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(54) RADIO SYSTEM HAVING A SLIDING MOUNT FOR A PORTABLE RADIO AND RELATED METHODS

(57) A radio system includes a portable radio and at least one elongate mounting rail having spaced apart indentations therein. At least one sliding mount includes a mount body having a passageway therethrough and slidably receiving a corresponding elongate mounting rail. The mount body is coupled to the portable radio. At least one spring plunger is carried by the mount body and configured to engage at least one adjacent indentation in the elongate mounting rail.

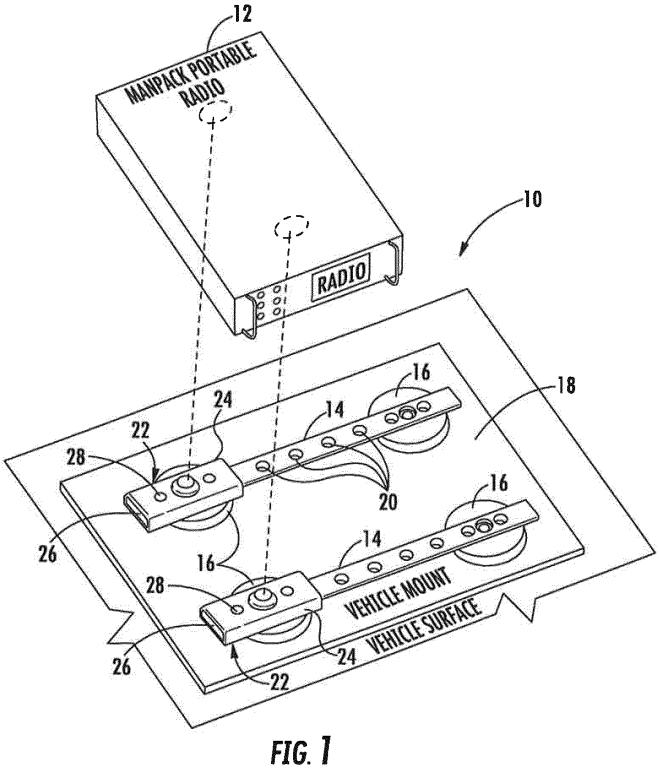

FIG. 1

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Description

Field of the Invention

[0001] The present invention relates to the field of radio systems, and more particularly, to a radio system having a portable radio received on a mounting rail and related methods.

Background of the Invention

[0002] Portable radios are often used in harsh environments, and in some settings, users mount their radios on vehicles or other locations with radio mounting systems that are cumbersome, prone to vibration, and make adjustment and removal of the portable radios difficult. These portable radios may be larger radios, such as a manpack portable radio, or the smaller handheld portable radios. Although some conventional radio mounting systems for vehicles or other locations may protect the radio from harsh environments and lessen vibration once attached, however, the portable radio may be difficult to move into a desired position for flexibility and allow ready removal. Some portable radio mounting systems are time-consuming and cumbersome to install and require specialized tools or thumbscrews to mount a portable radio onto a vehicle, and in some cases, even on a protective vest worn by the user. These types of radio mounting systems pose technical drawbacks because they do not allow a portable radio to be easily mounted and removed quickly such as on a vehicle subject to vibration or at similar locations where the portable radio may have to be positioned for ready access while also permitting easy removal.

Summary of the Invention

[0003] A radio system comprises a portable radio and at least one elongate mounting rail having a plurality of spaced apart indentations therein. At least one sliding mount comprises a mount body having a passageway therethrough slidably receiving a corresponding elongate mounting rail, and coupled to the portable radio. At least one spring plunger is carried by the mount body and configured to engage at least one adjacent indentation in the elongate mounting rail.

[0004] The radio system may further comprise a locking device carried by the mount body. The locking device may comprise a lock body coupled to the mount body at an end thereof, a manual actuating member carried by the lock body, and a locking pin carried by the lock body and moveable between locked and unlocked positions responsive to the manual actuating member. The locking device may further comprise a worm gear arrangement coupling the manual actuating member and the locking pin. The at least one spring plunger may comprise a housing having an end opening and an interior cavity coupled thereto, a ball moveable within the cavity, and a spring biasing the ball to an extended position exposed at the end opening of the housing. The at least one spring plunger may comprise three spring plungers arranged in spaced relation. A vehicle mount may carry the at least one elongate mounting rail. The portable radio may comprise a manpack portable radio or a handheld portable radio.

[0005] In yet another example, a sliding mount for an elongate mounting rail has a plurality of spaced apart indentations therein and comprises a mount body having a passageway therethrough slidably receiving the elongate mounting rail, and coupled to the portable radio, and at least one spring ball plunger carried by the mount body and configured to engage at least one adjacent indentation in the elongate mounting rail. The spring ball plunger comprises a housing having an end opening and an interior cavity coupled thereto, a ball moveable within the cavity, and a spring biasing the ball to an extended position exposed at the end opening of the housing.

[0006] A locking device may be carried by the mount body. The locking device may comprise a lock body coupled to the mount body at an end thereof, a manual actuating member carried by the lock body, and a locking pin carried by the lock body and moveable between locked and unlocked positions responsive to the manual actuating member. The locking device may further comprise a worm gear arrangement coupling the manual actuating member and the locking pin. The at least one spring ball plunger may comprise three spring ball plungers arranged in spaced relation.

[0007] A method of mounting a portable radio to at least one elongate mounting rail having a plurality of spaced apart indentations therein comprises slidably positioning at least one sliding mount along the at least one elongate mounting rail. The at least one sliding mount comprises a mount body having a passageway therethrough slidably receiving the corresponding elongate mounting rail, and coupled to the portable radio, and at least one spring plunger carried by the mount body and configured to engage at least one adjacent indentation in the elongate mounting rail.

Description of the Drawings

[0008] Other features and advantages will become apparent from the detailed description which follows, when considered in light of the accompanying drawings in which:

FIG. 1 is an exploded perspective view of the radio system having a portable radio coupled to an elongate mounting rail in accordance with a non-limiting example.

FIG. 2 is a top perspective view of the sliding mount slidably receiving a corresponding elongate mounting rail as shown in FIG. 1.

FIG. 3 is a bottom perspective view of the sliding mount receiving the corresponding elongate mount-

ing rail as shown in FIG. 1.

FIG. 4 is an end view of the radio system showing a handheld portable radio connected to the sliding mount in accordance with a non-limiting example.

FIG. 5 is a top perspective view of the sliding mount as shown in FIG. 4.

FIG. 6 is a bottom perspective view of the sliding mount as shown in FIG. 4.

FIG. 7 is a sectional view of a ball spring plunger as shown in FIG. 4.

FIG. 8 is a top perspective view of another embodiment of the sliding mount in accordance with a non-limiting example.

FIG. 9 is a bottom perspective view of the sliding mount as shown in FIG. 8.

Detailed Description

[0009] The present description is made with reference to the accompanying drawings, in which exemplary embodiments are shown. However, many different embodiments may be used, and thus, the description should not be construed as limited to the particular embodiments set forth herein. Rather, these embodiments are provided so that this disclosure will be thorough and complete. Like numbers refer to like elements throughout, and prime notation is used to indicate similar elements in different embodiments.

[0010] The radio system permits a portable radio such as a handheld portable radio or a manpack portable radio, for example, such as manufactured by Harris Corporation of Melbourne, Florida, to be coupled to a mount body as part of a sliding mount that receives a corresponding elongate mounting rail. No tools are required to mount or position the portable radio on the elongate mounting rail because it slides and locks in place via an appropriate locking device. The sliding mount may also be configured to fit a mounting rail such as the standard Picatinny rail also known as the MIL-STV-1913 rail and the Standardization Agreement 2324 rail, which of course, may also mount other devices such as flashlights and laser sights.

[0011] Referring now to FIG. 1, there is illustrated the radio system indicated generally at **10** that includes a portable radio **12,** which in this example is a manpack portable radio. Two elongate mounting rails **14** are supported via shock absorbers **16** on a vehicle mount **18,** which in turn, is mounted on a vehicle surface **20.** Each elongate mounting rail **14** includes a plurality of linearly aligned, spaced apart indentations **20,** also shown in FIGS. 2 and 3, and in this example are formed as through holes, but could be formed as small recesses and not extend through the elongate mounting rail **14.** The portable radio **12** is coupled to a sliding mount indicated generally at **22** and includes a mount body **24** having a passageway **26** therethrough as best shown in FIGS. 5 and 6. The passageway **26** receives the corresponding elongate mounting rail **14** so that each mount body **24** is slidable on the corresponding elongate mounting rail. Referring to FIG. 4, instead of supporting a manpack radio coupled to two mount bodies **24** as shown in FIG. 1, a handheld portable radio **12a** in this example is coupled to only one mount body **24** that receives in its passageway **26** an elongate mounting rail **14**.

[0012] The passageway **26** in the sliding mount **22** is preferably formed in an obround configuration, however, it is possible to form it in other configurations. In the example of FIGS. 5 and 6, the passageway **26** may be formed in a specific dovetail configuration to receive an elongate mounting rail **14** that is configured as a conventional Picatinny style mounting rail, allowing the mount body **24** to slide over the sharper edges of existing Picatinny rails. The mount body **24** and corresponding elongate mounting rail **14** can be formed of many different materials, including plastic or metal. The indentations **20** may be drilled or molded as through holes or recesses depending on the techniques used to manufacture the elongate mounting rail.

[0013] Each sliding mount **22** includes at least one spring plunger **28** carried by the mount body **24** and configured to engage at least one adjacent indentation **20** in the elongate mounting rail **14**. In the example shown in FIGS. 1-6, each mount body **24** includes three linearly spaced spring plungers **28**, which are received in orifices formed in the respective mount body.

[0014] Referring now to FIG. 7, each spring plunger **28** includes a housing **30** formed preferably of a metallic material and having an opening **32** and an interior cavity **34** coupled thereto. The housing **30** is configured in its outer dimension to fit within an orifice and may include an O-ring **31** to aid in securing the housing within an orifice or be configured as a press fit. A ball **36** formed preferably of a metallic material is movable within the cavity **34** and a spring biases **38** the ball into an extended position exposed at the end opening of the housing **30** as also shown in FIG. 6. Depending on the number of spring plungers **28** carried by a mount body **24**, the retaining force generated by the sliding mount **22** on the corresponding elongate mounting rail **14** can vary. For example, when three spring plungers **28** are arranged in spaced linear relation as illustrated, the sliding mount **22** will be retained with a greater amount of force on the corresponding elongate mounting rail **14** and be more secure. This may be advantageous in some environments where vibration or shock are present, such as imparted by a moving vehicle. In that high vibration situation, the sliding mount **22** having the portable radio **12** connected thereto may slide off the corresponding elongate mounting rail **14** if only one spring plunger was employed. If less retaining force is desired, however, then a fewer number of spring plungers **28** could be used.

[0015] Referring now to FIGS. 8 and 9, the mount body may carry a locking device illustrated generally at **40'**. The illustrated locking device **40'** includes a lock body **42'** coupled to the mount body **24'** at an end thereof and a manual actuating member **44'** carried by the lock body. A locking pin **46'** is carried by the lock body **42'** and mov-

able between locked and unlocked positions responsive to the manual actuating member **44'.** In an example, the locking device **40'** includes a worm gear arrangement **48'** coupling the manual actuating member **44'** and the locking pin **46'**. In this example, the manual actuating member **44'** is formed as a rod extending traverse through the lock body **42'** and includes a toothed surface that engages the worm gear arrangement **48'** similar to a rack and pinion arrangement. By pressing the manual activating member **48'** and in this example, the rod in one direction, the worm gear arrangement **48'** is rotated slightly to move the locking pin **46'** into a locked or unlocked position where the locking pin engages an indentation **20'** in the mounting rail **14'**. Other locking device designs may be used, including quick release pins that engage an indentation **20'** or a cam driven mechanism.

[0016] Alternative designs for the radio system **10** than those illustrated may be used. For example, the corresponding elongate mounting rail **14** may be shortened to a few inches and include a pivotally mounted attachment leg (not shown) that may be spring biased to permit the shortened elongate mounting rail **14** to be attached to a vest for temporary securement. A handheld portable radio may be mounted onto the sliding mount **22** that receives the shortened elongate mounting rail **14** having about the same length as the sliding mount **22**. In this shortened version, the mounting rail **14** may be inserted within a vest pocket and held therein by the pivotally mounted attachment leg to hold the radio in a temporary position so that it may be quickly grasped. The attachment leg may be removable from the elongate mounting rail **14** to allow the mounting rail to be secured on another surface, such as a vehicle mount. In yet another example, it may be possible to attach a drive mechanism (not shown), such as an electric motor, to the side of an elongate mounting rail **14** and drive via an appropriate drive transmission the sliding mount **22** into a preferred position on the elongate mounting rail.

[0017] A method of mounting the portable radio **12** to at least one elongate mounting rail **14** having a plurality of spaced apart indentations **20** therein is provided by slidably positioning at least one sliding mount **22** along the at least one elongate mounting rail. The at least one sliding mount **22** includes a mount body **24** having a passageway **26** therethrough slidably receiving the corresponding elongate mounting rail **26** and coupled to the portable radio **12**. At least one spring plunger is carried by the mount body **24** and configured to engage at least one adjacent indentation **20** in the corresponding elongate mounting rail **14**.

[0018] Many modifications and other embodiments of the invention will come to the mind of one skilled in the art having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is understood that the invention is not to be limited to the specific embodiments disclosed, and that modifications and embodiments are intended to be included within the scope of the appended claims.

Claims

1. A radio system comprising:

a portable radio;
at least one elongate mounting rail having a plurality of spaced apart indentations therein; and
at least one sliding mount comprising
a mount body having a passageway therethrough slidably receiving a corresponding elongate mounting rail, and coupled to said portable radio, and
at least one spring plunger carried by said mount body and configured to engage at least one adjacent indentation in said corresponding elongate mounting rail.

2. The radio system according to claim 1 further comprising a locking device carried by said mount body to lock said mount body to said corresponding elongate mounting rail.

3. The radio system according to claim 2 wherein said locking device comprises:

a lock body coupled to said mount body at an end thereof;
a manual actuating member carried by said lock body; and
a locking pin carried by said lock body and moveable between locked and unlocked positions responsive to said manual actuating member.

4. The radio system according to claim 3 wherein said locking device further comprises a worm gear arrangement coupling said manual actuating member and said locking pin.

5. The radio system according to claim 1 wherein said at least one spring plunger comprises:

a housing having an end opening and an interior cavity coupled thereto;
a ball moveable within the cavity; and
a spring biasing said ball to an extended position exposed at the end opening of said housing.

6. A sliding mount for an elongate mounting rail having a plurality of spaced apart indentations therein and comprising:

a mount body having a passageway therethrough slidably receiving the elongate mounting rail, and coupled to said portable radio; and
at least one spring ball plunger carried by said mount body and configured to engage at least one adjacent indentation in the elongate mounting rail;

said spring ball plunger comprising
a housing having an end opening and an interior cavity coupled thereto,
a ball moveable within the cavity, and
a spring biasing said ball to an extended position exposed at the end opening of said housing.

7. The sliding mount according to claim 6 further comprising a locking device carried by said mount body to lock said mount body to said corresponding elongate mounting rail.

8. The sliding mount according to claim 7 wherein said locking device comprises:

a lock body coupled to said mount body at an end thereof;
a manual actuating member carried by said lock body; and
a locking pin carried by said lock body and moveable between locked and unlocked positions responsive to said manual actuating member.

9. The sliding mount according to claim 8 wherein said locking device further comprises a worm gear arrangement coupling said manual actuating member and said locking pin.

10. The sliding mount according to claim 6 wherein said at least one spring ball plunger comprises three spring ball plungers arranged in spaced relation.

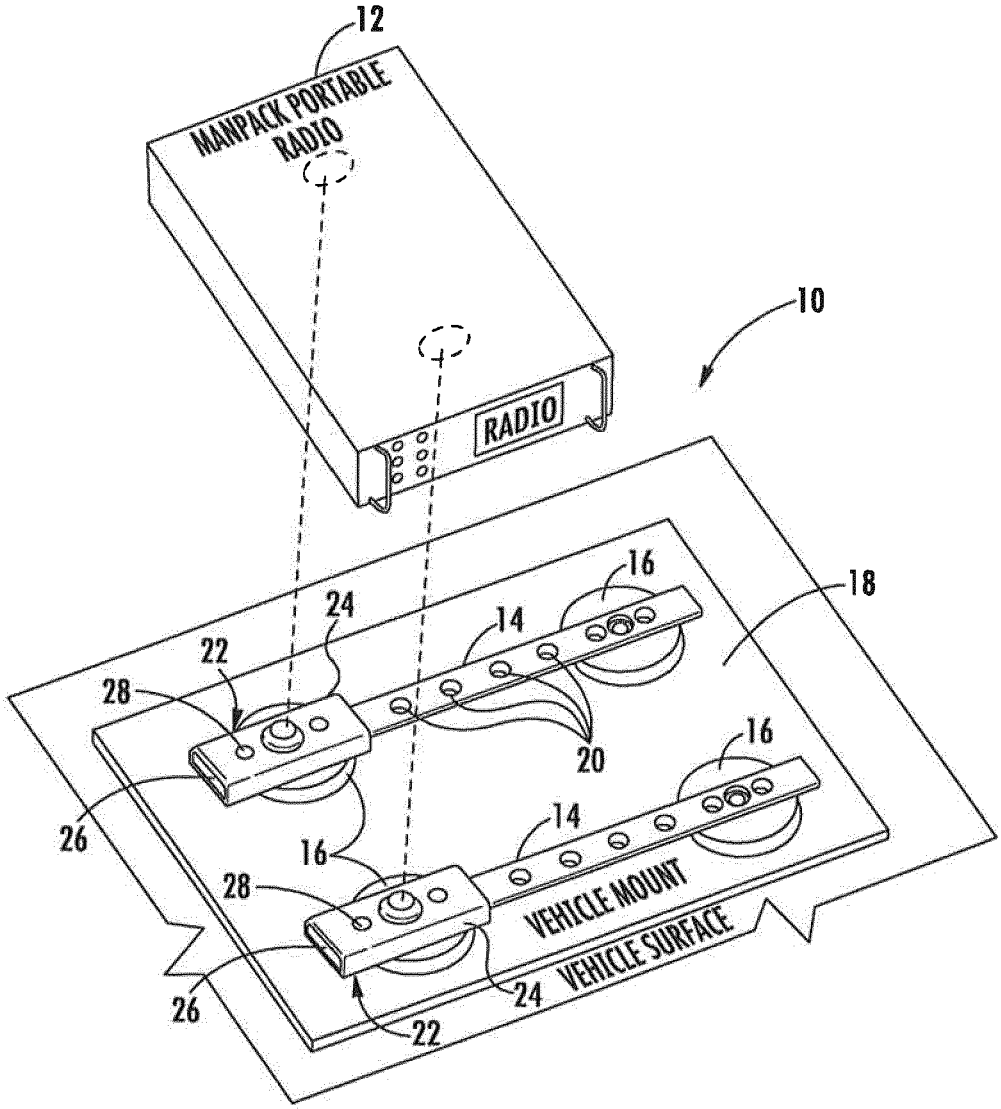
12
MANPACK PORTABLE RADIO
RADIO
10
18
16
24
14
22
28
20
16
26
14
16
28
VEHICLE MOUNT
VEHICLE SURFACE
26
24
22

FIG. 1

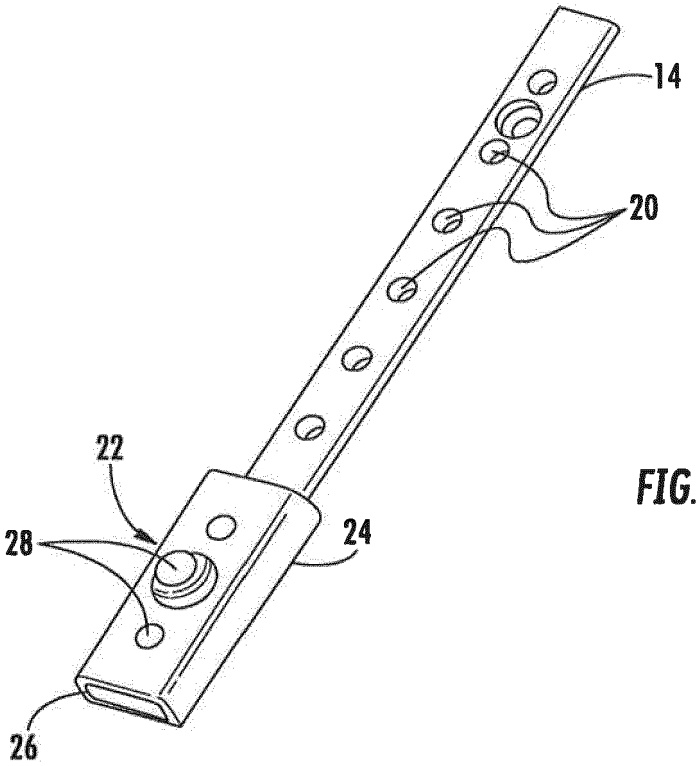

FIG. 2

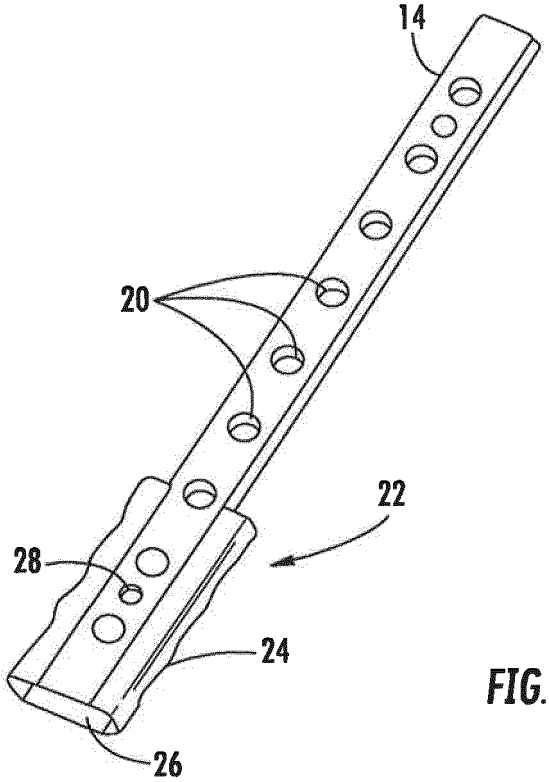

FIG. 3

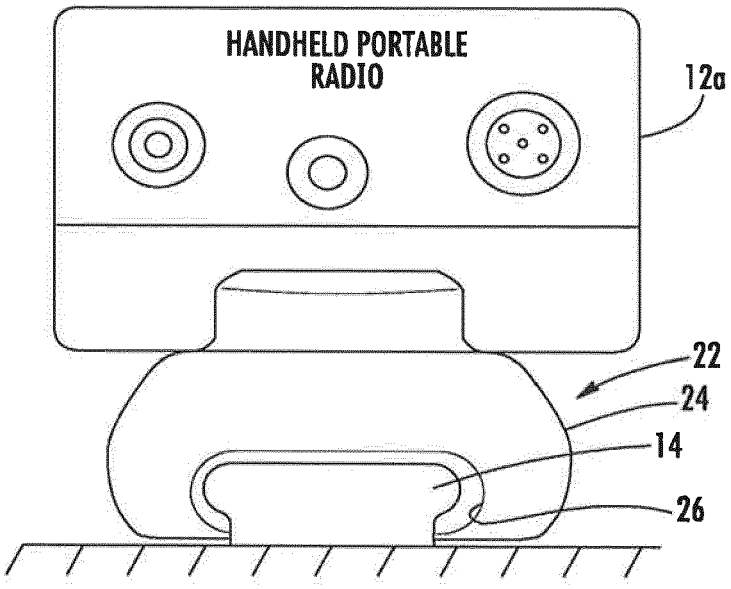

FIG. 4

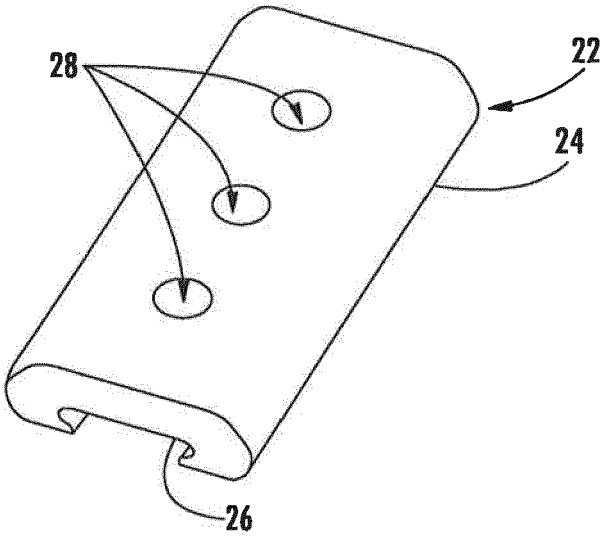

FIG. 5

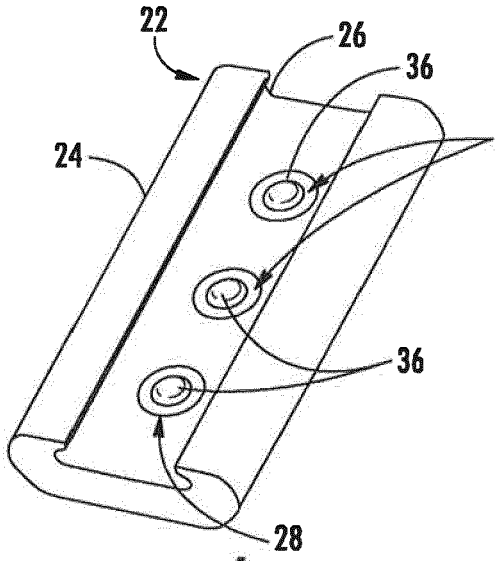

FIG. 6

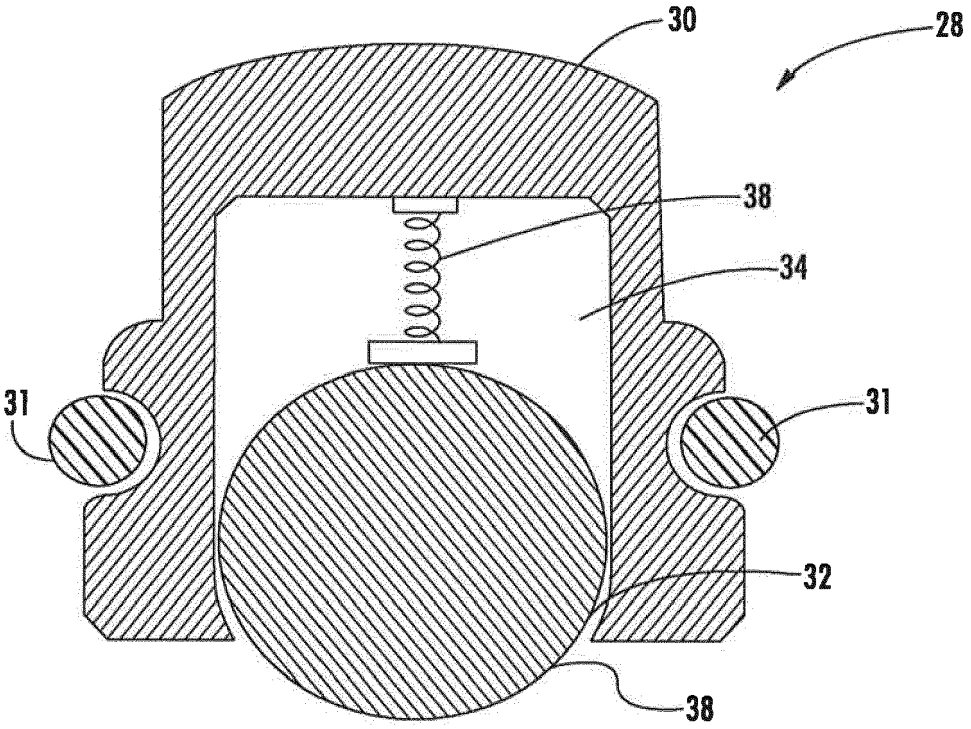

FIG. 7

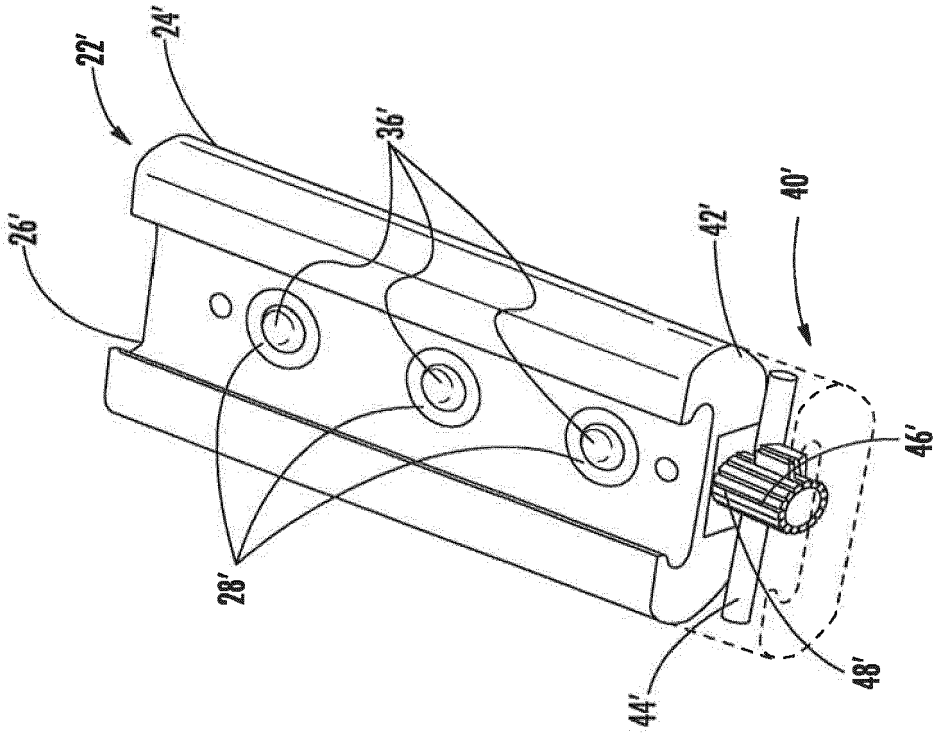

FIG. 9

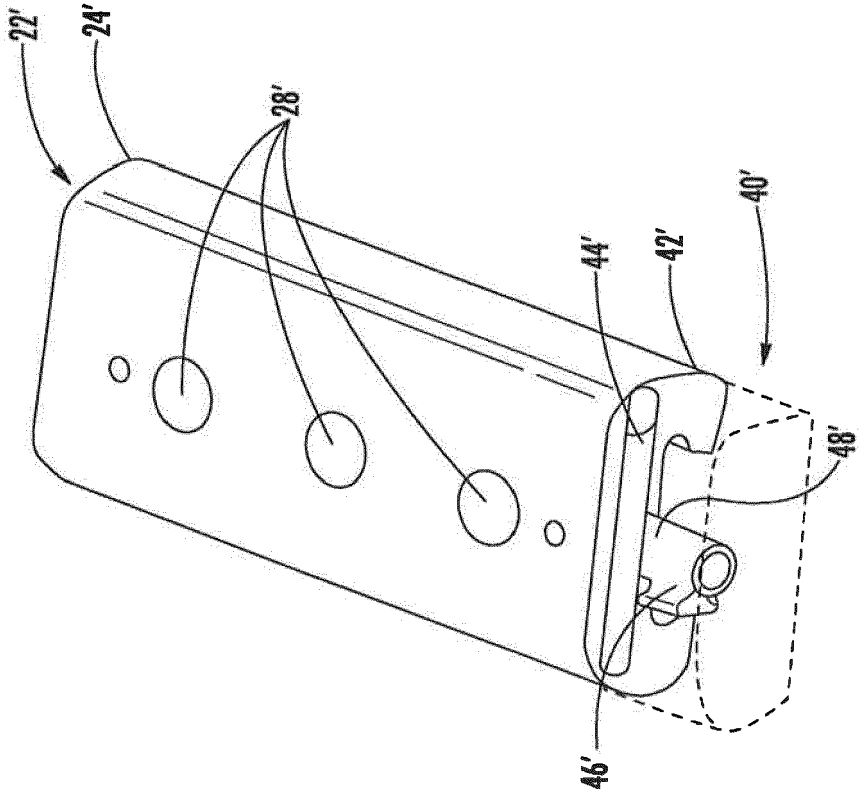

FIG. 8

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EUROPEAN SEARCH REPORT

Application Number
EP 18 19 5929

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2012/210624 A1 (SCHNEIDER LLOYD [US] ET AL) 23 August 2012 (2012-08-23)	1-4,7-10	INV. H04B1/3877 B60R11/02 H04B1/3822 F41C27/00
Y	* paragraph [0028] - paragraph [0040]; figures 2-5 *	5	

X	US 2014/252187 A1 (PETROVIC CODY [US]) 11 September 2014 (2014-09-11)	1-4,7-10	
Y	* paragraph [0006] - paragraph [0014]; figures 7,8, 9, 10 *	5	

X	US 2009/167634 A1 (HAN TAI-SHENG ANDREW [US]) 2 July 2009 (2009-07-02)	6	
Y	* paragraph [0039] - paragraph [0044]; figures 2, 4 *	5	

TECHNICAL FIELDS SEARCHED (IPC)

H04B
F41C
B60R
F41G
G06F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	15 February 2019	Lindberg, Per

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 18 19 5929

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15-02-2019

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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		US 2013212923 A1	22-08-2013
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US 2009167634 A1	02-07-2009	NONE	

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82