Jan. 9, 1923.

1,441,923.

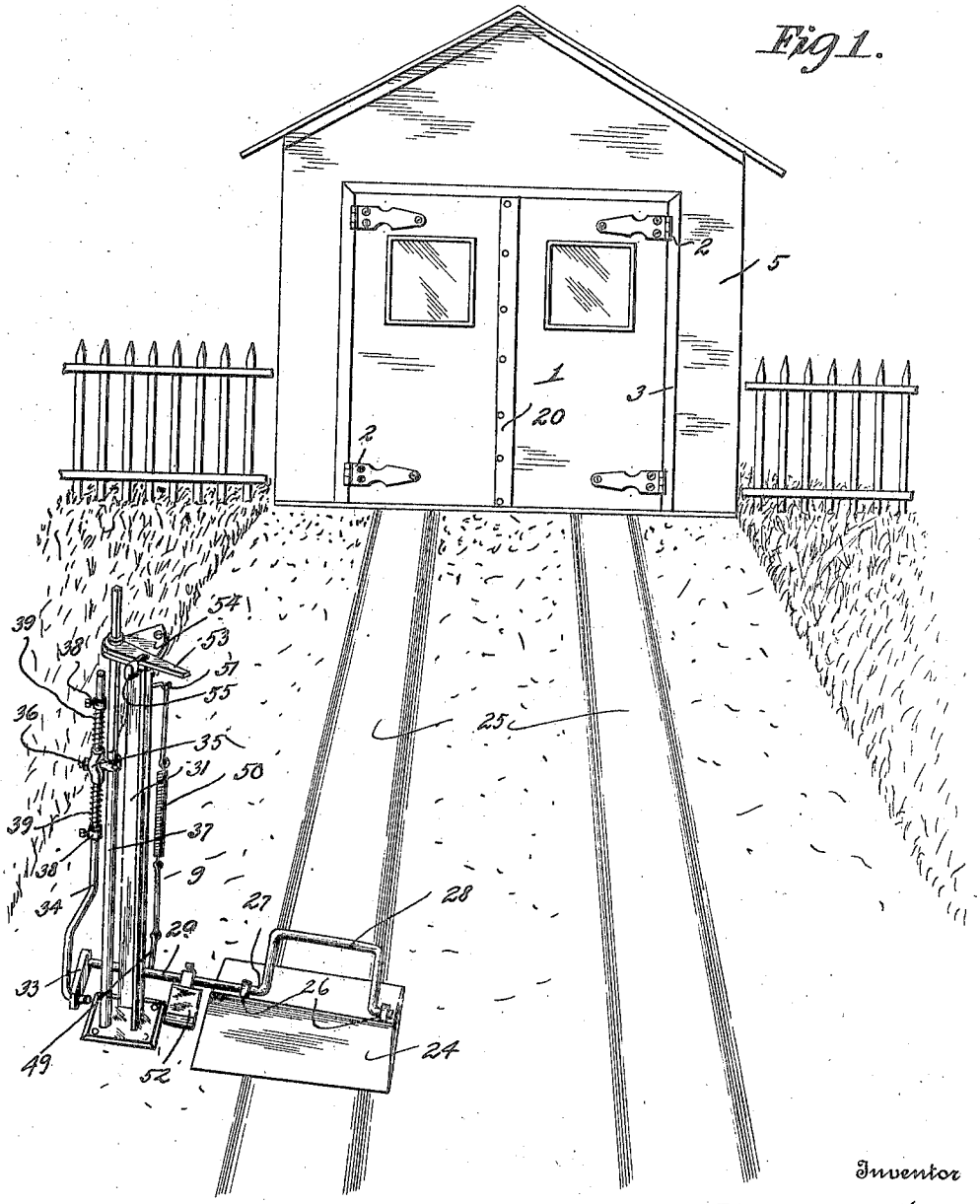
H. F. GUTH.

GARAGE DOOR OPERATING MECHANISM.

FILED MAY 19, 1921.

3 SHEETS—SHEET 1.

Fig 1.



Inventor

Harold F. Guth

By C. C. Shepherd

Attorney

Jan. 9, 1923.

1,441,923.

H. F. GUTH.

GARAGE DOOR OPERATING MECHANISM.

FILED MAY 19, 1921.

3 SHEETS—SHEET 2.

Fig 3.

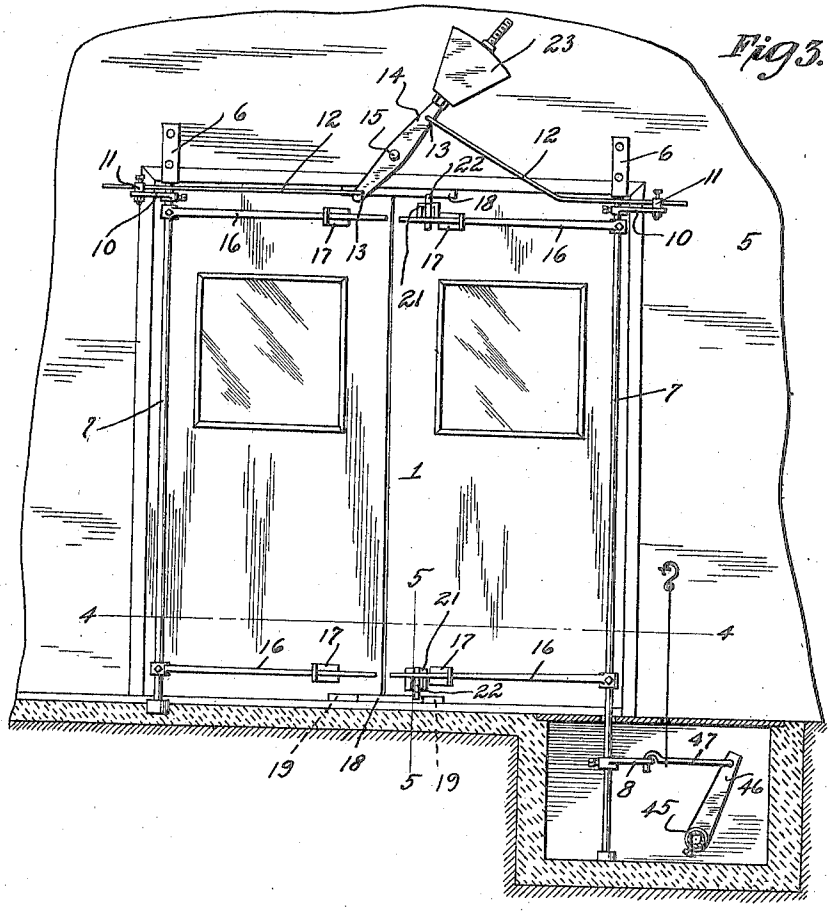


Fig 4.

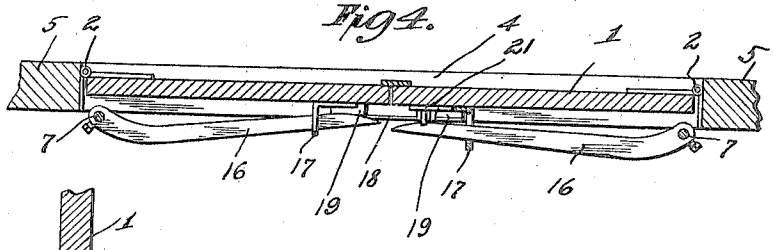
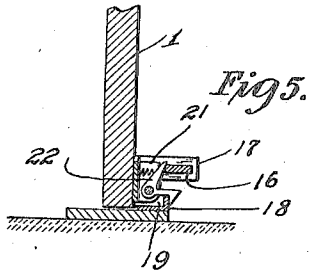


Fig 5.



Inventor

Harold F. Guth

By C. C. Shepherd

Attorney

Jan. 9, 1923.

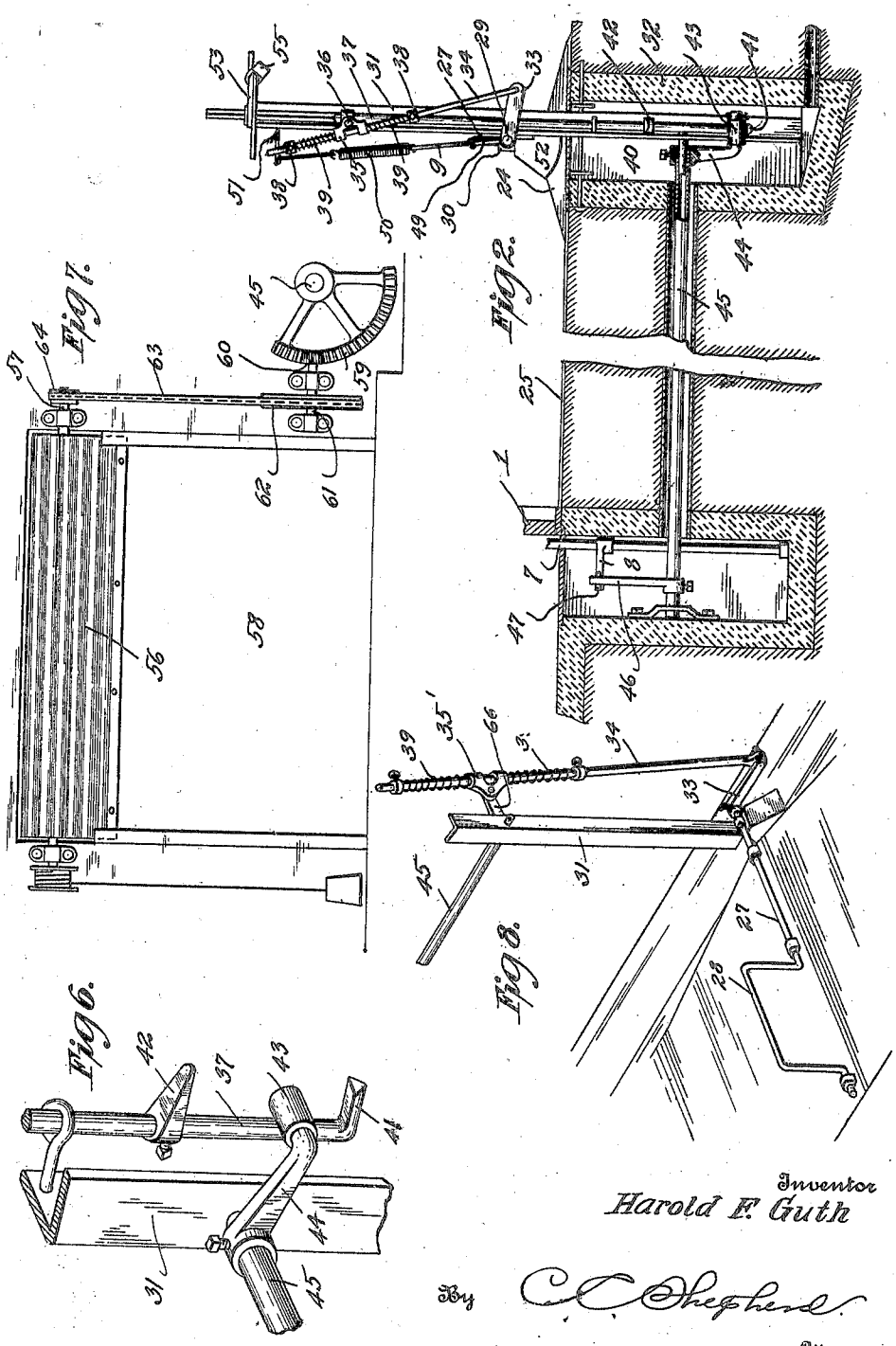
1,441,923.

H. F. GUTH.

GARAGE DOOR OPERATING MECHANISM.

FILED MAY 19, 1921.

3 SHEETS—SHEET 3.



Inventor

Harold F. Guth

By C. C. Shepherd

Attorney

Patented Jan. 9, 1923. 1,441,923

UNITED STATES PATENT OFFICE.

HAROLD F. GUTH, OF LONDON, OHIO.

GARAGE-DOOR-OPERATING MECHANISM.

Application filed May 19, 1921. Serial No. 470,330.

To all whom it may concern:

Be it known that HAROLD F. GUTH, a citizen of the United States, residing at London, in the county of Madison and State of Ohio, has invented certain new and useful Improvements in Garage-Door-Operating Mechanism, of which the following is a specification.

This invention relates to improvements in door, gate or other closure operating mechanism, and has for its object to provide mechanism of this character wherein an improved automatically operating trip structure is employed for the purpose of effecting opening or closing movements on the part of such closure members from more or less remote positions.

The primary object of the invention resides in the provision of mechanism of this character wherein the trip structure is formed to include a rocking member normally maintained by improved mechanism in an upright position in order that the same may be engaged by the wheels of a passing vehicle, whereby one of the shaft ends of the rocking member will be partially rotated, in providing the shaft end of said rocking member with a crank portion to which is connected the lower end of a substantially vertically arranged rod, the latter having its upper end slidably received within a sleeve provided in conjunction with a closure operating member, the said rod being formed to include fixed spaced abutments capable of receiving therebetween and said sleeve a pair of shock absorbing springs, the arrangement being such that the initial movement of the rocking member will be absorbed by said springs before motion is imparted to the closure operating member, whereby a shock and jar applied to the rocking member will be absorbed by the springs and thereby prevented from being transmitted to the closure operating member and other related parts.

Other objects of the invention reside in a structure of the character set forth which will be simple, compact and effective in construction and wherein the mechanical parts thereof may be easily yet positively operated in a substantially automatic manner by balancing said parts so that slight power may be imparted thereto in effecting their operation.

With these objects in view, among others, the present invention accordingly consists in the novel features of construction, combinations of elements and arrangements of parts, hereinafter to be fully described and pointed out in the appended claims.

In the accompanying drawings, forming a part of the specification, in which similar characters of reference denote like and corresponding parts throughout the several views thereof:

Figure 1 is a perspective view of the trip structure employed in my improved closure operating mechanism,

Figure 2 is a vertical longitudinal sectional view taken through the trip structure and disclosing the connections extending from said structure to the closure operating parts,

Figure 3 is a rear elevation of a pair of hinged doors and illustrating the operating parts thereof employed by the present invention,

Figure 4 is a horizontal sectional view taken on the line 4—4 of Figure 3,

Figure 5 is a vertical sectional view taken along the line 5—5 of Figure 3 disclosing more particularly the latch construction,

Figure 6 is a detail perspective view disclosing the connection between the trip structure and the door operating shaft.

Figure 7 is a detail view disclosing the operating mechanism when adapted to a vertically rolling metallic door, and

Figure 8 is a detail perspective view disclosing a slightly modified form of trip structure.

Referring more particularly to the form of the invention disclosed in Figures 1 to 6 inclusive, the numeral 1 designates a pair of vertically hinged doors of the type employed for controlling the door weights of garages, warehouses or for other similar purposes, the said doors being hinged as at 2 to the frame 3, which defines a doorway 4 in the wall 5 of any suitable type of building. The present invention consists primarily in the provision of mechanism whereby these doors, or other equivalent closures, may be opened or closed by means of improved mechanism capable of being actuated substantially automatically and at a distance more or less spaced from the doors, the construction being such as to admit of an automatic opening of the doors upon the approach of a vehicle, in order that the latter may be driven directly through the doorway without involving the necessity of manually operating said doors, a feature which is par-

ticularly desirable in eliminating exhausting manual effort, and it is also desirable in that it eliminates the necessity on the part of the driver of vacating his vehicle prior to the operating of the doors.

To effect the operation of the doors 1, the present invention employs a plurality of vertically spaced brackets 6, which serve to provide rotatable mountings for a pair of vertically disposed rock shafts 7. These shafts have their upper and lower ends journaled within the brackets and are located contiguous to the hinged edges of said doors, in view of the fact that the doors 1 are of the outwardly opening variety, the shafts 7 are consequently located on the inner sides thereof, so as to be out of the way of said doors when the latter are being opened or closed. One of the shafts 7 has its lower end provided with a fixed crank 8, which is adapted to be oscillated by means of mechanism operated from the spaced trip structure 9, hereinafter to be more fully described. At this point it will suffice to say, however, that upon the operation of the trip structure the crank 8 will be oscillated so as to rock the shaft connected therewith. This movement on the part of the shaft carrying the crank 8 is transmitted to the other or companion shaft by providing the upper ends of said shafts with outwardly diverging crank arms 10. The outer ends of these arms are provided with swiveled studs 11, to which are secured the outer ends of links 12. The inner ends of these links are connected as at 13 with a counterbalanced lever 14, which is pivotally mounted as at 15 upon the wall 5 or its equivalent. It will be observed that the ends of the links 12 are equally spaced from the pivot 15, and it will therefore be manifest that by reason of this construction, the rotation of one of the rock shafts 7 will impart corresponding rotation to the other of said shafts, but that through the instrumentality of the lever 14, the said shafts will be rotated in opposite directions.

Carried by the shafts 7 are fixed horizontally extending rocker arms 16. These arms are located contiguous to the upper and lower edges of the doors 1, and extend substantially across the full width of said doors, the outer or free ends of the arms being disposed to pass loosely through slots provided in fixed brackets 17, which are secured to the inner faces of the doors. It will be apparent that when the shafts 7 are rotated, movement will be imparted to the rocker arm 16, in such manner that the latter will be caused to press upon the bracket 17 so as to result in the opening or closing of the doors, in accordance with the direction in which the shafts 7 are rotated. By loosely mounting the outer ends of the arms 16 in the brackets 17, it will be apparent that the difference between the pivotal mountings of the doors and the arms 16 will be compensated for, thus permitting of the necessary relative movement between said arms and doors without undue friction or binding. Also, by extending the outer ends of the arm 16 through the openings provided in the bracket 17, the doors will be caused to move in unison with the arms.

In this instance the frame 3 is equipped along its upper and lower edges with the stop strips 18, which carry resilient blocks 19, against which the doors are adapted to press when the same are in their closed positions, the said blocks 19 serving to cushion or arrest the inward movement on the part of the doors and to prevent undue banging or jarring thereof. One of the doors carries the usual vertically disposed strip 20, which overlies, in the ordinary manner, the outer edge of the adjacent door, so as to provide a weatherproof joint therebetween, and to prevent surreptitious operation of the actuating means for the doors. The door carrying the strip 20 has its inner surface provided with fixed brackets 21, which carry pivoted latch members 22, the latter being normally disposed to engage with the vertical walls of the strips 18. These latch members are further formed to include offset arms which are disposed for engagement with the outer ends of the arms 16, and the slots within the brackets 17 are sufficiently elongated to permit the arms 16 to oscillate the latch members 22 prior to imparting swinging movement to the doors. Thus, when the rock shafts 7 are initially actuated, the arms 16 will press into engagement with the actuating ends of the latch members 22, thus effecting the release of the latter from door locking cooperation with the strips 18. When this operation has been effected the said rocker arms are then forced into engagement with the outer ends of the doors to effect their forced opening. It will be observed that the lever 14 has its upper end equipped with an adjustable weight 23, which serves as a counterbalance for the actuating elements for the doors 1 in permitting said doors to be easily opened or closed.

In order to effect automatic operation on the part of the rock shafts 7, and the mechanism controlled thereby, the trip structure 9 is provided. This trip structure is adapted to be permanently situated at a desired position located in advance or to the front of the doors 1, so that the same may be engaged by an approaching vehicle to permit of desired automatic opening of the doors. To this end the trip structure contemplates the provision of a concrete or other block 24 which is situated in alignment with the wheeled surfaces 25 approaching the doorway 4. Embedded in the block 24 are suitable bearings 26, in which is journaled a transversely extending trip member 27.

This member consists in this instance of a bail shaped portion 28, located above the block 24 and normally adapted to assume the substantially vertical position shown. The bail portion 28 terminates in an angularly extending rock shaft 29, which has its outer end journaled in a bearing 30 provided upon a vertical standard 31. This standard is adapted to be suitably embedded within a concrete or other similar base 32, in order that said standard may be rigidly and firmly maintained in a fixed operating position. The outer end of the rock shaft 29 is provided with a crank arm 33, to the outer end of which is pivotally connected the lower end of an actuating link 34. This link extends upwardly and is adapted to slidably pass through a sleeve 35 which is pivotally mounted as at 36 upon a vertically movable pitman rod 37, which is slidably mounted in bearings provided in conjunction with the base 32. The link 34 has its upper portion equipped with spaced and fixed stop collars 38, between which and the opposite ends of the sleeve 35 are positioned coil springs 39. Thus it will be manifest that when the bail portion of the trip member is engaged by the wheel of a vehicle, the said bail portion will move until the same is parallel with the ground. This results in imparting substantially a one-quarter turn to the shaft 29, which results in oscillating the arm 33 so as to cause upward movement on the part of the link 34. Then, by reason of the lowermost of the springs 39, which will become compressed by the upward movement of the link, motion will be imparted to the rod 37 so as to effect its elevation. Similarly, if a vehicle is moving outwardly from the doorway, the rock shaft 29 will be oscillated in the opposite direction, so as to force the link 34 downwardly and thence through the medium of the uppermost of the springs 39 to impart downward movement to the pitman 37.

The lower end of the pitman 37 is arranged to travel within a chamber 40 provided in the base 32, and has its extreme lower end terminated in an offset finger 41, which is disposed in vertically spaced relation from an adjustable finger 42 carried by the lower end of the rod 37. These fingers are adapted to cooperate with and to have confined therebetween a stud 43 provided upon the outer end of a crank arm 44, which latter is carried, in turn, by the extreme outer end of a longitudinally extending shaft 45. This shaft has its outer end suitably journaled in connection with the base 32, and is adapted to extend from said base longitudinally toward the doorway 4 and to terminate immediately within the wall of the building in which said doorway is situated. It will be understood that the shaft may be suitably enclosed so as to be protected from the effects of the elements and also to be out of the way and to thus avoid offering an objectionable appearance. The inner end of the shaft is equipped with a crank arm 46, which has its outer end connected by means of a link 47 with the crank 8. Manifestly, upon vertical movement on the part of the pitman rod 37, one of the outer of the fingers 41 and 42 will cooperate with the crank arm 44 so as to effect oscillation on the part of the shaft 45. This movement results in imparting similar oscillation to the crank arm 46, and thence by means of the link 47 to one of the rock shafts 7. By this construction it will be apparent that the doors may be readily opened or closed in a substantially automatic manner, and that the construction will eliminate manual operations in operating the doors. It will be observed that by the use of the springs 39, all shock or jar upon the operating mechanism will be absorbed by such springs. Thus, in the event that the trip structure is quickly engaged by an approaching vehicle, the said trip member may be moved for a considerable distance before movement will be imparted to the pitman rod. This feature enables the mechanism to be employed for relatively extended periods of time without becoming unduly out of order. To maintain the bail portion 28 of the trip member in an upright position, the said shaft 29 is provided with a crank arm 49, to which is connected the lower end of a spring 50, said spring leading up to a hook 51 carried by the standard 31. Since the spring 50 is normally under tension, it follows that the bail member will be maintained in its upright position. Also, a weight 52 may be employed for counterbalancing purposes in conjunction with the rock shaft 29. If it is desired to lock the mechanism against operation, this feature may be accomplished by providing the upper end of the pitman 37 with a crank arm 53. This arm is adapted to oscillate over a fixed plate 54 provided upon the upper end of the standard 31. The plate 54 and the arm 53 are provided with registering openings through which the hasp of a padlock 55 may be passed to hold the arm in fixed relation with said plate. By this construction it will be possible, by manipulating the arm 53 to rock the pitman 37 so that the fingers 41 and 42 will be oscillated to assume positions out of engagement with the stud 43, and may be held in such positions by the application of the padlock, this feature permits the trip structure to be freely operated without in any way operating the gate or door structure.

In view of the foregoing description, taken in conjunction with the accompanying drawing, it will be apparent that the

present invention provides an operating mechanism for gates, doors or other similar closure members which will be effective and efficient for the purpose of enabling such closure members to be automatically opened and closed by means of structure located more or less remotely with respect thereto. It will be observed that the structure described is essentially simple in construction and in operation, and in view of the results accomplished is devoid of undue complication. It will be observed that the operating mechanism throughout is properly counterbalanced with regard to the load carried so that the construction will be capable of being smoothly and easily operated with the application of but a minimum of effective power. Also, by means of the crank construction employed adjustments may be made in the relative positions and throw of the various parts of the operating mechanism so as to properly adapt the latter to the peculiar requirements of the door construction employed in conjunction therewith. It will of course be understood that the invention is not limited in its scope to the particular gate or door operating mechanism set forth. For instance, as shown in Figure 7 a vertically rolling flexible steel door 56 has been utilized. This door as usual, includes an operating shaft 57 around which the sections of the door may be wound or unwound so as to open or close the doorway 58. To effect the rotation of the shaft 57, the inner end of the shaft 45 is provided with a beveled sector 59, which is adapted to engage with a pinion 60 mounted on a suitably journaled countershaft 61. This countershaft carries a sprocket 62, over which a chain 63 is passed, the said chain being also trained over a smaller sprocket 64 mounted upon the shaft 57. Manifestly, by rotation of the shaft 45 motion, by means of the gearing 59 and 60, will be imparted to the chain 63, thus causing the rotation of the shaft 57 and the consequent operation of the door 56.

In Figure 8 a slightly modified form of trip structure is provided. In this particular construction the pitman rod 37 has been eliminated, and the shaft 45 is located above the trip member 27 instead of beneath it. As shown, the standard 31, is suitably supported to receive for rotation one end of the shaft 45, and that said shaft in this instance is provided with a crank 66, to which the sleeve 35′ is swiveled, said sleeve being adapted to slidably receive the link 34, which carries the shock absorbing springs 39. It will be apparent in this construction that when the trip member is operated, the crank arm 66 will be oscillated so as to rotate the shaft 45 directly, thus eliminating the use of the pitman rod and other underlying structure.

I have illustrated in the drawings described herein the constructions which at the present time seem to be the preferable embodiments of my invention, but I do not desire to limit myself to the constructions specifically shown and described, but contemplate the benefit of all variations of construction and modifications thereof which express the spirit of my invention.

What is claimed is:

1. In closure operating mechanism, a trip structure including a vertically disposed standard, a trip member rotatably supported in conjunction with said standard, a crank arm connected with said trip member, an upwardly extending rod connected with said crank arm, a closure operating structure including a sleeve capable of receiving said rod, and shock absorbing springs situated upon said rod and cooperative with said sleeve.

2. In closure operating mechanism, a trip structure including an oscillatory rock shaft, a vehicle engaging enlargement provided upon one end of said shaft, a crank arm formed with the other end of said shaft, means for journaling said shaft, an upwardly extending rod having its lower end connected with said crank arm, closure operating means including a movable member, a device swiveled upon one end of said member and capable of slidably receiving said rod, and shock absorbing springs carried by said rod and confined between fixed abutments provided upon said rod and the opposite sides of said device.

3. In closure operating mechanism, an oscillatory rock shaft, a wheel engaging enlargement provided upon one end of said shaft, a crank member formed upon the other end of said shaft, a counterbalancing weight fixed to said shaft, an upwardly extending rod connected with the outer end of said crank arm, a movable closure operating member, a device swiveled to said member and capable of slidably receiving said rod, and shock absorbing springs positioned between said device and fixed abutments provided upon said rock shaft.

4. In closure operating mechanism, a trip structure including oscillatory rock shaft, an actuating enlargement formed with said shaft, a throw member rotatable with said shaft, a rod having its lower end fixed to said throw member, a vertically movable pitman rod, a sleeve journaled upon said pitman rod and capable of slidably receiving said upwardly extending rod, cushioning springs situated between said sleeve and fixed abutments provided upon said upwardly extending rod, and closure operating means actuated by movement on the part of said pitman rod.

5. In closure operating mechanism, a trip structure including a rock shaft, an actuating portion formed with said shaft, a throw

member movable in unison with said shaft, an actuating rod having its lower end connected with said throw member and extending upwardly therefrom, a counterbalancing weight provided upon said rock shaft, a vertically movable pitman rod, a resilient connection between said upwardly extending rod and said pitman rod, and closure operating means movable in unison with said pitman rod.

6. In closure operating mechanism, a rock shaft having an actuating portion, a throw member provided in conjunction with said rock shaft, an upwardly extending rod connected with said throw member, a vertically movable pitman rod, a resilient connection between said rods, resilient means capable of maintaining the actuating portion of said rock shaft in a normal upright position, and means operative by movement of said pitman rod to open or close movable closure members.

7. In closure operating mechanism, a rock shaft including a relatively enlarged actuating portion, a crank rotatable with said shaft and vertically extending rod connected with said crank, a movable closure operating rod, a yieldable connection between said rods operating to permit of limited independent movement on the part of said first named rod before said rods operate in unison, and means for locking said closure operating rod in active or inactive positions.

8. In closure operating mechanism, a trip structure including a rock shaft, a crank movable with said rock shaft, a vertically movable rod, a link connected with said crank and having a yieldable connection with said rod, a closure operating shaft, a crank provided upon said shaft, and fingers projecting from the lower end of said rod and cooperative with said last named crank to effect oscillation on the part of the closure shaft when said rock shaft is oscillated.

9. In closure operating mechanism, a rock shaft having a crank formed therewith, substantially vertical movable rod, a link connected with said crank, a resilient connection between said link and said rod, a closure operating shaft, a crank provided upon said closure operating shaft, relatively adjustable fingers provided upon the lower end of said rod and cooperative with said crank to effect the operation of said closure shaft when said rock shaft is oscillated, and a counterbalancing weight carried by said rock shaft.

10. In closure operating mechanism, a trip structure including a rock shaft having an enlarged actuating extremity, means operative to normally maintain the actuating end of said shaft in a substantially upright position, a vertically movable rod, a resilient connection between said shaft and said rod, whereby the latter will be vertically reciprocated upon the oscillation of said shaft, a closure operating shaft, a connection between said latter shaft and said rod whereby said closure shaft will be oscillated upon vertical movement on the part of said rod, and means cooperative with said rod for maintaining said connection in operative or inoperative positions.

11. In closure operating mechanism, a pair of hinged doors, vertically disposed shafts journaled contiguous to the hinged edges of said doors, crank arms carried by said shafts and cooperative with the outer edges of said doors to open or close the latter upon movement on the part of said shafts, relatively angularly disposed cranks carried by said shafts, a centrally pivoted lever, links between said cranks and the opposite sides of the pivotal mounting of said lever, a counterbalancing weight carried by said lever, and an automatically operated trip structure for effecting the oscillation of at least one of said shafts.

12. In closure operating mechanism, a pair of hinged doors, vertically disposed shafts journaled contiguous to the hinged edges of said doors, crank arms carried by said shafts and extending in parallel relation with said doors, brackets carried by said doors and disposed to receive the outer ends of said arms, locking devices carried by said doors and cooperative with said arms whereby upon the initial movement of the latter said devices will be operated to effect the release of said doors, angularly extending cranks connected with said shafts, a centrally pivoted lever arranged above said doors, links connecting said cranks with opposite sides of the pivotal mounting of said lever, a counterbalancing weight carried by said lever, and an automatically operated trip structure for effecting the oscillation of at least one of said shafts.

13. In closure operating mechanism, a trip structure including a rock shaft, a closure operating shaft journaled to extend substantially at right angles to said rock shaft, a yieldable connection between said shafts, whereby the closure shaft will be oscillated upon movement on the part of the rock shaft, a crank arm carried by one end of said closure shaft, a closure structure, and a connection between said crank arm and said closure structure for effecting the operation of the latter upon movement on the part of the closure shaft.

In testimony whereof I affix my signature.

HAROLD F. GUTH.