hole **2062** are aligned with each other.

[0046] Having described the invention by the description and illustration above, it should be understood that there are exemplary of the invention and are not to be considered as limiting. Accordingly, the invention is not to be considered as limited by the foregoing description, but includes any equivalents.

What is claimed is:

1. A folding table comprising:

a supporting frame including a leg portion, an interconnecting portion and a central supporting structure; and a table top that is detachable from the supporting frame, wherein the leg portion includes a plurality of legs and the interconnecting portion is used to connect the legs of the leg portion, and the central supporting structure is located at center portion of the supporting frame to provide additional support to the supporting frame and is configured to start a table folding process,

wherein the leg portion has four legs that are located at four corners of the supporting frame, and each leg has an upper section and a lower section,

wherein the interconnecting portion has four identical sub-portions to connect with four legs, and each of the sub-portions has an upper connecting portion and a lower connecting portion, wherein the upper connecting portion is configured to pivotally connect with two first connectors while the lower connecting portion is configured to pivotally connect with two second connectors,

wherein the upper connecting portion has two upper bar members and the lower connecting portion has two lower bar members, and an interconnector is used to pivotally connect two upper bar members and two lower bar members,

wherein a bullet head connector is disposed at each of both ends of the lower bar members to lock the lower section of each leg through a connecting hole on the upper section of each leg when the lower section thereof is released from the upper section thereof.

2. The folding table of claim 1, wherein the bullet head connector includes a head unit, a body unit, a base, and a spring covering the body unit, and the head unit is retractable from the body unit.

3. The folding table of claim 1, wherein when the table is in a fully opening position but the lower section of each leg is still received in the upper section, the head unit and a portion of the body unit of the bullet head connector are pushed into the connecting hole by the lower bar member.

4. The folding table of claim 1, wherein a conjugating hole is formed on the outer surface of the lower section of each leg closed to an upper portion thereof, so that when the lower section of each legs is released from the upper portion, the retractable head unit is configured to automatically come out and insert into the conjugating hole to lock the legs to secure the legs when the connecting hole and conjugating hole are aligned with each other.