

Jan. 10, 1950

N. R. GUILBERT, JR
COLLAPSIBLE SAFETY GATE

2,493,815

Filed Feb. 19, 1946

3 Sheets-Sheet 1

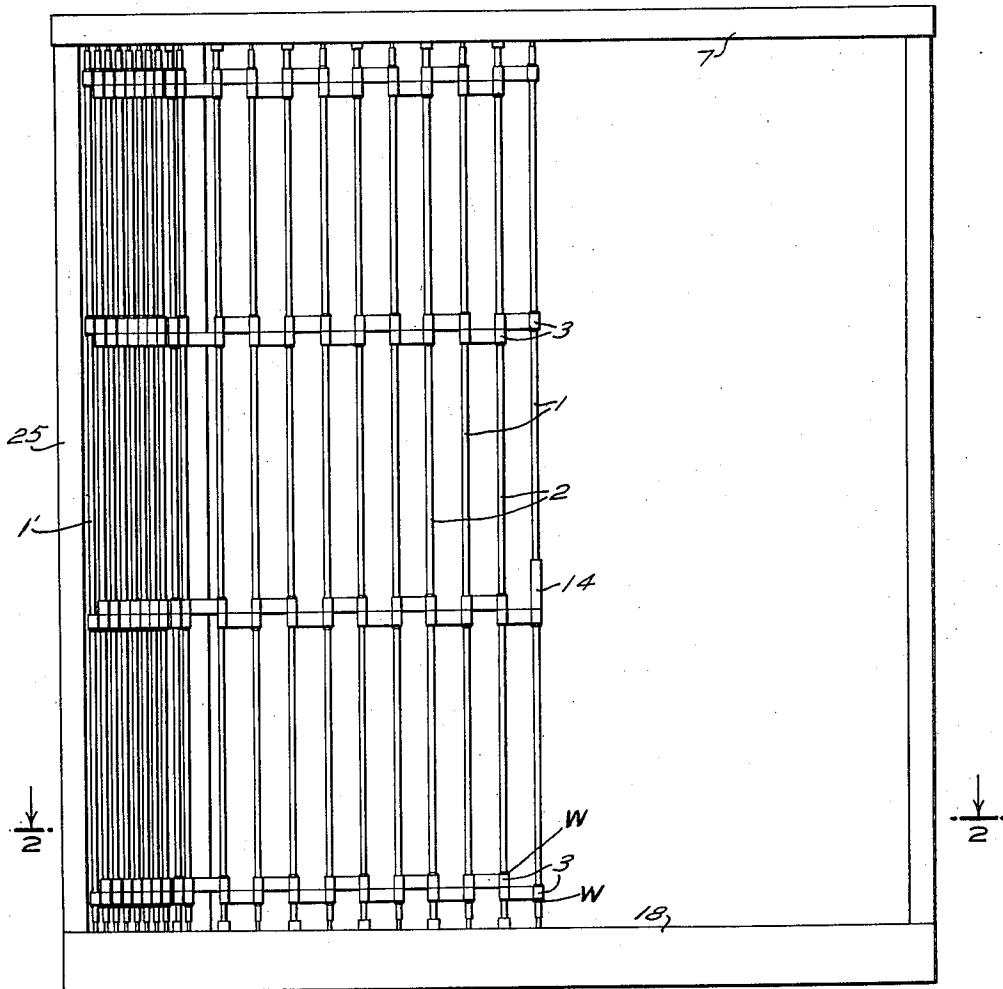


Fig. 1.

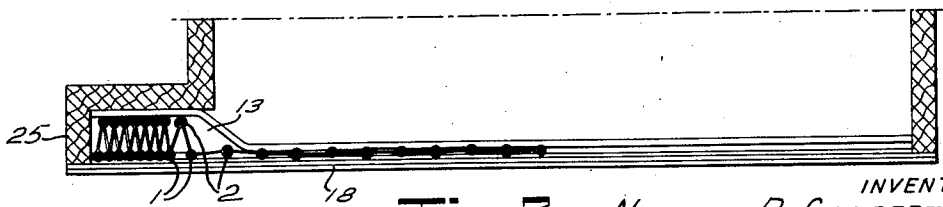


Fig. 2.

INVENTOR
NICHOLAS R. GUILBERT, JR.

BY *Gorge H. Kellum*
ATTORNEY

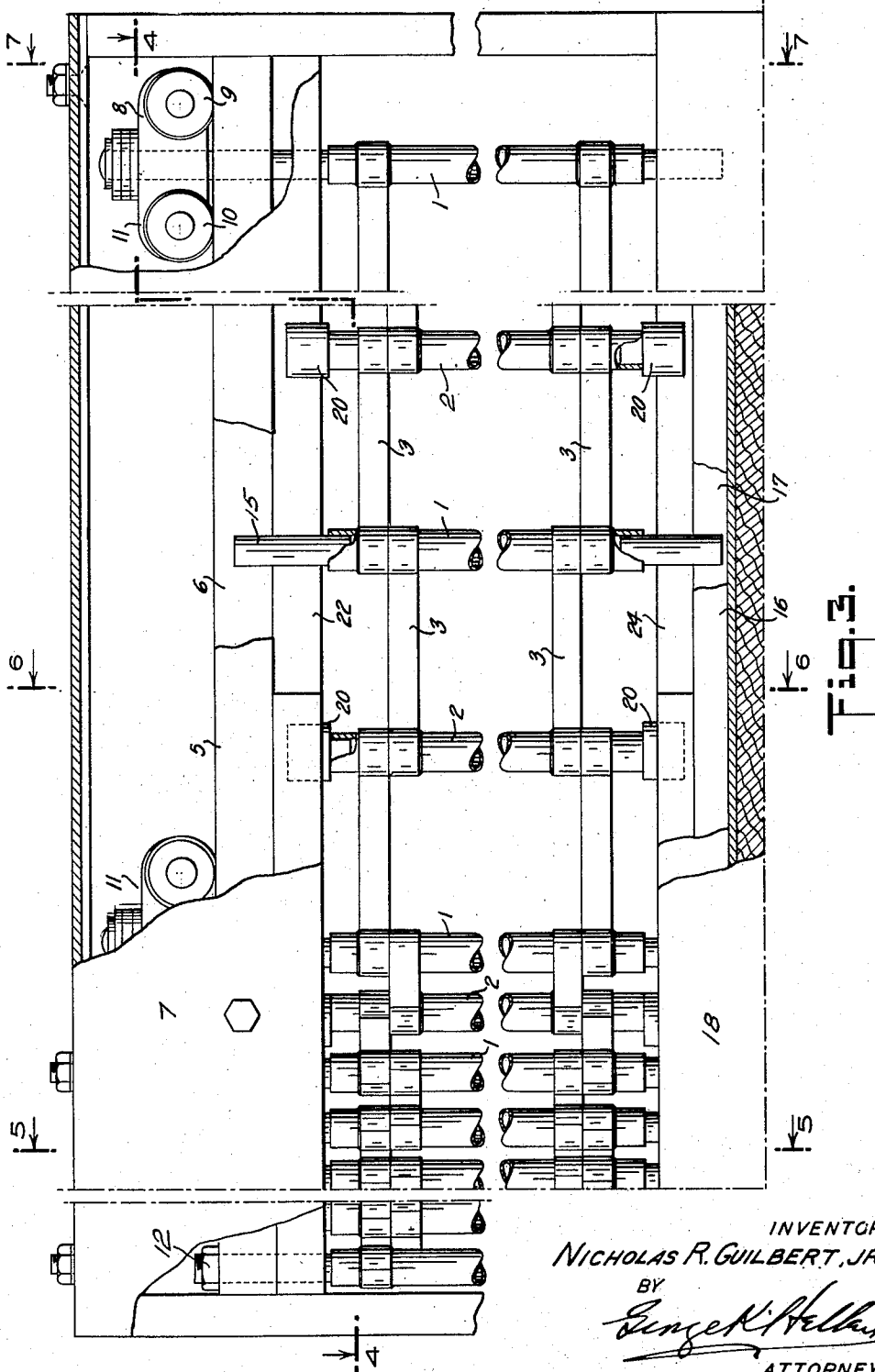
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Fig. 4.

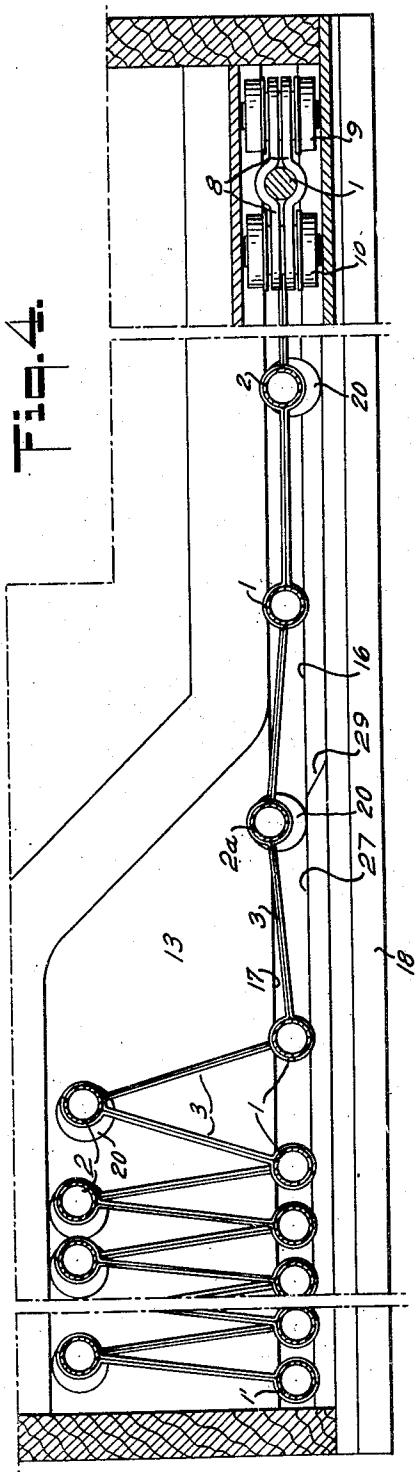


Fig. 7.

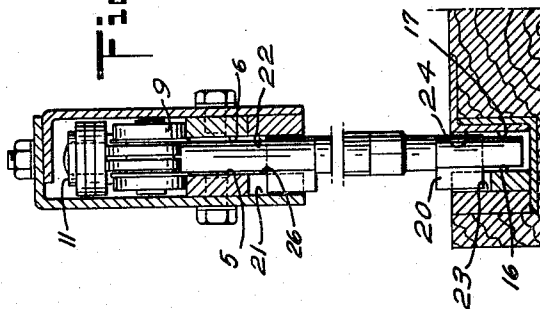


Fig. 8.

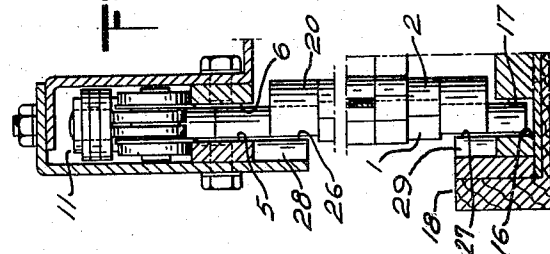
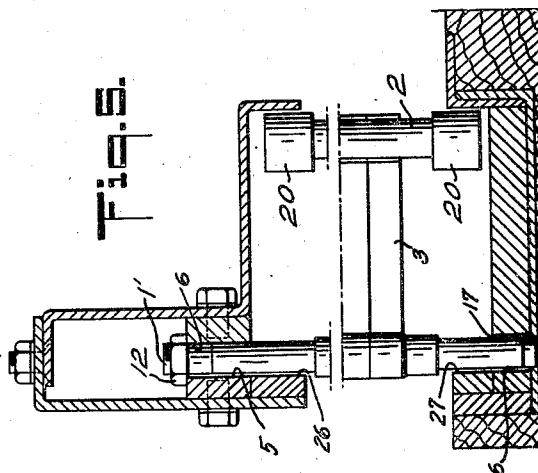


Fig. 9.



INVENTOR
NICHOLAS R. GUILBERT, JR.

BY
George K. Helms
ATTORNEY

UNITED STATES PATENT OFFICE

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COLLAPSIBLE SAFETY GATE

Nicholas R. Guilbert, Jr., Chestnut Hill, Pa.

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8 Claims. (Cl. 160—201)

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This invention relates to collapsible safety gates and especially to those for elevators and the like, where space is limited and it is desirable to provide a gate which can be compacted into the smallest possible space to afford a substantially unobstructed passage when the gate is open, but which is effective as a barrier and protector when extended to close the gateway.

Gates intended for the same general purposes as those to which the invention relates are now in use, comprising a plurality of vertically disposed transversely slidable bars interconnected by pivoted cross levers somewhat similar to those used in lazy tongs. But these gates embody intricate mechanical relationships whereby their several parts move in different directions and at varying speeds relatively to the part being directly manipulated by the operator with consequent likelihood of injury to the elevator passengers and delays in operation due to hands, parcels or other objects being caught in the meshes of the gate as it is opened or closed.

The present invention, therefore, is directed to the provision of a novel and improved gate comprising a plurality of articulated vertical bars or rods adapted when extended to afford a substantial barrier for, and adequate protection to the occupants of, the elevator or the like with which it is associated, the gate however being collapsible into a relatively small space at one side of the entrance where it offers substantially no obstruction to passage through the latter, and also being devoid of objectionable leverage between its bars creating a source of danger through unexpected movement of the parts while the gate is being opened or closed.

It is therefore a principal object of the invention to provide an improved safety gate of the aforesaid character affording maximum ease of operation and devoid of mechanical parts or motions likely to cause personal injury while it is being operated.

Another object is to provide a collapsible gate which is simple in construction, not likely to get out of order through use and able readily to withstand rough treatment of the nature to which mechanisms of this character are customarily subjected.

Other objects, purposes, advantages of the invention will hereinafter appear or will be understood from the following description of a preferred embodiment illustrated in the accompanying drawings, in which:

Fig. 1 is a front elevation of a typical elevator entrance or other similar passageway equipped

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with my improved gate which is shown as partly open;

Fig. 2 is a section on line 2—2 in Fig. 1;

Fig. 3 is a fragmentary enlarged front elevation of the gate foreshortened vertically to disclose details of construction adjacent the top and bottom of the gate;

Fig. 4 is a horizontal section on line 4—4 in Fig. 3, and Figs. 5, 6 and 7 are respectively vertical sections on lines 5—5, 6—6 and 7—7 in Fig. 3.

In the several figures like characters are used to designate the same parts, and sections are taken in direction of the arrows on the section lines.

Referring now more particularly to the drawings, the gate shown therein comprises in general a plurality of vertical, preferably round, tubular rods of which alternate rods 1 extend above and below the ends of adjacent and shorter intermediate rods 2 for reasons which will hereinafter more fully appear. The several rods are respectively connected to and articulated with adjacent rods by a plurality of courses of substantially horizontal links 3, constructed and disposed with relation to the rods to afford capacity for relative motion between each pair thereof about the axis of one of them, the links also serving to support certain of the rods, not directly carried by the elevator car structure, either directly or indirectly from those which are so carried. To attain this effect the links 3 connecting the first rod 1 with the first intermediate rod 2, reading from the free edge of the gate, are welded to the former as at W but connected to rod 2 in a manner to permit relative movement between the links and rod 2 about its axis, while the next group of links 3, connecting the first rod 2 with the second rod 1 are likewise welded as at W to the former but are free to turn about the axis of the latter, and so on throughout the length of the gate. The overlapping relation of the link ends which are welded to the rods with respect to the free or unwelded ends of adjacent links thus produces a hinge-like structure of which the rod itself serves as hinge pin when the gate is collapsed as to the left in Fig. 1.

The upper end of the first rod 1 at the free edge of the gate extends upwardly between horizontal ways 5, 6 in a U-shaped casing which forms the lintel 7 of the gateway and is supported directly from these ways through the medium of a pair of links 8 carried on trolley wheels 9, 10 movable along the ways. A similar trolley 11 may be supplied for another of the rods 1 at an interval along the horizontal length of the gate, preferably

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for the fourth long rod 1 from its outer or free edge, and it will be understood that additional such trolleys may be provided, if desired, depending upon the width of the gateway. At the extreme inner edge of the gate a fixed rod 1' is secured at the end of lintel 7 by a nut 12.

The mechanism provided for compacting the gate as it is opened is constructed in such manner that the long rods 1 are brought together in one file and the intermediate or short rods 2 into another file spaced from the first by links 3 connecting the rods, and at the left hand portion of Fig. 4 a number of the rods and their connecting links are indicated as thus compacted substantially in accordion-like folds within a region 13 which thus receives the folded gate when it is open and which may be substantially entirely enclosed or, as is indicated in the drawings, defined only by enlarged spaces in the lintel and sill of the gateway. Conversely, the rods and links are automatically unfolded and drawn out into the plane of the gateway when edge rod 1 of the gate is drawn in the opposite direction to close the gate, a handgrip 14 being provided on said rod which the operator may grasp to open or close the gate. The accordion-like folding of the rods and links when the outer edge of the gate is pushed toward region 13 is automatically effected by mechanism now to be described.

The extremities of rods 1 which extend above and below the corresponding ends of intervening rods 2 may be integral with the rods or, as shown, formed by solid extensions 15 welded to their ends; they extend into the spaces between ways 5, 6 in lintel 7 and generally similar ways 16, 17 in the sill 18 of the gateway.

The intermediate rods, 2, being shorter than rods 1, do not so extend into these spaces but carry at their ends eccentric cams 20 movable in other ways 21, 22 below upper ways 5, 6 and ways 23, 24 above the lower ways 16, 17. Adjacent the jamb post 25 of the gateway, toward which the gate is compacted when being opened and forming boundaries of regions 13, are disposed cam surfaces 26, 27 parallel to, but offset inwardly from, the adjacent surfaces of outer ways 21 and 23 for the intermediate rods 2. These cam surfaces extend longitudinally substantially the same distance as enlarged regions 13, and at their ends remote from jamb post 25 are provided with angular surfaces 28, 29 connecting them with the adjacent surfaces of ways 21 and 23.

Thus, as most clearly illustrated in Fig. 4, when the gate is pushed progressively toward the left of that figure, as eccentric cams 20 on rods 2 successively engage angular surfaces 28, 29 and then cam surfaces 26, 27, they are consecutively forced laterally inward out of the plane of ways 21-24, and so carry rods 2 out of the plane of the axes of adjacent rods 1 as indicated by the position of rod 2a in said figure. Continued pressure exerted by the operator to urge the gate toward the left in Fig. 4 then progressively folds links 3 together about the axes of the several rods to which they are connected, carrying intermediate rods 2 further inwardly and rearwardly across regions 13 away from the plane of rods 1, which are constrained by their ways 5, 6 and 16, 17 to remain in the plane of the gateway. The rods 1 thus move into close proximity with each other instead of being separated by intermediate rods 2 and connected links, as is the case when the rods and links are extended in substantially the same plane and the gate is closed. The folded gate thus occupies very little space when retracted

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from the gateway and affords free passage there-through.

It will, of course, be apparent that after the gate has been fully or partially opened in the manner described it may readily be closed by drawing its outer edge in the opposite direction, rods 2 and links 3 automatically assuming extended condition as cams 20 move away from cam surfaces 26-29 and into the paths formed by guide ways 21-24.

My invention thus provides a simple and easily operable safety gate for elevator cabs and the like which reduces the chance of injury to the hands or fingers of the passengers and operator to a minimum for the reason that as the gate is being opened the rods comprised in it remain in their normally spaced relation until they successively closely approach the side of the gateway. On the contrary, in the gates hitherto in general use the vertical bars, which when the gate is fully closed are in equidistantly spaced relation, progressively approach each other, though in varying amounts, during the whole time the gate is being opened, which greatly enhances the danger of accident through inability to quickly enough withdraw a hand or finger from between the bars before they close upon it.

While I have herein described with considerable particularity one embodiment of my invention suitable for use as an elevator gate, the invention is equally adapted for employment as a closure for many other types and kinds of passageways and openings and may be used advantageously therefor; moreover, numerous changes and modifications in the form, construction, arrangement and relationship of the several parts will readily occur to those skilled in the art and may be made if desired without departing from the spirit and scope of the invention as defined in the appended claims.

Having thus described my invention, I claim and desire to protect by Letters Patent of the United States:

1. A collapsible gate of the character described comprising a plurality of substantially similar vertical rods in one series, a plurality of mutually substantially similar vertical rods in a second series alternating with those of the first series, a plurality of links articulately interconnecting the rods, means forming substantially parallel ways embracing the ends of the rods of the first series, said ends extending into said ways beyond the ends of the rods of the second series, a cam surface disposed adjacent that end of the ways remote from the free edge of the gate when the gate is extended, and a cam carried by each rod of the second series operative to engage the cam surface when said rods are moved longitudinally of the ways to thereby translate said rods outwardly from the ways relatively to the rods of the first series.

2. A collapsible gate of the character described comprising two series of vertical rods, the rods of one series alternating with those of the other, links articulately interconnecting each rod of one series with an adjacent rod of the other series, means forming substantially parallel ways embracing the ends of the rods of the first series, the rods of the other series terminating short of said ways, a cam surface disposed adjacent that end of each of the ways remote from the free edge of the gate when the gate is extended, and means carried by the rods of said other series adapted to successively engage said cam surfaces when said rods are moved progressively

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along the ways toward said end thereby to translate the rods of said other series laterally from the plane of the ways.

3. In an elevator gateway or the like, means forming substantially parallel ways extending transversely of the gateway, a plurality of rods extending normal to said ways and movable longitudinally thereof, alternate rods extending into and intermediate ones terminating short of said ways, links interposed between adjacent rods articulating said alternate rods with the intermediate rods, and means cooperative with the alternate rods and disposed in said ways adjacent a jamb of the gateway operative to successively deflect said intermediate rods out of the plane of the ways when said intermediate rods are progressively moved with the alternate rods along the ways toward said jamb to collapse the gate.

4. In an elevator gateway or the like, means forming substantially parallel ways extending across the lintel and sill of the gateway, a plurality of vertical rods extending into said ways and movable longitudinally thereof, a plurality of rods terminating short of said ways respectively alternating with the first mentioned rods, links articulately interconnecting each of said first mentioned rods with an interposed shorter rod, and means disposed in said ways adjacent a jamb of the gateway operative to successively deflect said shorter rods out of the plane of said ways when the rods are progressively moved toward said jamb to collapse the gate.

5. In an elevator gateway or the like, a plurality of substantially vertical rods movable in parallel ways, means disposed at the top of the ways for supporting certain of said rods, links connecting each rod with an adjacent rod, articulating alternate rods with intermediate rods and adapted to afford support from the rods depending from said supporting means to said adjacent rods, means adjacent one jamb of the gateway for moving said intermediate rods transversely from the plane of said ways when the several rods are moved toward said jamb, and means operative to retain said alternate rods in the plane of said ways during the movement of the intermediate rods out of said plane.

6. In an elevator gateway or the like, a gate comprising a plurality of substantially vertical rods movable in parallel ways, rails defining one

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of the ways cooperative with certain of said rods for supporting the gate for movement along the ways, links connecting each of said supported rods with an adjacent rod, articulating it with the supported rods and affording support from the latter to the former, and means disposed adjacent a jamb of the gateway for moving said adjacent rods out of the plane of the ways during movement of the supported rods in said plane toward said jamb to collapse the gate of the gateway.

7. In an elevator gateway or the like, a gate comprising a plurality of substantially vertical rods movable in parallel ways, a plurality of links connecting each of the rods with another thereof for movement relatively thereto transversely to the rod axis, and means disposed adjacent that end of the ways remote from the free edge of the gate when the gate is extended operative to move alternate ones of the rods transversely of the plane of the ways during movement of other rods in said plane.

8. In an elevator gateway or the like, a gate comprising a plurality of elongated gate sections, and means articulating each section with an adjacent section for relative movement about vertical axes, a horizontal rail above the gateway, trolleys movable along the rail respectively supporting spaced sections of the gate therefrom, means adjacent one jamb of the gateway remote from the free edge of the gate when extended for progressively moving successive sections in opposite directions about said axes relatively to adjacent sections as the free edge of the gate is moved toward said jamb to retire it from the gateway, and means for moving the sections respectively in reverse directions relatively to adjacent sections when the free edge of the gate is thereafter moved away from said jamb to obstruct the gateway.

NICHOLAS R. GUILBERT, JR.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
312,380	Pitt	Feb. 17, 1885
1,405,485	Callery	Feb. 7, 1922

Certificate of Correction

Patent No. 2,493,815

January 10, 1950

NICHOLAS R. GUILBERT, JR.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows:

Column 5, line 45, after the word "jamb" and before the comma insert *to collapse the gate*;

and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 18th day of April, A. D. 1950.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.