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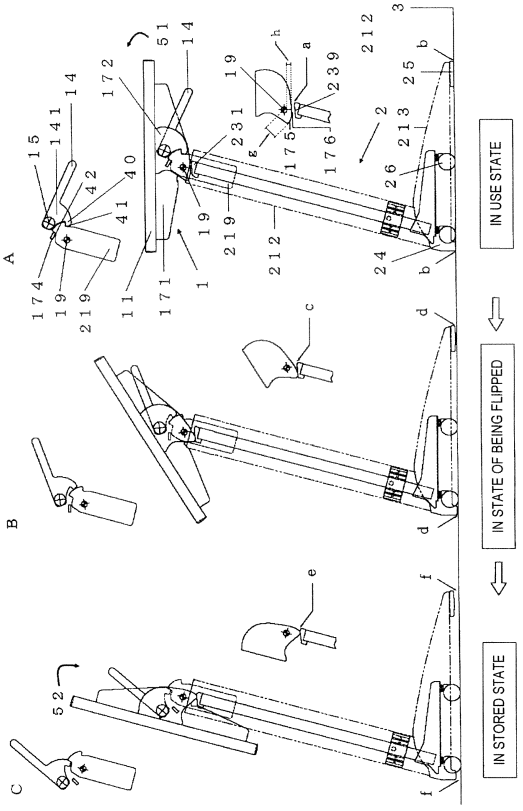
(54) FLIP-UP TABLE, TOP BOARD FOR FLIP-UP TABLE, LEG FOR FLIP-UP TABLE, AND METHOD FOR STOWING TOP BOARD

(57) The number of components of a flip-up table that can move a top board body from a use position to a stored position is reduced. A flip-up table of the present invention includes: a top board body movable to a use position and to a stored position; a cam which is connected to the top board body and swingable about a supporting shaft as the top board body is moved; a first leg which is connected to the supporting shaft, and supports the top board body when the top board body is in the use position; and a second leg which is movable with respect to the first leg, and supports the top board body via a supporting surface when the top board body is in the stored position; wherein, when the top board body is in the use position, the supporting surface faces a facing portion of the cam, and, when the top board body is in the stored position, the supporting surface is in contact with a contact portion of the cam, and a distance from the supporting shaft to the contact portion is longer than a distance from the supporting shaft to the facing portion.

FIG. 10



EP 2 599 404 A1

Description

Technical Field

[0001] The present invention relates to a flip-up table that can store a top board from a use position to a stored position, the top board for the flip-up table, a leg for the flip-up table, and a method for storing the top board.

Background Art

[0002] Conventionally, flip-up tables that can store a top board from a use position to a stored position for containing the tables in a warehouse or the like have been known. Among these flip-up tables, there has been a movable table, in which casters protrude downward from a bottom end of a leg portion and are in contact with a floor surface, and which is movable on the floor surface (PTL 1). This movable table includes: a swingable fine adjusting lock lever; a link member that turns a float interlock pipe as the fine adjusting lock lever is swung; a lifting mechanism that causes the casters to protrude according to a rotation of the float interlock pipe, and the like. In a state where the top board is at the use position, the lifting mechanism causes the casters to be apart from the floor surface. In a state where the top board is at the stored position, the lifting mechanism causes the casters to be in contact with the floor surface.

Citation List

Patent Literature

[0003] PTL 1: Japanese Patent Application Laid-Open No. 2008-104793 (Abstract, Figs. 1 and 7)

Summary of Invention

Technical Problem

[0004] However, this movable table requires a plurality of components, such as a rod, a lever and a float, for the lifting mechanism. Furthermore, the rod and the like are required to be linked to each other in a movable manner. Accordingly, the number of components is large and assembly is complicated. The manufacturing cost is high and the manufacturing time is also long.

Solution to Problem

[0005] In order to solve the above problems, a flip-up table of the present invention includes: a top board body movable to a use position and to a stored position; a cam which is connected to the top board body and swingable about a supporting shaft as the top board body is moved; a first leg which is connected to the supporting shaft, and supports the top board body when the top board body is in the use position; and a second leg which is movable with respect to the first leg, and supports the top board body via a supporting surface when the top board body is in the stored position; wherein, when the top board body is in the use position, the supporting surface faces a facing portion of the cam, and, when the top board body is in the stored position, the supporting surface is in contact with a contact portion of the cam, and a distance from the supporting shaft to the contact portion is longer than a distance from the supporting shaft to the facing portion.

Advantageous Effects of Invention

[0006] According to the flip-up table of the present invention, the top board body is moved from the use position to the stored position, thereby allowing the supporting to be easily switched from supporting by the first leg to supporting by the second leg. The switching is achieved by the cam connected to the top board body and the supporting surface of the second leg. Accordingly, in comparison with the conventional art, the number of components of the flip-up table can be reduced. Since the number of components is reduced, the flip-up table can be easily assembled. This can reduce the manufacturing cost and manufacturing time.

Brief Description of Drawings

[0007]

Fig. 1 shows a top view and a back view of a flip-up table.
Fig. 2 shows side views of the flip-up table in a use state and a stored state.
Fig. 3 shows a schematic side view of a top board.
Fig. 4 shows a diagram showing a lock lever, a lock plate and a lock spring.
Fig. 5 shows a schematic side view of a leg.
Fig. 6 shows a partially enlarged sectional view of the flip-up table in the use state.
Fig. 7 illustrates a first leg.
Fig. 8 illustrates a guide cap.
Fig. 9 illustrates a second leg.
Fig. 10 illustrates an operation of the flip-up table.

Description of Embodiments

[0008] An embodiment of the present invention will hereinafter be described based on drawings. Fig. 1A is a top view of a flip-up table of the present invention. Fig. 1B is a back view, and shows a state where the flip-up table is viewed from a user side. Figs. 1A and 1B show a state where a top board 1 is in a use position.

[0009] The flip-up table includes the top board 1 and a pair of legs 2 for supporting the top board 1. The top board 1 is supported in a movable manner with respect to the pair of legs 2. The top board 1 includes a top board body 11 supported substantially parallel to a ground sur-

face 3 in a use state. Note that, in a stored state, the top board body 11 is supported in a state of being inclined to a perpendicular line extending from the ground surface 3 to the flip-up table by a few degrees.

[0010] The pair of legs 2 includes leg frames 21 as first legs supporting the top board 1 when the top board body 11 is at the use position. The pair of leg frames 21 are coupled to each other by a rail 22. Although not shown in Fig. 1, an inner leg 23, which is a second leg supporting the top board 1 when the top board body 11 is at the stored position, is stored in the inside of the leg frame 21 (Fig. 5).

[0011] A modesty panel 12 is attached to the top board body 11. Furthermore, a top board frame 13 is attached to the top board body 11. The top board frame 13 is welded to a pair of top board arms 17 (Fig. 2). That is, the pair of top board arms 17 are coupled by the top board frame 13. Lock levers 14 for locking the top board 1 or releasing the locking of the top board 1 are swingably attached to the pair of top board arms 17, respectively. The pair of lock levers 14 are coupled by a lever shaft 15. Accordingly, as one lock lever 14 is swung about a lever shaft 15, the other lock lever 14 is also swung about the lever shaft 15 in synchronization therewith.

[0012] Fig. 2 shows side views of the flip-up table. Fig. 2A shows the flip-up table in a state where the top board body 11 is at the use position, that is, in the use state. Fig. 2B shows the flip-up table in a state where the top board body 11 is at the stored position, that is, in the stored state. The flip-up table of the present invention is bilaterally symmetrical. Accordingly, only one side view is shown, and the other side view is omitted.

[0013] A top board arm 17, which is a connecting part for connecting the top board 1 and the leg 2 to each other, is screwed to the top board body 11. The lock lever 14 is attached to the top board arm 17. As the lock lever 14 is swung toward the top board 1 in a direction indicated by an arrow 50, the locking is released. At the use position, the top board body 11 is supported substantially parallel to the ground surface 3. Releasing the locking of the top board 1 allows the top board 1 to turn to the stored position shown in Fig. 2B. The modesty panel 12 is coupled to the leg frames 21 via links 18, and to the top board 1 via links (not shown). Accordingly, as the top board 1 is turned between the use position and the stored position, the modesty panel 12 also moves in accordance with turning of the top board 1.

[0014] The top board 1 in the use state is supported by the leg frame 21. Accordingly, base caps 24 attached to base frames 213 of the respective leg frames 21, and adjusters 25 screwed to the respective base frames 213 are contact with the ground surface 3. As the top board 1 is moved to the stored position, the top board 1 is moved in a direction away from the ground surface 3 in a manner supported by the inner legs 23 stored in the leg frames 21. At this time, the leg frames 21 are also moved in accordance with the top board 1. Accordingly, the base caps 24 and the adjusters 25 are also moved in the direction away from the ground surface 3. This allows the top board 1 in the stored state to be supported by the inner legs 23. Accordingly, only a pair of casters 26 attached to the inner legs 23 are in contact with the ground surface 3.

[0015] Guide caps 27 are fitted into tip ends of the respective leg frames 21. The guide cap 27 shields a cam portion and the like of the top board arm 17 from the outside. This prevents a user from getting his/her finger or the like faultily caught in a gap between the top board arm 17 and the leg frame 21. A hook 28, on which an object can be hung, is formed on the guide cap 27. Note that, if there is no need to hang an object, the hook 28 is not necessarily formed.

[0016] Fig. 3 shows the top board 1 of the flip-up table. Fig. 3A is a schematic side view of the top board 1. Fig. 3B shows an enlarged sectional view of Fig. 3A taken along line A-A. In Fig. 3A, illustration of the modesty panel 12 and a lock spring are omitted. The top board 1 has the bilaterally symmetrical configuration. Accordingly, Fig. 3A only shows one side view of the top board 1.

[0017] Referring to Fig. 3A, the top board arm 17, which is formed of a steel plate, is screwed on the undersurface of the top board body 11 of the top board 1, i.e. on a surface of the leg 2 side. The top board arm 17 has a U-shaped cross-section, which includes: a supporting portion 171 supporting the top board body 11; a cam portion 172 which is a cam of the flip-up table; and a central portion 173 between the supporting portion 171 and the cam portion 172. The top board arm 17 is screwed to the top board body 11 by screws inserted into respective screw holes formed in the central portion 173. The top board frame 13 is welded to the supporting portion 171.

[0018] Furthermore, the lock lever 14 is attached to the top board arm 17. The lock lever 14 is swingable about the lever shaft 15. A lock plate 141 is attached to the inside of the lock lever 14. When the top board 1 is supported at the use position, the lock plate 141 is in contact with a first engaging groove 41 (Fig. 5A) of a rail frame 219 of the leg frame 21. The supporting portion 171 and the cam portion 172 of the top board arm 17 are coupled to each other by a stopper 174. When the top board 1 is supported at the use position, the stopper 174 is in contact with a second engaging groove 42 (Fig. 5A) of the rail frame 219. Furthermore, holes 177, into which the supporting shaft for supporting the top board 1 is inserted, are formed at the supporting portion 171 and the cam portion 172.

[0019] A contact portion 175, which is in contact with the supporting surface of the leg 2 when the top board body 11 is at the stored position, is formed at the cam portion 172. Furthermore, a facing portion 176, which is opposed to the supporting surface of the leg 2 when the top board body 11 is at the use position, is formed at the cam portion 172. The distance from the hole 177 of the supporting shaft to the contact portion 175 is longer than the distance from the hole 177 of the supporting shaft to

the facing portion 176. Accordingly, when turning of the top board body 11 causes the contact portion 175 to come into contact with and run onto the supporting surface of the leg 2, the supporting shaft moves in the direction away from the ground surface. This also moves the top board arm 17 having the cam portion 172 in the direction away from the ground surface. Note that, in a state where the top board 1 is attached to the legs 2, the distance from the supporting shaft 19 to the contact portion 175 is longer than the distance from the supporting shaft 19 to the facing portion 176 (Fig. 10).

[0020] As shown in Fig. 3B, which is a sectional view of Fig. 3A taken along line A-A, the lock plate 141 is attached to the lock lever 14. The lock plate 141 is swung in accordance with swinging of the lock lever 14. A lock spring 144 is engaged with a spring receiving portion 143 of the lock lever 14. One end of the lock spring 144 is in contact with the central portion 173 of the top board arm 17, and the other end is in contact with a stopper 148 (Fig. 4) of the lock lever 14. Thus, the lock spring 144 urges the lock lever 14 in a direction away from the top board body 11. Accordingly, in order to release the locking, a user swings the lock lever 14 against the urging force by the lock spring 144.

[0021] Moreover, the lever shaft 15 is inserted into the lock lever 14 and the lock plate 141. The lever shaft 15 is further inserted into the holes 142 of the cam portion 172 and the supporting portion 171 of the top board arm 17. Accordingly, the lock lever 14 can be swung about the lever shaft 15. Note that the lever shaft 15 is attached to the cam portion 172 by an outer fastener 145, and to the supporting portion 171 by an inner fastener 146.

[0022] Fig. 4 shows exploded views of the lock lever 14, the lock plate 141 and the lock spring 144. A groove 147 for storing the lock plate 141 is formed in the lock lever 14. The lock plate 141 is fitted into the groove 147. The spring receiving portion 143 is formed at the lock lever 14. The lock spring 144 is engaged with the spring receiving portion 143. One end of the lock spring 144 engaged with the spring receiving portion 143 is in contact with the stopper 148 of the lock lever 14.

[0023] Holes 149, into which the lever shaft 15 is inserted, is formed in the lock plate 141 and the spring receiving portion 143. Note that, since the lever shaft 15 of this embodiment has a rectangular cross-section, every hole 149 has an externally rectangular shape. An engaging protrusion 40, which is in contact with the engaging groove of the rail frame 219 of the leg frame 21, is formed at the lock plate 141.

[0024] Fig. 5A is a schematic side view showing the leg 2 in the state where the top board 1 is at the use position. Fig. 5B is an enlarged sectional view of Fig. 5A taken along line B-B. Each of the pair of legs 2 has symmetric configuration. Accordingly, Fig. 5 only shows one leg 2, and illustration of the other leg 2 is omitted. The leg 2 of this embodiment includes the hook 28 (Fig. 2). However, for the sake of simplification of illustration, illustration of the hook 28 is omitted.

[0025] The leg frame 21 of the leg 2 includes a base frame 213 and a frame body 212. The frame body 212 is welded to the base frame 213 in a state of being inclined thereto. The rail frame 219, which is formed of a steel plate and serves as a supporting member for connecting the top board 1 and the leg 2 to each other, is screwed to the leg frames 21. The first engaging groove 41 and the second engaging groove 42 are formed at the rail frame 219. The engaging protrusion 40 (Fig. 4) of the lock plate 141 connected to the lock lever 14 is engaged into the first engaging groove 41 and the second engaging groove 42. That is, the first engaging groove 41 and the second engaging groove 42 of the rail frame 219, and the engaging protrusion 40 of the lock plate 141 configure a locking mechanism of the flip-up table.

[0026] The rail 22 is welded to the rail frame 219, which is coupled to the other rail frame 219 of the other leg via the rail 22. Furthermore, a hole 214, into which one end of the supporting shaft 19 (Fig. 6) for supporting the top board 1 is inserted, is formed at the rail frame 219. The other end of the supporting shaft 19 is inserted into the hole 177 (Fig. 3) of the top board arm 17. This allows the top board 1 to be connected to the leg 2 and supported. The state where the top board 1 is connected to the leg 2 will be described using Fig. 6.

[0027] Fig. 6 shows connecting parts of the top board 1 and the leg 2 of the flip-up table in the use state, and shows an enlarged sectional view of Fig. 2 taken along line C-C. In Fig. 6, the rail frame 219, to which the rail 22 is welded, is connected to the frame body 212 of the leg frame 21. The supporting shaft 19 is inserted into the holes 177 of the supporting portion 171 and the cam portion 172 of the top board arm 17. This allows the supporting portion 171 and the cam portion 172 to be connected to the rail frame 219 via the supporting shaft 19. That is, the top board 1 is connected to the legs 2 having the frame bodies 212 via the supporting portions 171 and the cam portions 172.

[0028] As described above, the top board 1 is connected to the legs 2 only by the supporting shaft 19 and supported. Accordingly, the number of components can be reduced, and the flip-up table can be easily assembled. Furthermore, only detachment of the supporting shaft 19 easily separates the top board 1 and the leg 2 from each other. This allows the storing space for the flip-up table to be reduced, and enables the flip-up table to be easily transported. Note that, in the use state, a gap exists between the facing portion 176 of the cam portion 172 and an inner end 231 of the inner leg 23 stored in the leg frame 21. That is, the inner legs 23 do not support the top board 1.

[0029] Note that, in Fig. 6, an inner plate 215 is arranged between the frame body 212 and the inner leg 23. The rail frame 219, together with the inner plate 215, is screwed to the leg frame 21. Instead, the rail frame 219 can be formed integrally with the leg frame 21. In this case, the rail 22 is welded to the leg frame 21, and a part of the frame body 212 of the leg frame 21 extends

in a direction toward the top board 1. The engaging protrusion 40 (Fig. 4) of the lock plate 141 is engaged with this extending part.

[0030] Returning to Fig. 5, the inner leg 23, to which the casters 26 are attached, is stored in the leg frame 21. The guide cap 27, which restricts movement of the inner leg 23, is fitted into the tip end of the leg frame 21. Accordingly, when the inner leg 23 is moved in the leg frame 21 in the direction toward the top board 1, the inner leg 23 comes into contact with a part of the guide cap 27. This can prevent the inner leg 23 from falling off the leg frame 21 during assembly of the leg 2. Furthermore, the guide cap 27 includes a guide portion 271 to be inserted into the leg frame 21. When the inner leg 23 is attached, the inner end 231 of the inner leg 23 is inserted into the guide portion 271. Accordingly, even if the inner leg 23 moves in the leg frame 21, the guide portion 271 and the inner end 231 come into contact with each other to regulate movement of the inner leg 23. Thus, when moving the flip-up table or the like, the inner leg 23 is prevented from being in contact with the inner surface of the leg frame 21 to make a strange sound.

[0031] Furthermore, the inner leg 23 includes: a base portion 232, to which the casters 26 are attached; and an inner leg body 233 coupled to the base portion 232. The inner leg body 233 has a hollow cylindrical shape. An inner guide 234 is attached between the inner leg 23 and the leg frame 21. In more detail, the inner guide 234 is attached to the outside of the inner leg body 233, which is the inside of the frame body 212. The inner leg 23 is stored in the leg frame 21 in a state where the inner guide 234 is attached to the inner leg 23.

[0032] Referring to Fig. 5B, the inner guide 234 will be described in more detail. The inner guide 234 includes a fixing protrusion 235. This fixing protrusion 235 is fixed into a fixing hole 236 of the inner leg body 233. A plurality of protrusions 237 are formed on the outer surface of the inner guide 234 so as to be in contact with the inner surface of the frame body 212. Accordingly, even if a force is applied to the inner leg 23 in the leg frame 21, the plurality of protrusions 237 are in contact with the inner surface of the frame body 212 to thereby regulate movement of the inner leg 23.

[0033] Note that the internal size of the inner guide 234 is designed to be contact with the outer surface of the inner leg body 233. The inner guide 234 is inserted from the tip end of the inner leg 23 and can be slid to the fixing hole 236 of the inner leg body 233. The fixing protrusion 235 of the inner guide 234 is then slid to a position of being fixed into the fixing hole 236, thereby allowing the inner guide 234 to be attached. The inner leg 23 is movable in a direction toward the ground surface 3 and in a direction toward the top board 1 with respect to the leg frame 21. That is, the inner leg 23 is movable in the leg frame 21 in the direction toward the ground surface 3 and in the direction toward the top board 1.

[0034] The height of a rear of the base frame 213 of the leg frame 21 is formed lower than the height of a front thereof. That is, the height of the base frame 213 on a user side is formed lower than the height on a side of the modesty panel 12. As to the base portion 232 of the inner leg 23 arranged in the base frame 213, the height of a rear is also formed lower than the height of a front thereof. This can prevent the base frame 213 from catching a foot when the user enters and goes out of a space on the user side of the flip-up table. Accordingly, the user can easily enter and go out of the space.

[0035] Referring to Fig. 7, the leg frame 21 will be described in more detail. Note that Fig. 7 shows a state where the leg frame 21 is viewed from the inside of the flip-up table, i.e. viewed from the center side of the flip-up table. The guide cap 27 to be inserted into the leg frame 21 is shown in an upper part of Fig. 7. Furthermore, the rail frame 219 to be screwed to the outside of the leg frame 21 is shown in a right part of Fig. 7.

[0036] A first screw hole 276 is formed in the guide cap 27. A first screw hole 216, a second screw hole 217 and a third screw hole 218 are formed in the rail frame 219. Furthermore, a first screw hole 226, a second screw hole 227 and a third screw hole 228 are formed also in the inner plate 215 screwed to the inside of the leg frame 21 and the frame body 212 of the leg frame 21. The hole 214, into which the supporting shaft 19 for supporting the top board 1 is inserted, is also formed in the rail frame 219. The rail 22 is welded on the outer surface of the rail frame 219, i.e. a surface that does not face the frame body 212.

[0037] The first screw hole 276 of the guide cap 27, the first screw hole 216 of the rail frame 219, and the first screw holes 226 of the frame body 212 and the inner plate 215 are arranged such that the positions thereof are coaxial. The second screw holes 217 and 227 and the third screw holes 218 and 228 are also arranged such that the positions thereof are coaxial. Then, a screw is inserted from the outer surface of the rail frame 219 into the first screw holes 276, 216 and 226. This allows the rail frame 219, the inner plate 215 and the guide cap 27 to be connected to the frame body 212. Likewise, a screw is also inserted into the second screw hole 217 of the rail frame 219, and the second screw holes 227 of the frame body 212 and the inner plate 215. A screw is also inserted into the third screw hole 218 of the rail frame 219, and the third screw holes 228 of the frame body 212 and the inner plate 215.

[0038] The base frame 213 is welded to the frame body 212. An adjuster 25 is screwed to a rear of the base frame 213. In the use state, the adjuster 25 is turned to adjust the height of the flip-up table. A base cap 24 is screwed to a front of the base frame 213.

[0039] The base cap 24 internally includes a step portion 241. The position of the step portion 241 corresponds to the position of a step portion 238 (Fig. 9) of the base portion 232 of the inner leg 23. Accordingly, even if the inner leg 23 moves in a direction of falling out, the inner leg 23 comes into contact with the step portion 241 of the base cap 24 before falling off the leg frame 21. This

can prevent the inner leg 23 from falling off the leg frame 21. Such a step portion 241 negates the need to separately provide a component for preventing the inner leg 23 from falling off, thereby allowing the number of components to be reduced.

[0040] Subsequently, referring to Fig. 8, the guide cap 27 will be described in more detail. Fig. 8A shows the guide cap 27 viewed in the direction from the inside of the flip-up table. Fig. 8B shows a sectional view of Fig. 8A taken along line D-D. Fig. 8C shows the guide cap 27 viewed from the front of the flip-up table. Note that the hook 28 is formed at the guide cap 27 of this embodiment. However, illustration of the hook 28 is omitted. Furthermore, in addition to the guide cap 27, Fig. 8B shows the inner leg 23, the inner plate 215, a screw 277 and the leg frame 21 by chain double-dashed lines.

[0041] A first recess 279, into which the inner leg 23 is engaged, is formed in the guide cap 27. A second recess 278, into which the inner plate 215 attached to the inner surface of the leg frame 21 is engaged, is formed at an outer part of the first recess 279. Furthermore, the screw hole 276 is formed in the guide cap 27. The screw 277 to be inserted into the screw hole 276 penetrates the first screw holes 226 of the leg frame 21 and the inner plate 215. The guide cap 27 is thus screwed to the leg frame 21. The guide portion 271 is formed at the bottom end of the guide cap 27, i.e. on the side of the leg frame 21. A slope 280 is formed at the end of the guide portion 271. Because of the slope 280, the tip end of the guide portion 271 is narrowed. This allows the guide cap 27 to be easily inserted into the leg frame 21 even in a state of storing the inner leg 23.

[0042] As shown in Fig. 8C, a third recess 281 is formed at the tip end of the guide cap in order to secure a space for arranging the cam portion 172 of the top board arm 17. In a state after the flip-up table is assembled, the facing portion 176 and the contact portion 175 of the cam portion 172 are disposed in the third recess 281. Accordingly, in each of the use and stored states, the facing portion 176 and the contact portion 175 are shielded by a head 282 of the guide cap 27.

[0043] Subsequently, referring to Fig. 9, the inner leg 23 will be described in more detail. The inner leg body 233 and the base portion 232 of the inner leg 23 are formed of steel plates. The inner leg body 233 is welded to the base portion 232. A weld protruding toward the inner leg body 233 is formed at a part of the base portion 232. The step portion 238 is formed at the front of the base portion 232. Note that the step portion 241 is formed at the base cap 24 attached to the base frame 213 of the leg frame 21, on the position corresponding to the step portion 238. This can prevent the inner leg 23 from falling off the leg frame 21. The base portion 232 and the inner leg body 233 may be integrally formed of one steel plate.

[0044] The casters 26 are screwed to the base portion 232. The caster 26 can oscillate about the screw. Accordingly, when the flip-up table is moved, the directions of the casters 26 can be changed to the traveling direction. Note that the number of screw holes for screwing the caster 26 is not limited to two. Three or more screw holes may be provided to thereby allow the position of the caster 26 to be changed.

[0045] The inner end 231 made of plastic is fitted into the tip end of the inner leg body 233 of the inner leg 23, i.e. onto the end on the side of the top board 1. A supporting surface 239 inclined to the facing portion 176 of the cam portion 172 is formed at the inner end 231. The supporting surface 239 is in contact with the contact portion 175 of the cam portion 172 of the top board arm 17, when the top board 1 is at the stored position. This allows the top board 1 to be supported via the inner ends 231, the inner leg bodies 233, the base portions 232 and the casters 26.

[0046] In the case of assembling the leg 2 including such an inner leg 23, first, the casters 26 are screwed to the base portion 232 of the inner leg 23. Subsequently, the inner guide 234 is inserted into the inner leg body 233. At this time, the inner guide 234 is slid until the fixing protrusion 235 (Fig. 5) is fixed to the fixing hole 236 of the inner leg body 233. Then, the inner end 231 is fitted into the tip end of the inner leg body 233.

[0047] Subsequently, the assembled inner leg 23 is inserted into the leg frame 21. The rail frame 219 and the inner plate 215 are then screwed to the leg frame 21. Finally, the guide cap 27 is fitted into the tip end of the leg frame 21, and screwed to the leg frame 21. Note that the rail frames 219 of the assembled legs 2 are connected to the top board arms 17 of the top board 1 by the supporting shaft 19.

[0048] Next, referring to Fig. 10, an operation of the flip-up table will be described. Fig. 10A shows the use state. Fig. 10B shows a state of being flipped. Fig. 10C shows the stored state. Fig. 10 also shows an operation of the locking mechanism and an operation of the cam portion 172. Note that, for the sake of illustration, the components such as the guide cap 27 are omitted.

[0049] First, the operation of the locking mechanism will be described. In the flip-up table in the use state, the engaging protrusion 40 of the lock plate 141 is in contact with the first engaging groove 41 of the rail frame 219. The stopper 174 of the top board arm 17 is in contact with the second engaging groove 42 of the rail frame 219. Accordingly, the top board 1 is locked and fixed to the legs 2 at the use position. Note that, when the top board 1 is at the use position, the lock lever 14 is urged in the direction toward the leg 2 by the lock spring 144 (Fig. 4).

[0050] In order to store the top board 1, the user swings the lock lever 14 about the lever shaft 15 in the direction toward the top board 1 against the urging force by the lock spring 144. This releases the engagement between the engaging protrusion 40 and the first engaging groove 41. After the locking is released, the user flips up the top board 1 about the supporting shaft 19 in the direction indicated by an arrow 51. Accordingly, the lock lever 14 and the lock plate 141 are moved to the position of being flipped, shown in Fig. 10B. The stopper 174 is simulta-

neously moved to the position of being flipped, shown in Fig. 10B. As a result, the stopper 174 is moved in the direction away from the second engaging groove 42.

[0051] After the top board 1 is turned to the stored position shown in Fig. 10C, the user finished the operation on the lock lever 14. Thus, the lock lever 14 is urged again in the direction toward the leg 2 by the lock spring 144. Accordingly, the lock lever 14 is swung about the lever shaft 15 in a leg direction indicated by an arrow 52. As a result, the engaging protrusion 40 of the lock plate 141 comes into contact with the second engaging groove 42, and the top board 1 is locked and fixed to the legs 2 in the stored position.

[0052] Subsequently, the operation of the cam portion 172 and the operation of the flip-up table in accordance therewith will be described. As shown in Fig. 10A, in the flip-up table in the use state, a gap indicated by an arrow a exists between the facing portion 176 of the cam portion 172 of the top board arm 17 and the supporting surface 239 of the inner end 231. The top board 1 is supported via the supporting portions 171 of the top board arms 17, the supporting shaft 19, the rail frames 219, the frame bodies 212, the base frames 213, the base caps 24 and the adjusters 25.

[0053] Accordingly, in the use state, the base caps 24 and the adjusters 25 of the base frames 213 are in contact with the ground surface 3 as indicated by an arrow b. That is, in the use state, the top board 1 is supported by the leg frames 21. Note that, in the use state, the inner leg 23 is moved by the self weight in the leg frame 21 in the direction toward the ground surface 3. Accordingly, the casters 26 of the inner leg 23 are also in contact with the ground surface 3.

[0054] Subsequently, as the user releases the locking of the top board 1 to flip up the top board 1, the cam portion 172 is also swung in accordance with turning of the top board 1 as shown in Fig. 10B. That is, the cam portion 172 swingable about the supporting shaft 19 is connected to the top board body 11 and serves as a part of the top board arm 17. Accordingly, the cam portion 172 is swung in accordance with turning of the top board body 11. As a result, as indicated by an arrow c, the contact portion 175 of the cam portion 172 is in contact with the supporting surface 239 of the inner end 231.

[0055] Note that, in Fig. 10A, the distance from the supporting shaft 19 of the top board 1 to the contact portion 175 of the cam portion 172 is indicated by an arrow g. The distance from the supporting shaft 19 of the top board 1 to the facing portion 176 of the cam portion 172 is indicated by an arrow h. The distance indicated by the arrow g is shorter than the distance indicated by the arrow h. That is, the distance from the supporting shaft 19 to the contact portion 175 is longer than the distance from the supporting shaft 19 to the facing portion 176.

[0056] Accordingly, as the top board 1 is turned, the contact portion 175 is moved to an upper part of the supporting surface 239 so as to climb on the supporting surface 239. In other words, the contact portion 175 runs on the supporting surface 239 and moves in a direction away from the ground surface 3. Accordingly, the contact portion 175 comes into contact with a more distal part of the inner end 231. As a result, as the top board 1 is turned, the distance from the supporting shaft 19 to the ground surface 3 is increased. That is, the supporting shaft 19 is moved in a direction away from the ground surface 3.

[0057] The supporting shaft 19 is connected to the top board body 11 via the supporting portion 171 of the top board arm 17, and to the frame body 212 of the leg frame 21 via the rail frame 219. Accordingly, as the supporting shaft 19 is moved in the direction away from the ground surface 3, the top board body 11 and the leg frame 21 are also moved in the direction away from the ground surface 3. After the leg frame 21 is apart from the ground surface 3, the top board 1 is supported by the inner leg 23 via the cam portion 172.

[0058] Fig. 10B shows the state where the top board 1 is flipped up to a certain extent and the top board 1 is supported by the inner leg 23. In this state, as indicated by an arrow d, the adjuster 25 and the base cap 24 are apart from the ground surface 3. Accordingly, the top board 1 is supported by the inner legs 23 via the casters 26 in contact with the ground surface 3.

[0059] As the top board 1 is further turned to cause the top board 1 to move to the stored position shown in Fig. 10C, a position at which the contact portion 175 and the supporting surface 239 are in contact with each other moves to an upper part of the supporting surface 239 as indicated by an arrow e. Accordingly, the supporting shaft 19 is moved in the direction away from the ground surface 3, and the top board body 11 and the leg frame 21 are also moved in the direction away from the ground surface 3. As a result, turning the top board 1 to the stored position maximizes clearances between the ground surface 3 and the adjusters 25 and between the ground surface 3 and the base caps 24 as indicated by an arrow f.

[0060] The description has been made on the embodiment of the present invention. However, the present invention is not limited to the configuration of the embodiment. The configuration of the embodiment can appropriately be modified within a scope without substantially changing the content of the present invention. For instance, the rail frame 219 of the embodiment is screwed to the inner side surface of the leg frame 21, i.e. the side surface on the top board 1 side. Instead, the rail frame 219 formed integrally with the leg frame 21 may be adopted. In this case, a part of the leg frame 21 is extended, and the extended part forms the rail frame 219.

[0061] As to the top board arm 17 of the embodiment, the supporting portion 171 and the cam portion 172 are formed integrally with each other. Instead, the supporting portion 171 and the cam portion 172 may be formed separately from each other. In this case, the supporting portion 171 and the cam portion 172 are screwed to the top board body 11.

[0062] Furthermore, the inner leg 23 of the embodiment is prevented from falling off by the guide cap 27.

Instead, an elongate hole may be formed at the inner leg 23, and a screw inserted into a screw hole of the rail frame 219 may be inserted into this elongate hole to thereby prevent falling. In this case, even if a force is applied to the inner leg 23 in the leg frame 21, the screw is in contact with an edge of the elongate hole to thereby restrict the movement of the inner leg 23.

[0063] The supporting surface 239 of the inner end 231 according to the present invention may be any shape so as to heighten a height from the casters 26. Accordingly, the shape of the supporting surface 239 is not limited to the inclined surface. Instead, the shape may be a curved shape or a stepped shape having a slight step. Instead of providing of the inner end 231, the supporting surface 239 can be formed directly at the tip end of the inner leg 23.

[0064] The variations described above can appropriately be combined within the scope without substantially changing the content of the present invention.

[0065] This application claims the priority of Japanese Patent Application No. 2010-117735, filed May 21, 2010, the content of which is hereby incorporated by reference herein in its entirety.

Reference Signs List

[0066]

1	top board
2	leg
3	ground surface
11	top board body
19	supporting shaft
21	first leg
23	second leg
172	cam
175	contact portion
176	facing portion
239	supporting surface

Claims

1. A flip-up table, comprising:

a top board body movable to a use position and to a stored position;
a cam which is connected to the top board body and swingable about a supporting shaft as the top board body is moved;
a first leg which is connected to the supporting shaft, and supports the top board body when the top board body is in the use position; and
a second leg which is movable with respect to the first leg, and supports the top board body via a supporting surface when the top board body is in the stored position;
wherein, when the top board body is in the use position, the supporting surface faces a facing portion of the cam, and, when the top board body is in the stored position, the supporting surface is in contact with a contact portion of the cam, and
a distance from the supporting shaft to the contact portion is longer than a distance from the supporting shaft to the facing portion.

2. The flip-up table according to claim 1, wherein the second leg is stored in the first leg.

3. The flip-up table according to claim 1 or 2,
wherein, when the top board body is moved from the use position to the stored position, the cam is swung so as to run onto the supporting surface,
as the cam runs onto the supporting surface, the supporting shaft is moved in a direction away from a ground surface of the flip-up table, and
as the supporting shaft is moved, the first leg is moved in a direction away from the ground surface.

4. The flip-up table according to any one of claims 1 to 3,
wherein the supporting surface is inclined, and
as the top board body is moved from the use position to the stored position, the contact portion is moved in a direction away from the ground surface on the supporting surface.

5. The flip-up table according to any one of claims 1 to 4, wherein the top board body can be turned about the supporting shaft to the use position and to the stored position, and is supported by the first leg via the supporting shaft in the use position.

6. The flip-up table according to any one of claims 1 to 5,
wherein a guide cap restricting movement of the second leg is attached at a tip end of the first leg, and
the contact portion is shielded by the guide cap.

7. The flip-up table according to any one of claims 1 to 6, wherein a guide preventing the first leg and the second leg from being in contact with each other is attached between the first leg and the second leg.

8. The flip-up table according to any one of claims 1 to 7, wherein a caster is attached to the second leg.

9. A top board used for a flip-up table which has a top board body movable to a use position and to a stored position, and a leg supporting the top board body, the top board comprising:

the top board body; and
a cam which is connected to the top board body and swingable about a supporting shaft as the

top board body is moved,
wherein the cam has a facing portion which faces a supporting surface of the leg when the top board is in the use position, and a contact portion which is in contact with the supporting surface when the top board is in the stored position, and a distance from the supporting shaft to the contact portion is longer than a distance from the supporting shaft to the facing portion.

10. A leg used for a flip-up table having a top board body which is swingable to a use position and to a stored position, and a first leg and a second leg which support the top board body, the leg comprising:

the first leg which supports the top board body when the top board body is in the use position; and
the second leg which is movable with respect to the first leg and supports the top board body via a supporting surface when the top board body is in the stored position,
wherein the supporting surface is inclined.

11. A method for storing a top board, which is used for a flip-up table having a top board body and a first leg and a second leg which support the top board body, from a use position to a stored position,
wherein the top board body, which is in the use position and supported by the first leg, is turned about a supporting shaft,
a cam connected to the top board body is swung about the supporting shaft as the top board body is turned, to cause a contact portion of the cam to be in contact with a supporting surface of the second leg,
the top board body is turned in a state where the contact portion and the supporting surface are in contact with each other, to cause the cam to run onto the supporting surface,
as the cam runs onto the supporting surface, the supporting shaft is moved in a direction away from a ground surface of the flip-up table, and
as the supporting shaft is moved, the first leg is moved in a direction away from the ground surface.

FIG. 1

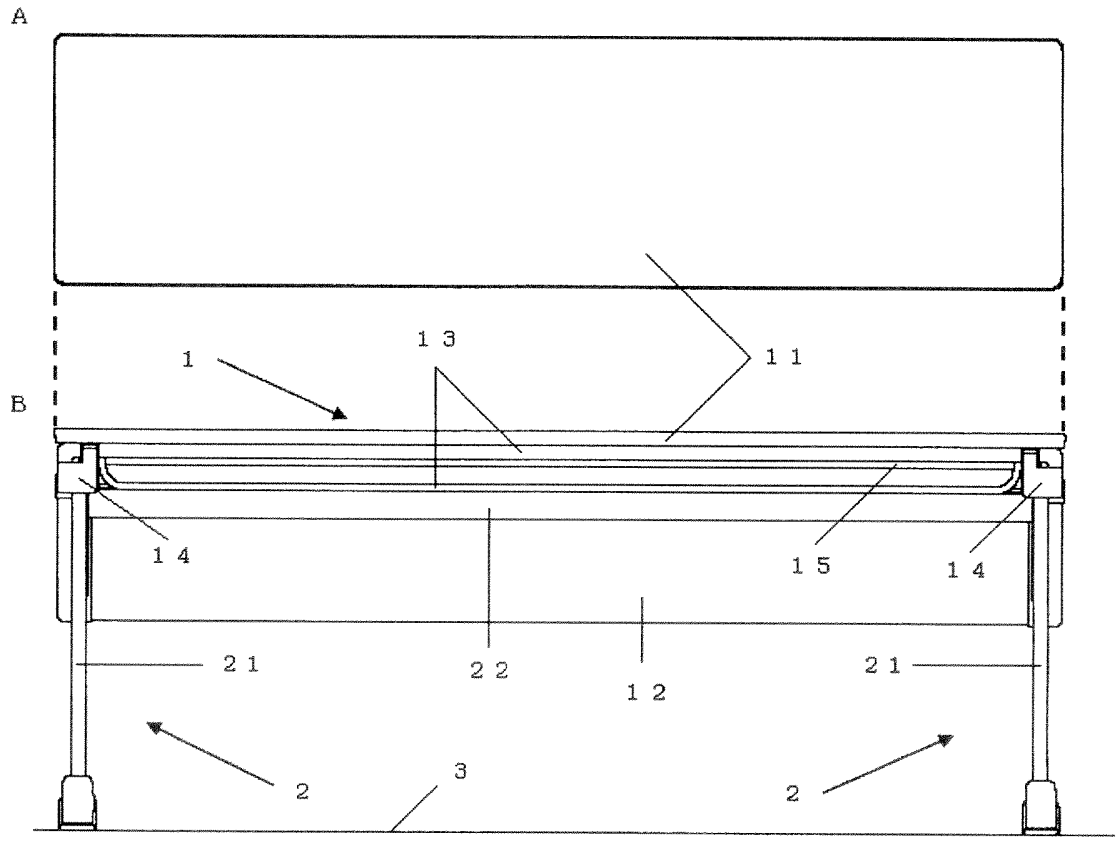


FIG. 2

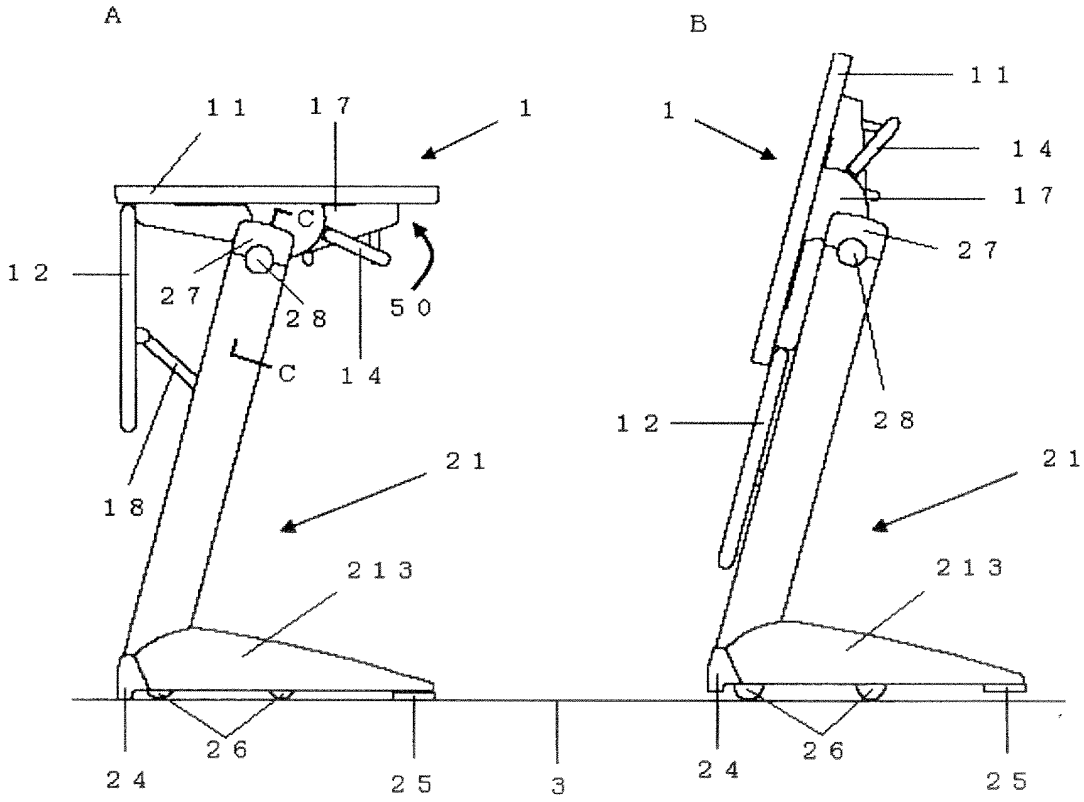

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FIG. 3

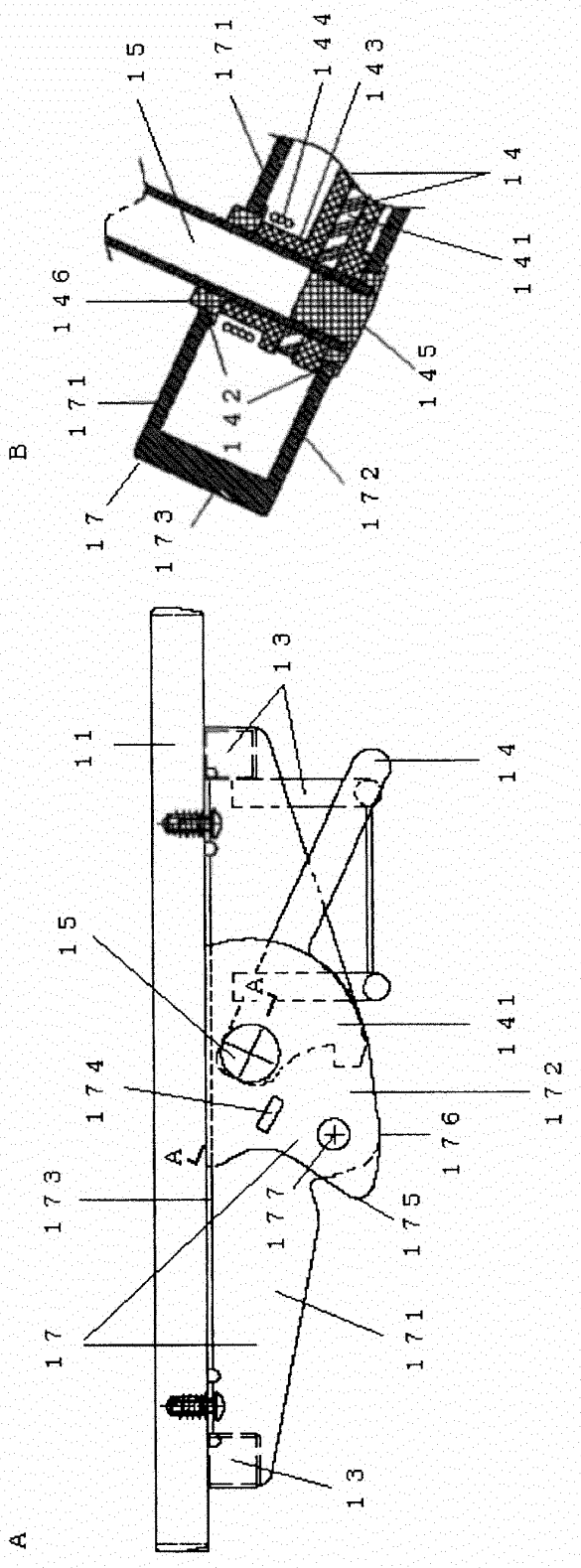
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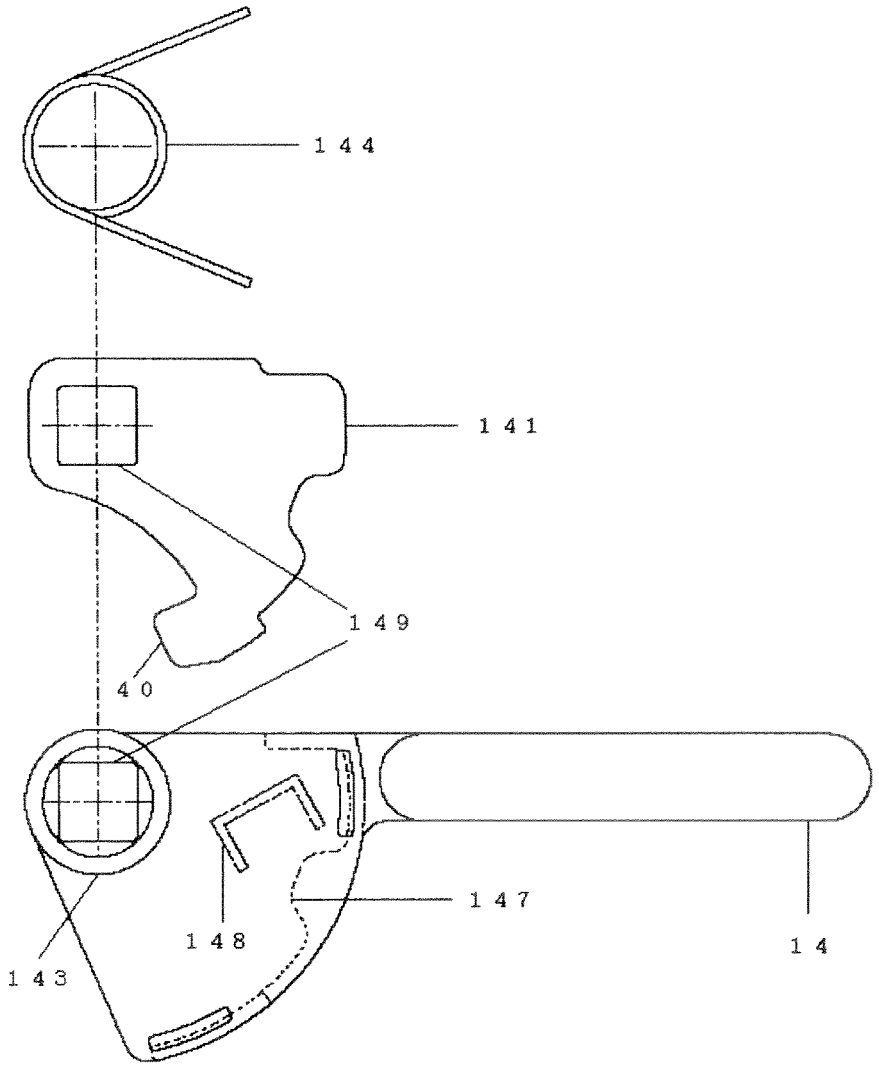
FIG. 4



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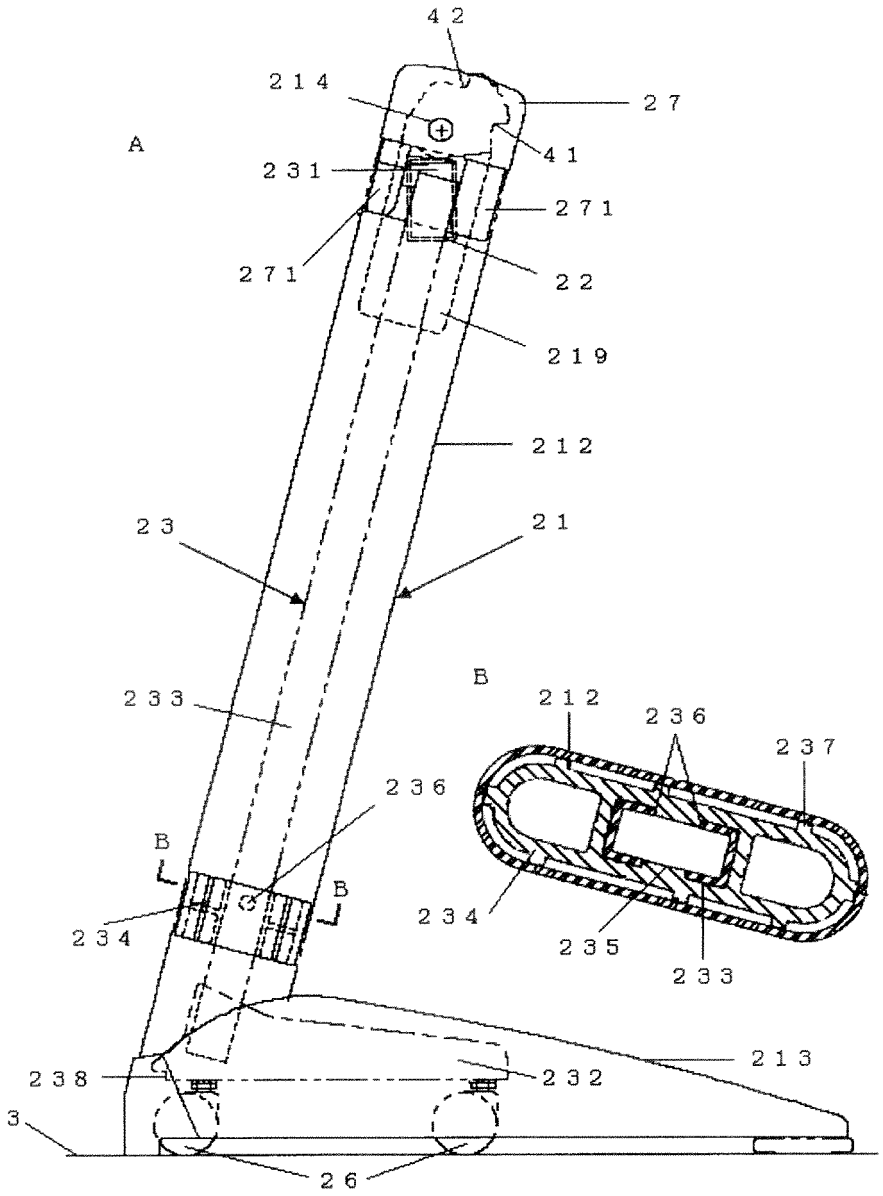
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FIG. 6

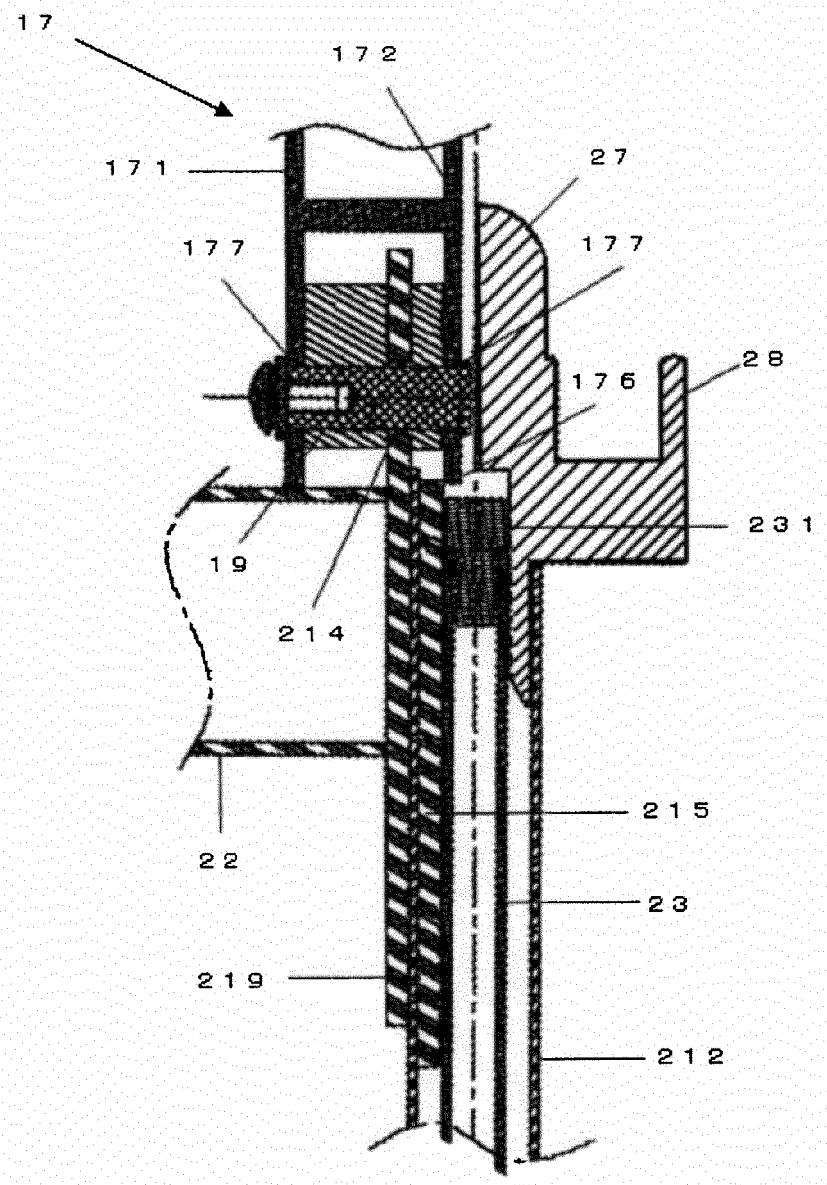


FIG. 7

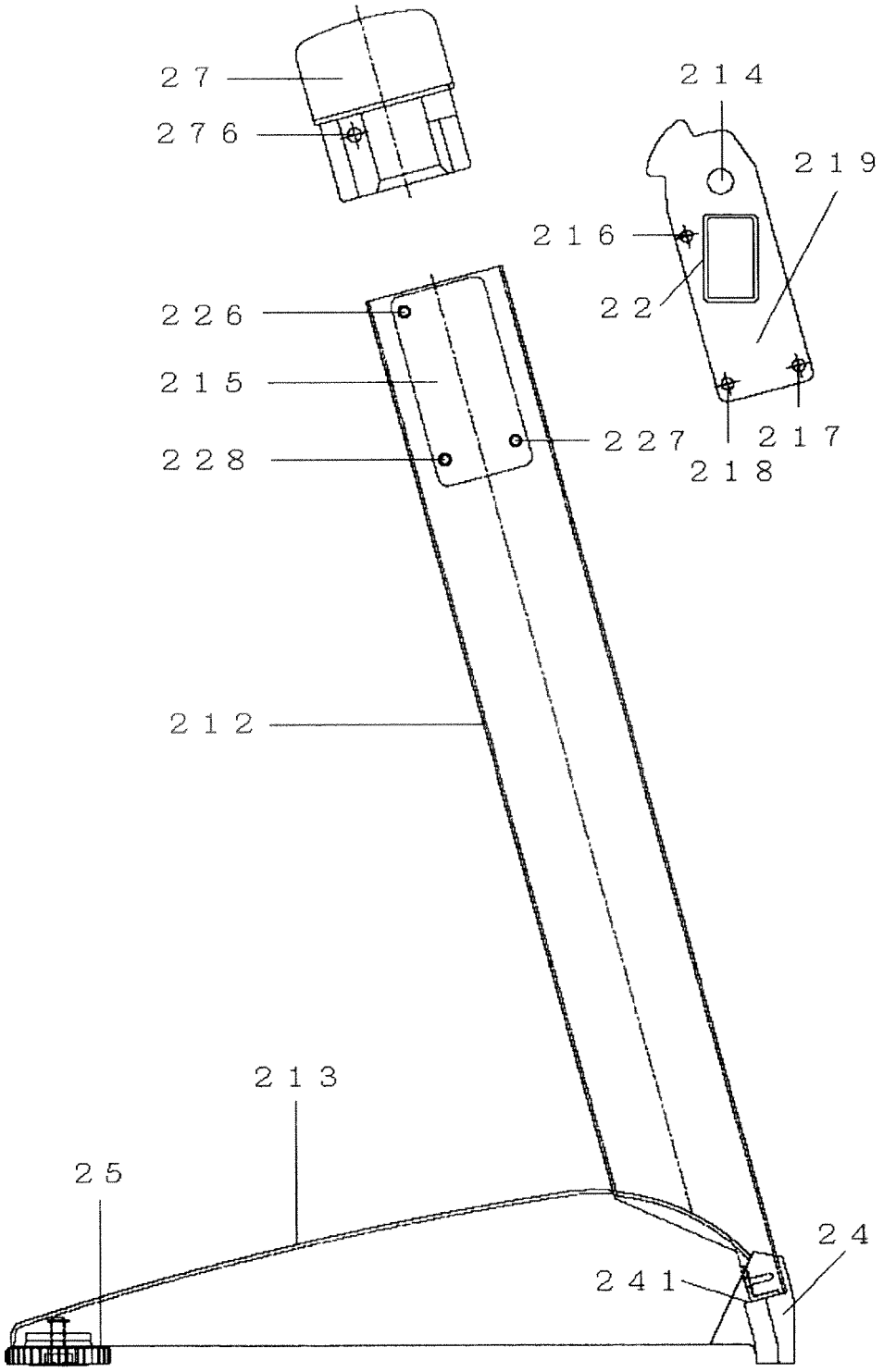


FIG. 8

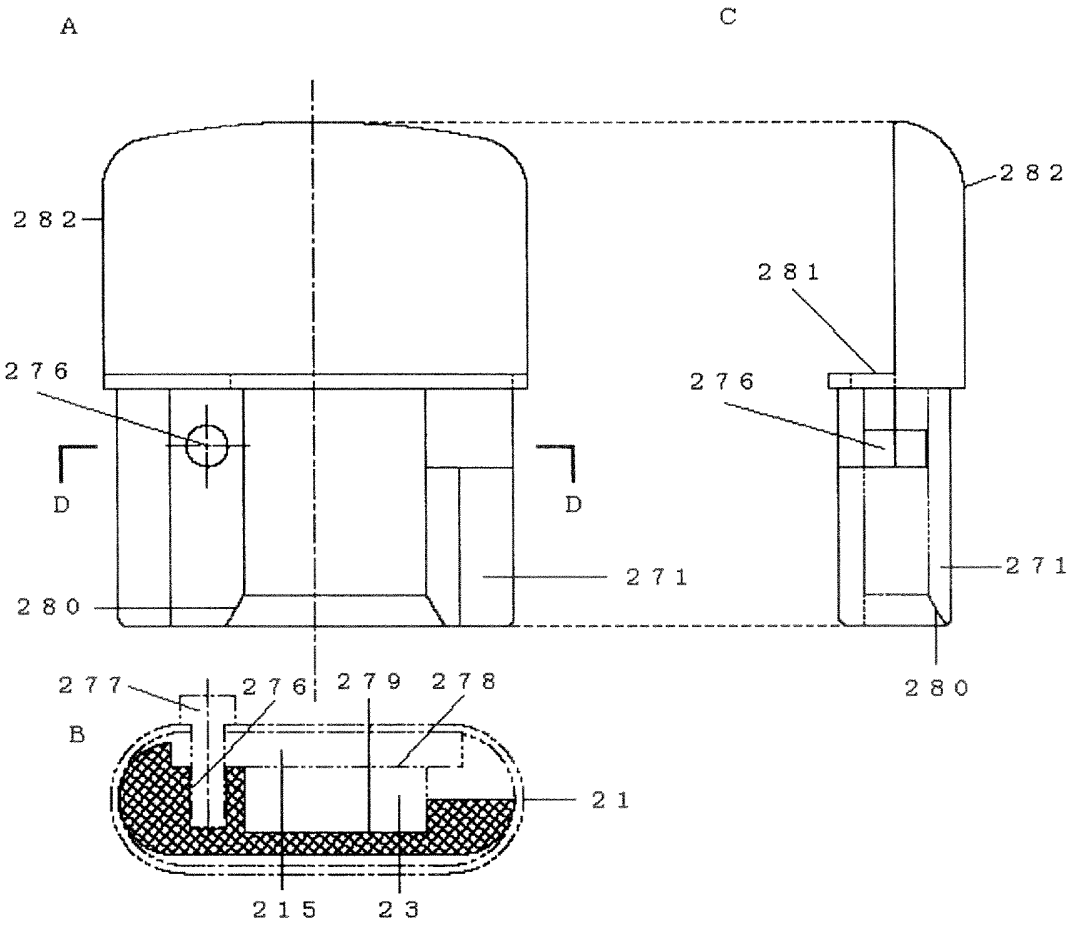


FIG. 9

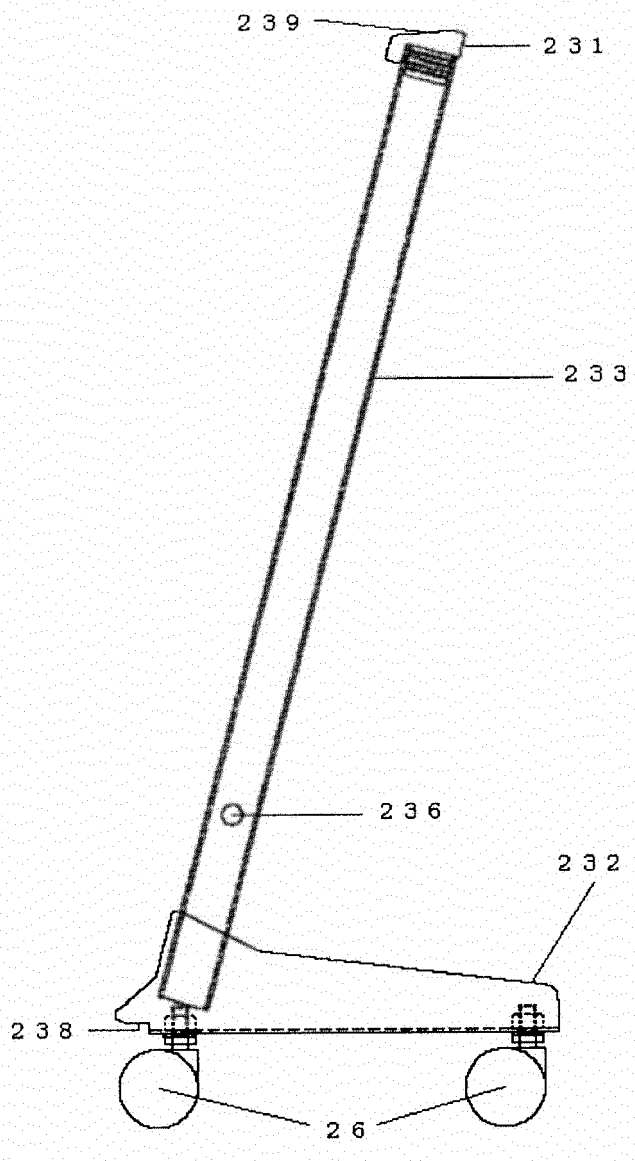
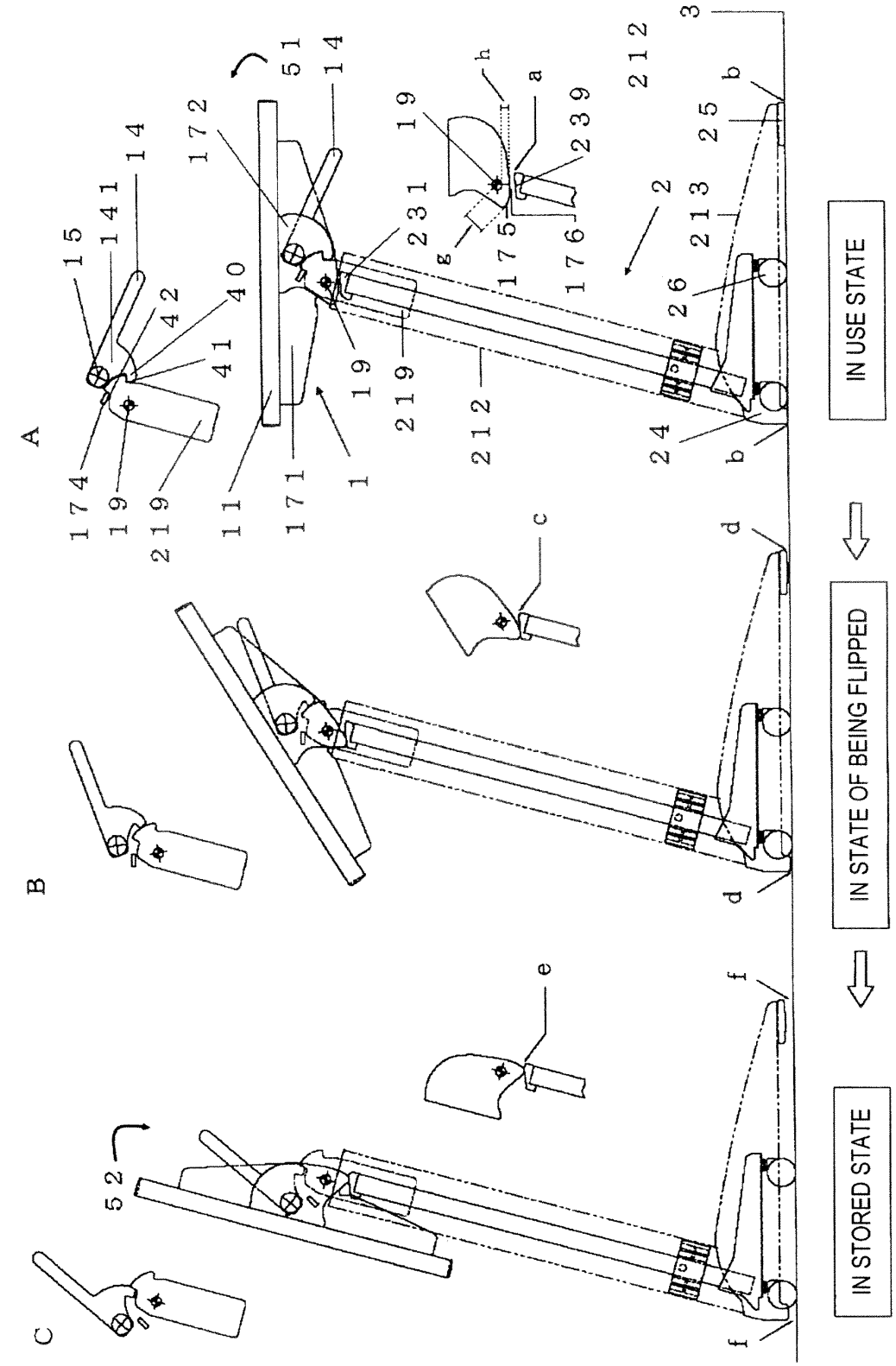


FIG. 10



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2011/002788

A. CLASSIFICATION OF SUBJECT MATTER
A47B3/08(2006.01)i

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)
A47B3/08

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2011
Kokai Jitsuyo Shinan Koho 1971-2011 Toroku Jitsuyo Shinan Koho 1994-2011

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2008-104793 A (Aichi Co., Ltd.), 08 May 2008 (08.05.2008), entire text; all drawings (Family: none)	1-11

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
21 July, 2011 (21.07.11)	02 August, 2011 (02.08.11)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (July 2009)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2008104793 A **[0003]**
- JP 2010117735 A **[0065]**