April 14, 1931. R. A. ISENBERG ET AL 1,800,635

DOOR OPERATING MECHANISM

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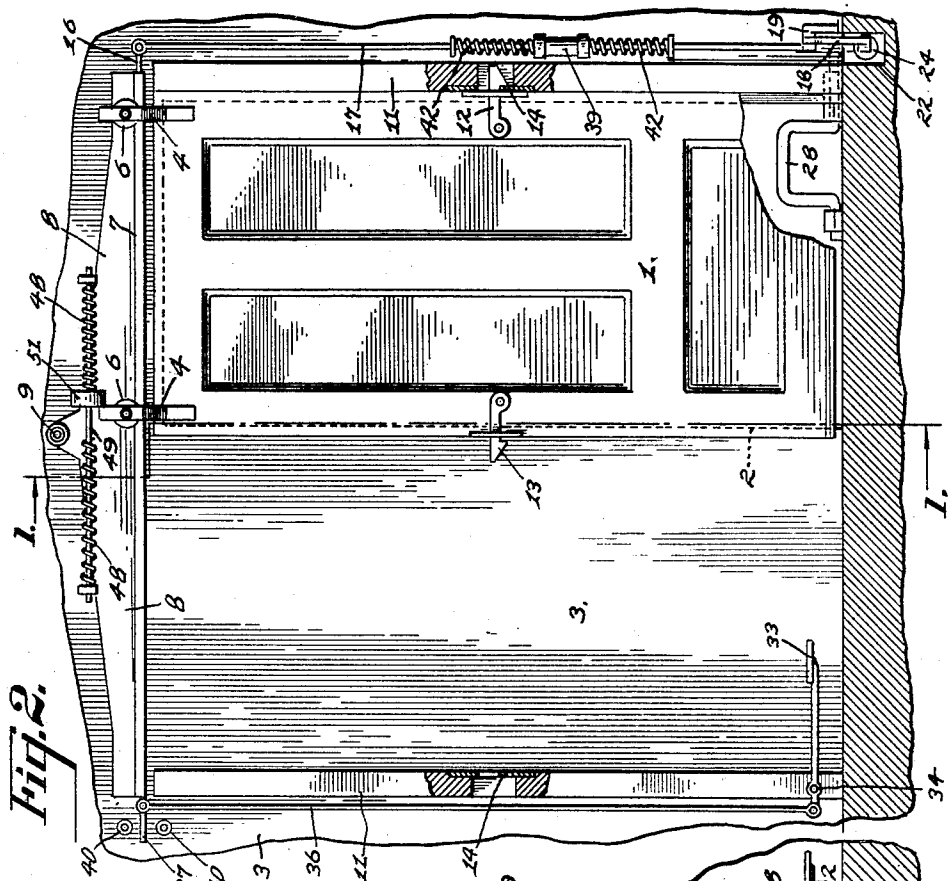


Fig. 2.

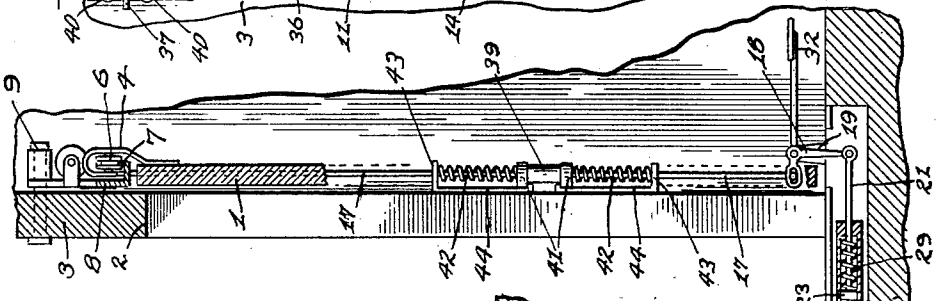


Fig. 1.

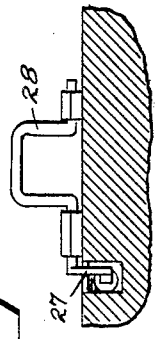


Fig. 5.

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DOOR OPERATING MECHANISM

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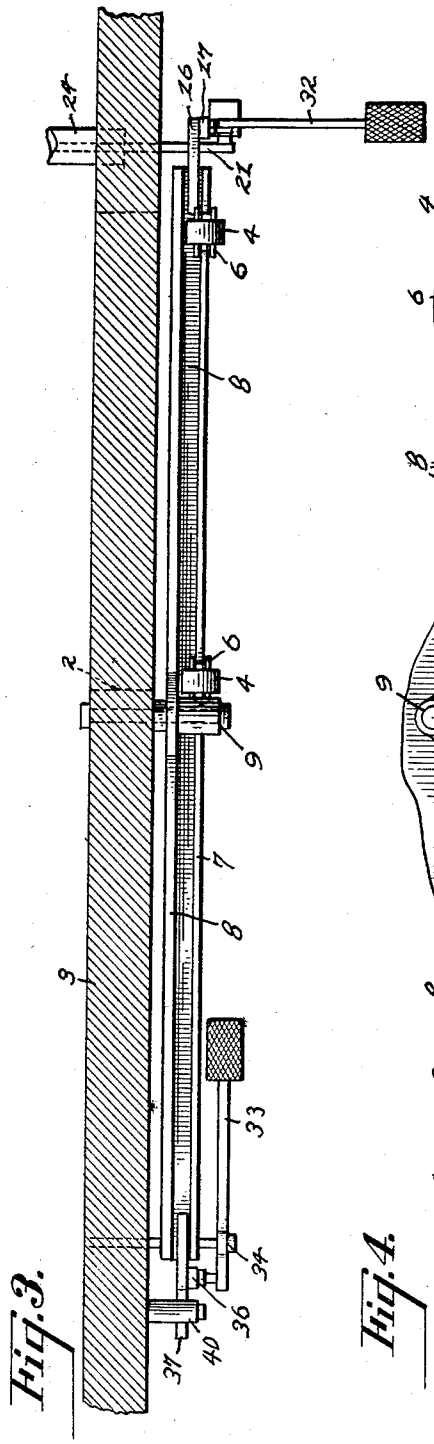


Fig. 3.

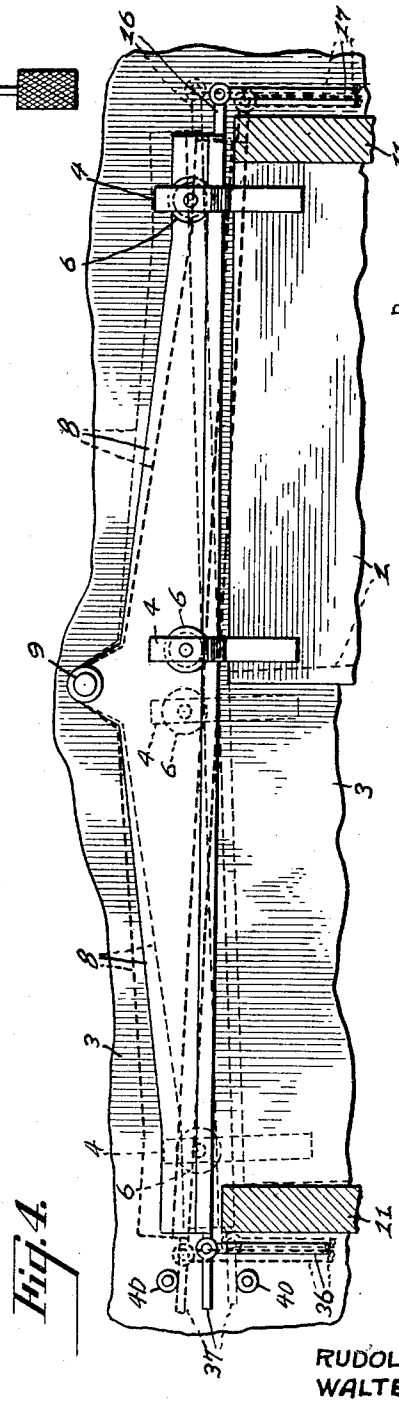


Fig. 4.

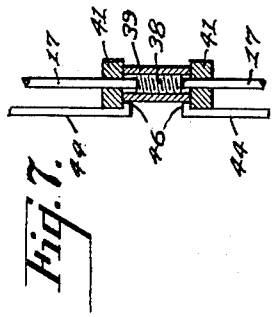


Fig. 7.

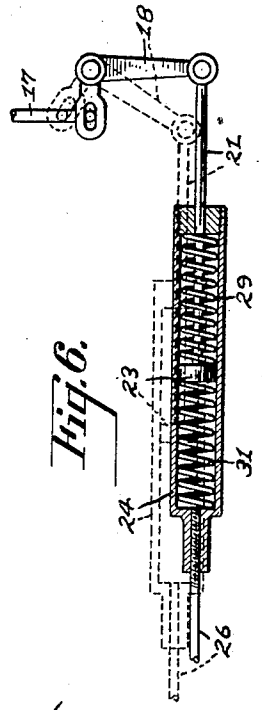


Fig. 6.

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Fig. 8.

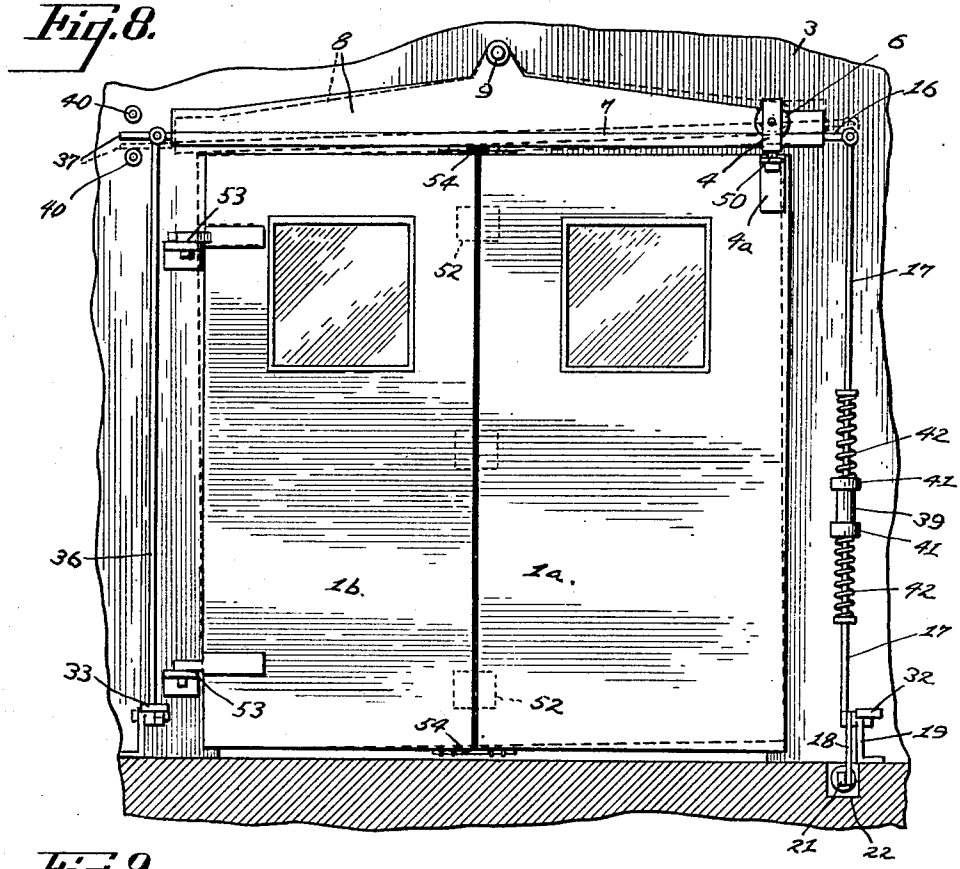


Fig. 9.

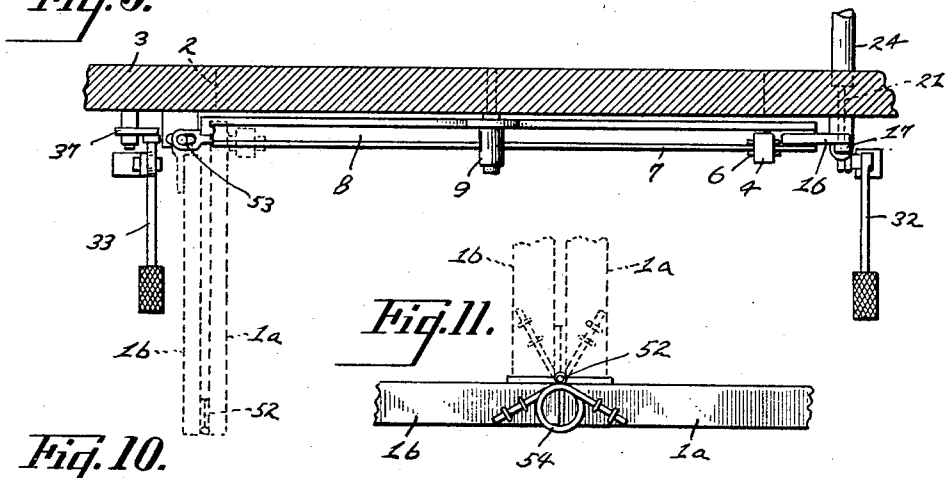
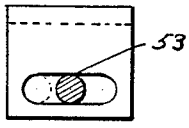


Fig. 11.

Fig. 10.



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UNITED STATES PATENT OFFICE

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DOOR-OPERATING MECHANISM

Application filed June 3, 1929. Serial No. 368,015.

Our invention relates to improvements in operating mechanism for garage doors and the like wherein a door is supported by rollers upon a pivotally mounted door supporting beam adapted to be tilted by means of actuating connections operable by a vehicle approaching or leaving the door whereby the door may be rolled along said beam to open or closed position as desired.

The primary object of our invention is to provide an improved door operating mechanism for opening and closing garage doors and the like.

Another object is to provide an improved door operating mechanism which may be easily and efficiently actuated by a vehicle approaching or leaving the door.

A further object is to provide an improved mechanism of the character described which may be conveniently operated by an individual independently of the vehicle actuated means.

Another object is to provide an improved mechanism which will normally occupy neutral inoperative position and which will be automatically returned to said neutral position after an operation to either open or close the door.

A further object is to provide an improved device wherein the actuating force applied by a vehicle is resiliently absorbed to prevent shock and injury to the mechanism and to provide a smooth, efficient operation.

Another object is to provide an improved device wherein the door may be moved by gravity to open or closed position, and in which an initial impulse is automatically imparted to the door when it is to be moved.

A still further object is to provide an improved mechanism of the character described which may be economically manufactured and installed and which is simple and efficient in its operation.

We accomplish these and other objects by means of the improved device disclosed in the drawings forming a part of the present application wherein like characters of reference are used to designate similar parts throughout the specification and drawings, and in which,

Fig. 1 is a vertical section of a door disclosing our improved operating mechanism, the section being taken upon the line 1—1 of Fig. 2 in the direction indicated;

Fig. 2 is a broken elevation of the inside of the door and operating mechanism, parts being broken away and shown in section;

Fig. 3 is a horizontal section showing a plan view of the operating mechanism, the figure being drawn upon a larger scale;

Fig. 4 is a broken inside elevation of the door supporting beam drawn upon the scale of Fig. 3 and disclosing the manner in which the beam is tilted to open or close the door;

Fig. 5 is a broken detail of the vehicle actuated member;

Fig. 6 is a broken sectional detail of the resilient actuating means;

Fig. 7 is a broken sectional detail of the beam adjusting means;

Fig. 8 is an inside elevation of a door of a modified form, disclosing the manner in which our operating mechanism is mounted in connection therewith;

Fig. 9 is a horizontal section showing a plan of the operating mechanism of Fig. 8;

Fig. 10 is a detail of the upper hinge mounting for the door shown in Figs. 8 and 9; and

Fig. 11 is a broken plan view of a portion of the door, as shown in Fig. 8, and disclosing the manner in which the door portions are folded to open position.

Referring to the drawings, the numeral 1 is used to designate in general a door movable to open and close a door opening 2 formed in a wall 3. The door 1 is preferably provided with a pair of supporting members 4 secured adjacent the upper corners of the door and provided with flanged rollers 6 adapted to engage a flange 7 formed upon a supporting beam 8 pivotally mounted at its center as at 9 above the door 1. The door is preferably mounted upon the inside of the wall 3 to entirely cover the opening 2 when in closed position and arranged to be moved to entirely uncover the opening 2 when the door is moved to its open position. Stops 11 are mounted to limit the movement of the door 1, and latches 12 and 13 are arranged

to engage detents 14 to secure the door in open or closed positions as desired.

An extension 16 is mounted upon one end of the beam 8 and pivotally connected to a rod 17 extending downwardly substantially parallel to the edge of the door to a bell crank 18 pivotally mounted upon a suitable bracket 19, the lower end of the rod 17 being pivotally connected to one arm of said bell crank. A plunger rod 21 is pivotally connected to the other arm of the bell crank 18, said rod extending outwardly through the wall 3 and along a recess 22 formed in the floor of an approach to the door 1. A plunger 23 is carried by the rod 21 and slidably received within a cylindrical casing 24 movable within the recess 22. A casing rod 26 is secured to the casing and extended into pivotal engagement with a crank arm 27 carried by an actuating member 28 pivotally mounted upon the approach to the door 1 and spaced at a convenient distance in front thereof. Springs 29 and 31 are mounted within the casing 24 upon opposite sides of the plunger 23 to normally center the plunger within the casing and to impart a resilient pressure upon the plunger when the casing is moved in either direction.

A foot pedal 32 is mounted in connection with the bell crank 18 and arranged to raise the rod 17 when the pedal 32 is depressed. A similar pedal 33 is pivotally mounted as at 34 and pivotally connected to the lower end of a rod 36 extending upwardly into pivotal engagement with an extension 37 secured upon the beam 8 at the end opposite the extension 16 whereby said end of the beam 8 may be raised when the pedal 33 is depressed. Stops 40 are mounted upon the wall 3 to engage the extension 37 and limit the movement of the beam 8.

The rod 17 is provided with a threaded portion 38 having an adjusting sleeve 39 threaded thereon. Collars 41 are slidably mounted upon the rod 17 and normally held seated against opposite ends of the sleeve 39 by means of springs 42 mounted around the rods and held between the collars 41 and extensions 43 formed upon guide members 44 secured upon the wall 3. The extensions 43 are apertured to slidably engage the rod 17, and stops 46 are formed upon said members 44 to limit the movement of the collars 41.

In operation, as applied to a garage door, the door 1 is hung upon the beam 8 and the operating members connected substantially as shown, the sleeve 39 being adjusted to cause the beam 8 to be disposed in a horizontal position when the rod 17 is moved to its normal neutral position by the springs 42 as shown in Figs. 1 and 2 of the drawings. The actuating member 28 is normally positioned in an upright position within the path of the wheels of a vehicle approaching or leaving the door 1. As a vehicle approaches the door, a front wheel of the vehicle, not shown, engages the member 28 and moves the same to move the casing rod 26 and casing 24 outwardly along the recess 22. The movement of the casing 24 is imparted to the plunger 23 through the spring 29 and operates to move the bell crank 18 as indicated in dotted lines in Fig. 6 of the drawings. The crank 18 in turn moves the rod 17 upwardly against the pressure of the upper spring 42 and tilts the beam 8 upon its pivot mounting 9 to the position indicated in light dotted lines in Fig. 4 of the drawings.

In tilting the beam 8, as above explained, the door 1, supported by the rollers 6 is tilted a corresponding amount, thereby raising the latch 12 out of engagement with the adjacent detent 14, and permitting the door to be moved by gravity and to roll along the flange 7 of the beam 8 to the open position as indicated in dotted lines in Fig. 4, the latch 13 engaging its detent 14 to retain the door in said open position. The rollers 6 are preferably mounted upon roller bearings so that a slight inclination of the beam 8 will be sufficient to cause the door to roll along the tilted beam. To insure a quick and positive opening, springs 48 are preferably mounted upon a rod 49 secured upon the beam 8 parallel to the rib 7. A collar 51 is slidably mounted upon the rod 49 between the springs 48 and arranged to be engaged and moved along the rod by the upper ends of the supporting members 4 to compress one of the springs as the door is moved to an extreme position, as shown in Fig. 2, the pressure of said compressed spring being adapted to impart an initial impulse to move the door when the beam is again tilted to operate the door.

In driving a vehicle away from the door, the actuating member 28 is engaged by one of the wheels of the vehicle and moved in a direction opposite to that above described, thereby causing the operating connections to be actuated in an opposite direction to tilt the beam 8 to a door closing position, as indicated in heavy dotted lines in Fig. 4 of the drawings. When moved to this position, the latch 13 is caused to disengage its detent 14 and permit the door to roll back to its normal closed position. As the vehicle is moved past the member 28, said member and the beam 8 are returned to normal position by the springs 29, 31 and 42.

When it is desired to open or close the door independently of the vehicle actuated member 28, an individual may depress the desired pedal 32 or 33 to tilt the beam in the desired direction to open or close the door. The leverage of the pedals 32 and 33 is made sufficient to permit a relatively easy tilting of the beam in the desired direction. The leverage of the actuating member 28 however is

made relatively small so that the force required will be too great to permit operation by an individual.

The shock imparted to the member 28 when engaged by the wheel of a vehicle is absorbed by the springs 29 and 31 to prevent strain upon the operating members. Thus, as the member 28 is depressed by a vehicle, the casing 24 is moved to compress one of the springs 29 or 31. The force thus stored in the spring causes the plunger 23 to be moved to actuate the beam, thus relieving the mechanism of any sudden strain, and obtaining a smooth positive action.

In Figs. 8 and 9 I have illustrated a modified form of door. In this arrangement, the door consists of two sections 1*a* and 1*b*, hingedly connected at their adjacent edges by hinges 52. One edge of the door is hingedly mounted upon suitable hinges 53, one of said hinges being adapted to permit a sliding movement of the pintal, preferably as indicated in Fig. 10, whereby the door may be tipped upon the hinges 52. The opposite edge of the door is supported by a supporting member 4 provided with a flanged roller 6 engaging the beam 8 as shown in Fig. 8, and in a manner fully analogous to the mechanism above described, except that the member 4 is pivotally connected as at 50 to a mounting portion 4*a* secured to the door portion 1*a*.

When the beam 8 is tilted as above described, and as indicated in dotted lines in Fig. 8, the free edge of the door is caused to be moved along the beam 8 to fold the door sections to open position as indicated in dotted lines in Fig. 9. Springs 54 are mounted upon the upper and lower edges of the door adjacent the hinged edges of the door section, the ends of the springs being secured to opposite door sections and arranged to exert a normal pressure tending to move the sections on the hinges 51 to the folded relation as indicated in Fig. 11 of the drawings. The operation of the beam tilting mechanism is the same as for the full sliding type of door, and requires no further description.

While we have illustrated the invention as applied only to garage doors of the sliding and folding types, the device is of course adaptable for use in numerous other connections, and for other purposes. The specific details of construction and arrangement are likewise subject to modification in numerous ways without departing from the spirit of our invention. We therefore desire to avail ourselves of all modifications of structure and arrangement which may fall within the scope of the appended claims.

Having thus described my invention what we claim as new and desire to secure by Letters Patent is—

1. A door opening mechanism comprising a pivotally mounted supporting beam; a door; a door supporting means secured to the door and forming rolling contact with the supporting beam; means normally holding the beam in a horizontal position and operable to raise one end of the beam to roll the door to an open position; and means for raising the opposite end of the beam to roll the door to a closed position.

2. A door opening mechanism comprising a pivotally mounted supporting beam; a door provided with rollers engaging the beam and supporting the door thereon; an actuating member mounted in spaced relation to the front of the door and operable by a vehicle approaching or leaving the door; a rod connected to one end of the beam; a bell crank connected to the rod; resilient means connecting the actuating member with the bell crank to tilt the beam whereby the door may be rolled between its open and closed positions; and foot operated means for tilting the beam in either direction independently of the actuating member.

3. A door opening mechanism comprising a pivotally mounted supporting beam; a door provided with rollers engaging the beam and supporting the door thereon; an actuating member mounted in spaced relation to the front of the door and operable by a vehicle approaching or leaving the door; a rod connected to one end of the beam; a bell crank connected to the rod; resilient means connecting the actuating member with the bell crank to tilt the beam whereby the door may be rolled between its open and closed positions; means connected to the bell crank and rod for actuating the same manually independently of the actuating member; and means connected to the other end of the beam for tilting the beam to close the door.

4. A door operating mechanism comprising a pivotally mounted supporting beam; a door provided with rollers engaging the beam and supporting the door thereon; an actuating member mounted in spaced relation to the front of the door and operable by a vehicle approaching or leaving the door; a rod connected to one end of the beam; means mounted in connection with said rod for moving the rod to a normal position holding the beam in a horizontal position; a bell crank connected to the rod; and resilient means connecting the actuating member with the bell crank whereby movement of the actuating member operates to tilt the beam and cause the door to roll between its open and closed positions.

5. A door operating mechanism comprising a pivotally mounted supporting beam; a door provided with rollers engaging the beam and supporting the door thereon; an actuating member mounted in spaced relation to the front of the door and operable by a vehicle approaching or leaving the door; a rod connected to one end of the beam;

means mounted in connection with said rod for moving the rod to a normal position holding the beam in a horizontal position; a bell crank connected to the rod; resilient means connecting the actuating member with the bell crank whereby movement of the actuating member operates to tilt the beam and cause the door to roll between its open and closed positions; and spring means for imparting a starting impulse to the door.

6. A door operating mechanism comprising a pivotally mounted supporting beam; a door provided with rollers engaging the beam and supporting the door thereon; an actuating member mounted in spaced relation to the front of the door and operable by a vehicle approaching or leaving the door; a rod connected to one end of the beam; adjusting means mounted upon the rod and movable to adjust the beam to a normal horizontal position; spring means for moving the rod to a normal position holding the beam to said normal position; a bell crank connected to the rod; and resilient means connecting the actuating member with the bell crank whereby movement of the actuating member operates to tilt the beam and cause the door to roll between its open and closed positions.

7. A door operating mechanism comprising a pivotally mounted supporting beam; a door provided with rollers engaging the beam and supporting the door thereon; a rod connected to one end of the beam; a bell crank connected to the rod; a cylindrical casing; a plunger mounted within the casing and provided with a plunger rod connected to the bell crank; springs mounted within the casing and normally centering the plunger therein and adapted to be compressed to resiliently actuate the plunger when the casing is moved in either direction; a casing actuating rod secured to the casing; and an actuating member connected to the casing actuating rod and positioned within the path of a vehicle approaching or leaving the door and adapted to be displaced by such vehicle to operate the connecting members and tilt the beam and roll the door to open or closed position.

8. A door operating mechanism comprising a pivotally mounted supporting beam; a door provided with rollers engaging the beam and supporting the door thereon; a rod connected to one end of the beam; a bell crank connected to the rod; a cylindrical casing; a plunger mounted within the casing and provided with a plunger rod connected to the bell crank; springs mounted within the casing and normally centering the plunger therein and adapted to be compressed to resiliently actuate the plunger when the casing is moved in either direction; a casing actuating rod secured to the casing; an actuating member connected to the casing actuating rod and positioned within the path of a vehicle approaching or leaving the door and adapted to be displaced by such a vehicle to operate the connecting members and tilt the beam and roll the door to open or closed position; and means for normally holding the beam in a horizontal position.

9. A door operating mechanism comprising a pivotally mounted supporting beam; a door provided with rollers engaging the beam and supporting the door thereon; a rod connected to one end of the beam; a bell crank connected to the rod; a cylindrical casing; a plunger mounted within the casing and provided with a plunger rod connected to the bell crank; springs mounted within the casing and normally centering the plunger therein and adapted to be compressed to resiliently actuate the plunger when the casing is moved in either direction; a casing actuating rod secured to the casing; an actuating member connected to the casing actuating rod and positioned within the path of a vehicle approaching or leaving the door and adapted to be displaced by such vehicle to operate the connecting members and tilt the beam and roll the door to open or closed position; and spring means for imparting an initial impulse to the door when the beam is tilted.

10. A door operating mechanism comprising a pivotally mounted supporting beam; a door provided with rollers engaging the beam and supporting the door thereon; a rod connected to one end of the beam; a bell crank connected to the rod; a cylindrical casing; a plunger mounted within the casing and provided with a plunger rod connected to the bell crank; springs mounted within the casing and normally centering the plunger therein and adapted to be compressed to resiliently actuate the plunger when the casing is moved in either direction; a casing actuating rod secured to the casing; an actuating member connected to the casing actuating rod and positioned within the path of a vehicle approaching or leaving the door and adapted to be displaced by such vehicle to operate the connecting members and tilt the beam and roll the door to open or closed position; and manually operated means connected to the beam and operable independently of the vehicle actuated means for tilting the beam in either direction.

11. A door operating mechanism comprising a pivotally mounted supporting beam; a door provided with rollers engaging the beam and supporting the door thereon; a rod connected to one end of the beam; a bell crank connected to the rod; a cylindrical casing; a plunger mounted within the casing and provided with a plunger rod connected to the bell crank; springs mounted within the casing and normally centering the plunger therein and adapted to be compressed to re-

siliently actuate the plunger when the casing is moved in either direction; a casing actuating rod secured to the casing; an actuating member connected to the casing actuating rod and positioned within the path of a vehicle approaching or leaving the door and adapted to be displaced by such vehicle to operate the connecting members and tilt the beam and roll the door to open or closed position; and manually operated means connected to opposite ends of the beam and operable independently of the vehicle actuated means for tilting the beam in either direction.

In witness whereof, we hereunto set our signatures.

RUDOLF A. ISENBERG.
WALTER B. SNOOK.