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(54) **TAILGATE SUPPORT ASSEMBLY WITH  
PUSH-BUTTON RELEASE**

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(57) **ABSTRACT**

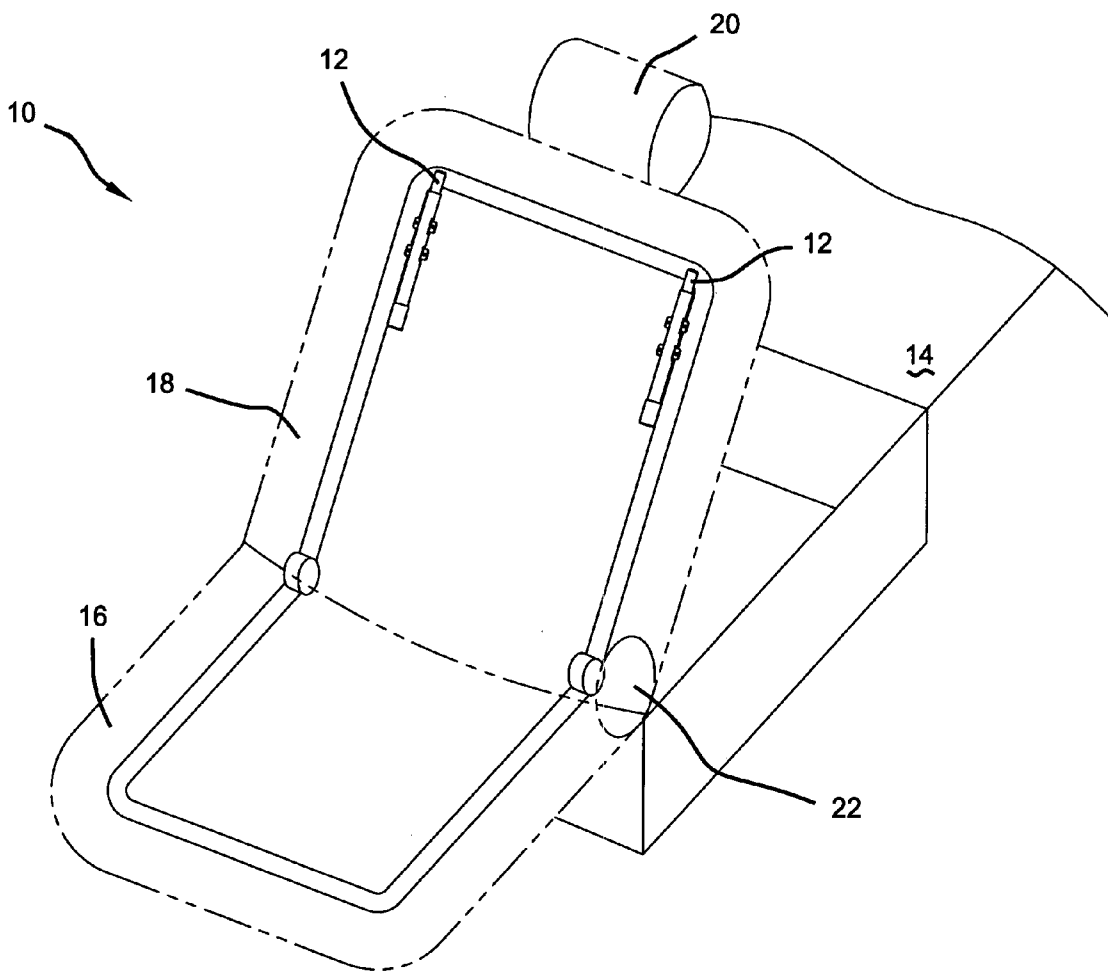
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A seating apparatus is provided including a seating member and a support mechanism. The seating member is pivotable between a first seating position and a second seating position. The support mechanism is attached to the seating member. The support mechanism is operable between a retracted position and an extended position. The support mechanism is adapted to engage a portion of a vehicle to support the seating member in the second seating position.



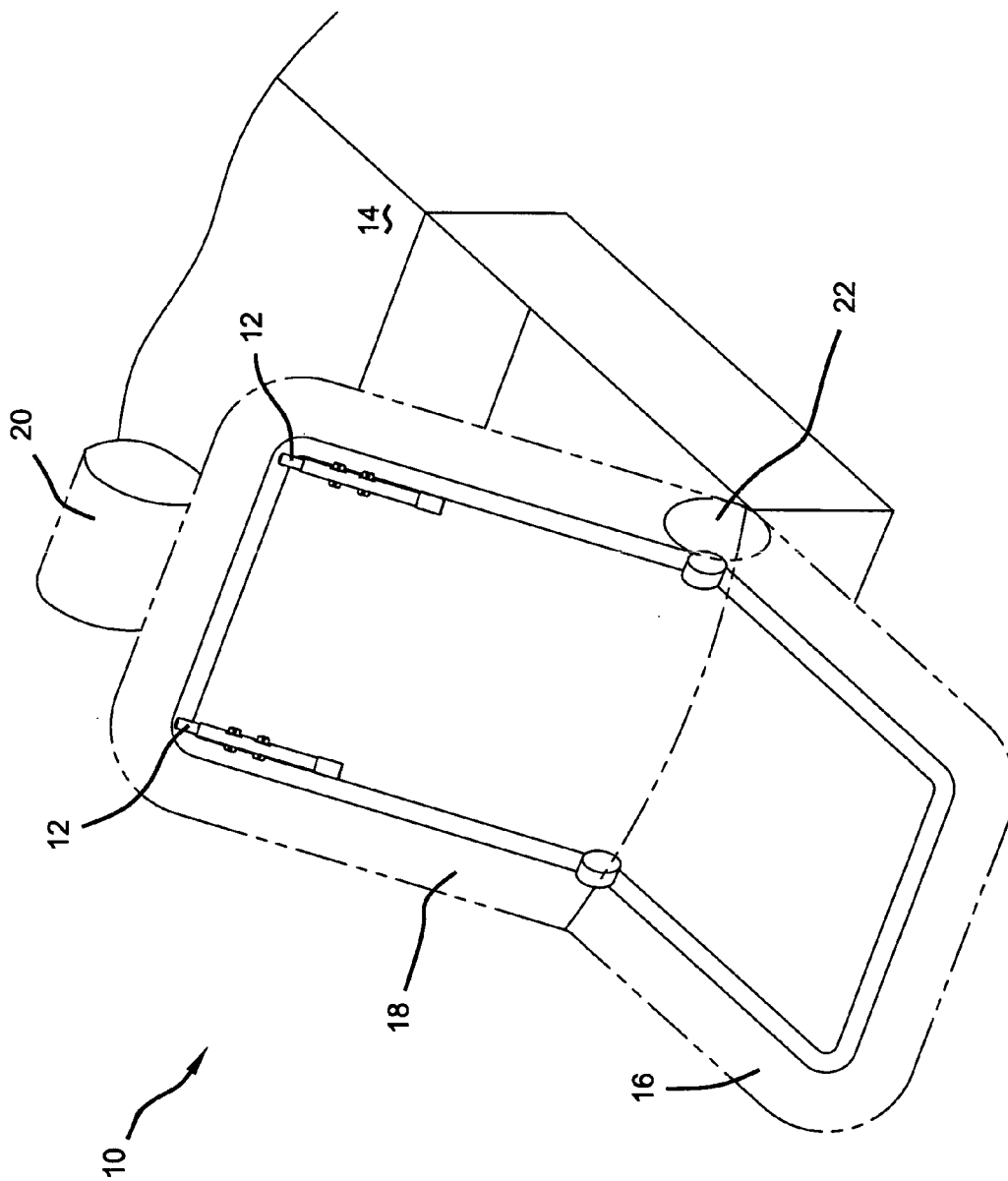


FIG 1

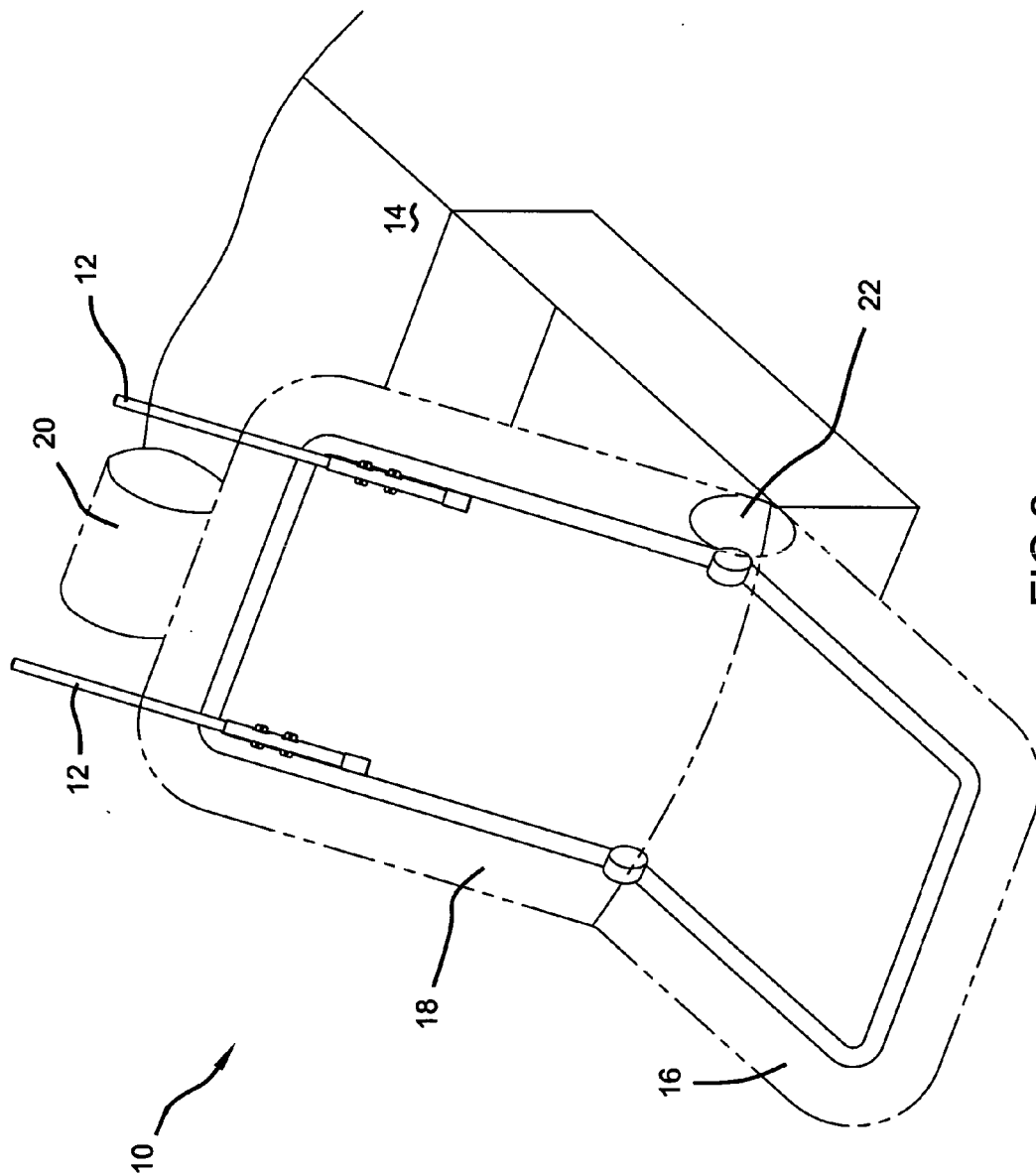


FIG 2

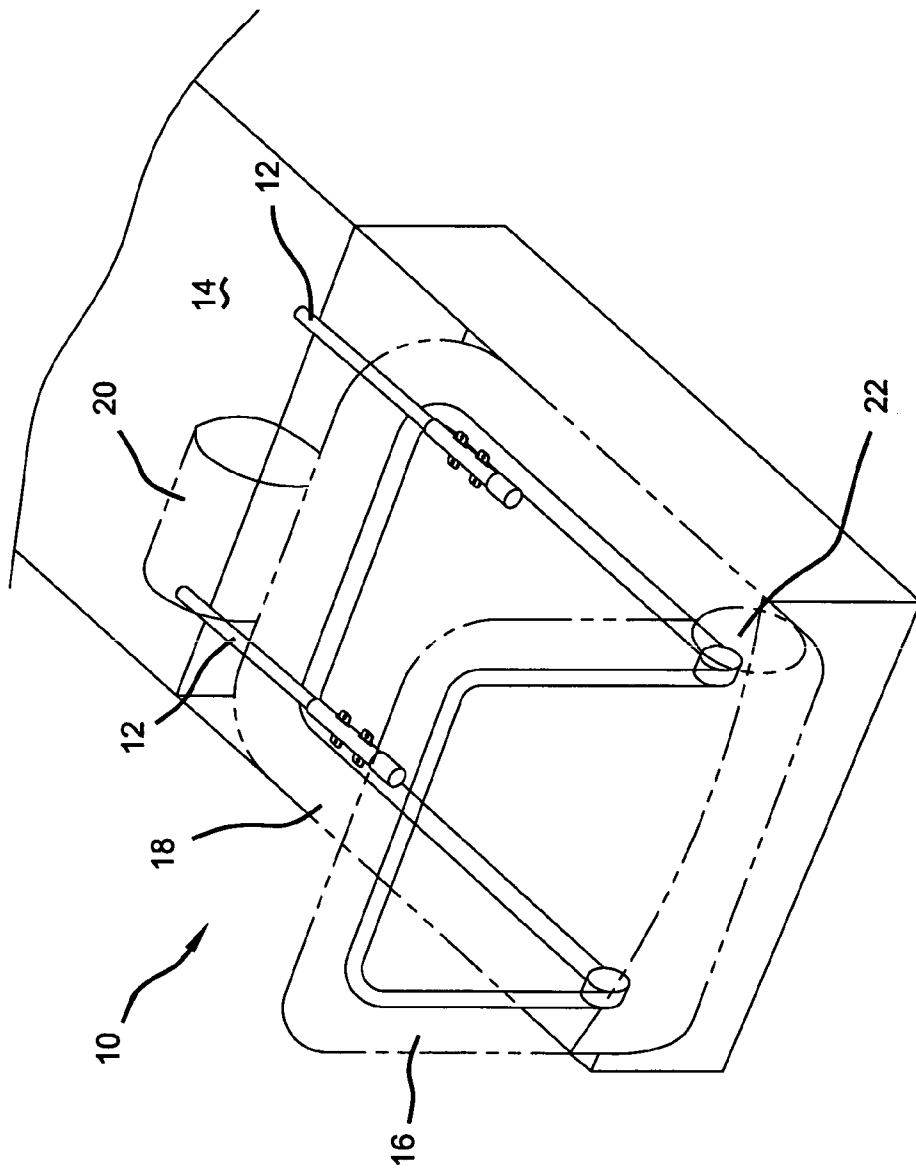


FIG 3

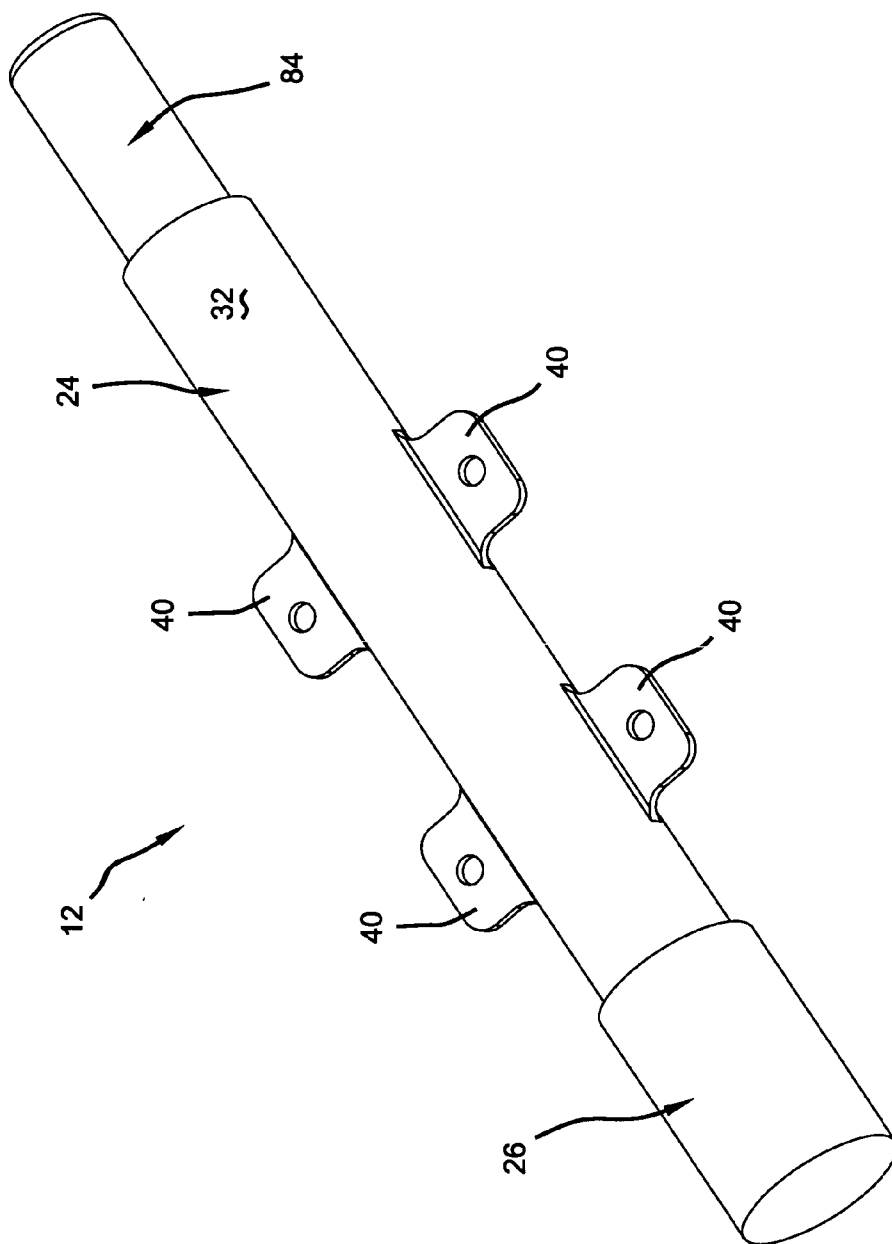


FIG 4

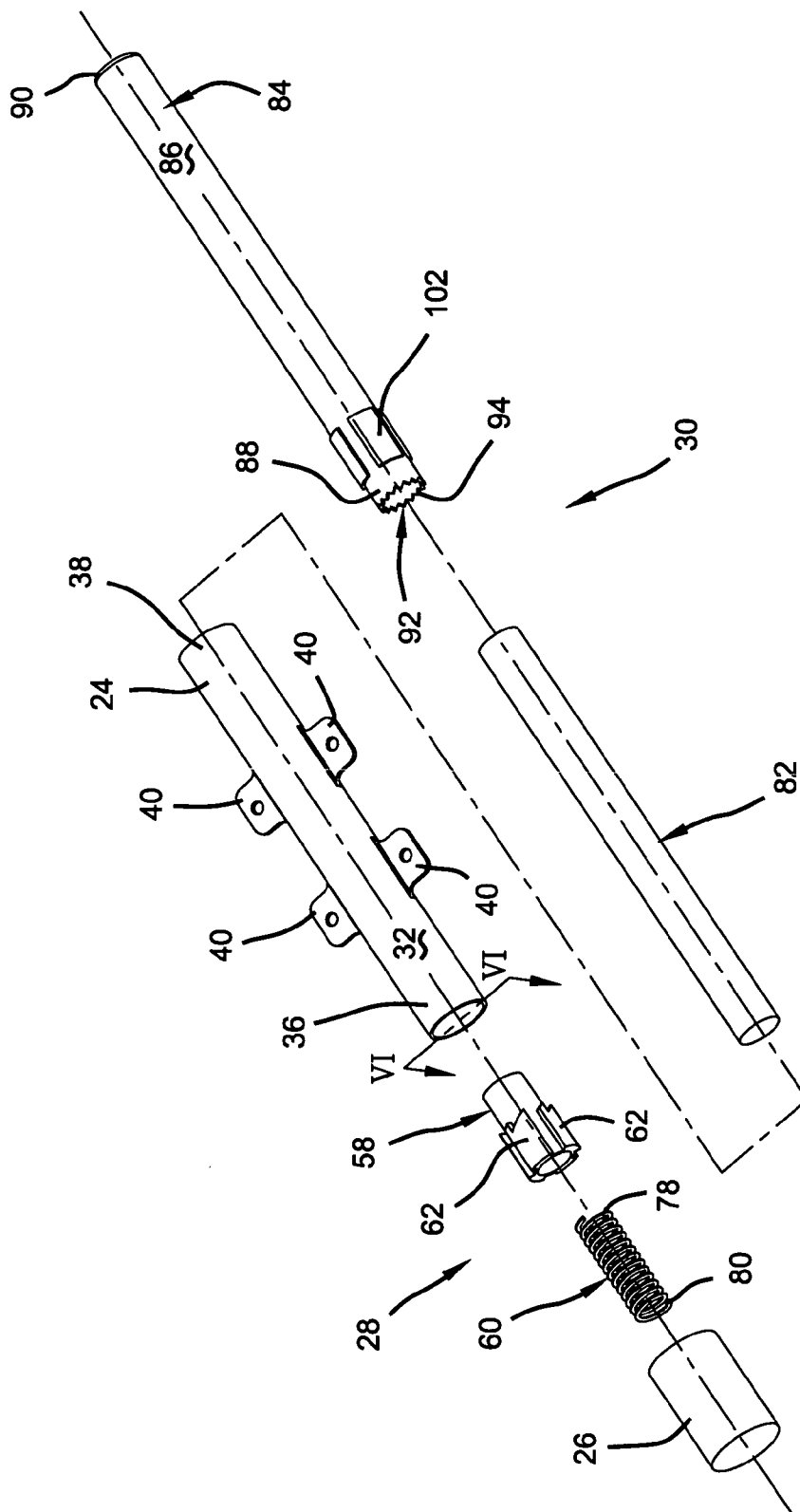


FIG 5

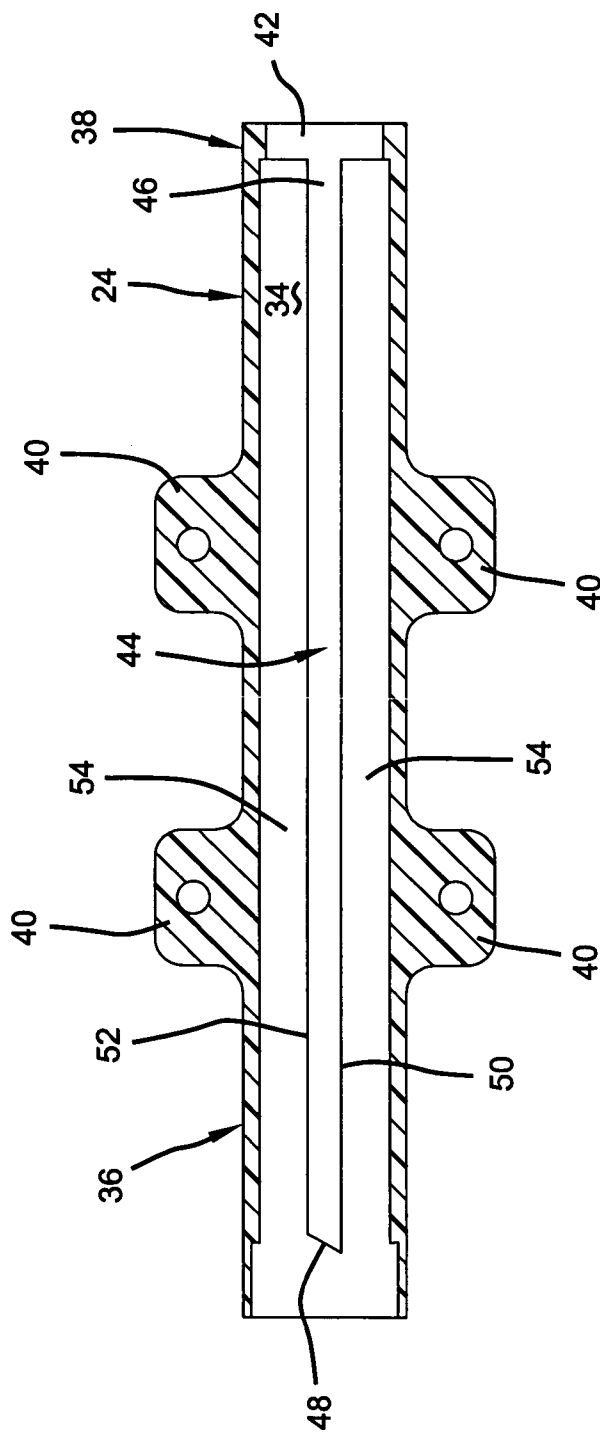


FIG 6

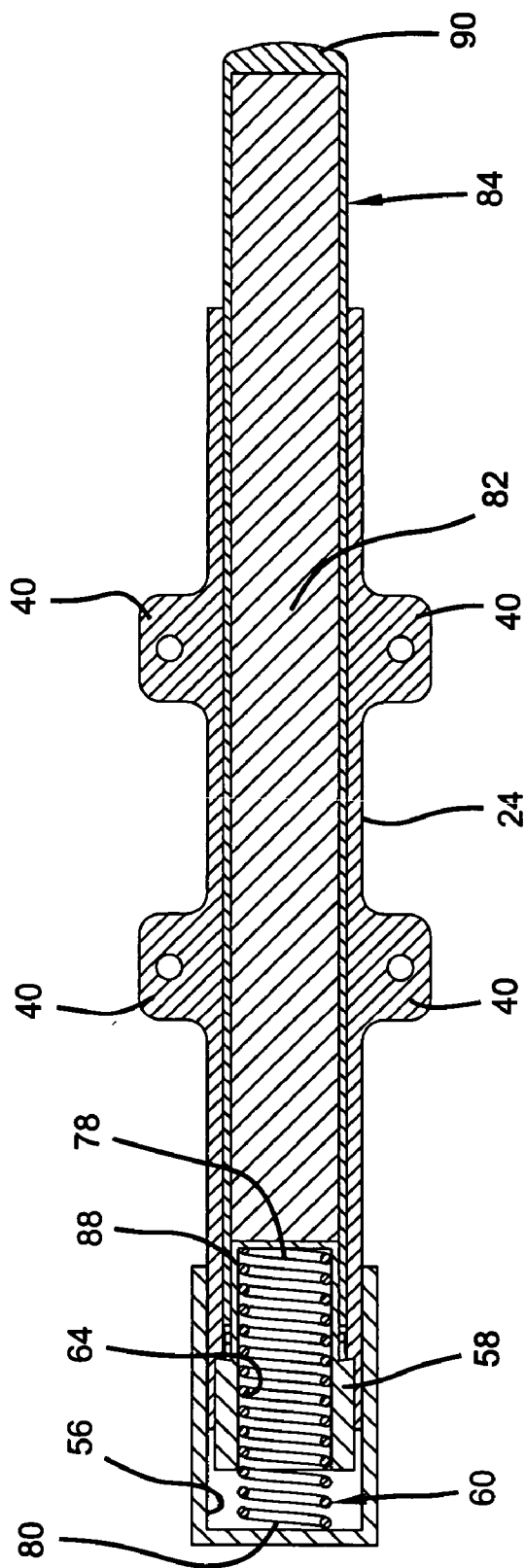


FIG 7



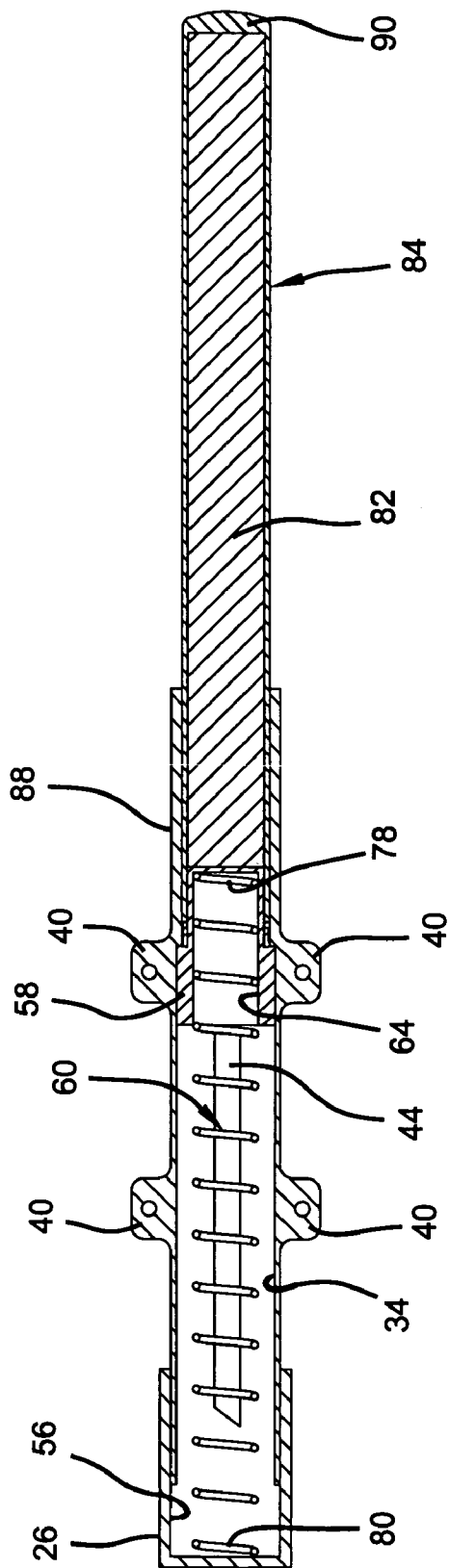
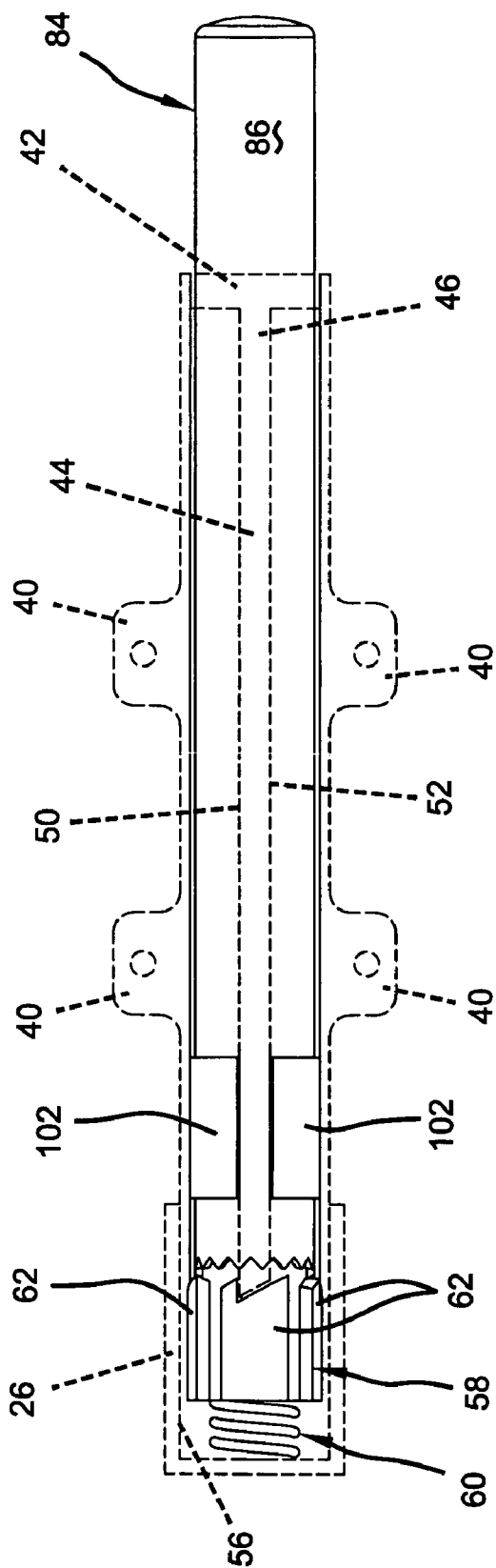


FIG 8



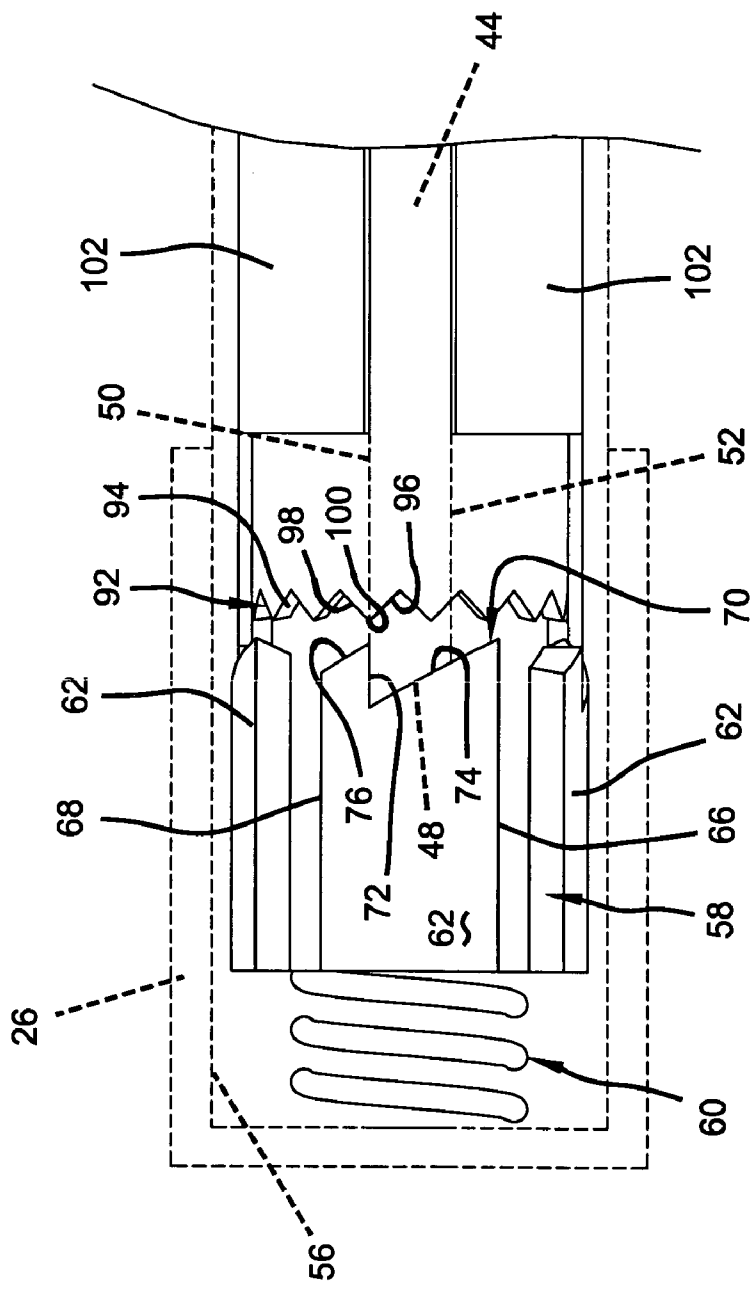


FIG 9B

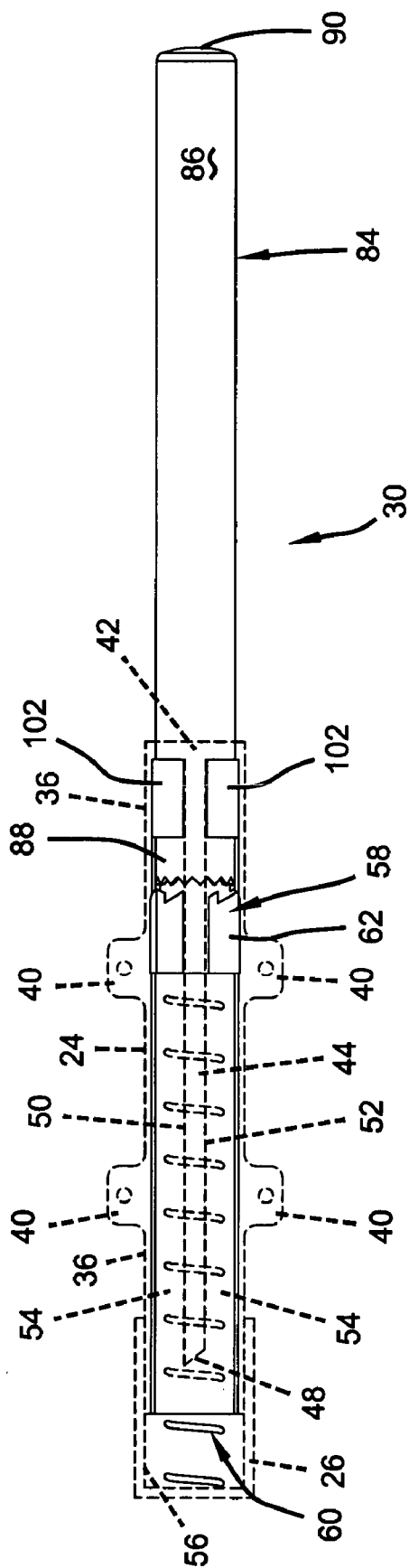


FIG 10

## TAILGATE SUPPORT ASSEMBLY WITH PUSH-BUTTON RELEASE

### FIELD OF THE INVENTION

[0001] The present invention relates to a seat support mechanism and, more particularly, a seat support mechanism adapted for use with a rear or third row seat that is pivotable between a forward facing position and a rearward facing position.

### BACKGROUND OF THE INVENTION

[0002] Minivan and sport utility markets are extremely competitive. A growing focus of the competition is the overall utility and comfort of these vehicles. One important utility feature that is gaining much attention includes flexible vehicle interiors and, more particularly, flexible rear or third row seating assemblies. Flexibility, in this sense, refers to the ability to modify the configuration of a particular seating assembly. For example, when attending an outdoor function, a consumer may desire to utilize the cargo compartment of the vehicle as a seating area. This would allow the consumer to sit within the vehicle while maintaining a direct line of sight with, and being able to hear, individuals outside of the vehicle. Thus, automobile manufacturers have developed a rear or third-row seat that is pivotable about the vehicle body from a forward seating position to a rearward seating position. A problem that exists, however, is that the cargo space of the vehicle is typically not configured to support the vehicle seat in this rear seating position.

### SUMMARY OF THE INVENTION

[0003] A seating apparatus is provided including a seating member and a support mechanism. The seating member is pivotable between a first seating position and a second seating position. The support mechanism is attached to the seating member. The support mechanism is operable between a stored position and a supporting position. The support mechanism is adapted to engage a portion of a vehicle to support the seating member in the second seating position.

[0004] Another aspect of the present invention provides a vehicle seating apparatus including a seat and a support mechanism. The seat includes a first seating member and a second seating member. The seat is pivotable between a first seating position and a second seating position. The support mechanism is attached to the second seating member and is operable between a stored position and a supporting position. The support mechanism is adapted to engage a portion of a vehicle to support the seat in the second seating position.

[0005] Further areas of applicability of the present invention will become apparent from the detailed description provided hereinafter. It should be understood that the detailed description and specific examples, while indicating the preferred embodiment of the invention, are intended for purposes of illustration only and are not intended to limit the scope of the invention.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0006] The present invention will become more fully understood from the detailed description and the accompanying drawings, wherein:

[0007] FIG. 1 is a perspective view of a seating apparatus in accordance with the principles of the present invention in a forward seating position;

[0008] FIG. 2 is a perspective view of the seating apparatus of FIG. 1 having a pair of support mechanisms in an extended position;

[0009] FIG. 3 is a perspective view of the seating apparatus of FIG. 2 in a rearward seating position;

[0010] FIG. 4 is a perspective view of one of the pair of support mechanisms of FIGS. 1-3;

[0011] FIG. 5 is an exploded perspective view of the support mechanism of FIG. 4;

[0012] FIG. 6 is a cross-sectional side view of the support mechanism taken through line VI-VI of FIG. 5;

[0013] FIG. 7 is a cross-sectional side view of the support mechanism of FIG. 4 in a retracted position;

[0014] FIG. 8 is a cross-sectional side view of the support mechanism of FIG. 4 in an extended position;

[0015] FIGS. 9A and 9B are partially hidden detail side views of the support mechanism of FIG. 4 in the retracted position; and

[0016] FIG. 10 is a partially hidden detail side view of the support mechanism of FIG. 4 in an extended position.

### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0017] The following description of the preferred embodiment is merely exemplary in nature and is in no way intended to limit the invention, its application, or uses.

[0018] FIGS. 1-3 depict a seating apparatus 10 having a pair of support mechanisms 12. The seating apparatus 10 is pivotable between a forward seating position, shown in FIGS. 1 and 2, and a rearward seating position, shown in FIG. 3. The support mechanisms 12 are attached to a top portion of the seating apparatus 10 and are operable between a retracted position, shown in FIG. 1, and an extended position, shown in FIGS. 2 and 3. The support mechanisms 12 are adapted to engage a portion of a vehicle body 14, such as a rear door sill, thereby supporting the seating apparatus 10 in its rearward seating position.

[0019] The seating apparatus 10 generally includes a seat bottom 16, a seatback 18, a headrest 20, and a pivot mechanism 22. As shown in FIGS. 1 and 2, the seat bottom 16 is generally horizontal and the seatback 18 is generally upright when the seating apparatus 10 is in its forward seating position. Alternatively, the seat bottom 16 is generally upright and the seatback 18 is generally horizontal when the seating apparatus 10 is in its rearward seating position.

[0020] FIGS. 4-10 depict the support mechanism 12 including a housing sleeve 24, a cap 26, a locking mechanism 28, and a support arm subassembly 30. The housing sleeve 24 and cap 26 contain the locking mechanism 28 and the support arm subassembly 30.

[0021] The housing sleeve 24 generally includes an elongated tubular member having an external surface 32, an internal surface 34, a containing end 36, and a receiving end 38. A plurality of attachment flanges 40 append from the

external surface 32 of the housing sleeve 24. The attachment flanges 40 are adapted to receive fasteners (not shown), such as screws, to fasten the support mechanism 12 to the seating apparatus 10. The internal surface 34 of the housing sleeve 24 defines an internal abutment collar 42 and a plurality of internal guide rails 44, as best seen in FIG. 6. The internal abutment collar 42 extends radially inward from the internal surface 34 and is disposed proximate to the receiving end 38 of the housing sleeve 24. The internal guide rails 44 also extend radially inward from the internal surface 34 of the housing sleeve 24. The internal guide rails 44 each include an abutment end 46, a chamfered end 48, a locking edge 50, and a guide edge 52. The abutment ends 46 of the internal guide rails 44 are disposed adjacent to the internal abutment collar 42. The chamfered ends 48 of the internal guide rails 44 extend at an angle of approximately 45 degrees between the locking edge 50 and guide edge 52. The internal guide rails 44 define a plurality of blind guide slots 54 therebetween. The cap 26 includes a cylindrical body defining a blind bore 56, which is best illustrated in FIGS. 7 and 8. The blind bore 56 receives the containing end 36 of the housing sleeve 24. The cap 26 is fixed to the external surface 32 of the housing sleeve 24 via an adhesive, a set screw, by interference fit, or any other suitable means.

[0022] The locking mechanism 28 includes a nut 58 and a biasing member 60. The nut 58 generally includes a cylindrical body defining a plurality of locking arms 62 and a blind bore 64. As best illustrated in FIG. 9B, the locking arms 62 include first and second longitudinal guide edges 66, 68 and a working edge 70. The working edge 70 includes a locking longitudinal edge 72, an inclined locking surface 74, and an inclined unlocking surface 76. The inclined locking surface 74 and inclined unlocking surface 76 are generally parallel to each other and extend at an angle of approximately 45 degrees relative to the locking longitudinal edge 72. The locking arms 62 each have a semi-circumferential dimension that is slightly less than a semi-circumferential dimension of the blind guide slots 54 defined between the internal guide rails 44 of the housing sleeve 24. This enables the locking arms 62 to freely slide within the blind guide slots 54 upon extension and retraction of the support mechanism 12, as will be discussed in more detail below. The biasing member 60 includes a first end 78 and a second end 80. The first end 78 is disposed within the blind bore 64 of the cylindrical body of the nut 58. The second end 80 is disposed within the blind bore 56 of the cylindrical body of the cap 26. The biasing member 60 biases the nut 58 away from the cap 26. In an exemplary embodiment, the biasing member 60 includes a coil spring.

[0023] The support arm subassembly 30 is disposed within the housing sleeve 24 and includes a support arm 82 and a support arm sleeve 84. The support arm 82 is a generally elongated cylindrical member constructed of a rigid material such as steel. The support arm sleeve 84 is a generally tubular member receiving the support arm 82. The support arm sleeve 84 includes an external surface 86, an open end 88, and a closed end 90. The open end 88 includes a saw-toothed circumferential edge 92. The saw-toothed circumferential edge 92 includes a plurality of teeth 94. As best illustrated in FIG. 9B, the teeth 94 each include a primary edge 96 and secondary edge 98 intersecting through an apex 100 at an angle of approximately 90 degrees.

[0024] The external surface 86 of the support arm sleeve 84 defines a plurality of guide pads 102. The plurality of guide pads 102 extend radially outward from the external surface 86 of the support arm sleeve 84. The plurality of guide pads 102 each have a semi-circumferential dimension that is slightly smaller than the semi-circumferential dimensions of the blind guide slots 54 disposed between the internal guide rails 44 of the housing sleeve 24. This allows the guide pads 102 to freely slide within the blind guide slots 54 during actuation of the support mechanism 12. The plurality of guide pads 102 are disposed within the blind guide slots 54 to maintain the rotational disposition of the support arm subassembly 30 relative to the housing sleeve 24.

[0025] FIGS. 9A and 9B depict the support mechanism 12 in the retracted position. The plurality of internal guide rails 44 on the internal surface 34 of the housing sleeve 24 lockingly engage the working edge 70 of the locking arms 62 of the nut 58. The chamfered ends 48 of each of the internal guide rails 44 engage the inclined locking surfaces 74 of the locking arms 62 of the nut 58. The locking edges 50 of the plurality of guide rails 44 engage the locking longitudinal edges 72 of the working edges 70 of the locking arms 62 of the nut 58. This locking engagement maintains the rotational, as well as the axial disposition, of the locking mechanism 28, support arm subassembly 30, and housing sleeve 24 in this retracted position.

[0026] FIG. 10 depicts the support mechanism 12 in the extended position. The guide pads 102 on the support arm sleeve 84 axially engage the abutment collar 42 on the internal surface 34 of the housing sleeve 24. The locking arms 62 of the nut 58 are disposed within the guide slots 54 located between the internal guide rails 44 on the internal surface 34 of the housing sleeve 24. The biasing member 60 biases the nut 58 and support arm subassembly 30 toward the receiving end 38 of the housing sleeve 24 to maintain this extended position.

[0027] The following steps provide the transition between the above-described retracted and extended positions. With the support mechanism 12 in the retracted position, as illustrated in FIGS. 9A and 9B, a downward axial force is applied to the closed end 90 of the support arm subassembly 30. This force axially displaces the support arm subassembly 30 such that the teeth 94 on the open end 88 of the support arm sleeve 84 engage the working edges 70 of the locking arms 62 of the nut 58. More particularly, the teeth 94 engage the working edges 70 such that their apexes 100 initially contact the inclined locking and unlocking surfaces 74, 76 of the working edge 70 of the locking arms 62 of the nut 58. Subsequently, the primary edges 96 of the teeth 94 slidably engage the respective inclined locking and unlocking surfaces 74, 76. This causes the nut 58 to rotate relative to the support arm subassembly 30 in a clockwise direction, as viewed from the cap 26 of the support mechanism 12 shown in FIGS. 9 and 10.

[0028] Once this initial rotation is achieved, the force applied to the closed end 90 of the support arm subassembly 30 can be released. This enables the biasing member 60 to axially displace the nut 58 in the upward axial direction toward the support arm subassembly 30. Upon such axial displacement, the inclined unlocking surface 74 of the working edge 70 of the locking arm 62 of the nut 58 slidably

engages the chamfered ends 48 of the internal guide rails 44 of the housing sleeve 24. This further causes the nut 58 to rotate in the clockwise direction, as viewed from the cap 26. This further rotation continues until the second longitudinal edge 68 of the locking arms 62 of the nut 58 passes the guide edge 52 of the guide rails 44 of the housing sleeve 24. At this point, the locking arms 62 of the nut 58 are substantially axially aligned with the plurality of blind guide slots 54 in the housing sleeve 24 disposed between the internal guide rails 44. The biasing member 60 is then enabled to fully extend and axially displace the nut 58 and support arm subassembly 30 to the extended position shown in FIG. 10. It should be appreciated that while the support arm subassembly 30 and locking mechanism 28 have been disclosed herein as including a nut 58 having locking arms 62 with working edges 70 adapted to slidably engage and interlock with a plurality of internal guide rails 44 having chamfered ends 48, it is envisioned that any type of manually or automatically actuable device capable of serving the principles of the present invention is intended to be included within the scope of the invention.

[0029] The description of the invention is merely exemplary in nature and, thus, variations that do not depart from the gist of the invention are intended to be within the scope of the invention. Such variations are not to be regarded as a departure from the spirit and scope of the invention.

- 1-2. (canceled)
- 3. The seating apparatus of claim 20 wherein said support mechanism includes a support arm at least partially disposed in a housing.
- 4. (canceled)
- 5. The seating apparatus of claim 4 further comprising a biasing member biasing said support mechanism into said extended position and a locking mechanism for locking said support mechanism in said retracted position.
- 6. The seating apparatus of claim 5 wherein said locking mechanism selectively engages a locking surface of said housing.
- 7. The seating apparatus of claim 5 wherein said locking mechanism is disposed between said support arm and said biasing member.
- 8-9. (canceled)
- 10. The seating apparatus of claim 21 wherein said support mechanism includes a support arm at least partially disposed in a housing.
- 11. (canceled)
- 12. The seating apparatus of claim 11 further comprising a biasing member biasing said support mechanism into said extended position and a locking mechanism for locking said supporting mechanism in said retracted position.
- 13. The seating apparatus of claim 12 wherein said locking mechanism selectively engages a locking surface of said housing.

14. The seating apparatus of claim 13 wherein said locking mechanism is disposed between said support arm and said biasing member.

15.-16. (canceled)

17. The seating apparatus of claim 20 wherein said first seating member and said second seating member are rotated approximately ninety degrees from said first seating position to said second seating position.

18. (canceled)

19. The seating apparatus of claim 21 wherein said first seating member and said second seating member are rotated approximately ninety degrees from said first seating position to said second seating position.

20. A seating apparatus comprising:

- a first seating member operating as a seatback in a first seating position and operating as a seat bottom in a second seating position;
- a second seating member operating as a seat bottom in said first seating position and operating as a seatback in said second seating position, said second seating member pivoting with said first seating member about a fixed pivot between said first seating position and said second seating position; and
- a support mechanism selectively extending from an end of said first seating member opposite said fixed pivot to support said first seating member in said second seating position.

21. A seating apparatus comprising:

- a first seating member and a second seating member pivotal together about a fixed pivot between a first seating position and a second seating position and a support mechanism selectively extendable from an end of one of said first seating member and said second seating member opposite said fixed pivot to retain the seating apparatus in one of said first seating position and said second seating position.

22. The seating apparatus of claim 3 wherein said support arm extends from said housing to an extended position to support said first seating member in said second seating position and retracts generally within said housing to a retracted position when said first seating member is in said first seating position.

23. The seating apparatus of claim 10 wherein said support arm extends from said housing to an extended position to support said one of said first seating member and second seating member in said one of said first seating position and said second seating position and retracts generally within said housing to a retracted position when said one of said first seating member and said second seating member is in the other of said first seating position and said second seating position.

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