Oct. 20, 1964 G. LA VERNE RUNKLE ETAL 3,153,398

SCHOOL BUS SAFETY GATE

Filed Sept. 5, 1963 8 Sheets-Sheet 1

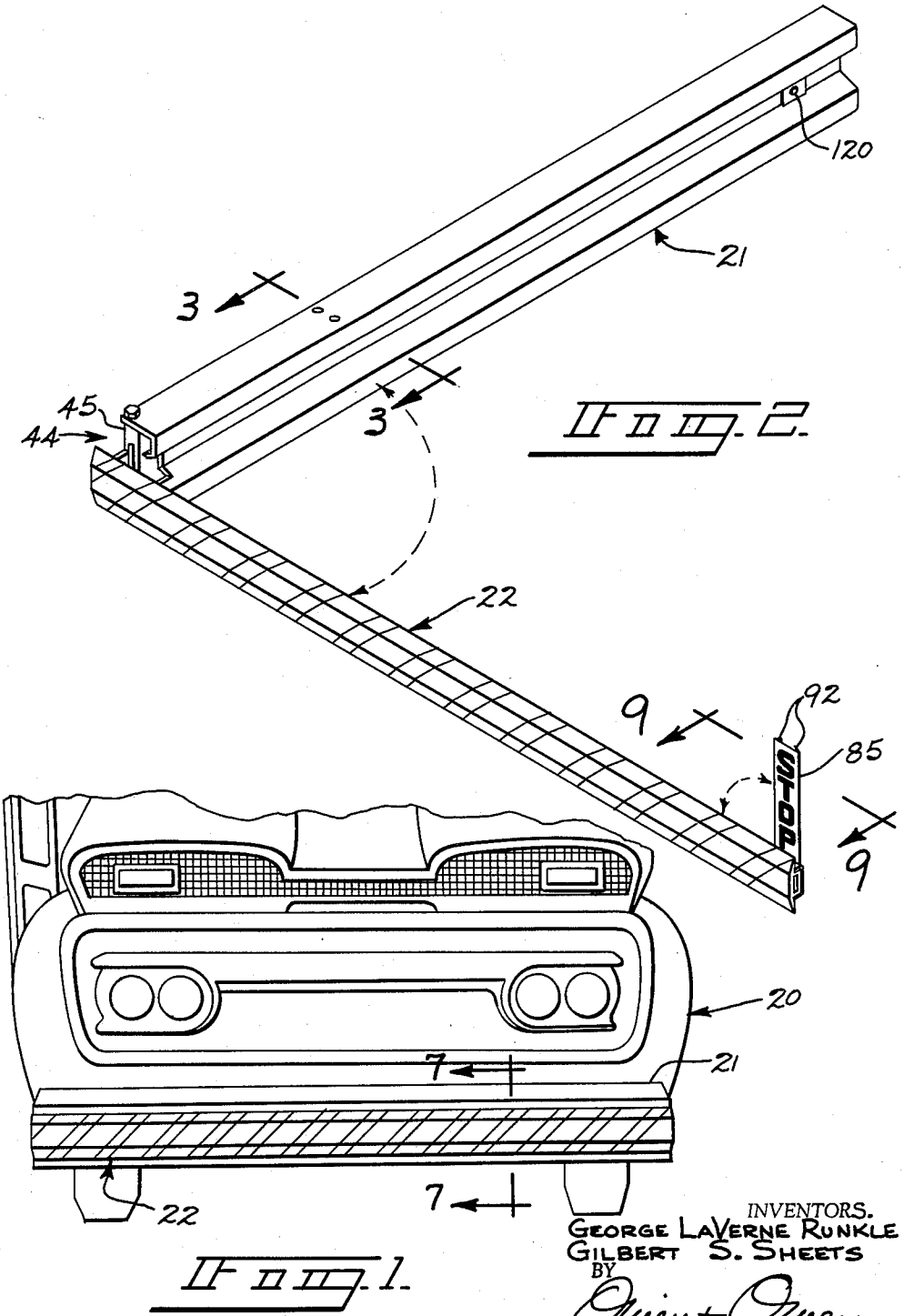


Fig. 2.

Fig. 1.

INVENTORS.
GEORGE LAVERNE RUNKLE
GILBERT S. SHEETS
BY
Owen & Owen
ATTORNEYS

Oct. 20, 1964 G. LA VERNE RUNKLE ETAL 3,153,398

SCHOOL BUS SAFETY GATE

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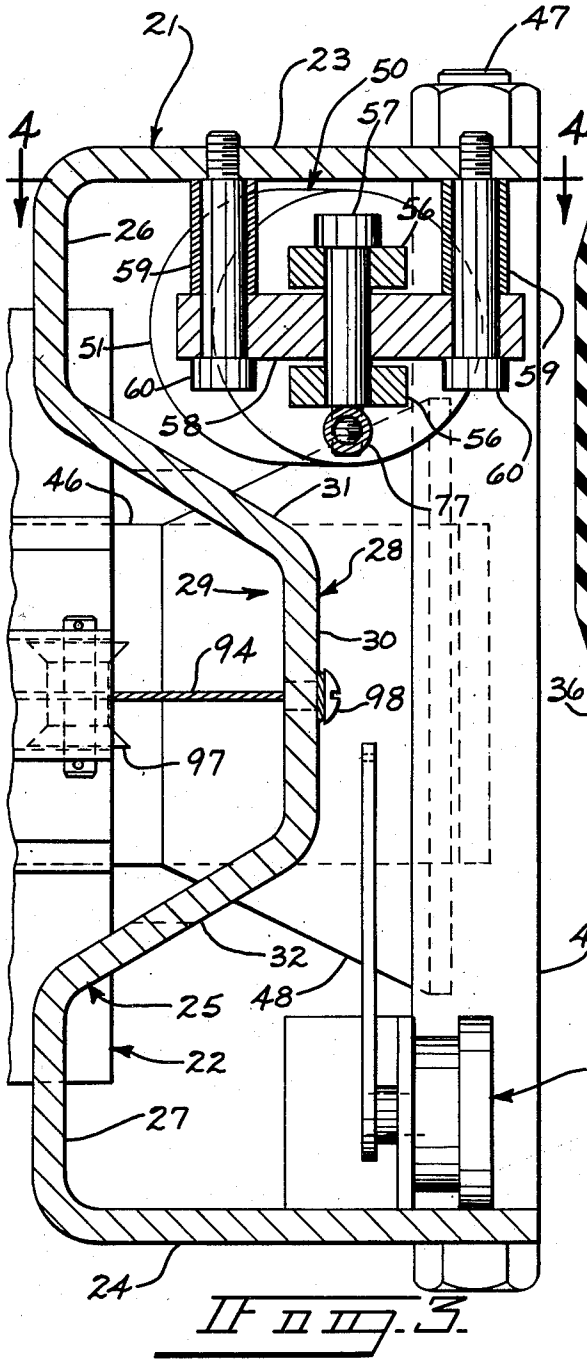


FIG. 3.

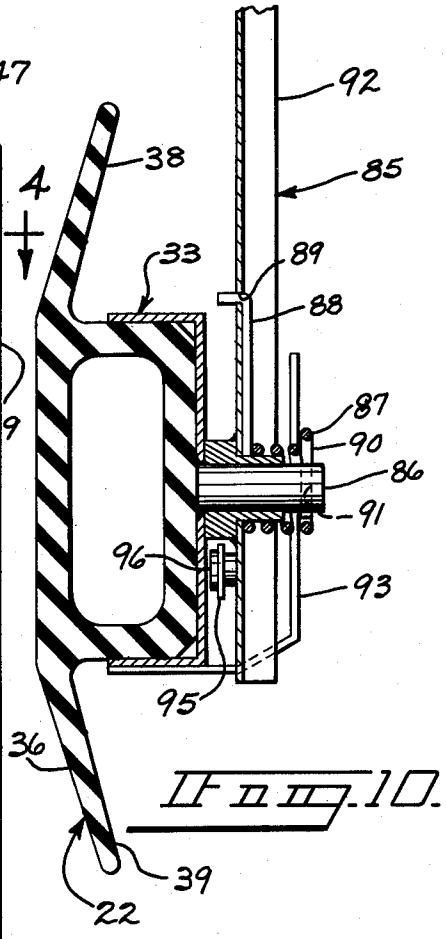


FIG. 10.

INVENTORS.
GEORGE LAVERNE RUNKLE
GILBERT S. SHEETS
BY
Owen & Owen
ATTORNEYS

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SCHOOL BUS SAFETY GATE

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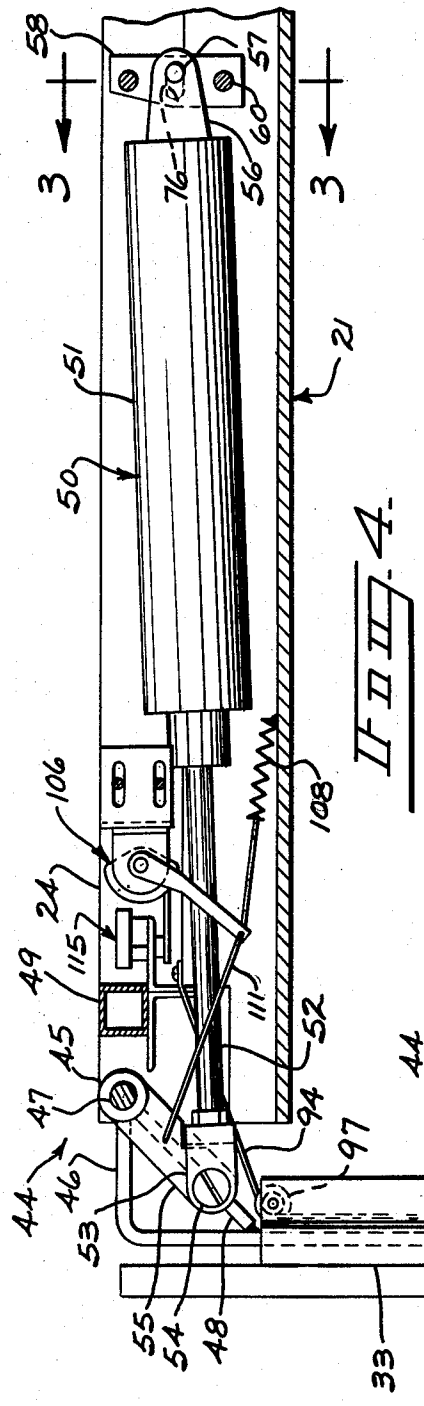


Fig. 4.

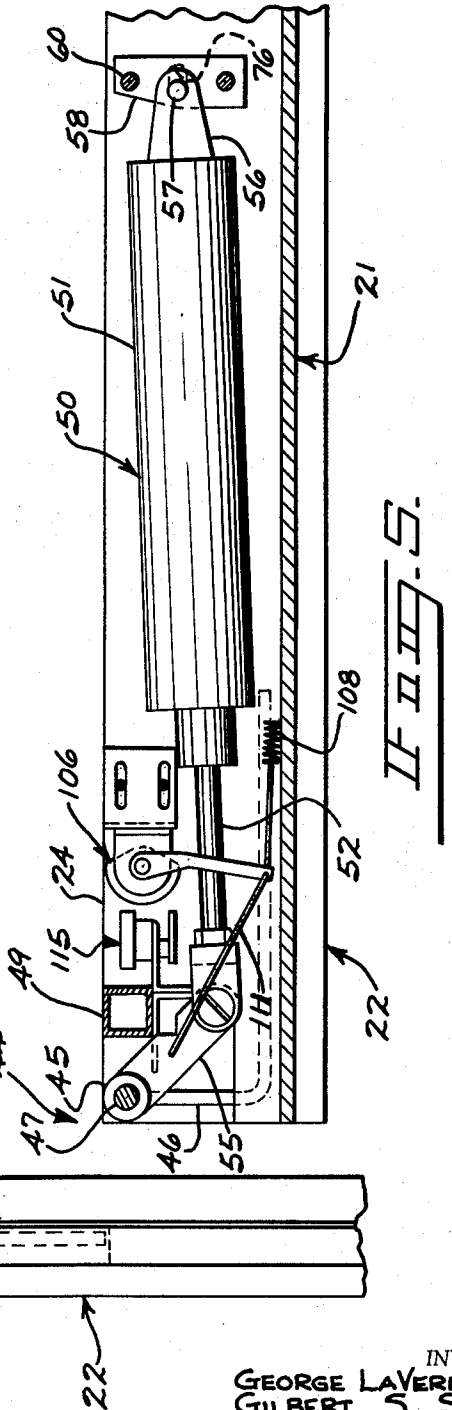


Fig. 5.

INVENTORS.
GEORGE LAVERNE RUNKLE
GILBERT S. SHEETS
BY
Owen & Owen
ATTORNEYS

Oct. 20, 1964 G. LA VERNE RUNKLE ETAL 3,153,398

SCHOOL BUS SAFETY GATE

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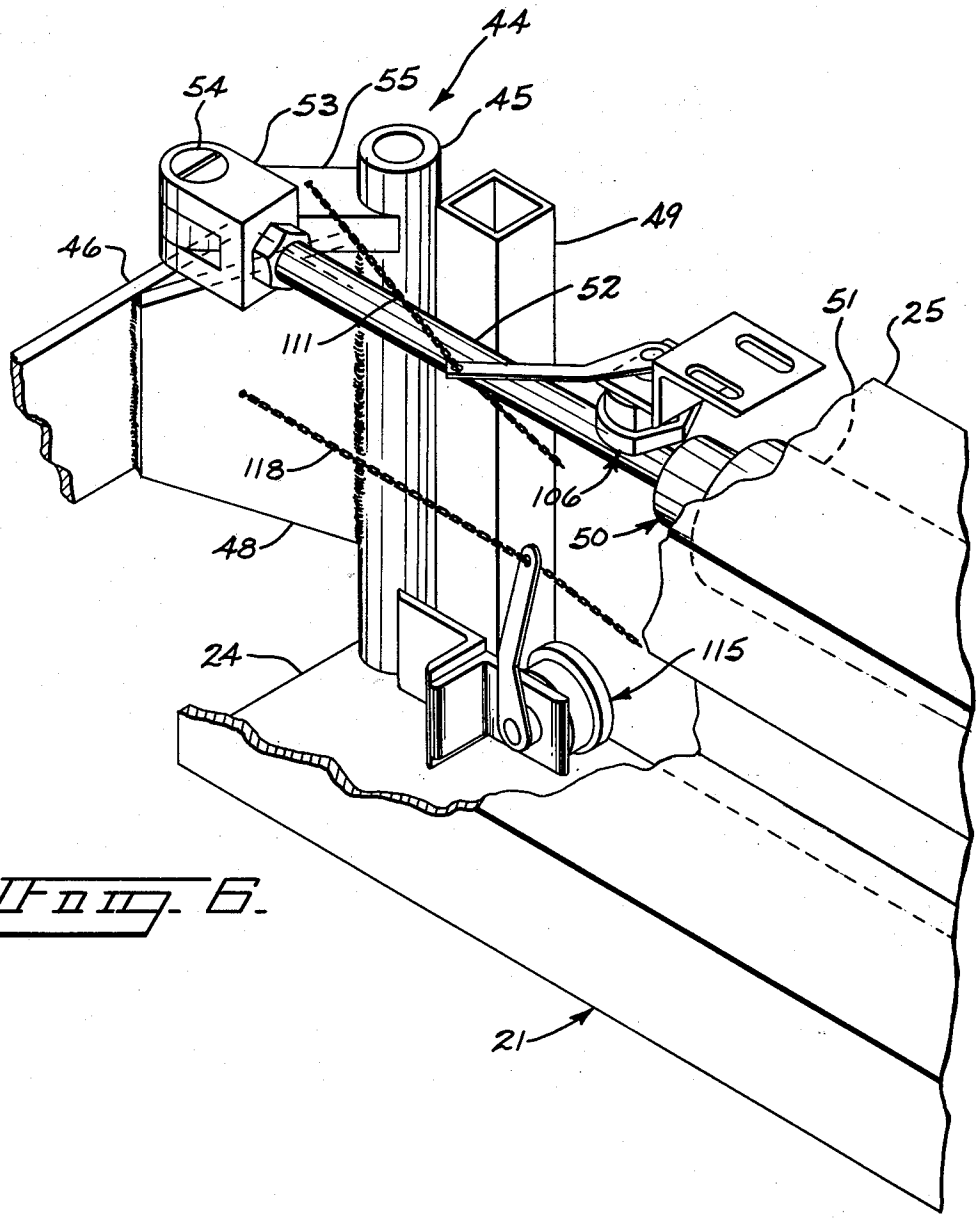


FIG. 6.

INVENTORS.
GEORGE LAVERNE RUNKLE
GILBERT S. SHEETS
BY
Owen & Owen
ATTORNEYS

Oct. 20, 1964 G. LA VERNE RUNKLE ETAL 3,153,398

SCHOOL BUS SAFETY GATE

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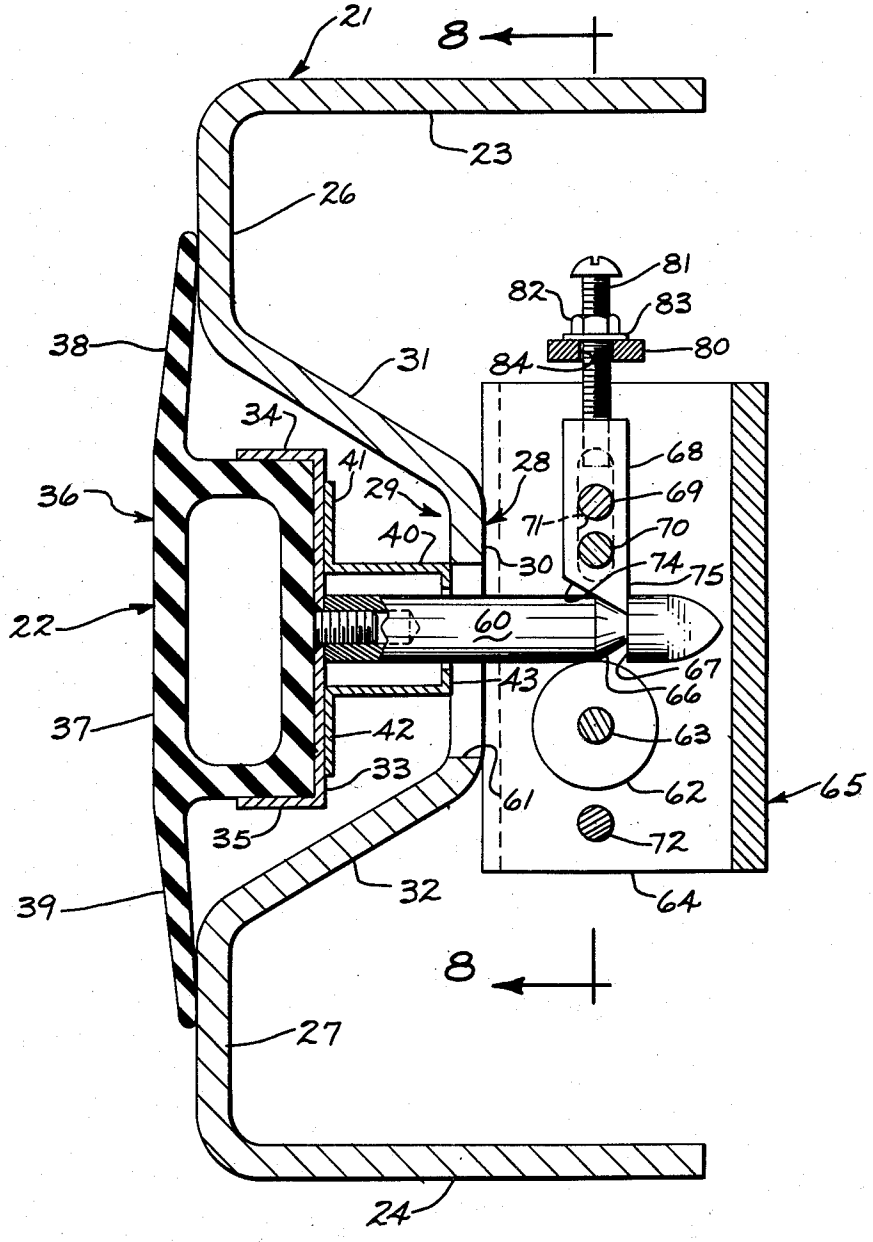


FIG. 7.

INVENTORS.
GEORGE LAVERNE RUNKLE
GILBERT S. SHEETS
BY
Owen & Owen
ATTORNEYS

Oct. 20, 1964 G. LA VERNE RUNKLE ETAL 3,153,398

SCHOOL BUS SAFETY GATE

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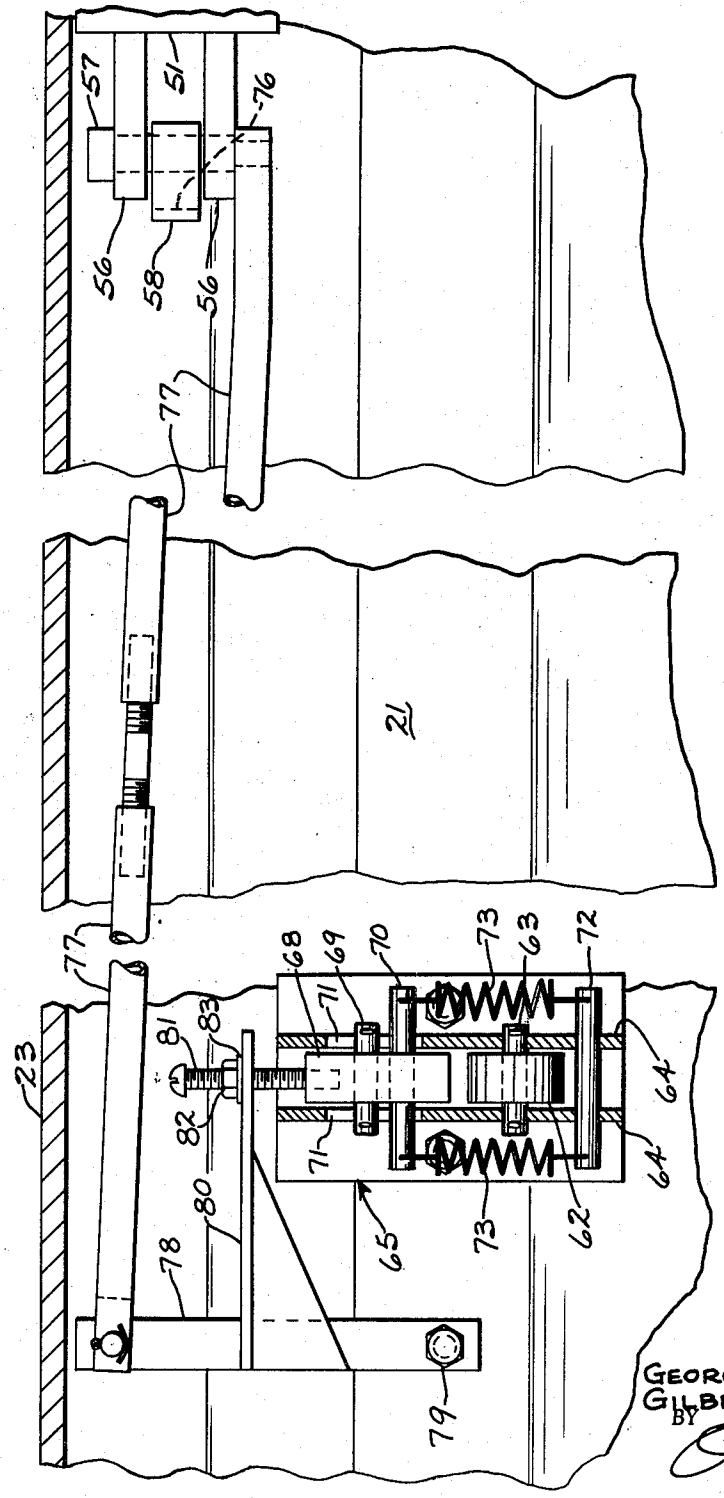


Fig. 8.

INVENTORS.
GEORGE LAVERNE RUNKLE
GILBERT S. SHEETS
BY
Owen & Owen
ATTORNEYS

Oct. 20, 1964 G. LA VERNE RUNKLE ETAL 3,153,398

SCHOOL BUS SAFETY GATE

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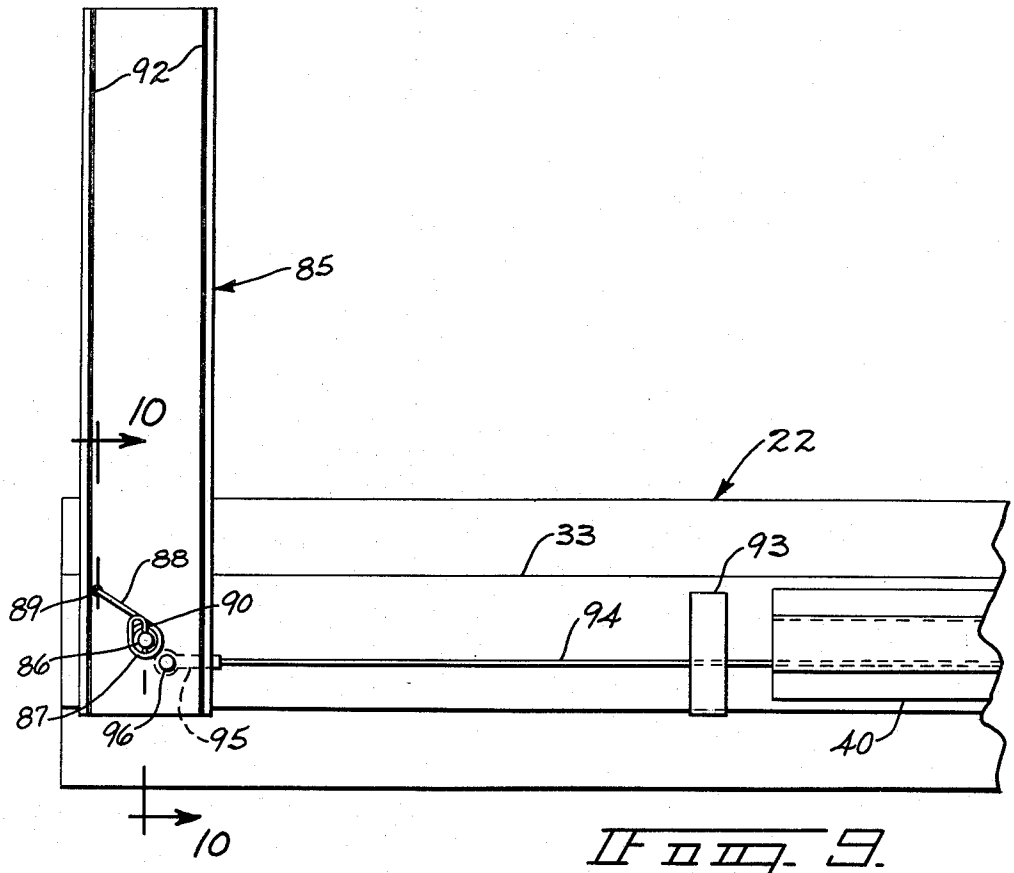


FIG. 9.

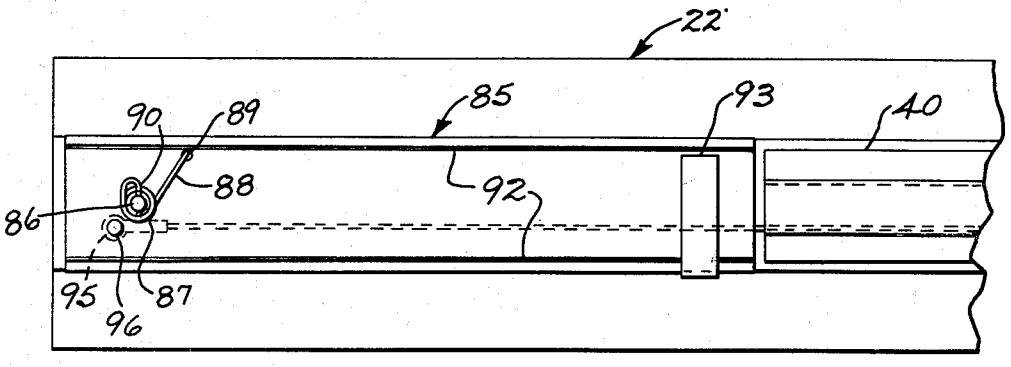


FIG. 11.

INVENTORS.
GEORGE LAVERNE RUNKLE
GILBERT S. SHEETS
BY
Owen & Owen
ATTORNEYS

Oct. 20, 1964 G. LA VERNE RUNKLE ETAL 3,153,398

SCHOOL BUS SAFETY GATE

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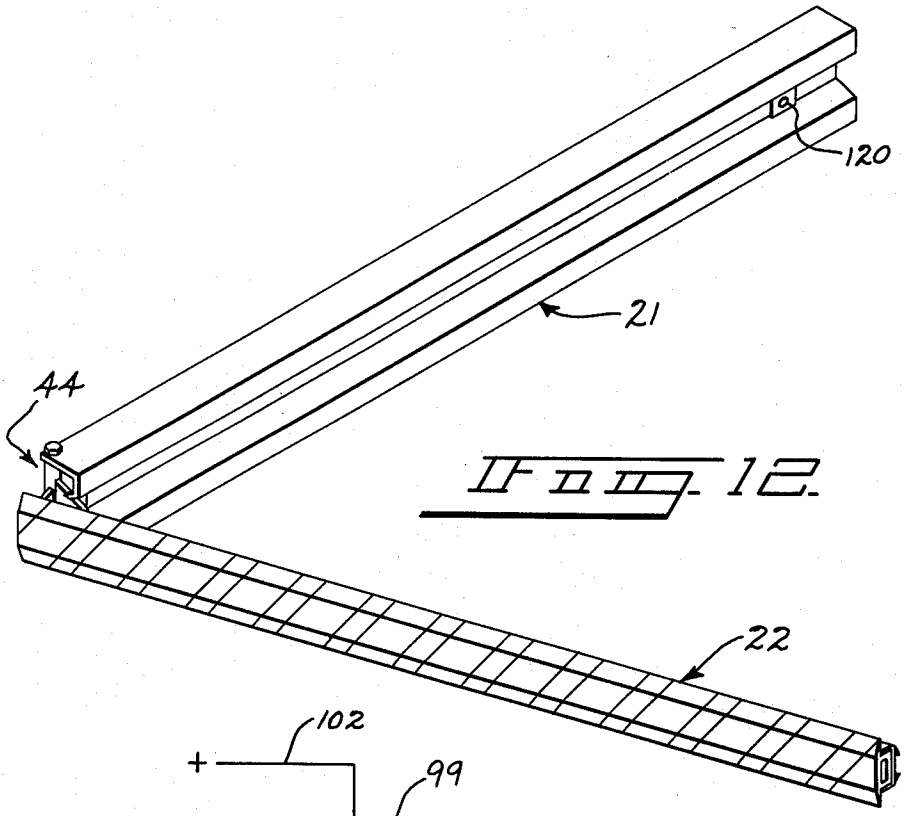


Fig. 12.

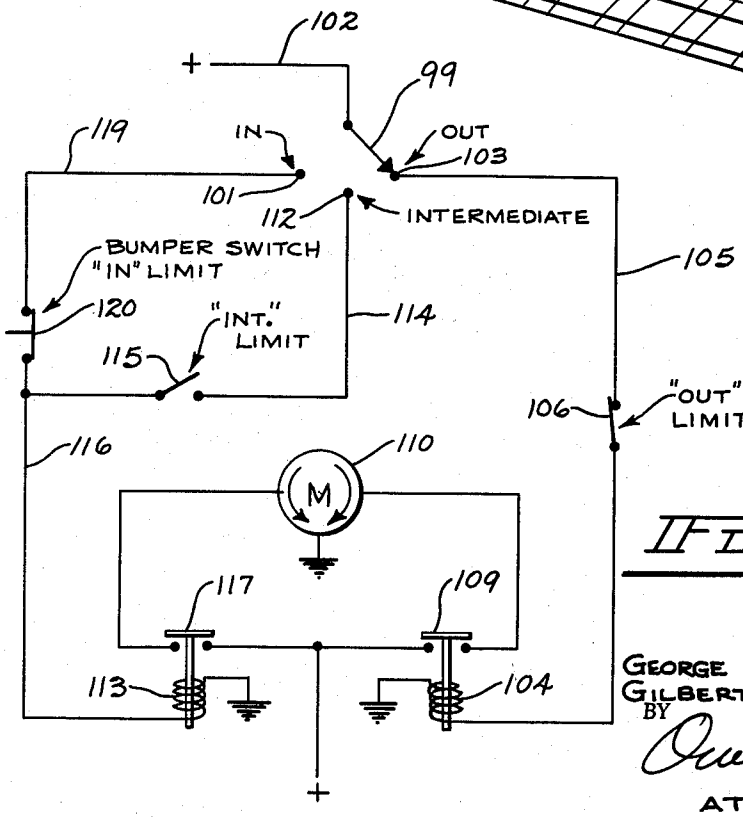


Fig. 13.

INVENTORS.
GEORGE LAVERNE RUNKLE
GILBERT S. SHEETS
BY
Owen & Owen
ATTORNEYS

United States Patent Office 3,153,398 Patented Oct. 20, 1964

3,153,398

SCHOOL BUS SAFETY GATE

George La Verne Runkle and Gilbert S. Sheets, Lima, Ohio, assignors to Superior Coach Corporation, Lima, Ohio, a corporation of Ohio

Filed Sept. 5, 1963, Ser. No. 306,926
9 Claims. (Cl. 116—28)

The present invention relates to school buses of the type having safety gate structures hinged to the front of the bus; and more particularly to an improved combination bumper and safety gate structure for use on such buses.

An object of the present invention is the provision of a new and improved bumper configuration which is strong, can be easily rolled or pressed from a strip of metal plate, and which not only provides a horizontal recess in its front face into which a gate structure recedes, but also provides a horizontal recess of sufficient size and shape in its back face to receive an activating cylinder for the gate structure.

Another object of the invention is the provision of a new and improved school bus having a safety gate on the front of the bus which is swingable from a first position parallel to the front of the bus, through an intermediate position, to a second position wherein the safety gate is substantially at right angles to the front of the bus, the safety gate having a warning arm affixed thereto which is automatically moved from a horizontal position to a vertical position as the safety gate is moved from the intermediate to the second position and wherein the warning arm moves back to its horizontal position when the safety gate returns from the second position to the intermediate position.

The invention also includes a new and improved safety gate structure comprising: a latch which is positively locked in the closed position of the gate, an actuating mechanism having a lost motion connection which is in a first condition when the gate is being moved to its closed position and which is in a second condition when the gate is being moved to its open position, and means operatively connected between the actuating mechanism and the latch for utilizing the movement of the actuating mechanism as said lost motion connection changes from its first to its second condition to unlock the latch.

Further objects and advantages of the invention will become apparent to those skilled in the art to which the invention relates from the following description of the preferred embodiment described with reference to the accompanying drawings forming a part of this specification, and in which:

FIG. 1 is a fragmentary view of the front of a school bus embodying principles of the present invention and showing a safety gate structure retracted into its front bumper;

FIG. 2 is an isometric view of the bumper and safety gate structure showing the safety gate in its open position wherein it extends generally at right angles to the bumper;

FIG. 3 is a secional view taken approximately on the line 3—3 of FIG. 2;

FIG. 4 is a fragmentary sectional view taken approximately on the line 4—4 of FIG. 3;

FIG. 5 is a fragmentary view similar to FIG. 4 showing tht safety gate structure in its closed position;

FIG. 6 is a fragmentary isometric view showing the hinged connection between the safety gate structure and the bumper as well as part of the actuating mechanism and attendant switch structure;

FIG. 7 is a sectional view taken approximately on the line 7—7 of FIG. 1;

FIG. 8 is a sectional view taken approximately on the line 8—8 of FIG. 7;

FIG. 9 is a rear elevational view of the outer end of the gate as shown by the line 9—9 of FIG. 2 and showing a warning arm in a vertical position;

FIG. 10 is a sectional view taken approximately on the line 10—10 of FIG. 9;

FIG. 11 is a rear elevational view similar to FIG. 9 showing the warning arm in a horizontal position;

FIG. 12 is an isometric view similar to FIG. 2 but showing the safety gate structure in an intermediate position in which the warning arm is in the horizontal position shown in FIG. 11; and

FIG. 13 is a wiring diagram of the controls which actuate the safety gate structure.

Referring to the drawings, there is shown therein a school bus 20 having a front bumper 21 and a safety gate structure 22 hinged to the curb side of the bumper 21 for movement from a position adjacent the bumper to a position extending generally at right angles to the bumper. The bumper 21, best seen in FIGS. 3 and 7, is pressed or rolled from a strip of steel plate into a configuration having top and bottom rearwardly extending flanges 23 and 24 respectively, that are connected by a front web section 25. The front web section 25 has top and bottom vertical portions 26 and 27 adjacent the top and bottom flanges 23 and 24 respectively, and a rearwardly deformed center portion 28 forming a recess 29 into which the safety gate structure 22 is adapted to be received. The rearwardly deformed center portion 28 has a vertical rear wall 30 which is connected to the top and bottom vertical web portions 26 and 27 by sidewalls 31 and 32 which preferably diverge forwardly and outwardly from the rear wall 30 to the top and bottom web portions 26 and 27 respectively. The recess 29 therefore has a flat rear surface and tapered sidewalls.

The safety gate structure 22 may be made in various ways. The preferred safety gate structure 22, however, as best seen in FIG. 7, comprises a channel shaped section 33 made from light sheet metal and having top and bottom forwardly extending flanges 34 and 35 respectively. The channel shaped section 33 is sized to fit into the recess 29, and a guard structure 36 is attached to the channel shaped section 33 to close off the recess 29 when the gate structure is in its retracted position shown in FIG. 7. The guard structure 36 shown in the drawings is made of rubber and has a hollow rectangular center portion 37 which is cemented into the channel shaped section 33. The rubber guard structure 36 includes top and bottom flange portions 38 and 39 respectively, which extend vertically and slightly rearwardly from the front face of the hollow center portion 37 to contact the top and bottom vertical portions 26 and 27 respectively of the front web section of the bumper to seal off the recess 29 into which the safety gate structure 22 retracts. Alternatively, in some instances the guard structure 36 might lap over the top and bottom bumper flanges 23 and 24. The channel section 33 is stiffened by a U-section 40, having out-turned legs 41 and 42 fixed to the back of the channel section 33, the closed center section 43 of the U being adapted to bear against the rear wall 30 of the bumper depression 29.

The safety gate structure 22 is hinged to the bumper 21 adjacent the curb side of the bus, which in the United States is the right-hand side. The hinge structure 44 best seen in FIGS. 4, 5 and 6 comprises a tube 45 which extends between the top and bottom bumper flanges 23 and 24, and an L-shaped bracket 46 which extends between the tube 45 and the curb end of the gate channel 33. A through bolt 47 extends through the bumper flanges 23 and 24 and tube 45, and the L-shaped bracket 46 is stiffened by a diagonal plate 48 welded between the tube

45 and the L-shaped bracket 46. The pulling together of the bumper flanges 23 and 24 by the through bolt 46 is prevented by a vertical spacer section 49 of square tubing welded in place between the flanges.

Actuation of the safety gate structure 22 between its retracted position shown in FIG. 1 to its extended position shown in FIG. 2 is performed by an expansible and retractable mechanism which in the embodiment shown includes a hydraulic cylinder 50. The hydraulic cylinder 50 comprises a cylinder housing 51 from which a piston rod 52 projects, and opposite ends of the housing 51 and 52 have attachment points operatively connected between the bumper 21 and safety gate 22 to swing the safety gate toward and away from the bumper. In the embodiment shown in the drawing, the piston rod 52 has a bifurcated end 53 which is pinned as at 54 to the end of an arm 55 which is welded to the tube 45. The opposite end of the cylinder housing 51 is also bifurcated as at 56 (see FIGS. 8 or 3) and is anchor-pinned as at 57 to an anchor bar 58 that is fixed to the top bumper flange 23 by means of a pair of spaced apart tubular spacers 59 and machine screws 60. It will be seen that the configuration of bumper previously described provides a convenient pocket in the back side of the bumper between its flanges and rearwardly deformed center section 28 in which the hydraulic cylinder 50 is completely protected.

It is highly desirable to provide a latching arrangement which positively holds the safety gate structure 22 in the recess 29 in such a way as to prevent vibration from producing relative movement between the safety gate structure 22 and the bumper 21, and also to hold the guard structure 36 in sealing engagement with the bumper 21. In the embodiment shown in the drawing, and as best seen in FIG. 7, a latch pin 60 is affixed to the inside of the channel section 33 in such manner as to project rearwardly through an opening 61 in the bumper 21. The end of the latch pin which projects rearwardly through the opening 61 engages the top surface of a roller 62 which is pinned as at 63 between the opposite legs 64 of a bifurcated bracket 65 that is fixed to the rear of the bumper 21. The portion of the latch pin 60 which is positioned just rearwardly of the roller 62 in the closed position of the gate 22 is provided with a groove 66 having a forwardly facing shoulder 67 for engagement by a retainer 68. The retainer 68 is guided for vertical movement toward and away from the top surface of the roller by two vertically spaced pins 69 and 70, the opposite ends of which project through a pair of vertically elongated openings 71 in the bracket legs 64. An anchor pin 72 similar to the pin 70 is fixed to the bracket legs 64 beneath the roller 62, and a pair of coil springs 73 are positioned on opposite sides of the bracket 65 between the pins 70 and 72 to bias the retainer 68 toward the roller 62. The inner end of the latch pin 60 is tapered so that it will ride smoothly between the roller 62 and the retainer 68, and the lower outer surface of the retainer is also tapered as at 74 so that the retainer will be cammed upwardly by the latch pin 60 as it moves rearwardly into locking position over the roller 62. The rear surface 75 of the retainer engages the shoulder 67 to hold the latch pin 60 in its locked position.

In order that the safety gate 22 can be opened from its locked position, it is necessary that the retainer 68 be withdrawn vertically out of the groove 66 in the latch pin 60. It is a feature of the present invention that the retainer 68 be withdrawn by the same expansible and retractable mechanism 50 that is used to open and close the safety gate 22. The expansible and retractable mechanism 50 must, of course, perform one of its expanding or contracting functions (depending on the linkages used to operate the safety guide) to bias the safety gate 22 closed, and must perform the other of its expanding and contracting functions to bias the safety gate 22 open. By providing a lost motion connection somewhere in the expansible and retractable mechanism or the structure which interconnects the mechanism between the safety gate 22 and bumper 21, a predetermined movement of the expansible and retractable mechanism will occur when the expansible and retractable mechanism is caused to change from its safety gate closing condition to its safety gate opening condition. One of the features of the present invention utilizes this predetermined movement of the expansible and retractable mechanism as it changes from its gate closing to its gate opening condition to withdraw the retainer 68 from the latch pin 60.

In the embodiment shown in the drawing, and as best seen in FIG. 8, the anchor pin 57 of the hydraulic cylinder 50 extends through a slotted opening 76 in the anchor bar 58. The pin 57 will normally be in the end of the slotted opening 76 away from the latch pin 60 when the cylinder 50 pulls the safety gate 22 closed, and will move to the end of the slotted opening 76 toward the latch pin 60 when the cylinder 50 starts to open the safety gate. The initial movement of the anchor pin 57 from the spaced ends of the slotted opening 76 in the anchor bar 58 is transmitted through a push bar 77 to the top of a rocker arm 78 which is pinned at its bottom end as at 79 to the bumper. The rocker arm 78 includes a lateral arm 80 which extends over the retainer 68 and which is moved upwardly when the push bar 77 is actuated. A machine screw 81 having an adjustment nut 82 and washer 83 which seats against the top of the arm 80 extends through a hole 84 in the lateral arm 80 and is threaded into the retainer 68. Vertical movement of the lateral arm 80, therefore, lifts the machine screw 81 and the retainer 68 to unlock the latch pin 60.

The safety gate structure shown in the drawing also includes a warning arm 85 on its end opposite from its hinge structure and which is adapted to be raised to a vertical warning position when it is unsafe for the school children to pass in front of the bus. The warning arm 85 is pivoted about a horizontal pivot pin 86, best seen in FIG. 10, which projects rearwardly from the gate channel 33. The warning arm 85 is biased to a horizontal position behind the channel section 33 by a coil spring 87 that is wrapped around the pin 86 with one of its ends 88 projecting through a hole 89 in the warning arm 85 and the other of its ends 90 extending through a hole 91 in the pin 86. The warning arm 85 has rearwardly turned side edges 92 which are bent toward each other to match the tapered side surfaces of the bumper recess 29. An L-shaped bracket 93 is fixed to the back of the gate channel 33 to support the warning arm 85 in a horizontal position. Spring 87 normally biases the warning arm 85 toward the horizontal position wherein the warning arm 85 abuts the L-shaped bracket 93.

The warning arm 85 is raised to its vertical position shown in FIG. 2 by a cable 94 (see FIGS. 9 and 11) one end of which is provided with a connector 95 pinned as at 96 to the portion of the warning arm 85 beneath the pivot pin 86. The cable 94 extends lengthwise of the safety gate 22 and passes around a pulley 97 (see FIG. 3) adjacent the hinge structure 44. The end of the cable 94 which extends past the pulley 97 is fixed to the bumper 21 by a screw 98 so that the cable 94 is pulled, and the warning arm raised, as the safety gate 22 is moved to its fully open position shown in FIG. 2.

It is desired that the warning arm 85 be automatically lowered while the safety gate 22 is in an intermediate position, shown in FIG. 12, wherein it is retracted slightly from the fully open position, but wherein the safety gate still extends a sufficient distance forwardly of the bus that children passing in front of the safety gate 22 can be seen by the operator of the vehicle over the hood of a conventional school bus. In the intermediate position of the arm shown in FIG. 12, the pulley 97 will, of course, assume a corresponding intermediate position, and it is possible to place the anchoring screw 98 at such a position that movement of the pulley 97 away from the screw 98 while traveling from its intermediate position

to its fully open position just corresponds to the horizontal movement of the pin 96 from the position shown in FIG. 11 to the position shown in FIG. 9. The warning arm 85 is therefore, automatically lowered when the safety gate 22 is moved to its intermediate position shown in FIG. 12.

The operation of the safety gate 22 can best be explained with reference to the wiring diagram shown in FIG. 13. When the safety gate 22 is in its closed position shown in FIG. 1, the actuating hydraulic cylinder and attendant mechanism will be in the position shown in FIG. 5, the latch pin 60 and retainer 68 will be in the position shown in FIG. 7, and the contact arm 99 (see FIG. 13) of the control switch 100 will be in engagement with the "in" contact 101. The contact arm 99 is connected to the positive terminal of a battery, not shown, by means of wire 102.

When the operator of the bus desires to open the safety gate 22, he moves the contact arm 99 into engagement with the "out" contact 103, which energizes solenoid 104 through wire 105, "out" limit switch 106, and wire 107. The "out" limit switch 106 shown in FIGS. 4, 5 and 6 is normally held in its closed position by a spring 108, and is only opened when the safety gate 22 is in its open position shown in FIG. 2. The hydraulic cylinder 50 will be in the position shown in FIG. 5 with the anchor pin 57 against the end of the slotted opening 76 in the anchor bar 58 that is adjacent the hinged end of the safety gate. Energization of the solenoid 104 closes the switch 109 which starts the motor 110 of a hydraulic pump, not shown, in such a direction as to force the piston rod 52 out of the cylinder housing 51. The initial expansive movement of the piston and housing causes a reaction which moves the anchor pin 57 to the opposite end of the opening 76 to move the push rod 77, see FIG. 8, toward the latch pin 60. Movement of the push rod 77 toward the latch pin 60 pivots the rocker arm 78 to lift the retainer 68 out of the groove 66 in the latch pin so that subsequent movement of the piston rod 52 swings the safety gate 22 toward its open position. When the safety gate 22 reaches the intermediate position shown in FIG. 12, the cable 94 becomes taut between the machine screw and the horizontal warning arm 85, see FIG. 11. Thereafter movement of the safety gate 22 from the intermediate position to the fully open position pulls the cable 94 by an amount which moves the warning arm 85 to its vertical position shown in FIGS. 9 and 2. When the safety gate reaches its fully open position, seen in FIGS. 2 and 4, it moves switch 106 to its open position by means of cable 111 to deenergize the motor 110.

When the safety gate 22 is in its fully open position, the operator of the bus opens the bus door to allow children to stand on the curb side of the gate. When it is safe for the children to cross in front of the bus, the operator moves the contact arm 99 to engage the "intermediate" contact 112. This energizes "in" solenoid 113, through wire 114, "intermediate" limit switch 115, and wire 116. Actuation of "in" solenoid 113 closes switch 117 which energizes motor 110 in such a way as to drive the pump, not shown, backwards to move the piston rod 52 into the cylinder housing 51. Retractile movement of the piston rod 52 pulls anchor pin 57 to the "hinge side" of the opening 76 in the anchor bar 58 and thereafter starts to swing the safety gate towards its closed position. As the safety gate swings towards its closed position, cable 94 is relaxed and warning arm 85 moves toward its horizontal position. When the safety gate 22 reaches its intermediate position shown in FIG. 12, the warning arm 85 is in its horizontal position, and the switch 115 is opened to deenergize motor 110. The "intermediate" limit switch 115 is normally spring biased open and is closed by chain 118 that is attached to its diagonal plate 48 as the safety gate moves from the intermediate position to the open position. With the safety gate in its intermediate position and the warning arm 85 down, the children are free to cross in front of the bus.

When the operator desires to close the safety gate 22, he moves the contact arm 99 to engage contact 101 to again energize "in" solenoid 113 and actuate the motor 110 in the "in" direction. The contact 101 is connected to solenoid 113 by wire 119, normally closed limit switch 120, and wire 116. As the safety gate 22 swings into the bumper recess 29, latch pin 60 passes over roller 62 to cam the retainer 68 upwardly. When the safety gate is completely closed, retainer 68 is biased into groove 66 in the latch pin, and the limit switch 120 is opened to stop the motor 110.

While the invention has been described in considerable detail, we do not wish to be limited to the particular embodiment shown and described; and it is our intention to cover hereby all novel adaptations, modifications, and arrangements thereof which come within the practice of those skilled in the art to which the invention relates.

What we claim is:

1. In a school bus and the like: a horizontal bumper at the front of said bus, said bumper being made from a generally uniform thickness of metal into a generally channel shaped configuration having top and bottom rearwardly extending flanges connected together by a front web, said web having top and bottom generally vertical sections adjacent the top and bottom flanges respectively, and a rearwardly deformed center web section having a rear generally vertical center portion and top and bottom forwardly diverging sidewall portions which connect to said top and bottom vertical sections of said web respectively to thereby form a horizontal depression in the front surface of said bumper having a flat bottom and diverging sides, a gate structure fitting into said horizontal depression and adapted to bear against said center portion, means hinging said gate structure to one side of said bumper for horizontal swinging movement toward and away from said bumper, expansible and retractable means positioned horizontally in the space behind one of said top and bottom vertical web sections and between the adjacent flange and said rearwardly deformed center section, said expansible and retractable means extending between said gate and said bumper for moving said gate from a position fitting into said horizontal depression to a position generally at right angles to said bumper and including a lost motion connection, a latch for holding said gate structure in a latched position against said center web portion of said rearwardly deformed section, a retainer which must be removed from said latch to permit said gate structure to swing away from said latched position, said lost motion connection being in a first condition when said expansible and retractable means moves said gate structure toward its latched position and being in a second condition when said expansible and retractable means moves said gate structure away from its latched position, means using the movement of said expansible and retractable means in moving said lost motion connection from said first condition to said second condition for removing said retainer from said latch, a warning arm pivoted to the side of said gate structure which faces said bumper, said arm being horizontal and parallel to said gate structure when said gate structure fits into said horizontal depression, means for moving said arm to a vertical position when said gate structure is moved to its open position, and a guard structure carried by said gate structure and sealing off said horizontal depression when said gate structure is latched into said horizontal depression.

2. In a school bus and the like: a horizontal bumper at the front of said bus, said bumper being made from a generally uniform thickness of metal into a generally channel shaped configuration having top and bottom rearwardly extending flanges connected together by a front web, said web having a rearwardly deformed center section forming a horizontal depression in the front sur-

face of said bumper, a gate structure fitting into said horizontal depression, means hinging said gate structure to one side of said bumper for horizontal swinging movement toward and away from said bumper, expansible and retractable means positioned horizontally behind said bumper, means for holding said gate structure in a latched position against the rear of said depression, said expansible and retractable means being operatively positioned between said gate and said bumper for moving said gate structure between said latched position and a position generally at right angles to said bumper, and a rubber guard structure carried by said gate structure and sealing off said horizontal depression when said gate structure is latched into said horizontal depression, and whereby rearwardly applied force on said rubber guard structure is transmitted through said gate structure to the rear of said horizontal depression.

3. In a school bus and the like: a horizontal bumper at the front of said bus, said bumper being made from a generally uniform thickness of metal into a generally channel shaped configuration having top and bottom rearwardly extending flanges connected together by a front web, said web having top and bottom generally vertical sections adjacent said top and bottom flanges respectively, and a rearwardly deformed center web section having a rear generally vertical center portion and top and bottom forwardly diverging sidewall portions which connect to said top and bottom vertical sections of said web respectively to thereby form a horizontal depression in the front surface of said bumper having a flat bottom and diverging sides, a gate structure fitting into said horizontal depression, means hinging said gate structure to one side of said bumper for horizontal swinging movement toward and away from said bumper, expansible and retractable hydraulic cylinder means positioned horizontally in the space behind one of said top and bottom vertical web sections and between the adjacent flange and said rearwardly deformed center section for moving said gate from a position fitting into said horizontal depression to a position generally at right angles to said bumper, means for holding said gate structure in said rearwardly deformed section, and a guard structure carried by said gate structure and sealing off said horizontal depression when said gate structure is held in said horizontal depression.

4. In a school bus and the like, a horizontal bumper at the front of said bus, a horizontal gate structure one side end of which is hinged to one end of said bumper for movement from a position parallel to said bumper to a position generally at right angles to said bumper, a latch spaced apart from said hinged side of said gate structure for holding said gate structure parallel to said bumper, a retainer which must be removed from said latch to move said gate structure away from said bumper, expansible and retractable means operatively connected between said gate and structure and said bumper and including a lost motion connection for moving said gate structure between a position wherein said retainer engages said latch and a position generally at right angles to said bumper, said lost motion connection being in a first condition when said expansible and retractable means moves said gate structure toward its latched position and being in a second condition when said expansible and retractable means moves said gate structure away from its latched position, and means using the movement of said expansible and retractable means in moving said lost motion connection from said first to said second condition for removing said retainer from said latch.

5. In a school bus and the like, a horizontal bumper at the front of said bus, a horizontal gate structure one side end of which is hinged to one end of said bumper for movement from a position parallel to said bumper to a position generally at right angles to said bumper, a latch spaced apart from said hinged side of said gate structure for holding said gate structure parallel to said bumper, a retainer which must be removed from said latch to permit said gate structure to move away from said bumper, expansible and retractable means located between said hinged end of said gate and said latch, one end of said expansible and retractable means being attached to said gate and the other end of said expansible and retractable means being attached to said bumper through a lost motion connection located intermediate said latch and said hinged end of said gate, said lost motion connection being in a first condition when said expansible and retractable means pulls said gate to the position where said retainer engages said latch and being in a second condition when said expansible and retractable means moves said gate away from said bumper, and means for removing said retainer from said latch when said expansible and retractable means moves said lost motion connection from said first to said second condition.

6. In a school bus and the like, a horizontal bumper at the front of said bus, a horizontal gate structure one side of which has a hinged connection to one end of said bumper for movement from a position parallel to said bumper to a position generally at right angles to said bumper, a latch pin on said gate structure and spaced apart from said hinged side of said gate structure, a latch support over which said latch pin rides when said gate structure moves to its position parallel to said bumper, said latch pin having a forwardly facing shoulder, a retainer guided for vertical movement toward and away from said latch support for abutment with said forwardly facing shoulder of said latch pin, a hydraulic cylinder having a piston rod extensible from a cylinder housing, said rod and housing each having attachment points, one of said attachment points being connected to said gate structure and the other of said attachment points being connected to said bumper intermediate said hinged connection and said latch support, said hydraulic cylinder being arranged so that movement of said attachment points toward each other pulls said gate structure over said latch support for engagement by said retainer and separation of said attachment points moves said gate structure away from said bumper, said other attachment point closest said latch support being connected to said bumper through a lost motion connection wherein said other attachment point is moved from a first position spaced away from said latch support to a second position spaced toward said latch support as said gate structure is moved away from said bumper, and means utilizing movement of said other attachment point from said first position to said second position for moving said retainer out of engagement with said shoulder of said latch pin.

7. A school bus and the like comprising: a body, a bumper at the front of said body, a gate one end of which has a hinged connection at the curb side of said bumper for horizontal swinging movement between a first position adjacent said bumper to a second position extending forwardly of the curb side of said bumper to form a right angle with said bumper, said bumper having an intermediate position wherein it forms an acute angle with said bumper, a flag arm having a horizontal pivotal connection to said gate, said flag arm having a warning portion pivotable from a position extending horizontally from said pivotal connection toward said hinged end of said gate to a vertical position, gate actuating means for swinging said gate between said first and second position, a spring biasing said flag arm from its vertical position to said horizontal position, and a cable fixed at one end and connected at its other end to said flag arm, said fixed end of said cable being so located relative to said hinged connection of said gate so as to move said flag from said horizontal position to said vertical position when said gate actuating means moves said gate from said intermediate to said second position.

8. A school bus and the like comprising: a body, a

bumper at the front of said body, a gate one end of which has a hinged connection at the curb side of said bumper for horizontal swinging movement between a first position adjacent said bumper to a second position extending forwardly of the curb side of said bumper to form a right angle with said bumper, said bumper having an intermediate position wherein it forms an acute angle with said bumper, a flag arm having a horizontal pivotal connection to said gate, said flag arm having a warning portion pivotable from a position extending horizontally from said pivotal connection toward said hinged end of said gate to a vertical position, gate actuating means for swinging said gate between said first and second position, a spring biasing said flag arm from its vertical position to said horizontal position, and a cable one end of which is fixed to an attachment point on said flag arm spaced a distance to the opposite side of said horizontal pivotal connection from said warning portion, said attachment point moving a predetermined horizontal distance as said warning portion of said flag arm moves from said horizontal to said vertical position, said gate having sheave means located adjacent said hinged connection of said gate and about which said cable extends, said sheave means having an intermediate position which it occupies in the intermediate position of said gate and a second position which it occupies in said second position of said gate, and the end of said cable which extends around said sheave being fixed at a location which is further from said second position of said sheave than it is from said intermediate position of said sheave by said predetermined distance which said attachment point moves as said warning portion of said flag arm moves from its horizontal to its vertical position.

9. A school bus and the like comprising: a body, a bumper at the front of said body, a gate one end of which has a hinged connection at the curb side of said bumper for horizontal swinging movement between a first position adjacent said bumper to a second position extending forwardly of the curb side of said bumper to form a right angle with said bumper, said bumper having an intermediate position wherein it forms an acute angle with said bumper, a flag arm having a horizontal pivotal connection to the other end of said gate, said flag arm having a warning portion pivotable from a horizontal position to a vertical position, and means for automatically moving said flag arm to its vertical position when said gate is moved to its second position, and means for automatically moving said flag arm to its horizontal position when said gate is moved from its second position to its intermediate position.

No references cited.