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The Director

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Therefore, this United States

Patent

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John A. Squires

Director of the United States Patent and Trademark Office

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If the application for this patent was filed on or after June 8, 1995, the term of this patent begins on the date on which this patent issues and ends twenty years from the filing date of the application or, if the application contains a specific reference to an earlier filed application or applications under 35 U.S.C. 120, 121, 365(c), or 386(c), twenty years from the filing date of the earliest such application ("the twenty-year term"), subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b), and any extension as provided by 35 U.S.C. 154(b) or 156 or any disclaimer under 35 U.S.C. 253.

If this application was filed prior to June 8, 1995, the term of this patent begins on the date on which this patent issues and ends on the later of seventeen years from the date of the grant of this patent or the twenty-year term set forth above for patents resulting from applications filed on or after June 8, 1995, subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b) and any extension as provided by 35 U.S.C. 156 or any disclaimer under 35 U.S.C. 253.

US012465142B2

(12) **United States Patent**
Ke

(10) **Patent No.: US 12,465,142 B2**
(45) **Date of Patent: Nov. 11, 2025**

(54) **FOLDABLE CARRYING EQUIPMENT**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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B62B 3/02 (2006.01)

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CPC ***A47B 43/00*** (2013.01); *B62B 3/02* (2013.01)

(58) **Field of Classification Search**
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See application file for complete search history.

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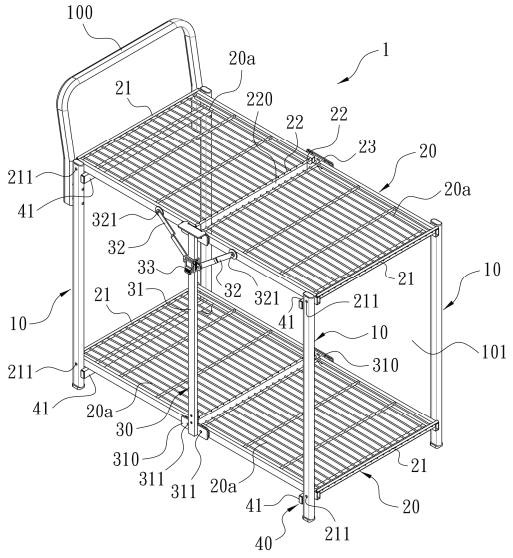
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Primary Examiner — Stanton L Krycinski
(74) *Attorney, Agent, or Firm* — LANWAY IPR SERVICES; Chun-Ming Shih

(57) **ABSTRACT**

A kind of foldable carrying equipment is provided. The carrying equipment includes four legs, at least two platforms each of which having two adjacent loading plates and pivot plates, a support linkage rod set having a support rod pivotally connected to inner sides of the loading plates and operable for driving the loading plates to switch between folded and extended positions, an outer stopper arranged at outer sides of the loading plates or between the legs for supporting the outer sides, and a first inner stopper. The outer side of the loading plate is pivotally connected to the legs and one side of the inner side is pivotally connected to the pivot plate. The first inner stopper is disposed on the inner side of the loading plate and between the pivot plate and a pivot piece of the support rod for supporting the inner side of the loading plate.

10 Claims, 19 Drawing Sheets



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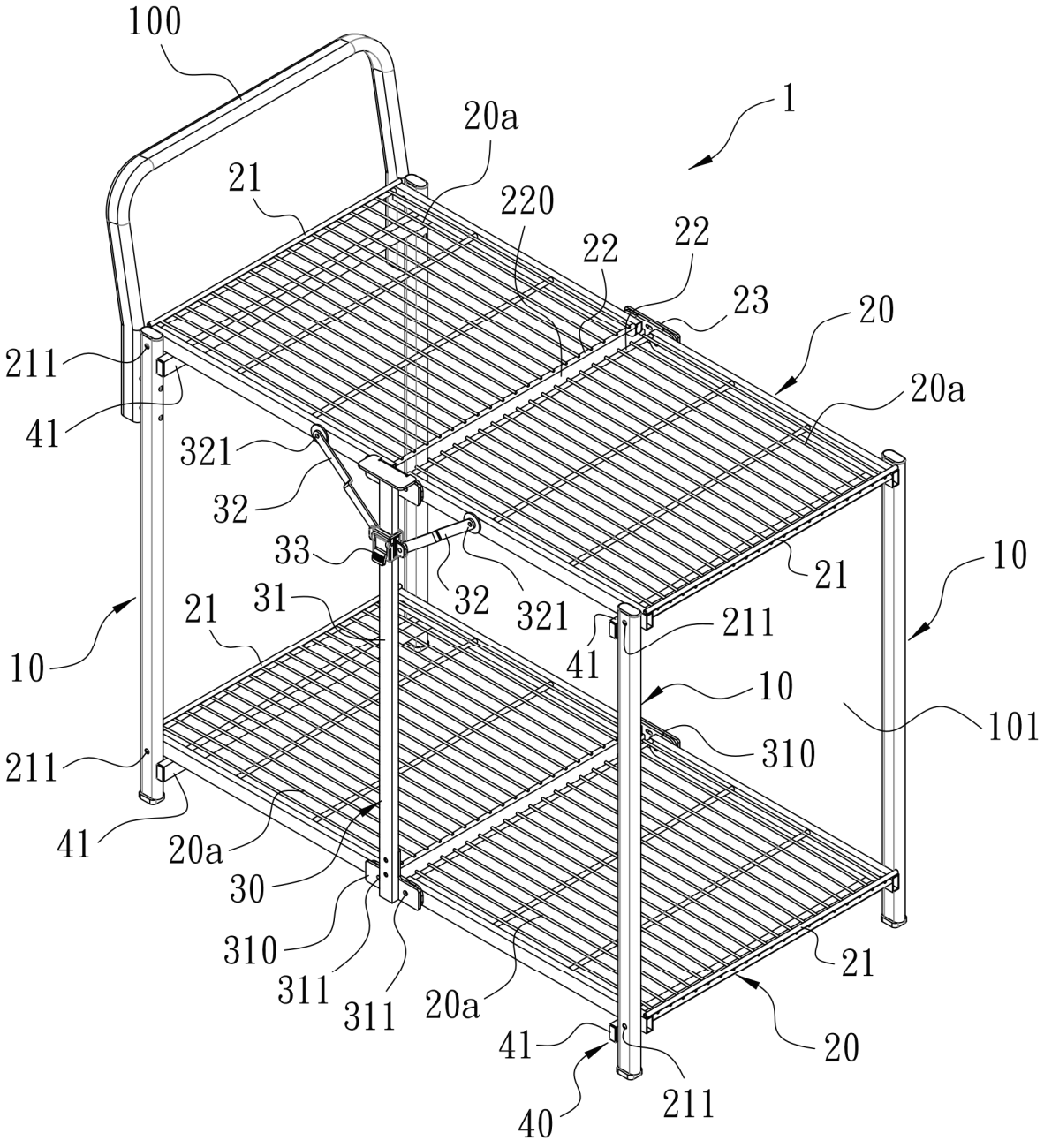

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FIG. 1

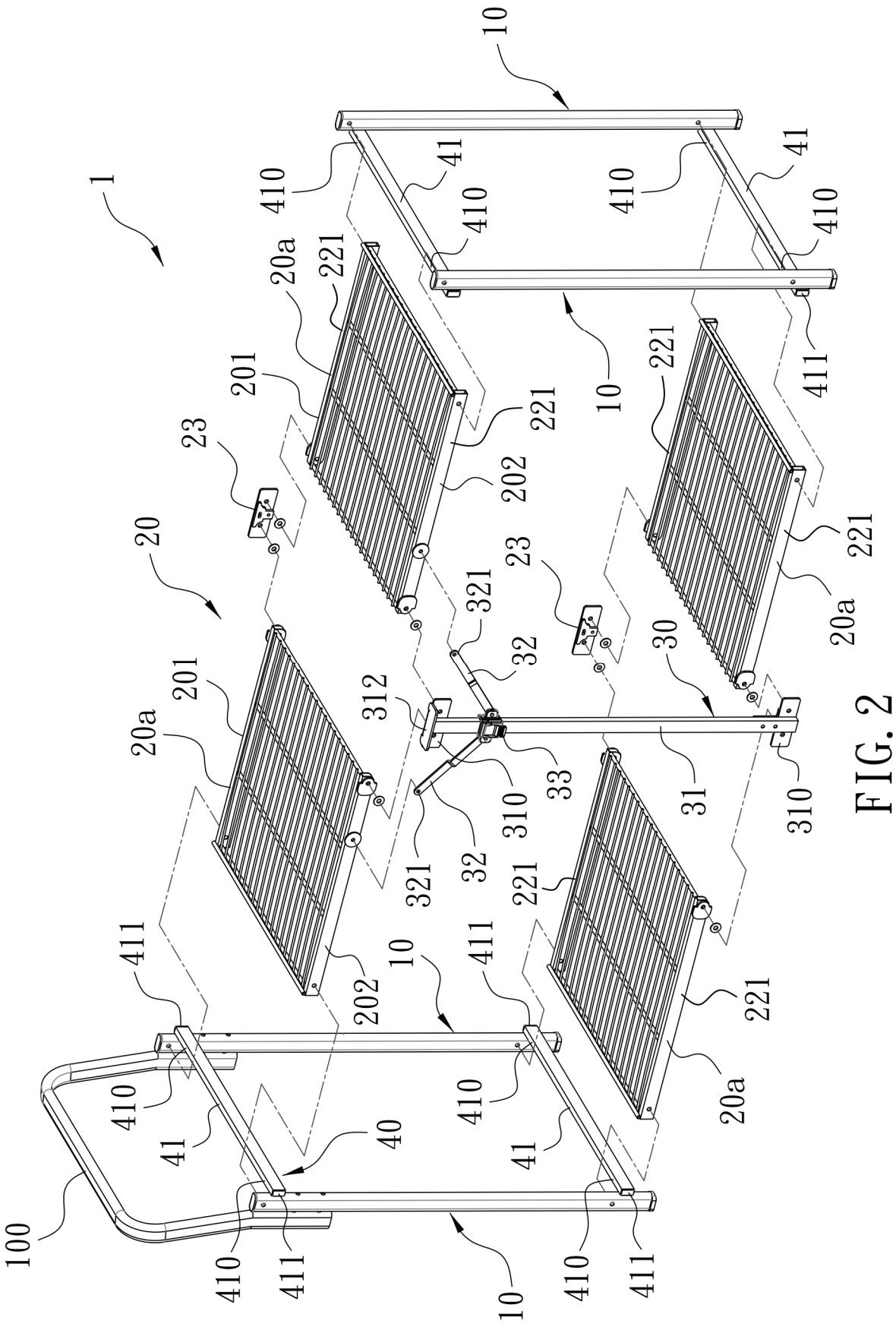


FIG. 2

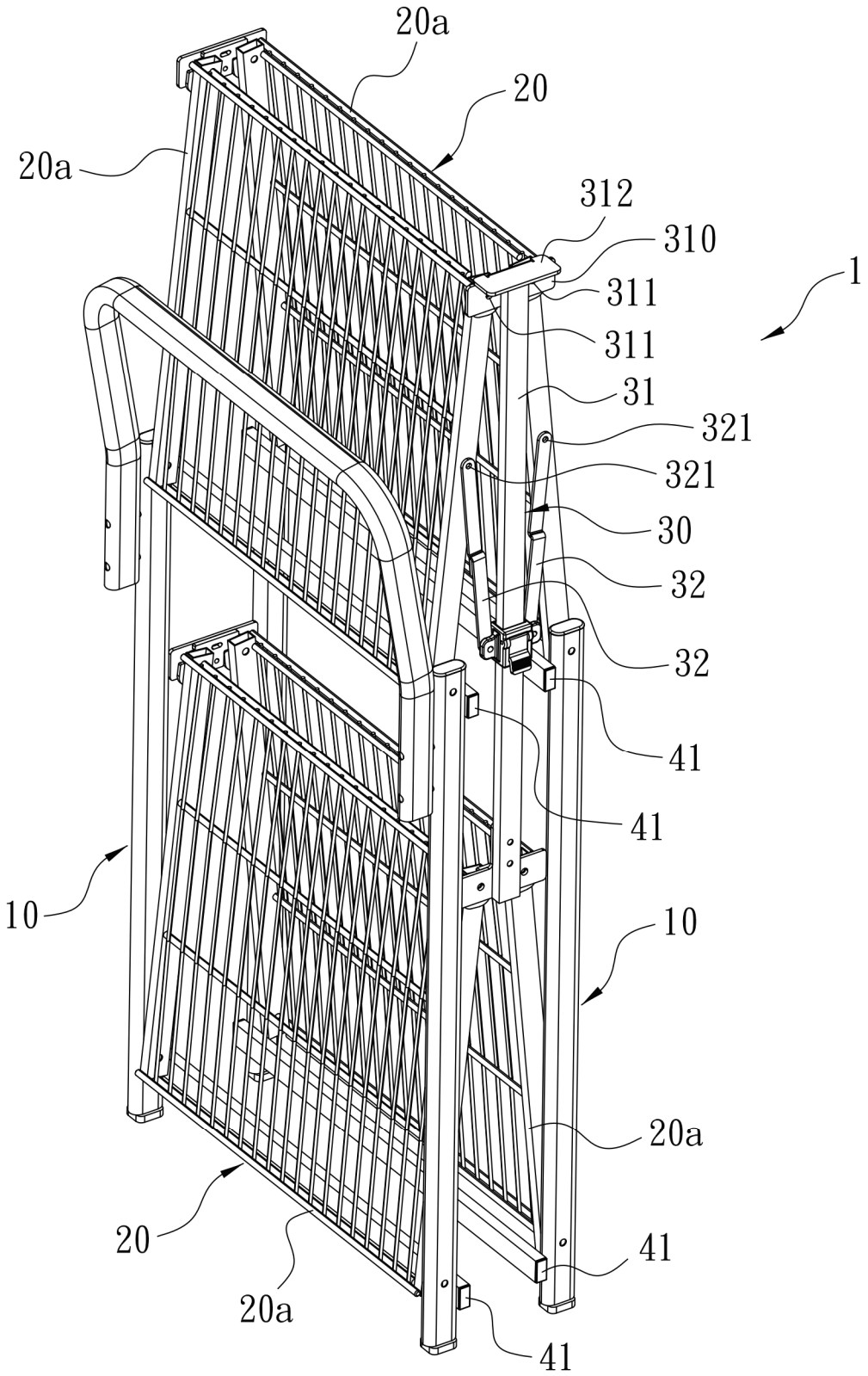

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FIG. 3

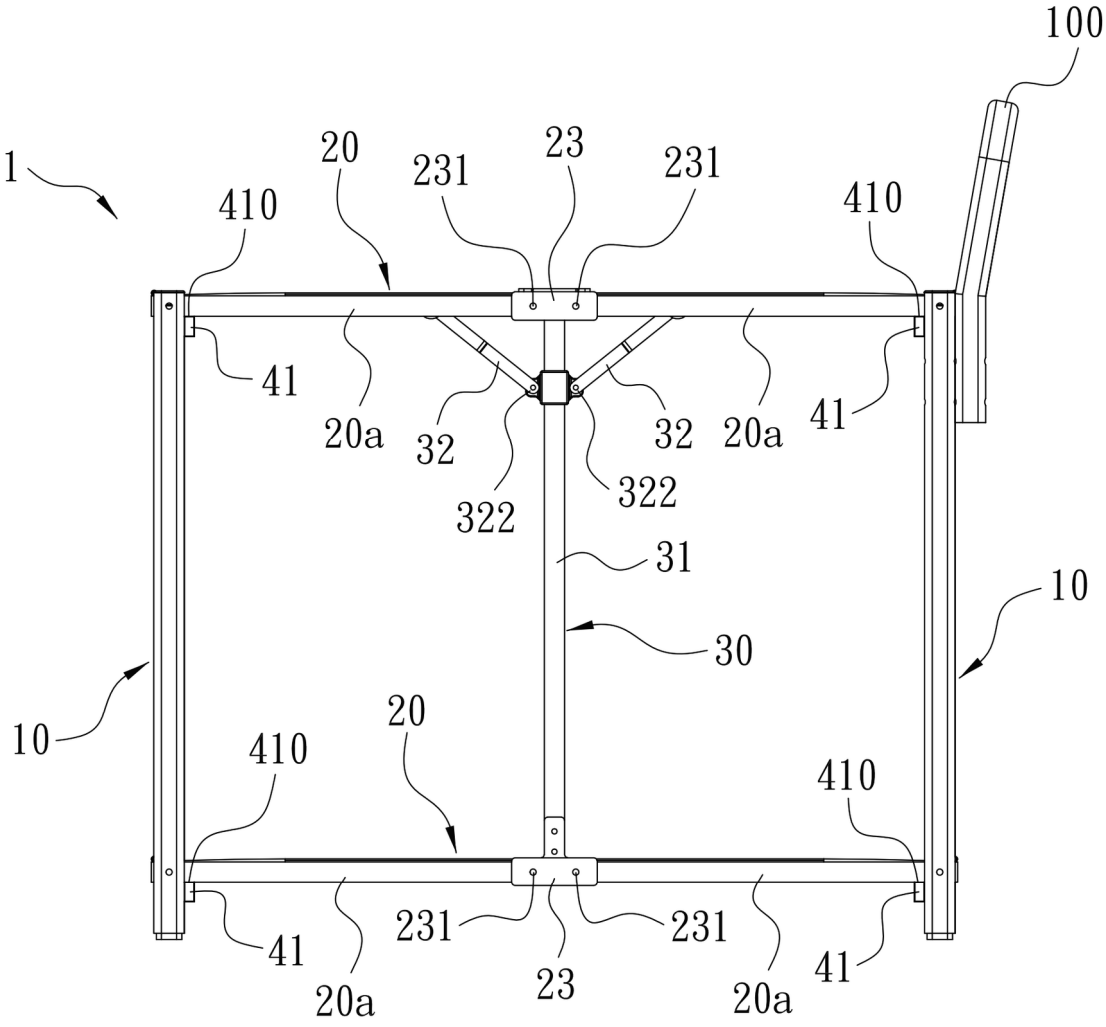

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20a
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FIG. 4

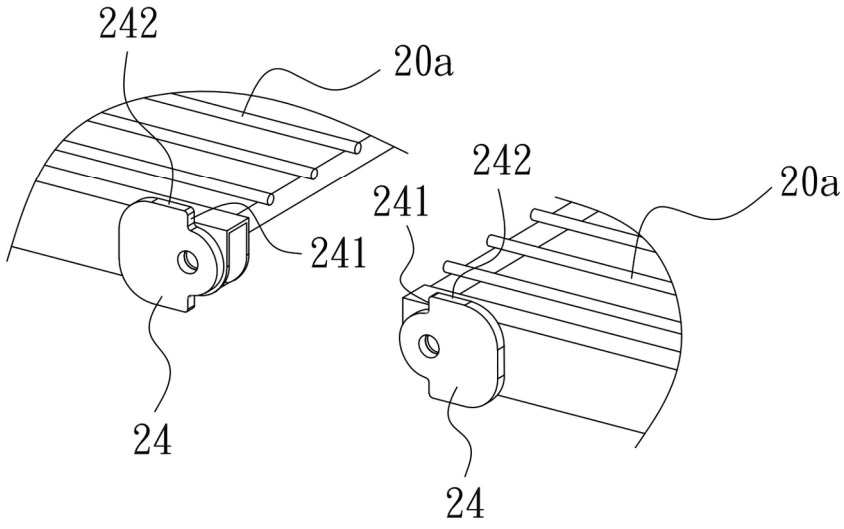

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FIG. 5

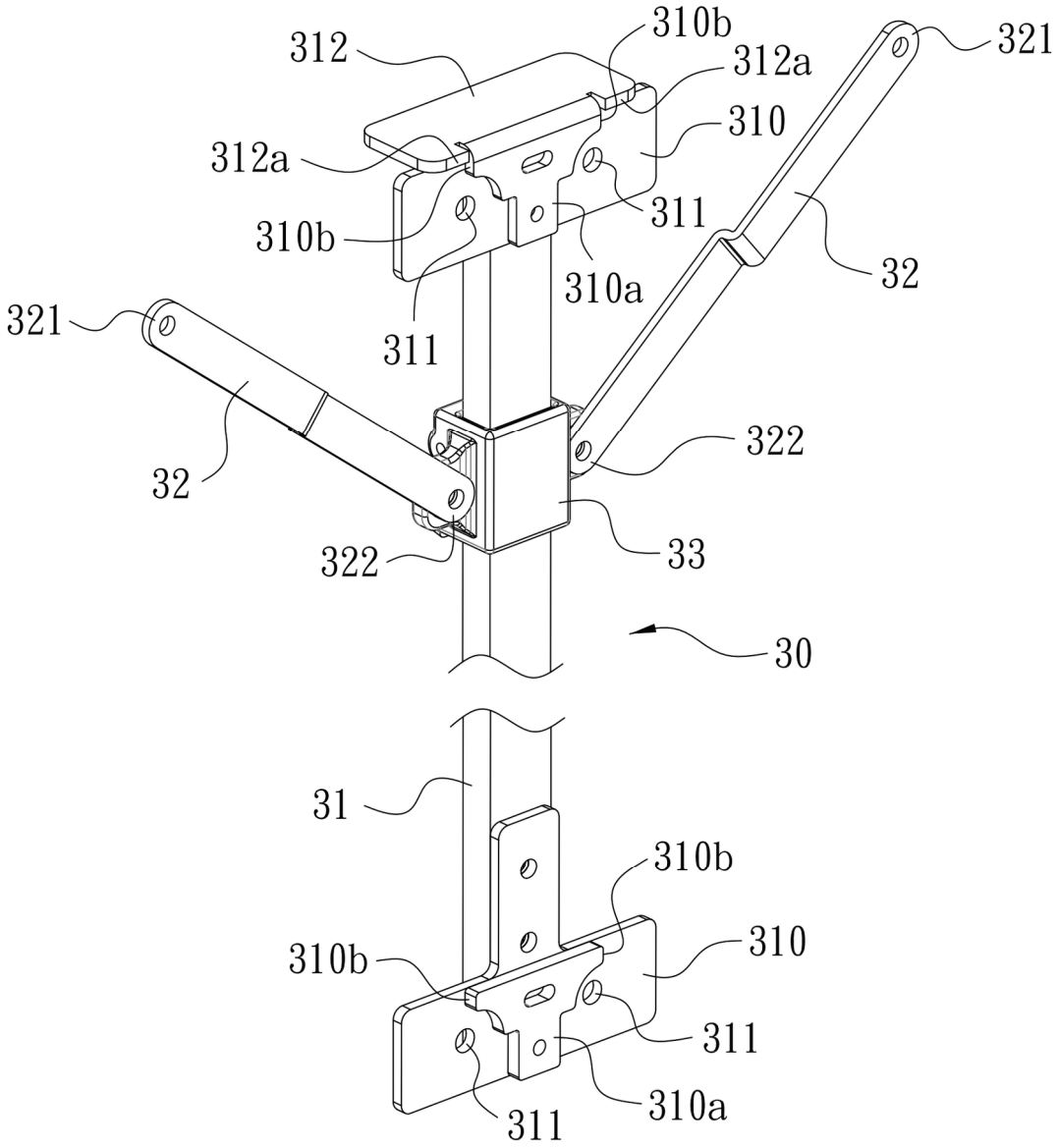

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310a

FIG. 6

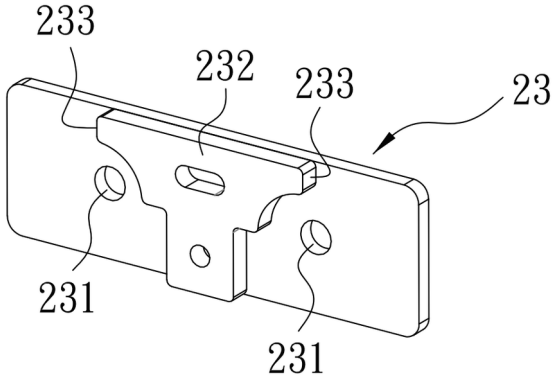

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FIG. 7

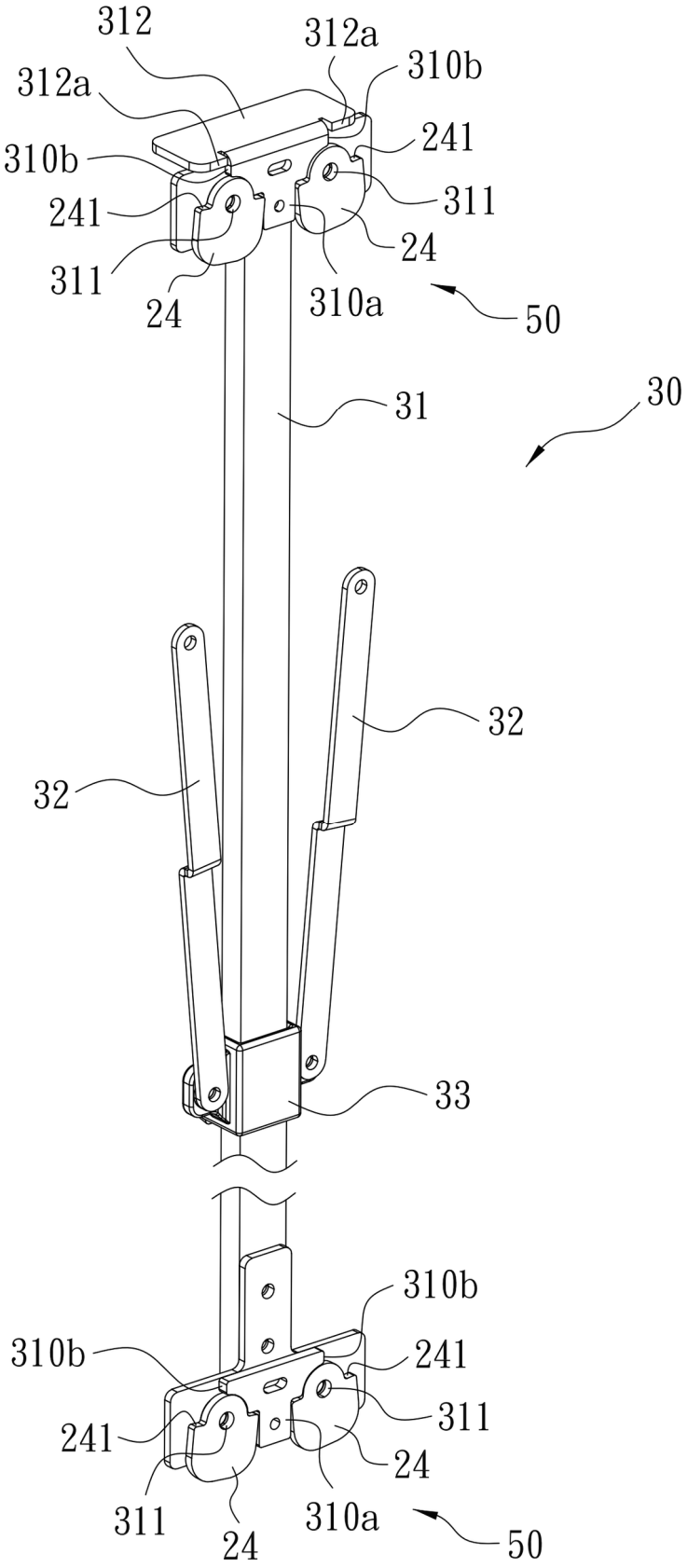

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FIG. 8

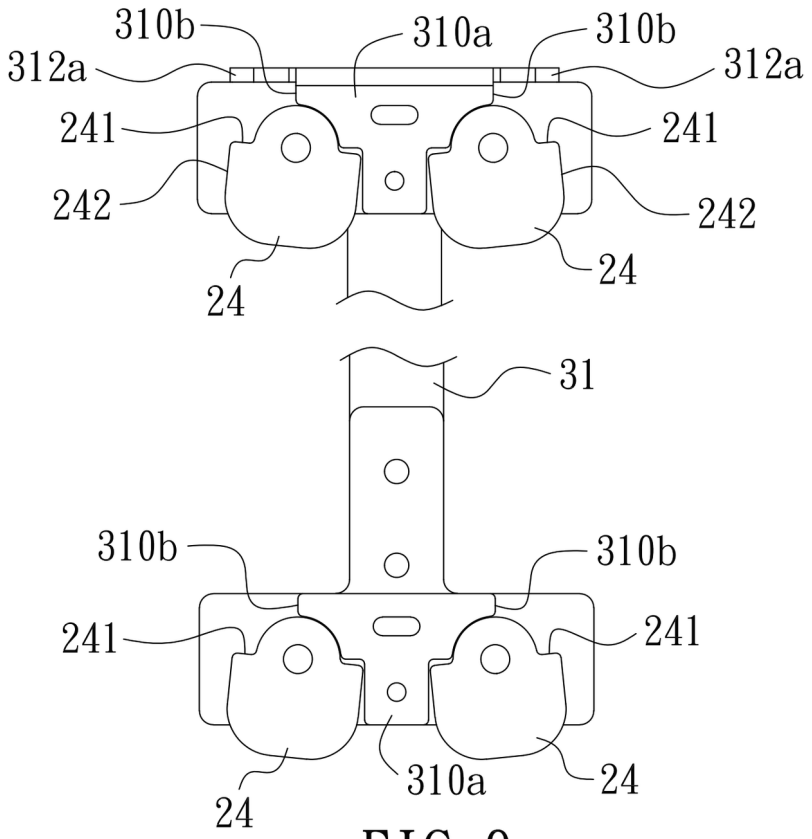

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FIG. 9

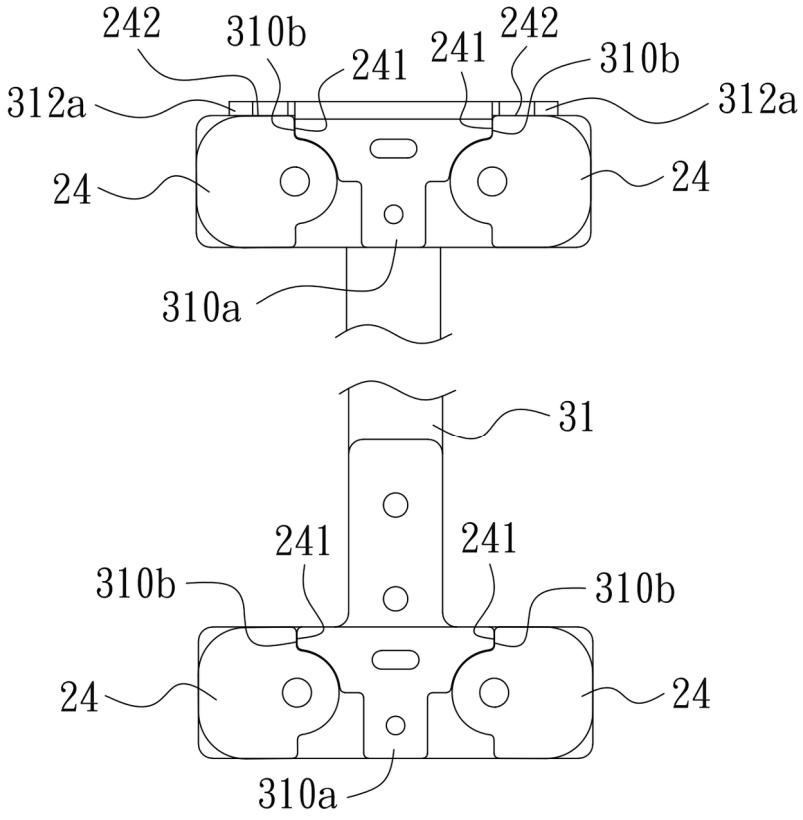

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FIG. 10

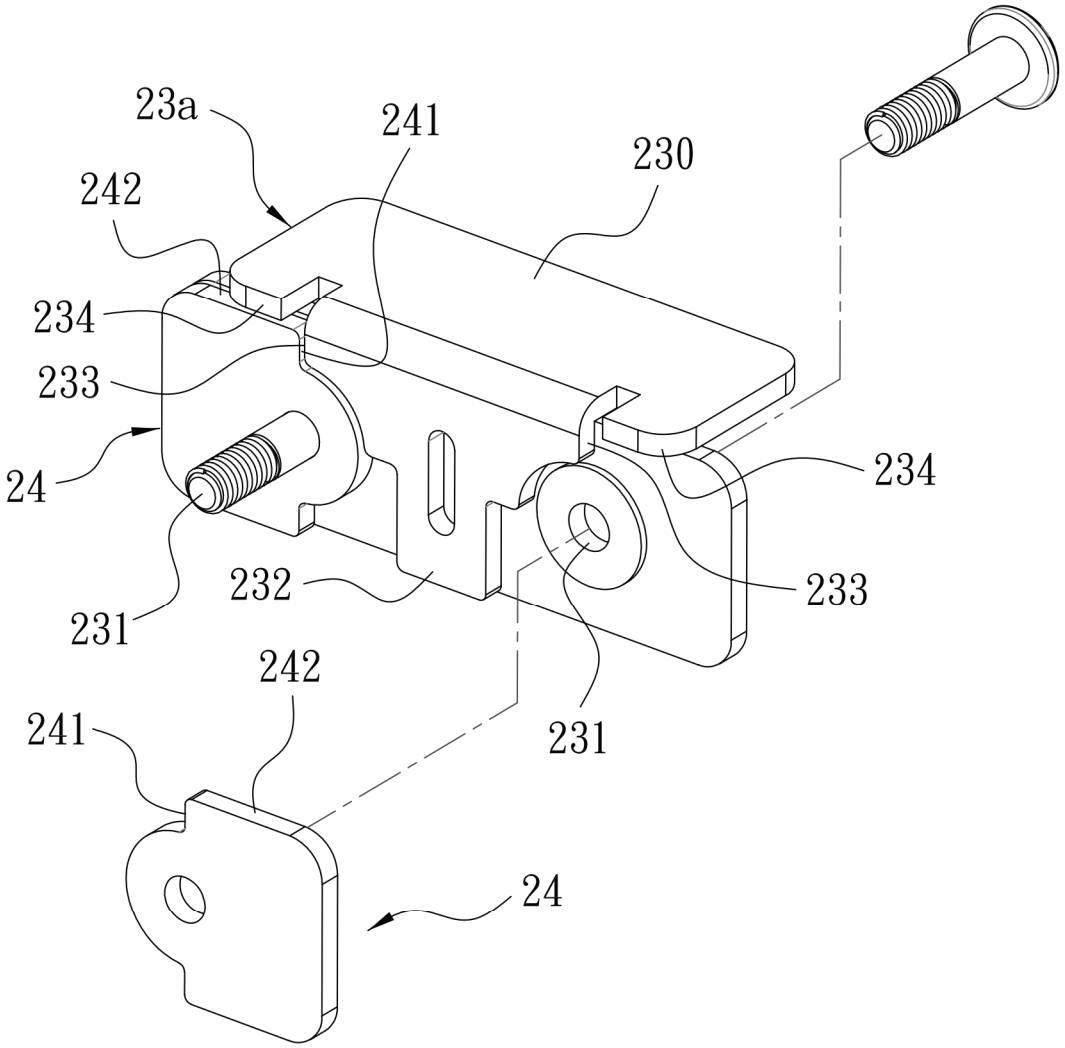


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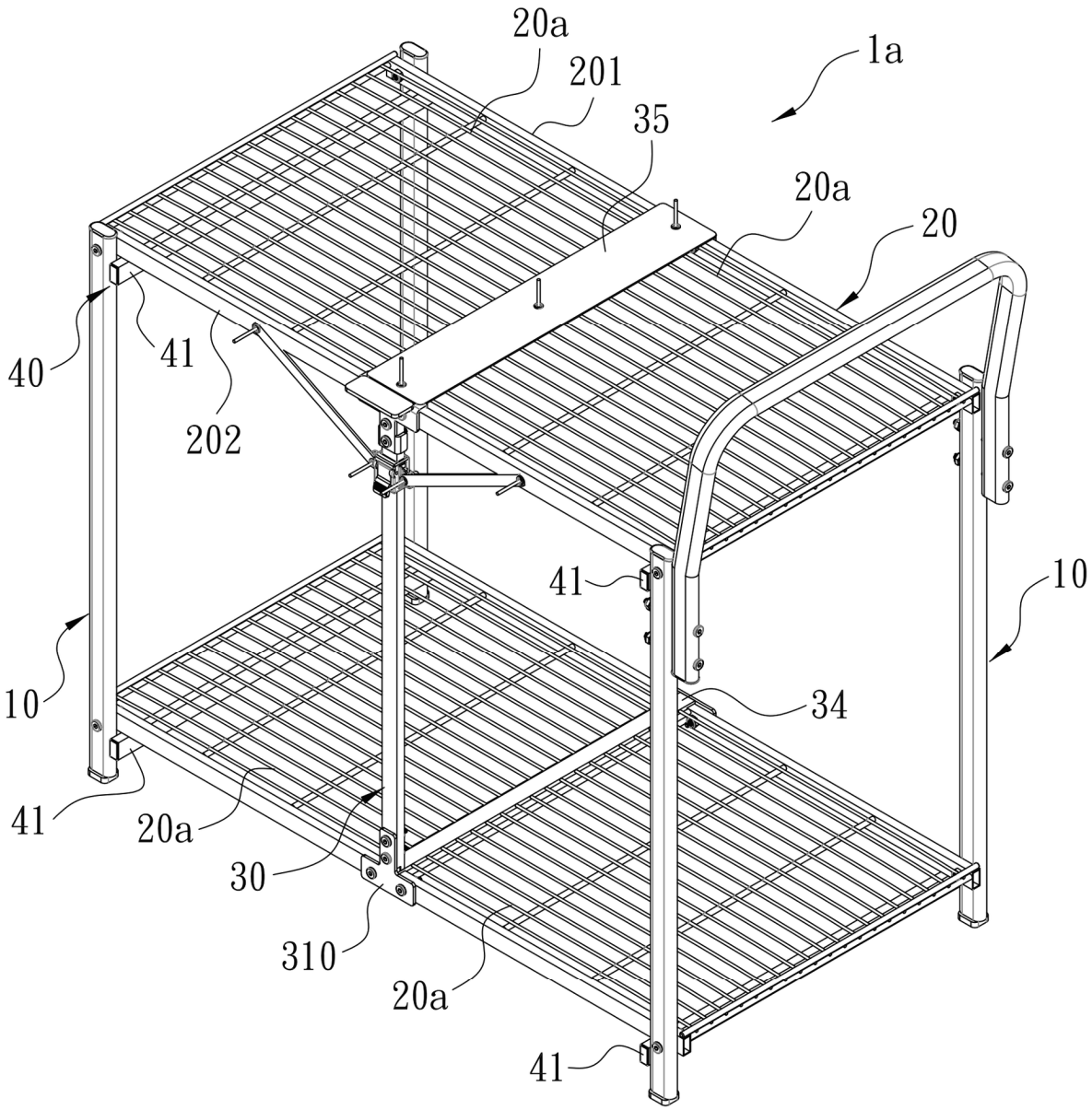


FIG. 12

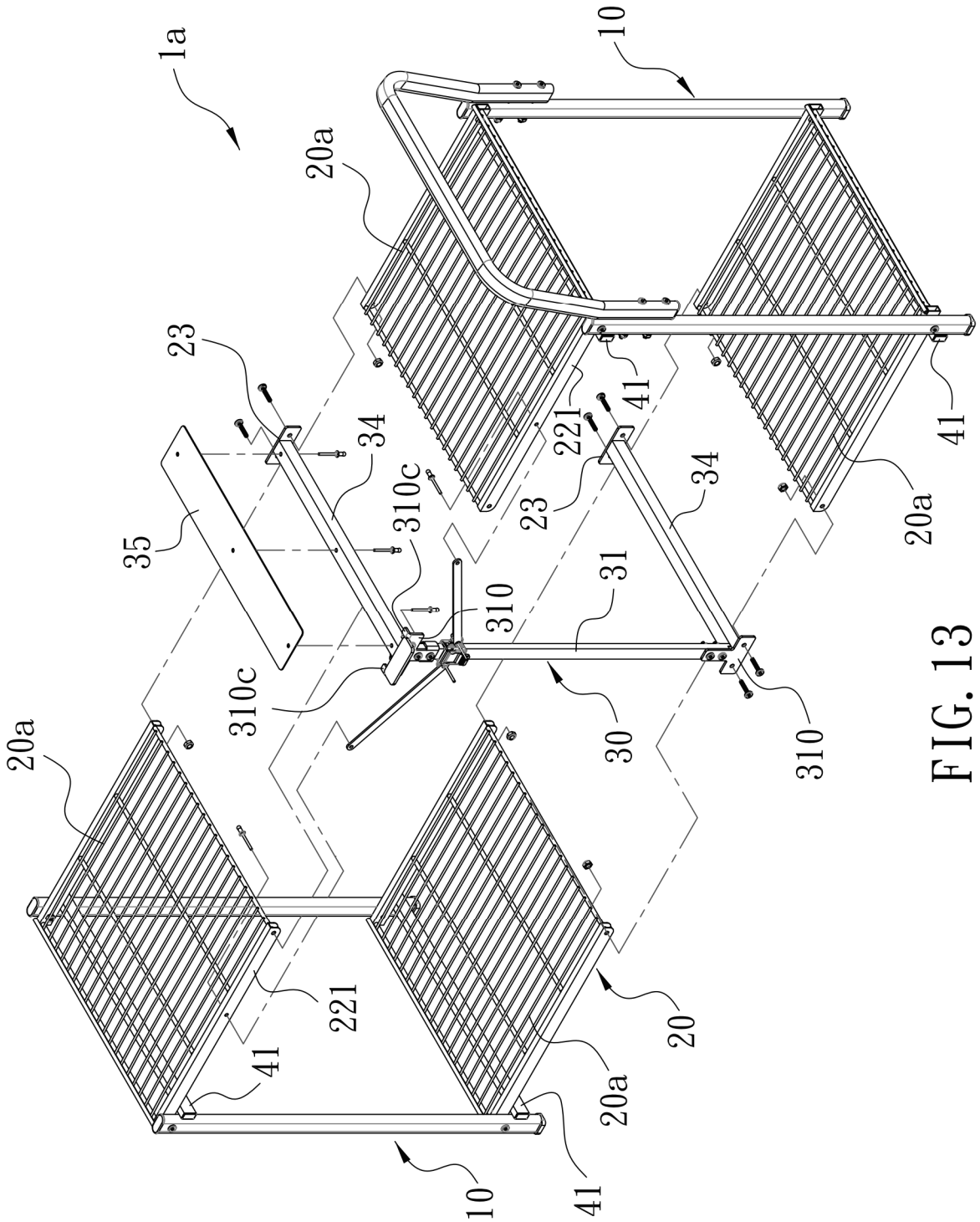


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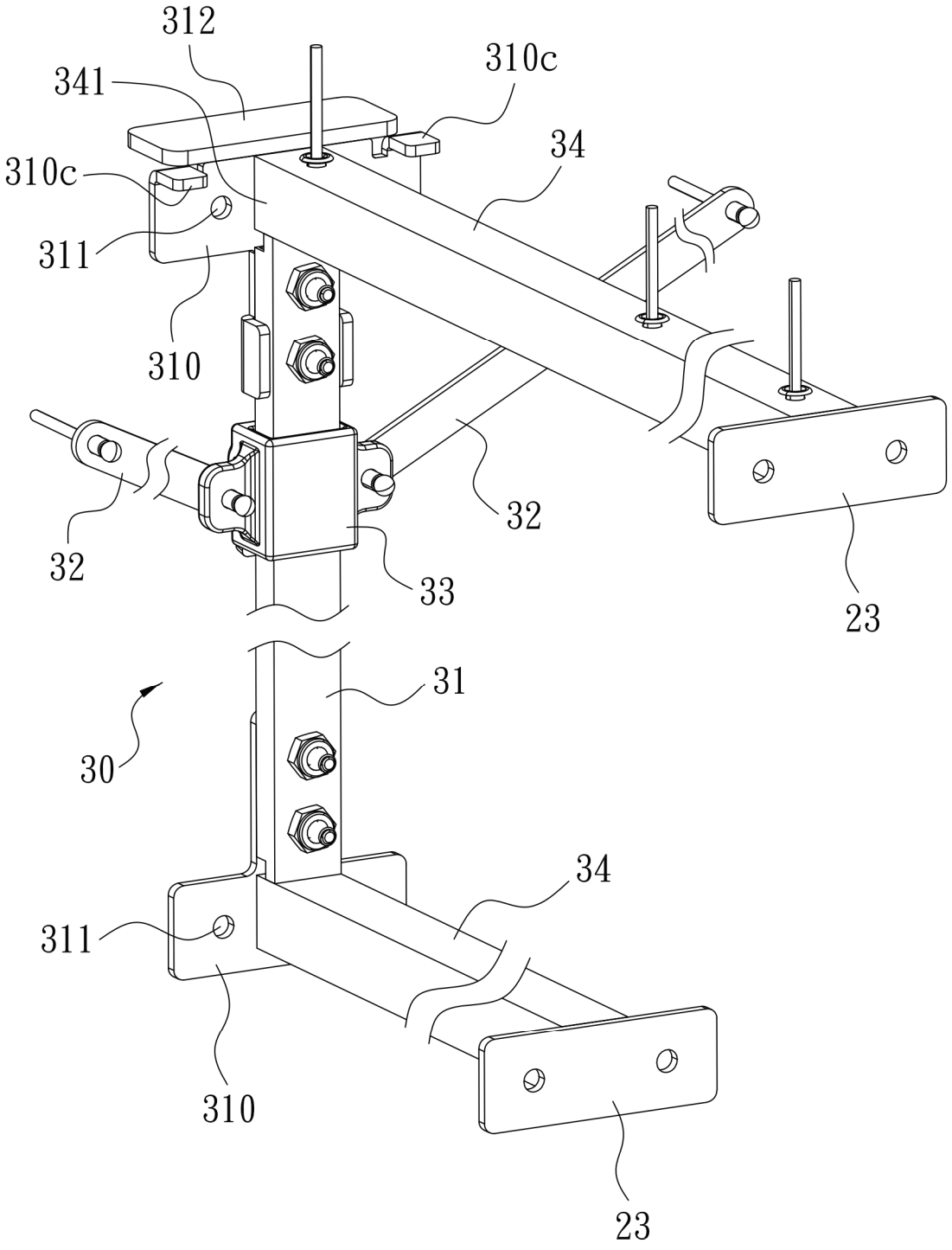


FIG. 14

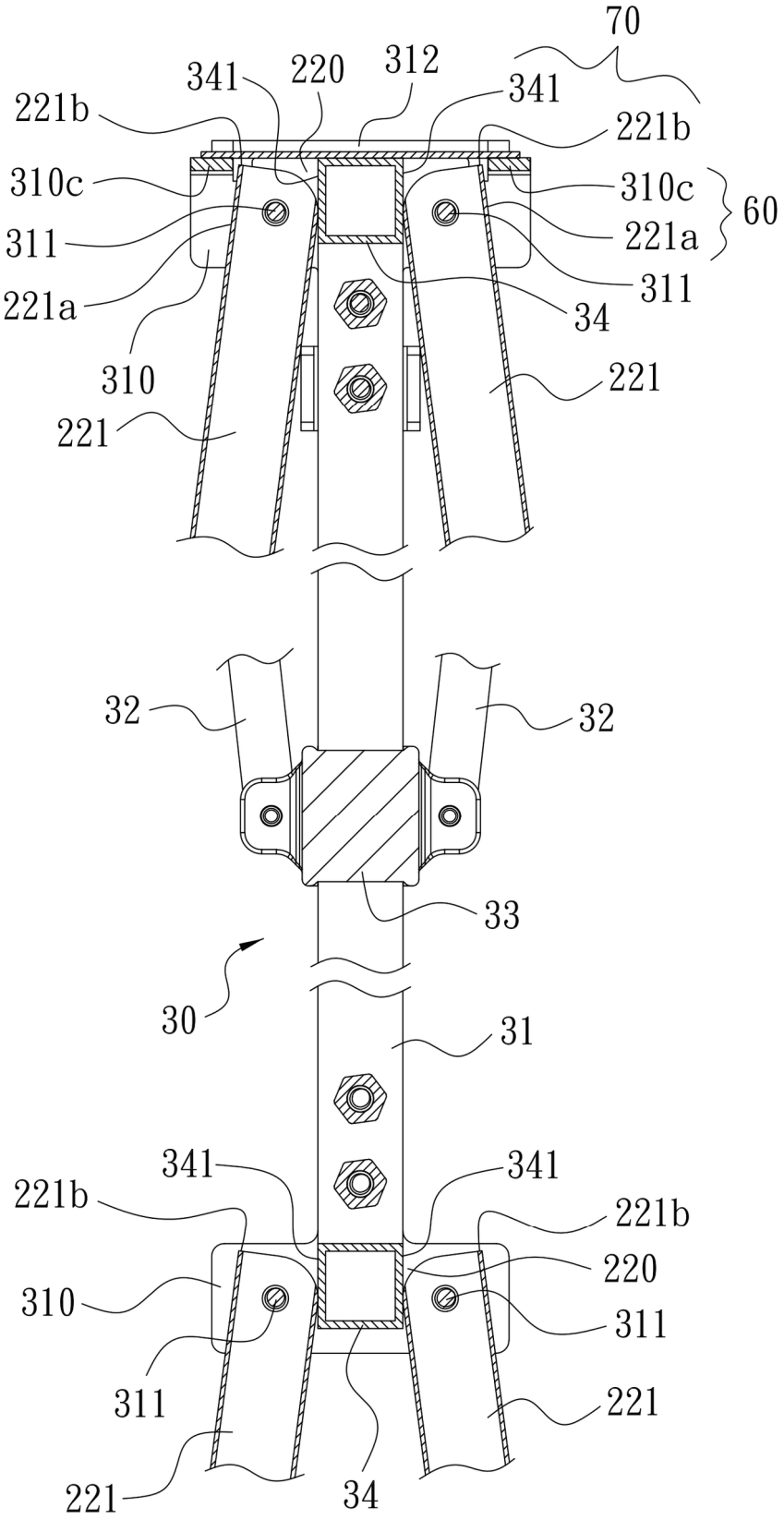

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FIG. 15

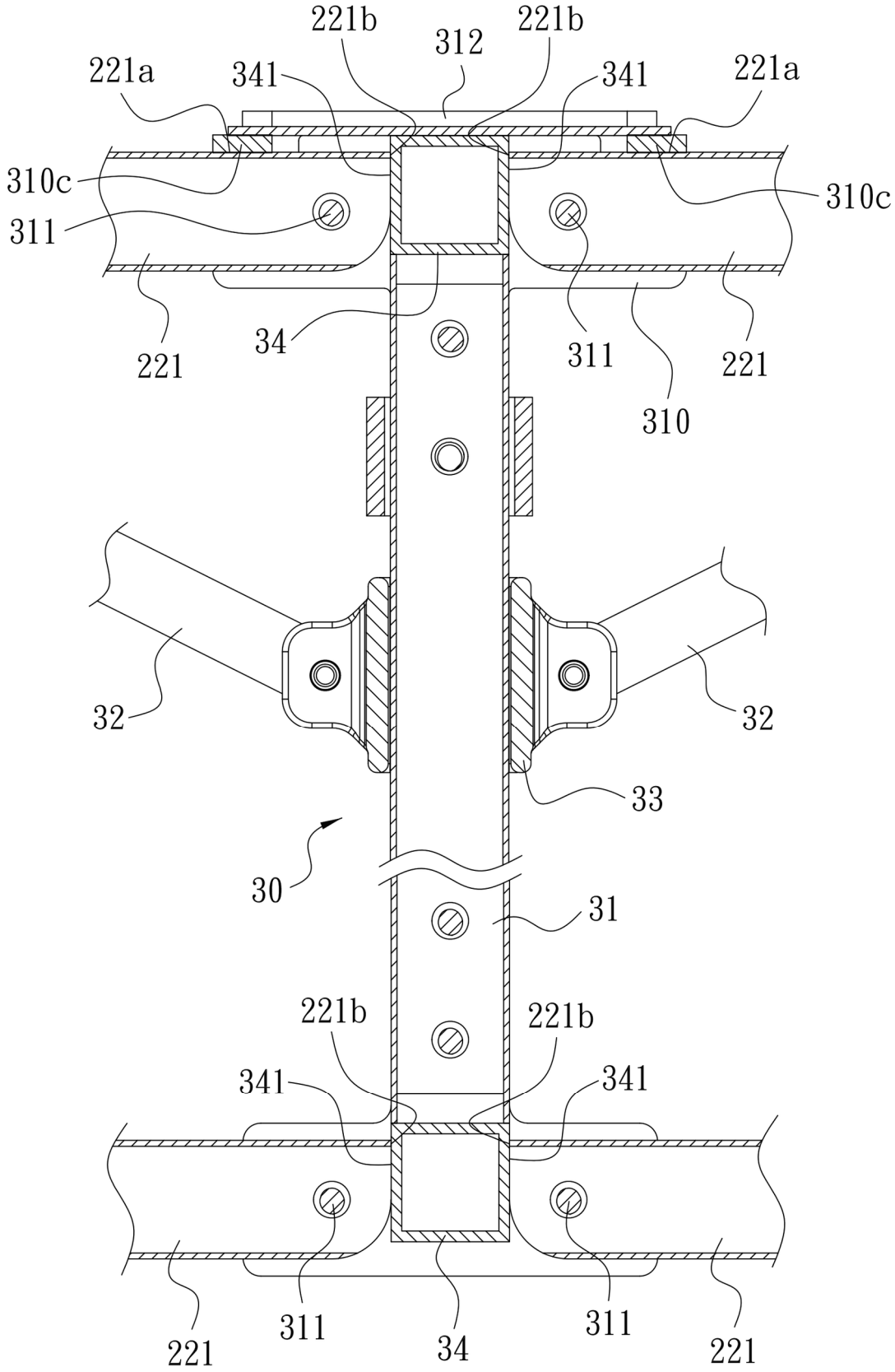

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FIG. 16

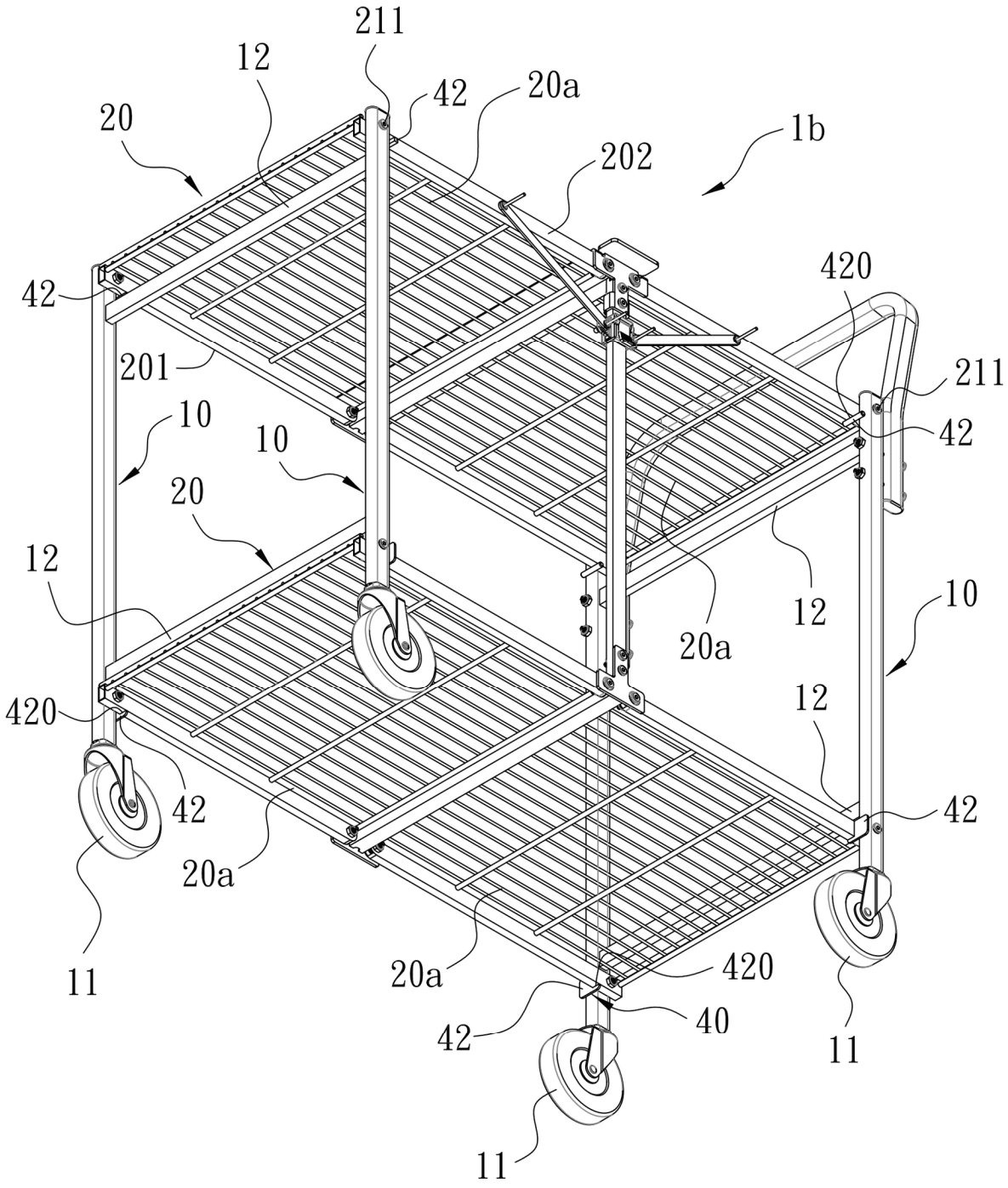

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FIG. 17

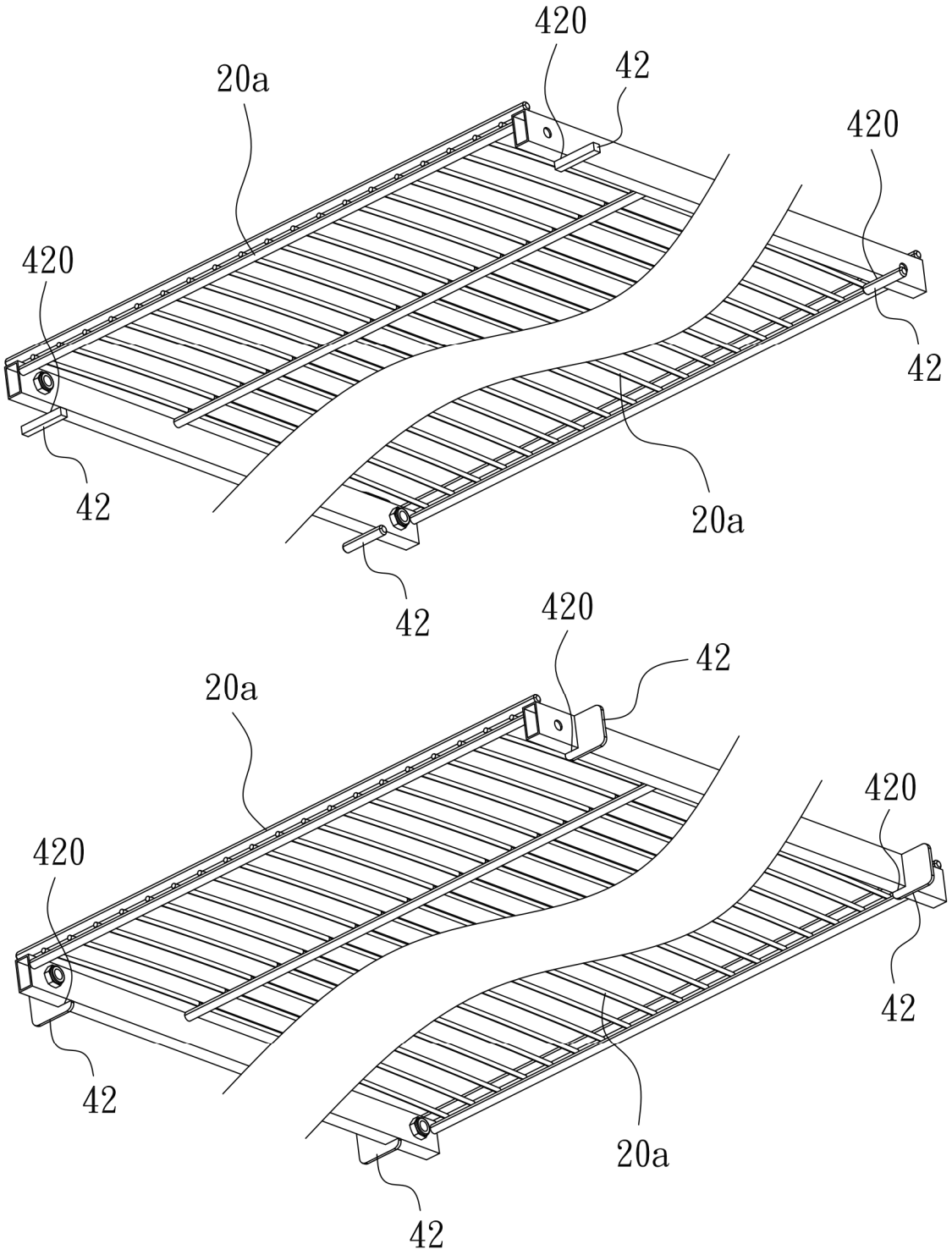


FIG. 18

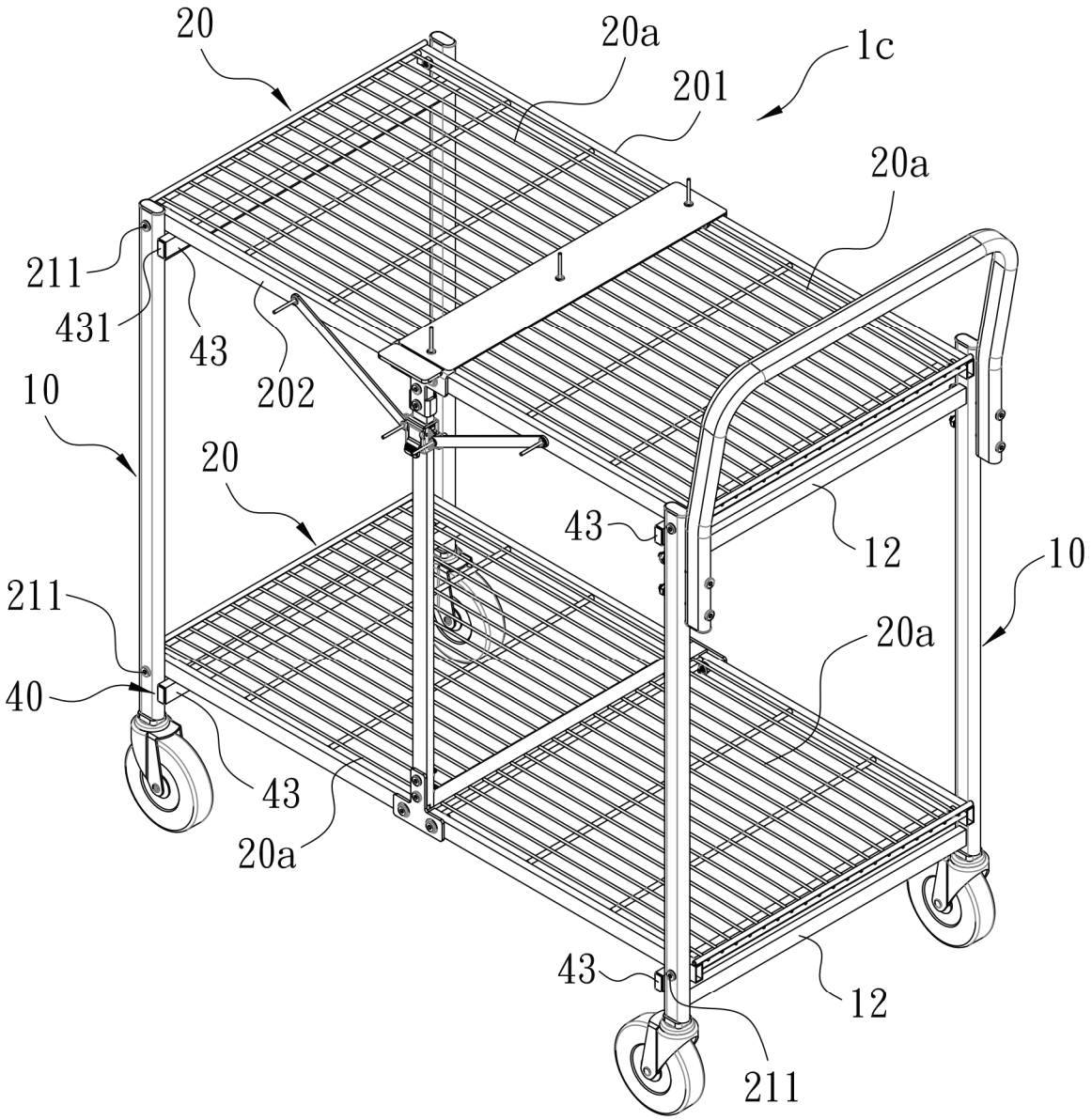

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FIG. 19

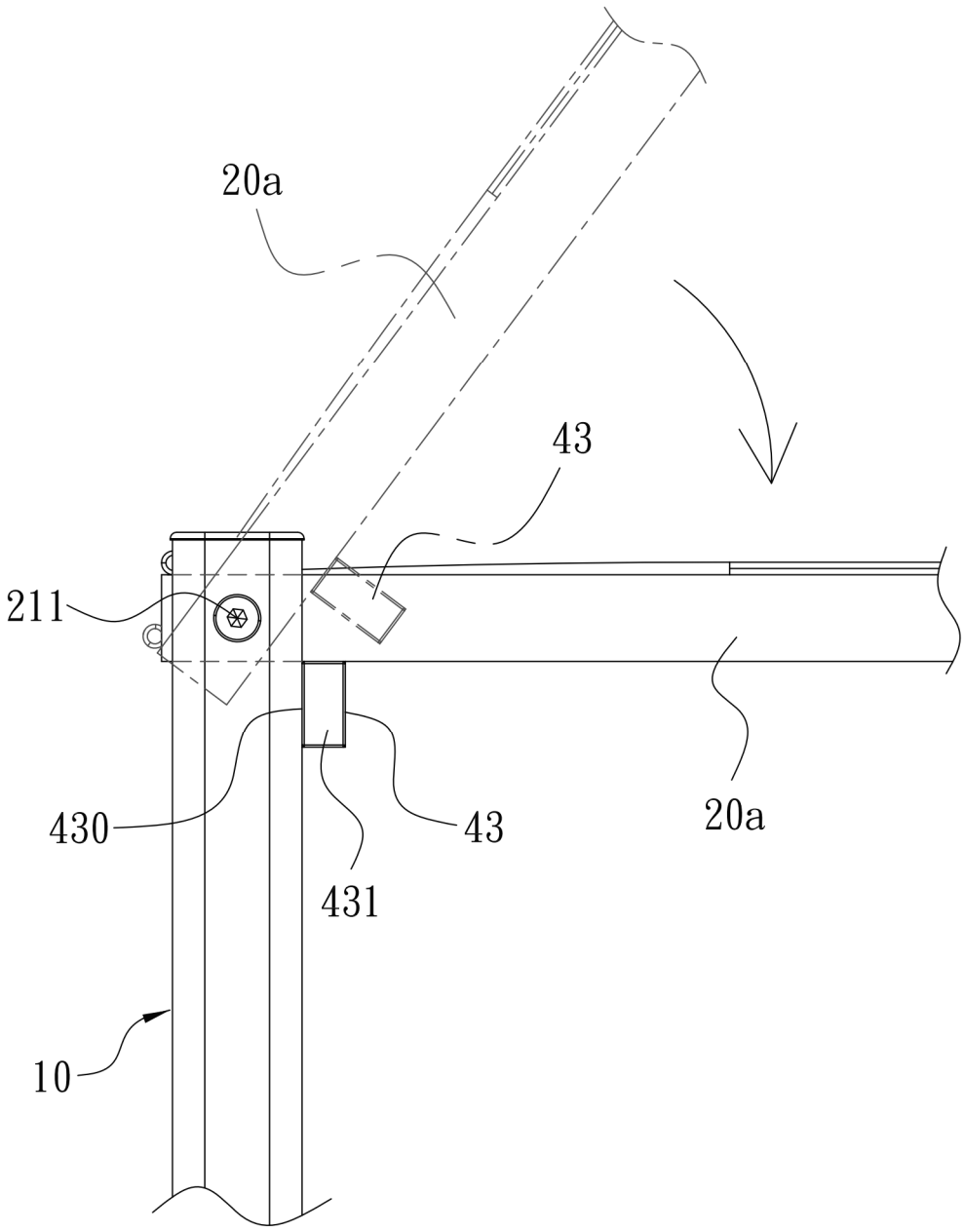


FIG. 20

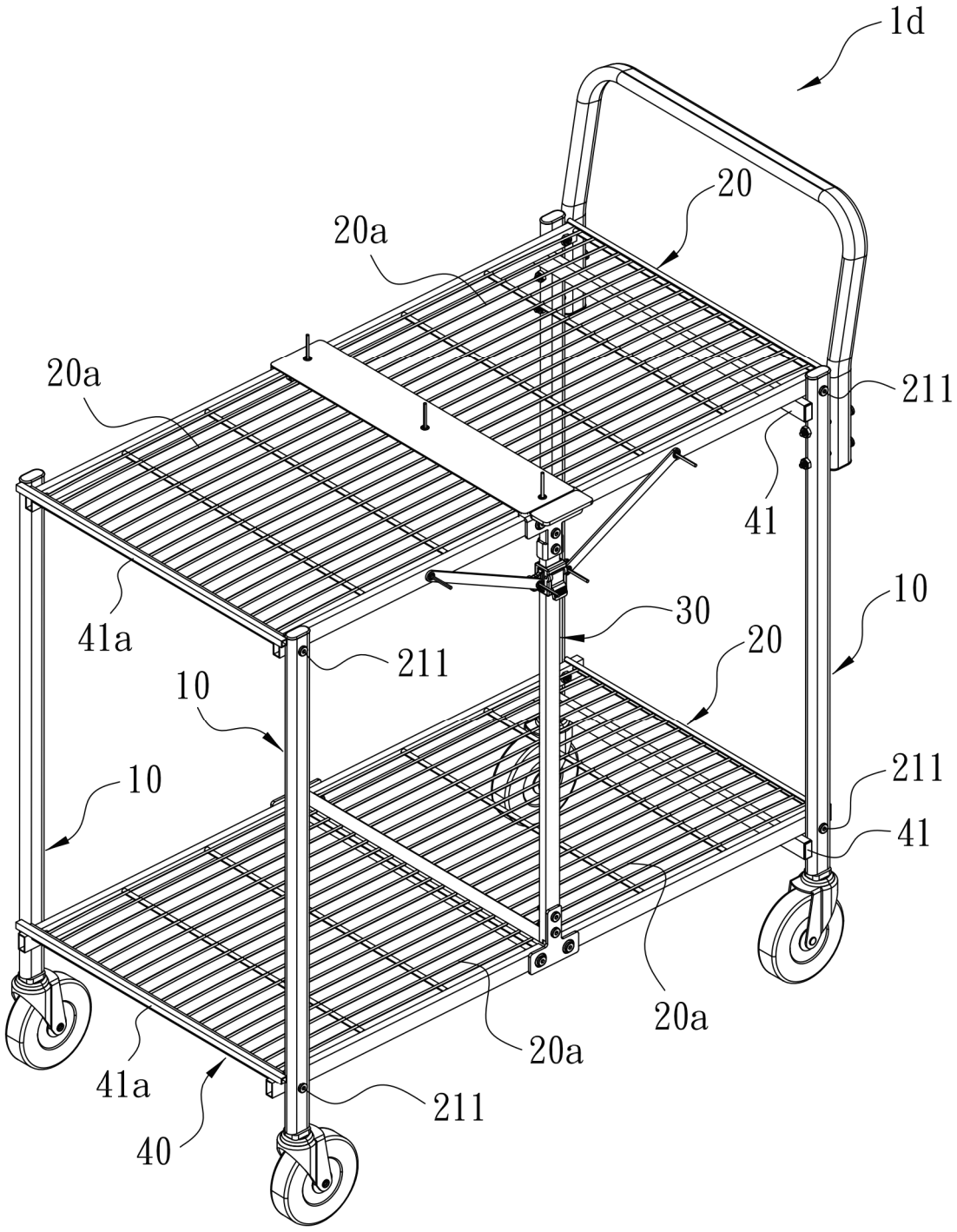

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FIG. 21

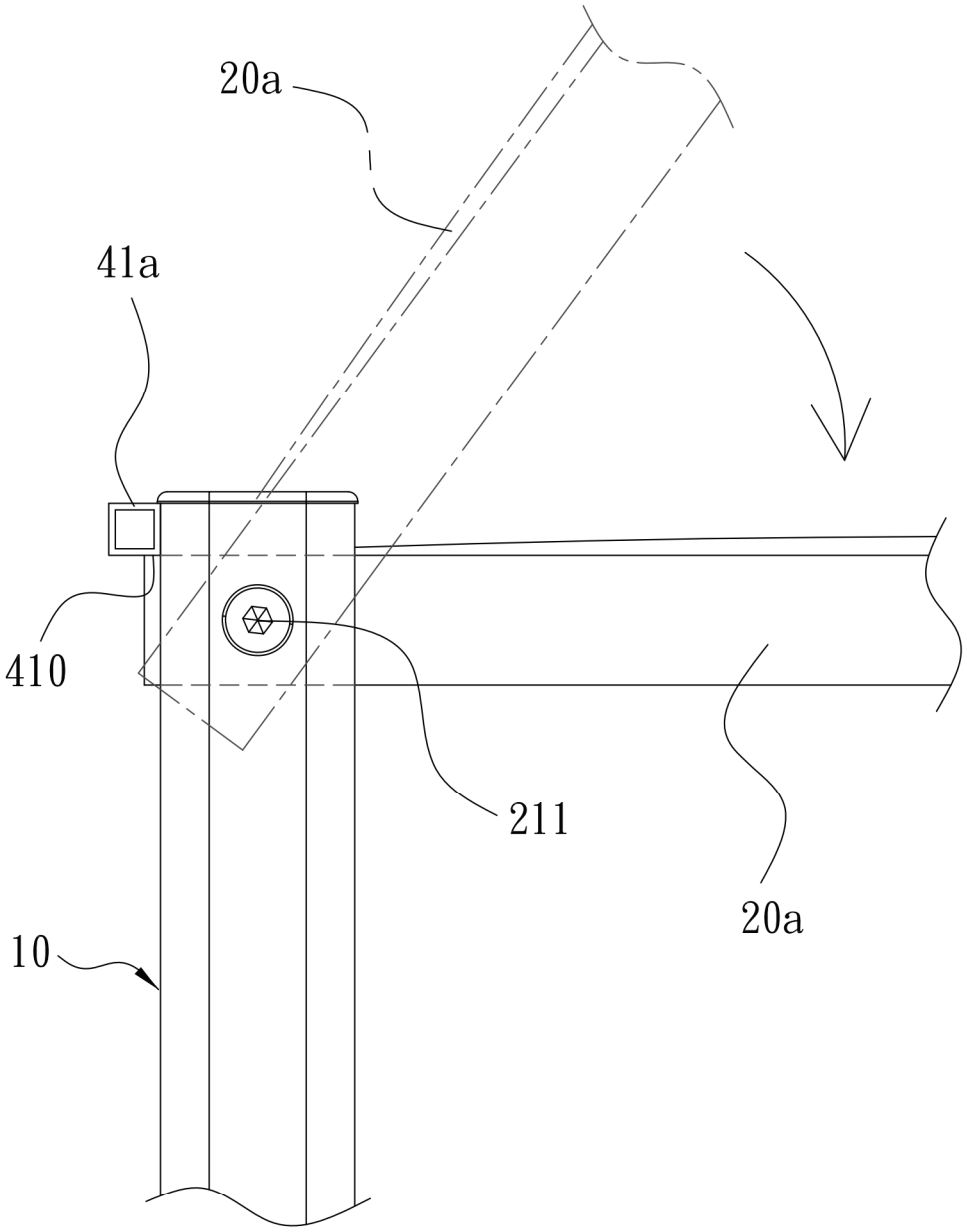


FIG. 22

FOLDABLE CARRYING EQUIPMENT

FIELD OF THE INVENTION

The present invention relates to a kind of equipment used for carrying objects, especially to a kind of foldable carrying equipment.

BACKGROUND OF THE INVENTION

No matter fixed racks or moveable trolleys, they are used to carry various object. Especially the movable trolley, it's convenient for transportation of object. A typical application of the trolley is used for shopping and carrying goods. Then move the trolley to a parking lot and place the goods into cars. The trolley can also be applied to different workplaces, even at home environments.

In order to have sufficient capacity, a volume of these racks or trolleys is not small and this a certain space is occupied. This affects space utilization and the large volume is not convenient for placement or storage while not in use. Thus there are quite a lot foldable racks or trolleys available on the market now and related patent documents are provided. For example, analogues of the foldable rack or trolley are provided in Taiwanese Pat. No. M546936U (Utility model), Taiwanese Pat. No. M556218U (Utility model), U.S. Pat. No. 10,292,491B1 (invention), U.S. Pat. No. 10,604,170B1, etc.

The foldable rack or trolley mentioned in the above patents includes a plurality of legs and at least two platforms disposed among the legs. Each of the platforms consists of two loading plates arranged adjacent to each other and able to be folded and extended. In order to allow these loading plates to be extended and folded freely and stably, there are many kinds of pivot structures able to be pivotally rotates and a plurality of support linkage rod set able to be operated by users. In a common design, each of two sides of the loading plates of the platform adjacent to each other is provided with a support linkage rod set. The typical support linkage rod set includes a support rod, two linkage rods, and a slider. The support rod is disposed between inner sides of the vertically-arranged loading plates of the platform close to each other. The linkage rod is disposed in a V-shape and its top end is pivotally connected to the corresponding loading plate. The slider is able to slide along the support rod. Preferably, the slider is able to be loosened or fastened. For example, the slider is loosened from or fastened on a specific position of the support rod by an elastic press portion or a pull-lock fastener disposed on the slider. A bottom of the linkage rod is pivotally connected to two sides of the slider. Thereby users can pull or push the top end of one of the support rods to force the slider sliding vertically along the support rod. At the same time, the linkage rod is further moved and the loading plates of the platform are pivotally rotated along with the slider. Thereby the rack or trolley are folded and expanded. It can be understood that the support linkage rod set is mainly used for equally-distributed forces and synchronous operation. That means not matter objects or goods are placed on the upper platform, the lower platform, or both platforms, weight of the objects or the goods is distributed to the respective platforms through the design of the support linkage rod set to share all the forces equally. Moreover, synchronous movement of the loading plates of the upper platform and the lower platform, or the adjacent loading plates of the same platform is ensured during the folding process or expansion process.

It is easy to understand that two adjacent sides of the two adjacent loading plates of the platform are both provided with one support linkage rod set to ensure stable support for the respective platforms. However, such design has apparent shortcomings, especially under certain conditions. For example, users need to place object with larger volume to the lower platform through the side. Inevitably, the support linkage rod set arranged at a middle part of the respective sides causes a bump in the road during placement of the larger objects. In order to solve the above problem, a feasible solution is to omit one of the support linkage rod sets arranged at one side and only one support linkage rod set is used. However, a problem of insufficient support strength for the respective platforms is also derived. Once the objects are heavier, the respective loading plates may collapse at the sides adjacent to each other. Although various types of stopping structure between the adjacent loading plates are designed and provided in some patent documents, they are usually used for limiting and unable to provide sufficient and effective support, especially when placed with heavy objects.

Furthermore, even the design of double support linkage rod sets is used, only the forces applied are equally distributed to the respective platform and no stable and effective support is provided. In order to solve the problem, a caster is disposed under the respective support linkage rod sets in U.S. Pat. No. 10,604,170B1 to increase support strength of a middle portion of the respective platforms. However, the design of the caster also has its own disadvantage. For example, the caster is easy to suspend and lose its support function when the ground is uneven. Or the caster makes other legs hang in the air so that smoothness or stability of the movement is affected. In other words, the function and operation of the caster are often severely compromised while in use.

A foldable trolley is provided in Japanese Pat. Pub. No. 2023-7258 A and at least one stopping block is disposed on an outer side of the respective loading plates or respective legs correspondingly. When the respective loading plates are extended to be set horizontally, the loading plate is limited and maintained at a horizontal position, by the stopping block on the outer side of the loading plate abutting against the corresponding leg or the stopping block on the leg abutting against the outer side of the loading plate, without being pivotally rotated in the valley folding direction. However, we all learn that a middle portion of the respective platform (the sides of right and left loading plates close to each other) is the most stressed area and the easiest place to have collapse and deformation when objects are loaded on the loading plates of the platform. The above design which prevents the loading plate from rotating in the valley folding direction is obviously insufficient to prevent the deformation of the platform because a larger width of the respective loading plates is not taken into consideration sufficiently. Once the objects loaded are heavier, the platform is still deformed easily. Thereby support provided by the sides of the loading plates close to each other needs to be reinforced for preventing the right and left loading plates from collapsing.

SUMMARY

Therefore, it is a primary object of the present invention to provide a foldable carrying equipment which includes four legs, at least two platforms, a support linkage rod set, an outer stopper, and a first inner stopper. The platforms are vertically arranged and each of the platforms having two

adjacent loading plates and a plurality of pivot plates. An outer side of the loading plate is pivotally connected to the legs and one side of an inner side is pivotally connected to the pivot plate. The support linkage rod set is provided with a support rod vertically disposed and pivotally connected to the other end of the inner sides of the loading plates and operable for driving the loading plates to switch between a folded position and an extended position. The outer stopper is arranged at the outer sides of the loading plates or between the legs for supporting the outer side of the loading plate while the loading plate is at the extended position. The first inner stopper is disposed on the inner side of the loading plate and located between the pivot plate and a pivot piece of the support rod for supporting the inner side of the loading plate while the loading plate is at the extended position.

The foldable carrying equipment according to the present invention allows both the inner side and the outer side of the respective loading plates to be stopped and limited by the outer stopper and the first inner stopper while the loading plates of the platform are pivotally rotated from the folded position to the extended position simultaneously. Thereby support of the loading plate is further improved, especially an intermediate portion of the loading plate. Therefore, the loading plate can be maintained at a horizontal state quite well while being at the extended position, without being collapsed and deformed toward valley-folding direction due to heavy objects loaded on the loading plates.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of an embodiment of a carrying equipment in an extended state according to the present invention;

FIG. **2** is an exploded view of the embodiment in FIG. **1** according to the present invention;

FIG. **3** is another perspective view of an embodiment of a carrying equipment in a folded state according to the present invention;

FIG. **4** is a left view of the embodiment in FIG. **1** according to the present invention;

FIG. **5** is a partial perspective view showing an area of two loading plates adjacent to each other of a platform in an embodiment according to the present invention;

FIG. **6** is a perspective view showing an inner side of a support linkage rod set in an embodiment according to the present invention;

FIG. **7** is a perspective view showing an inner side of a pivot plate in an embodiment according to the present invention;

FIG. **8** is a perspective view showing an inner side of a support linkage rod set in a folded state used in combination with limit blocks of an embodiment according to the present invention;

FIG. **9** is a partial planar view showing an inner side of a support linkage rod set of the embodiment in FIG. **8** according to the present invention;

FIG. **10** is a partial planar view showing an inner side of a support linkage rod set in an extended state of an embodiment according to the present invention;

FIG. **11** is a perspective view showing a pivot plate of the upmost platform in another form and an exploded view of a corresponding limit block of an embodiment according to the present invention;

FIG. **12** is a perspective view of a second embodiment of a carrying equipment in an extended state according to the present invention;

FIG. **13** is an exploded view of the embodiment in FIG. **12** according to the present invention;

FIG. **14** is a partial perspective view showing a support linkage rod set, a bar, and pivot plates assembled with one another of a second embodiment in an extended state according to the present invention;

FIG. **15** is a partial side sectional view showing a support linkage rod set, a bar, and a side frame assembled with one another of a second embodiment in a folded state according to the present invention;

FIG. **16** is a partial side sectional view showing a support linkage rod set, a bar, and a side frame assembled with one another of a second embodiment in an extended state according to the present invention;

FIG. **17** is a bottom perspective view of a third embodiment in an extended state according to the present invention;

FIG. **18** is a partial perspective view showing a bottom of the embodiment in FIG. **17** according to the present invention;

FIG. **19** is a perspective view of a fourth embodiment in an extended state according to the present invention;

FIG. **20** is a schematic drawing showing a loading plate pivotally rotated from a folded position to an extended position of the embodiment in FIG. **19** according to the present invention;

FIG. **21** is a perspective view of a fifth embodiment according to the present invention;

FIG. **22** is a schematic drawing showing a loading plate pivotally rotated from a folded position to an extended position of the embodiment in FIG. **21** according to the present invention.

DETAILED DESCRIPTION

Refer to FIGS. **1**-**4** and FIG. **8**, a first embodiment of a foldable carrying equipment is provided. In this embodiment, a foldable carrying equipment **1** is designed into a shelf, but not limited. The carrying equipment **1** can also be a trolley or in other forms.

The carrying equipment **1** includes four legs **10**, at least two platforms **20**, a support linkage rod set **30**, an outer stopper **40**, and a first inner stopper **50**.

The four legs **10** are respectively arranged at four corners correspondingly.

The two platforms **20** are disposed vertically. As shown in FIG. **1**, there are two platforms **20** at an upper position and a lower position in this embodiment, but not limited. The number of the platforms **20** can also be more than two. The platform **20** consists of two loading plates **20***a* arranged adjacent to each other. Each of the loading plates **20***a* includes an outer side **21**, an inner side **22**, a first side **201**, and a second side **202**. In the two adjacent loading plates **20***a*, the outer sides **21** are away from each other and the inner sides **22** are close to each other while the two first sides **201** and the two second sides **202** are opposite to each other. Two ends of the outer side **21** of the loading plate **20***a* are pivotally connected to the legs **10** to form outer pivot points **211** correspondingly. The platform **20** further includes a plurality of pivot plates **23**, as shown in FIG. **2** and FIG. **7**. A junction between the inner side **22** and the first side **201** of the loading plate **20***a* is pivotally connected to the pivot plate **23** to form a first pivot point **231** and there is a gap **220** formed between the two inner sides **22**. Thus the inner sides **22** of the loading plate **20***a* can be either moved upward and pivotally rotated to a folded position, as shown in FIG. **3**, or moved downward and pivotally rotated to an extended

position, as shown in FIG. **1**. The folded and the extended positions are about the same as those of prior arts and not described in detail herein.

The support linkage rod set **30** can be selectively disposed on either the first side **201** or the second side **202** of the loading plate **20***a*. In this embodiment, the support linkage rod set **30** is disposed on the second side **202**. As shown in FIG. **6**, the support linkage rod set **30** consists of a support rod **31**, two linkage rods **32**, and a slider **33**. The support rod **31** is vertically arranged and pivotally connected to the inner sides **22** of the loading plates **20***a* of the platform **20** which are close to each other. The two linkage rods **32** are disposed in a V-shape and each of the linkage rods **32** is provided with a first end portion **321** and a second end portion **322**. The first end portion **321** is pivotally connected to a position between the outer side **21** and the inner side **22** of the loading plate **20***a* of the platform **20**. The slider **33** is slidably moved along the support rod **31** and operable to be loosened from or fastened on the support rod **31**. The second end portion **322** of the linkage rod **32** is pivotally connected to and positioned on the slider **33** so that linkage rod **32** is pivotally rotated along with vertical movement of the support rod **31**. For example, the slider **33** is forced to slide along the support rod **31** when users apply a force to pull up or press down a top end of the support rod **31**. Thereby the respective loading plates **20***a* of the platform **20** are driven to be pivotally rotated and switched between the folded position and the extended position.

Moreover, as shown in FIG. **6**, the support rod **31** is provided with at least two pivot pieces **310** each of which is provided with two second pivot points **311**. The pivot pieces **310** are disposed on positions at the same levels as the respective platforms **20** correspondingly. A junction between the inner side **22** and the second side **202** of the loading plate **20***a* is pivotally connected to the corresponding pivot piece **310** to form the second pivot point **311**, as shown in FIG. **1**. The two second pivot points **311** are spaced apart due to the gap **220** between the two inner sides **22**. Thereby the junction between the inner side **22** and the first side **201** of the loading plate **20***a* and the junction between the inner side **22** and the second side **202** of the loading plate **20***a* can be respectively rotated pivotally around the first pivot point **231** and the second pivot point **311**, and thus switched between the folded position and the extended position synchronously.

A mechanism for loosening and fastening of the slider **33** and structure for movement among the slider **33**, the linkage rods **32**, and the support rod **31** are prior arts and thus not described in detail herein.

In this embodiment, a single support linkage rod set **30** is taken as an example. The support linkage rod set **30** is vertically arranged and disposed on the sides adjacent to the inner sides **22** of the respective loading plates **20***a* of the platform **20** such as the second side **202** in this embodiment. In order to allow the user to move the carrying equipment **1** which is designed into a shelf conveniently, top ends of the two adjacent legs **10** at the same side are provided with a handle **100** able to be held by the user. It should be understood that the user usually stands close to one side of the handle **100**. In the following description, the side close to the handle **100** is defined as a back side while the side away from the handle **100** is defined as a front side. As shown in FIG. **1**, it is clear that the support linkage rod set **30** is disposed on the right side. Thus a full, non-obstructed larger opening **101** is formed on the left side and used for allowing objects with larger volume to be placed onto the platform **20** at the lower position.

The outer stopper **40** includes a plurality of stopping members arranged at the outer sides **21** of the respective loading plates **20***a* of the platform **20** away from each other or the corresponding legs **10**. When the loading plates **20***a* are rotated downward to the extended position, the two adjacent loading plates **20***a* are stopped and limited by the stopping members, without being rotated toward a valley-folding direction. Thus the outer sides **21** of the respective loading plates **20***a* are further supported.

In this embodiment, the stopping member is a horizontal support rod **41** having two end portions **411** fixed on an inner side of the two legs **10** adjacent to each other and located at the same side such as the front side or the back side. The end portion **411** of the horizontal support rod **41** is provided with a stopping portion **410**. It should be understood that the stopping portion **410** is located at the inner side of the outer pivot point **211**, as shown in FIG. **1** and FIG. **2**. A side frame **221** is located at both the first side **201** and the second side **202** of the loading plate **20***a*. Thus the outer side **21** of the respective loading plates **20***a* gets good support and reinforcement due to a corresponding portion of the side frame **221** abutting against and stopped by the stopping portion **410** when the respective loading plates **20***a* of the platform **20** are pivotally rotated to the extended position. At the same time, rotation toward the valley-folding direction is also prevented. The design with the single support linkage rod set **30** especially has higher requirement for support and reinforcement.

In this embodiment, a plurality of connection rods is arranged between and fixed on the two adjacent legs **10** at the same side. The connection rod can be used to form the horizontal support rod **41**. In other words, arrangement of the connection rods is to connect the two adjacent legs **10** at the same side with each other for increasing connection strength and structural firmness. In order to simplify the structure, the horizontal support rod **41** can also use as the connection rods and provide the same function. Thus there is no need to arrange the connection rods, but not limited. In other embodiments, additional connection rods can also be provided.

As shown in FIGS. **5**-**8**, the first inner stopper **50** consists of a plurality of first limit bumps **232**, a plurality of second limit bumps **310***a*, and a plurality of limit blocks **24**.

The first limit bump **232** is projecting from an area around the first pivot point **231** on an inner side of the pivot plate **23**. Each of the first limit bumps **232** is provided with a first limit wall **233** formed on each of two sides of the first limit bump **232**. Similarly, the second limit bump **310***a* is projecting from an area around the second pivot point **311** on an inner side of the pivot piece **310**. Each of the second limit bumps **310***a* is provided with a second limit wall **310***b* formed on each of two sides of the second limit bump **310***a*. The limit blocks **24** are disposed on the first pivot point **231** and the second pivot point **311** of the loading plate **20***a*. As shown in FIG. **5**, each of the limit blocks **24** is provided with a limit lock wall **241**. When the loading plate **20***a* is pivotally rotated from the folded position to the extended position, the support effect of the inner side **22** of the loading plate **20***a* of the platform **20** is strengthened due to the limit lock walls **241** abutting against and stopped by the first limit wall **233** of the pivot plate **23** and by the second limit wall **310***b* of the pivot piece **310** correspondingly, as shown in FIG. **5** and FIGS. **8**-**10**. In other words, support of the respective loading plates **20***a* of the platform **20**, no matter the outer side **21** or the inner side **22**, can be respectively improved by the structural design of the outer stopper **40** and the first inner stopper **50**. Thus it is ensured that the loading plate **20***a* can

be maintained at a horizontal state quite well while being extended, especially being mounted with heavy objects. The above design can prevent the inner sides **22** of the loading plates **20***a* from collapsing and deforming in the valley-folding direction and the objects are placed and loaded on the loading plates **20***a* well.

In this embodiment, a braking plate **312** is disposed on the top end of the support rod **31** so that users can apply forces vertically for operation of the support rod **31** and further movement of the loading plates **20***a* of the respective platforms **20** along with the support rod **31**. In a preferred embodiment, a lug **312***a* is horizontally protruding from of the inner side of the pivot piece **310** of the support rod **31** at the same level of the upmost platform **20** and located over the second pivot point **311**, as shown in FIG. **6**. Refer to FIG. **5**, a stopping edge **242** is arranged adjacent to the limit lock wall **241** of the limit block **24** corresponding to the lug **312***a*. When the loading plate **20***a* is pivotally rotated from the folded position to the extended position, the stopping edge **242** is abutting against and limited by the corresponding lug **312***a* of the pivot piece **310**, as shown in FIG. **9** and FIG. **10**. Thereby the support strength and stability of the second side **202** of the respective loading plates **20***a* of the platform **20** at the upper position are improved while being extended.

In order to simplify the structure, the lug **312***a* can be directly extended from an inner side of the braking plate **312** and integrated with the braking plate **312**. It should be understood that the first inner stopper **50** can further include the lug **312***a* and the corresponding stopping edge **242**.

Similarly, the pivot plate **23** of the upmost platform **20** of the first embodiment can also be modified into a pivot plate **23***a* in another form. As shown in FIG. **11**, the difference between this form and the above one is in that a lug **234** is projecting horizontally from an inner side of the pivot plate **23***a* and located above the first pivot point **231**. When the loading plate **20***a* is pivotally rotated from the folded position to the extended position, the stopping edge **242** of the limit block **24** is abutting against and limited by the lug **234** of the corresponding pivot plate **23***a*, as shown in FIG. **9** and FIG. **10**. Thereby the support strength and stability of the first side **201** of the respective loading plates **20***a* of the platform **20** at the upper position are improved while being extended.

In a preferred embodiment, a detent plate **230** is arranged at a top end of the pivot plate **23***a* so that users can use their hands to pull up or press down the detent plate **230** at the first side **201** and the braking plate **312** at the second side **202** at the same time for folding or extending the respective loading plates **20***a* of the platform **20**. In order to simplify the structure, the lug **234** can be directly extended from an inner side of the detent plate **230** and integrated with the detent plate **230**. It should be understood that the first inner stopper **50** can further include the lug **234** and the corresponding stopping edge **242**.

As shown in FIGS. **12-16**, a second embodiment of a foldable carrying equipment according to the present invention is provided. A carrying equipment **1***a* in this embodiment is about the same as the carrying equipment **1** of the above embodiment and the difference between the carrying equipment **1***a* and the carrying equipment **1** is in that a bar **34** is connected between the upmost pivot piece **310** of the support rod **31** and the corresponding pivot plate **23** and mounted in the gap **220** for supporting the objects loaded on the platform **20**. An anti-pinch plate **35** is connected and fixed on the bar **34** for completely covering the bar **34** and the gap **220** with the bar **34** therein. Thereby the above design effectively protects users fingers from injuries caused by being trapped in the gap **220** during extension and folding processes.

In a preferred embodiment, the bar **34** is connected between the respective pivot pieces **310** and the corresponding pivot plates **23**. Although the anti-pinch plate **35** is only disposed on the upmost bar **34** in the figures, the position of the anti-pinch plate **35** is not limited. The anti-pinch plate **35** can also be disposed on another bar **34**.

As shown in FIG. **15** and FIG. **16**, the carrying equipment **1***a* in this embodiment further includes a second inner stopper **60** which is composed of a plurality of limit stopping portions **310***c* and a plurality of leaning walls **221***a*, respectively formed by two upper sides above the second pivot point **311** of the pivot piece **310** projecting inward horizontally and a top wall surface of the side frame **221** at the extended position. When the respective loading plates **20***a* of the platform **20** are pivotally rotated from the folded position to the extended position, abutting-against and limiting effect is created by the leaning walls **221***a* of the side frame **221** abutting against and stopped by the corresponding limit stopping portions **310***c*. Thereby the support for the inner sides **22** of the respective loading plates **20***a* of the platform **20** are further reinforced.

As shown in FIG. **15**, the carrying equipment **1***a* in this embodiment further includes a third inner stopper **70** which consists of a plurality of side stopping walls **341** and a plurality of leaning edges **221***b*, respectively formed on two sides of the bar **34** and the side frame **221** of the loading plate **20***a* corresponding to the side stopping wall **341**. When the respective loading plates **20***a* are pivotally rotated from the folded position to the extended position, stopping and limiting effect is created by the leaning edges **221***b* leaning against the corresponding side stopping walls **341** of the bar **34**. Thereby the support for the inner sides **22** of the respective loading plates **20***a* of the platform **20** are further increased.

It should be noted that at least one of the second inner stopper **60** and the third inner stopper **70** in this embodiment can be used to replace the first inner stopper **50** in the first embodiment mentioned above. That doesn't mean at least one of the second inner stopper **60** and the third inner stopper **70** or both are unable to integrate with the first inner stopper **50** or coexist with the first inner stopper **50**. By modifications made to the structural design, the first inner stopper **50**, the second inner stopper **60**, and the third inner stopper **70** can selectively or all exist in the same embodiment at the same time so as to adjust support strength levels of the respective loading plates **20***a* of the platform **20** according to specifications, properties, and uses of the products.

Refer to FIG. **17** and FIG. **18**, a third embodiment of a foldable carrying equipment according to the present invention is provided. A carrying equipment **1***b* in this embodiment is about the same as the carrying equipment **1** of the above embodiment and the difference between the carrying equipment **1***b* and the carrying equipment **1** is in that: the stopping member in this embodiment is a support member **42** which is connected and fixed on the inner side of the leg **10** and provided with a stopping area **420**. When the respective loading plates **20***a* of the platform **20** are pivotally rotated to the extended position, the stopping area **420** is abutting against corresponding part of the respective loading plates **20***a* for supporting. In other words, the two end portions **411** of the horizontal support rod **41** are connected to the two legs **10** adjacent to each other at the same side so that the two stopping portions **410** are formed on the two

horizontal support rods **41** correspondingly in the first embodiment. In this embodiment, each of the support member **42** is connected and fixed on the single leg **10** so that only one stopping area **420** is formed on the support member **42**.

It should be understood that connection rods **12** are added to connect the two adjacent legs **10** at the same side in order to improve connection strength and structural stability since the support member **42** is not connected with the two adjacent legs **10** at the same side.

Furthermore, a rotating wheel **11** is mounted to a bottom of the respective legs **10** of the carrying equipment **1***b* so that users can push and move the carrying equipment **1***b* conveniently. The carrying equipment **1***b* is in the form of a trolley.

Refer to FIG. **19** and FIG. **20**, a fourth embodiment of a foldable carrying equipment according to the present invention is provided. A carrying equipment **1***c* in this embodiment is about the same as the carrying equipment **1** of the above embodiment and the difference between the carrying equipment **1***c* and the carrying equipment **1** is in that: the stopping member in this embodiment is an abutting horizontal rod **43** with two end portions **431** connected and fixed on an area close to the outer side **21** of the loading plates **20***a* of the platform **20** to form a stopping part **430** on each of the end portions **431**. The stopping part **430** is located on the inner side of the outer pivot point **211**. When the respective loading plates **20***a* of the platform **20** are pivotally rotated to the extended position at the same time, the stopping part **430** is abutting against corresponding area of the respective legs **10**. By the abutting horizontal rod **43** at the extended position and the legs **10** abutting against each other, the support strength of the outer side **21** of the respective loading plates **20***a* of the platform **20** is improved.

Similarly, the stopping member in this embodiment can also be an abutting member which works like the support member **42** in the third embodiment mentioned above. The difference is only in that the abutting member is connected and fixed on the respective loading plates **20***a*, instead of the legs **10**. Each of the abutting members is provided with one of the stopping parts **430** which is abutting against a corresponding area of the respective legs **10** when the respective loading plates **20***a* of the platform **20** are pivotally rotated to the extended position at the same time.

As shown in FIG. **21** and FIG. **22**, a fifth embodiment of a foldable carrying equipment according to the present invention is provided. A carrying equipment **1***d* in this embodiment is about the same as the carrying equipment **1** of the above embodiment and the difference between the carrying equipment **1***d* and the carrying equipment **1** is in that: the two end portions **411** of at least a part of the horizontal support rods **41***a* are selectively connected and fixed on an outer side of the two adjacent legs **10** located at the same side so that the stopping portion **410** on the end portion **411** is located on the outer side of the outer pivot point **211**. When the loading plate **20***a* is pivotally rotated from the folded position to the extended position at the same time, an area of the outer side **21** of the loading plate **20***a* such as a top surface in the figure is moved upward to abut against the corresponding stopping portion **410** under the end portion **411** of the horizontal support rod **41***a*. Thereby the support strength of the outer side **21** of the respective loading plates **20***a* of the platform **20** is reinforced.

The above horizontal support rods **41***a* can also be designed to be similar to the support member **42** of the third embodiment mentioned above. That means one of the horizontal support rods **41***a* is replaced by the two support members **42** and the same abutting-against and limiting effect are achieved.

According to the above embodiments, it is learned that in the present carrying equipment **1**~**1***d*, the outer side **21** and the inner side **22** of the loading plate **20***a* are abutting against and supported well by the legs **10** or the outer stoppers **40** arranged at the outer sides **21** of the loading plates **20***a* in combination with the first inner stopper **50** disposed on the inner sides **22** of the loading plates **20***a*, and/or the second inner stopper **60**, and/or the third inner stopper **70** when the platform **20** is pivotally rotated from the folded position to the extended position. Thereby it is ensured that the loading plates **20***a* are maintained at the horizontal state, without collapse or deformation, especially while being loaded with heavy objects.

In summary, the outer stopper **40** used in combination with the first inner stopper **50**, and/or the second inner stopper **60**, and/or the third inner stopper **70** can ensure sufficient support or loading strength of the outer side **21** and the inner side **22** of the respective loading plates **20***a* of the platform **20** while the design of the single support linkage rod set **30** is used.

Additional advantages and modifications will readily occur to those skilled in the art. Therefore, the invention in its broader aspects is not limited to the specific details, and representative devices shown and described herein. Accordingly, various modifications may be made without departing from the spirit or scope of the general inventive concept as defined by the appended claims and their equivalent.

The invention claimed is:

1. A kind of foldable carrying equipment comprising:

four legs;

at least two platforms disposed vertically and each of the platform having two loading plates adjacent to each other and a plurality of pivot plates; each of the loading plates including a first side, a second side opposite to the first side, an inner side, and an outer side; the two outer sides of the two adjacent loading plates away from each other and the two inner sides of the two adjacent loading plates close to each other; two ends of the outer side of the loading plate pivotally connected to the legs to form outer pivot points correspondingly; a junction between the inner side and the first side of the loading plate pivotally connected to the pivot plate to form a first pivot point and a gap formed between the two inner sides of the loading plates; thus the inner side of the loading plate able to be either moved upward and pivotally rotated to a folded position, or moved downward and pivotally rotated to an extended position;

a support linkage rod set disposed on the second side of the loading plate and having a support rod, two linkage rods, and a slider; the support rod vertically arranged and pivotally connected to the inner sides of the loading plates of the platform; the two linkage rods disposed in a V-shape and each of the linkage rods provided with a first end portion and a second end portion; the first end portion pivotally connected to a position between the outer side and the inner side of the loading plate of the platform; the slider slidably moved along the support rod and operable to be loosened from or fastened on the support rod; the second end portion of the linkage rod pivotally connected to and positioned on the slider; the slider being forced to slide along the support rod and further drive the loading plates of the platform to be pivotally rotated and switched between the folded

position and the extended position when a force applied to a top end of the support rod for vertical operation;

wherein the support rod is provided with at least two pivot pieces each of which having two second pivot points; the pivot piece is disposed on a position at the same level as the corresponding platform; a junction between the inner side and the second side of the loading plate is pivotally connected to the pivot piece to form the second pivot point; the two second pivot points are spaced apart due to the gap between the two inner sides of the loading plates; thereby the junction between the inner side and the first side of the loading plate, and the junction between the inner side and the second side of the loading plate are respectively able to be pivotally rotated around the first pivot point and the second pivot point synchronously, and thus switched between the folded position and the extended position;

wherein an outer stopper having a plurality of stopping members arranged at the outer sides of the loading plates of the platform away from each other or the corresponding legs; the adjacent loading plates are stopped and limited by the stopping members, without being rotated to a valley-folding direction when the loading plate is pivotally rotated downward to the extended position; wherein a first inner stopper having a plurality of first limit bumps, a plurality of second limit bumps, and a plurality of limit blocks; the first limit bump is projecting from an area around the first pivot point on an inner side of the pivot plate and each of the first limit bumps is provided with a first limit wall formed on each of two sides of the first limit bump; the second limit bump is projecting from an area around the second pivot point on an inner side of the pivot piece and each of the second limit bumps is provided with a second limit wall formed on each of two sides of the second limit bump; the limit blocks are disposed on the first pivot point and the second pivot point of the loading plate; each of the limit blocks is provided with a limit lock wall; when the loading plate is pivotally rotated from the folded position to the extended position, the limit lock walls are abutting against and stopped by the first limit wall of the pivot plate and the second limit wall of the pivot piece correspondingly.

2. The foldable carrying equipment as claimed in claim **1**, wherein the stopping member is a horizontal support rod having two end portions fixed on at least one of an inner side and an outer side of the two legs adjacent to each other and located at the same side; the end portion of the horizontal support rod is provided with a stopping portion; the first side and the second side of the loading plate are both provided with a side frame which is able to be abutting against and stopped by the stopping portion when the loading plate is pivotally rotated to the extended position.

3. The foldable carrying equipment as claimed in claim **1**, wherein the stopping member is a support member which is connected and fixed on at least one of an inner side and an outer side of the leg and provided with a stopping area; the first side and the second side of the loading plate are both provided with a side frame which is able to be abutting against and stopped by the stopping area when the loading plate is pivotally rotated to the extended position.

4. The foldable carrying equipment as claimed in claim **1**, wherein a lug is horizontally protruding from of the inner side of the pivot piece of the support rod at the same level of the upmost platform and located over the second pivot point; a stopping edge is arranged adjacent to the limit lock wall of the limit block corresponding to the lug; the stopping edge is abutting against and limited by the lug of the corresponding pivot piece when the loading plate is pivotally rotated from the folded position to the extended position; the lug of the pivot piece and the limit lock wall of the corresponding limit block are combined to form a part of the first inner stopper.

5. The foldable carrying equipment as claimed in claim **4**, wherein a braking plate to which users can apply forces vertically is disposed on the top end of the support rod and the lug is integrally extended from an inner side of the braking plate.

6. The foldable carrying equipment as claimed in claim **1**, wherein a lug is horizontally protruding from of the inner side of the pivot plate of the upmost platform and located above the first pivot point; a stopping edge is arranged adjacent to the limit lock wall of the limit block corresponding to the lug; the stopping edge of the limit block is abutting against and limited by the lug of the corresponding pivot plate when the loading plate is pivotally rotated from the folded position to the extended position; the lug and the limit lock wall of the corresponding limit block are combined with to form a part of the first inner stopper.

7. The foldable carrying equipment as claimed in claim **6**, wherein a detent plate is arranged at a top end of the pivot plate of the upmost platform and the lug is integrally extended from an inner side of the detent plate.

8. The foldable carrying equipment as claimed in claim **1**, wherein a bar is connected between at least the upmost pivot piece of the support rod and the corresponding pivot plate and able to be mounted in the gap; an anti-pinch plate is connected and fixed on the bar for completely covering the bar and the gap with the bar therein.

9. The foldable carrying equipment as claimed in claim **1**, wherein a bar is connected between at least one of the pivot pieces of the support rod and the corresponding pivot plate and mounted in the gap; a limit stopping portion is formed by two upper sides above the second pivot point of the pivot piece on the top end of the support rod projecting inward horizontally; the first side and the second side of the loading plate are both provided with a side frame and a leaning wall is disposed on the side frame and corresponding to the limit stopping portion; the leaning wall is abutting against the limit stopping portion when the loading plate is pivotally rotated from the folded position to the extended position; the limit stopping portion and the leaning wall are combined to form a second inner stopper.

10. The foldable carrying equipment as claimed in claim **1**, wherein a bar is connected between at least one of the pivot pieces of the support rod and the corresponding pivot plate and mounted in the gap; a side stopping wall is formed on each of two sides of the bar; the first side and the second side of the loading plate are both provided with a side frame; a leaning edge is arranged at the side frame and corresponding to the side stopping wall; when the loading plate is pivotally rotated from the folded position to the extended position, the leaning edges are leaning against the corresponding side stopping walls of the bar; the side stopping walls and the leaning edges are combined to form a third inner stopper.

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