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Kelsch et al.

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(54) **ANTI-THEFT DEVICE WITH ADJUSTABLE LOCKING ARMS FOR SECURING AN ARTICLE OF MERCHANDISE**

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Related U.S. Application Data

(63) Continuation-in-part of application No. 16/458,967, filed on Jul. 1, 2019, now Pat. No. 10,858,865, which (Continued)

(51) **Int. Cl.**
E05B 73/00 (2006.01)
E05B 47/00 (2006.01)

(52) **U.S. Cl.**
CPC ***E05B 73/0023*** (2013.01); ***E05B 73/0017*** (2013.01); ***E05B 73/0082*** (2013.01); *E05B 2047/002* (2013.01)

(58) **Field of Classification Search**
CPC E05B 53/008; E05B 73/00; E05B 73/0017; E05B 73/0023; E05B 73/0029;
(Continued)

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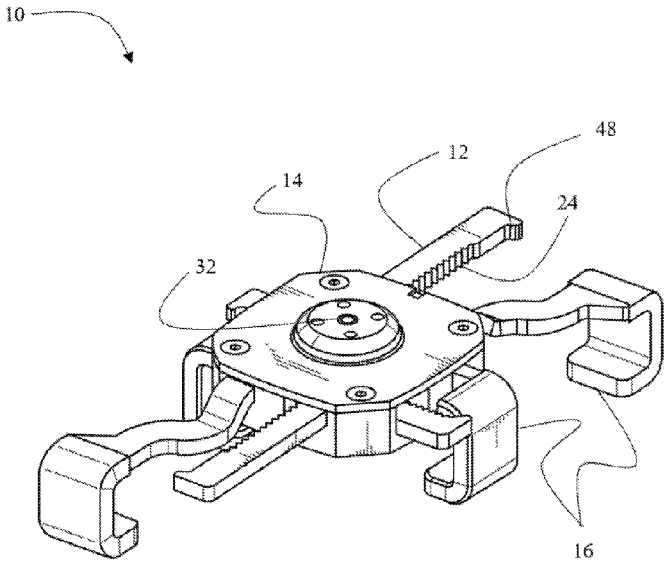
(57) **ABSTRACT**

An anti-theft device for securing an article of merchandise against unauthorized removal from a display counter. The anti-theft device includes a plurality of arms slidingly disposed within the housing. Grips are disposed on proximal ends of the arms and are configured to receive and secure edges of an article of merchandise. A locking mechanism is disposed within the housing of the anti-theft device. Complimentary teeth are disposed on the locking component and the arms. An actuator transitions the locking components between a first unlocked configuration in which the teeth of the locking components are retracted away from the teeth of the arms, and a second locked configuration in which the teeth of the locking components engage the teeth of the arms.

20 Claims, 19 Drawing Sheets



Related U.S. Application Data

is a continuation-in-part of application No. 16/050,696, filed on Jul. 31, 2018, now Pat. No. 10,378,248.

(58) **Field of Classification Search**

CPC E05B 73/008; E05B 2047/002; E05B 2047/0021; E05B 2047/0022; F16H 27/02

See application file for complete search history.

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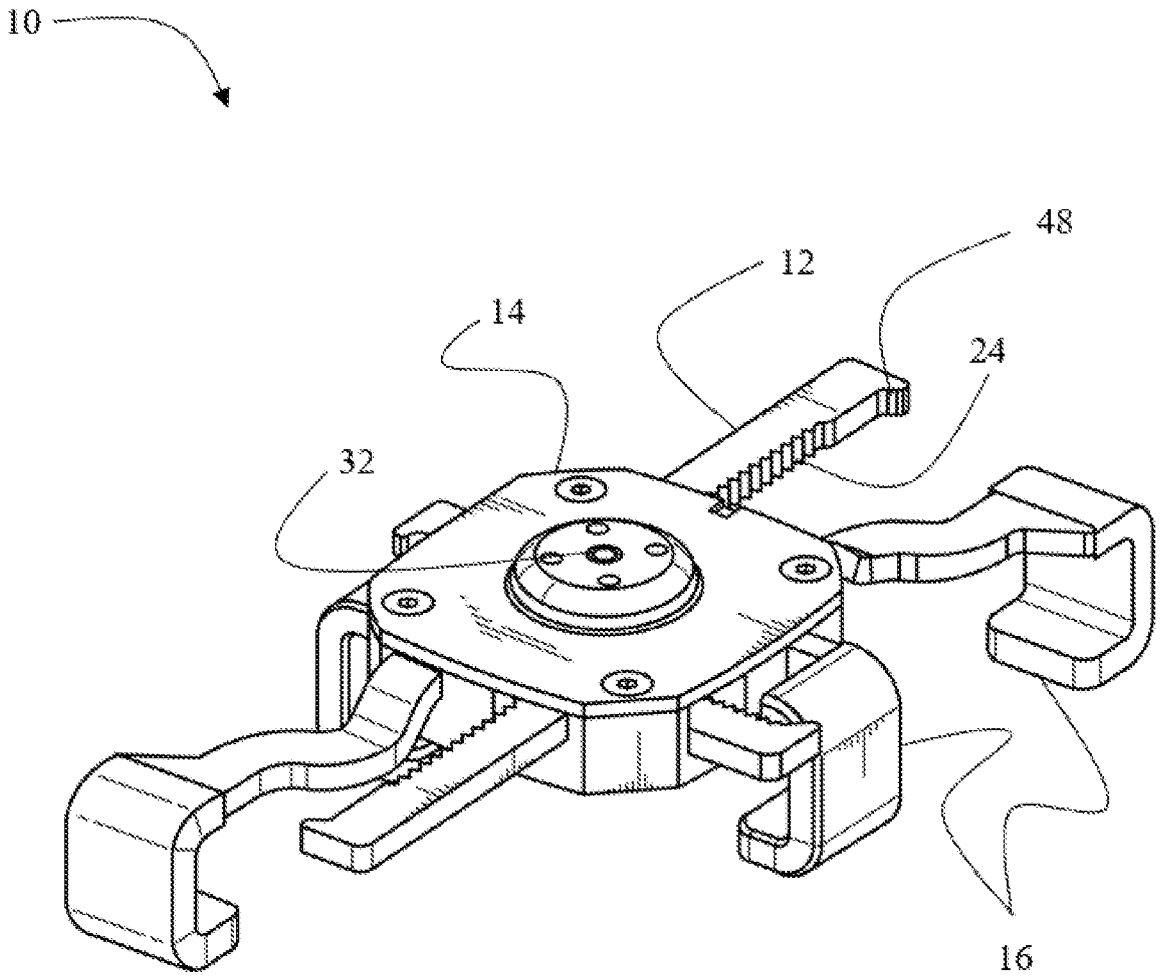

FIG. 1A

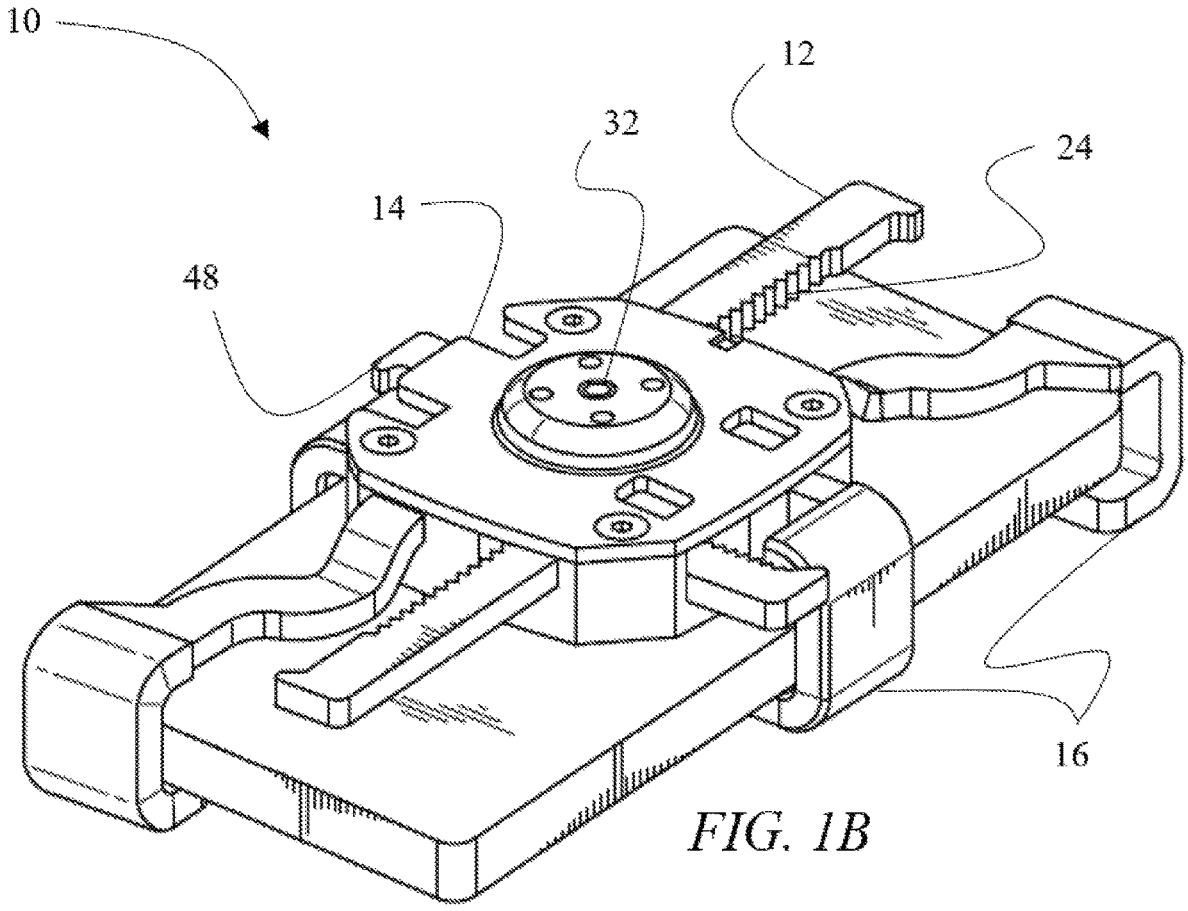

FIG. 1B

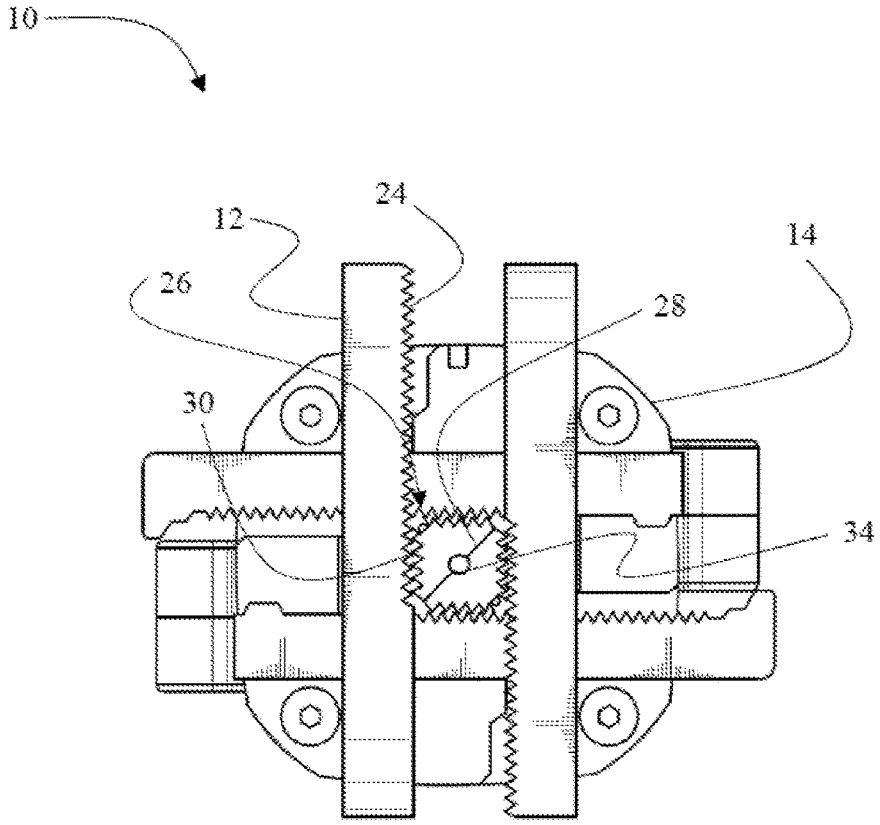

FIG. 2A

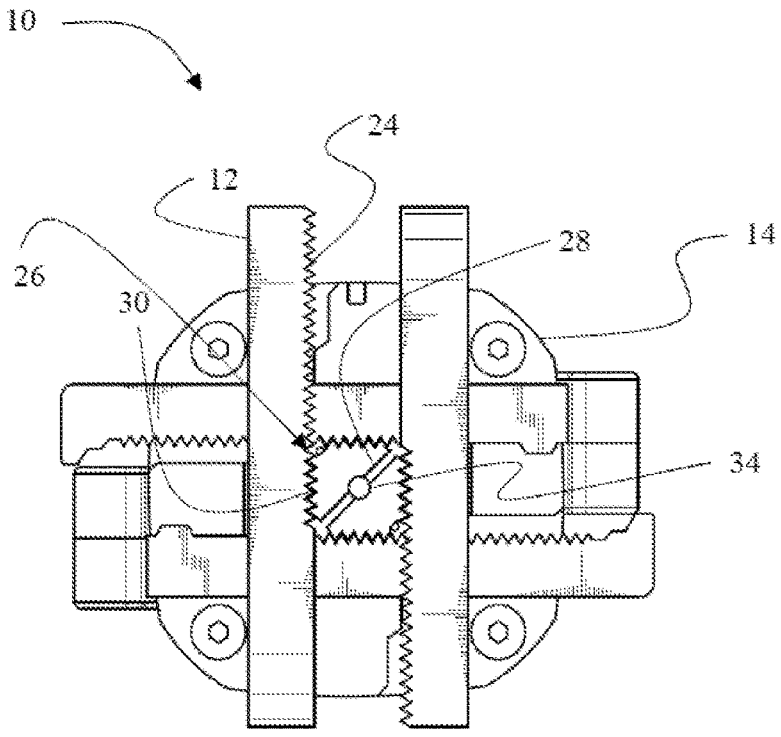

FIG. 2B

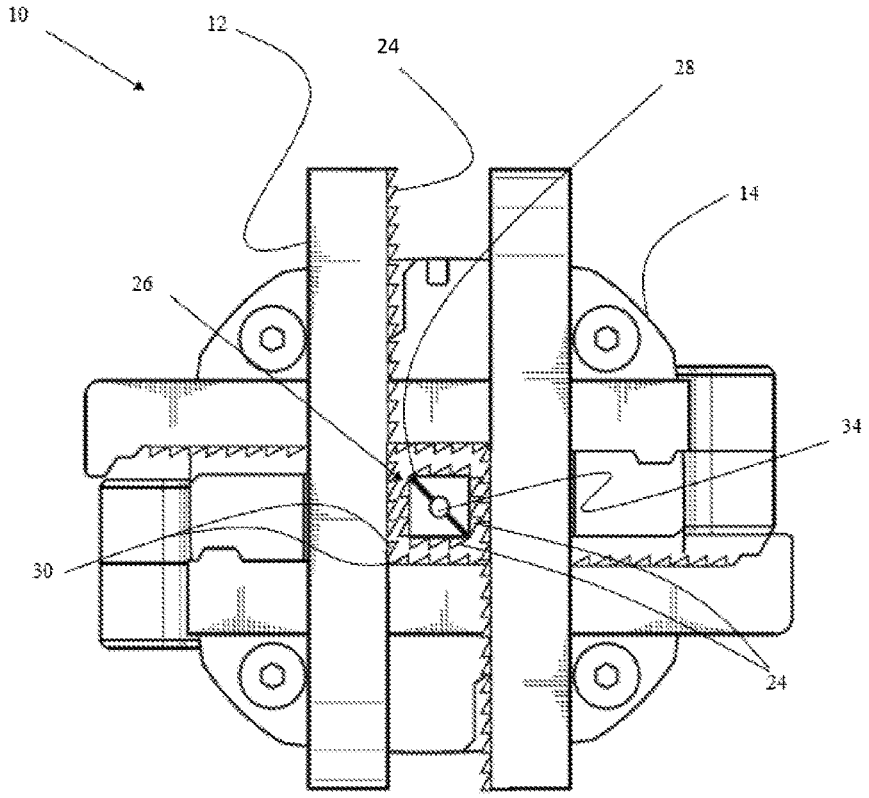

FIG. 2C

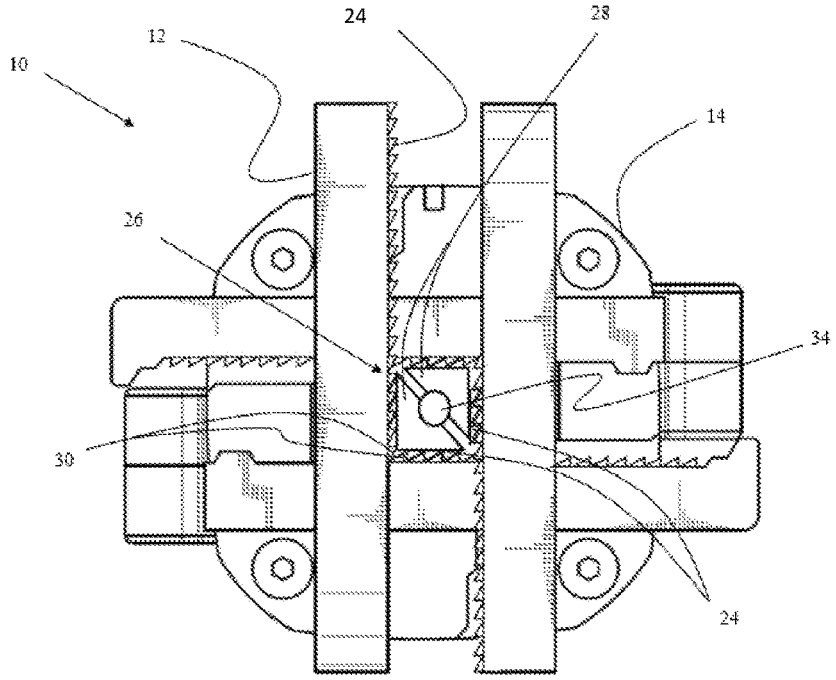

FIG. 2D

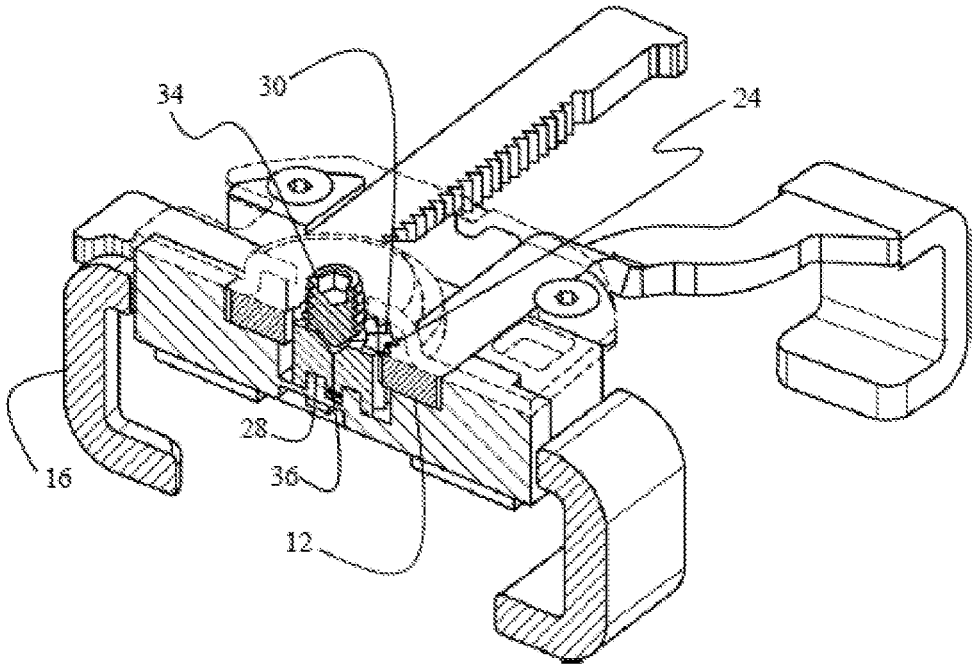

FIG. 3A

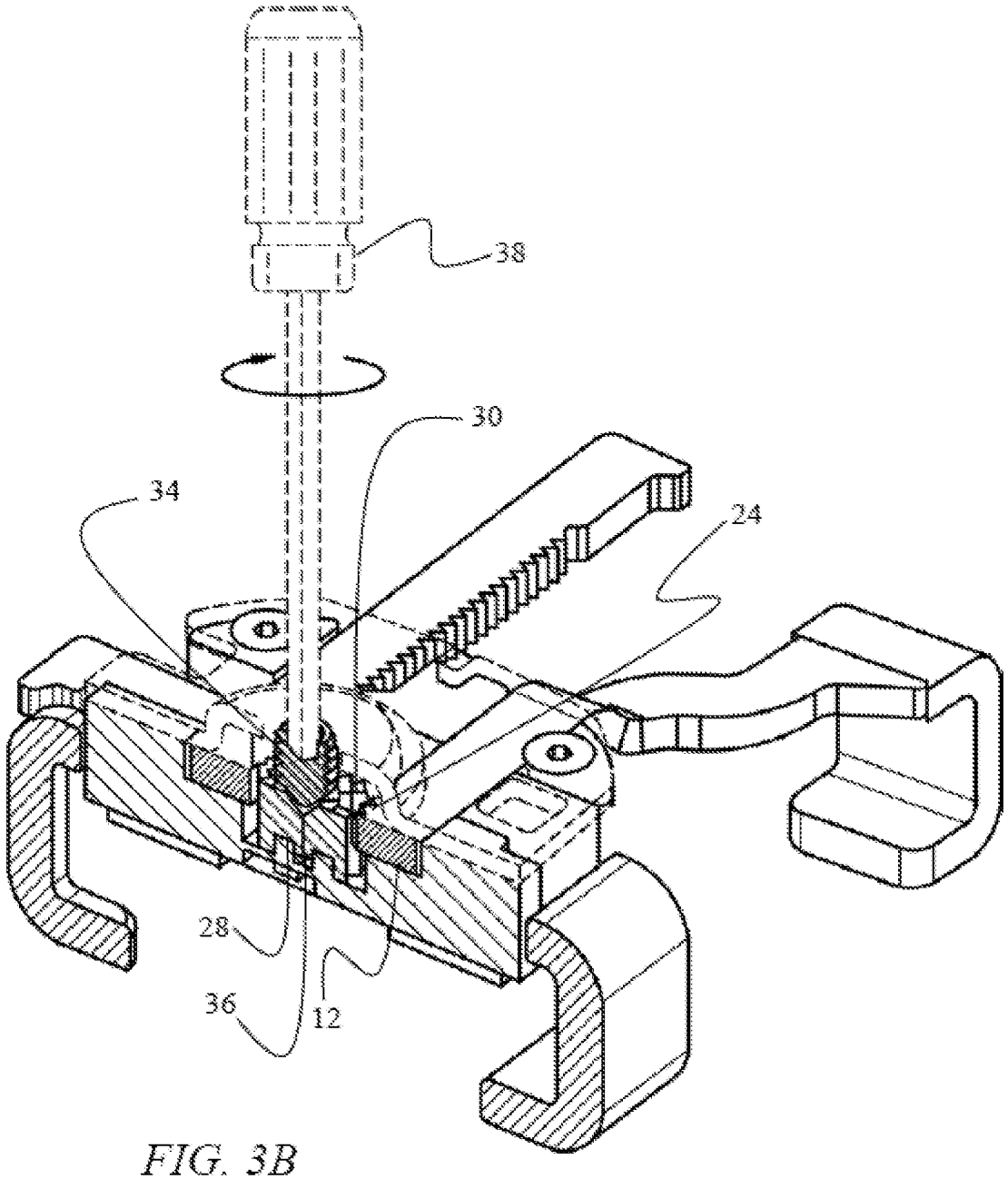

FIG. 3B

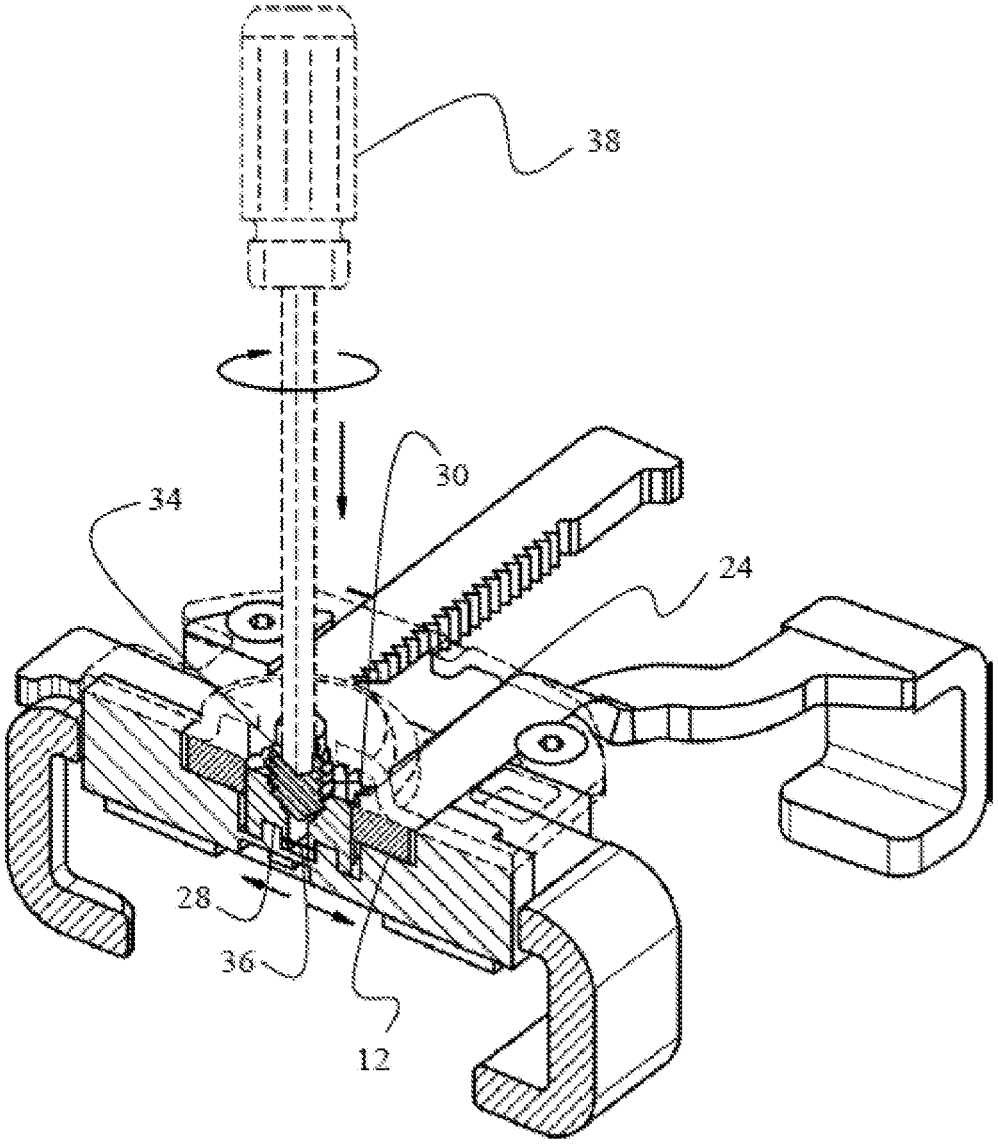

FIG. 3C

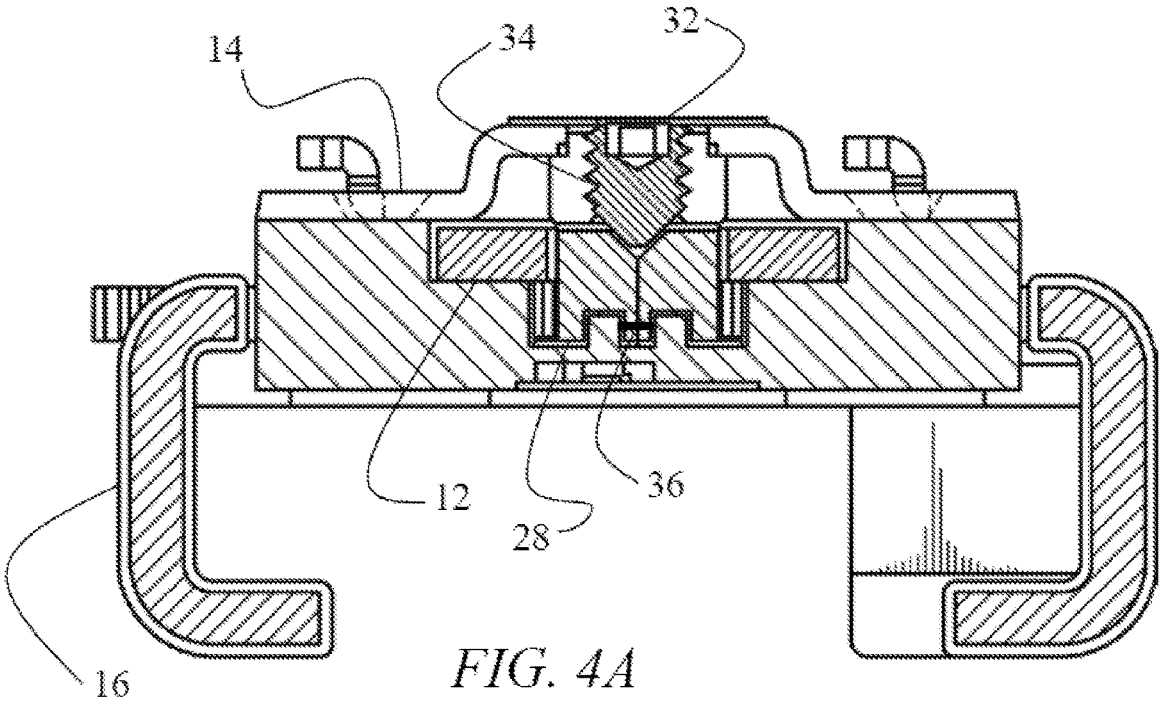

FIG. 4A

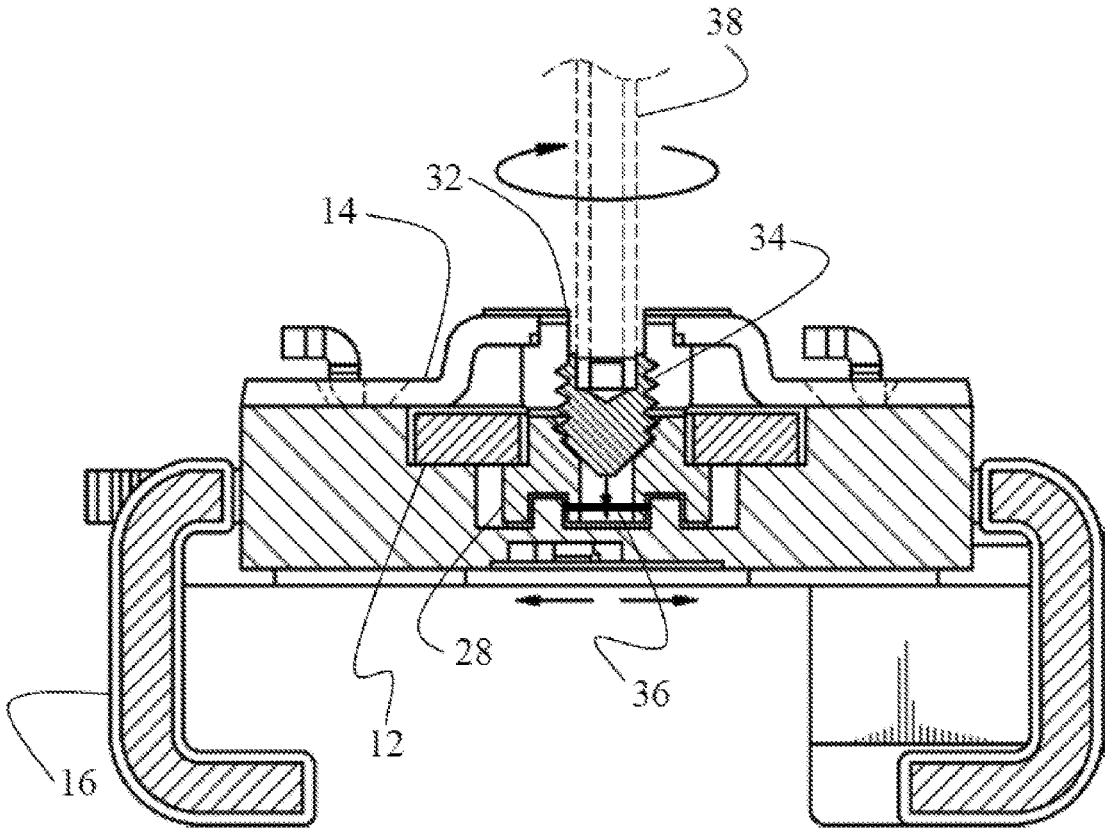

FIG. 4B

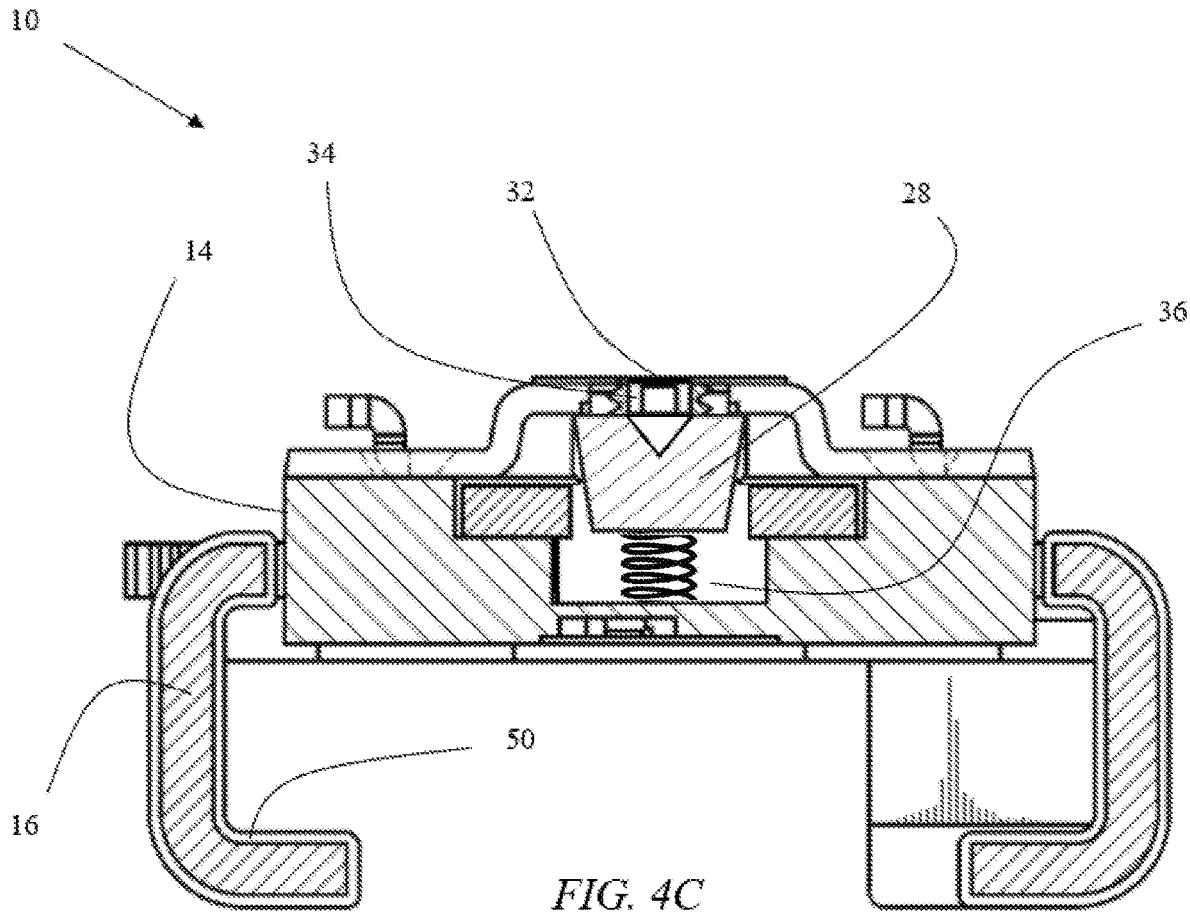

FIG. 4C

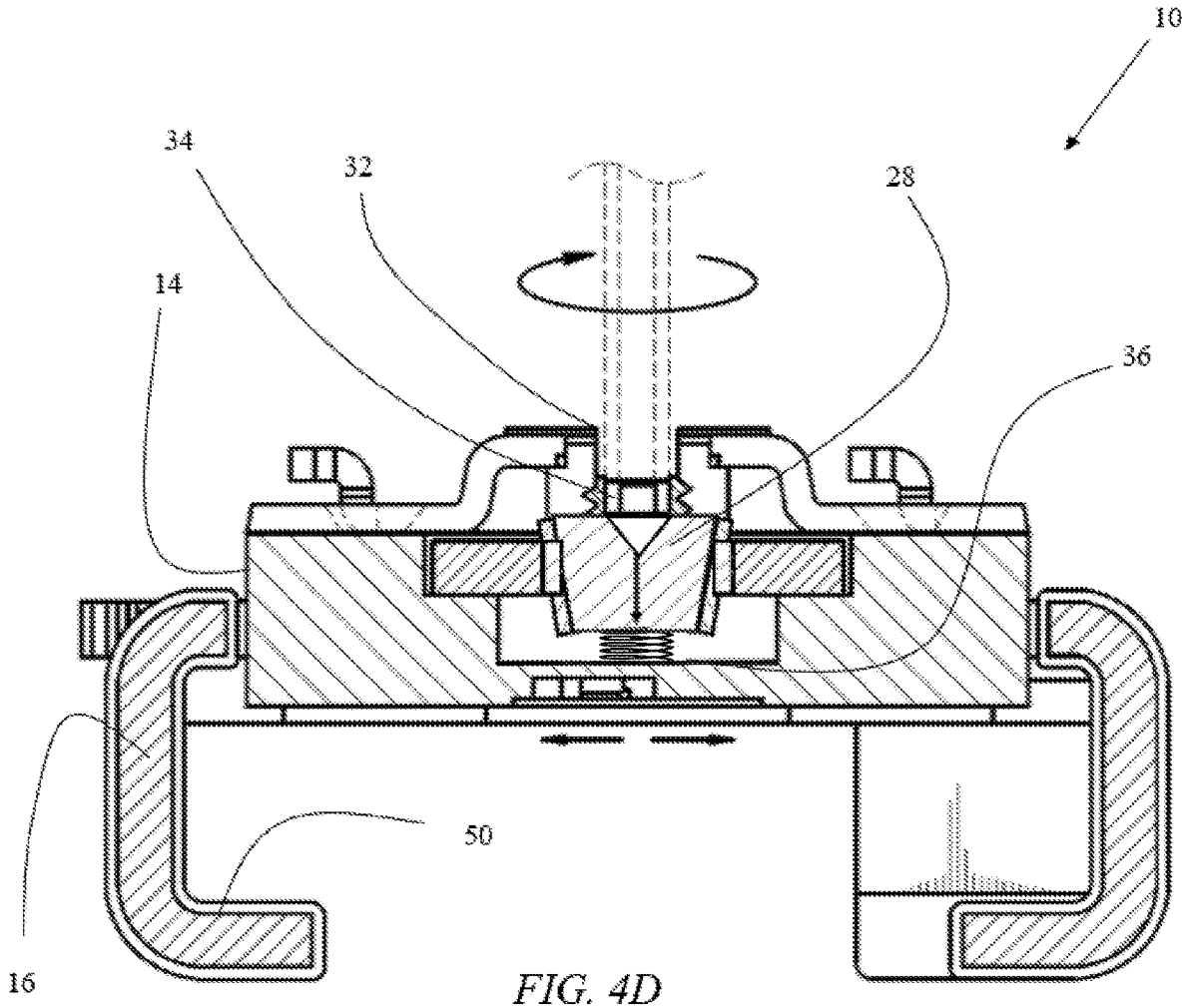

FIG. 4D

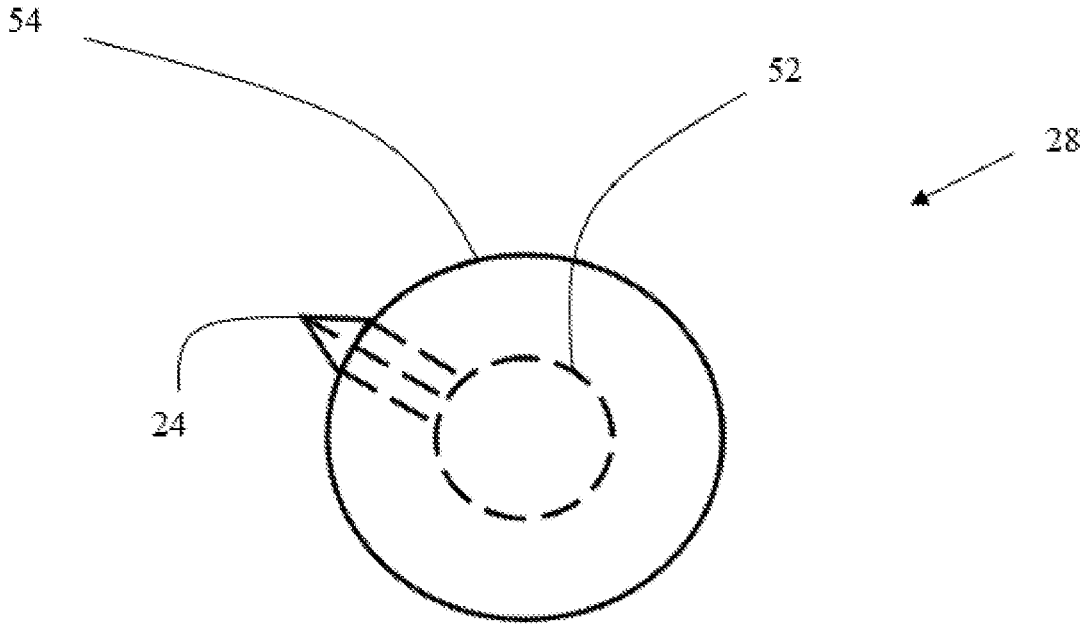

FIG. 5A

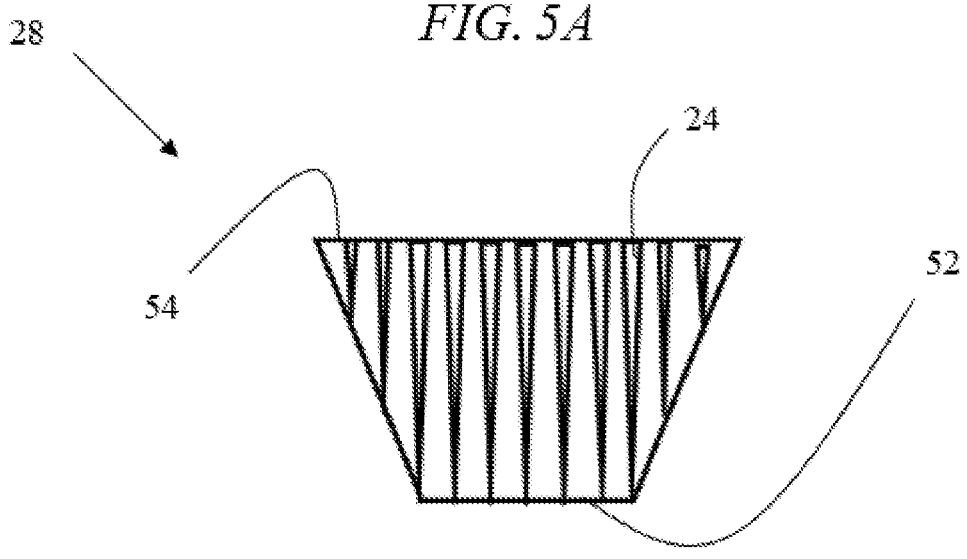

FIG. 5B

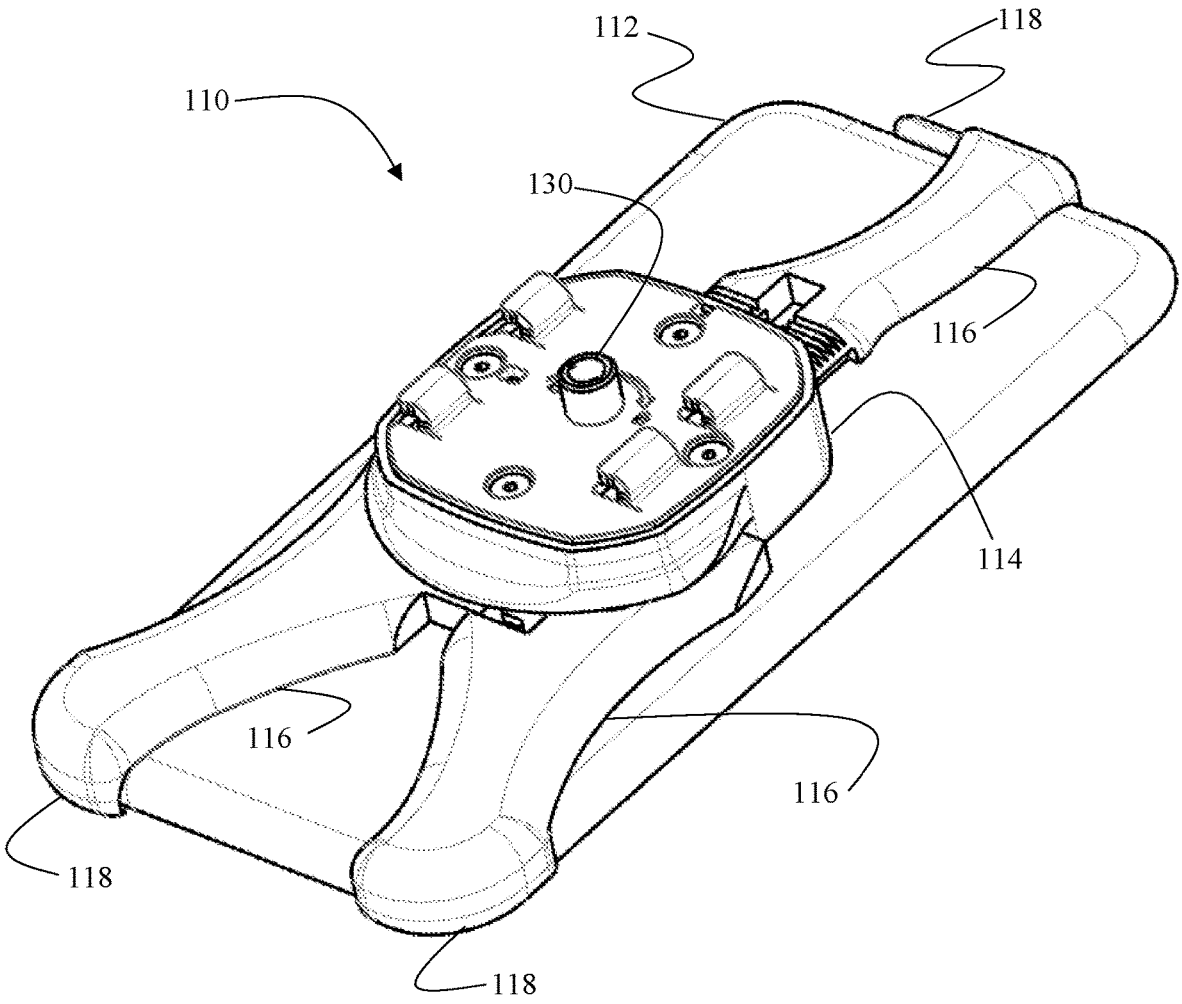

FIG. 6

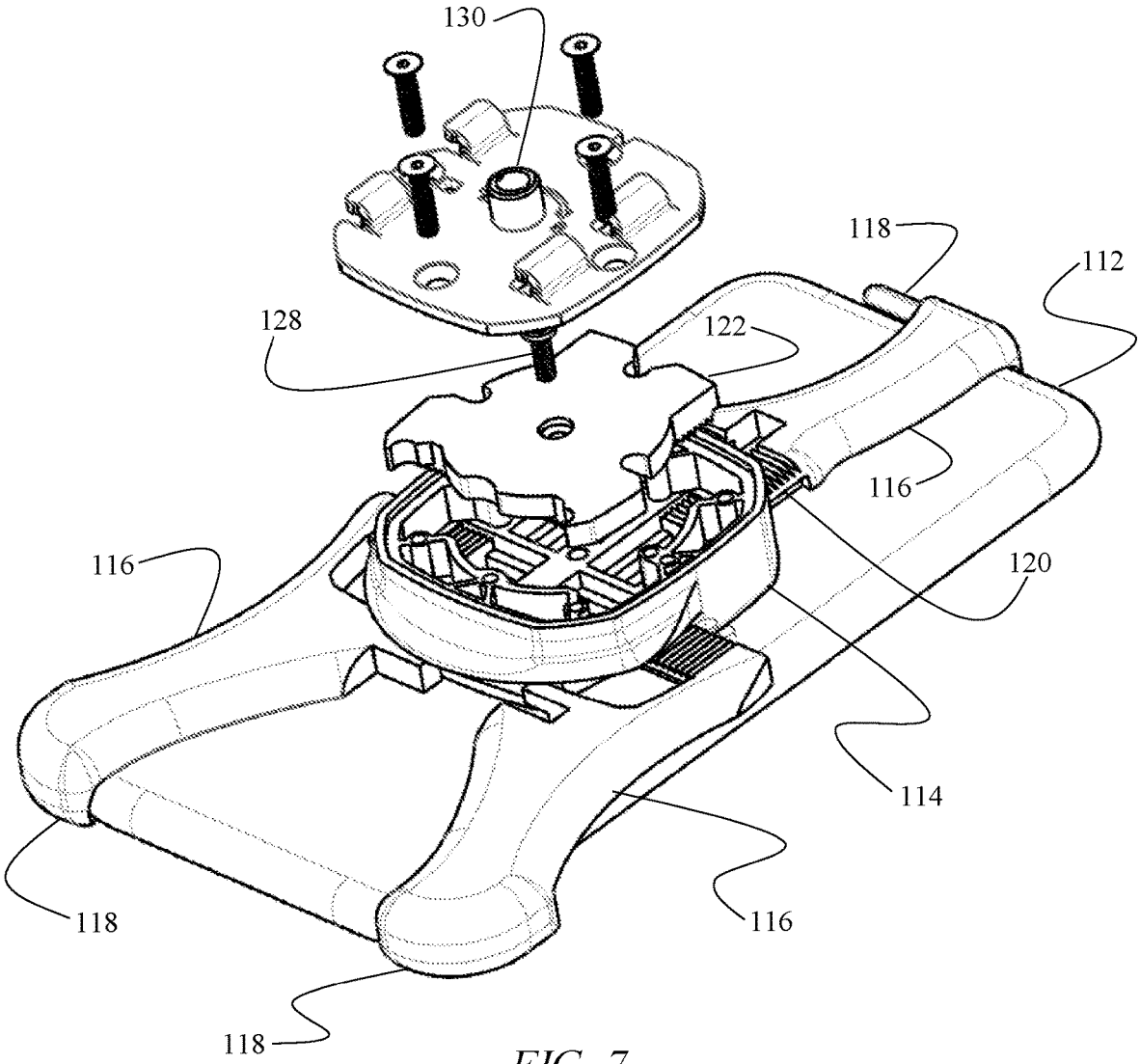

FIG. 7

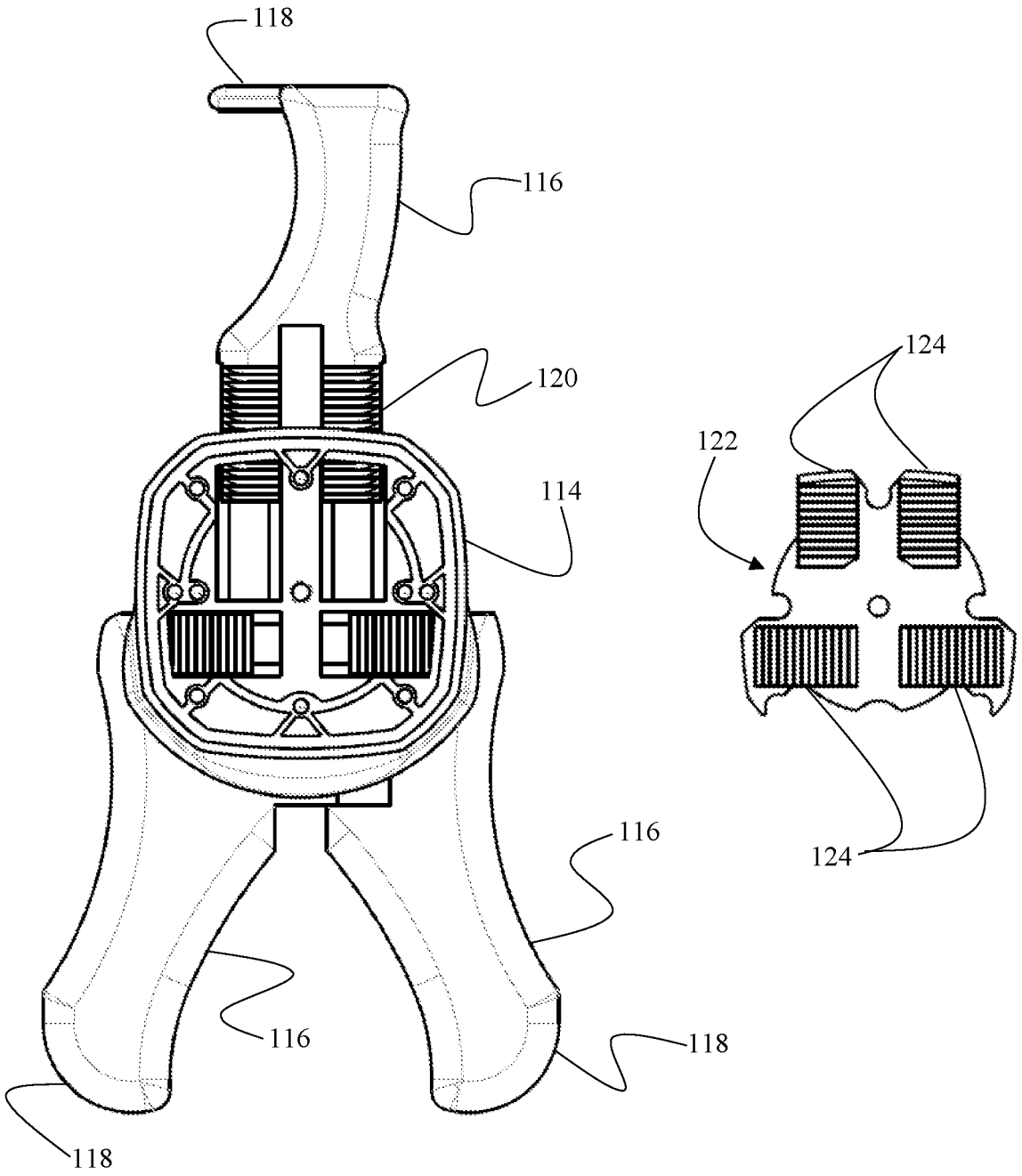

FIG. 8

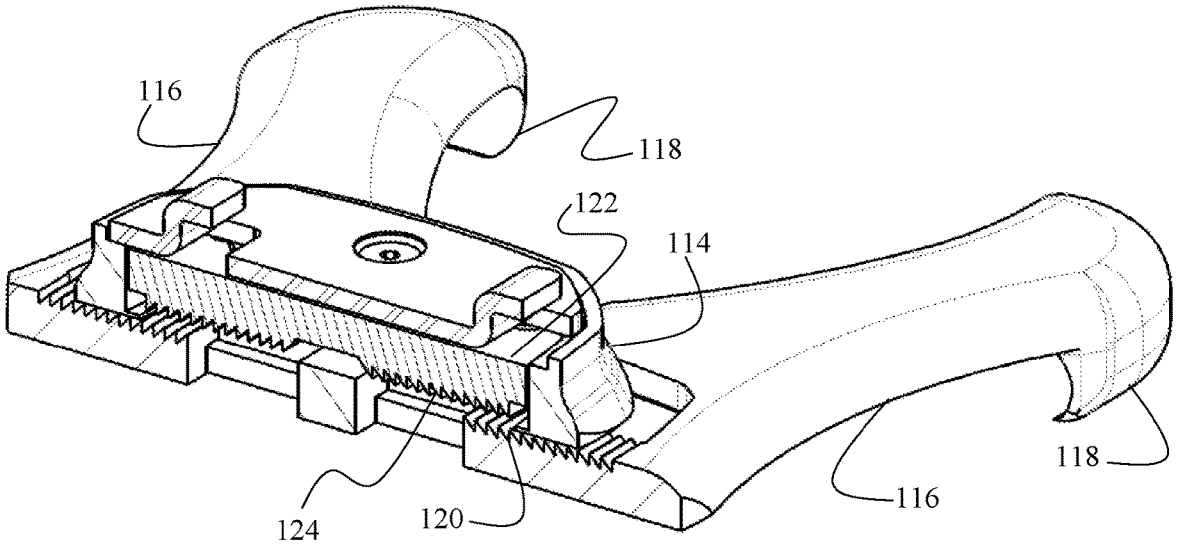

FIG. 9A

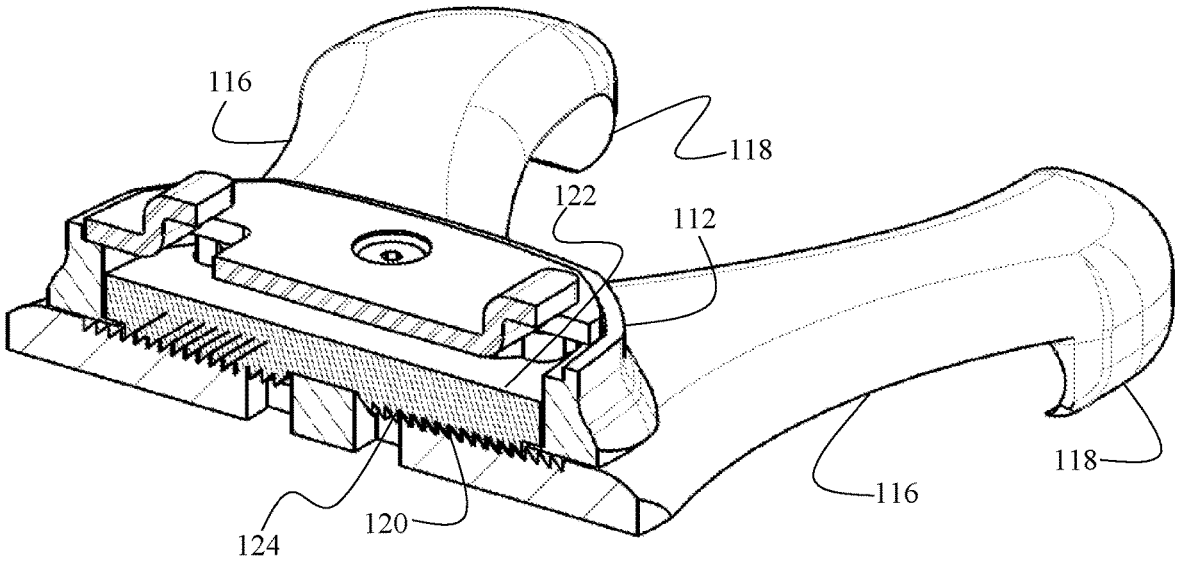

FIG. 9B

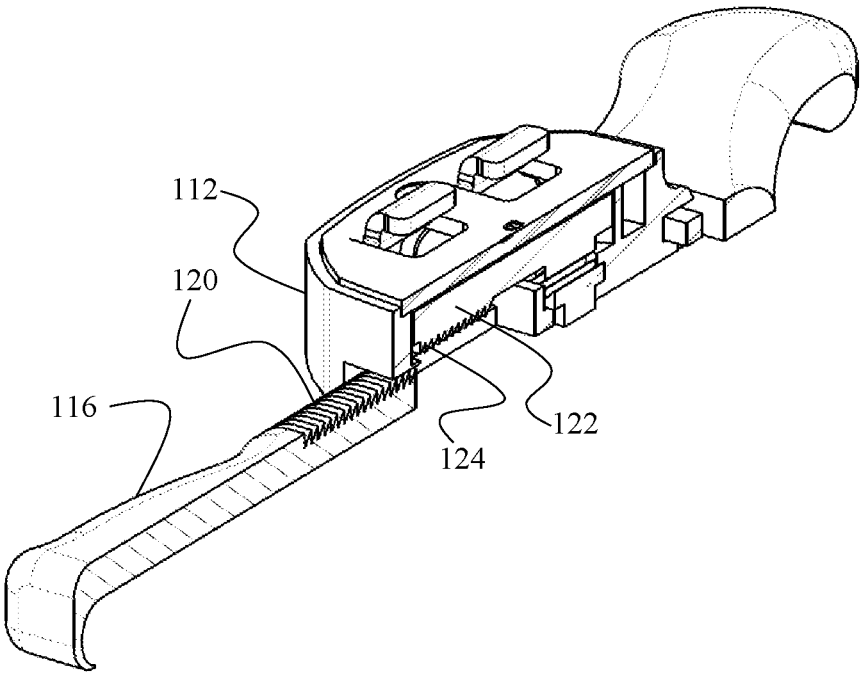

FIG. 10A

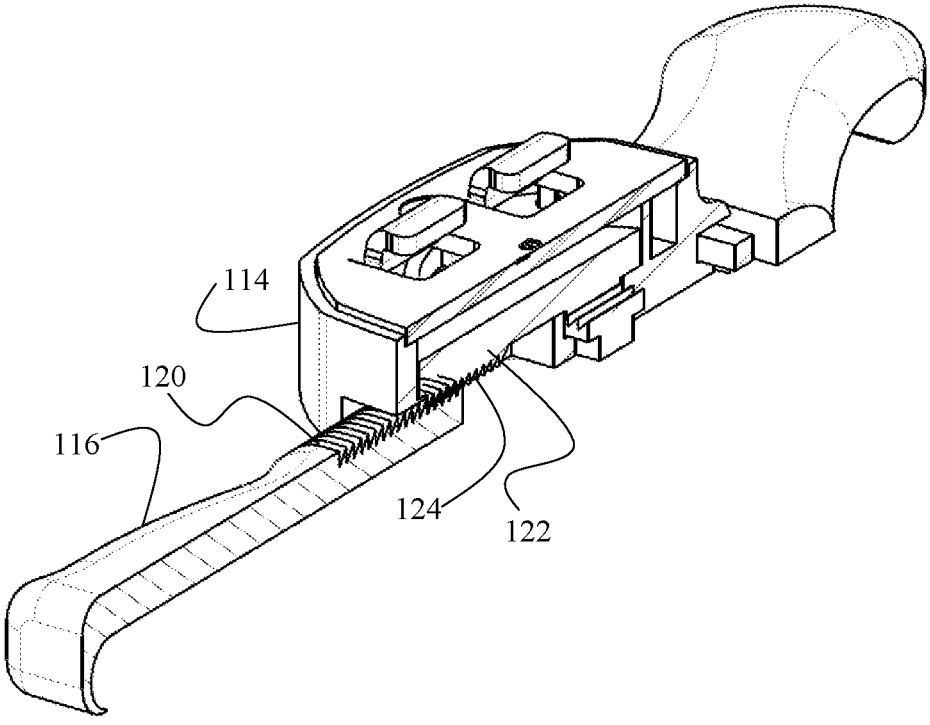

FIG. 10B

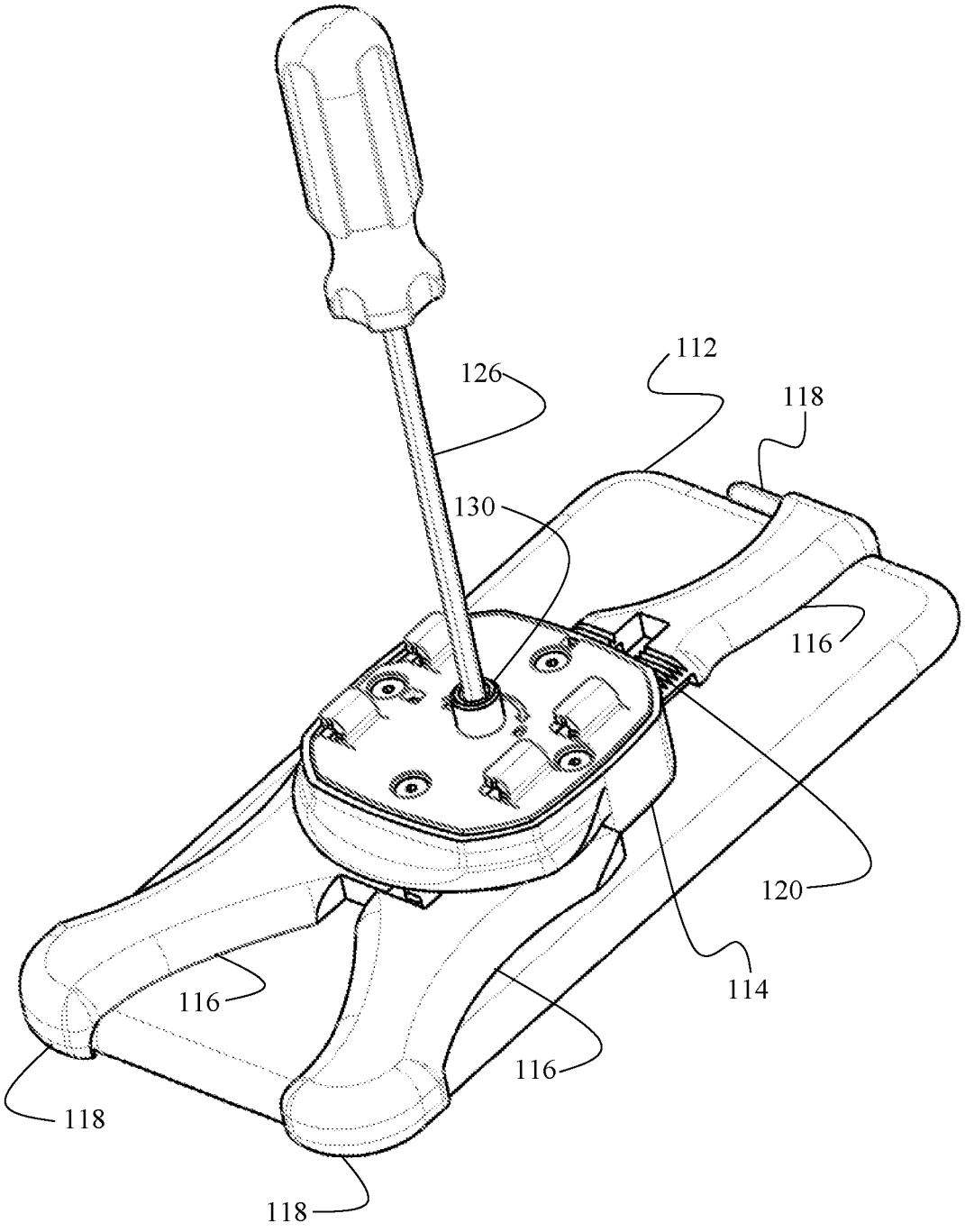

FIG. 11

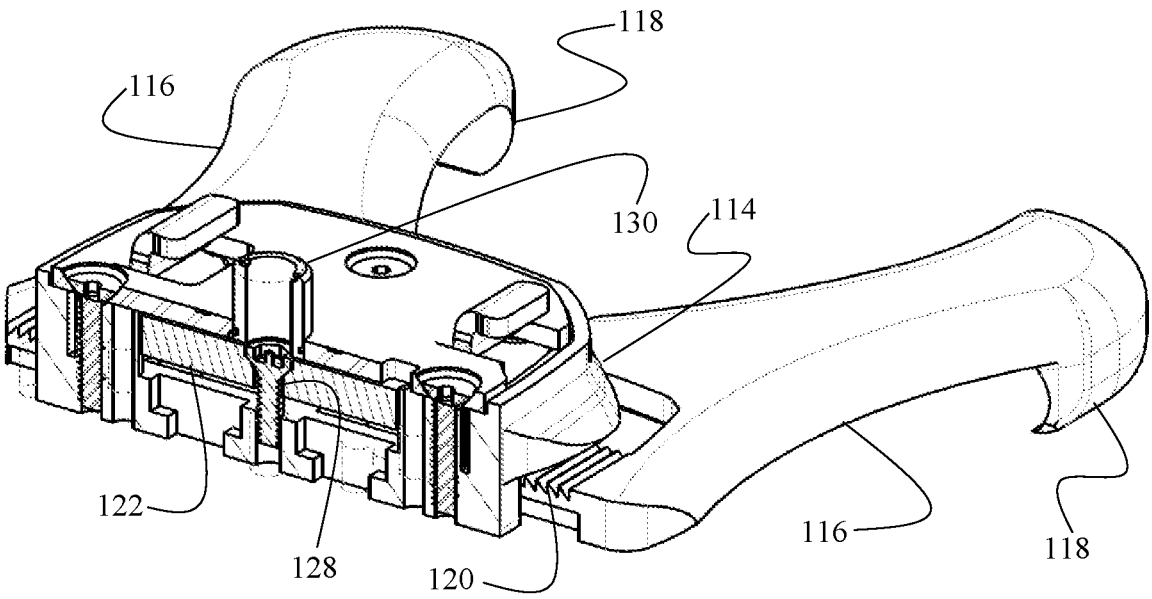

FIG. 12A

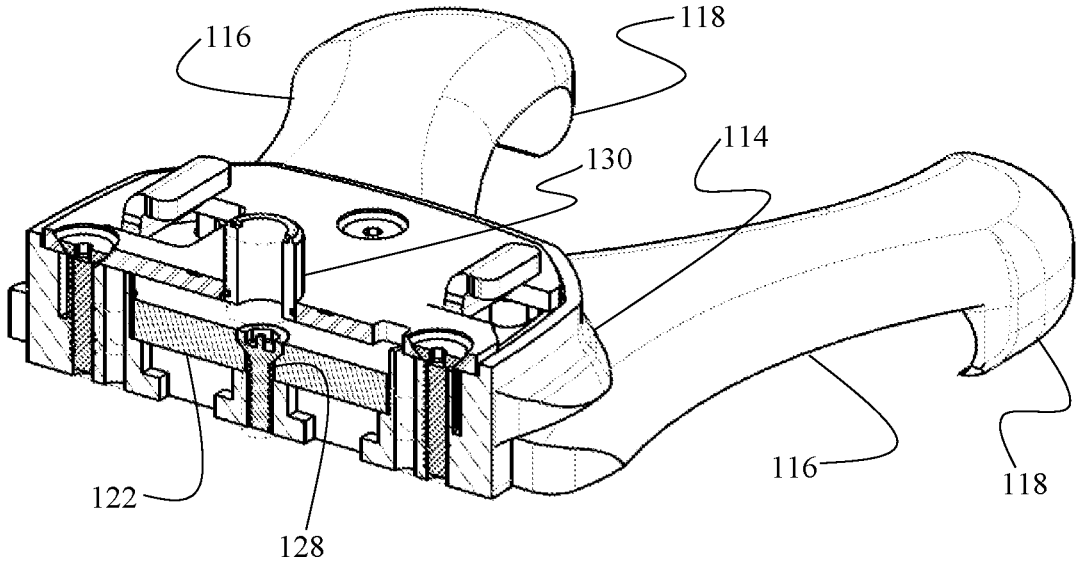

FIG. 12B

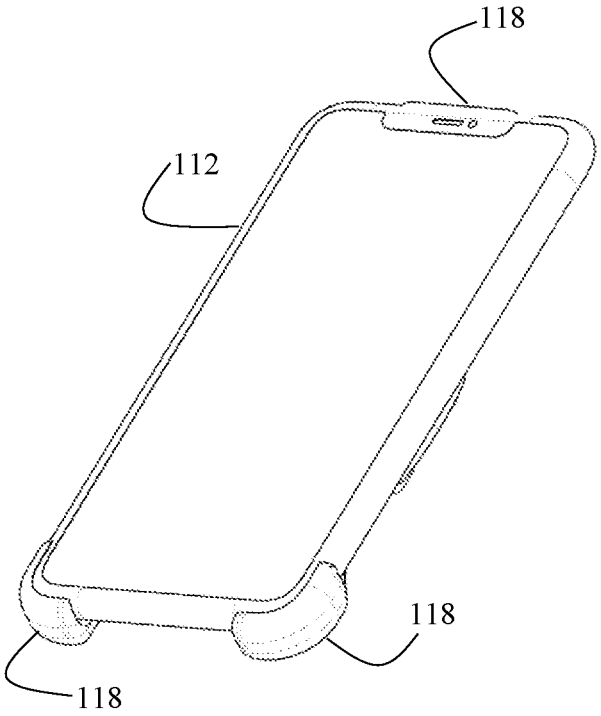

FIG. 13A

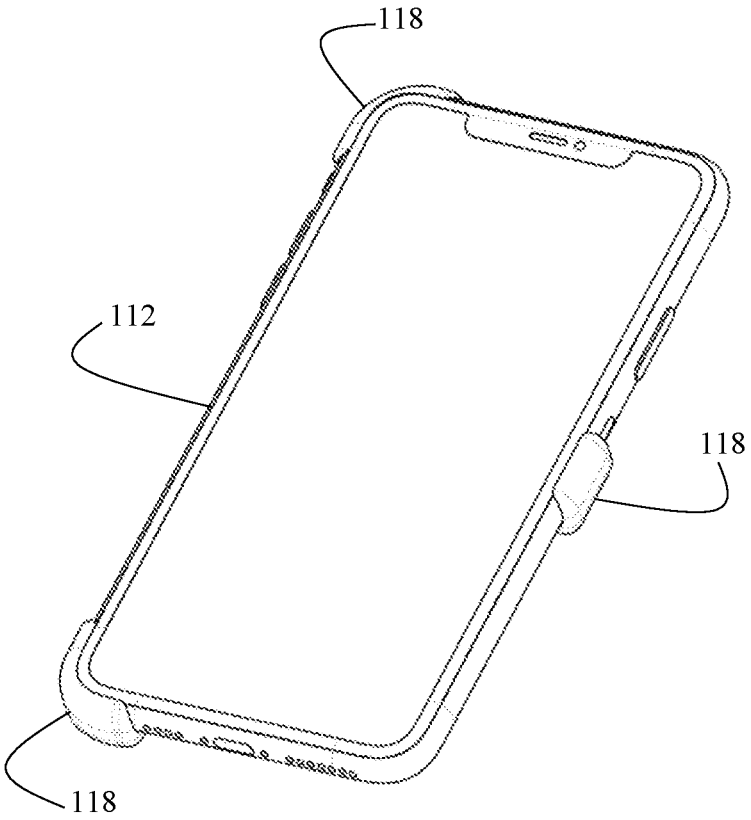

FIG. 13B

ANTI-THEFT DEVICE WITH ADJUSTABLE LOCKING ARMS FOR SECURING AN ARTICLE OF MERCHANDISE

CROSS-REFERENCE TO RELATED APPLICATIONS

This Continuation-In-Part application claims priority to Nonprovisional application Ser. No. 16/458,967, filed on Jul. 1, 2019, which is a continuation-in-part of and claims priority to Nonprovisional application Ser. No. 16/050,696, entitled "ANTI-THEFT DEVICE WITH ADJUSTABLE LOCKING ARMS FOR SECURING AN ARTICLE OF MERCHANDISE," filed Jul. 31, 2018.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to merchandise anti-theft devices. More specifically, it relates to an anti-theft device having adjustable arms and a locking mechanism for securing an article of merchandise against unauthorized removal from a display counter.

2. Brief Description of the Related Art

Retailers often prefer to present their merchandise to consumers in a way that allows the consumers to touch, inspect, and otherwise interact with the products at a display counter. Many merchandise items, especially portable electronic devices, are relatively expensive and, therefore, are under a serious threat of theft. Retailers often face a dilemma pertaining to how to interactively display their merchandise to attract customers and increase sales, while, at the same time, safeguarding the merchandise against theft.

Several anti-theft devices are currently known in the art, but they have serious flaws. One example of an existing anti-theft device is disclosed in a published PCT application WO 2011/032147. The device includes a housing that attaches to the back cover of the gadget via an adhesive layer. Two arms extend laterally from the housing and grasp the opposite edges of the gadget, thereby securing it within the clamp. This anti-theft device, however, has a serious flaw: many electronic gadgets have removable back covers, which makes them vulnerable to theft because thieves can easily circumvent this anti-theft device by simply removing the back cover of the gadget and sliding the gadget out of the grasping arms. This flaw significantly undermines the efficacy of this device rendering it inadequate for many electronic gadgets.

Other currently available anti-theft solutions involve obtrusive and aesthetically unattractive devices such as steel cables, locks, and casings. Although these security measures may effectively protect against theft, they have a negative effect on the consumers by discouraging interaction with products and may ruin the overall ambiance of a retail store. Accordingly, there exists an unresolved need for a discrete and effective anti-theft device that adequately secures an electronic gadget while allowing the prospective purchasers to fully experience the gadget without obstructing access to any of the gadget's functional features, including the front screen.

SUMMARY OF THE INVENTION

The invention pertains to an anti-theft security device that involves a plurality of bracket arms having grips configured to receive edges (i.e., straight edges and/or corners) of an article of merchandise. At least one of the arms is independently adjustable by sliding in and out relative to the housing of the anti-theft device. The movable arms have a plurality of teeth disposed thereon.

A locking component is movably disposed within the housing. The locking component has a set of teeth configured to interlock with the teeth disposed on the movable arms. When the locking component is retracted away from the distal ends of the movable arms, the teeth of the locking component disengage the teeth of the arms—this is the unlocked configuration. In this unlocked configuration, the bracket arms are free to slide with respect to the housing. By sliding the arms relative to the housing, a user can adjust the distances between the grips to accommodate the geometry of the article of merchandise.

The security device includes an actuator slidingly disposed within the housing. The actuator is used to transition the security device between the locked and unlocked configurations. The actuator is configured to translate along the center axis thereof in an inward direction relative to the housing. As the actuator translates inwardly, it applies a normal force on the locking component. Thus, as the actuator is translated inwardly with respect to the housing, the locking component also translates inwardly, toward distal ends of the arms residing within the housing. As the locking component translates inwardly, the teeth of the locking component engage the teeth disposed on the distal ends of the arms, thereby immobilizing the arms with respect to the housing.

When the arms are immobilized, the anti-theft device is in its locked configuration. To transition the anti-theft device into the unlocked configuration, the actuator must be translated outwardly with respect to the housing. As the actuator is translated outwardly, the actuator releases the locking component, enabling it to retract away from the distal ends of the arms. In this manner, the teeth disposed on the locking component disengage the teeth of the arms. In this unlocked configuration, the arms can slide relative to the housing, thereby releasing the grips from edges of the article of merchandise.

DESCRIPTION OF THE DRAWINGS

For a fuller understanding of the invention, reference should be made to the following detailed description, taken in connection with the accompanying drawings, in which:

FIG. **1**A is a perspective view of the anti-theft device.

FIG. **1**B is a perspective view of the anti-theft device securing an article of merchandise.

FIG. **2**A is a top view of an embodiment of the anti-theft device in an unlocked configuration.

FIG. **2**B is a top view of an embodiment of the anti-theft device in a locked configuration.

FIG. **2**C is a top view of an embodiment of the anti-theft device in an unlocked configuration.

FIG. **2**D is a top view of an embodiment of the anti-theft device in a locked configuration.

FIG. **3**A is a perspective cut-away view of the anti-theft device in an unlocked configuration.

FIG. **3**B is a perspective cut-away view of the anti-theft device in an unlocked configuration, wherein a semi-specialized tool is being used to operate the actuator.

FIG. **3**C is a perspective cut-away view of the anti-theft device in a locked configuration after the semi-specialized tool has been used to move the actuator.

FIG. **4**A is a front cut-away view of the anti-theft device in an unlocked configuration.

FIG. **4**B is a front cut-away view of the anti-theft device in a locked configuration.

FIG. **4**C is side cut-away view of an embodiment of the anti-theft device depicting the locking member in an unlocked configuration.

FIG. **4**D is a side cut-away view of an embodiment of the anti-theft device depicting the locking member in a locked configuration.

FIG. **5**A is a top view of the frustoconically-shaped locking member.

FIG. **5**B is a side view of the locking member depicting teeth disposed on the outside surface thereof.

FIG. **6** is a perspective view of a 3-arm bracket embodiment securing an article of merchandise.

FIG. **7** is an exploded perspective view of the 3-arm bracket embodiment depicting the interior view of the housing.

FIG. **8** is a top view of the 3-arm bracket embodiment depicting the housing with the removed cover and a top view of the locking component.

FIG. **9**A is a first perspective cutaway view depicting the security device in an unlocked configuration in which the locking component is retracted away from the distal ends of the arms residing within the housing.

FIG. **9**B is a first perspective cutaway view depicting the security device in a locked configuration in which the locking component is pressed against the distal ends of the arms residing within the housing.

FIG. **10**A is a second perspective cutaway view depicting the security device in the unlocked configuration in which the locking component is retracted away from the distal ends of the arms residing within the housing.

FIG. **10**B is a second perspective cutaway view depicting the security device in the locked configuration in which the locking component is pressed against the distal ends of the arms residing within the housing.

FIG. **11** is a perspective view depicting a semi-specialized tool inserted into an access port to operate the actuator transitioning the locking component between the locked and unlocked positions.

FIG. **12**A is a perspective cutaway view of the unlocked configuration depicting the actuator in a position that enables the locking component to retract away from the distal ends of the arms.

FIG. **12**B is a perspective cutaway view of the locked configuration depicting the actuator in a position that presses the locking component against the distal ends of the arms and retains the locking component in this configuration.

FIG. **13**A is a perspective view depicting the 3-arm bracket embodiment of the security device securing an article of merchandise in a portrait configuration.

FIG. **13**B is a perspective view depicting the 3-arm bracket embodiment of the security device securing an article of merchandise in a landscape configuration.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

In the following detailed description of the preferred embodiment, reference is made to the accompanying drawings, which form a part hereof, and within which specific embodiments are shown by way of illustration by which the invention may be practiced. It is to be understood that other embodiments may be utilized and structural changes may be made without departing from the scope of the invention.

FIGS. **1**A-B depict an anti-theft security device **10**. Security device **10** has two sets of adjustable bracket arms **12** disposed within a housing **14**. The distal end of each arm **12** has a C-shaped grip **16** configured to receive an edge of an article of merchandise. The two sets of adjustable arms **12** are in an orthogonal relationship with one another. The length of each arm **12** is independently adjustable by sliding arm **12** relative to housing **14**. This configuration enables arms **12** to adjust to the geometry of the article of merchandise.

Referring to FIGS. **1**A-B, the following is a description of the method of securing the article of merchandise within security device **10** and, subsequently, releasing the article of merchandise therefrom. When unlocked, arms **12** are configured to slide in a direction away from housing **14**, thereby increasing a distance between opposite grips **16**. When the distance between opposite grips **16** exceeds the dimensions of the article of merchandise, the article of merchandise can be positioned between grips **16**. At this point, arms **12** can be manipulated to slide toward one another, thereby decreasing the distance between opposite grips **16** until they engage the edges of the article of merchandise. In this configuration, the article of merchandise is secured to housing **14** by grips **16**. To release the article of merchandise from housing **14**, arms **12** are manipulated to slide outward from housing **14**, thereby increasing the distances between opposite grips **16**. Once the distance between opposite grips **16** exceeds the dimensions of the article of merchandise, the article of merchandise can be removed from security device **10**.

As depicted in FIG. **1** A, in an embodiment the proximal end of each arm **12** has flange **48** that prevents arms **12** from completely sliding out of housing **14**. Arms **12** are slidingly disposed within corresponding channels inside housing **14**. The width of each channel is such that it exceeds the width of the arm but is less than the combined width of the arm and flange **48**. Thus, flanges **48** secure arms **12** against removal from housing **14**. Each arm **12** can slide a predetermined distance relative to housing **14**. This distance is controlled by the length of the channels: when flanges **48** engage the entryway of the channel arms **12** cannot slide outwardly any further because flanges **48** cannot enter into the channels. This feature secures arms **12** inside housing **14**, thus preventing arms **12** from becoming lost or misplaced and facilitating ease of operation by ensuring that arms **12** do not accidentally slide out of housing **14** during the process of securing the article of merchandise within security device **10**.

To ensure that arms **12** cannot be manipulated by an unauthorized individual, security device **10** includes a locking mechanism **20**, depicted in FIGS. **2**A-**2**D. Arms **12** are disposed within housing **14** in an orthogonal relationship with one another, such that each longitudinal arm **12** overlaps two latitudinal arms **12**. This configuration results in a rectangle being formed between overlapping arms **12**, wherein the rectangle is defined by inner edges of arms **12**. Each inner edge has a rack of gear teeth **24** disposed therealong.

In an embodiment depicted in FIGS. **2**C and **2**D, gear teeth **30** and gear teeth **24** have right-triangular shapes with sloping sides. During the locking process, gear teeth **24** of locking components **28** apply forces onto sloping sides of gear teeth **30** of arms **12**, thereby causing arms **12** to further slide inwardly relative housing **14**. The geometries of the sloping sides of gear teeth **24** and **30** ensure that, when transitioning from an unlocked configuration to a locked configuration, arms **12** always slide inwardly relative to housing **14**, thus causing grips **16** of arms **12** to securely

grasp the edges of the article of merchandise. Gear teeth **30** and gear teeth **24** may be any geometric shape and/or different geometric shapes that one in the art would appreciate causing arms **12** to slide further toward housing **14** when gear teeth **30** engage gear teeth **24**, securing the article of manufacture within security device **10**.

As depicted in FIGS. **2**A-**2**D, locking mechanism **20** is disposed within housing **14** inside the rectangle formed by overlapping bracket arms **12**. Locking mechanism **26** comprises two locking components **28**. Each locking component **28** has a right-triangular shape with a plurality of gear teeth **30** disposed along the legs of the right triangle. Gear teeth **30** are configured to interlock with gear teeth **24**.

Locking components **28** are configured to transition between an unlocked configuration depicted in FIG. **2**A into a locked configuration depicted in FIG. **2**B. In the unlocked configuration, hypotenuse sides of two locking components **28** are in a close proximity or in an abutting relation with respect to one another. In this configuration, gear teeth **30** are disengaged from gear teeth **24**, and, therefore, arms **12** are free to slide outwardly with respect to housing **14**.

In the locked configuration, depicted in FIGS. **2**B and **2**D, locking components **28** are moved away from one another. In this configuration, gear teeth **30** of locking components **28** engage gear teeth **24** of arms **12**. Because arms **12** in an orthogonal orientation with respect to one another, and because gear teeth **30** are disposed in a right-angle arrangement along the edges of the locking components **26**, each locking component **28** is configured to simultaneously engage two arms **12**. Thus, in the locked configuration, gear teeth **30** of two locking components **28** engage gear teeth **24** of all four arms **12**. In this configuration, arms **12** are immobilized because interlocking of gear teeth **30** and gear teeth **24** restricts arms **12** against movement relative to housing **14**. Therefore, when the article of merchandise is secured within grips **16**, and security device **10** is in its locked configuration, the article of merchandise cannot be removed from grips **16** until locking components **28** are retracted, thereby releasing arms **12**.

FIGS. **3**A-C and **4**A-B illustrate the mechanism and method of transitioning locking mechanism **24** between the locked and unlocked configurations. Housing **14** includes a port **32** disposed directly above the line at which hypotenuse edges of locking components **28** meet. An actuator **34** is disposed within the port **32**. Actuator **34** is configured to translate along a vertical center axis of port **32**, whereby actuator **34** can move in a downward direction toward locking components **28**, and in an upward direction away from locking components **28**. In an embodiment, port **32** and actuator **34** have complementary threads, whereby actuator **34** can be translated along the center axis of port **32** by clockwise or counterclockwise rotation. In other embodiments, various means known in the art for achieving a connection between a female port and a male component, whereby the male component is movable along the center axis of the female port can be implemented.

FIGS. **3**A-C and **4**A-B depict locking components **28** having sloping inner edges. Actuator **34** has a pointed distal end configured to engage the sloping edges of locking components **28**. Locking components **28** are biased toward one another by a biasing element **36**. Thus, as depicted in FIGS. **3**A-B and **4**A, when actuator **34** is in its retracted configuration, locking components **28** are biased toward one another. In this configuration, gear teeth **30** are retracted away from gear teeth **24**, and, therefore, arms **12** are free to slide with respect to housing **14**.

FIGS. **3**B-C and **4**B depict a semi-specialized tool **38** being used to manipulate actuator **34** in the embodiment in which port **32** and actuator **34** are in a screw-threaded engagement with one another. Clockwise rotation of tool **38** drives actuator downward. The pointed distal end of actuator **34** applies a force onto the sloping edges of locking members **28**. Because the edges of locking members **28** and the pointed distal end of actuator **34** have complementary slopes, the force applied onto locking members **28** by actuator **34** has a horizontal component. The horizontal component of the applied force exceeds the biasing force exerted by biasing element **36**, thereby causing locking members **28** to slide apart toward the position depicted in FIGS. **3**C and **4**B. In this configuration, gear teeth **30** of locking components **28** engage gear teeth **30** disposed along inner edges of arms **12**, thereby immobilizing arms **12** within housing **14**. This is the locked configuration of security device **10**.

To transition security device **10** into the unlocked configuration, an authorized personnel member in possession of tool **38** uses tool **38** to rotate actuator **34** in a counterclockwise direction, thereby retracting actuator away from locking components **28**. Biasing element **36** pulls locking components **28** toward each other, thereby disengaging gear teeth **30** from gear teeth **24**. When the gear teeth **30** fully disengage gear teeth **24**, security device **10** is in the unlocked configuration and lengths of arms **12** can be adjusted, thereby releasing the article of merchandise from grips **16**.

In an embodiment depicted in FIGS. **4**C and **4**D, grips **16** are encased by sleeves **50**. Sleeves **50** may be made of an elastomeric material having an elastic limit that is greater than that of the of a maximum force exerted on the elastomeric material **50** by the article of merchandise when security device **10** is in the locked configuration. Elastomeric material **50** is nonconductive and allows for an article of manufacture to retain full functionality while secured within grips **16** (e.g., when grips **16** secure a cellular device within the security device **10** the elastomeric material does not interfere with the use of the touch screen of the cellular device). Some examples of acceptable elastomeric materials include ethylene propylene rubber, silicone rubber, fluoroelastomers, and any other material that one of ordinary skill in the art would appreciate to protect an article of manufacture from damage while being secured in security device **10**.

FIGS. **4**C and **4**D depict a semi-specialized tool **38** being used to manipulate actuator **34** in the embodiment in which port **32** and actuator **34** are in a screw-threaded engagement with one another. Clockwise rotation of tool **38** drives actuator downward. The pointed distal end of actuator **34** applies a force onto the sloping edges of locking member **28**. Because the edges of locking members **28** and the pointed distal end of actuator **34** have complementary slopes, the force applied onto locking members **28** by actuator **34** has a vertical component. The vertical component of the applied force exceeds the biasing force exerted by biasing element **36**, thereby causing locking members **28** to translate vertically toward the position depicted in FIG. **2**B. In this configuration, gear teeth **30** of locking components **28** engage gear teeth **30** disposed along inner edges of arms **12**, thereby immobilizing arms **12** within housing **14**. This is the locked configuration of security device **10**.

FIGS. **5**A and **5**B depict an alternative embodiment of locking member **28**. Locking member **28** has a frustoconical shape having gear teeth **24** disposed along an outside surface of locking member **28** extending along a longitudinal extent

formed between first smaller circumference **52** and second larger circumference **54**. Gear teeth **24** have complementary shapes to gear teeth **30** and protrude radially relative locking member **28** such that when actuator **34** drives locking member **28** toward arms **12**, gear teeth **24** engage gear teeth **30**, thereby immobilizing arms **12** within housing **14**.

To transition security device **10** into the unlocked configuration, an authorized personnel member in possession of tool **38** uses tool **38** to rotate actuator **34** in a counterclockwise direction, thereby retracting locking component **28**. Biasing element **36** urges locking component **28** toward port **32**, thereby disengaging gear teeth **30** from gear teeth **24**. When the gear teeth **30** fully disengage gear teeth **24**, security device **10** is in the unlocked configuration and lengths of arms **12** can be adjusted, thereby releasing the article of merchandise from grips **16**.

3-Arm Adjustable Bracket

FIGS. **6-13** pertain to an embodiment of a security device **110** having a 3-arm adjustable bracket configured to secure an article of merchandise **112**. Security device **110** includes a housing **114**, wherein three arms **116** extend from housing **114**, each arm **116** terminating with a grip **118**. FIG. **6** depicts an exemplary embodiment in which two grips **118** are configured to engage corners of article of merchandise **112**, while the third grip **118** is configured to engage a side of article of merchandise **112**. In an alternative embodiment (not depicted), security device **110** may comprise two, rather than three, arms **116**. One or more arms **116** can branch out and can have multiple grips **118**.

Referring to FIGS. **7** and **8**, the length of each arm **116** extending beyond housing **114** can be independently adjusted when security device **110** is in an unlocked configuration. In an alternative embodiment, one or more arms **116** may be fixed, but at least one arm **116** must be movable relative to housing **114**.

To secure the article of merchandise **112**, a user slides at least one arm **116** into a position in which distances between grips **118** are greater than the length and/or width of the article of merchandise **112**. Next, the article of merchandise **112** is placed into security device **110** such that a back surface of the article of merchandise **112** abuts housing **114**. Then, the user slides one or more arms **116** into a position in which each grip **118** securely engages an edge (i.e., a corner or a lateral side) of the article of merchandise **112**.

As depicted in FIGS. **7-8**, distal ends of arms **116** reside within housing **114**. The section of each arm **116** residing within housing **114** has a first set of teeth **120** disposed thereon. Security device **110** further includes a locking component **122** residing within housing **114**. Locking component **122** has a second set of teeth **124** disposed thereon. Second set of teeth **124** disposed on locking component **122** is configured to interlock with the first set of teeth **120** disposed on arms **116**.

As depicted in FIGS. **9**A-B and **10**A-B, locking component **122** is transitionable between an unlocked configuration and a locked configuration. In the unlocked configuration, depicted in FIGS. **9**A and **10**A, locking component **122** is retracted away from arms **116**, such that second set of teeth **124** does not engage first set of teeth **120**. In this unlocked configuration, arms **116** can slide freely relative to housing **114**.

In the locked configuration, depicted in FIGS. **9**B and **10**B, locking component **122** is pressed against the distal ends of arms **116** residing within housing **114**. When locking component **122** is depressed relative to housing **114**, second set of teeth **124** engages first set of teeth **120**. When the two sets of teeth are interlocked, arms **116** cannot slide relative to housing **114** and, therefore, become immobilized. In this manner, when article of merchandise **112** is received within grips **118** of arms **116**, and locking component **122** has been transitioned into the locked configuration, arms **116** become immovable. Accordingly, in the locked configuration of security device **110**, article of merchandise **112** cannot be removed from grips **118** until locking component **122** is retracted away from arms **116**, and second set of teeth **124** disengages first set of teeth **120**, thereby releasing arms **116**.

FIGS. **9**A-B depict a cutaway view of security device **110**, illustrating the process of transitioning locking component **122** from an unlocked configuration into a locked configuration. FIG. **9**A depicts locking component **122** in the unlocked configuration. In this configuration, locking component **122** is retracted away from the distal ends of arms **116** residing within housing **114**. In this retracted position, second set of teeth **124** of locking component **122** does not engage first set of teeth **120** of arms **116**. Accordingly, in the unlocked configuration depicted in FIG. **9**A, a user can slide arms **116** with respect to housing **114**, without interference from locking component **122**. In an embodiment, arms **116** may have flanges to prevent arms **116** from being completely removed from housing **114**.

FIG. **9**B depicts the locked configuration of security device **110**. In this configuration, locking component **122** is pressed against arms **116**, such that second set of teeth **124** engages first set of teeth **120**. As depicted in FIG. **9**B, when first and second sets of teeth **120**/**124** interlock, arms **116** become immobilized against movement relative to housing **114**. Accordingly, in the locked configuration depicted in FIG. **9**B, arms **116** cannot be moved apart and, therefore, the article of merchandise **112** cannot be removed from security device **110**.

Analogously, FIGS. **10**A-B provide cutaway views depicting locked and unlocked configurations relative to the third arm **116**. In the unlocked configuration depicted in FIG. **10**A, locking component **122** is retracted away from arm **116**, thus enabling arm **116** to slide relative to housing **114**. In FIG. **10**B, locking component **122** is pressed against the distal end against arm **116**, such that second set of teeth **124** engages first set of teeth **120**, thereby immobilizing arm **116** relative to housing **114**.

In the manner described above, in the locked configuration, locking component **122** is pressed against distal ends of arms **116**. In this configuration, second set of teeth **124** of locking component **122** interlocks with first set of teeth **120** of arms **116**, preventing arms **116** from sliding apart. Thus, when locking component **122** is pressed against distal ends of arms **116**, the engagement of first and second sets of teeth **120** and **124** immobilizes arms **116** relative to housing **114**. Thus, arms **116** cannot be manipulated to release article of merchandise **112**.

In an embodiment, first set of teeth **120** of arms **116**, second set of teeth **124** of locking component **122**, or both have sloping mating surfaces. The direction of the slopes is such that when second set of teeth **124** is pressed against first set of teeth **120**, the downward force applied onto sloping surfaces of teeth **120** translates into an inward horizontal force which causes arms **116** to slide inwardly relative to housing **114**. In this manner, security device **110** ensures that article of merchandise **112** does not become loose within grips **118** due to accidental outward movement of arms **116** during the locking procedure. Thus, the sloping surfaces of teeth **120** and **124** drive arms **116** inwardly, ensuring a tight grip on article of merchandise **112**.

Furthermore, to protect the article of merchandise **112** against excessive force applied by grips **118** of arms **116**,

grips **118** can be encased by sleeves. These sleeves may be made of an elastomeric material. Elastomeric material is preferably nonconductive, so that article of merchandise **112** can retain full functionality when secured within grips **118**. Specifically, nonconductive sleeves ensure that grips **118** do not interfere with the touchscreen of the electronic device being secured therein.

FIG. **11** depicts an exemplary implementation of a mechanism for transitioning locking component **122** between the locked and unlocked configurations. In this implementation, housing **114** has an access port **130**. An actuator **128**, which is depicted in FIGS. **12**A and **12**B, resides within housing **114** and can be engaged via access port **130**. Semi-specialized tool **126** can be rotated about its axis to drive actuator **128** inwardly or outwardly with respect to housing **114**.

Next, FIG. **12**A depicts security device **110** in an initial unlocked configuration, in which actuator **128** permits locking component **122** to be retracted away from arms **116**. Next, semi-specialized tool **126** can be rotated to drive actuator **128** inwardly relative to housing **114**. As actuator **128** translates downwardly, it exerts a force onto locking component **122**, pressing it into distal ends of arms **116** as security device **110** transitions into its locked configuration.

FIG. **12**B depicts the locked configuration of security device **110**, in which second set of teeth **124** interlocks first set of teeth **120**, thereby immobilizing arms **116**. FIG. **12**B further depicts that actuator **128** retains locking component **122** in its locked configuration. It shall be understood that driving actuator **128** in an opposite direction would release locking component **122**, enabling it to retract away from distal ends of arms **116**, thereby returning security device **110** to the unlocked configuration depicted in FIG. **12**A.

In an embodiment, locking component **122** may be biased toward the locked configuration. In this embodiment, a biasing element, such as a spring, exerts a biasing force onto locking component **122**, pressing it into distal ends of arms **116**. In an alternative embodiment, locking component **122** may be biased toward the unlocked configuration. In this embodiment, when actuator **128** releases locking component **122**, the biasing element exerts a force onto locking component **122** to retract it away from distal ends of arms **116**. In this manner, when the user drives actuator **128** outwardly, locking component **122** is automatically retracted into the unlocked configuration, releasing arms **116**. To transition locking component **122** back into the locked configuration, a user drives actuator **128** inwardly relative to housing **114**, which causes actuator **128** to press locking component **122** into distal ends of arms **116**, against the biasing force.

In another embodiment, the biasing element may be eliminated altogether. In this embodiment, after moving actuator **128** into the unlocked position, the user can manipulate arms **116** by applying a moment to proximal ends thereof, thereby causing the distal ends of arms **116** to rise within housing **114**. When distal ends of arms **116** rise, they apply an upward force onto locking component **122**, causing locking component **122** to retract away from arms **116**, thereby releasing them.

When security device **110** is deployed in a retail environment, housing **114** can be configured either to couple directly to a pedestal mounted onto a display counter or to couple to a cover anchored to the display counter via a tether. FIG. **11** depicts latching hooks disposed on the underside of housing **114** which are used for this purpose, as disclosed in U.S. Pat. No. 10,323,440. When housing **114** is coupled to a pedestal or a cover, access port **130** is concealed, thereby preventing unauthorized access to actuator **128**. Thus, to release the article of merchandise **112** from security device **110**, a user must first use the required key to decouple housing **114** from the pedestal/cover to reveal access port **130**. Then, the user must use semi-specialized tool **126** to drive actuator **128** into an unlocked position to release locking component **122** from its locked configuration. Only then will the user be able to slide apart arms **116** to remove the article of merchandise **112** from security device **110**. In this manner, when deployed in a retail environment, security device **110** provides multiple layers of anti-theft protection for the article of merchandise **112**.

Finally, FIGS. **13**A and **13**B depict that security device **110** can secure article of merchandise **112** in multiple ways. For example, portrait configuration is depicted in FIG. **13**A, while a landscape configuration is depicted in FIG. **13**B. This versatility provides an advantage of enabling the retail stores to display the merchandise **112** in a variety of orientations.

The advantages set forth above, and those made apparent from the foregoing description, are efficiently attained. Since certain changes may be made in the above construction without departing from the scope of the invention, it is intended that all matters contained in the foregoing description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. An anti-theft device for securing an article of merchandise, comprising:

a housing;

a plurality of arms, wherein at least a first arm of the plurality of arms is slidingly disposed within the housing, wherein a length of the first arm extending beyond the housing is adjustable by sliding the first arm inwardly or outwardly with respect to the housing;

a grip disposed at an end of each of the plurality of arms, each grip configured to receive the article of merchandise therein;

a first set of teeth disposed along the first arm;

a locking component disposed within the housing, wherein the locking component is non-rotational;

a second set of teeth disposed on a surface of the locking component, the second set of teeth disposed on the locking component configured to interlock with the first set of teeth disposed along the first arm, wherein the anti-theft device has a first unlocked configuration in which the locking component is retracted away from the first arm such that the first and the second sets of teeth are disengaged, and a second locked configuration in which the first and the second sets of teeth are interlocked; and

an actuator disposed within the housing, the actuator configured to apply a force onto the locking component to transition the locking component from the first unlocked configuration into the second locked configuration, thereby immobilizing the first arm relative to the housing, wherein to adjust the length of the first arm, the second set of teeth must be disengaged from the first set of teeth.

2. The anti-theft security device of claim **1**, wherein the first arm comprises a flange configured to retain the first arm within the housing.

3. The anti-theft security device of claim **1**, wherein at least one tooth of the first set of teeth has a sloped side, such that when the locking component engages the sloped side, the first arm is configured to slide inwardly relative to the housing.

4. The anti-theft security device of claim 1, wherein the grip is encased by a sleeve configured to undergo elastic deformation responsive to being pressed against the edge of the article of merchandise.

5. The anti-theft security device of claim 4, wherein the sleeve is non-conductive.

6. The anti-theft security device of claim 4, wherein the sleeve is made of an elastomeric material.

7. The anti-theft security device of claim 1, further comprising a biasing element configured to bias the locking component toward the first unlocked configuration.

8. The anti-theft security device of claim 7, wherein, in the locked configuration, the force applied onto the locking component by the actuator exceeds a biasing force exerted onto the locking component by the biasing element.

9. The anti-theft security device of claim 1, wherein the actuator is screw-threadedly disposed within the housing, whereby rotation of the actuator about a longitudinal center axis thereof causes the actuator to apply the force onto the locking component.

10. The anti-theft security device of claim 1, wherein the housing includes a port providing access to the actuator.

11. The anti-theft security device of claim 10, wherein the port is concealed when the housing is coupled to a pedestal or a cover.

12. The anti-theft security device of claim 10, wherein the port is configured to receive a semi-specialized tool for operating the actuator.

13. A method of securing an article of merchandise, comprising:

receiving an anti-theft device having a housing and a plurality of arms disposed therein, wherein at least a first arm of the plurality of arms is slidingly disposed relative to the housing, each of the plurality of arms having a grip disposed on an end thereof;

adjusting a length of the first arm by sliding the first arm relative to the housing of the anti-theft device;

positioning an article of merchandise between the grips;

retracting the first arm into the housing such that the article of merchandise is received within the grips; and

operating an actuator disposed within the housing to transition the anti-theft device from a first unlocked configuration in which a locking component is retracted away from the first arm into a second locked configuration in which the locking component engages the first arm, wherein the locking component is non-rotational and wherein operation of the actuator causes the actuator to apply a force onto the locking component residing within the housing, thereby causing the locking component to translate within the housing toward the first arm such that the locking component engages the first arm;

wherein a first set of teeth is disposed along the first arm and a second set of teeth is disposed on the locking component, whereby, in the second locked configuration, the second set of teeth disposed on the locking component interlocks the first set of teeth disposed along the first arm, thereby immobilizing the first arm within the housing and retaining the article of merchandise within the grips, wherein to release the article of merchandise from the anti-theft device, the second set of teeth must be disengaged from the first set of teeth so that the first arm can be extended relative to the housing.

14. The method of claim 13, wherein a biasing element is disposed within the housing and is configured to retract locking component away from the first arm, thereby urging the anti-theft device into the first unlocked configuration.

15. The method of claim 14, wherein the force applied onto the locking component by the actuator exceeds the biasing force exerted by the biasing element.

16. The method of claim 13, wherein the actuator is screw-threadedly disposed within the housing, whereby operation of the actuator involves rotation of the actuator about its longitudinal center axis.

17. The method of claim 13, wherein the housing has a port having an opening on a first surface of the housing opposite to a second surface of the housing facing the article of merchandise, thereby enabling access to the actuator when the article of merchandise is secured within the anti-theft device.

18. The method of claim 13, wherein the first arm comprises a flange configured to retain the first arm within the housing.

19. The method of claim 13, wherein each grip is encased by a sleeve configured to undergo elastic deformation responsive to being pressed against the edge of the article of merchandise.

20. The method of claim 13, wherein at least one tooth of the first set of teeth has a sloped side, such that when the locking component engages the sloped side, the first arm is configured to slide inwardly relative to the housing.

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