



US 20090031541A1

(19) **United States**(12) **Patent Application Publication**  
**Pribonic**(10) **Pub. No.: US 2009/0031541 A1**(43) **Pub. Date: Feb. 5, 2009**(54) **PASSENGER RESTRAINT SYSTEM****Publication Classification**(76) Inventor: **Edward M. Pribonic, Seal Beach, CA (US)**(51) **Int. Cl.**  
**A44B 11/25** (2006.01)(52) **U.S. Cl.** ..... **24/603**(57) **ABSTRACT**

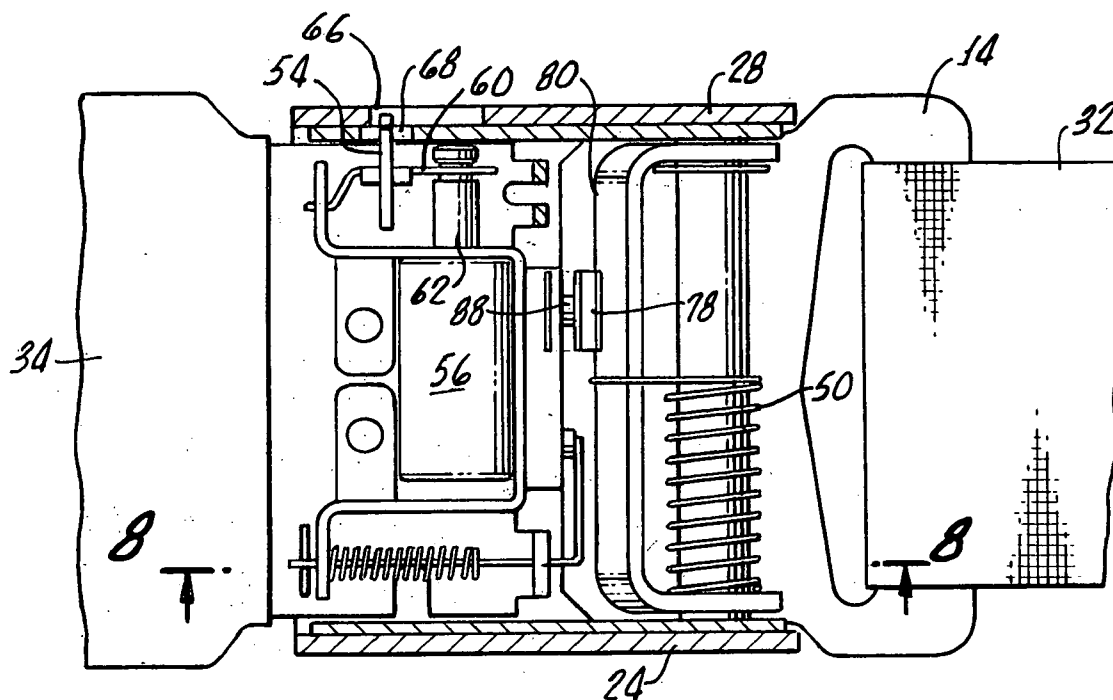
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A passenger restraint system includes a seatbelt buckle mechanism which includes a tongue having an aperture for receiving the belt and a pair of opposing recesses formed in an opposite edge of the tongue. A housing is provided for receiving a tongue and a latch is pivotably attached to the housing for locking the tongue to the housing. A retainer is provided for releasably locking the housing and latch and a solenoid is disposed in an operative relationship with the retainer for moving the retainer out of engagement with the latch in a remote manner. Apertures in the housing and latch enable mechanical access to the retainer for moving the retainer out of engagement with the latch independent of this solenoid if desired or necessary.

(21) Appl. No.: **12/177,762**(22) Filed: **Jul. 22, 2008****Related U.S. Application Data**

(60) Provisional application No. 60/962,199, filed on Jul. 27, 2007.



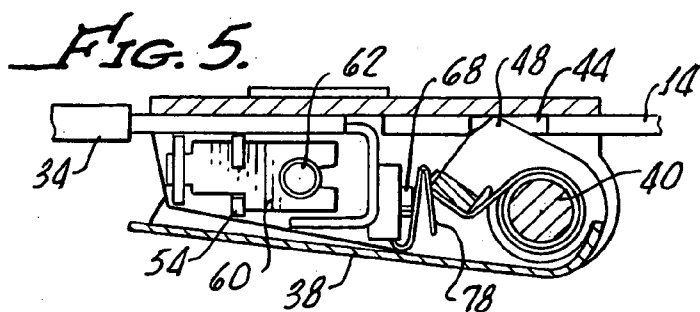
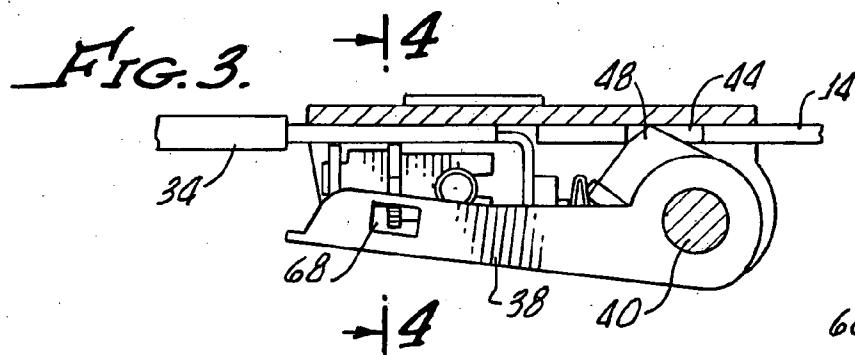
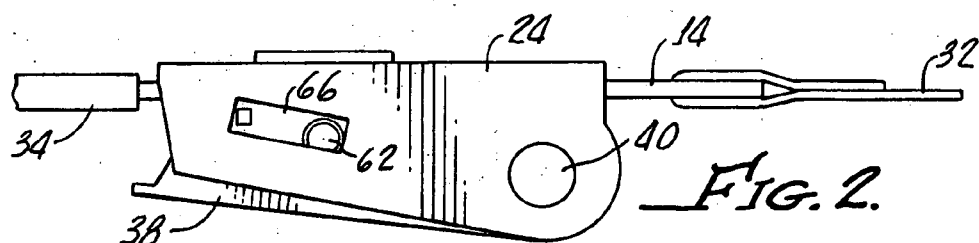
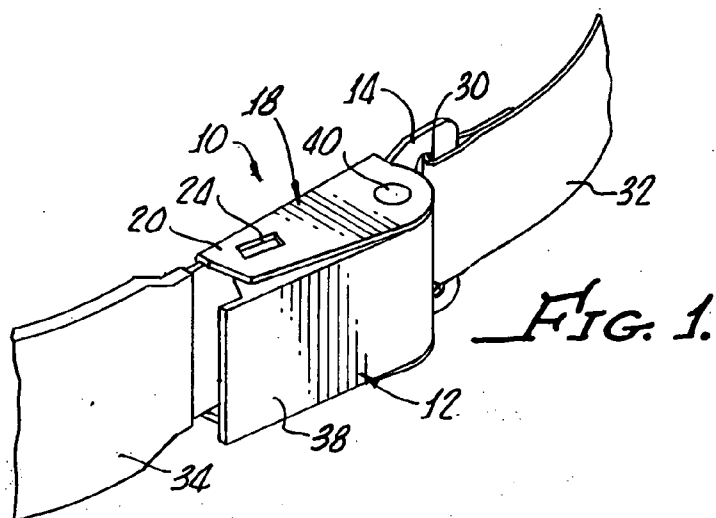
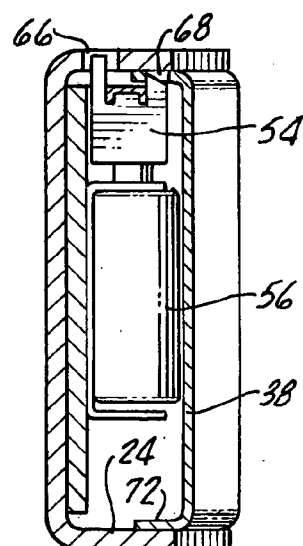


FIG. 4.



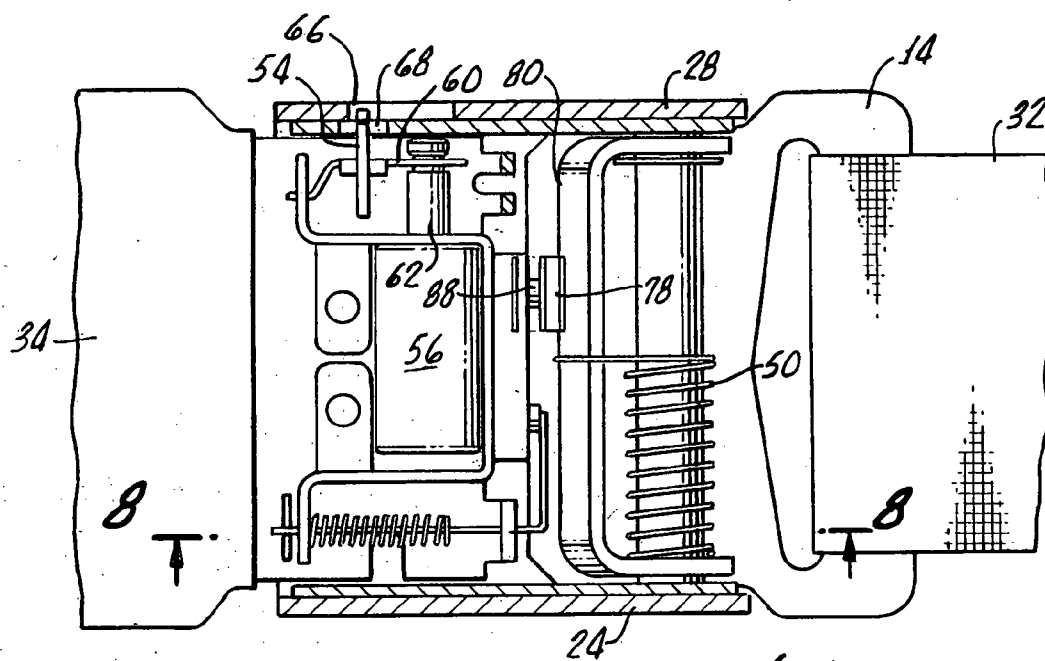


FIG. 6.

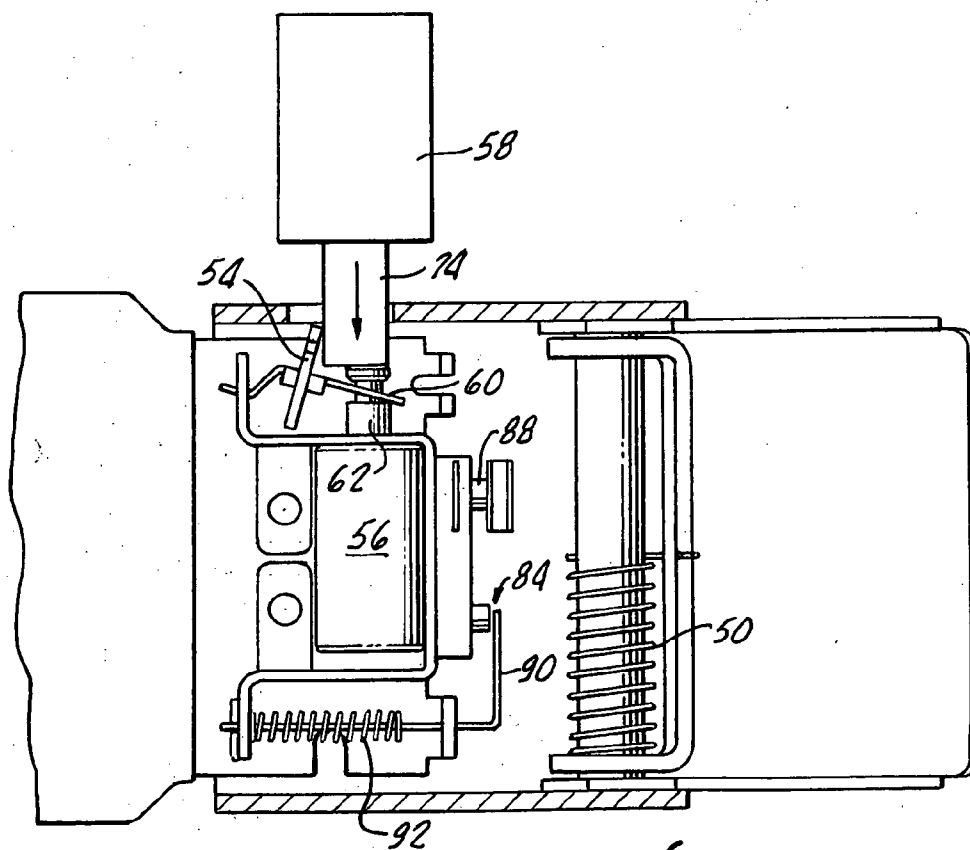


FIG. 7.

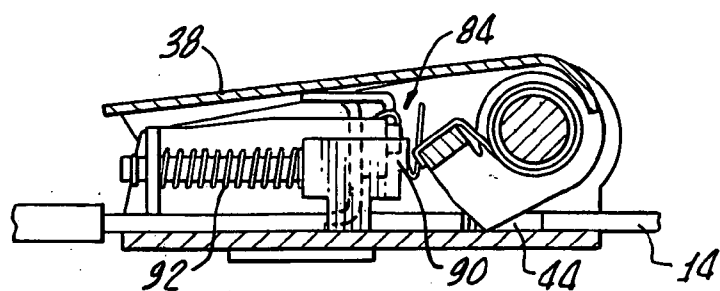


FIG. 8.

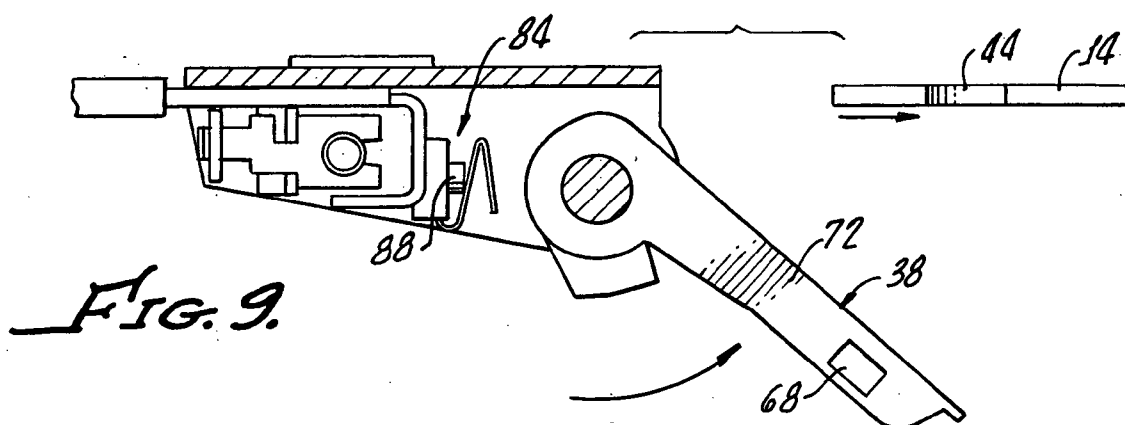


FIG. 9.

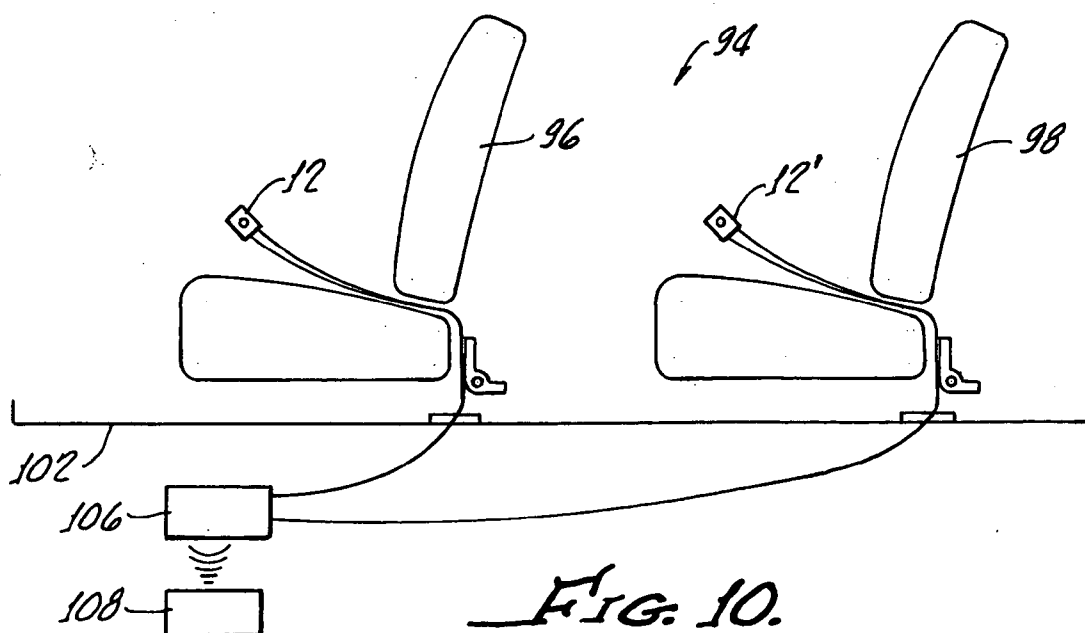


FIG. 10.

## PASSENGER RESTRAINT SYSTEM

**[0001]** The present invention generally relates to systems for safely restraining passengers and is more particularly directed to systems for the restraint of passengers on an amusement ride.

**[0002]** Seatbelt locking devices have been developed for allowing operators to control the locking and unlocking of seatbelts. Typically, the seat belt locking system includes a buckle portion into which a latching tongue is inserted and held by a retractable element.

**[0003]** The latching tongue can be removed from the buckle by depressing a releasing lever.

**[0004]** While each of the seat belt buckles should be operable remotely, there is also a need for individual operation of the belts, if necessary, upon loss of electrical power.

**[0005]** Accordingly, there is a need for a seatbelt locking system which can be activated by a remote operator, other than the user of the seat belt and for determining the status of each seatbelt before operation of the amusement ride. Further, there is a need for a seatbelt locking system, or passenger restraint system, which enables override of the operators' locking of each of the seatbelt buckles.

## SUMMARY OF THE INVENTION

**[0006]** A passenger restraint system in accordance with the present invention generally includes a seatbelt buckle mechanism which, in turn, includes a tongue having an aperture for receiving a belt and a pair of opposing recesses are formed in opposing edges of the tongue.

**[0007]** A housing is provided with a base and upstanding sidewalls for receiving the tongue therebetween along with the latch pivotably attached between the upstanding sidewalls and spaced apart from the housing body for enabling the tongue to pass thereunder.

**[0008]** The latch includes depending sidewalls and spaced apart depending lugs which are receivable by the tongue opposing recesses for locking the tongue to the housing upon closing of the latch onto the housing. A spring mechanism is provided for holding the latch in a closed position and a retainer is also provided for latching engaging the housing and latch sidewalls for preventing pivoting of the latch. Thus, once latched, the tongue cannot be removed from the housing.

**[0009]** Removal of the tongue is enabled by a solenoid which is disposed in an operative relationship with the retainer for moving the retainer out of engagement with the latch sidewall. The solenoid is remotely operated and enable, independent or simultaneous operation of a plurality of a seatbelt buckles.

**[0010]** Apertures in the housing sidewall and the latching sidewall which are aligned with one another enable mechanical access to the retainer for moving the retainer out of engagement with the latch sidewall independent of the solenoid. This, in effect, provides an override for enabling individual opening of seatbelt buckles.

**[0011]** For remote operation, a controller is provided for operating the solenoids.

**[0012]** A plurality of seatbelt buckle mechanisms may be part of a passenger restraining system which may also include a plurality of seats disposed on a conveyor.

**[0013]** Each of the belt buckles include a tongue sensor for indicating full insertion of the tongue into a housing between the upstanding sidewalls and a latch sensor for indicating

closure of the latch. Thus, each belt buckle mechanism of the system may be remotely monitored by a operator/controller.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0014]** The present invention may be more readily understood by consideration of the following detailed description when taken in conjunction with the accompanying drawings, in which:

**[0015]** FIG. 1 is a perspective view of passenger restraint system in accordance with the present invention generally illustrating a seatbelt buckle mechanism, a tongue, housing, and latch along with extending belt portions;

**[0016]** FIG. 2 is an elevation view of the passenger restraint system shown in FIG. 1;

**[0017]** FIG. 3 is a cross sectional view of the elevation view shown in FIG. 2;

**[0018]** FIG. 4 is a cross sectional view taken along the line 4-4 of FIG. 3;

**[0019]** FIG. 5 is a cross sectional view illustrating more clearly a latch sensor for indicating closure of the latch;

**[0020]** FIG. 6 is a top plan view of the restraint system more clearly illustrating a spring mechanism for holding the latch in a closed position, a retainer for engaging at least one of the latch sidewalls and a solenoid for moving the retainer out of engagement with the latch sidewall;

**[0021]** FIG. 7 is a top plan view illustrating the mechanical operation of opening the latch independent of the solenoid through the use of a separate key insertable through both of the housing and latch sidewalls;

**[0022]** FIG. 8 is a cross sectional view taken along the line 8-8 of FIG. 6 illustrating actuation of a latch sensor;

**[0023]** FIG. 9 is a cross sectional view illustrating the opening of the latch and release of the tongue from the housing; and

**[0024]** FIG. 10 is an illustration of a patent restraint system in accordance with the present invention utilizing a plurality of seats disposed on a conveyance and a plurality of seatbelt mechanisms as hereinabove described and installed on corresponding seats along with a controller.

## DETAILED DESCRIPTION

**[0025]** With reference to FIGS. 1-9, there is shown a passenger restraint system 10 which includes a seat buckle mechanism 12 including a tongue 14, a housing 18 having a base 20, and upstanding sidewalls 24, the sidewalls 24 being spaced apart for receiving the tongue 14 therebetween.

**[0026]** The tongue 14 includes an aperture 30 for receiving a belt 32 in a conventional manner.

**[0027]** An opposing belt 34 is attached to the housing 18, also in a conventional manner.

**[0028]** As shown in the figures, a latch 38 is attached by pivot 40 to the housing sidewalls 24 in a spaced apart manner from the housing bottom 20 for enabling the tongue 14 to pass thereunder as shown in FIGS. 3-8.

**[0029]** The tongue 14 includes a pair of opposing recesses 44 and is arranged for engagement by latch lugs 48, as shown in FIG. 3 for locking the tongue 14 to the housing 18 upon closing of the latch 38 onto the housing 18, as shown in FIGS. 3-5.

**[0030]** As best shown in FIGS. 6 and 7, a spring mechanism 50 is utilized for holding the latch 38 in the closed position.

[0031] Also, as best illustrated in FIG. 6, a spring loaded retainer 54 releasably locks the housing 18 and the latch 38 to another thereby preventing pivoting of the latch 38 and release of the tongue 14.

[0032] Release of the latch 38 from the housing 18 may be affected through either a solenoid 56 or a key 58, as illustrated in FIGS. 6 and 7. A linkage 60 interconnecting a solenoid piston 62 withdraws the retainer from aligned housing aperture 66 and latch aperture 68, the latch aperture being formed in depending sidewall 72 as best illustrated in FIG. 9.

[0033] As shown in FIG. 7, the apertures 66, 68 also enables the movement of the retainer 54 out of a locking position by insertion of a key 58 having a suitable shank 74 for insertion through the apertures 66, 68 and a movement of the piston 62 and concomitant movement of the retainer 54.

[0034] With reference to FIG. 6, a tongue sensor 78 is positioned for engaging a tongue front 80 when the tongue is fully inserted into the housing 18 thereby indicating a coupling position between the belts 32 and 34. A conventional micro switch may be utilized for the tongue sensor 78.

[0035] Indication of a locked latch 38 by way of a latch sensor 84 which includes a micro switch 88 contact arm 90 and biasing spring 92, see FIG. 7.

[0036] With reference to FIG. 10, there is shown a passenger restraint system 94 in accordance with the present invention which includes a plurality of buckle mechanisms 12, 12', these mechanisms being identical to the buckle mechanism 12 hereinabove described.

[0037] In combination, the system 94 includes a plurality of seats 96, 98 disposed on a conveyance 102 such as an amusement ride, not shown in detail.

[0038] A controller 106 interconnected to the solenoid 56 and tongue and latch sensors 78, 84 is provided for both operating the latch and for monitoring the status of the belt configuration, that is, tongue inserted, and latch closed. These parameters are important in operation of the ride.

[0039] The controller may be hardwired to the buckle mechanism 12, 12' through a rail configuration (not shown) or wireless transmission to a fixed controller 108 may be provided in a conventional manner.

[0040] Although there has been hereinabove described a specific seat belt buckle in accordance with the present invention for the purpose of illustrating the manner in which the invention may be used to advantage, it should be appreciated that the invention is not limited thereto. That is, the present invention may suitably comprise, consist of, or consist essentially of the recited elements. Further, the invention illustratively disclosed herein suitably may be practiced in the absence of any element which is not specifically disclosed herein. Accordingly, any and all modifications, variations or equivalent arrangements which may occur to those skilled in the art, should be considered to be within the scope of the present invention as defined in the appended claims.

What is claimed is:

1. A passenger restraint system comprising:
  - a seat belt buckle mechanism comprising:
    - a tongue having an aperture for receiving a belt and a pair of opposing recesses formed in opposing edges of said tongue;
    - a housing having a base and upstanding sidewalls for receiving said tongue therebetween;
    - a latch pivotably attached between the upstanding sidewalls and spaced apart from the housing bottom for enabling said tongue to pass thereunder, said latch

including depending sidewardly and spaced apart depending lugs receivable by the tongue opposing recesses for locking said tongue to said housing upon closing said latch onto said housing;

- a spring mechanism for holding said latch in a closed position;
- a retainer for releasably locking said housing and latch for prevent pivoting of said latch;
- a solenoid, disposed in an operative relationship with said retainer, for moving said retainer out of engagement with the latch lug sidewall;
- apertures in the housing sidewall and the latch sidewall and, aligned with one another for enabling mechanical access to said retainer for moving said retainer out of engagement with the latch sidewall independently of said solenoid; and
- a controller for operating said solenoid.

2. The system according to claim 1 further comprising a tongue sensor for indicating full insertion of said tongue into said housing between the upstanding sidewalls.

3. The system according to claim 2 further comprising a latch sensor for indicating closure of said latch.

4. The system according to claim 1 further comprising a plurality of seat buckle mechanisms, each mechanism comprising:

- a tongue having an aperture for receiving a belt and a pair of opposing recesses formed in opposing edges of said tongue;
- a housing having a base and upstanding sidewall, for receiving said tongue therebetween;
- a latch pivotably attached between the upstanding sidewalls and spaced apart from the housing bottom for enabling said tongue to pass thereunder, said latch including depending sidewalls and spaced apart depending lugs receivable by the tongue opposing recesses for locking said tongue to said housing upon closing said latch onto said housing;
- a spring mechanism for holding said latch in a closed position;
- a retainer for releasably locking said housing and latch for prevent pivoting of said latch;
- a solenoid, disposed in an operative relationship with said retainer, for moving said retainer out of engagement with the latch sidewall;
- apertures in the housing sidewall and the latch sidewall and aligned with one another for enabling mechanical access to said retainer for moving said retainer out of engagement with the latch sidewall independently of said solenoid;
- a controller for operating said solenoid;
- a tongue sensor for indicating full insertion of said tongue into said housing between the upstanding sidewall;
- a latch sensor for indicating closure of said latch; and
- a canted circuit for operating said solenoids.

5. The system according to claim 4 further comprising a plurality of seats with each seat belt mechanism installed on a corresponding seat for removably restraining a passenger in at least one of the seats.

6. The system according to claim 5 wherein said controller includes status elements for indicating a position of each tongue and each latch.

7. A passenger restraint system comprising:  
a plurality of seats disposed on a conveyance;  
a seat belt mechanism installed on corresponding seats for removably restrain a passenger in at least one of the seats, each mechanism comprising:  
a tongue having an aperture for receiving a belt and a pair of opposing recesses formed in opposing edges of said tongue;  
a housing having a base and upstanding sidewall, for receiving said tongue therebetween;  
a latch pivotably attached between the upstanding sidewalls and spaced apart from the housing bottom for enabling said tongue to pass thereunder, said latch including depending sidewalls and spaced apart depending lugs receivable by the tongue opposing recesses for locking said tongue to said housing upon closing said latch onto said housing;  
a spring mechanism for holding said latch in a closed position;  
a retainer for releasably locking said housing and latch for prevent pivoting of said latch;

a solenoid, disposed in an operative relationship with said retainer, for moving said retainer out of engagement with the latch sidewall;  
apertures in the housing sidewall and the latch sidewalls and aligned with one another for enabling mechanical access to said retainer for moving said retainer out of engagement with the latch sidewall independently of said solenoid; and  
a controller for operating said solenoid.

8. The system according to claim 7 further comprising a plurality of tongue sensors for indicating full insertion of one of said tongues into a corresponding housing between the upstanding sidewalls.

9. The system according to claim 8 further comprising a plurality of tongue sensors for indicating full insertion of the tongues in corresponding housings.

10. The system according to claim 8 further comprising a plurality of latch sensors for indicating closure the latch in corresponding housing.

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