G. MERZ.

AUTOMATIC MECHANISM FOR OPERATING GATES, DOORS, &c.

APPLICATION FILED AUG. 8, 1919.

1,378,183.

Patented May 17, 1921.

2 SHEETS—SHEET 1.

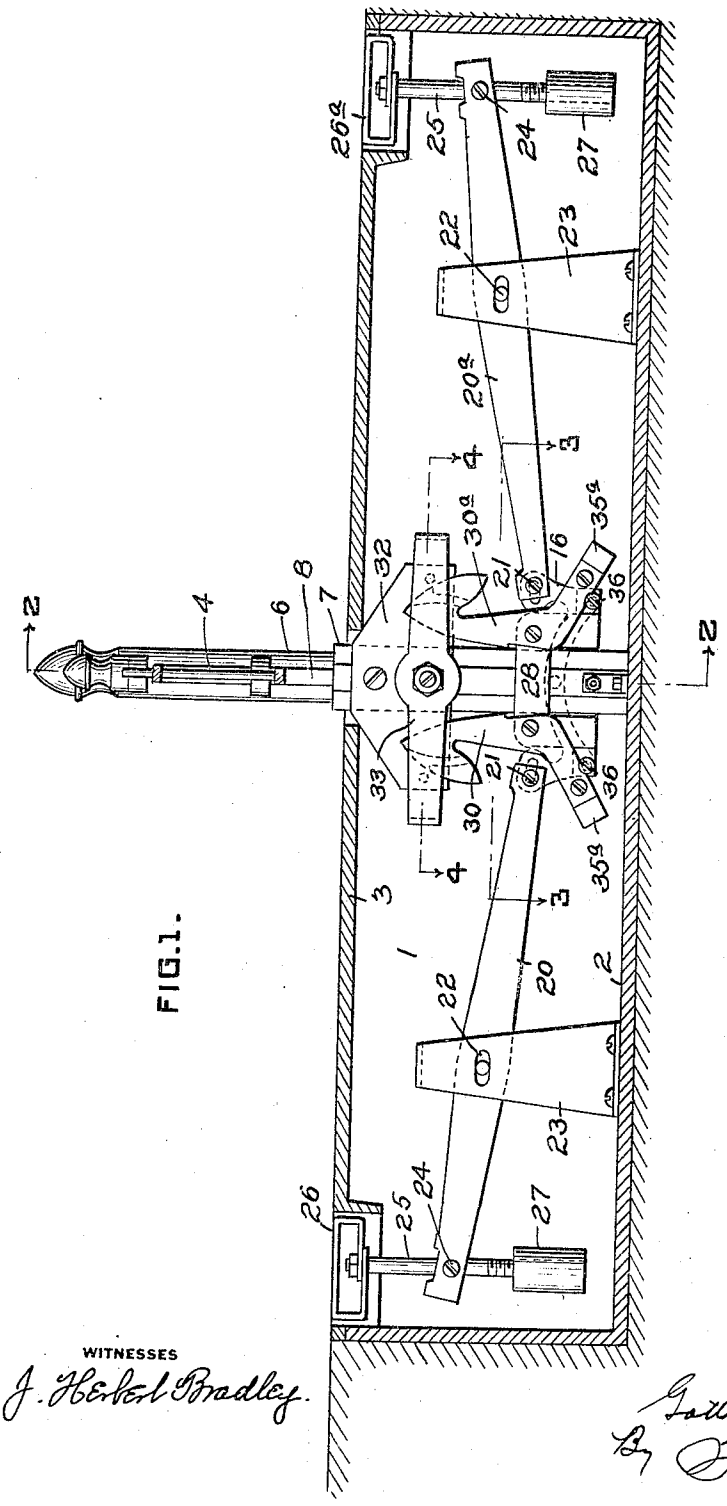

FIG. 1.

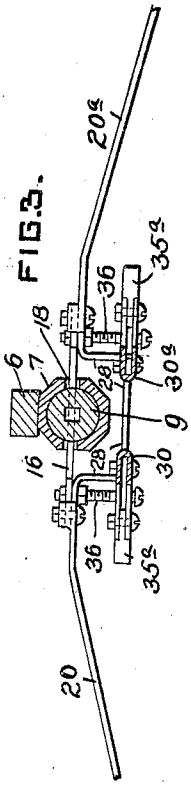

FIG. 3.

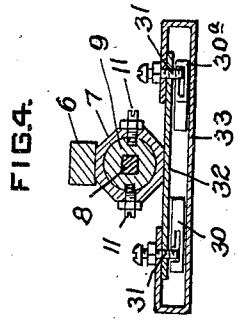

FIG. 4.

WITNESSES

J. Herbert Bradley.

INVENTOR

Gottlieb Merz

By Fredk W. Fowler

Attorney

G. MERZ.

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FIG. 6.

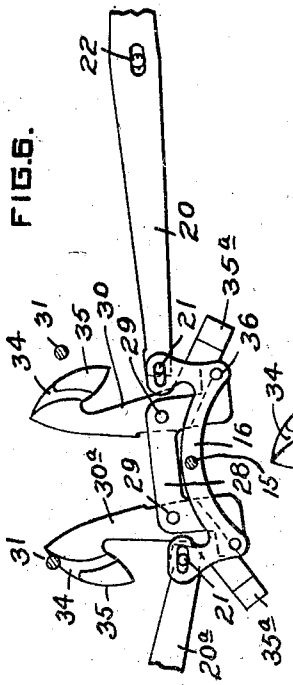


FIG. 7.

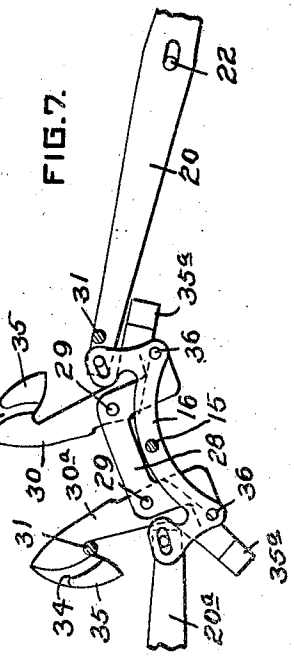


FIG. 8.

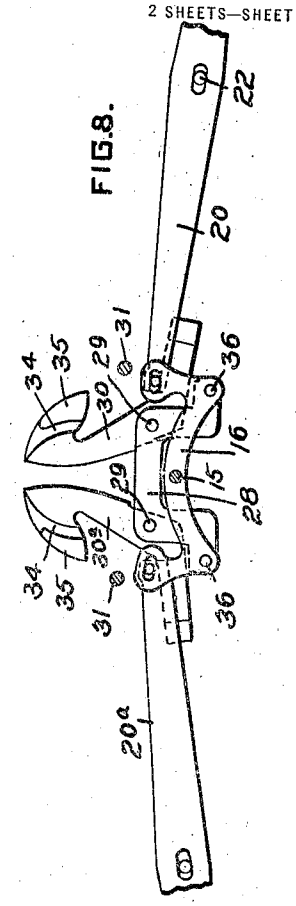


FIG. 2.

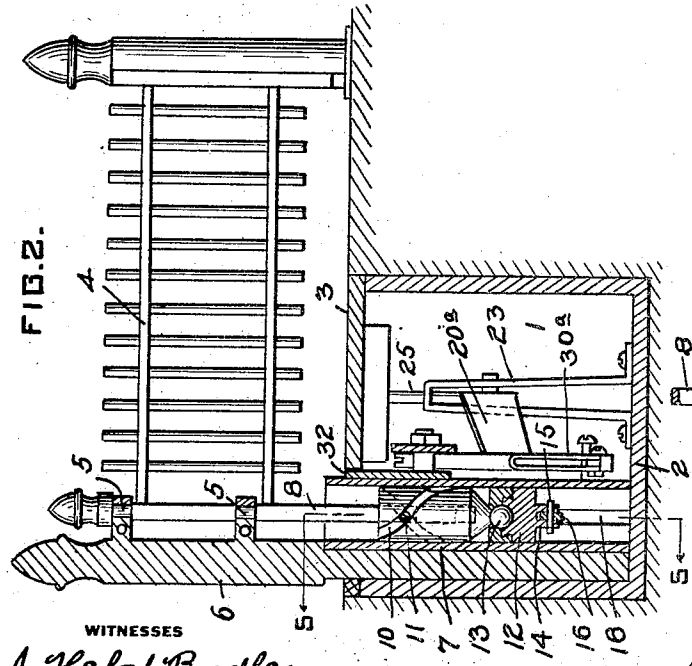
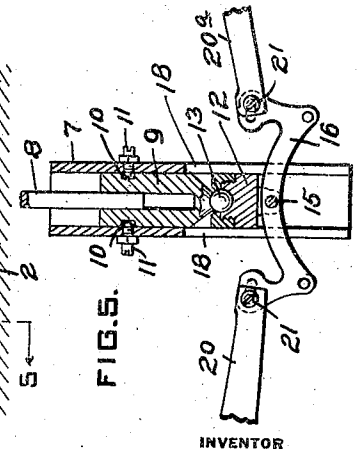


FIG. 5.



WITNESSES

J. Herbert Bradley.

INVENTOR

Gottlieb Merz

By Fred'k W. Mueller

Attorney

UNITED STATES PATENT OFFICE.

GOTTLIEB MERZ, OF McKEESPORT, PENNSYLVANIA.

AUTOMATIC MECHANISM FOR OPERATING GATES, DOORS, &c.

1,378,183. Specification of Letters Patent. Patented May 17, 1921.

Application filed August 8, 1919. Serial No. 316,080.

To all whom it may concern:

Be it known that I, GOTTLIEB MERZ, a resident of McKeesport, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Automatic Mechanism for Operating Gates, Doors, &c., of which the following is a specification.

The invention relates to mechanism for opening and closing gates, doors and the like, so arranged that the gate or the like is automatically opened and closed without the driver of the vehicle leaving his seat. The object of the invention is to provide mechanism for this purpose which is reliable in operation, simple in construction and entirely automatic.

More specifically the invention relates to mechanism by means of which the gate is automatically opened, locked in open position and automatically closed by mechanism which is set into operation by a wheel of the vehicle passing over actuating members or plates located in the driveway or roadway on opposite sides of the gate.

The invention will be described more particularly for opening and closing gates, but it will be understood that it can be applied for opening and closing doors or any similar structure.

The invention comprises the construction and arrangement of parts hereinafter described and claimed.

In the accompanying drawings Figure 1 is a vertical section taken longitudinally of the roadway and showing the gate actuating mechanism in side elevation; Fig. 2 is a transverse section on the line 2—2, Fig. 1; Figs. 3 and 4 are horizontal sections taken respectively on the lines 3—3 and 4—4, Fig. 1; Fig. 5 is a vertical sectional view on the line 5—5, Fig. 2; and Figs. 6, 7 and 8 are rear side elevations showing the different positions of the locking mechanism.

The gate actuating mechanism is contained in a suitable box or casing buried or constructed in the roadway at one side thereof, and which box may be constructed of any suitable material which can be embedded in the roadway or may be formed of concrete directly in place. In the drawings 1 indicates the box, 2 its bottom or floor, and 3 its cover or top. The gate may be of any suitable form of swinging gate, one form being shown at 4, hinged or pivoted at 5 to a stationary post 6 set at the side of the roadway at one side of the box 1 and which can be anchored or braced in any suitable way.

In the chamber of the box, just inside of the post 6 is a vertical cylinder 7, whose axis is in line with the axis of the end post 8 of the gate. Vertically movable in the cylinder 7 is a heavy body or plunger 9, provided on diametrically opposite sides with spiral grooves 10 which are engaged by pins or other suitable members 11 extending through the walls of the cylinder 7, so that when the plunger 9 is lifted, it is also given a rotary movement through an angle of ninety degrees. The foot of the gate end post 8 is square or of other non-circular form and fits in a correspondingly shaped hole in the body 9, so that as the latter is lifted and rotates, it slides upwardly on the gate post 8 and rotates the latter with it, thus swinging the gate to open position,—and when said member 9 drops, the reverse movement takes place, closing the gate.

In the cylinder 7, underneath the plunger 9 is a lifting member 12, which preferably will be attached to the plunger 9 by means which connect the two together but permits the plunger 9 to rotate, such as by a ball and socket connection, shown at 13. By this construction the weight of the lifting member 12 is added to that of the body 9, and the combined weight of the two will be sufficient to cause the gate to be closed by the downward gravity movement of these members.

The lifting member 12 is provided with a slotted lug 14 to which is pivoted, at 15, a bar 16 arranged to have a limited rocking or tilting movement relative to the lifting member 12, such tilting movement being limited by the engagement of the bar 16 with the bottom face of the lifting member. The bar 16 extends in opposite directions through slots 18 in the walls of the cylinder 7 and has pivotally connected at its ends the oppositely extending actuating levers 20 and 20^a, the specific construction illustrated showing the ends of bar 16 turned upwardly, and having the inner ends of the levers 20, 20^a connected thereto by slot and pin connections 21. Levers 20 and 20^a are fulcrumed at 22, on suitable supports 23 rising from the floor of the box 1, this fulcrum connection also preferably being slotted to allow limited longitudinal

movements to the levers 20 and 20ª. The outer end of each lever has pivotally connected to it, at 24, a vertical rod 25, said rods at their upper ends carrying actuating members or plates 26 and 26ª which project up through the top of the box and are substantially flush with the same, and which are of sufficient size to allow a vehicle wheel to depress the same. The rods 25 extend downwardly and are provided with adjustable end portions 27, preferably threaded to the rods 25, and which serve as stops to contact with the bottom 2 of the box and limit the downward movement of the actuating members 26, 26ª.

It is apparent from the mechanism described that when either one of the operating plates 26, 26ª is depressed, such as by a vehicle wheel coming on top of the same, the movement is transmitted through lever 20 or 20ª, as the case may be, to the bar 16, which is given a slight rocking or tilting movement until it contacts with the lower face 16 of the lifting member, after which the lifting member 12 and the weighted plunger 9 are lifted in cylinder 7, and by reason of the spiral grooves 10 engaged by pins 11, said plunger 9 is caused to rotate as it moves upwardly, thus also rotating the gate end post 8 and swinging the gate 4 on its hinges, thus opening the gate, and that when the pressure on the actuating plate 26 or 26ª is released, the ponderous bodies 9 and 12 fall by gravity, thus causing a reverse rotary movement of plunger 9 and gate 4, thus closing the latter.

It is however necessary to lock the gate in open position until the vehicle has passed through it, and then unlock the same to permit it to close, and effect this unlocking from the opposite one of the actuating plates. The following mechanism is provided for this purpose: Secured to the rocking or tilting member 16 is a frame member 28, to which are pivoted, at 29, a pair of oppositely arranged locking dogs 30 and 30ª, which have hook shaped upper ends coöperating with short studs 31 projecting from a plate 32 secured near the upper end of the cylinder 7. A loop member 33 is secured to the ends of this plate and lies on the outside of the upper ends of the hooked ends of the dogs, to guide the latter. The upper end of each of these dogs is provided with a cam shaped slot 34 through which the pin 31 can pass, and with an outer cam shaped face 35. The lower ends of these dogs are counter-weighted, as shown at 35ª and lie adjacent to pins or lugs 36 projecting from the ends of the tilting bar 16.

The normal position of these parts is shown in Fig. 1, this indicating the position when the gate is closed. We will assume that a vehicle is coming in such direction that its front wheel will pass over the actuating plate 26, thus depressing the latter and rocking the lever 20. The first effect of the upward movement of the inner end of lever 20 causes the bar 16 to tilt, lifting its lefthand end until said lever comes in contact with the bottom face of the lifting member 12, whereupon further movement lifts said member 12, and with it the plunger 9, thus swinging the gate to open position. The initial tilting movement of bar 16 carries with it the frame member 28 and dogs 30 and 30ª, swinging the upper ends of said dogs toward the right. This brings the upper ends of said dogs in the position shown from the rear in Fig. 6, so that when they rise with the lifting member 12, the outer cam face 35 of dog 30 is in contact with its pin 31, whereas the cam groove 34 of dog 30ª is in position to pass over its pin 31. This brings the parts to such position that as soon as the vehicle wheel releases the actuating plate 26 the mechanism tends to drop slightly, whereupon the hooked portion of dog 30ª becomes locked on its pin 31, whereas the hooked portion of the dog 30 is entirely free from its pin 31, as shown in Fig. 7. This locks all of the parts of the mechanism in elevated position, thus holding the gate open so that the vehicle can pass through.

After the vehicle has passed through it will be so guided that one of its wheels will run on actuating plate 26ª thus depressing the latter and lifting the inner end of lever 20ª. The first effect of this movement is to cause a slight rocking movement of bar 16 and frame 28 in the opposite direction from which it was rocked in the beginning, thus causing the pin 36 to press upon the lower end of the dog 30ª and disengage its hooked end from the lug 31, to the position shown from the rear in Fig. 8, whereupon as soon as the vehicle wheels pass off the actuating plate 26 the parts fall by gravity to lowermost position, thus swinging the gate to closed position.

In case the vehicle should come from the opposite direction, exactly the same operations are effected as above described, except that the lever 20ª is first actuated, which tilts or rocks the bar 16 and frame 28 in the opposite direction from that described, so that when the parts are fully lifted it is the dog 30 which makes hooked engagement with its lug 31, instead of the dog 30ª as before described; and when the vehicle has passed through the gate the pressure of its wheels coming on the actuating plate 26 actuates lever 20ª to unlock dog 30 from its lug 31.

It will thus be seen that the mechanism is entirely automatic, it merely being necessary to guide the vehicle so that its wheel runs over the actuating plate on the approaching side of the gate to set the mechanism in operation to swing the gate to open position,

where it becomes locked; and when the vehicle has passed through the gate one of the wheels is guided over the actuating plate on the leaving side of the gate, thus releasing the locking dog and allowing the parts to fall by gravity and thereby swing the gate to closed position.

The actuating plates 26, 26[a] will obviously be located at such distances on opposite sides of the gate as to permit the gate to swing to open position without coming in contact with the vehicle, and will be made of such size that the wheel can depress the same to a sufficient extent to effect the operation of the parts.

Various changes can obviously be made in the form and construction of the parts. The various pivotal connections can if desired or necessary be provided with anti-friction bearings to reduce friction. Likewise the pins 11 which project into the spiral grooves 10 can be provided with rollers to reduce friction.

I claim:

1. In combination with a swinging gate or the like, of a pair of actuating members located on opposite sides of the gate and arranged to be operated by the vehicle, operating connections therefrom to the gate and so arranged that the actuation of either of said members swings the gate to open position, a pair of locking dogs, and a tilting member associated with said operating connections and said locking dogs and arranged to be tilted in one direction by the actuation of one of said actuating members to bring one of said dogs into locking position and the other into idle position and to be tilted in the opposite direction by the movement of the other actuating member to release the locking dog.

2. In combination with a swinging gate or the like, of a pair of actuating members located on opposite sides of the gate and arranged to be operated by the vehicle, a vertically movable member connected to the gate to swing the same when said member moves up or down, operating mechanism between the actuating members and said vertically movable member and including a tilting member pivotally connected to the vertically movable member and arranged to be tilted in opposite directions on the initial movements of said actuating members respectively, locking means associated with said tilting member and arranged to be brought into locking position when said member is tilted in one direction and to be released when said tilting member is tilted in the opposite direction, and automatic means for closing the gate.

3. In combination with a swinging gate or the like, of a pair of actuating members located on opposite sides of the gate and arranged to be operated by the vehicle, a vertically movable member connected to the gate to swing the same when said member moves up or down, operating mechanism between the actuating member and said vertically movable member and including a tilting member pivotally connected to the vertically movable member and arranged to be tilted in opposite directions on the initial movements of said actuating members respectively, a pair of locking dogs pivotally connected to said tilting member, lugs with which said dogs engage when lifted, and cam faces on said dogs to guide the same into and out of locking position relative to their lugs.

4. In combination with a swinging gate or the like, of a pair of actuating members located on opposite sides of the gate and arranged to be operated by the vehicle, a member slidably connected to the gate and arranged to move vertically, cam slots and projections arranged to rotate said member when it moves vertically and thereby swing the gate, operating connections between both of said actuating members and said vertically movable member, a lock arranged to lock the gate in open position, and means associated with said sliding member and so arranged that the actuation of said sliding member by either actuating member releases said lock.

5. In combination with a swinging gate or the like, of an actuating member located on each side of said gate and arranged to be operated by a vehicle, a vertically movable weighted plunger having sliding connection with the gate end post, a cylinder in which said plunger moves, spiral interengaging connections between said cylinder and plunger, whereby said plunger is caused to rotate as it moves up and down, operating connections between both of said actuating members and said weighted plunger for lifting the latter, a lock arranged to lock the gate in open position, and means operated from either actuating member for releasing said lock.

In testimony whereof, I have hereunto set my hand.

GOTTLIEB MERZ.

Witness:
E. M. TRICH.