Nov. 3, 1970 N. R. GUILBERT, JR., ET AL 3,537,211

REVERSING EDGE CONTROL FOR CAR DOORS

Filed June 26, 1967 3 Sheets-Sheet 1

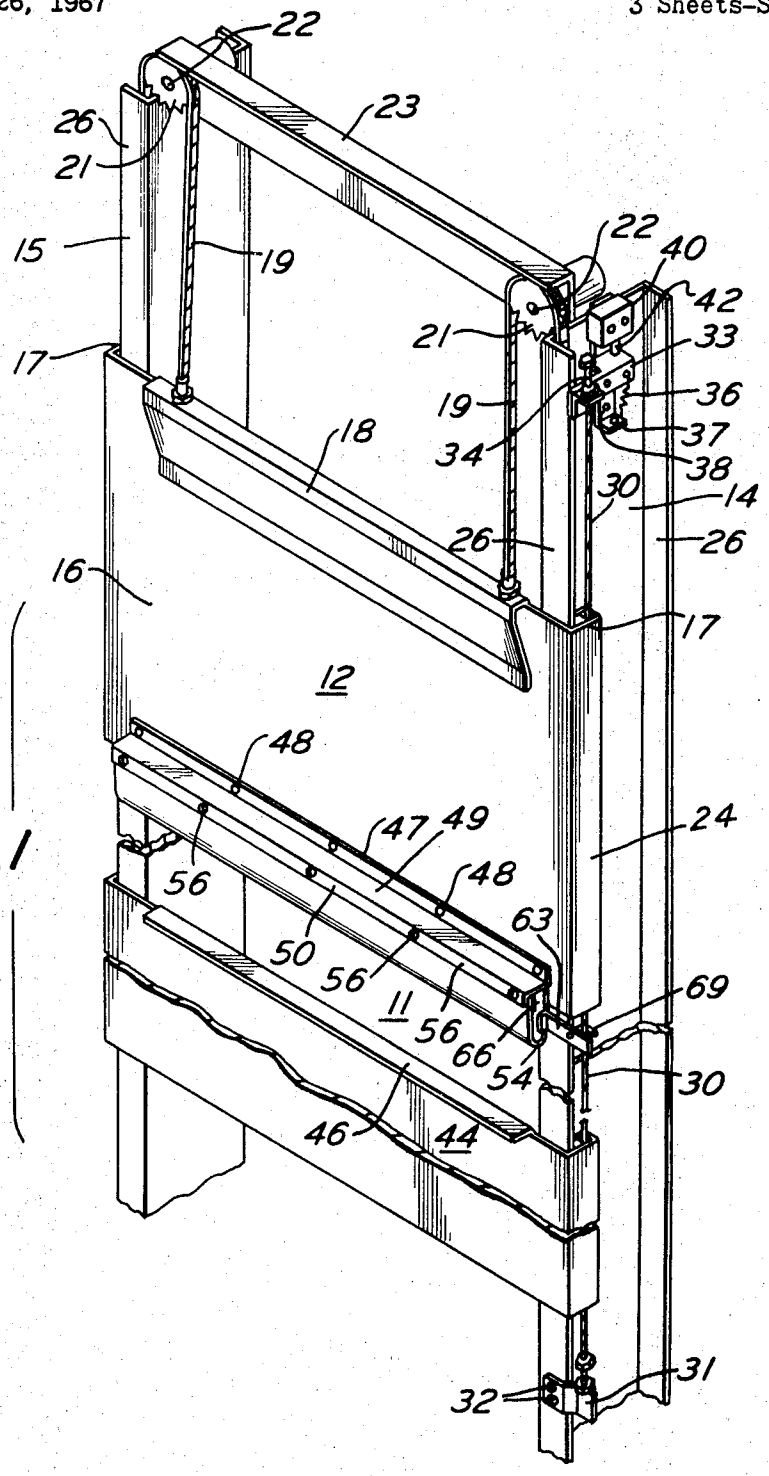


FIG. 1

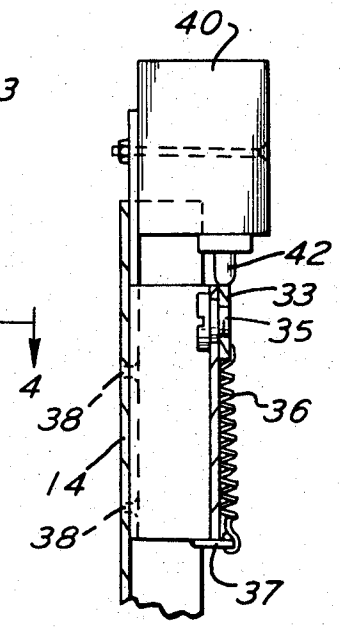
INVENTORS
NICHOLAS R. GUILBERT, JR.
LOUIS P. METZ
BY B. T. Wolfenbarger
ATTORNEY

Nov. 3, 1970 N. R. GUILBERT, JR., ET AL 3,537,211

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FIG. 3



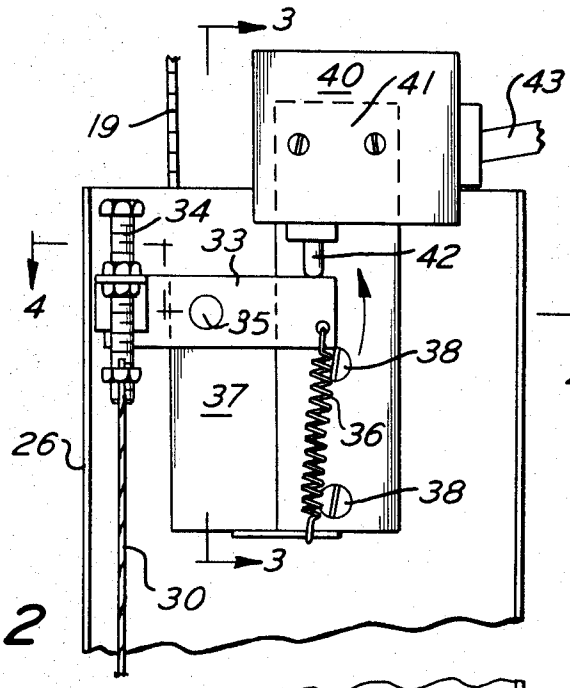


FIG. 2

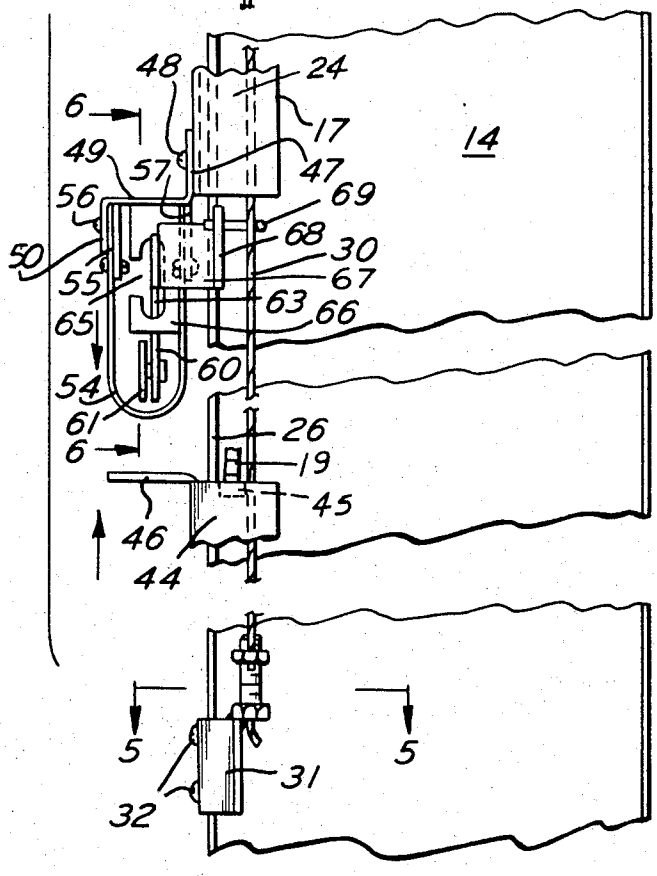
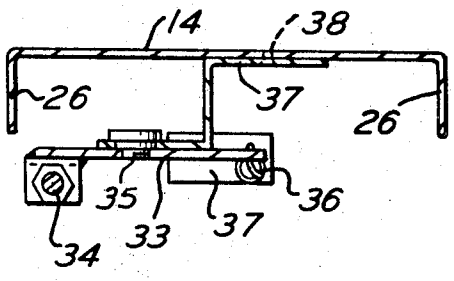


FIG. 4



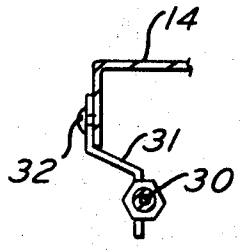


FIG. 5

INVENTORS
NICHOLAS R. GUILBERT, JR.
LOUIS P. METZ

BY J. T. Wobensmith 2nd
ATTORNEY

Nov. 3, 1970 N. R. GUILBERT, JR., ET AL 3,537,211

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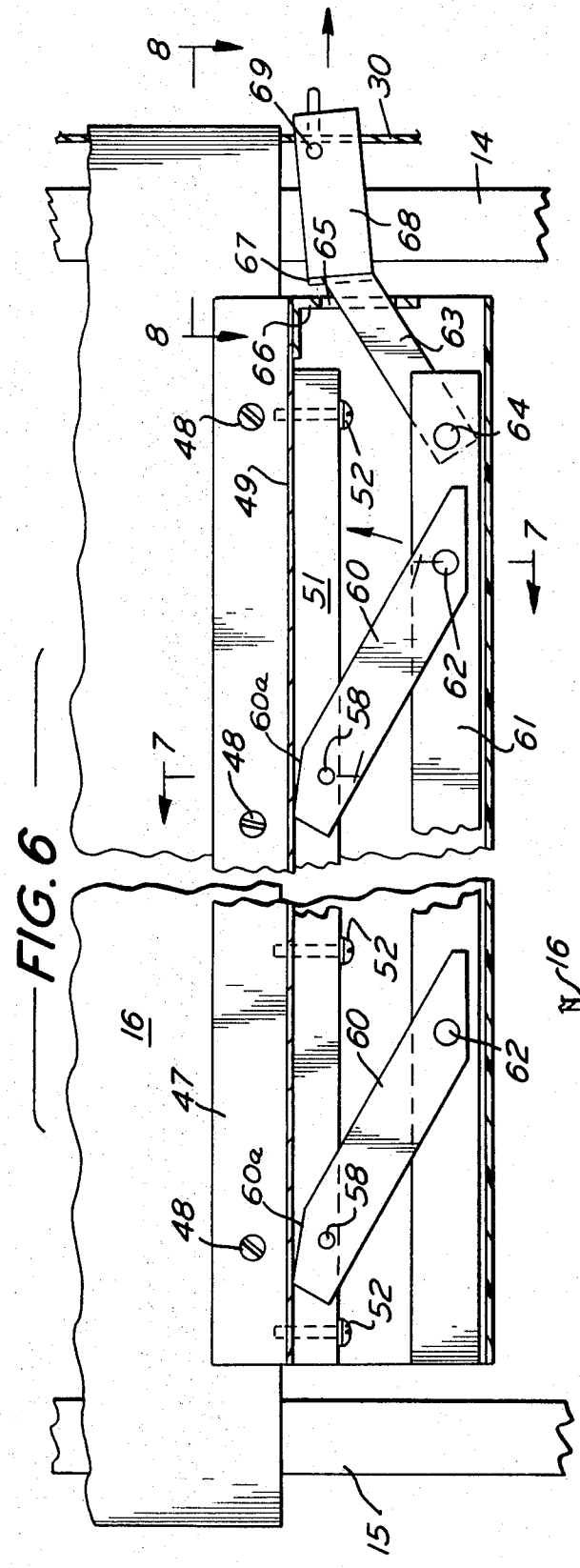


FIG. 6

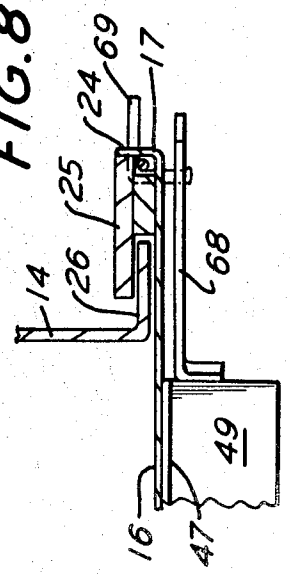


FIG. 8

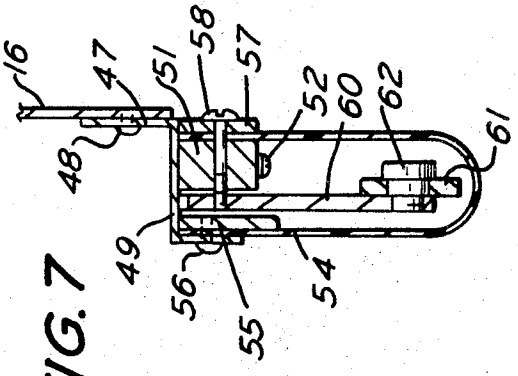


FIG. 7

INVENTORS.
NICHOLAS R. GUILBERT, JR.
LOUIS P. METZ
BY
ATTORNEY

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REVERSING EDGE CONTROL FOR CAR DOORS

Nicholas R. Guilbert, Jr., Glenside, and Louis P. Metz, Abington, Pa., assignors to Guilbert, Incorporated, Philadelphia, Pa., a corporation of Pennsylvania

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Int. Cl. E05f 15/08
U.S. Cl. 49—27 8 Claims

ABSTRACT OF THE DISCLOSURE

A reversing edge control for use with car doors for dumb-waiters, elevators and the like wherein deformation of the resilient edge of the door will result in an operating finger extending from the edge engaging a cable and thereby actuating a control element, such as a switch, to reverse or stop the movement of the door.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates to apparatus carried by the car door of a dumbwaiter, elevator or the like, which, upon deformation of the edge, engages a cable and actuates a control member, such as a switch whereby the door movement is reversed or stopped.

DESCRIPTION OF THE PRIOR ART

Apparatus previously available for reversing the movement of a car door usually employed a compressible member extending across the width of the gate or door. The compressible member carried one or more electrical contacts that caused the electrical circuit to close upon compression of the reversing edge and reverse or stop downward door movement. This system necessitated a flexible wire extending from the edge to a switch which resulted in many design and operational problems. One solution to the problem is described in the prior application of Louis P. Metz, Ser. No. 470,465, filed July 8, 1965 now Pat. No. 3,352,059, which employed a cable extending within and through the flexible edge member on the bottom of the door which cable was engaged by the deformation of the member and activated a switch to cause the edge to stop further movement. However, this invention has limitations in that the means of power operation should include a cross shaft, or its equivalent, to keep the door from racking, and it is not practical on small doors inasmuch as there is a limitation on how small a sheave may be over which the reversing cable rides.

The present invention does not have a cable passing through the edge member and does not need the complicated mechanism associated therewith and requires no contact or wires within or attached to the edge member.

SUMMARY OF THE INVENTION

The principal object of the present invention is to provide a reversing edge for car doors which activates a control device, such as an electrical switch, quickly and positively to reverse or halt the door movement.

A further object of the present invention is to provide a reversing edge for car doors which is simple and inexpensive to construct but sturdy and reliable in operation.

A further object of the present invention is to provide a reversing edge for car doors which does not require a cable running through the edge.

A further object of the present invention is to provide a reversing edge for car doors wherein there is little danger of the switch activating cable being snarled or inadvertently engaged by the reversing edge.

Other objects and advantageous features of the invention will be apparent from the description and claims.

BRIEF DESCRIPTION OF THE DRAWING

The nature and characteristic features of the invention will be more readily understood from the following description taken in connection with the accompanying drawings forming part thereof, in which:

FIG. 1 is a view in perspective showing the reversing edge apparatus installed on a door;

FIG. 2 is a fragmentary side view, enlarged, of the apparatus illustrated in FIG. 1, and showing the reversing edge in accordance with the present invention;

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

FIG. 4 is a horizontal sectional view taken approximately on the line 4—4 of FIG. 2;

FIG. 5 is a horizontal sectional view taken approximately on the line 5—5 of FIG. 2;

FIG. 6 is a vertical sectional view taken approximately on the line 6—6 of FIG. 2;

FIG. 7 is a vertical sectional view taken approximately on the line 7—7 of FIG. 6, and

FIG. 8 is a horizontal sectional view taken approximately on the line 8—8 of FIG. 6.

It should, of course, be understood that the description and drawings herein are illustrative merely, and that various modifications and changes can be made in the structure disclosed without departing from the spirit of the invention.

Like numerals refer to like parts throughout the several views.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now more particularly to the drawings and specifically FIG. 1 thereof, a portion of a car for vertical movement is illustrated having an opening therein with respect to which an upper gate or door panel **12** is vertically movable on spaced vertical guide rails **14** and **15**.

The gate **12** has a central panel **16**, a pair of side guide shoes **17**, and may have a top bracket portion **18**.

The top bracket **18** is engaged by a pair of chains **19** which serve to suspend and position the gate **12**, preferably in counter-balanced relation to a lower door or gate **44**. The chains **19** are carried by a pair of sprockets **21** which are mounted on shafts **22** carried by a top rail **23** which connects the two vertical guide rails **14** and **15** and extend downwardly to and are secured to the top flange **45** of the lower door or gate **44**. The door or gate **44** also has a horizontal edge flange **46** which provides an abutment.

Referring now also to FIGS. 2 through 8, the guide shoes **17** of the panel **12** are of substantially U-shape in cross section with a perpendicular rearwardly extending portion **24** and a plate portion **25** attached thereto and parallel to the central panel **16**

Front or outer vertical flanges **26** of the guide rails **14** and **15** are engaged between the panel **16** and shoe plate **25** of the gate guide shoes **17**.

A cable **30** is provided attached to a bracket **31** mounted on the right side front flange **26** of rail **14** by bolts **32** as seen in FIG. 1, and extends vertically upwardly along the guide shoes **17** and is connected at the top to a lever **33** by an adjustable bolt **34**. The lever **33** is pivotally mounted by a pin **35** to the guide rail **14**. A spring **36** engages the other end of the lever **33** and normally urges the lever **33** downwardly. The spring **36** is engaged by brackets **37** which is mounted to rail **14** by bolts **38**. A switch **40** is mounted on rail **14** above the bracket **37** and lever **33**.

The switch **40** has central body **41**, plunger **42** and leads **43**. The leads **43** are connected into the door mechanism electrical circuit (not shown) in well known manner. The lever **33** is adjusted by means of bolt **34** and spring **36** so

that it just contacts the plunger **42** when the cable is taut.

The upper gate **12** at the bottom of panel **16** is provided with a bracket **47** fastened thereto by bolts **48** and extending substantially the length of the panel **16** with a forwardly extending portion **49** and a vertical plate **50**. A mounting bar **51** is attached to the portion **49** by screws **52**, the bar **51** extending the length of portion **49**.

A sheath **54** of rubber, plastic or other flexible material, U-shaped when mounted, is held to plate **50** by plate **55** and bolts **56**, and to the rear of the mounting bar **51** by a plate **57** and bolts **58**. Between the mounting bar **51** and the plate **55**, pairs of links **60** are provided pivotally mounted on the bar **51** by bolts **58**.

The upper faces **60***a* of the links **60** by the engagement of their ends with the under face of the bracket portion **49** provide limit stops upon downward and upward movement. A lower horizontal contact bar **61** is movably mounted with respect to bar **51** by links **60** and bolts **62**.

An arm **63** is pivotally attached to the right end of contact bar **61** by a pin **64** and extends outwardly to the right through a slot **65** in an end closure and limit stop plate **66** mounted to the end of portion **49**. The arm **63** has a link portion **67** and a plate portion **68** with a U-shaped rod **69** attached thereto and extending around the cable **30**.

The mode of operation will now be pointed out. Assuming that the gates **12** and **44** are to be closed, the mechanism (not shown) is activated to cause the chains **19** to permit the gate **12** to move vertically downwardly and the gate **44** to move upwardly along guide rails **14** and **15**, to substantially close off the opening **11**. When the sheath **54** is about two inches from the lip **46** of gate **44** downward movement of gate **12** is halted by the mechanism (not shown) which controls the chain **19**.

If, while the gate **12** is descending, the sheath **54** strikes an object such as a person or some part of the body of a person, the deformation of the sheath **54** causes movement of the contact bar **61**.

Due to the mounting of the links **60** the bar **61** moves in an arc to the right and arm **73** is urged outwardly through slot **65** so that the rod **69** presses against the cable **30**.

The action of the rod **69** against cable **30** exerts pressure against the lever **34** and spring **36** and urges the lever **34** to rotate upwardly and push in the plunger **42** of switch **40**. The movement of plunger **42** of switch **40** causes the circuit (not shown) controlling the movement of the chains **19** to either reverse the motion and move gates **12** and **44** toward open positions or to halt the motion as desired.

It will thus be seen that apparatus has been provided to carry out the objects of the invention.

I claim:

1. In combination with an element having an access opening and pair of parallel guide rails extending along opposite sides of said opening, and a panel mounted for movement transversely with respect to the opening,

means for controlling the positioning of the panel comprising

a control cable disposed along one of said guide rails

mounted at one end at a fixed location on one side of said opening and along which said panel is movable,

a control member mounted at a fixed location with respect to said opening on said one side thereof and to which the other end of said control cable is connected in actuating relation, and

sensing means carried by a free edge of the panel normal to said guide rails and having a portion movable into actuating engagement with said control cable upon engagement of said sensing means with an interposed object.

2. The combination defined in claim **1** in which

said control cable is fixedly and adjustably mounted at said one end.

3. The combination defined in claim **1** in which

said means includes

a flexible sheath, and

a contact bar within said sheath actuating said movable portion upon displacement of said contact bar.

4. The combination defined in claim **3** in which

said means also includes a mounting bar on which said flexible sheath is carried, and

said contact bar is movably mounted with respect to said mounting bar.

5. The combination defined in claim **3** in which

said means also includes a mounting bar, and

said contact bar is vertically movably mounted with respect to said mounting bar.

6. The combination defined in claim **3** in which

said means also includes a mounting bar, and

links are provided connected to said mounting bar and said contact bar.

7. The combination defined in claim **6** in which

said links have limit stop portions for limiting the movement of said contact bar.

8. The combination defined in claim **3** in which

said means also includes a mounting bar

links are provided connected to said mounting bar and said contact bar, and

said movable portion is pivotally connected to said contact bar and carried with respect to said panel for movement outwardly upon vertical movement of said contact bar.

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DENNIS L. TAYLOR, Primary Examiner

U.S. Cl. X.R.

200—61.43