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(54) **HOLDER AND SUPPORT APPARATUS**

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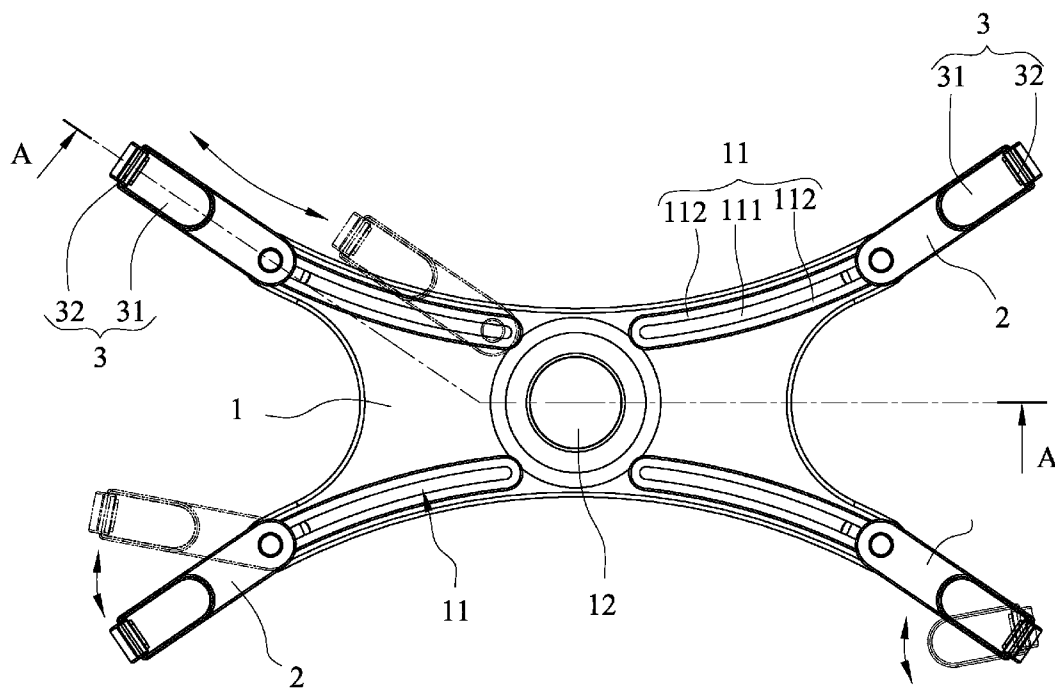
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(57) **ABSTRACT**

A holder and support apparatus is provided for clamping portable devices of different sizes, including a support platform, at least two position adjustment sets, and at least two clamping sets. The support platform is for the electronic device to place on. The platform includes at least two guiding tracks, with each position adjustment set located at a guiding track for sliding and rotating the guiding track to adjust position and angle. Each clamping set is installed on position adjustment set. Through sliding and rotating position adjustment set on guiding track to change the position of clamping elements, the clamping size formed by a plurality of clamping elements can be changed to clamp on devices of different sizes.



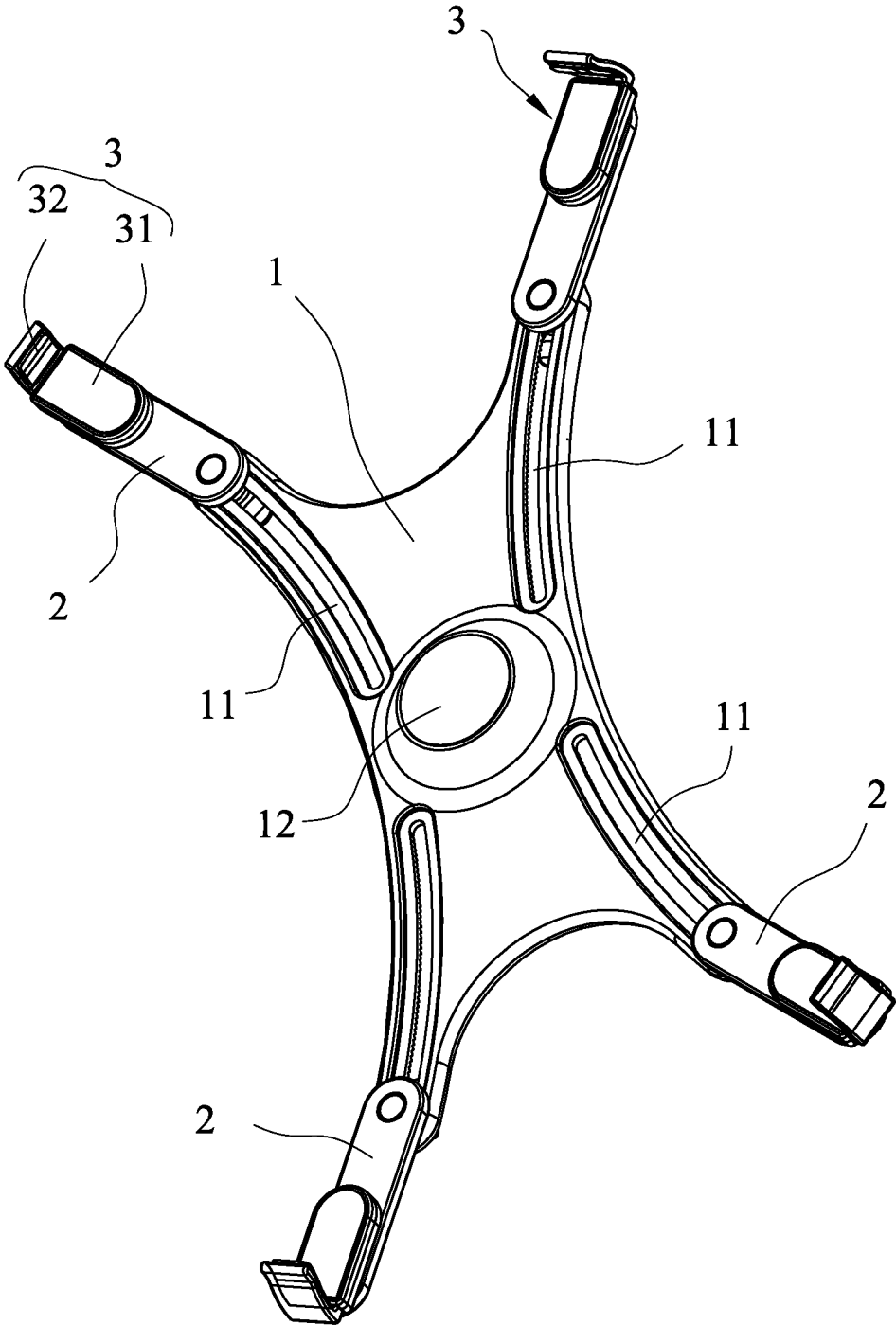


FIG. 1

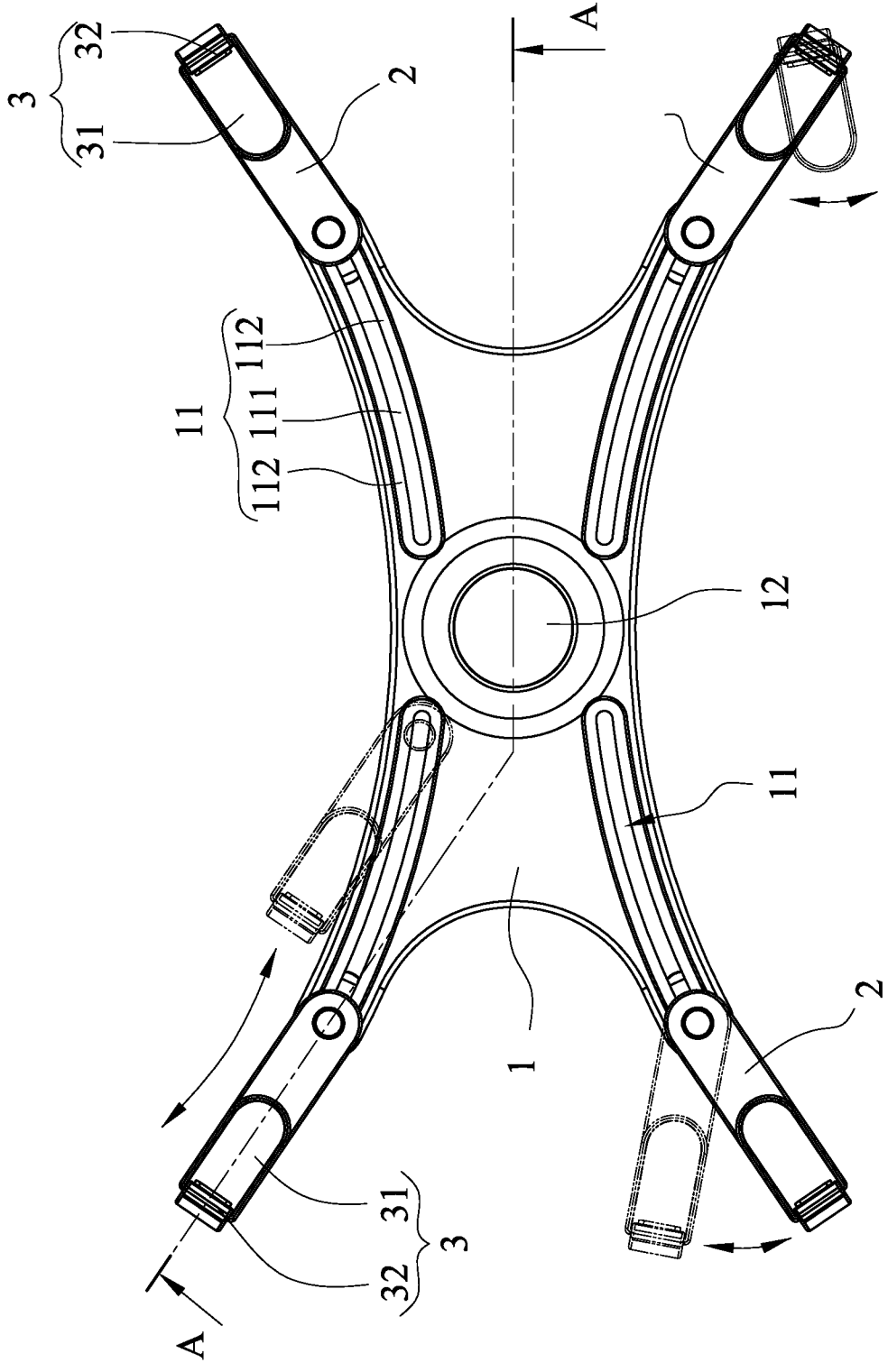


FIG. 2

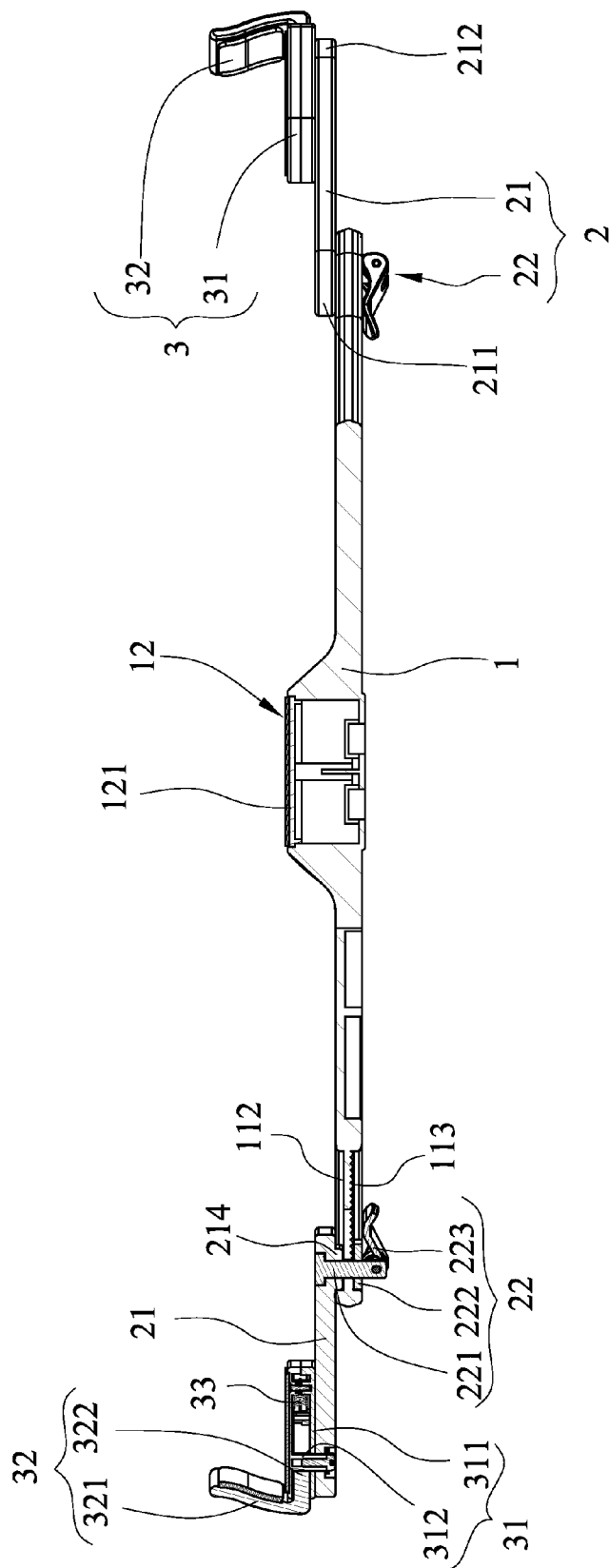


FIG. 3

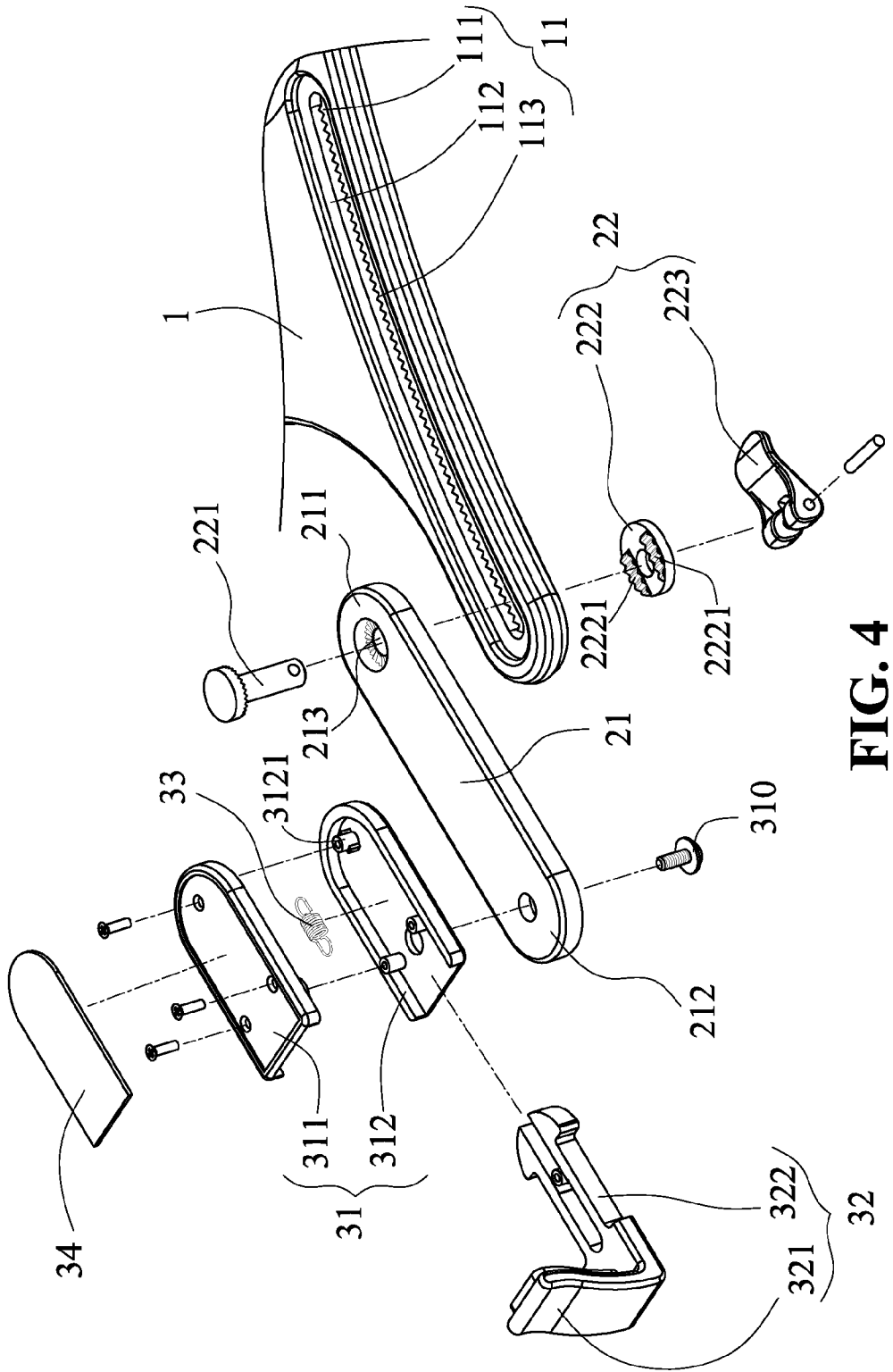


FIG. 4

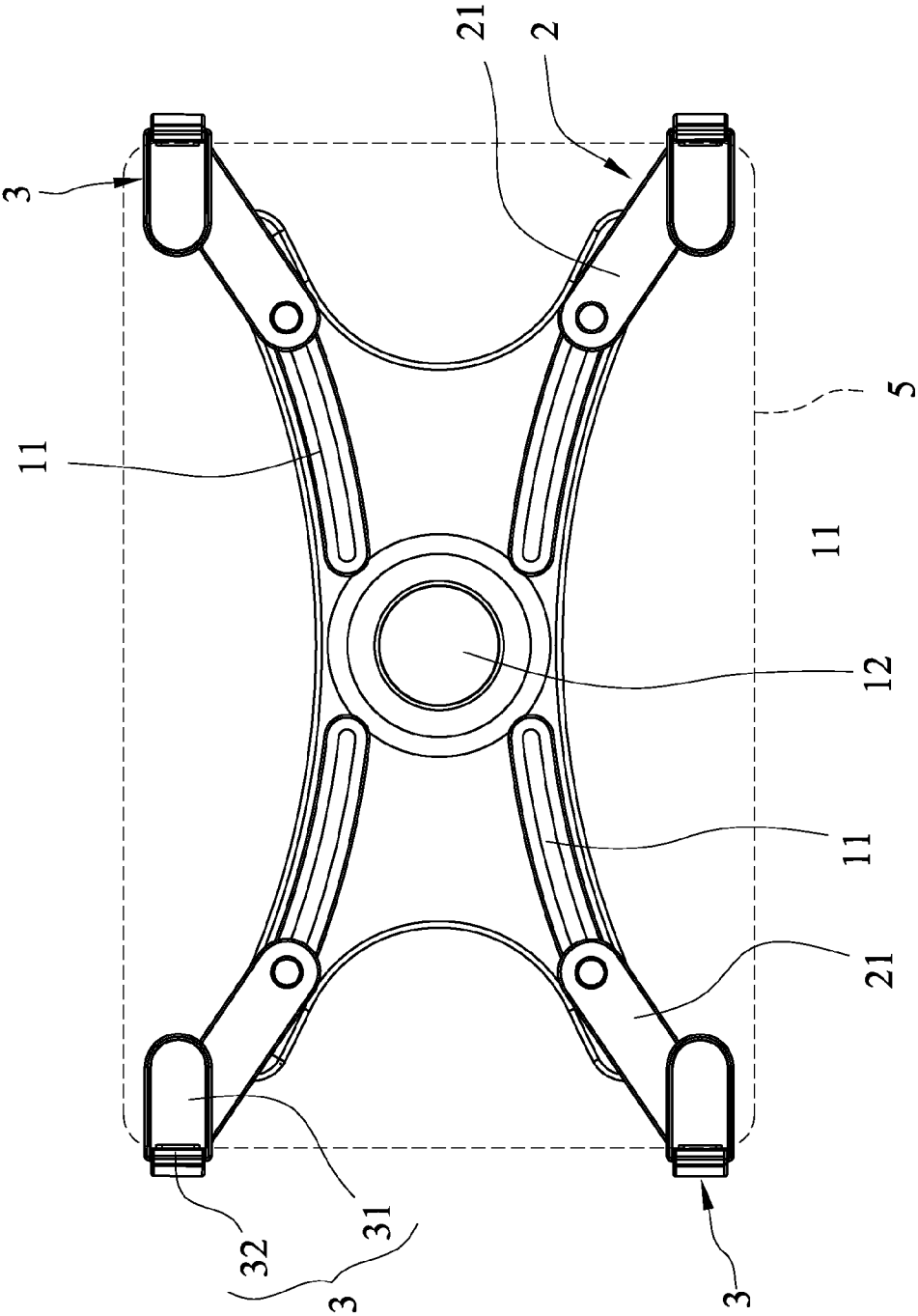


FIG. 5

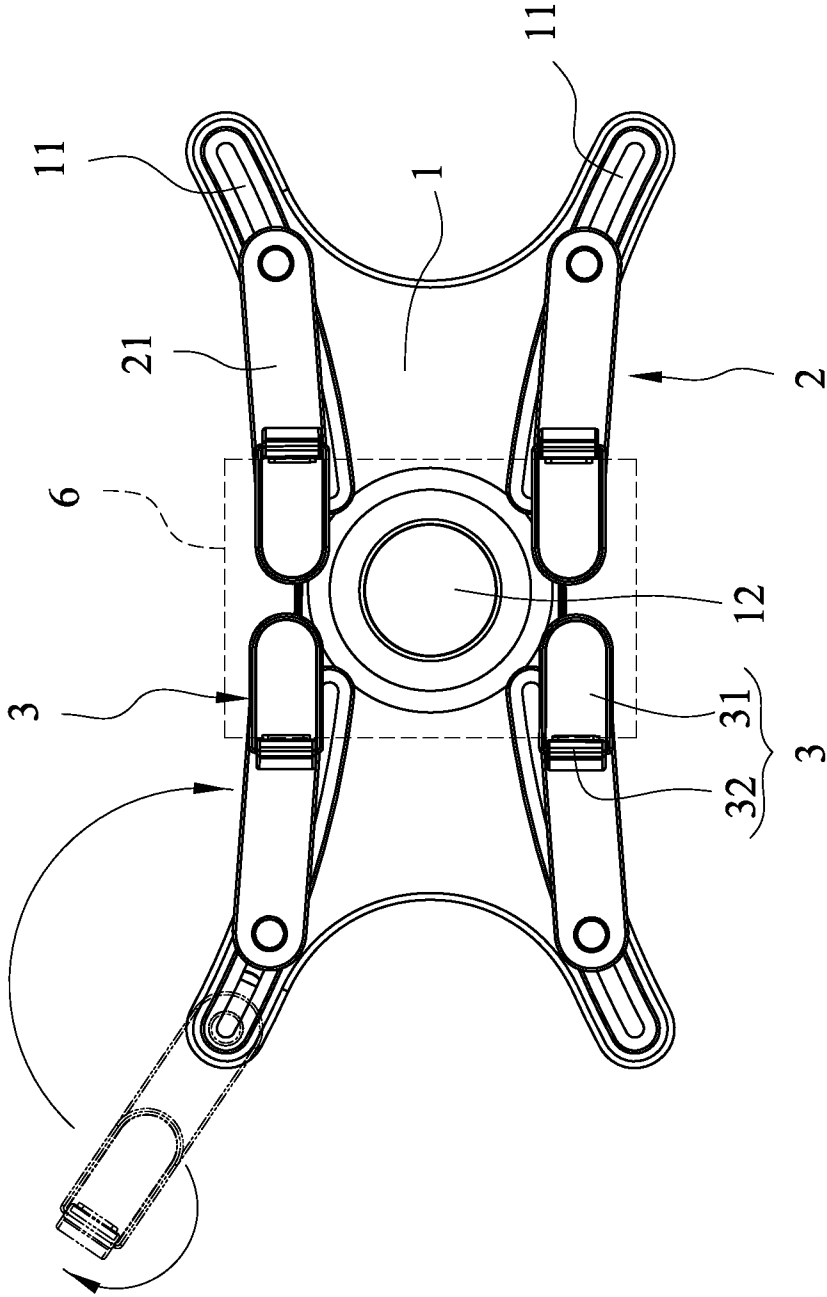


FIG. 6

HOLDER AND SUPPORT APPARATUS

FIELD OF THE INVENTION

[0001] The present invention generally relates to a holder and support apparatus, and more specifically to a design with a wide holding range, applicable to portable electronic device ranging from 3 to 16 inches.

BACKGROUND OF THE INVENTION

[0002] The popularity of a wide range of digital contents and the availability of portable related devices propels the users to download the contents to the devices, such as, smart phone and tablet, for later viewing. Hence, the demands for an auxiliary apparatus to hold and support the device for comfortable viewing increase. Currently available in the market are usually support apparatuses able to hold and support one type of size, such as, for supporting 6-10 inches tablet, or for 3-5 inches smart phone, and so on. A general observation is that the maximum size and the minimum size that a conventional holder and support apparatus is less than 2:1. As the size of a smart phone is often one-fifth or one-third of the size of a tablet, the conventional holder and support apparatus cannot conveniently accommodate both smart phone and tablet.

SUMMARY OF THE INVENTION

[0003] The primary object of the present invention is to provide a holder and support apparatus applicable to different types of portable electronic devices, of various sizes ranging from 3 inches to 16 inches, i.e., maximum size is about 3-5 times of the minimum size. In this manner, the present invention is applicable to most smart phones and tablets currently available in the market, and thus provides a one-size-fits-all solution to a variety of portable electronic devices.

[0004] To achieve the aforementioned object, the present invention provides a holder and support apparatus, including a support platform, at least two position adjustment sets, and at least two clamping sets. The support platform is for the electronic device to place on. The platform includes at least two guiding tracks, with each position adjustment set located at a guiding track. Each position adjustment set includes an arm and a lock element. The arm has a first end and a second end, where the first end can slide and rotate on the guiding track. The lock element is to fasten the first end of the arm to the guiding track. Each clamping set is located at the second end of the arm, including a fixing base and a clamping element on the fixing base. The fixing base, though attached to the arm, can rotate. A plurality of clamping elements can clamp to the side walls of the portable electronic device.

[0005] The foregoing and other objects, features, aspects and advantages of the present invention will become better understood from a careful reading of a detailed description provided herein below with appropriate reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] The present invention can be understood in more detail by reading the subsequent detailed description in conjunction with the examples and references made to the accompanying drawings, wherein:

[0007] FIG. 1 shows a schematic view of a hold and support apparatus according to the invention;

[0008] FIG. 2 shows a side view of the present invention;

[0009] FIG. 3 shows an AA cross-section view of the present invention;

[0010] FIG. 4 shows a partial dissected view with a single guiding track, a position adjustment set and a clamping set;

[0011] FIG. 5 shows a schematic view of the present invention in a scenario of actual application; and

[0012] FIG. 6 shows a schematic view of the present invention in another scenario of actual application.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0013] FIG. 1 and FIG. 2 show a schematic view and side view of the present invention respectively. The hold and support apparatus of the present invention can be used to clamp portable electronic devices of different sizes. The hold and support apparatus includes a support platform 1, at least two position adjustment sets 2, and at least two clamping sets 3. Support platform 1 includes at least two guiding tracks 11, with each position adjustment set 2 located at a guiding track 11. Position adjustment set 2 can use guiding track 11 as center for rotation angle adjustment and slide position adjustment, shown as the dash-line drawing in FIG. 2. Each clamping set 3 is installed to position adjustment set 2 for rotation angle adjustment. In this manner, the present invention can change the clamping size formed by clamping sets 3 to clamp devices of different sizes through sliding or rotating position adjustment sets 2 along guiding track 11 on support platform 1 so as to change the positions of clamping sets.

[0014] The following describes each component in details. Support platform 1 is a flat long stripe-shaped plate, with four corners extending outwards. The center of the platform includes a convex carrying base 12. Guiding tracks 11 are distributed close to and along the long sides the platform. The present embodiment includes four guiding tracks 11. An anti-slip element 121, such as sponge, anti-slip pad, and so on, is attached to the surface of carrying base 12, as shown in FIG. 3. Carrying base 12 is for contacting the placed portable electronic device. The convex design of the surface is to match the clamping sets 3. The directions of guiding tracks 11 originating from the center carrying base 12 are extending outwards towards the four corners of the platform. The trajectory of guiding tracks 11 has an arc shape. As shown in FIGS. 2, 3 and 4, each guiding track 11 includes guiding trench 111 penetrating support platform 1, concave positioning track 112 neighboring on both sides of guiding trench 111 and against inner wall of support platform, and tooth rack 113 formed on bottom surface of positioning track 112. Guiding trench 111 and positioning track 112 are for position adjustment set 2 to slide and rotate, and tooth rack 113 is provided for position locking after adjustment.

[0015] As shown in FIGS. 3 and 4, each position adjustment set 2 includes an arm 21 and a lock element 22. Arm 21 has a first end 211 and a second end 212, where first end 211 can slide and rotate on guiding track 11 for position adjustment. Lock element 22 is to fasten first end 211 of arm 21 to guiding track 11. Lock element 22 can be of any structure to fasten arm 21 to guiding track 11, for example, a bolt and a nut. Lock element 22 in the present embodiment includes an axial element 221, a brake element 222 and a wrench element 223. First end 211 of arm 21 has an axial hole 213 and a round slide block 214, as shown in FIG. 3. For assembly, round slide block 214 of arm 21 is placed inside positioning track 112. Axial element 221 passes, from top to bottom, axial hole 213, guiding trench 112, and brake element 222. Wrench element

223 is coupled to bottom end of axial element **221**. Brake element **222** is not round, with terminating surface having teeth **2221** corresponding to tooth rack **113**. When wrench element **223** is pulled to release, first end **211** of arm **21** slides inside guiding track **11** or rotates around axial **221**. When wrench element **223** is pushed to lock, first end **211** of arm **21** is fastened to guiding track **11**.

[0016] Clamping set **3** is installed to second end **212** of arm **21** of position adjustment set **2**, and is for contacting side walls of the clamped portable electronic device. Clamping set **3** includes a fixing base **31** and a clamping element **32** installed on fixing base **31**. Fixing base **31** is coupled to arm **21**. The present embodiment uses screw **310** to couple fixing base **31** to arm **21**; hence, fixing arm can rotate around arm **21**. The purpose is to allow fixing base **31** rotate freely when clamping the portable device so that clamping element **32** can contact flatly with the side walls of the clamped portable device.

[0017] In the present embodiment, although clamping element **32** is attached to fixing base **31**, clamping element **32** is allowed to move laterally for a brief distance for convenient placing and removing the portable device into and from the space formed by clamping sets **3**.

[0018] As shown in FIG. 4, fixing base **31** is formed by two plates; for example, an upper cover **311** and a lower shell **312** forms a base with a hollow inside. The formed base includes an opening on a vertical surface for placing clamping element **32**. Clamping element is L-shaped, including a vertical plate **321** and lateral plate **322**. For assembly, later plate **322** is hidden inside fixing base **31**. The space inside fixing base **31** matches the shape of lateral plate **322** so that lateral plate **322** can move laterally for a brief distance without disengaged from fixing base **31**. Furthermore, fixing base **31** further includes a spring **33** inside, with two ends attached to lateral plate **322** and a protruding column **3121** inside fixing base. The force of spring **33** can pull vertical plate **321** tightly against the side wall of fixing base **3** without external force. In addition, an anti-slip pad **34** can be attached to surface of upper cover **311** to provide additional friction when contacting portable device as well as aesthetics.

[0019] Clamping element **32** can also be fixed to fixing base **31** in an unmovable manner. Because vertical plate **321** has a slight arc curve, a slight expansion resilience can be obtained when foam or anti-slip element is attached to the surface. Therefore, when all the position adjustment sets **2** are positioned and locked, a slight force must be applied to force vertical plates **321** expanding slightly outwards when placing the portable device into the apparatus until the portable device contacts carrying base **12**. At this point, vertical plates **321** can restore their shape and position to clamp at the side wall of portable device. The same also applies to removing the portable device from the hold and support apparatus.

[0020] The following describes the usage scenarios of the apparatus of the present invention. FIG. 5 and FIG. 6 show schematic view of the hold and support apparatus of the present invention clamping portable devices of different sizes. As shown in FIG. 5, the dash-line drawing indicates the outline of a tablet **5**. The first step is to place tablet **5** on carrying base **12** of support platform **1** and unlock lock element **22** of position adjustment set **2**. Then, for each position adjustment set **2**, the position of arm **21** on guiding track **11** is adjusted to move clamping element **3** on second end **212** close to side wall of tablet **5**. During the close-in, fixing base **31** can rotate around arm **21** and finally clamping element **32** presses

against side wall of tablet **5**. When all four position adjustment sets **2** on guiding tracks **11** complete adjustment, each side wall of tablet **5** is contacted by two clamping elements **32**, as shown in FIG. 5. The adjusted positions of position adjustment sets are applicable to a portable device. No additional adjustment is required for the subsequent placing and removal of the same portable device.

[0021] As shown in FIG. 6, the dash-line drawing indicates the outline of a smart phone **6**. The first step is to place smart phone on carrying base **12** of support platform **1**. Then, for each position adjustment set **2**, the position of arm **21** on guiding track **11** is adjusted. Because the size of smart phone **6** is smaller, arm **21** must rotate a large angle, with initial position indicated by dash-line drawing. Fixing base **31** is preferably rotate around arm **21** prior to sliding arm **21** on guiding track **11** to move clamping element **3** close to side wall of smart phone **6**. Then, lock element **22** is locked to fasten the position of arm **21** on guiding track **11**. When all four position adjustment sets **2** on guiding tracks **11** complete adjustment, each side wall of smart phone **6** is contacted by two clamping elements **32**, as shown in FIG. 6.

[0022] In summary, the present invention achieves position adjustment by sliding first end **211** of arm **21** of position adjustment set **2** on guiding track **11** and angle adjustment by rotating first end **211** of arm **21** of position adjustment set **2** on guiding track **11**. Also, by changing the position of clamping set **3** on second end **212** of arm **21**, the present invention allows different clamping sizes. In this manner, the hold and support apparatus of the present invention can clamp 3-16 inches portable electronic devices.

[0023] Furthermore, support platform **1** of the present invention can include three guiding tracks, three position adjustment sets and three clamping sets, as opposed to four in the previous embodiment. For arrangement, the guiding tracks are preferably distributed in the area surrounding the center part of the carrying base in an isometric manner, i.e., equal angles among each pair of guiding tracks.

[0024] Although the present invention has been described with reference to the preferred embodiments, it will be understood that the invention is not limited to the details described thereof. Various substitutions and modifications have been suggested in the foregoing description, and others will occur to those of ordinary skill in the art. Therefore, all such substitutions and modifications are intended to be embraced within the scope of the invention as defined in the appended claims.

What is claimed is:

1. A hold and support apparatus, applicable to clamping on portable electronic devices of different sizes, said apparatus comprising:

a support platform, for placing said portable electronic device, having at least two guiding tracks distributed on said support platform;

at least two position adjustment sets, with each said position adjustment set installed at each said guiding track, said position adjustment set further comprising an arm and a lock element, said arm having a first end and a second end, with said first end engaged to said guiding track and able to slide and rotate on said guiding track, said locking element for fastening said first end of said arm to said guiding track; and

at least two clamping sets, with each said clamping set installed to said second end of said arm, said clamping set further comprising a fixing base and a clamping

element installed on said fixing base, said fixing base coupled to said arm and able to rotate around said arm, said clamping elements being for clamping on side wall of said portable electronic device.

2. The apparatus as claimed in claim 1, wherein said support platform comprises a convex carrying base at center area of said support platform.

3. The apparatus as claimed in claim 2, wherein four said guiding tracks are included, and said four guiding tracks are originating from said carrying base and extending outwards toward four corners of said support platform.

4. The apparatus as claimed in claim 3, wherein said guiding tracks have an arc-shaped trajectory.

5. The apparatus as claimed in claim 1, wherein said clamping element is L-shaped, further comprises a vertical plate and a lateral plate, for assembly, said lateral plate is hidden inside said fixing base, said fixing base has an inside space matching the shape of said lateral plate so that said lateral plate can move laterally without being disengaged from said fixing base.

6. The apparatus as claimed in claim 5, wherein said fixing base further comprises a spring inside, with both ends of said spring attached to said lateral plate and a protruding column inside said fixing base, said spring provides a force to press said vertical plate against said fixing base without external force applied.

7. The apparatus as claimed in claim 1, wherein each said guiding track further comprises a guiding trench penetrating said support platform, concave positioning track neighboring on both sides of said guiding trench and against inner wall of said support platform, and tooth rack formed on bottom surface of said positioning track.

8. The apparatus as claimed in claim 7, wherein said lock element further comprises an axial element, a brake element and a wrench element, said first end of said arm has an axial hole and a round slide block, for assembly, said round slide block of said arm is placed inside said positioning track, and said axial element passes, from top to bottom, said axial hole, said guiding trench, and said brake element, said wrench element is coupled to bottom end of said axial element.

9. The apparatus as claimed in claim 8, wherein said brake element is not round, with terminating surface having teeth corresponding to said tooth rack of said guiding track.

10. The apparatus as claimed in claim 1, wherein said support platform comprises three guiding tracks, and the number of said position adjustment sets and said clamping sets are also three; in this manner, said guiding tracks are distributed in area surrounding the center part of said carrying base in an isometric manner, i.e., equal angles among each pair of said guiding tracks.

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