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(54) **ADJUSTABLE EXERCISE WEIGHT EQUIPMENT**

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(72) Inventor: **Tim CHUNG**, Mississauga (CA)

(21) Appl. No.: **17/381,362**

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(60) Provisional application No. 63/054,996, filed on Jul. 22, 2020.

Publication Classification

(51) **Int. Cl.**

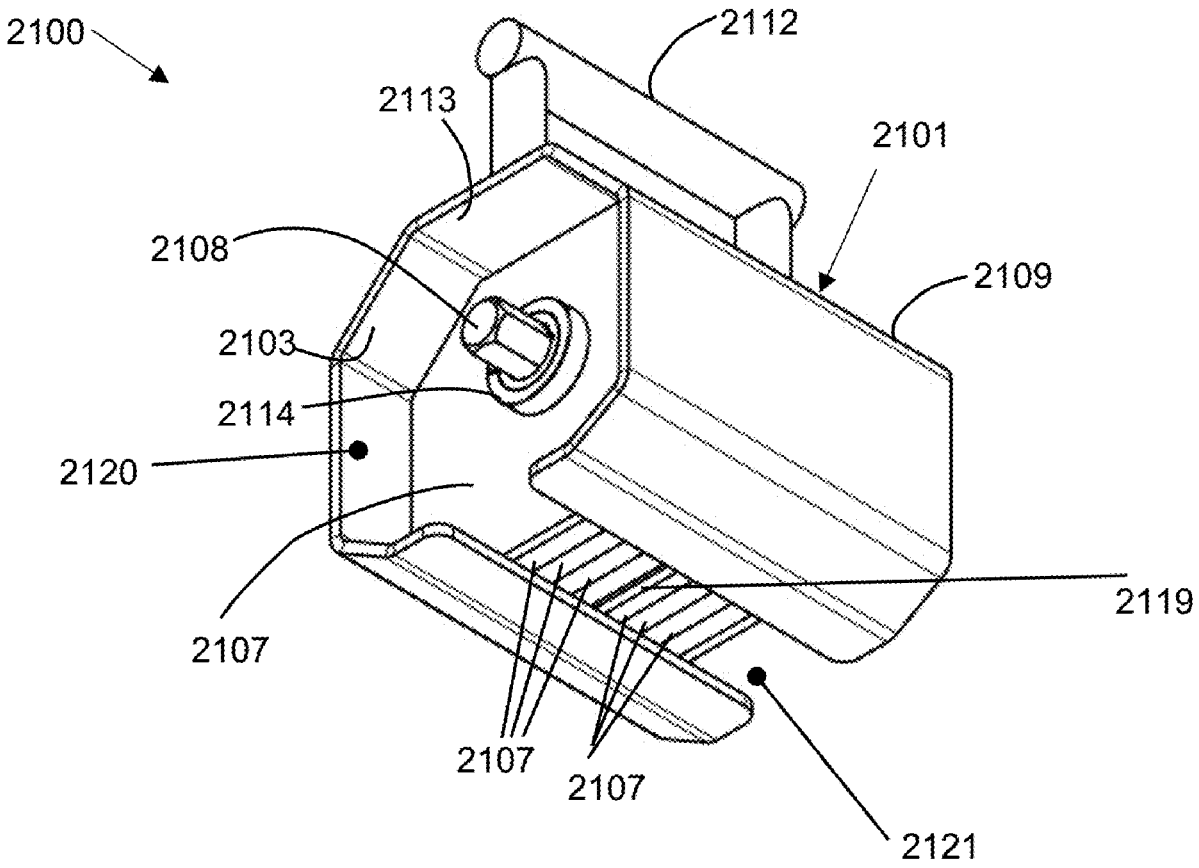
A63B 21/075	(2006.01)
A63B 21/072	(2006.01)
A63B 21/06	(2006.01)

(52) **U.S. Cl.**

CPC ***A63B 21/075*** (2013.01); ***A63B 21/0605*** (2013.01); ***A63B 21/0604*** (2013.01); ***A63B 21/0726*** (2013.01)

(57) **ABSTRACT**

A lot of space and material is typically used to have a full range of exercise weights. An adjustable exercise weight is herein provided to save space and material. The exercise weight, for example, can be dumbbell or a kettlebell or some other type of exercise apparatus. It includes a housing that has opposingly angled inner surfaces. Removable weight pieces are shaped to wedge between the opposingly angled inner surfaces, and the housing supports the weight pieces. A movable holder secures the weight pieces and holds the weight pieces within the housing.



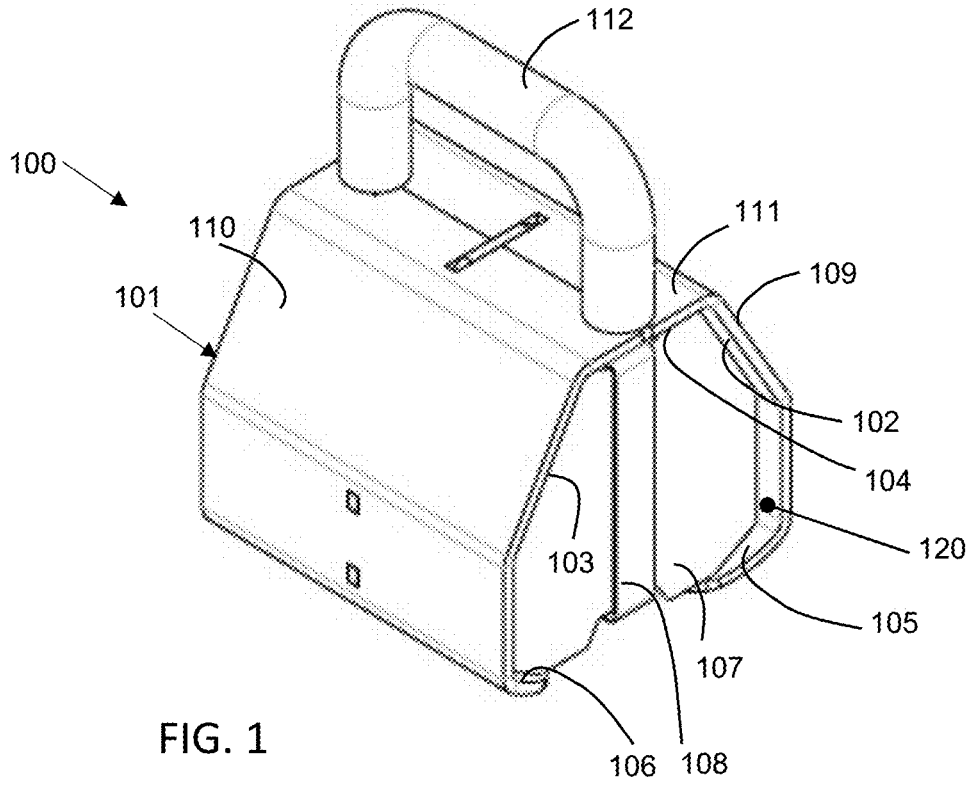

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FIG. 1

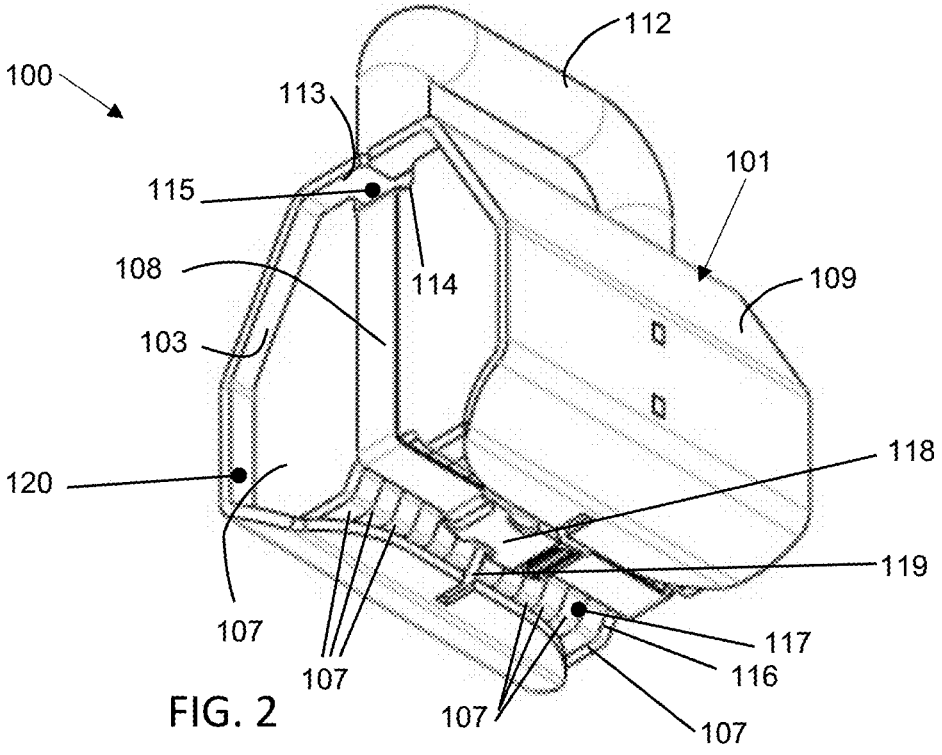

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FIG. 2

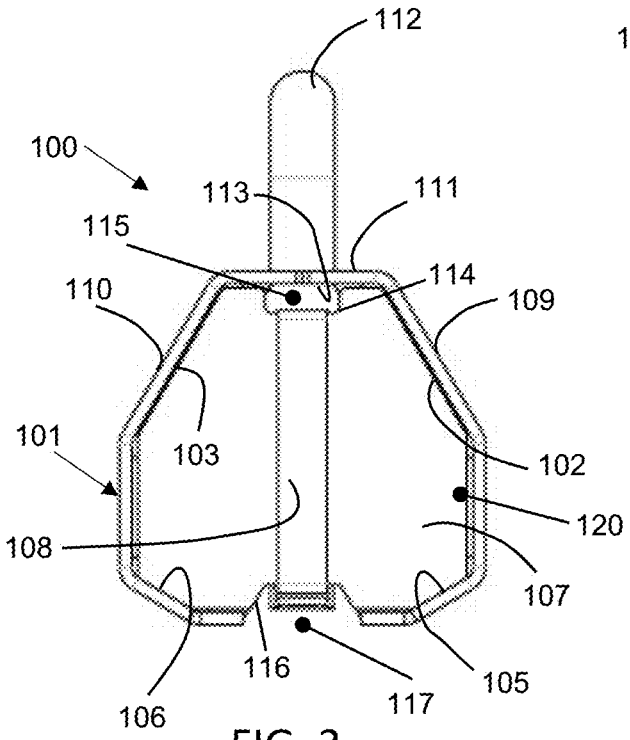


FIG. 3

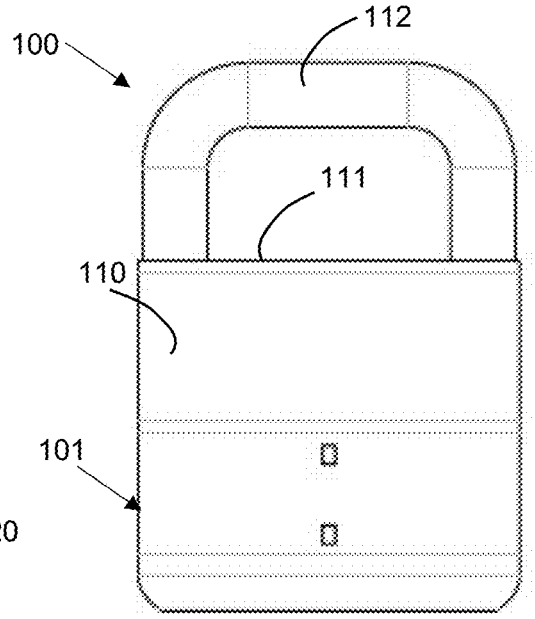


FIG. 4

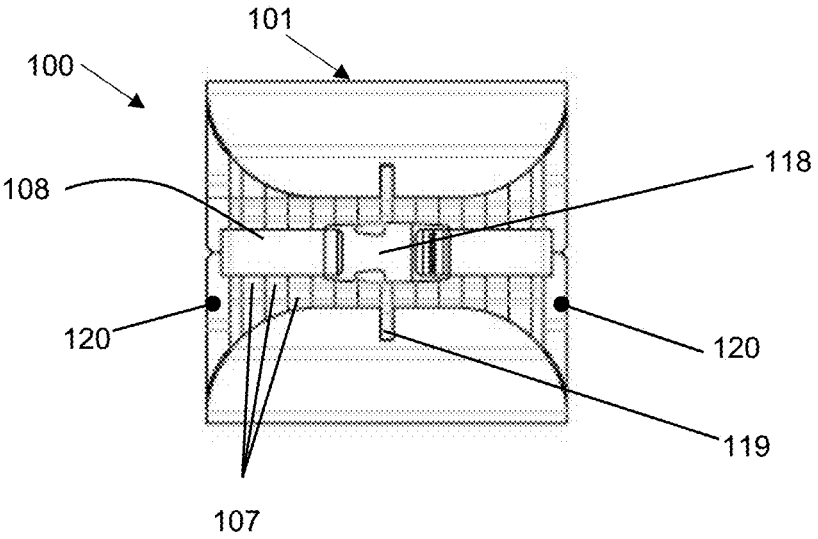


FIG. 5

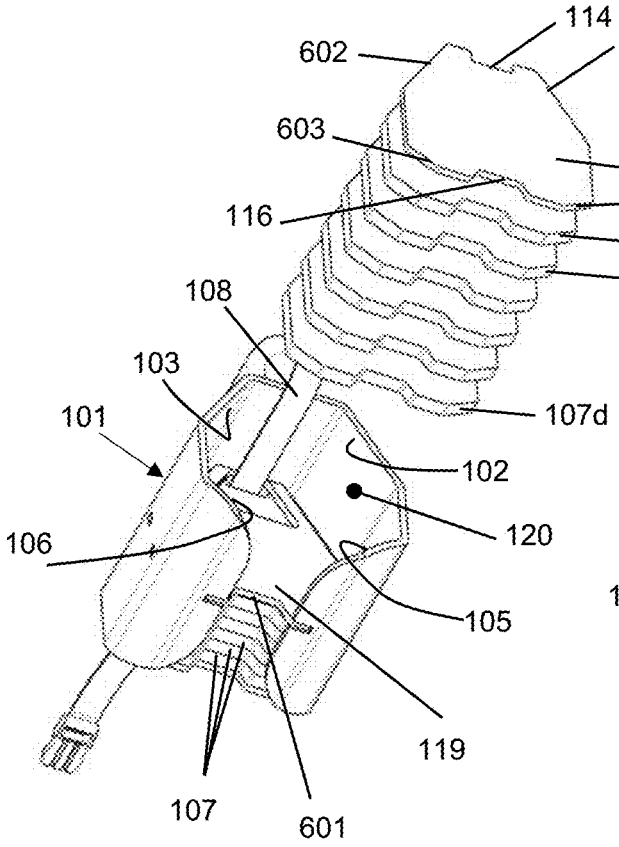


FIG. 6A

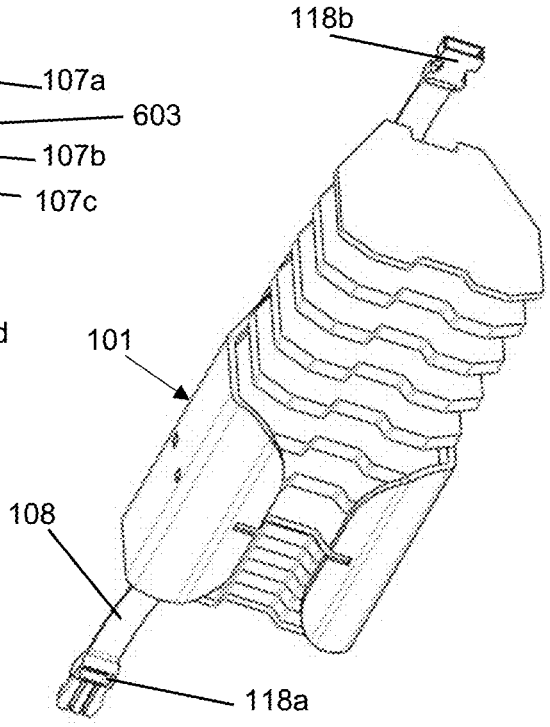


FIG. 6B

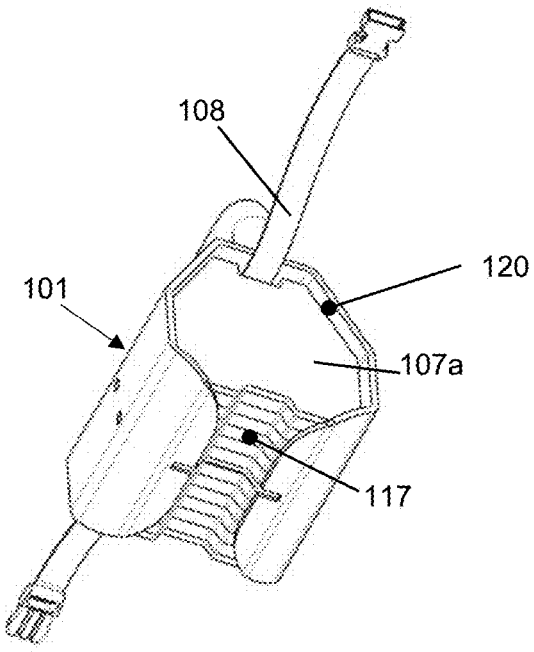


FIG. 6C

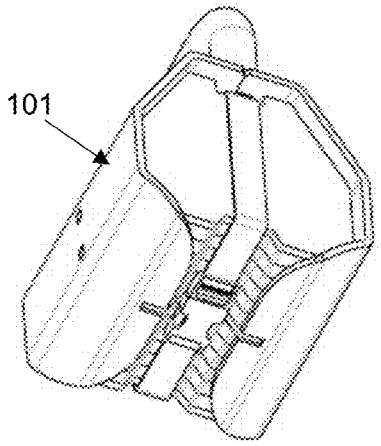


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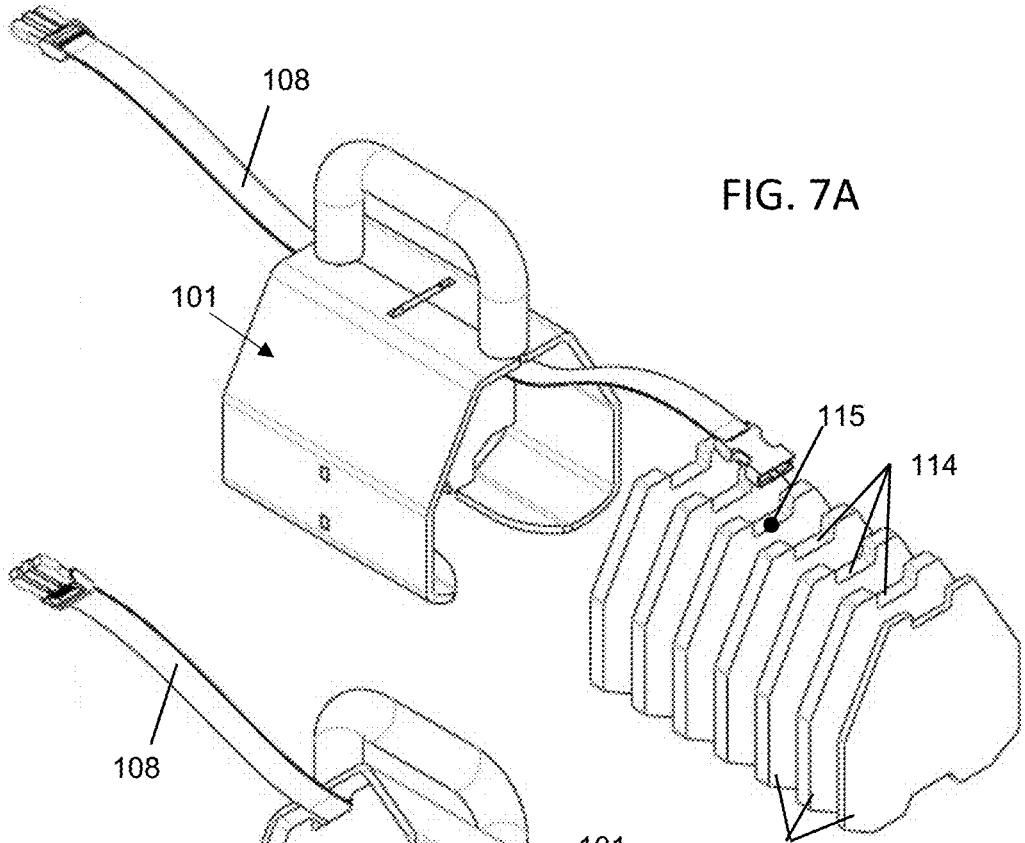


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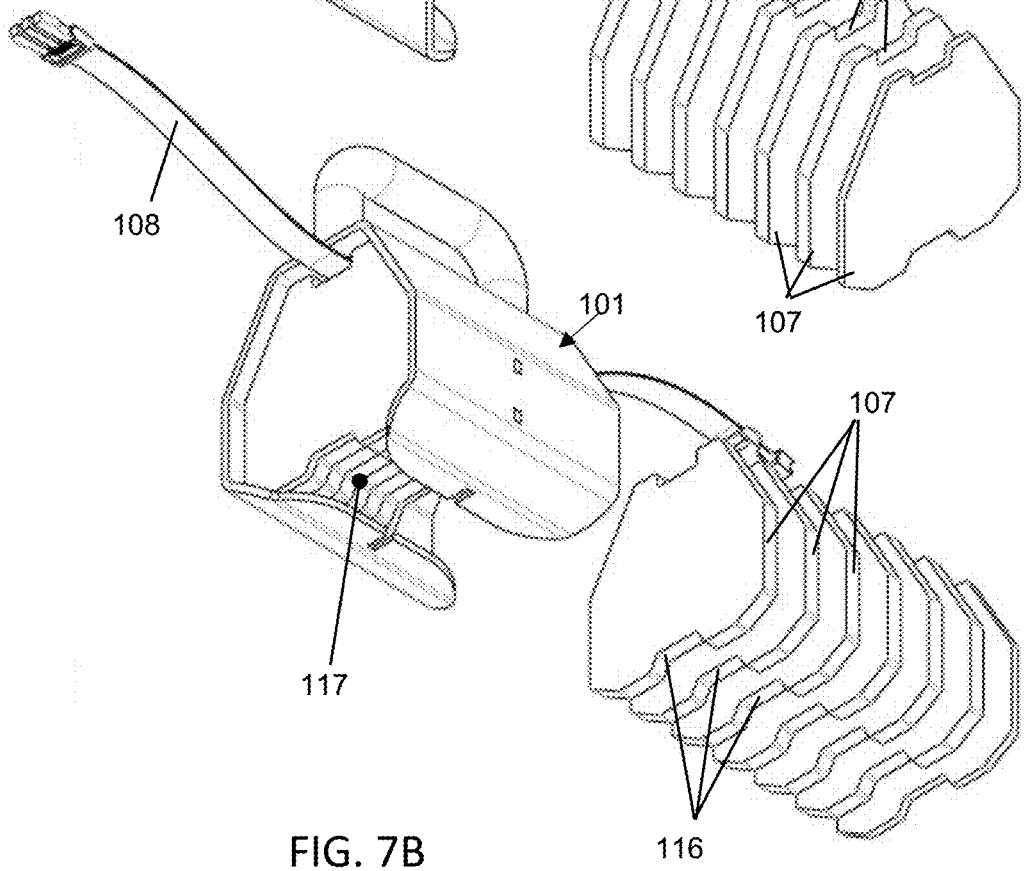


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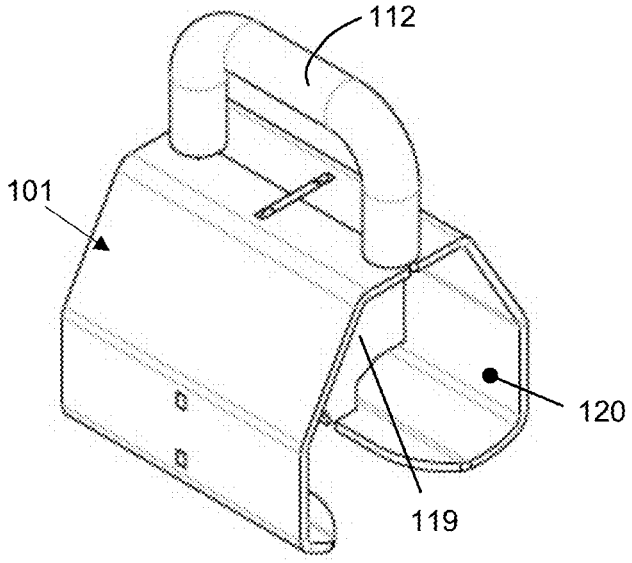


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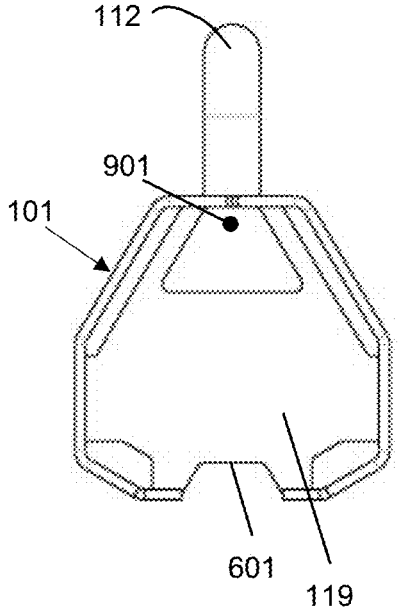


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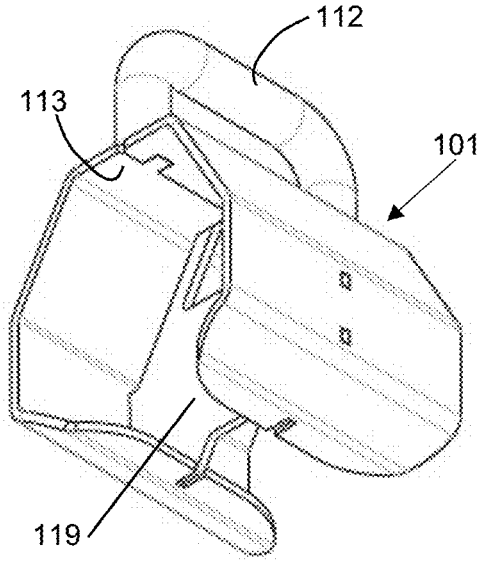


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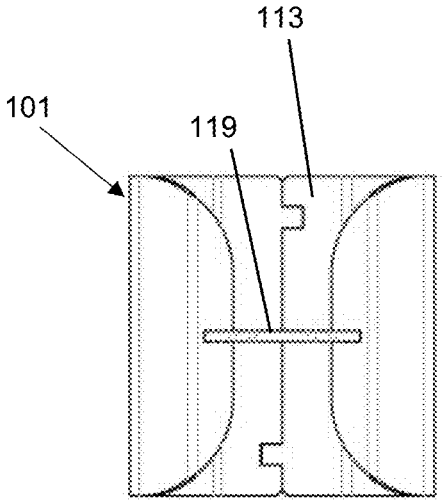


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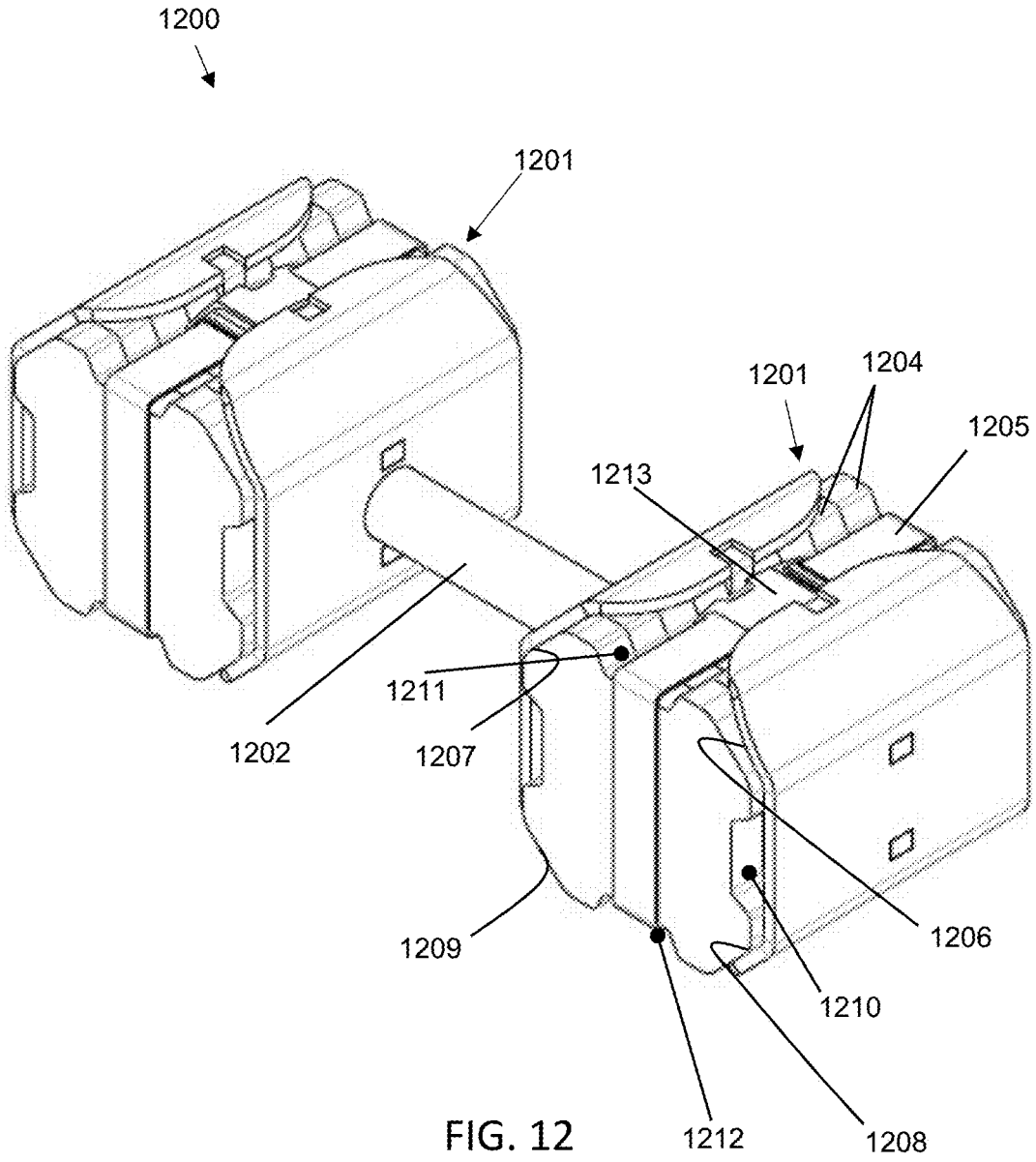

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FIG. 12

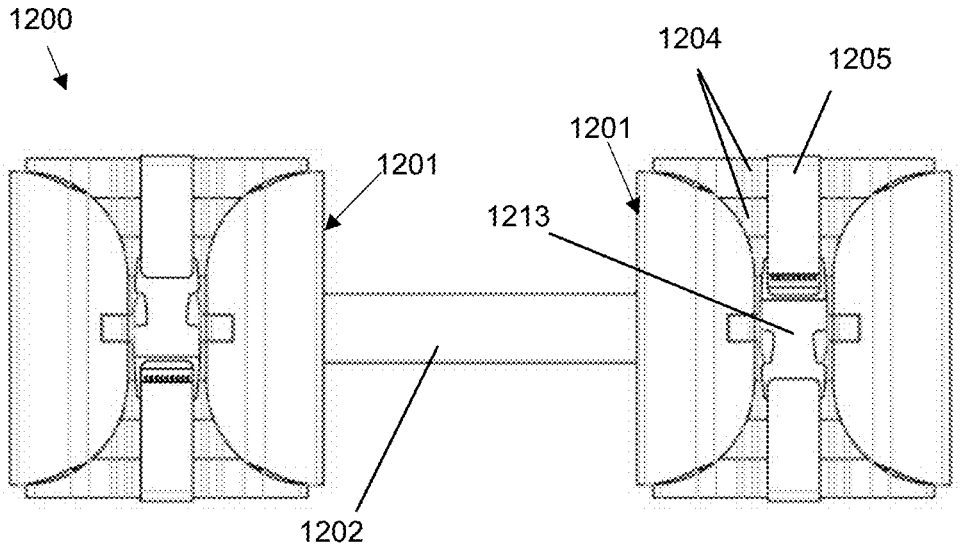


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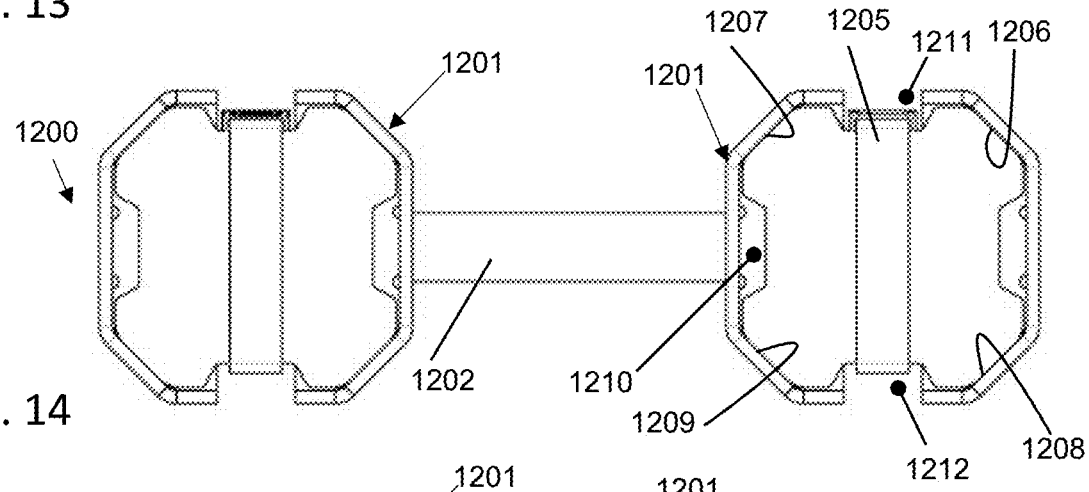


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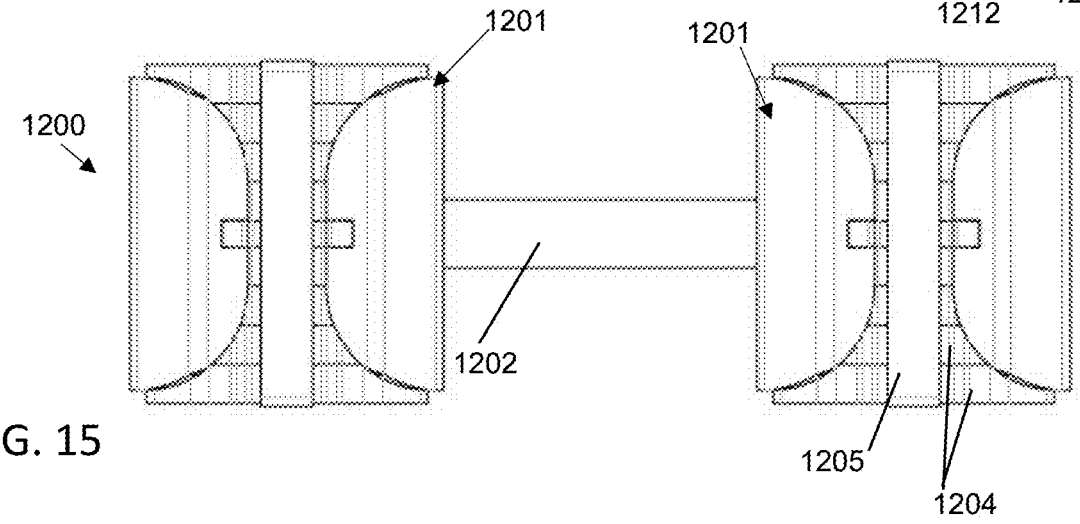


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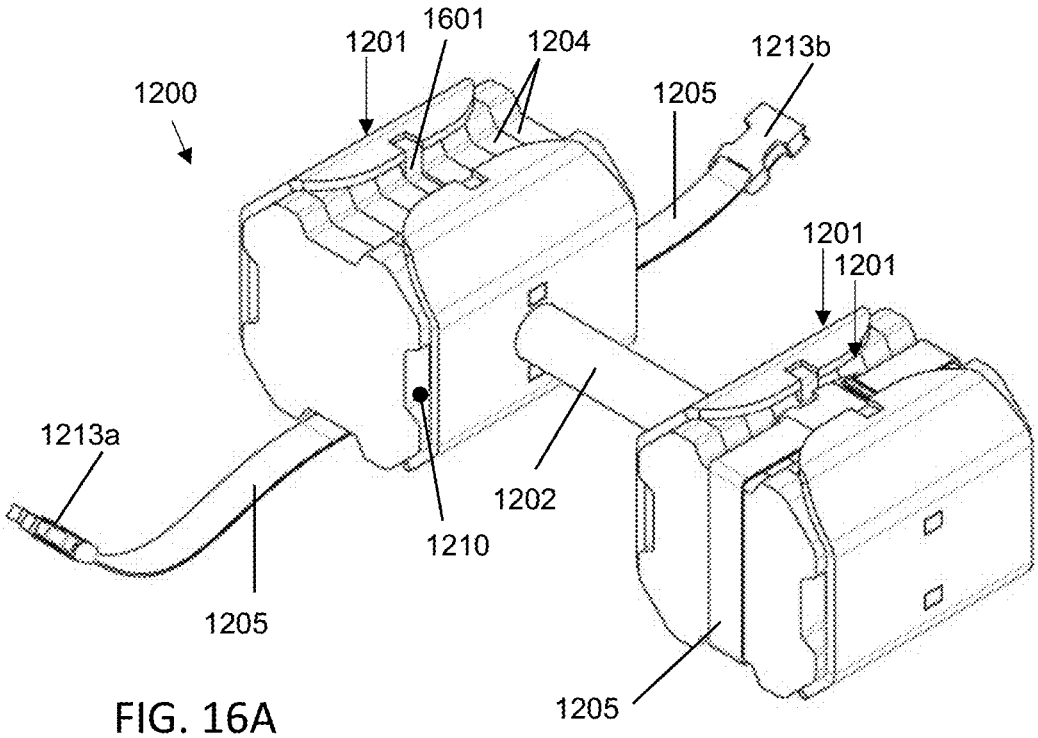


FIG. 16A

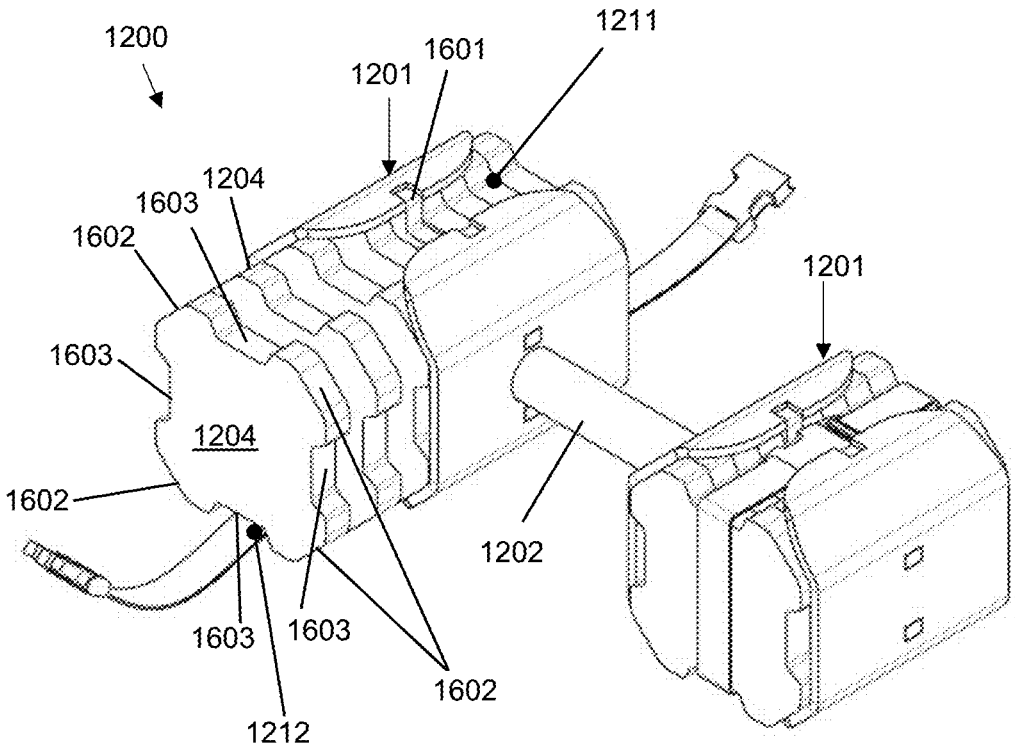


FIG. 16B

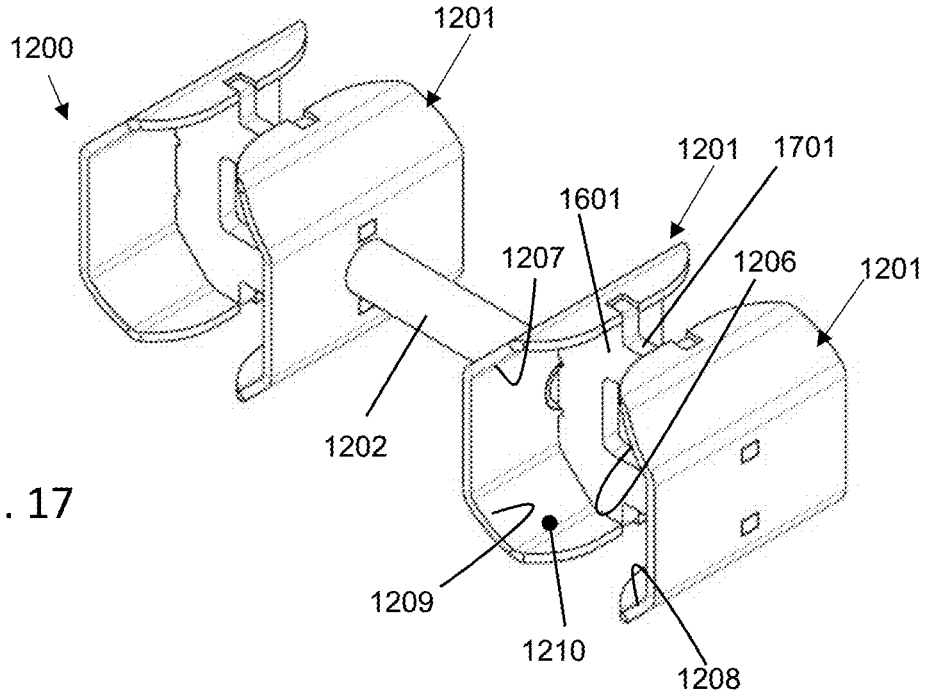


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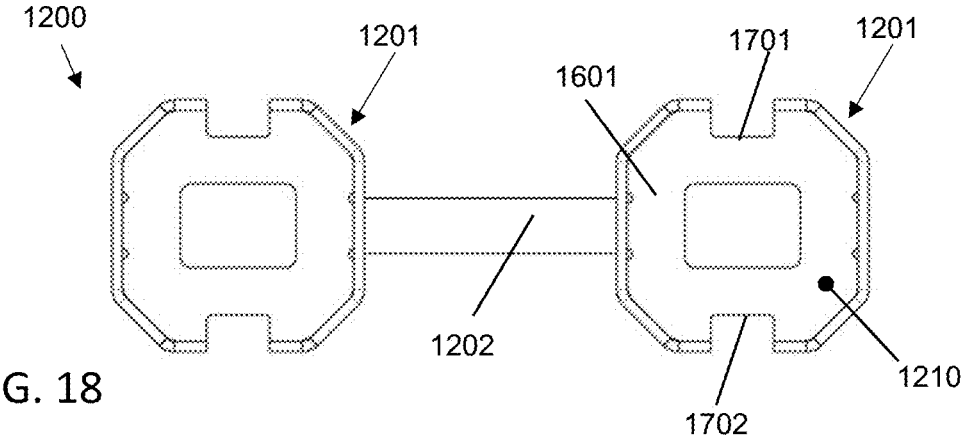


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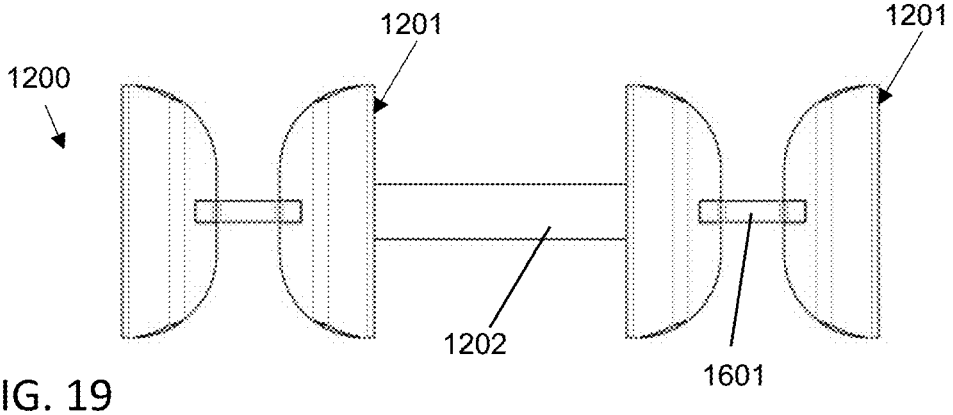


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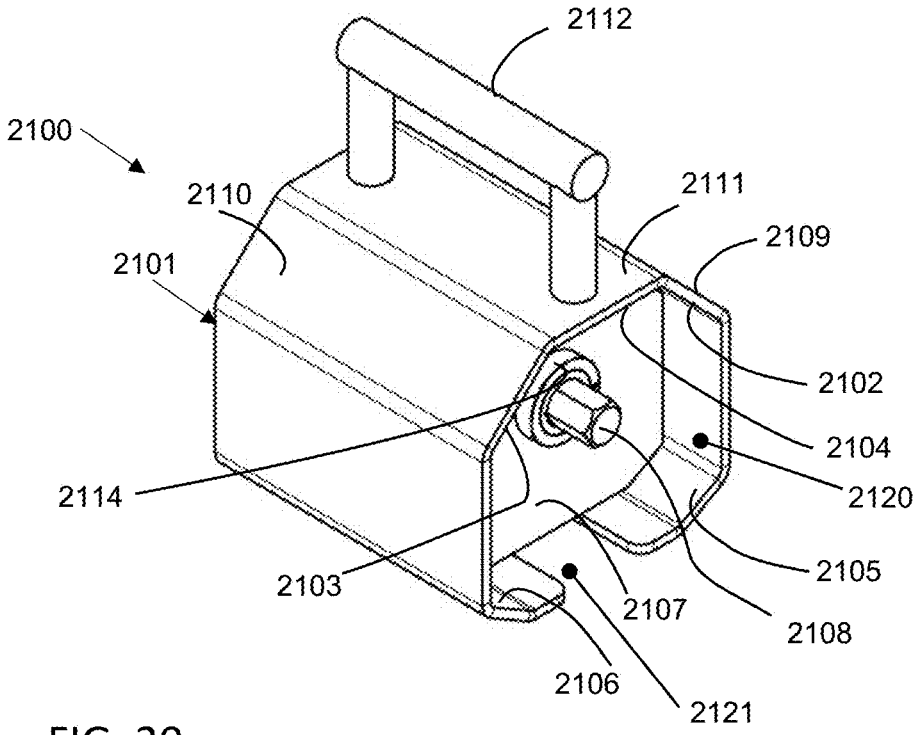

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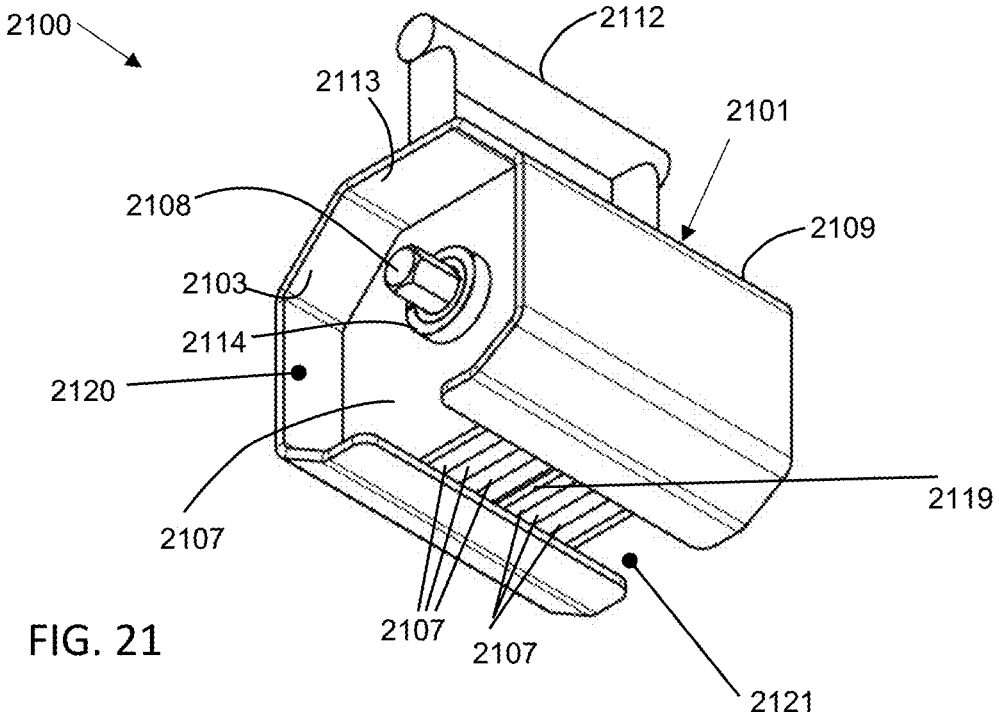

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FIG. 21

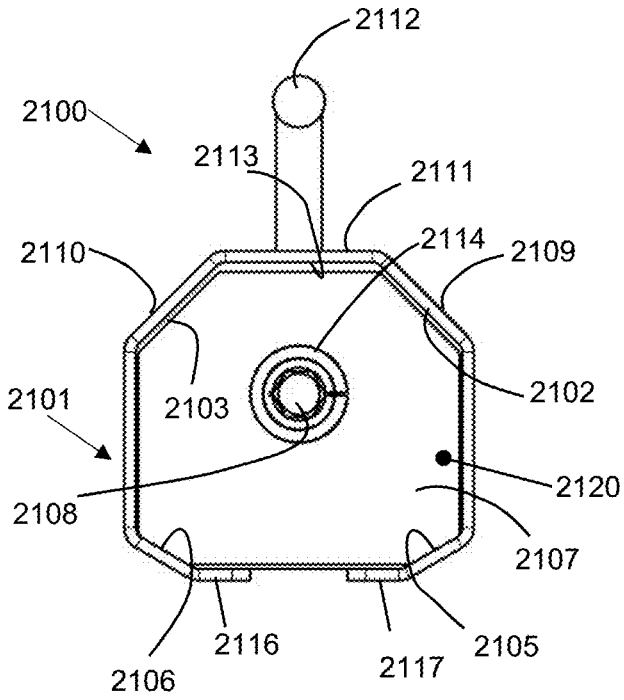


FIG. 22

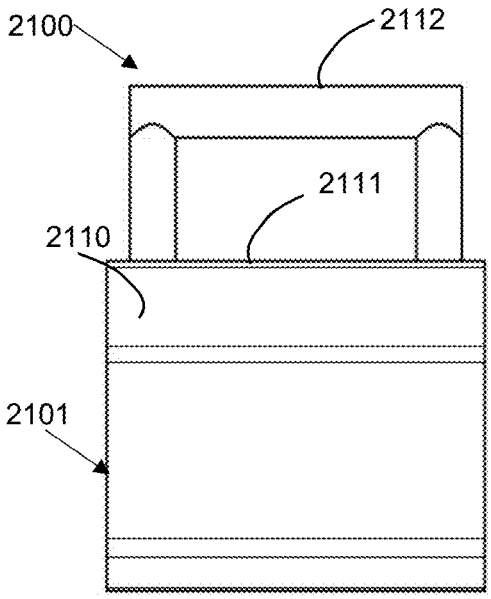


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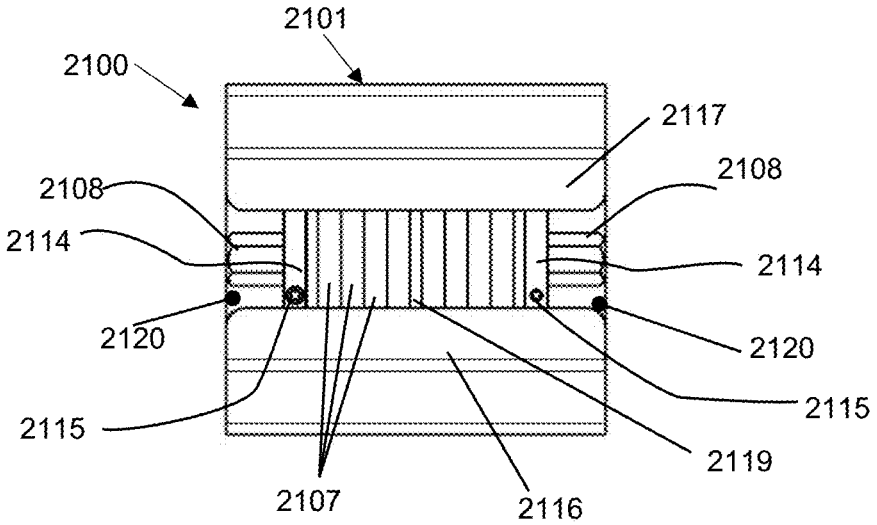


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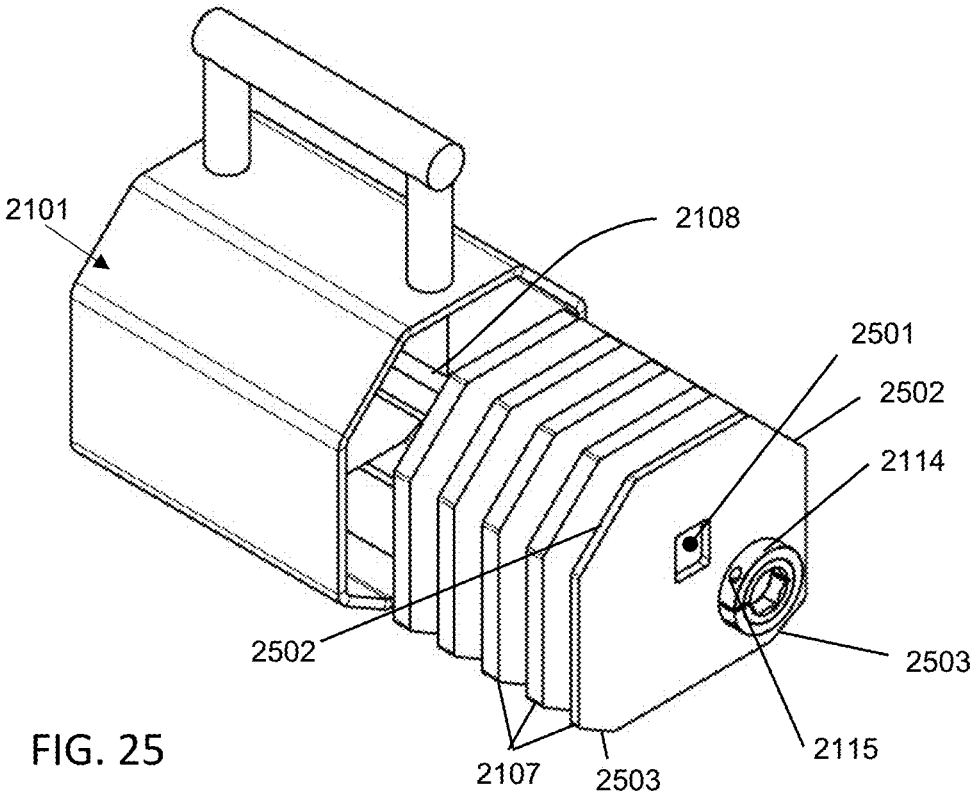

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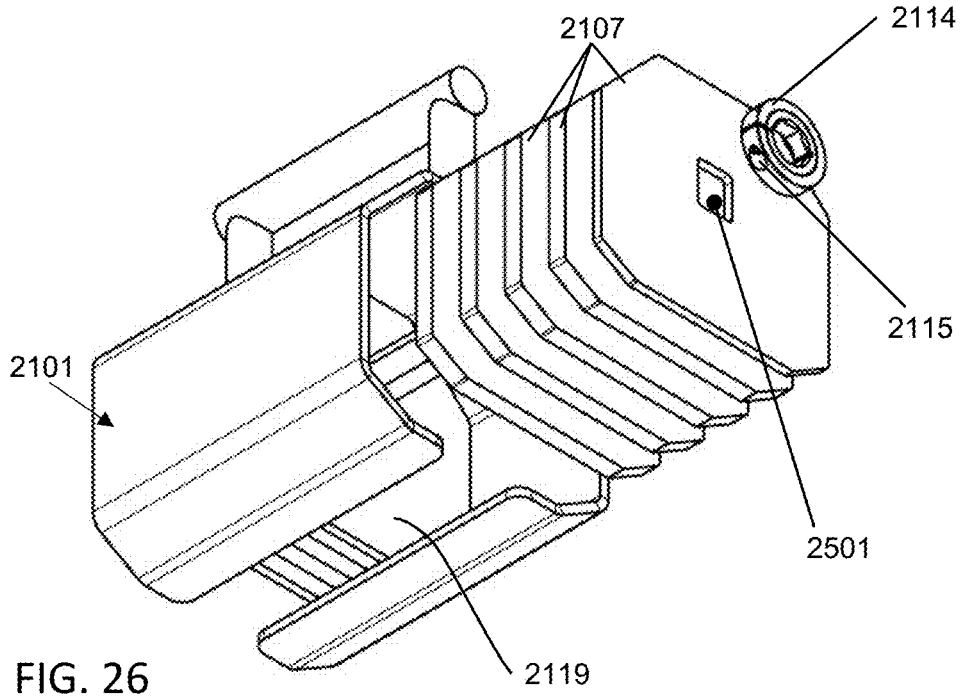

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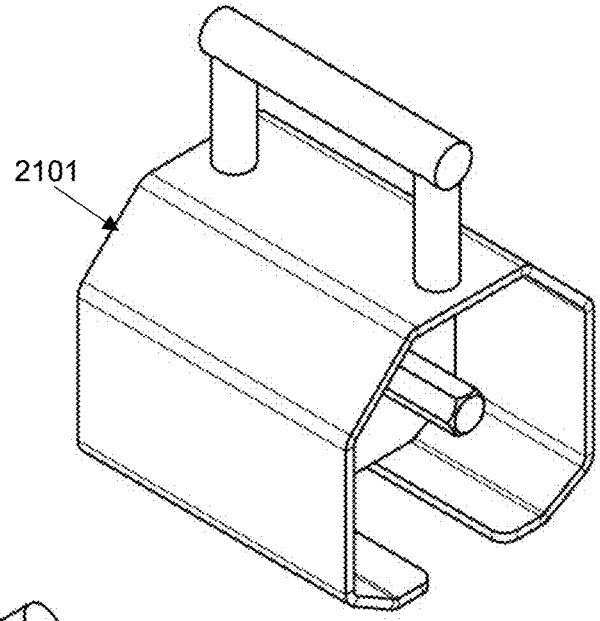


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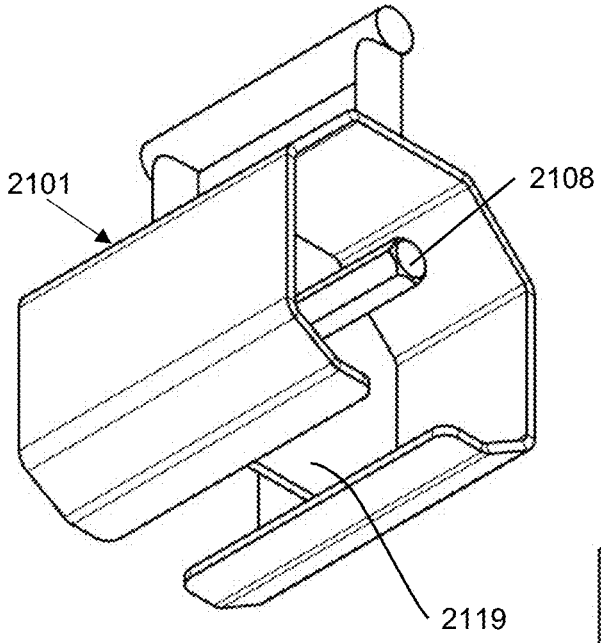


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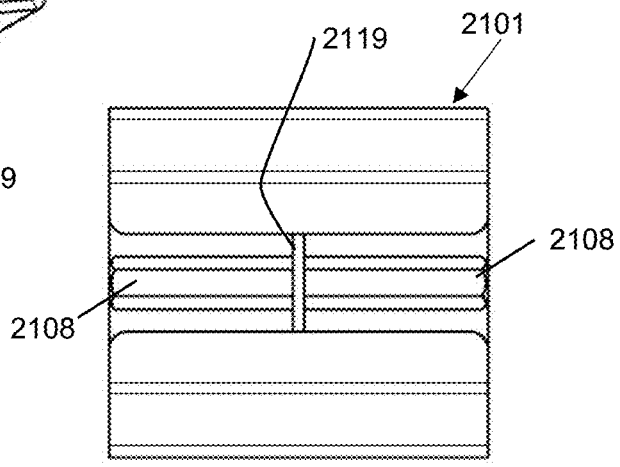


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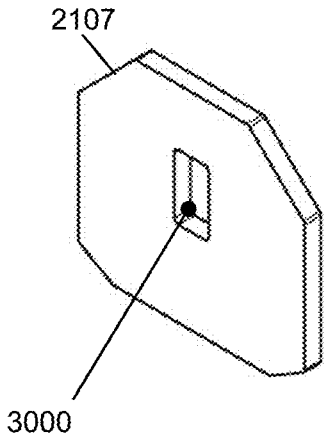


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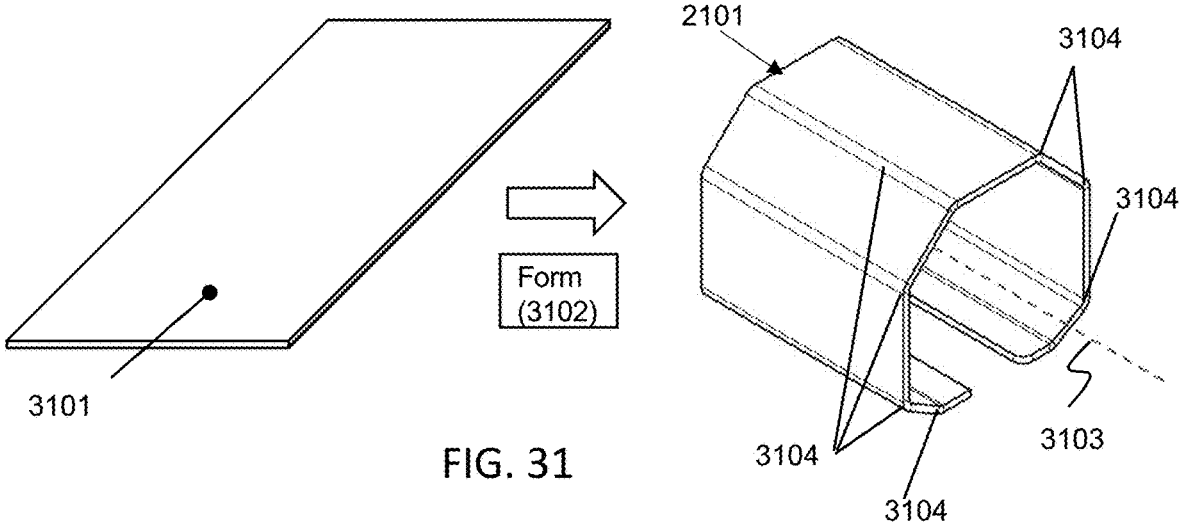

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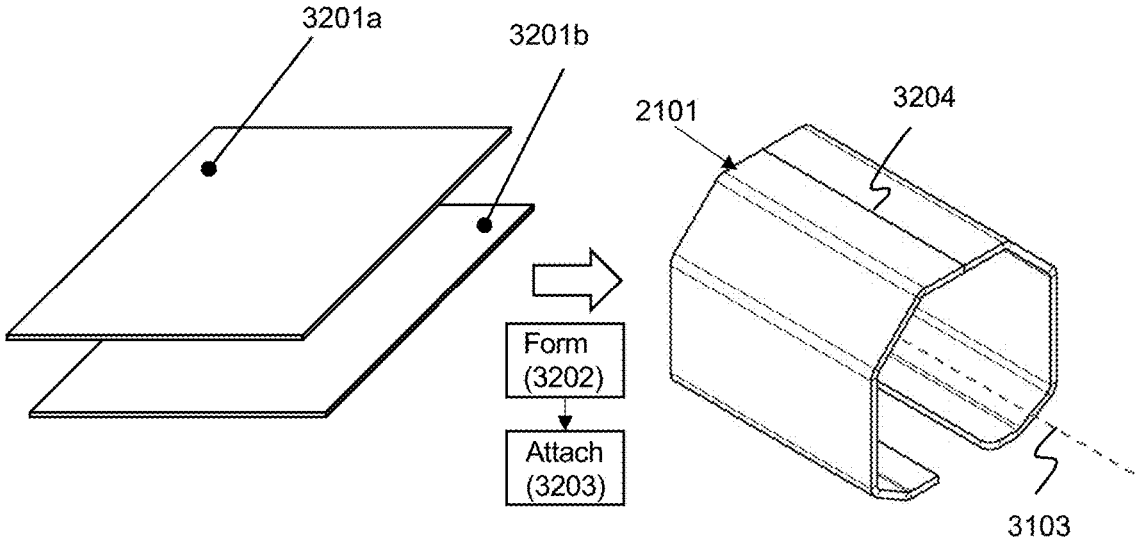

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FIG. 32

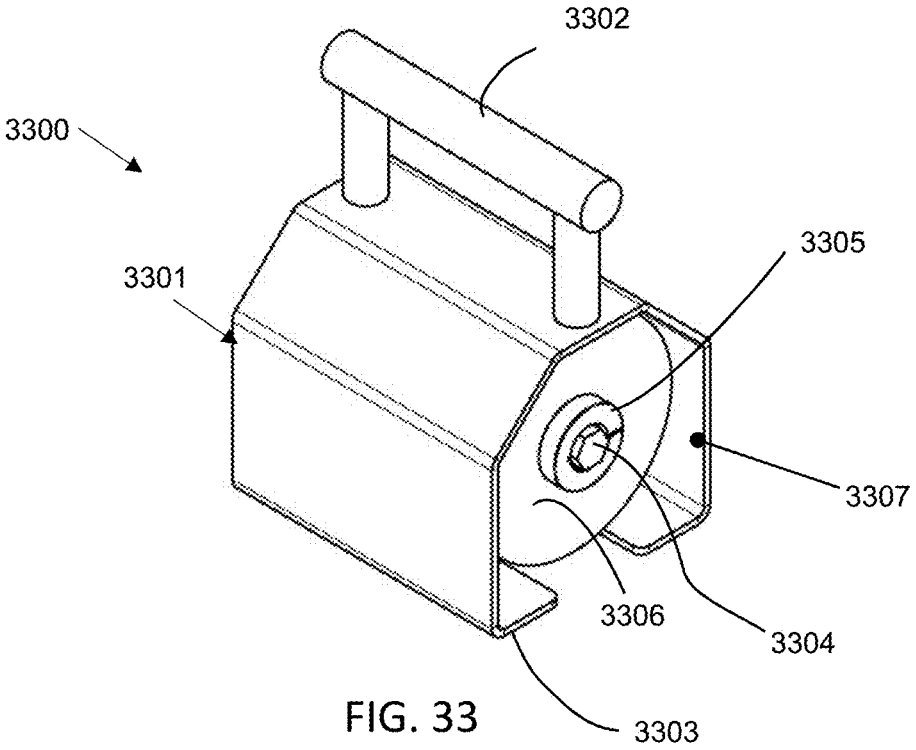


FIG. 33

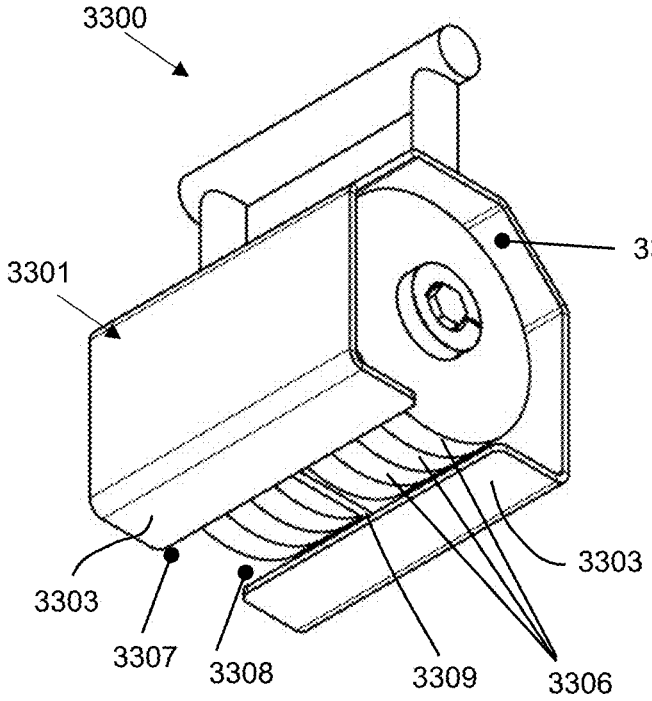


FIG. 34

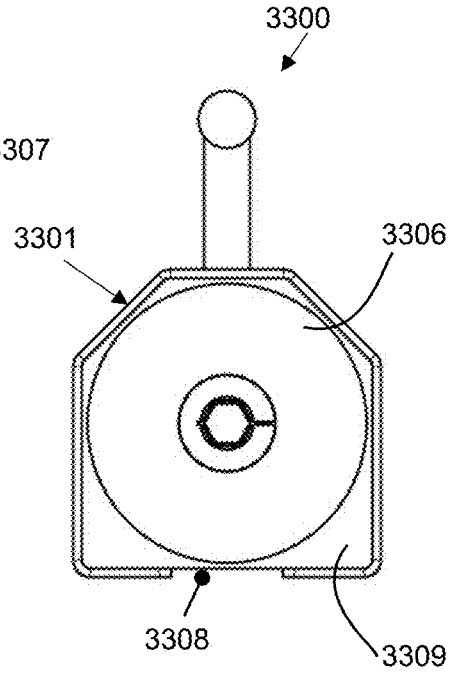


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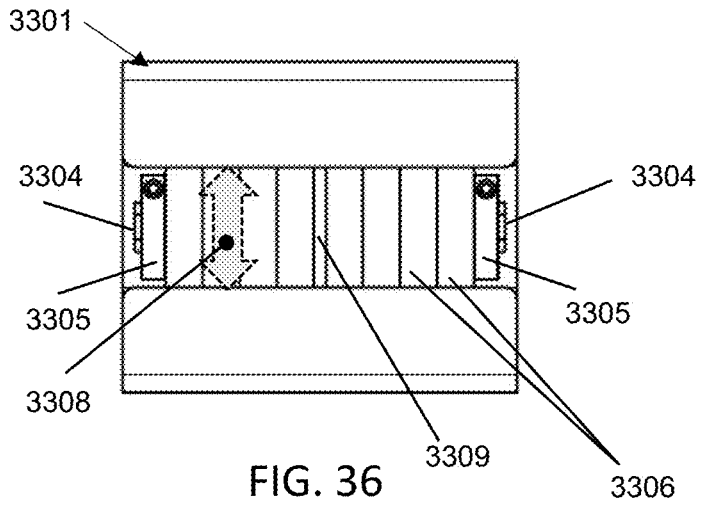

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FIG. 36

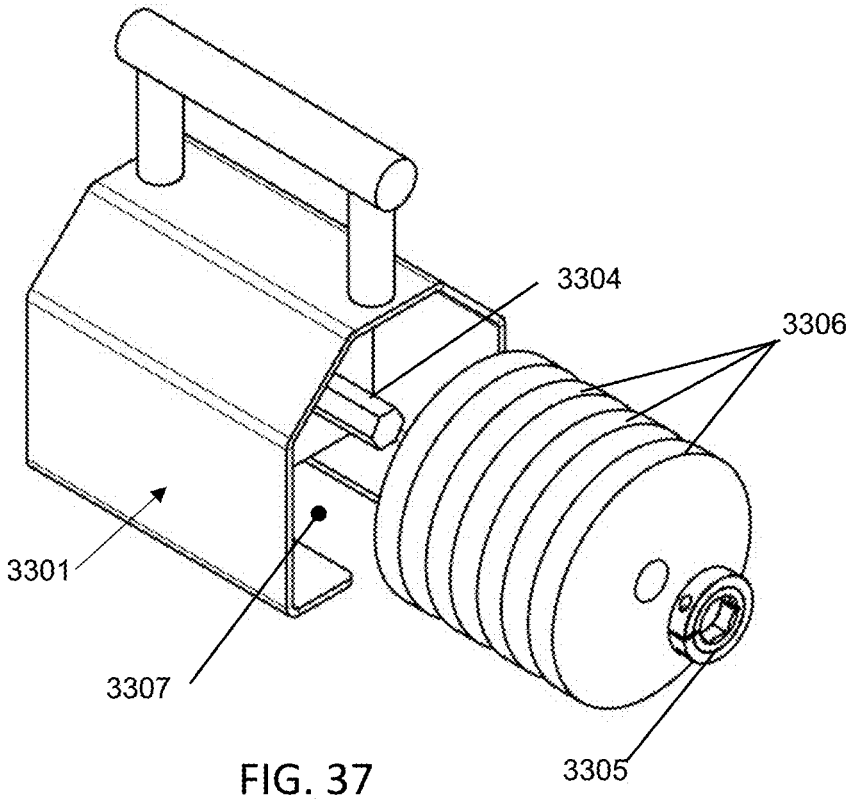

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FIG. 37

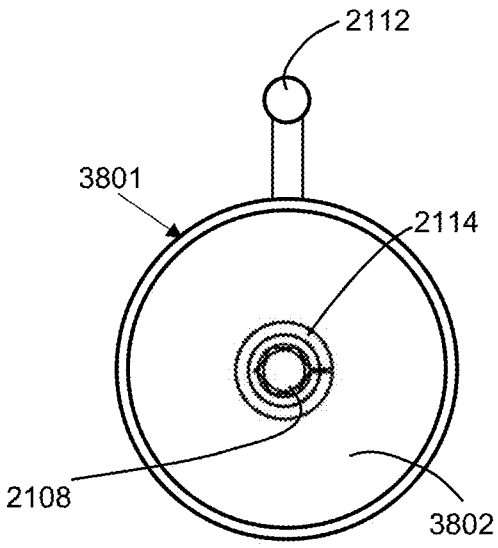


FIG. 38

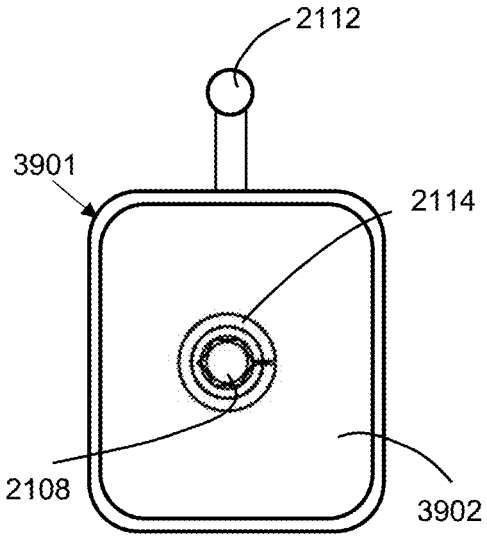


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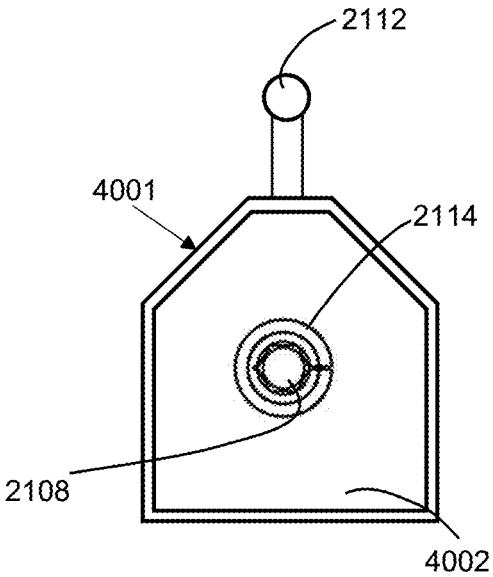


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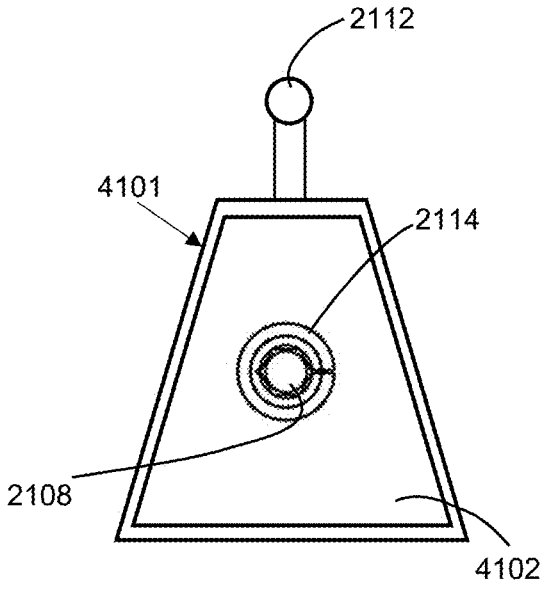


FIG. 41

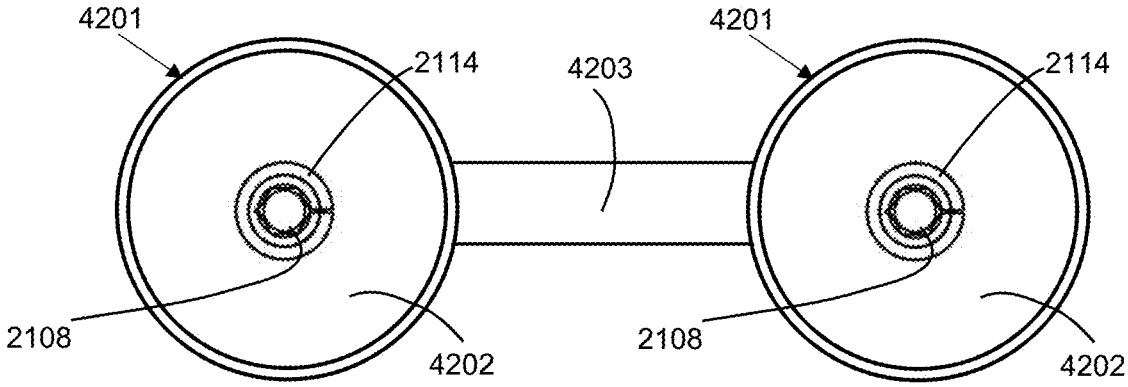

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FIG. 42

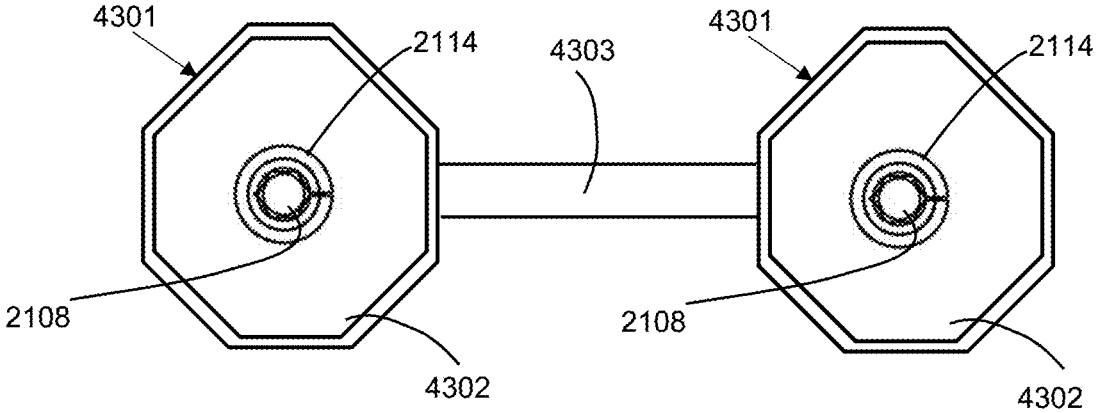

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FIG. 43

ADJUSTABLE EXERCISE WEIGHT EQUIPMENT

CROSS-REFERENCE TO RELATED APPLICATION(S)

[0001] The present application claims priority to U.S. Provisional Application No. 63/054,996, filed on Jul. 22, 2020, and titled "Adjustable Exercise Weight Equipment", the entire contents of which are herein incorporated by reference.

TECHNICAL FIELD

[0002] The following generally relates to exercise equipment, and more particularly to weight training equipment that has weights that can be added and removed to adjust the weight.

DESCRIPTION OF THE RELATED ART

[0003] People use weight training equipment when exercising. Examples of weight training equipment include dumbbells, kettlebells, and barbells. It is desirable to have a range of weights. In one approach, there may be a set of dumbbells, with each pair of dumbbells having different weights (e.g., 5 lbs, 10 lbs, 12 lbs, 15 lbs, 20 lbs, 25 lbs, 30 lbs, 35 lbs, 40 lbs, 45 lbs, 50 lbs, 55 lbs, etc.). These sets of dumbbells take up a lot of space. Similar issues apply to kettlebells and other free weights.

[0004] Adjustable dumbbells are used to reduce the number of different dumbbells and save space. For example, a weight system is provided that includes a handle, weight discs each with a hole in the middle, and collars. The handle slides through the hole in the weight discs, and the collars are used to hold the weight discs in place.

[0005] In an example embodiment, some adjustable dumbbells use a series of rotatable latching plates that are connected by an axial rod. The latching plates rotate to lock certain plates into place, depending on the rotated positions of the latching plates. Other adjustable dumbbells include removable plates that are locked into place using several pins; removing certain pins removes certain corresponding weights from the dumbbell. Yet some other adjustable dumbbells have plates that are screwed onto a centre rod.

[0006] These mechanisms for adjustable dumbbells also are used for kettlebells.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] Embodiments will now be described by way of example only with reference to the appended drawings wherein:

[0008] FIG. **1** is a top perspective view of an adjustable kettlebell, according to an example embodiment.

[0009] FIG. **2** is a bottom perspective view of the adjustable kettlebell shown in FIG. **1**.

[0010] FIG. **3** is a side view of the adjustable kettlebell shown in FIG. **1**.

[0011] FIG. **4** is front view of the adjustable kettlebell shown in FIG. **1**.

[0012] FIG. **5** is a bottom view of the adjustable kettlebell shown in FIG. **1**.

[0013] FIG. **6**A is an exploded bottom perspective view of weight plates positioned outside the kettlebell housing; FIG. **6**B shows the weight plates moved into the kettlebell housing; FIG. **6**C shows the weight plates positioned within the kettlebell housing and a strap undone; and FIG. **6**D shows the weight plates positioned within the kettlebell housing and the strap securing the weight plates.

[0014] FIG. **7**A is an exploded top perspective view of weight plates positioned outside the kettlebell housing; and FIG. **7**B is a bottom perspective view of embodiment shown in FIG. **7**A.

[0015] FIG. **8** is a top perspective view of the kettlebell housing shown in isolation, according to an example embodiment.

[0016] FIG. **9** is a side view of the kettlebell housing shown in FIG. **8**.

[0017] FIG. **10** is a bottom perspective view of the kettlebell housing shown in FIG. **8**.

[0018] FIG. **11** is a bottom view of the kettlebell housing shown in FIG. **8**.

[0019] FIG. **12** is a top perspective view of an adjustable dumbbell, according to an example embodiment.

[0020] FIG. **13** is a bottom view of the adjustable dumbbell shown in FIG. **12**.

[0021] FIG. **14** is a front view of the adjustable dumbbell shown in FIG. **12**.

[0022] FIG. **15** is a bottom view of the adjustable dumbbell shown in FIG. **12**.

[0023] FIG. **16**A is a top perspective view of an adjustable bell with its straps opened, so that the weight plates are not secured. FIG. **16**B shows the weight plates sliding out of the dumbbell housing.

[0024] FIG. **17** is a top perspective view of the dumbbell housing shown in isolation, according to an example embodiment.

[0025] FIG. **18** is a front view of the dumbbell housing shown in FIG. **17**.

[0026] FIG. **19** is a bottom view of the dumbbell housing shown in FIG. **17**.

[0027] FIG. **20** is a top perspective view of an adjustable kettlebell that includes a post and collar or clamp, according to an example embodiment.

[0028] FIG. **21** is a bottom perspective view of the adjustable kettlebell shown in FIG. **20**.

[0029] FIG. **22** is a side view of the adjustable kettlebell shown in FIG. **20**.

[0030] FIG. **23** is front view of the adjustable kettlebell shown in FIG. **20**.

[0031] FIG. **24** is a bottom view of the adjustable kettlebell shown in FIG. **20**.

[0032] FIG. **25** is an exploded top perspective view of weight plates positioned outside the kettlebell housing showing the adjustable kettlebell of FIG. **20**.

[0033] FIG. **26** is an exploded bottom perspective view of weight plates positioned outside the kettlebell housing showing the adjustable kettlebell of FIG. **20**.

[0034] FIG. **27** is a top perspective view of a kettlebell housing shown in isolation, according to an example embodiment.

[0035] FIG. **28** is a bottom perspective view of the kettlebell housing shown in FIG. **27**.

[0036] FIG. **29** is a bottom view of the kettlebell housing shown in FIG. **27**.

[0037] FIG. **30** is a perspective view an example embodiment of weight plate shown in isolation.

[0038] FIG. **31** is an example flow diagram showing phases of making a housing of a kettlebell using a rigid sheet.

[0039] FIG. **32** is an example flow diagram showing phases of making a housing of a kettlebell using two or more rigid sheets.

[0040] FIG. **33** is a top perspective view of an adjustable kettlebell that includes a post and collar or clamp, and the weight plates are supported by the post, according to an example embodiment.

[0041] FIG. **34** is a bottom perspective view of the adjustable kettlebell shown in FIG. **33**.

[0042] FIG. **35** is a side view of the adjustable kettlebell shown in FIG. **33**.

[0043] FIG. **36** is a bottom view of the adjustable kettlebell shown in FIG. **33**.

[0044] FIG. **37** is an exploded top perspective view of weight plates positioned outside the kettlebell housing showing the adjustable kettlebell of FIG. **33**.

[0045] FIG. **38** is a side view of an adjustable kettlebell that includes a post and a collar or clamp, and with a circular housing, according to another example embodiment.

[0046] FIG. **39** is a side view of an adjustable kettlebell that includes a post and a collar or clamp, and with a rectangular housing, according to another example embodiment.

[0047] FIG. **40** is a side view of an adjustable kettlebell that includes a post and a collar or clamp, and with a hexagonal housing, according to another example embodiment.

[0048] FIG. **41** is a side view of an adjustable kettlebell that includes a post and a collar or clamp, and with a trapezoidal housing, according to another example embodiment.

[0049] FIG. **42** is a front view of an adjustable dumbbell that includes a post and collar or clamp, with circular housings, according to another example embodiment.

[0050] FIG. **43** is a front view of an adjustable dumbbell that includes a post and collar or clamp, with octagonal housings, according to another example embodiment.

DETAILED DESCRIPTION

[0051] It will be appreciated that for simplicity and clarity of illustration, where considered appropriate, reference numerals may be repeated among the figures to indicate corresponding or analogous elements. In addition, numerous specific details are set forth in order to provide a thorough understanding of the example embodiments described herein. However, it will be understood by those of ordinary skill in the art that the example embodiments described herein may be practiced without these specific details. In other instances, well-known methods, procedures and components have not been described in detail so as not to obscure the example embodiments described herein. Also, the description is not to be considered as limiting the scope of the example embodiments described herein.

[0052] As noted above, adjustable dumbbells and kettlebells typically use screw locking mechanisms, rotatable latches, and multiple pins to hold different weight plates in place. However, these mechanisms are bulky and increase the size of the adjustable dumbbell or adjustable kettlebell. It is also herein recognized that these mechanisms are sometimes difficult to use; it takes time to learn how to adjust the mechanisms. Furthermore, the weight plates in some of these adjustable dumbbells or kettlebells wobble and clank against each other, which can disrupt a person's exercise. It is also herein recognized that adjustable dumbbells and kettlebells have the weight plates exposed; this results in more edges, crevices, and corners, which in turn causes more soft tissue pinch points and entanglement risk (e.g. entanglement of string or hair).

[0053] An adjustable exercise weight system is provided that includes a housing with opposingly angled inner surfaces, and removable weight pieces that are shaped to wedge between the opposingly angled inner surfaces. The housing supports the weight pieces. A strap wraps around the weight pieces and the strap holds the weight pieces within the housing.

[0054] In an example aspect, the adjustable exercise weight system is a free weight. Examples of free weights include dumbbells and kettlebells. In another example, the adjustable exercise weight system is part of an exercise machine.

[0055] Turning to FIGS. **1** to **5**, an example embodiment of a weight adjustable kettlebell **100** is shown from different views. It includes a kettlebell housing **101** that has inner surfaces that are oppositely angled towards each other to create a wedge. For example, the inner surfaces **102** and **103** are oppositely angled towards each other to create a wedge shape therebetween. Similarly, inner surfaces **105** and **106** are oppositely angled towards each other to create a wedge shape therebetween. An inner upper surface **104** bridges across the two angled inner surfaces **102** and **103**. In an example aspect, the inner upper surface **104** is spans horizontally between the tops of the angled inner surfaces **102** and **103**.

[0056] In the example shown, the inner surface **102** and the inner surface **105** are also oppositely angled towards each other to create another wedge shape therebetween. The inner surface **103** and the inner surface **106** are also oppositely angled towards each other to create another wedge shape therebetween. In other words, there are four wedge shapes formed between the four inner surfaces.

[0057] It will be appreciated, however, that in other examples, there are two oppositely angled inner surfaces that one wedge shape therebetween.

[0058] The wedge shape or wedge shapes formed between the oppositely angled inner surfaces are used to hold in place one or more weight pieces **107** that are positioned within the housing **101**.

[0059] The inner surfaces **102**, **103**, **105**, and **106** are shown as being flat surfaces. However, in another example embodiment, these inner surfaces are curved and still function to hold the weight pieces in a wedged manner.

[0060] It will be appreciated that the opposingly angled inner surfaces **102**, **103**, **105**, **106** extend in a same direction parallel to each other. For example, this is similar to an octagonal prism, which has elongate rectangular walls or elongate rectangular faces extending in parallel between the two octagon caps.

[0061] In the example shown, several weight pieces **107** are held within the housing **101**. The weight pieces **107** are removable from the housing and easy to insert within the housing, so that the weight of kettlebell **100** can be adjusted.

[0062] In an example aspect, the weight pieces are plates, or weight plates, that have a profile that matches the profile of the inner surfaces of the housing **101**. In the example shown, while a given weight plate **107** is positioned in the housing **101**, the edges of the given weight plate **107** face and are adjacent to the inner surfaces **102**, **103**, **105** and **106**.

[0063] In other words, as best seen in FIG. **6**A, which shows several weight plates out of the housing **101**, a given weight plate **107***a* includes oppositely angled edges **602** that are angled towards each other. The given weight plate **107***a* also includes oppositely angled edges **603** that are angled towards each other. The angled edges **602** of the weight plate **107***a* rest against the inner surfaces **102** and **103** of the housing, and the angled edges **603** of the weight plate **107***a* rest against the inner surfaces **105** and **106** of the housing. In this way, a weight plate **107** is wedged between the inner surface **102** and **103**, as well as the inner surfaces **105** and **106**.

[0064] It will be appreciated that if the inner space defined within the housing were a different shape, then the profile of the weight plate would match so that it could fit within the inner space of the housing. It will also be appreciated that the terms "weight piece" and "weight plate" are herein interchangeably used. It will also be appreciated that the weight piece does not have to be a plate, but can have other profiles (e.g. blocks, prisms, orbs, etc.).

[0065] Turning back to FIGS. **1** to **5**, the housing **101** also includes an opening **120** to receive the weight piece. For example, the inner surfaces **102**, **103**, **105**, and **106** terminate at an opening positioned on a side of the housing, through which the weight pieces are insertable into the housing.

[0066] In an example embodiment, there are two openings **120**; one on each opposite side ends of the housing **101**. In another example embodiment, there is only one opening **120** on the side of the housing. Using the opening **120**, a person can slide in or insert one or more weight pieces into the interior volume (e.g., also the inner space) of the housing.

[0067] It will be appreciated that the weight pieces can also have different sizes and weights. For example, different weight amounts include: 1 lb, 3 lbs, 5 lbs, 10 lbs, 20 lbs, etc.

[0068] The weight pieces **107** are also held by a strap **108** to keep the weight pieces from falling out of the housing **101**. In the example shown, the strap **108** wraps around the weight pieces and stops the weight pieces from falling out of the opening **120**.

[0069] Although a strap is shown, in a more general example, a movable holder is positioned to contact at least a weight piece positioned closest to the opening. The movable holder laterally secures the weight pieces, including the weight piece positioned closest to the opening, within the housing. In other words, the movable holder stops the weight pieces from sliding side-to-side within the housing. The upward, downward, forward, and backward movements of the weight plates are secured or restricted by the inner surface (or inner surfaces) of the housing, which extend parallel to each other to form an elongate prism. Other examples of movable holders include: a strap, a latch, a clamp, a bolt, a screw mechanism, etc.

[0070] As best shown in FIGS. **1** and **2**, the housing **101** includes an outer upper surface **109** that is offset to one side of a handle **112**, and another outer upper surface **110** that is offset to an opposite side of the handle **112**. Between the surfaces **109** and **110** is an upper surface **111**, and the handle **112** protrudes from the upper surface **111**. The outer upper surface **109** is angled downwards and away from the handle **112**. Similarly, the outer upper surface **110** is angled downwards and away from the handle **112**. In this way, when a person holds the kettlebell **100** from the handle **112**, the person's arm is more comfortably braced against the surface **109** or the surface **110**.

[0071] As better seen in FIGS. **2**, **3** and **5**, there is a first notch **114** defined on each of the weight pieces **107**. When the weight pieces are aligned within the housing, a first channel **115** is formed between the aligned first notches **114** of the weight pieces and the inner upper surface **113** of the housing. A second notch **116** is defined on each of the weight pieces **107**. When the weight pieces are aligned within the housing, a second channel **117** is formed by the aligned second notches **116** of the weight pieces. The strap **108** passes through the first channel **115** and the second channel **117**. As shown in FIG. **6**, a strap attachment mechanism **118** holds the strap tight. For example, the mechanism **118** is a buckle or a clasp.

[0072] The housing further incudes a brace structure **119** that is secured to the inner surface of the housing. The brace structure **119** is a plate or a flange that is located in the middle of the housing's inner space. In an example aspect, the brace structure is also herein referred to as a center flange. In an example aspect, the brace structure is weight bearing, so that it can support the weight of the weight pieces. The brace structure **119** reduces the amount of weight being supported by the strap **108**. For example, on one side of the brace structure there is positioned a first set of one or more weight pieces, and on an opposite side of the brace structure there is positioned a second set of one or more weight pieces. When the housing **101** is angled so that the opening **120** is facing up, the first set of one more weight pieces rests on top of the brace structure **119** and is supported by the brace structure **119**, while the second set of the one or more weight pieces is positioned below the brace structure **110** and is supported by the strap **108**.

[0073] Turning to FIG. **6**A, the brace structure **119** is more clearly shown unobstructed from the weight pieces. The brace structure **119** also includes a notch **601** that matches the profile of the notch **116** of a given weight piece **107***a*.

[0074] In the example shown, the brace structure **119** spans and is connected to opposite facing inner side surfaces of the housing **101**. This also helps to provide more structural support to the housing **101**.

[0075] However, in another example embodiment, the brace structure includes one or more protrusions from the inner side surfaces of the housing, and do not connect to each other. This example brace structure, even without spanning the distance between side surfaces, is able to support the weight of the weight pieces.

[0076] In FIG. **6**A, the weight pieces **107***a*, **107***b*, **107***c*, **107***d* are outside the housing **101**, and the strap **108** is lose. In FIG. **6**B, these weight pieces are passed through the opening **120** of the housing, until they are positioned within the housing (in FIG. **6**C). The different attachment mechanisms **118***a*, **118***b* are then attached together to make the strap **108** tight around the weight plates as shown in FIG. **6**D. It will be appreciated that in most orientations of the kettlebell **100**, the weight pieces are being supported by the housing **101** and not the strap **108**. Only when the kettlebell is tilted in a certain direction (e.g. when the opening **120** is pointed downwards), then the strap acts to hold the weight pieces within the housing.

[0077] FIGS. **7**A and **7**B show other exploded views of the weight pieces outside the housing.

[0078] FIGS. **8**, **9**, **10** and **11** show the housing **101** in isolation. The example of the brace structure **119** is also more clearly shown.

[0079] Turning to FIGS. **12**, **13**, **14**, and **15**, another example embodiment of an adjustable exercise weight is shown. In particular, this exercise weight is a dumbbell **1200**.

[0080] The dumbbell includes two housings **1201** that are supported by and connected to opposite ends of a handle **1202**. In the example shown, the housings **1201** are identical. Therefore, the components and features of described with respect to one housing **1201** apply to both housings.

[0081] The housing **1201** holds removable weight pieces **1204**. The housing **1201** includes inner surfaces **1206**, **1207**, **1208** and **1209** that define at least part of the inner space to hold the weight pieces. The inner surfaces **1206** and **1207** are oppositely angled towards each other to create a wedge shape therebetween. The inner surfaces **1208** and **1209** are oppositely angled towards each other to create a wedge shape therebetween.

[0082] In this example embodiment, the inner surfaces **1206** and **1208** are also are oppositely angled towards each other to create a wedge shape therebetween. The inner surfaces **1207** and **1209** are also are oppositely angled towards each other to create a wedge shape therebetween.

[0083] Each weight piece **1204** also has oppositely angled sides that fit between the inner surfaces **1206**, **1207**, **1208** and **1209**. In this way, a weight piece is supported by and wedged between the inner surfaces **1206**, **1207**, **1207**, **1209**. The wedge support depends on the angle of the housing during a lifting movement. In the orientation shown in FIG. **12**, the weight piece is supported by and wedged between the inner surfaces **1208** and **1209**.

[0084] The inner surfaces **1206**, **1207**, **1208** and **1209** are shown as being flat surfaces. However, in another example embodiment, these inner surfaces are curved and still function as a wedge to hold the weight pieces.

[0085] It will be appreciated that the housing **1201** has an opening **1210** through which the weight pieces **1204** can be inserted or removed from the housing **1201**.

[0086] The weight pieces **1204** are also held by a strap **1205** to keep the weight pieces from falling out of the housing **1201**. In the example shown, the strap **1205** wraps around the weight pieces and stops the weight pieces from falling out of the opening **1210**.

[0087] Although a strap is shown, in a more general example, a movable holder is positioned to contact at least a weight piece positioned closest to the opening. The movable holder secures the weight pieces, including the weight piece positioned closest to the opening, within the housing. Examples of movable holders include: a strap, a latch, a clamp, a bolt, etc.

[0088] The ends of the strap are held fastened together with a buckle **1213**.

[0089] As will be shown better in FIGS. **16**A and **16**B, the weight pieces have notches so that, when the weight pieces are aligned, a channel **1211** and an opposite facing channel **1212** are formed. These channels **1211** and **1212** help to keep the strap **1205** in position around the weight pieces **1204**.

[0090] It will be appreciated that in the orientation shown in FIG. **12**, the majority of the weight is supported by the housing **1201** and not the strap **1205**.

[0091] FIG. **16**A shows the strap **1205** being unbuckled, with two parts **1213***a* and **1213***b* of the buckle being separated from each other. In FIG. **16**A, a brace structure **1601** is also better shown. The brace structure **1601** protrudes from the inner surfaces of the housing. In the example shown, the support brace **1601** spans between and connects two opposite facing inner surfaces. However, in other example embodiments, the support brace does not span across the entire inner space of the housing.

[0092] In an example aspect, the brace structure is weight bearing, so that it can support the weight of the weight pieces. The brace structure **1601** reduces the amount of weight being supported by the strap **1205**. For example, on one side of the brace structure there is positioned a first set of one or more weight pieces, and on an opposite side of the brace structure there is positioned a second set of one or more weight pieces. When the housing **1201** is angled so that the opening **1210** is facing up, the first set of one more weight pieces rests on top of the brace structure **1601** and is supported by the brace structure **1601**, while the second set of the one or more weight pieces is positioned below the brace structure **1601** and is supported by the strap **1205**.

[0093] FIG. **16**B shows the weight pieces **1204** being positioned outside of the housing **1201**. The shape of a given weight piece **1204** is more clearly shown. It includes angled sides **1602** that sit against the inner surfaces **1206**, **1207**, **1208** and **1209**. Each weight piece also includes notches **1603** that form the channels **1211** and **1212**.

[0094] In an example aspect, there are four notches **1603** defined respectively on the four sides of a weight piece, so that the weight piece can be put into the housing in any of the four orientations.

[0095] FIGS. **17**, **18** and **19** show the dumbbell **1200** with the weight pieces **1204** removed. From these views, the example of the brace structure **1601** can be better seen. The brace structure **1601** also includes two opposite facing notches **1701** and **1702**, which respectively form part of the channels **1211** and **1212** when the weight pieces are positioned in the housing.

[0096] Turning to FIGS. **20** to **24** another example embodiment of a weight adjustable kettlebell **2100** is shown. It includes a kettlebell housing **2101** that has inner surfaces that are oppositely angled towards each other to create a wedge. For example, the inner surfaces **2102** and **2103** are oppositely angled towards each other to create a wedge shape therebetween. Similarly, inner surfaces **2105** and **2106** are oppositely angled towards each other to create a wedge shape therebetween. An inner upper surface **2104** bridges across the two angled inner surfaces **2102** and **2103**. In an example aspect, the inner upper surface **2104** is spans horizontally between the tops of the angled inner surfaces **2102** and **2103**.

[0097] In the example shown, the inner surface **2102** and the inner surface **2105** are also oppositely angled towards each other to create another wedge shape therebetween. The inner surface **2103** and the inner surface **2106** are also oppositely angled towards each other to create another wedge shape therebetween. In other words, there are four wedge shapes formed between the four inner surfaces.

[0098] It will be appreciated, however, that in other examples, there are two oppositely angled inner surfaces that one wedge shape therebetween.

[0099] The wedge shape or wedge shapes formed between the oppositely angled inner surfaces are used to hold in place one or more weight pieces **2107** that are positioned within the housing **1201**.

[0100] The inner surfaces **2102**, **2103**, **2105** and **2106** are shown as being flat surfaces. However, in another example

embodiment, these inner surfaces are curved and still function to hold the weight pieces in a wedged manner.

[0101] It will be appreciated that the opposingly angled inner surfaces **2102**, **2103**, **2105**, **2106** extend in a same direction parallel to each other. For example, this is similar to an octagonal prism, which has elongated rectangular walls or elongate rectangular faces extending in parallel between the two octagon caps.

[0102] In the example shown, several weight pieces **2107** are held within the housing **2101**. The weight pieces **2107** are removable from the housing and easy to insert within the housing, so that the weight of kettlebell **2100** can be adjusted.

[0103] In an example aspect, the weight pieces are plates, or weight plates, that have a profile that matches the profile of the inner surfaces of the housing **2101**. In the example shown, while a given weight plate **2107** is positioned in the housing **2101**, the edges (e.g., also called the perimeter surfaces or the perimeter edges) of the given weight plate **2107** face and are adjacent to the inner surfaces **2102**, **2103**, **2105** and **2106**.

[0104] In other words, as best seen in FIG. **25**, which shows several weight plates out of the housing **2101**, a given weight plate **2107** includes oppositely angled edges **2502** that are angled towards each other. The given weight plate **2107** also includes oppositely angled edges **2503** that are angled towards each other. The angled edges **2502** of the weight plate **2107** rest against the upper inner surfaces **2102** and **2103** of the housing, and the angled edges **2503** of the weight plate **2107** rest against the lower inner surfaces **2105** and **2106** of the housing. In this way, a weight plate **2107** is wedged between the inner surfaces **2102** and **2103**, as well as the inner surfaces **2105** and **2106**.

[0105] It will be appreciated that if the inner space defined within the housing were a different shape, then the profile of the weight plate would match so that it could fit within the inner space of the housing.

[0106] In an example aspect, as also best seen in FIGS. **25** and **26**, each weight plate **107** has an opening **2501** defined therein, through which a bar or post **2108** passes through. The post **2108** (e.g., also herein called a bar) extends horizontally from a brace structure **2119** (e.g., also herein called a center flange). The opening **2501**, for example, is sized to at least fit the girth of the post **2018**. In another example aspect, the opening **2501** is a vertically elongate slot to facilitate the easy removal of the weight plate from the post, or to facilitate the easy placement of the weight plate onto the post. The elongate slot also helps a user to grasp the weight plate more easily. For example, the user can put their thumb or finger through the slot of the weight plate. Turning briefly to FIG. **30**, for example, a weight plate **2107** is shown in isolation and defines therein an elongate slot **3000**. It will be appreciated that the shape of the opening **2501** can vary. Examples shapes of the opening **2501** include a square, a circle, a pentagon, a hexagon, and an elongated shape.

[0107] Turning to FIGS. **27**, **28**, and **29**, which show the housing **2101** in isolation, it will be appreciated that two posts **2108** extend from in opposite directions the brace structure **2119**. In another example embodiment, a single post passes through the brace structure and, in effect, forms two posts **2108** extending in opposite directions from the brace structure. As shown in FIGS. **25** and **26**, each post **2108** can have positioned thereon one or multiple weight plates **2107** along the post's length. As best seen in FIG. **24**, a collar or clamp **2114** is positioned on the post **2108**, which laterally secures the one or more weight plates **2107** between the brace structure **2119** and the collar or clamp **2114**. In an example aspect shown, the collar or clamp includes a screw **2115** to tighten the collar or clamp around the post **2108**. In another example embodiment, the collar or clamp includes a series of hinges and a lever to tighten the collar or clamp onto the post **2108**. It will be appreciated that other tightening mechanisms and other movable holders that can be removably fixed on to the post **2108** to laterally secure weight plates **2107** on the post are applicable to the principles described herein.

[0108] In another example embodiment, the post **2108** has a circular cross-section and has screw threads along its length, and so that a threaded collar screws onto the post.

[0109] In operation, one or more weight plates are positioned on a given post. The number and mass of the weight plates are selected by the user, according to their desired weightlifting specification. Then a collar or a clamp is positioned on the given post to secure the one or more plates from falling off the post, and more generally, to keep the one or more plates secured within the housing. The one or more weight plates are, for example, added on both posts that extend on opposite sides of the center flange. To remove the one or more weight plates, the collar or the clamp is removed from a given post, the one or more weight plates are removed from the post and housing, and the collar or the clamp is put back onto the given post. This process can be repeated on the opposite facing posts.

[0110] Turning back to FIGS. **20** to **24**, the housing **2101** also includes an opening **2120** to receive a weight piece or weight plate. In an example embodiment, there are two openings **2120**; one on each opposite end of the housing **2101**. In another example embodiment, there is only one opening **2120**. Using the opening **2120**, a person can slide in or insert one or more weight pieces into the inner space of the housing. The collar or clamp **2114** stops the weight pieces **2107** from falling out of the opening **2120**.

[0111] It will be appreciated that the weight pieces, also herein called weight plates, can have different sizes and weights.

[0112] It will be appreciated that the collar or clamp **2114** is an example of a movable holder that is positioned to contact at least a weight piece positioned closest to the opening. The movable holder secures the weight pieces, including the weight piece positioned closest to the opening, within the housing.

[0113] As best shown in FIGS. **20** and **21**, the housing **2101** also defines therein an opening **2121** at the bottom of the housing. This bottom opening **2121** helps the user to grasp at specific weight plates **2107** when removing weight plates from the housing. The bottom opening **2121** also allows a user to visually see the weight plates **2107** mounted within the housing. This visual information allows the user to confirm or determine the amount of total weight of the kettlebell.

[0114] As best shown in FIGS. **20** and **22**, the housing **2101** includes an outer upper surface **2109** that is offset to one side of a handle **2112**, and another outer upper surface **2110** that is offset to an opposite side of the handle **2112**. Between the surfaces **2109** and **2110** is an upper surface **2111**, and the handle **2112** protrudes from the upper surface **2111**. The outer upper surface **2109** is angled downwards

and away from the handle **2112**. Similarly, the outer upper surface **2110** is angled downwards and away from the handle **2112**. In this way, when a person holds the kettlebell **2100** from the handle **2112**, the person's arm is more comfortably braced against the surface **2109** or the surface **2110**.

[0115] The housing further incudes a brace structure **2119** that is secured to the inner surface of the housing. The brace structure **2119** is a plate or a flange that is located in the middle of the housing's inner space. In an example aspect, the brace structure is weight bearing, so that it can support the weight of the weight pieces. The brace structure **2119** supports the posts **2108** and, in combination with the collars or clamps **2114**, laterally holds or secures the weight plates **2107**. In the example shown, the brace structure **2119** spans and is connected to opposite facing inner side surfaces of the housing **2101**. This also helps to provide more structural support to the housing **2101**. This example brace structure, even without spanning the distance between side surfaces, is able to support the posts and support the weight of the weight pieces.

[0116] It will be appreciated that the shape of the kettlebell housing can vary from what is shown. For example, the side profile of the example shown in FIG. **22** is similar to an octagonal prism. However, other shapes can be used.

[0117] Turning to FIG. **31**, an example embodiment of a process for manufacturing the housing **2101** is shown. The process starts with a rigid sheet **3101**. This rigid sheet is formed **3102** into a housing **2101**. In particular, the forming process includes making one or more bends **3104** or curves to form an elongate prism about a longitudinal axis **3103**. For example, multiple parallel bends **3104** are formed into the sheet **3101** to form the housing **2101**. Alternatively, a continuous curve is formed into the sheet **2101** to form a volumetric shape around a longitudinal axis **3103**.

[0118] FIG. **32** shows a similar example process, but at least two sheets **3201***a* and **3201***b* are used to form the housing **2101**. The process includes forming **3202** the curves or bends into the sheets, and then attaching **3203** the formed sheets together. For example, a line **3204** between the two formed sheets are shown. Different approaches for attaching the two formed sheets together can be used, including welding, fasteners, adhesives, etc.

[0119] In an example embodiment, the rigid sheet is sheet metal or a metal plate. More generally, the rigid sheet is made of metal. In another example embodiment, the rigid sheet is plastic. In another example embodiment, the rigid sheet is a composite material.

[0120] In an example aspect, the rigid sheet has a constant thickness. As a result, the housing has a constant thickness.

[0121] It will be appreciated that this process for manufacturing the kettlebell is efficient and economical, while providing an ergonomic form-factor.

[0122] Turning to FIGS. **33**, **34**, **35**, **36**, and **37**, another example embodiment of a kettlebell **3300** is shown. The housing **3301** has attached to it a handle **3302**. An internal brace structure **3309** is positioned within the housing **3301**. The brace structure **3309** supports a post **3304** that extends laterally towards an opening **3307** that is defined in the side of the housing. Weight plates **3306** can be inserted and removed through the opening **3307**. In particular, the weight plates **3306** are stacked laterally, side-by-side, and are supported by the post **3304**. A collar or clamp **3305** is removably secured to the post **3304** and can be laterally moved along the post to laterally restrict movement of the weight plates **3306**.

[0123] In an example aspect, there are two openings **3307** positioned on opposite sides of the housing **3301**. There are also two posts **3304** that laterally extend on opposite sides from the brace structure **3309**. In an example aspect, the brace structure is attached (e.g., welded) to multiple points on the inner surface of the housing. For example, the brace structure is a flange or a web, which increases the structural rigidity of the housing.

[0124] In another example aspect, the housing **3301** defines therein a bottom opening **3308** along the length of the bottom of the housing. Two bottom portions **3303** of the housing are spaced apart from each other, which defines the bottom opening **3308**. The bottom portions **3303** support the housing when the kettlebell **3300** is placed on a surface, such as a ground surface. Preferably, although not necessarily, the bottom portions **3303** are flat surfaces to help keep the kettlebell oriented upright when positioned on a ground surface. The bottom opening **3308** helps a user to grasp at one or more specific weight plates **3306** in the lateral stack. The bottom opening **3308** also provides visual access, so that the user can see how much weight is within the housing.

[0125] It will be appreciated that in the example kettlebell **3300**, the weight plates **3306** are entirely supported by the post or posts **3304**. The inner surface of the housing **3301** does not contact the weight plates **3306** nor does the inner surface of the housing directly support the weight of the weight plates. The weight plates **3306** are circular, while the housing **3301** has a different interior profile shape. In the example shown, the housing has a hexagonal interior profile shape, but it will be appreciated that the housing shape can be different. The configuration of the kettlebell **3300** provides housing **3301** that is shaped for ergonomics when a user performs kettlebell exercises. The kettlebell **33000** is versatile as it allows for different shaped weight plates, such as circular weight plates that are more commonly available, to be used with kettlebell. In other words, the weight plates are not necessarily wedged into the inner surfaces of the housing.

[0126] Turning to FIG. **38**, an example embodiment of a circular shaped housing **3801** is shown. The weight plates **3802** are also circular shaped to fit within the interior volume of the housing. It will be appreciated that the circle shaped housing includes opposingly facing inner surfaces, but there is a continuous transition between these opposing inner faces to form rounded interior surface.

[0127] FIG. **39** shows an example embodiment of a rectangular shaped housing **3901**. The weight plates **3902** are also rectangular shaped to fit within the interior volume of the housing.

[0128] FIG. **40** shows an example embodiment of a hexagonal shaped housing **4001**. The weight plates **4002** are also hexagonal shaped to fit within the interior volume of the housing.

[0129] FIG. **41** shows an example embodiment of a trapezoidal shaped housing **4101**. The weight plates **4102** are also trapezoidal shaped to fit within the interior volume of the housing.

[0130] A post and collar or clamp are used to hold the weight plates within the housings shown in the examples in FIGS. **38**, **39**, **40**, and **41**. However, another movable holder, such as a strap can be used instead.

[0131] In another example embodiment, the weight plates shown in FIGS. **38**, **39**, **40**, and **41** are instead circular-shaped weight plates, or some other shape of weight plates that are differently shaped compared to the profile shape of housing's interior space.

[0132] The different shapes of housings are also applicable to dumbbells. Furthermore, it will be appreciated that the features of the post and the collar or clamp can be used to secure weight pieces in a dumbbell configuration.

[0133] For example, FIG. **42** shows a front profile view of an example embodiment of a dumbbell, similar to FIG. **14**. However, the shape of the housing **4201** is circular, and the weight pieces **4202** are circular to fit within the interior volume of the housing. A handle **4203** extends between the two housings **4201**. Instead of a strap, a post **2018** and collar **2114** are used to laterally secure the weight pieces **4202** from falling out of the opening in the housing.

[0134] FIG. **43** shows a similar embodiment to FIG. **42**, but with an octagonal shaped prism housing **4301**. The weight pieces **4302** are also octagonal. A bar or handle **4303** extends between the two housings **4301**.

[0135] Below are general example embodiments of an adjustable exercise weight system.

[0136] In an example embodiment, an adjustable exercise weight includes: a housing comprising one or more inner surfaces that extend horizontally to define an interior volume with an opening on a side of the housing; weight pieces insertable and removable through the opening, wherein the weight pieces are laterally stacked beside each other and are shaped to wedge between the one or more inner surfaces, and the housing supports the weight pieces; and, a laterally adjustable holder to laterally secure the weight pieces within the housing.

[0137] In an example aspect, the adjustable exercise weight further includes a brace structure positioned within the housing, and a post laterally extending from the brace structure; wherein the weight pieces comprise an opening defined therein through which the post extends, and the laterally adjustable holder is positioned on the post and secures the weight pieces between the brace structure and the movable holder. In another example aspect, the opening defined in each weight piece is an elongate slot. In another example aspect, the laterally adjustable holder is a collar removably attached to the post. In another example aspect, the brace structure is positioned in a center of the housing, and another post laterally extends from the brace structure in an opposite direction.

[0138] In an example aspect of the adjustable exercise weight, the laterally adjustable holder comprises a strap that wraps around the weight pieces and holds the weight pieces within the housing.

[0139] In an example aspect of the adjustable exercise weight, the housing is formed from a rigid sheet.

[0140] In an example aspect of the adjustable exercise weight, the housing comprises multiple opposingly angled inner surfaces, which are flat surfaces.

[0141] In an example aspect of the adjustable exercise weight, the one or more inner surfaces comprise one or more curved surfaces.

[0142] In an example aspect, the adjustable exercise weight is a kettlebell. Alternatively, the adjustable exercise weight is part of a dumbbell weight.

[0143] In an example aspect of the adjustable exercise weight, the housing includes a bottom portion, and the bottom portion of the housing defines therein a bottom opening that extends laterally along the housing.

[0144] In an example aspect of the adjustable exercise weight, the housing includes one or more rigid sheets, and parallel bends are formed in the one or more rigid sheets.

[0145] In an example aspect of the adjustable exercise weight, the housing comprises two rigid pieces attached together.

[0146] In an example embodiment, an adjustable kettlebell is provided, which includes: a housing comprising opposingly angled inner flat surfaces and at least one opening to receive removable weight pieces; the removable weight pieces that are shaped to wedge between the opposingly angled inner flat surfaces, and the housing supporting the weight pieces; and, a movable holder positioned to contact at least a weight piece positioned closest to the opening, the holder securing the weight pieces, including the weight piece positioned closest to the opening, within the housing.

[0147] In an example aspect of the adjustable kettlebell, the movable holder is a strap that wraps around the weight pieces within the housing.

[0148] In another example aspect, the adjustable kettlebell further includes a brace structure positioned within the housing, and a post extends from the brace structure; wherein each of the removable weight pieces comprise an opening defined therein through which the post extends, and the movable holder is a clamp that clamps onto the post.

[0149] In another example aspect of the adjustable kettlebell, the housing comprises one or more rigid sheets formed around a longitudinal axis of the kettlebell.

[0150] In another example aspect of the adjustable kettlebell, the housing comprises a bottom portion, and the bottom portion of the housing defines therein a bottom opening that extends laterally along the housing.

[0151] In an example embodiment, an adjustable kettlebell is provided, which includes: a housing defining therein an interior volume that extends laterally to at least one side opening, wherein the at least one side opening is sized to receive weight plates; a post extending laterally from a structure within the housing; the weight plates each have defined therein a hole through which the post extends, and the weight plates are laterally stacked beside each other along the post and are positioned in the interior volume of the housing; a clamp positioned on the post to laterally secure the weight pieces; and, a handle positioned on the housing.

[0152] In an example aspect, the weight plates positioned on the post are in spaced relation to one or more interior walls of the housing. In another example aspect, the weight plates are circular, and a cross-section profile of the interior volume is polygonal. In another example aspect, the interior volume of the housing extends between two side openings at opposite ends of the housing, and a second post extends laterally from the structure in an opposite direction from the post. In another example aspect, the housing comprises one or more rigid sheets. In another example aspect, the one or more rigid sheets comprise parallel bends. In another example aspect, the housing comprises a bottom portion, and the bottom portion of the housing defines therein a bottom opening that extends laterally along the housing.

[0153] In an example embodiment, an adjustable exercise weight is provided that includes: a housing comprising of opposingly angled inner surfaces; removable weight pieces that are shaped to wedge between the opposingly angled

inner surfaces, and the housing supporting the weight pieces; and a strap that wraps around the weight pieces and hold the weight pieces within the housing.

[0154] In an example embodiment, an adjustable exercise weight is provided that includes: a housing comprising opposingly angled inner surfaces and at least one opening to receive removable weight pieces; the removable weight pieces that are shaped to wedge between the opposingly angled inner surfaces, and the housing supporting the weight pieces; and a movable holder positioned to contact at least a weight piece positioned closest to the opening, the holder securing the weight pieces, including the weight piece positioned closest to the opening, within the housing.

[0155] In an example aspect, the movable holder is a strap. In another example aspect, the movable holder is a clamp. In another example aspect, the movable holder includes a screw mechanism.

[0156] In an example embodiment, an adjustable kettlebell weight is provided that includes: a housing comprising opposingly angled inner surfaces; removable weight pieces that are shaped to wedge between the opposingly angled inner surfaces, and the housing supporting the weight pieces; a strap that wraps around the weight pieces and holds the weight pieces within the housing; and a handle positioned on the housing.

[0157] In an example embodiment, an adjustable dumbbell weight is provided that comprises: two housings connected to each other on opposite ends of a handle; each of the two housings comprising opposingly angled inner surfaces; removable weight pieces that are shaped to wedge between the opposingly angled inner surfaces, and each of the two housings support the weight pieces; and a movable holder in each of the two housing to hold the weight pieces within each of the two housings.

[0158] It will be appreciated that different features of the example embodiments of the apparatus as described herein, may be combined with each other in different ways. In other words, functionality and components may be used together according to other example embodiments, although not specifically stated.

[0159] It will also be appreciated that the examples and diagrams used herein are for illustrative purposes only. Different configurations and terminology can be used without departing from the principles expressed herein. For instance, components, shapes and configurations can be added, deleted, modified, or arranged without departing from these principles.

[0160] Although the above has been described with reference to certain specific embodiments, various modifications thereof will be apparent to those skilled in the art without departing from the scope of the claims appended hereto.

1. An adjustable exercise weight comprising:

a housing comprising one or more inner surfaces that extend horizontally to define an interior volume with an opening on a side of the housing;

weight pieces insertable and removable through the opening, wherein the weight pieces are laterally stacked beside each other and are shaped to wedge between the one or more inner surfaces, and the housing supports the weight pieces; and

a laterally adjustable holder to laterally secure the weight pieces within the housing.

2. The adjustable exercise weight of claim **1** further comprising a brace structure positioned within the housing, and a post laterally extending from the brace structure; wherein the weight pieces comprise an opening defined therein through which the post extends, and the laterally adjustable holder is positioned on the post and secures the weight pieces between the brace structure and the movable holder.

3. The adjustable exercise weight of claim **2** wherein the opening defined in each weight piece is an elongate slot.

4. The adjustable exercise weight of claim **2** wherein the laterally adjustable holder is a collar removably attached to the post.

5. The adjustable exercise weight of claim **2** wherein the brace structure is positioned in a center of the housing, and another post laterally extends from the brace structure in an opposite direction.

6. The adjustable exercise weight of claim **1** wherein the laterally adjustable holder comprises a strap that wraps around the weight pieces and holds the weight pieces within the housing.

7. The adjustable exercise weight of claim **1** wherein the housing is formed from a rigid sheet.

8. The adjustable exercise weight of claim **1** wherein the housing comprises multiple opposingly angled inner surfaces, which are flat surfaces.

9. The adjustable exercise weight of claim **1** wherein the one or more inner surfaces comprise one or more curved surfaces.

10. The adjustable exercise weight of claim **1** being a kettlebell weight.

11. The adjustable exercise weight of claim **1** being part of a dumbbell weight.

12. The adjustable exercise weight of claim **1** wherein the housing comprises a bottom portion, and the bottom portion of the housing defines therein a bottom opening that extends laterally along the housing.

13. The adjustable exercise weight of claim **1** wherein the housing comprises one or more rigid sheets, and parallel bends are formed in the one or more rigid sheets.

14. The adjustable exercise weight of claim **1** wherein the housing comprises two rigid pieces attached together.

15. An adjustable kettlebell comprising:

a housing comprising opposingly angled inner flat surfaces and at least one opening to receive removable weight pieces;

the removable weight pieces that are shaped to wedge between the opposingly angled inner flat surfaces, and the housing supporting the weight pieces;

a movable holder positioned to contact at least a weight piece positioned closest to the opening, the holder securing the weight pieces, including the weight piece positioned closest to the opening, within the housing.

16. The adjustable kettlebell of claim **15**, wherein the movable holder is a strap that wraps around the weight pieces within the housing.

17. The adjustable kettlebell of claim **15** further comprising a brace structure positioned within the housing, and a post extends from the brace structure; wherein each of the removable weight pieces comprise an opening defined therein through which the post extends, and the movable holder is a clamp that clamps onto the post.

18. The adjustable kettlebell of claim **15**, wherein the housing comprises one or more rigid sheets formed around a longitudinal axis of the kettlebell.

19. The adjustable kettlebell of claim **15** wherein the housing comprises a bottom portion, and the bottom portion of the housing defines therein a bottom opening that extends laterally along the housing.

20. An adjustable kettlebell comprising:

a housing defining therein an interior volume that extends laterally to at least one side opening, wherein the at least one side opening is sized to receive weight plates;

a post extending laterally from a structure within the housing;

the weight plates each have defined therein a hole through which the post extends, and the weight plates are laterally stacked beside each other along the post and are positioned in the interior volume of the housing;

a clamp positioned on the post to laterally secure the weight pieces; and

a handle positioned on the housing.

21. The adjustable kettlebell of claim **20** wherein the weight plates positioned on the post are in spaced relation to one or more interior walls of the housing.

22. The adjustable kettlebell of claim **20** wherein the weight plates are circular, and a cross-section profile of the interior volume is polygonal.

23. The adjustable kettlebell of claim **20** wherein the interior volume of the housing extends between two side openings at opposite ends of the housing, and a second post extends laterally from the structure in an opposite direction from the post.

24. The adjustable kettlebell of claim **20** wherein the housing comprises one or more rigid sheets.

25. The adjustable kettlebell of claim **24** wherein the one or more rigid sheets comprise parallel bends.

26. The adjustable kettlebell of claim **20** wherein the housing comprises a bottom portion, and the bottom portion of the housing defines therein a bottom opening that extends laterally along the housing.

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