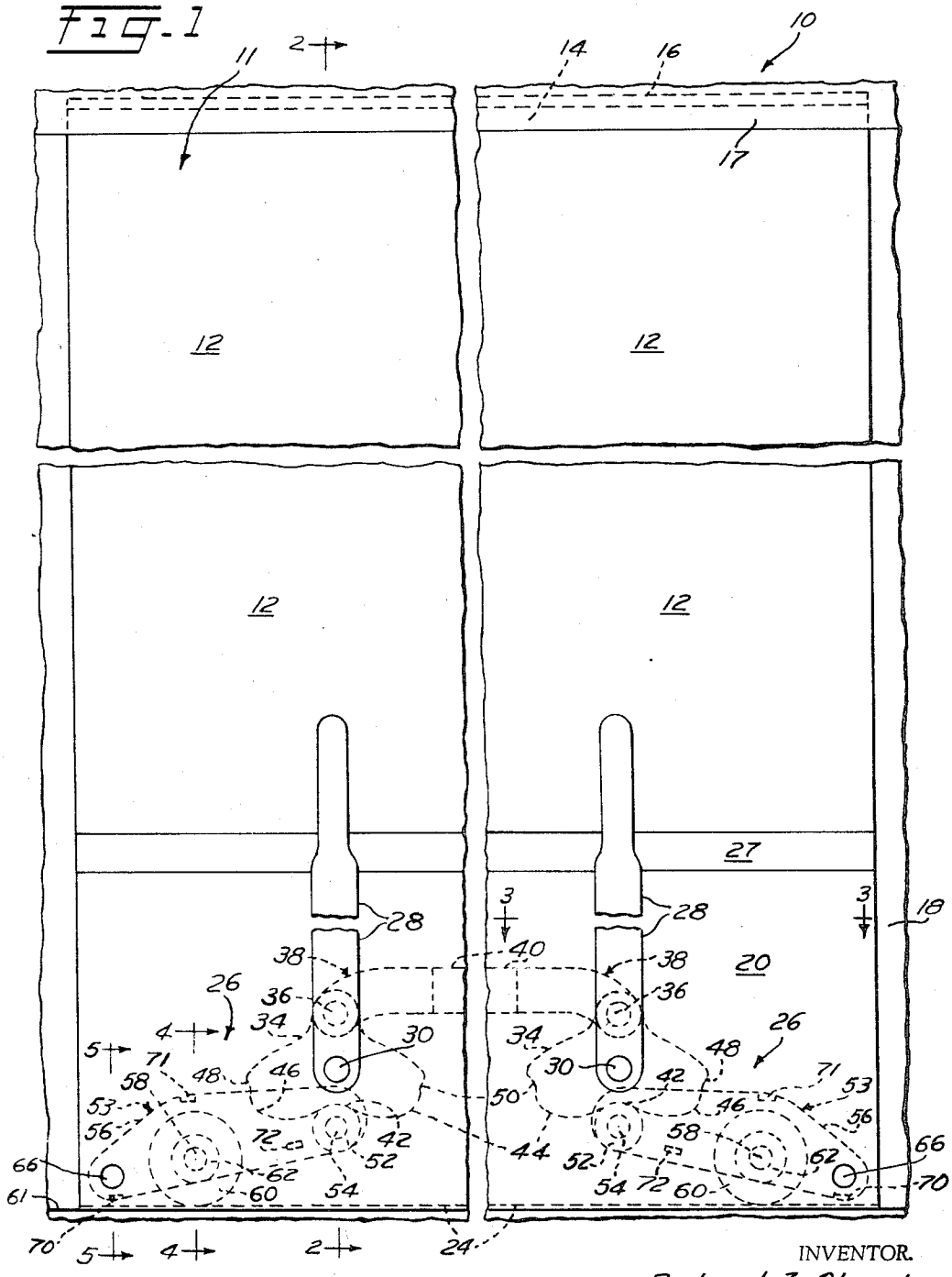
April 29, 1969 R. J. OLANDER 3,440,682

CAR DOOR MECHANISM

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Fig. 1



INVENTOR.
Roland J. Olander
BY Edward F. Jurow
Atty.

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Fig. 2

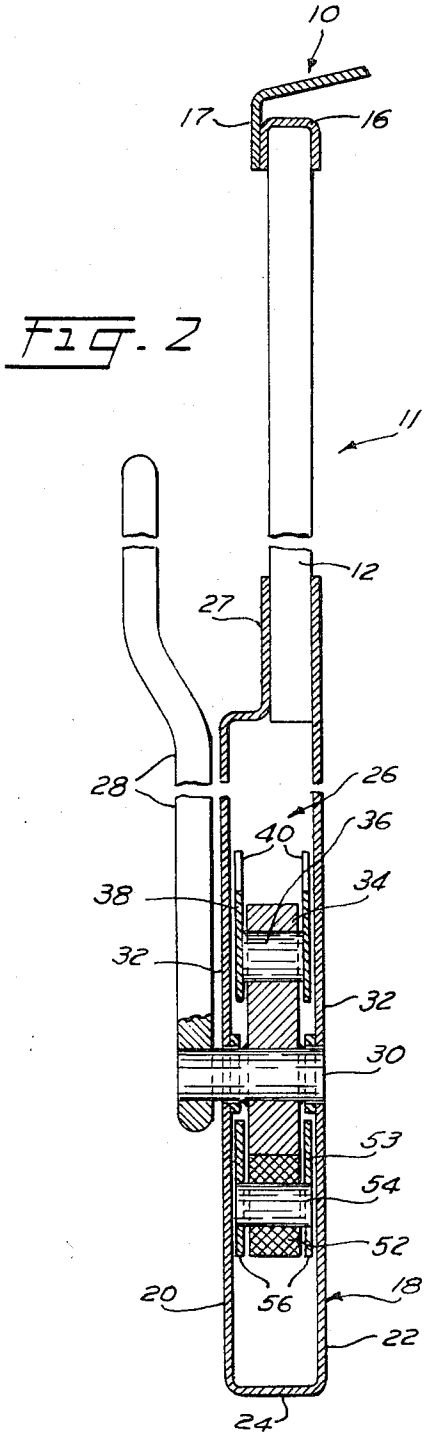


Fig. 5

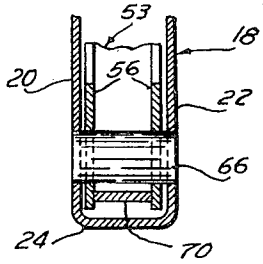
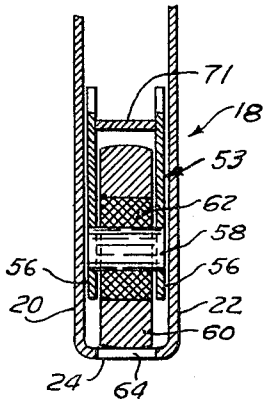


Fig. 4



INVENTOR.
Roland J. Olander
BY Edward F. Jurow
Atty.

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CAR DOOR MECHANISM

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Fig. 3

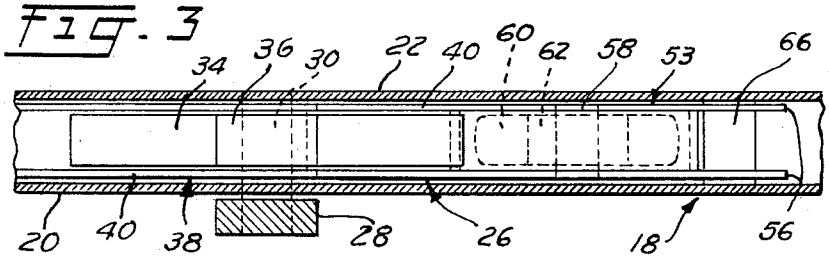
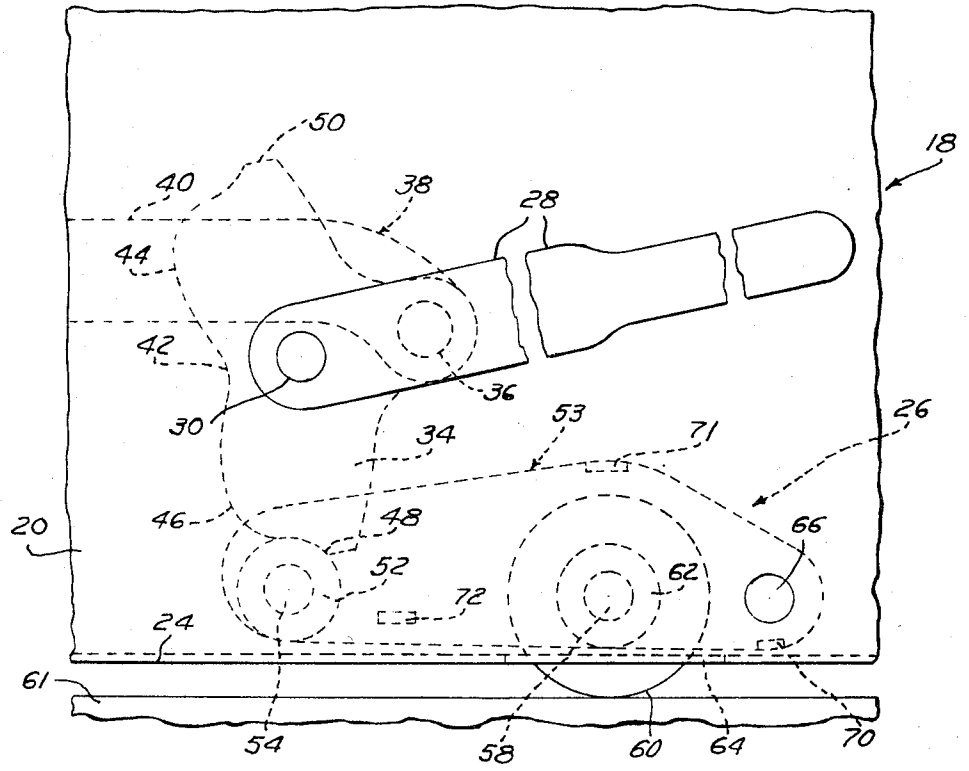


Fig. 6



INVENTOR.
Roland J. Olander
BY
Edward F. Jurow
Atty.

April 29, 1969 R. J. OLANDER 3,440,682

CAR DOOR MECHANISM

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Fig. 7

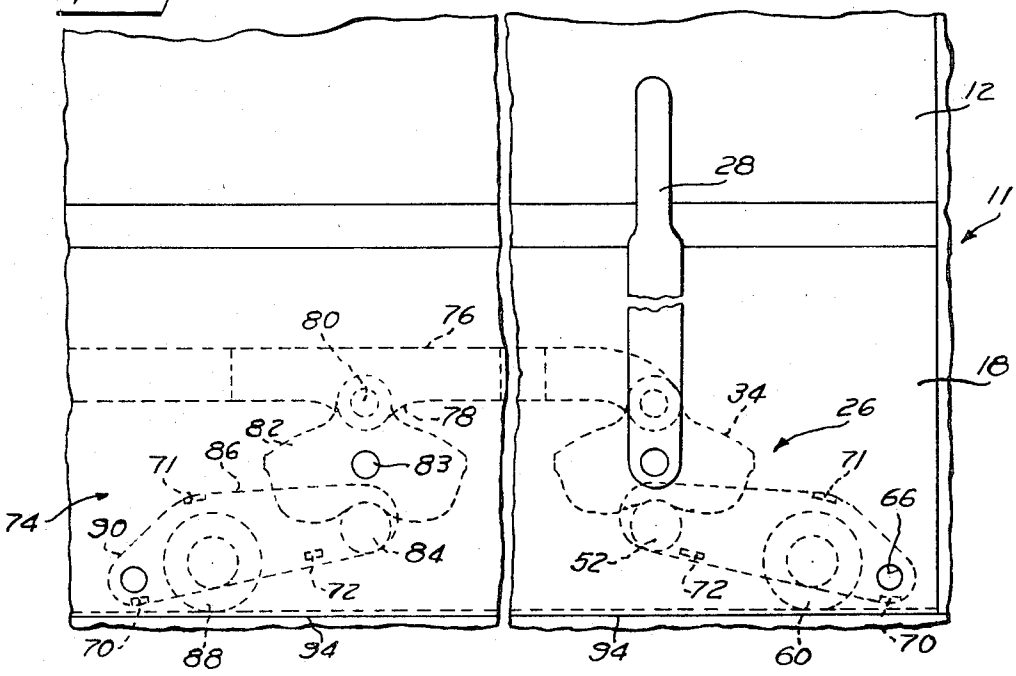
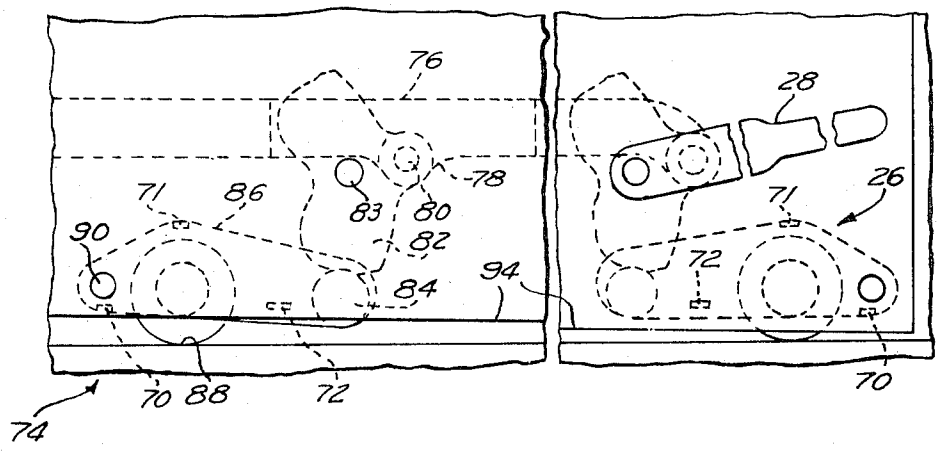


Fig. 8



INVENTOR.
Roland J. Olander
BY Edward F. Jurow
Atty.

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3,440,682

CAR DOOR MECHANISM

Roland J. Olander, La Grange, Ill., assignor to W. H. Miner, Inc., Chicago, Ill., a corporation of Delaware

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Int. Cl. E05d 13/02
U.S. Cl. 16—99 3 Claims

ABSTRACT OF THE DISCLOSURE

A mechanism for raising a door of a railway car or the like normally supported on its bottom edge onto rollers for sliding movement along a track and having a pair of rollers pivotally supported on the lower portion of the door at opposite side edges of same and manually actuated operating means associated with each of said rollers, either of which may be actuated to simultaneously lower both rollers to raise the door. The operating means may automatically retain the door in its raised position until actuated in reverse. A third intermediate roller may be pivotally mounted on the door to tilt same in the direction of its sliding movement.

This invention relates in general to railway car door lifting and moving mechanisms and more particularly to a railway car door lifting and moving mechanism adapted to be operated by either one of a pair of handles disposed at opposite ends of the car door.

Railway car doors, in many instances, are provided with rollers which, after the doors have been moved into their desired positions, open or closed, are normally retracted into the doors whereby the doors rest directly on the frame structure with their weight holding same firmly in position. In order to move a door of this type, the rollers must first be forced downwardly against the car frame structure to raise the door until same is supported on the rollers. For this reason, lifting and moving mechanisms or roller assemblies are employed in the doors to permit same to be lifted onto their rollers and lowered therefrom by means of a handle extending from the side of the doors. After the doors are raised and supported on the rollers, they may be moved in the desired direction.

As may be appreciated, this presents a rather difficult and arduous task which is further complicated in the case of multiple doors, such as are found on all-door railway cars, by the necessity of the attendant to walk a considerable distance between the handles of the respective doors in order to actuate the mechanisms.

In order to overcome these problems, the present invention provides cam operated roller assemblies for the doors which are operable by either one of a pair of handles placed at the opposite ends of each door. Furthermore, the present invention provides for operation of the handles in a direction corresponding to the desired movement of the doors so that the thrust applied to the handle for actuating the door lifting mechanism may also be advantageously applied to the handle for moving the door. In addition the present invention contemplates a simple arrangement for locking the doors in their raised position, thus permitting the attendant to concentrate his attention on moving the door. This invention also contemplates the use of a roller assembly for tilting the doors between several rollers thereby advantageously utilizing the weight of the door for moving same.

It is, therefore, a primary object of the present invention to provide an improved railway car door lifting and moving mechanism.

It is another object of the present invention to provide a railway car door lifting and moving mechanism which may be operated from either end of the door.

It is still another object to provide a railway car door lifting arrangement having a handle which may be operated in either of two directions to lift the door while also serving to thrust the door in a corresponding direction.

It is also an object of the present invention to provide an improved arrangement for locking railway car doors in their raised position.

It is a further object of this invention to provide an improved car door lifting arrangement whereby the door is tilted on its rollers for more advantageously moving same.

Other objects and features of this invention will become apparent upon examination of the following specification, claims and drawings, wherein:

FIG. 1 is a partially broken elevational view illustrating a railway car door, together with the mechanism for lifting and moving the same;

FIG. 2 is a vertical sectional view taken generally on the line 2—2 of FIG. 1;

FIG. 3 is a horizontal sectional view taken generally on the line 3—3 of FIG. 1;

FIG. 4 is a vertical sectional view taken generally on the line 4—4 of FIG. 1;

FIG. 5 is a vertical sectional view taken generally on the line 5—5 of FIG. 1;

FIG. 6 is a fragmentary elevational view illustrating the door lifting and moving mechanism of FIGS. 1–5 in its door-lifted condition;

FIG. 7 is a fragmentary elevational view illustrating a modified form of railway card door lifting arrangement for advantageously balancing the door for movement in a desired direction; and

FIG. 8 is a fragmentary elevational view of the door lifting mechanism shown in FIG. 7 in its door-lifted condition.

In the drawings, a railway car door for a multiple door or all-door railway car **10**, for example, is illustrated generally by the reference character **11**. As seen in FIGS. 1 and 2, the door **11** is shown broken and is comprised of a vertical panel **12** whose upper end **14** is provided with a cap **16** which bears against the inner surface of a structural member **17** of the car frame, the door **11** being permitted to move a limited distance upwardly relative to the structural member **17**. A generally U-shaped housing **18** comprised of outer and inner vertical panels **20** and **22**, respectively, and a bottom connecting portion **24** fixedly embraces at its upper end the lower edge of the door panel **12**. The panels **20** and **22** are spaced apart a distance sufficient to accommodate a pair of roller operating assemblies **26** positioned adjacent opposite ends of the car door **11**. The upper end of panel **20** is provided with a portion **27** which is offset inwardly to seat against the outer surface of the lower edge of the door panel **12** while the panel **22** seats against the inner surface of the lower edge of the panel as seen in FIG. 2.

Each roller operating assembly **26** is provided with an operating handle **28** which is secured at its lower end on a stub shaft **30** which is journalled in the housing **18** by bushings **32** mounted on the panels **20** and **22**. A cam **34** is secured on each stub shaft **30** between the panels **20** and **22**. A pin **36** is mounted in the upper portion of each cam **34** and a connecting link **38** has its opposite ends pivotally connected to the two pins **36** whereby to interconnect the two roller operating assemblies **26**. The connecting link **38** is characterized by a pair of spaced apart identical links **40** which are pivotally mounted between the projecting ends of the two pins **36** whereby to permit movement of the cams **34** between the links **40**.

Each cam **34** is provided with an indentation **42** in its bottom edge in alignment with a plane passing through the axes of the shaft **30** and the pin **36**. Extending in

opposite directions from the indentation **42** are identical camming faces **44** and **46**, each terminating in a locking face defined by flange-like portions **48** and **50**.

Each cam **34** has a cam follower **52** associated therewith, which cam follower is mounted in a carrier **53** disposed within the housing **18** and characterized by a pair of spaced apart plates **56**. The plates **56** are retained in their spaced apart relationship by a series of transverse brace members **70**, **71** and **72**. Each cam follower **52** is rotatably supported on a pin **54** mounted in one end of the carrier **53**. The carrier **53** also carries a pin **58** which rotatably supports a car door roller **60** in a bushing **62** intermediate the ends of the carrier. An aperture **64**, as shown in FIG. 4, is provided in the bottom portion **24** of the housing **18** directly below each roller **60** to permit same to move through the bottom of the housing **18** for engagement with a bottom roller track **61** of the car frame structure in a conventional manner. The other end of each carrier **53** is pivotally suspended from a pin **66** mounted in the panels **20** and **22** adjacent the lower corners of the housing **18**.

Conventional spring means (not shown) may be provided for biasing the carriers **53** upwardly to aid in retaining the cam followers **52** in contacting engagement with the cams **34** to prevent undesirable rattling and possible damage to the parts.

To operate the roller assemblies **26** the attendant simply grasps the handle **28** at the side of the door **11** to which he has most immediate access, and pivots the handle **28** in a direction corresponding to that in which he desires the door to move until the handle is generally horizontal, as seen in FIG. 6, whereby to raise the door **11** up on its rollers **60** with the force being applied to the handle also serving to roll the door in the desired direction.

Upon actuating the handle **28**, the cams **34** are pivoted with the cam followers **52** riding along either face **44** or **46**, depending upon the direction in which the handle was rotated, until the followers **52** engage either locking face **48** or **50**. The followers **52** are pushed downward as they follow the faces **44** and **46**, whereby the carriers **53** are pivoted downwardly about the pins **66** to lower the rollers **60** through the apertures **64**. As the rollers **60** engage the track **61**, the door **11** is raised, by means of the leverage exerted on the pins **66**, above the level of the track **61** so that same is supported on the rollers **60**. Thereafter the followers **52** move adjacent the locking faces **48** or **50** into indented locking positions and, as seen in FIG. 6, thus prevent the door **11** from shifting downwardly from casual applications of force to the roller assemblies **26**.

During movement of either cam follower **52**, the connecting link **40** is pulled in the direction of movement of the handle **28** in response to movement of the associated cam **34** whereby this same movement is transferred through the link **40** to the other cam **34**. The follower **52** associated with the other cam **34** is therefore also moved in the corresponding direction so that both of the rollers **60** simultaneously descend through their respective apertures **64** whereby to raise and support the door **11** at both its ends.

With the door **11** raised and locked in its raised position, thrust may be exerted along the axis of the handle **28** in the desired direction of movement. This thrust may also be exerted in a smooth action as part of the raising or lifting force, and need actually not await the locking action between the cams **34** and the followers **52**. With the door **11** locked in its raised position, however, the attendant need not be overly concerned with maintaining the door in said position and may direct his main attention to moving the door.

After the door **11** has been moved to its desired position, opened or closed, the handle **28** is pivoted back to its upright position, thereby causing the cam **34** to return to its normal door-lowered position and, by means of the link **40**, causing the other cam **34** to follow its return movement. The followers **52** retrace their former movement over the cam surfaces **44** or **46** to lower the door and bring it to rest on the roller track **61**. As the followers **52** move toward the indentations **42** in the cams **34**, the pressure on the assemblies is relieved, thereby retracting the rollers **60** into the housing **18**.

In the arrangement shown in FIGS. 7 and 8, an additional roller assembly **74** is mounted in the houing **18** intermediate the two assemblies **26** of which only one is shown. The two assemblies **26** are interconnected by a link **76** which functions as link **40** did in FIG. 1, but is provided with a depending flange structure **78** thereon.

A pin **80** located in the flange structure **78** is pivotally connected to a cam **82** which is adapted to rotate about a pin **83**. A cam follower **84** is adapted to follow the movement of cam **82** in a manner similar to that as described for the other followers **52**. The follower **84** is turn controls the carrier **86** which carries a roller **88**. As seen in FIG. 8, the carrier **86** is pivotable downwardly about a pivot pin **90** in response to the rotation of cam **82** by the link **76**, thereby pushing the roller **88** into engagement with the roller track **61** whereby same aids in raising and supporting the door **11**.

It will therefore be apparent that the elements of the assembly **74** are generally similar to those of the assemblies **26** with the exception that either the cam follower **84** or the cam **82**, or if desired the roller **88**, is proportioned whereby the roller **88** will engage the roller track **61** before the other rollers **60**. Thus, when the cam followers **52** and **84** are in their operated position, as shown in FIG. 8, the center of the door **11** will be slightly higher than one of the ends, as indicated by lines **94** representing the lower edge of the door, whereby the door may be tilted toward one side or the other as desired by the application of a slight manual pressure. With the door **11** tilted in this fashion, the force necessary to move the door is considerably diminished and it is easily pushed to the desred location and lowered in a manner similar to that previously explained.

What is claimed as new is:

1. A car door lifting mechanism comprising, in combination:

(a) a pair of roller mechanisms mounted in the door along its lower edge, one at each end thereof, said roller mechanisms normally being in an upwardly retracted position whereby said door is supported directly on its lower edge, said roller mechanisms each comprising a carrier pivotally mounted on the lower edge of said door and having mounted thereon a cam follower and a roller for supporting the door,

(b) a pair of operating means associated with each roller mechanism with each operating means having a manually operable handle associated therewith for lowering said roller mechanisms relative to said door whereby to raise said door until same is supported directly on said roller mechanisms, said operating means each comprising a cam member moutned on the lower edge of said door in engagement with said cam follower of one of said roller mechanisms and for pivoting movement upon actuation of either of said handles, said parts being arranged such that the movement imparted to said cam followers by said cam members upon actuation of either handle simultaneously pivots said rollers downwardly relative to said door whereby to raise said door,

(c) linkage means interconnecting said pair of operating mechanisms whereby both operating means are simultaneously actuated upon actuation of either of said handles,

(d) a third roller mechanism pivotally mounted on the lower edge of said door intermediate said pair of roller mechanisms, and

(e) a third cam member for actuating said third roller

mechanism pivotally mounted on the lower edge of said door and connected to said linkage means in a manner such the movement of said linkage means in either direction during actuation of said pair of operating means pivots said third cam member so that said third roller mechanism is simultaneously lowered with said pair of roller mechanisms at opposite ends of the door.

2. A car door lifting mechanism as recited in claim 1 wherein said third roller mechanism and said third cam member are arranged so that said third roller mechanism is lowered further than said pair of roller mechanisms at the opposite ends of said door whereby said door will readily tilt in the direction of sliding movement thereof whereby to facilitate sliding same.

3. A car door lifting mechanism as recited in claim 1 wherein said third cam member is characterized by a pair of symmetrical cam surfaces each of which terminates in a locking face.

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RICHARD E. MOORE, *Primary Examiner.*

JOSEPH H. McGLYNN, *Assistant Examiner.*