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HEIGHT ADJUSTER FOR A SEAT BELT WEB GUIDE

This invention relates to an adjustable turning loop for a vehicle safety restraint system.

A seat belt system is typically anchored to a vehicle at three different locations around a vehicle passenger. Two anchors support the lap belt portion of a seat belt while a third anchor, a loop or D-ring, located at the approximate height of the shoulder of the passenger provides support for the shoulder belt portion of the seat belt. Due to varying sizes of passengers, manufacturers use assemblies known as adjustable turning loops, which allow the shoulder loop to be adjusted up or down to accommodate these differing heights. Existing adjustable turning loops typically comprise a slide that mounts the D-ring to a rail, which is attached to the B pillar of the vehicle. The slide may be adjusted up or down by lifting or pressing an actuator, which releases a lock that holds the slide in place. The locking mechanism is frequently very complex and expensive to manufacture and assemble. A need therefore exists for a simplified locking mechanism for an adjustable turning loop.

The present invention provides an adjustable turning loop for a seat belt web guide. The adjustable turning loop has a rail and a slide slideably received on the rail. The slide mounts a D-ring. Like existing adjustable turning loops, the invention has a lock for maintaining the slide at a position on the rail. The lock has a locked condition limiting movement of the slide on the rail and an unlocked condition allowing movement of the slide on the rail. The lock is greatly simplified from existing structures. The lock comprises a first member and a second member. The first member and the second member pivot relative to the rail and engage the rail in the locked condition and disengage from the rail in the unlocked condition.

The first member and the second member are in contact with the rail in the locked condition. The rail has teeth for engaging the first and second members. The first member and the second member have edges that

engage these teeth in the locked condition. To promote the secure locking of the slide on the rail, the first member is biased to pivot against the rail in a clockwise direction while the second member is biased to pivot against the rail in a counterclockwise direction. In this way, the slide is secured along two different directions. The first member and the second member may comprise a loop that extends around the rail. Both the first member and the second member may be biased in the locked condition. A spring may be used to bias the first and second members in this locked condition. Furthermore, a securing member that secures the web guide to the slider may form a pivot point for the first member and the second member.

Figure 1 is a view of the inventive adjustable turning loop, illustrating rail, slide and D-ring.

Figure 2 is a reverse view of the actuator of Figure 1 in the locked condition.

Figure 3 illustrates the actuator of Figure 2 in the unlocked condition.

Figure 4 illustrates a cross-sectional view of the first and second members in the locked condition.

Figure 5 illustrates the first and second members of Figure 4 in the unlocked condition.

Figure 6 illustrates a seat assembly using the inventive locking mechanism of the previous figures.

Figure 1 illustrates an adjustable turning loop or height adjuster 10 for a seat belt web guide 22 comprising a rail 14 and a slide 18. As shown, the web guide 22 is a D-ring secured to the slide 18 by a securing member 66, here a bolt. The slide 18 receives the rail 14 through a pair of holes 90, 94. In contrast to other adjustable turning loops, the height adjuster 10 has very few components to lock the slide 18 in place at a selected position 30. Specifically, as shown in Figures 2 and 4, the slide 18 has an actuator 26 for locking and unlocking the slide 18 on the rail 14. The actuator 26 has a first loop 42 and a second loop 46, which receive the rail 14 through the pair of holes 90, 94, respectively. In the locked position shown in Figure 4, the first

loop 42 and the second loop 46 engage the teeth 50 of the rail 14 when locked. The first loop 42 has a first edge 54, which engages the teeth 50, while the second loop 46 has a second edge 58, which also engages the teeth 50.

Preferably, the rail 14 is oval in shape to accommodate shape of the loops 42, 46. The first loop 42 and the second loop 46 may be steel stampings. The rail 14 may be made of steel and roll formed with additional steps taken to form any needed holes or bends.

The first loop 42 is pivotally connected to the second loop 46 at a pivot point 48, the center of a nut 49, which is preferably the location for receiving the securing member 66 shown in Figure 1. As shown in Figure 2, a spring 62 is connected to the first loop 42 and second loop 46. The spring 62 is biased to pivot the first loop 42 in a clockwise direction and the second loop 46 in a counterclockwise direction, both directions are into the rail 14 as shown in Figure 4. In this way, the height adjuster 10 is locked at two different locations along the X-axis. Moreover, because the first loop 42 and second loop 46 are biased to pivot in opposite directions, the slide 18 is secured along the X-axis along two different directions.

To unlock the slide 18 for movement along the rail 14, an actuator 26 is pressed in the direction of arrow A from the locked position shown in Figure 2. As shown in Figure 5, the first loop 42 moves in a counterclockwise direction to disengage the first edge 54 from the teeth 50 while the second loop 46 moves in a clockwise direction to disengage the second edge 58 from the teeth 50. Consequently, the first loop 42 and second loop 46 no longer engage the teeth 50 of the rail 14. The rail 14 is free to move through the pair of holes 90, 94. Preferably, the actuator 26 is oriented so that in the event of a crash the seat belt 20 pulls along the direction of arrow B to reinforce locking rather than unlocking.

The actuator 26 of the height adjuster 10 need not be limited for use with adjustable turning loops. As shown in Figure 6, other vehicle components may benefit from such a simplified locking mechanism. Figure 6

illustrates a vehicle seat 70, which is slideably received on a first rail 78 and a second rail 82. The first rail 78 and second rail 82 are both mounted to a vehicle floor 74 as shown. A vehicle seat 70 may be slideably moved along the Y-axis. To lock the seat 70 in place with respect to the first rail 78 and second rail 82, locking mechanisms 86 may be employed on each rail. The locking mechanisms 86 are constructed in the same fashion as a locking mechanism of Figure 1. A handle 90 may be used to lock and unlock the locking mechanisms 86 through known linkages.

CLAIMS

1. A height adjuster (10) for a seat belt web guide (22) comprising:
a rail (14);
a slide (18) for a web guide (22), the slide (18) being slideable on the rail (14);
an actuator (26) for maintaining the slide (18) at a position on the rail (14), the actuator (26) having a locked condition limiting movement of the slide (18) on the rail (14) and an unlocked condition allowing movement of the slide (18) on the rail (14); wherein the actuator (26) comprises a first member and a second member, the first member (42) and the second member (46) pivotable relative to the rail (14), the first member (42) and the second member (46) engaged with the rail (14) in the locked condition and disengaged from the rail (14) in the unlocked condition.
2. A height adjuster (10) for a seat belt web guide (22) according to Claim 1 wherein the first member (42) and the second member (46) are in contact with the rail (14) in the locked condition.
3. A height adjuster (10) for a seat belt web guide (22) according to Claim 2 wherein the rail (14) has teeth (50) for engaging the first member (42) and the second member (46).
4. A height adjuster (10) for a seat belt web guide (22) according to Claim 3 wherein the first member (42) has a first edge (54) and the second member (46) has a second edge (58), the first edge (54) and the second edge (58) are engaged with the teeth (50) in the locked condition.
5. A height adjuster (10) for a seat belt web guide (22) according to Claim 1 wherein the first member (42) is biased to pivot against the rail (14) in

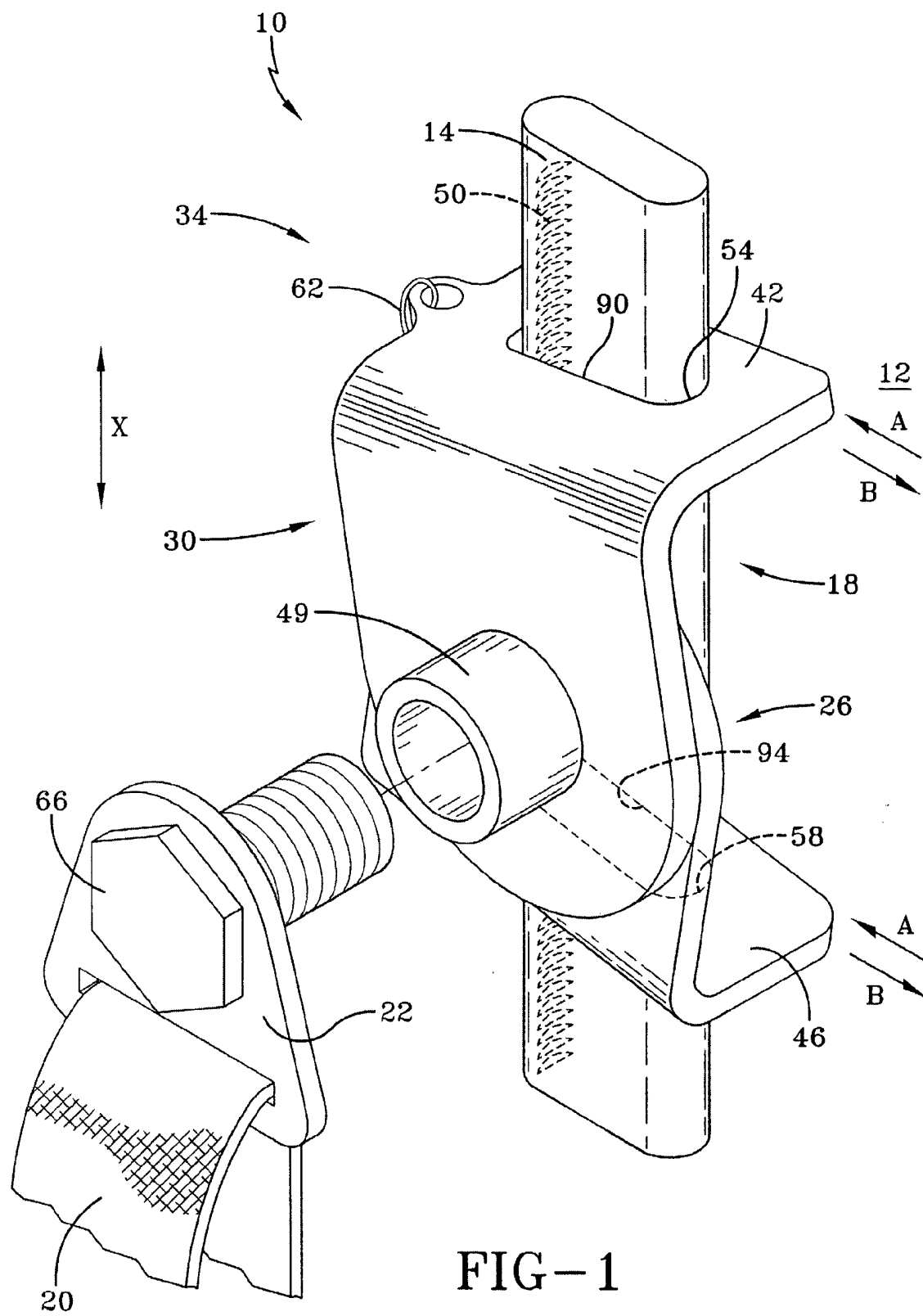
a clockwise direction and the second member (46) is biased to pivot against the rail (14) in a counterclockwise direction.

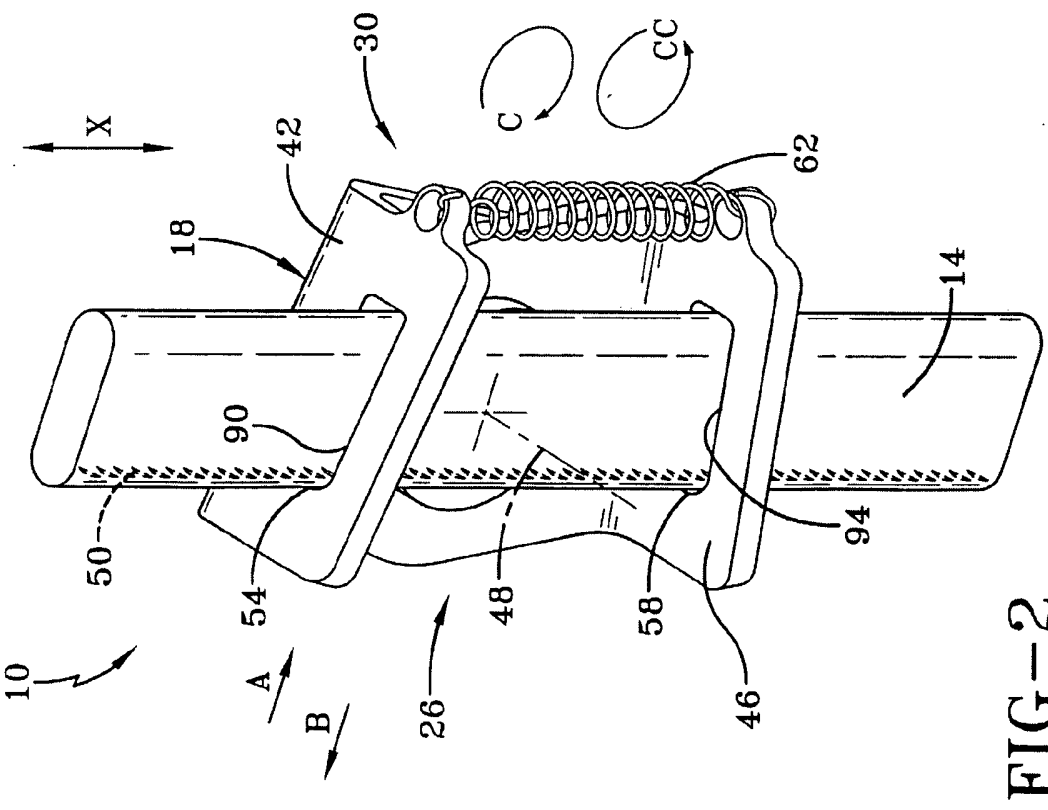
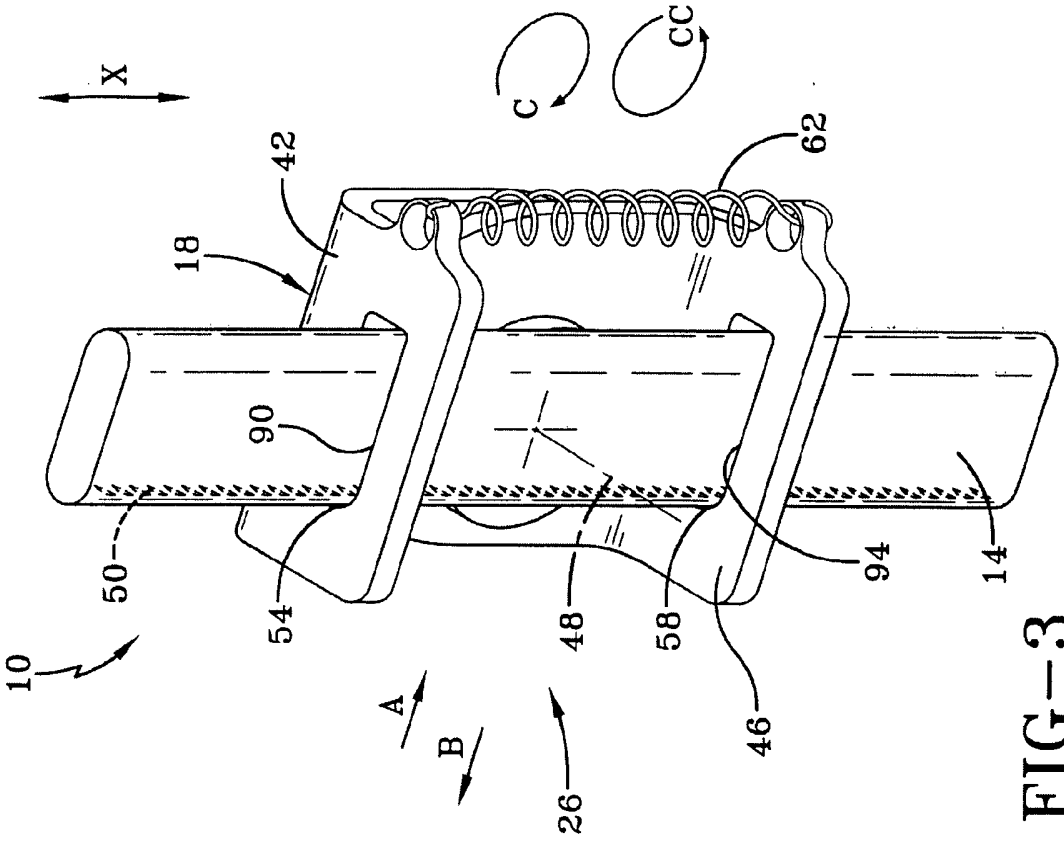
6. A height adjuster (10) for a seat belt web guide (22) according to Claim 1 wherein at least one of the first member (42) and the second member (66) is a loop, the rail (14) disposed in the loop.

7. A height adjuster (10) for a seat belt web guide (22) according to Claim 1 wherein the first member (42) and the second member (46) are biased in the locked condition.

8. A height adjuster (10) for a seat belt web guide (22) according to Claim 5 including a spring for biasing the first member (42) and the second member (46) to be in the locked condition.

9. The height adjuster (10) for a seat belt web guide (22) according to Claim 1 including a securing member (66) for securing the web guide (22) to the slide (18), the first member (42) and the second member (46) being rotatable about the securing member (66).





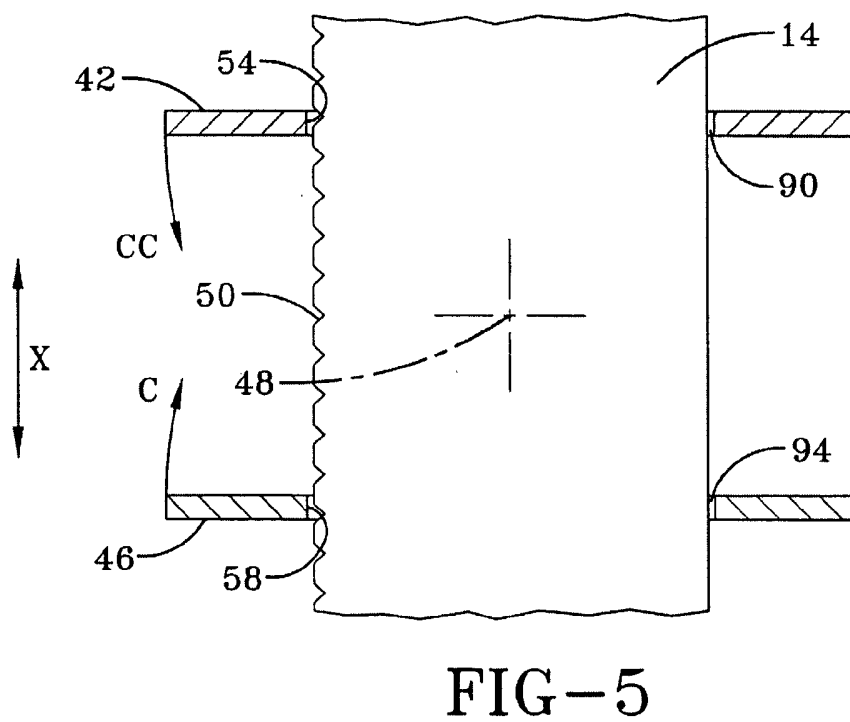
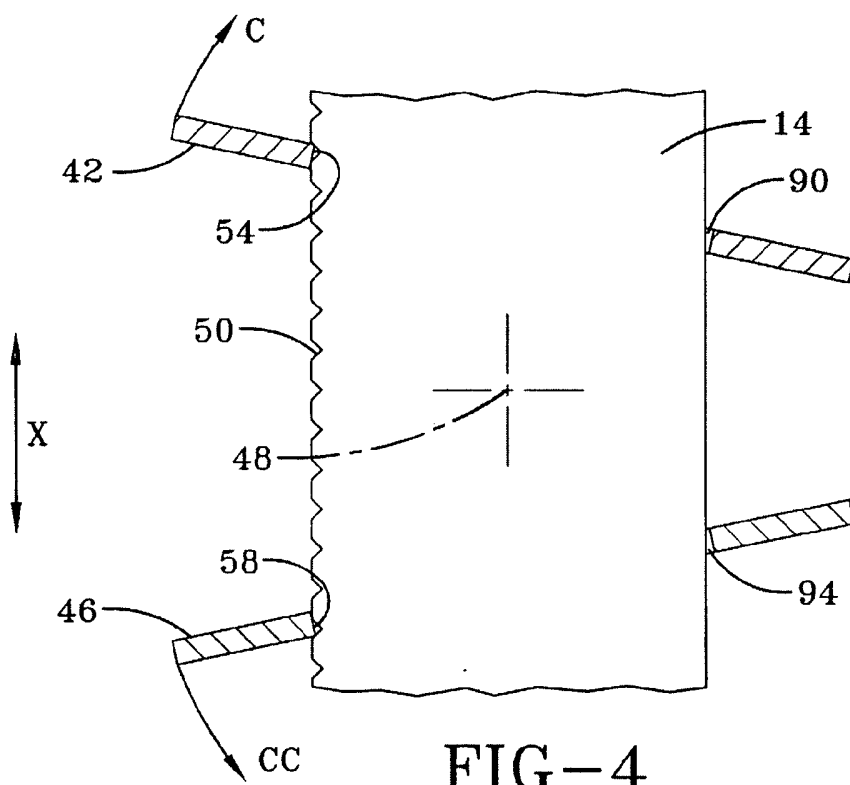


FIG-6

