April 28, 1925. 1,535,753

G. G. WEISER

AUTOMATIC SAFETY GATE

Filed April 16, 1923 3 Sheets-Sheet 1

Fig. 1.

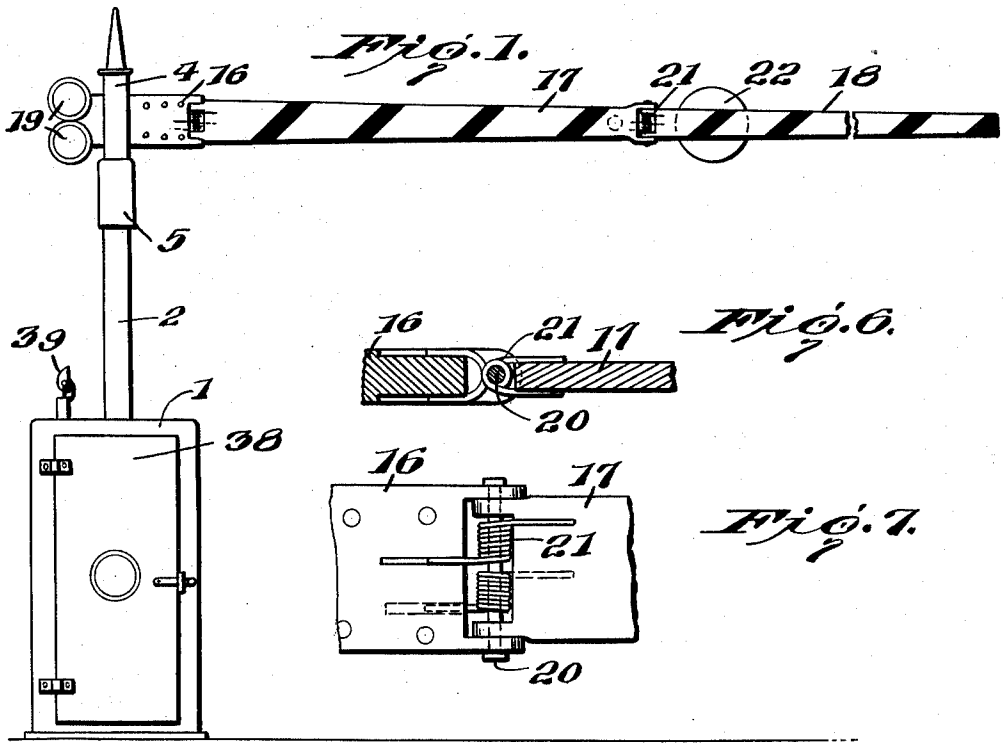


Fig. 6.

Fig. 7.

Fig. 2.

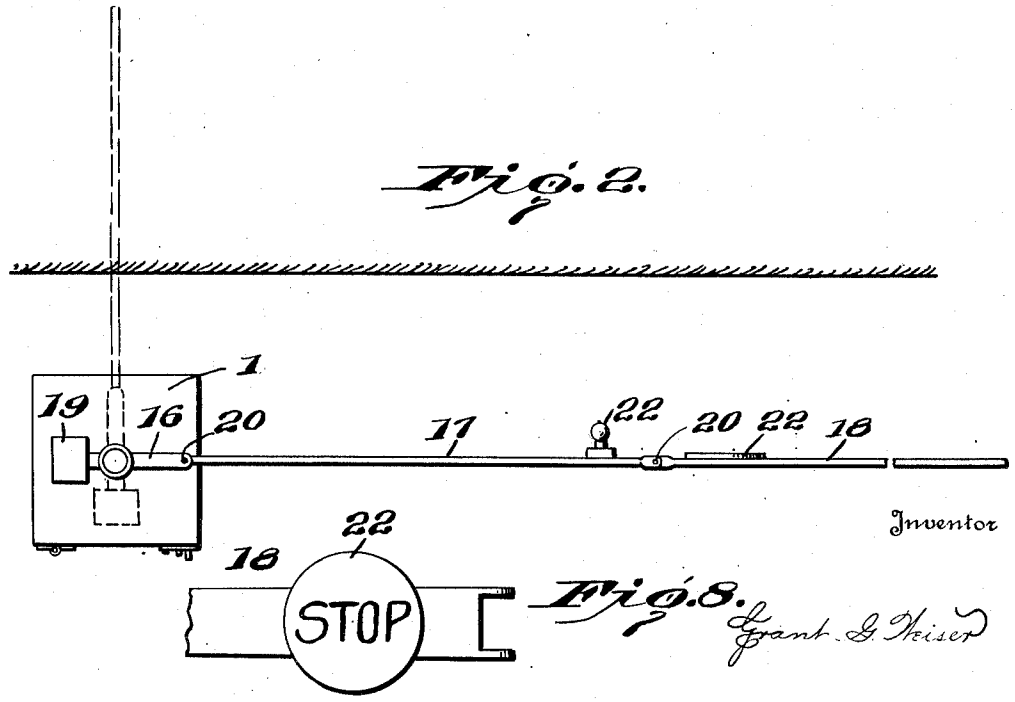


Fig. 8.

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Fig. 3.

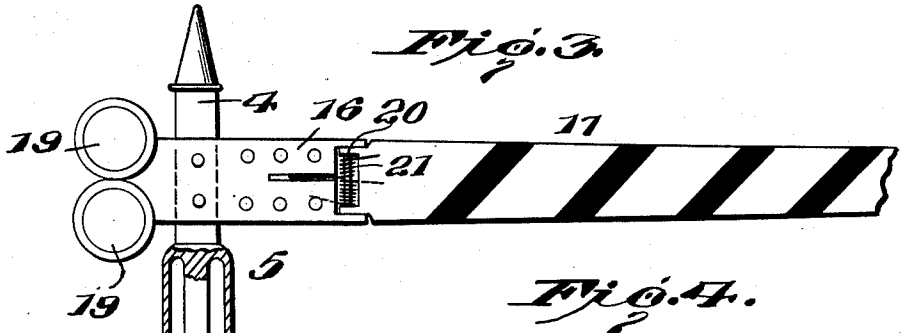
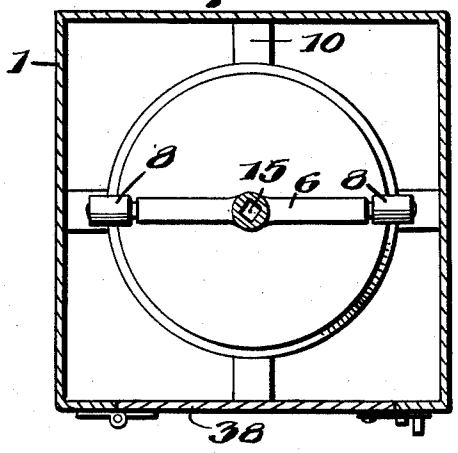
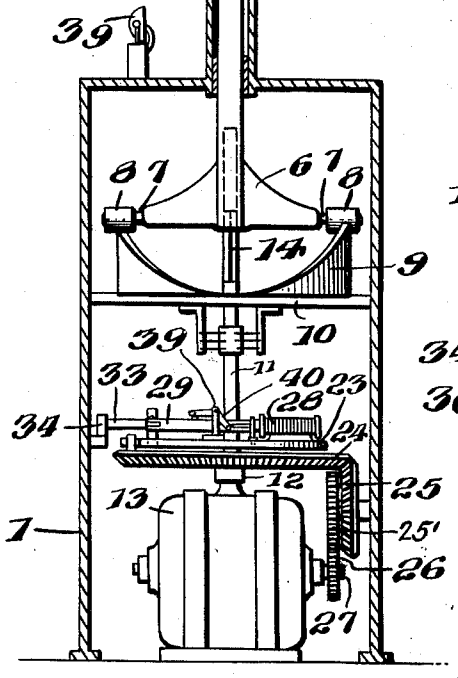


Fig. 4.





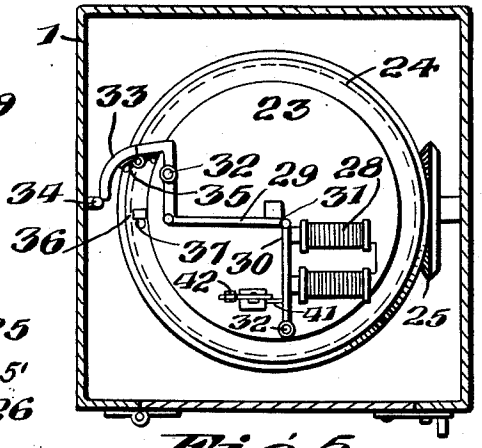


Fig. 5.

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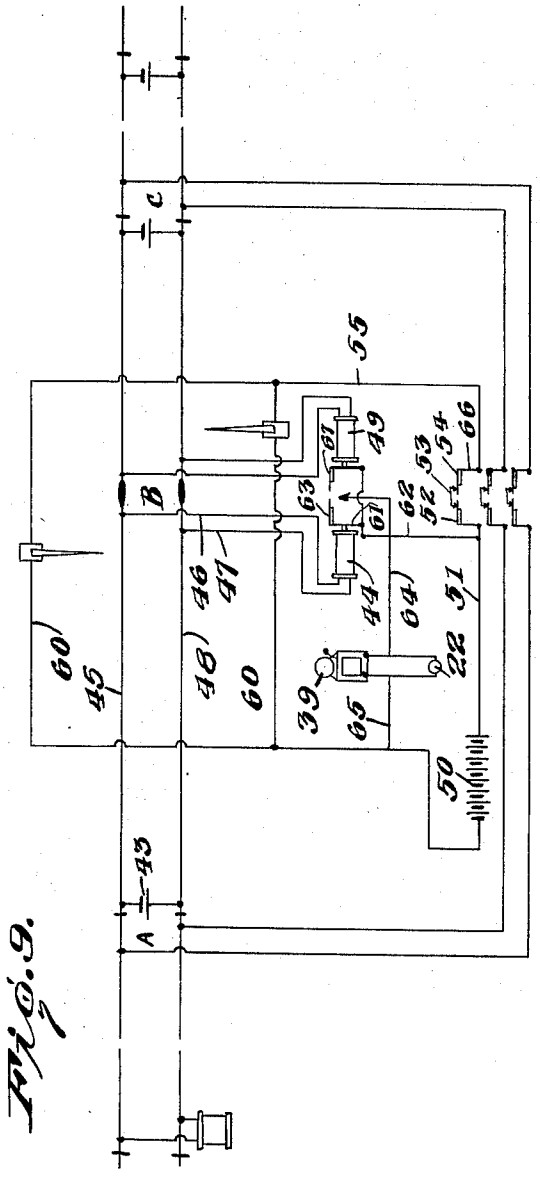


Fig. 9.

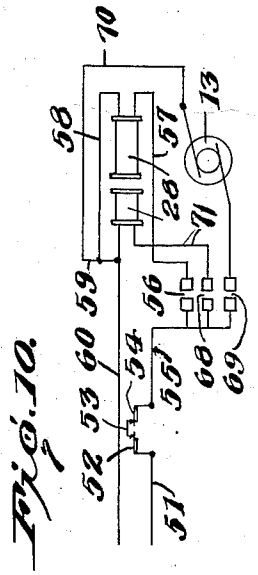


Fig. 10.

Inventor

Grant G. Weiser

Patented Apr. 28, 1925. 1,535,753

UNITED STATES PATENT OFFICE.

GRANT G. WEISER, OF HELLERTOWN, PENNSYLVANIA.

AUTOMATIC SAFETY GATE.

Application filed April 16, 1923. Serial No. 632,383.

To all whom it may concern:

Be it known that I, GRANT G. WEISER, a citizen of the United States, residing at Hellertown, in the county of Northampton and State of Pennsylvania, have invented certain new and useful Improvements in an Automatic Safety Gate, of which the following is a specification.

This invention relates to improvements in safety gates for railroad crossings and has for its prime object to provide a gate which is entirely automatic in operation.

A further object of the invention is to provide a gate that will automatically close upon the approach of a train and one that will sound an alarm in the form of a bell and at the same time display a light on the closed gate.

A still further object of the invention is to provide a gate that will automatically close by the weight of same upon the approach of a train.

And a still further object of the invention is to provide a gate which is equipped with an electric motor that is automatic in operation to restore the gate to an inoperative or open position as soon as the railroad train has passed the railroad crossing.

Another object of the invention is to provide a gate comprising a blade or arm that is attached at right angles to a supporting post and which is constructed of several sections hingedly connected together so as to provide a flexible blade or arm which will permit a vehicle accidentally caught on the railroad tracks during closing of the gate to escape without injury to the vehicle or occupants thereof.

Another object of the invention is to provide an automatic gate for railroad crossings, which is simple in construction, durable, efficient for the purpose intended, and one that can be installed at all railroad highway crossings at a relatively low cost.

These and like objects of the invention will be better understood as the description follows and as is specifically pointed out in the appended claims.

Referring to the accompanying drawings which form a part of this specification,

Figure 1 is a side elevation view of an automatic gate constructed in accordance with my invention.

Figure 2 is a top plan view of same.

Figure 3 is a side elevation of my improved gate, showing same partly in section to better illustrate the construction and operation.

Figure 4 is a horizontal section through the upper portion of the housing containing the operating mechanism.

Figure 5 is a similar view taken through the middle of the housing.

Figure 6 is an enlarged fragmentary sectional view of a pair of the hingedly connected sections comprising the blade or arm of my improved gate.

Figure 7 is an enlarged fragmentary side elevation of the blade or arm section connecting means.

Figure 8 is an enlarged fragmentary side elevation of one of the sections comprising the gate showing the light signal attached thereto.

Figure 9 is a diagrammatic plan view of the electric circuit, and

Figure 10 is a diagrammatic view of the electric circuit for operating the electric motor to operate the gate.

Referring to the accompanying drawings in detail, like characters will be used to designate like parts in the different views.

My invention has been designed particularly for use in connection with steam railroads, but same is also capable of being used in connection with electric roads with a slight modification of the electric system involved.

In the drawings, the numeral 1 indicates a housing which is constructed of steel or any other suitable material and which is placed along one side of the railroad track at the highway crossing. The top of the housing has a sleeve 2 extending centrally upwardly therefrom.

A shaft 3 having an enlarged head 4 to provide a weight is mounted for rotation in the sleeve 2. At the intersection of the shaft 3 with the enlarged head 4, a hood 5 is formed integral to prevent water or foreign matter of any kind from passing into the sleeve and entering the housing 1.

The lower end of the shaft 3 extends downwardly within the housing and is provided with a T-head as at 6 and each end of the T-head is provided with an axle 7 on which is mounted a roller 8. The rollers two in number are held in engagement with a quadrant 9. The quadrant is supported within the housing by cross braces 10.

A second shaft 11 which is smaller in diameter than the shaft 3 is mounted for support in a socket 12 on top of an electric motor 13 which is in turn supported in the bottom of the housing. The shaft 11 extends upwardly and passes through the center of the cross braces 10. The upper end of the shaft 11 is provided with a square portion as at 14 which engages a square recess in the lower end of the shaft 3.

Attached to the enlarged head 4 of the shaft 3 in any suitable manner is an arm positioned at right angles to the shaft 3, which is formed of a series of sections 16, 17, and 18. The sections are each provided with black and white stripes, as is the means often employed by railroads as a warning signal. The section 16 is formed of metal and has weights 19 attached to one end, which cooperate with the enlarged head 4 for holding the rollers 8 into engagement with the quadrant 9. The section 17 is constructed of wood and is pivotally connected to the section 16 by means of a bolt 20. A spring 21 is positioned around the bolt 20 so that the section 17 may be moved in either direction. The section 18 which forms the extreme end of the arm is composed of rubber and is connected to the section 17 in the manner described for the connection between sections 16 and 17. A signal which is preferably in the form of a lamp having a red bulb is attached to the section 18 and is visible to anyone approaching the railroad crossing when the gate is in an operative position. By having the arm composed of a number of sections and hingedly connected together, the same prevents anyone from being caught between the gate when same is moved to a closed position, as a machine caught on the railroad track can easily pass therefrom by bearing against the sectional arm and causing same to swing outwardly. As soon as the vehicle has passed from the track, the arm assumes its normal position under the influence of the spring 21.

A disk 23 is keyed to the shaft 11, and positioned directly under the disk 23 is a bevel-gear 24, which is loosely mounted on the shaft 11. The bevel-gear 24 meshes with a gear 25 on the same shaft and fastened to a gear 25′ which meshes with a gear 26 on the end of a shaft 27 of the electric motor 13.

An electric magnet as indicated by the numeral 28 is supported on top of the disk 23. A locking pawl which comprises a link 29 and an armature 30 are hingedly connected together as at 31 and each of the members are pivotally connected to the disk as at 32. The extreme end of the link member 29 is provided with a catch 33 for engagement with a stop 24 carried by one wall of the housing 1. The catch 33 is hingedly connected to the link 29 and held in position by means of a spring 35. A projection 36 is formed on the periphery of the disk 23 and engages a peg 37 carried by the bevel-gear 24. One side of the housing 1 is provided with a hinged door 38, so that access to the interior of same may be easily secured.

A bracket 39 is mounted on the disk 23 and an L-shaped arm 40 is pivotally attached to the bracket at its upper end. One end of the L-shaped arm is connected as at 41 to the armature 30, while the opposite end of the L-shaped arm has a weight 42 adjustably mounted thereon. Due to the weight of the sectional arm, weights 19, pinnacle or top 4, shaft 3, and part 6, there is a tendency to move the pawl 33 to the right and slide it over the stop 34 when the gate is in its normal or inoperative position. This tendency is overcome and the pawl 33 is prevented from sliding past the stop 34 by the energized electric magnet holding the armature 30 against itself and thus preventing the pawl 33 from moving to the right and sliding past the stop 34. For the electric magnet to overcome this weight and hold the gate normal, it would require a considerable amount of electric power. The object of the weight 42 is primarily to assist the electric magnet in holding the pawl 33 in engagement with the stop 34, thus holding the gate normal and reducing the holding power consumption to a minimum.

In order to clearly show the operating means for moving the sectional arm to its normal or inoperative position and for sounding a bell and lighting the light 22, I have shown a diagrammatic plan view as in Figure 9 which when taken in connection with the accompanying description will clearly show the operating means employed for the above.

In explaining and tracing the circuit shown in Figure 9, it will be assumed that the gate is in its normal position and that the track battery 43 energizes an electromagnet 44 of the relay, through a circuit established as follows: positive side of battery 43, rail 45, wire 46, electromagnet 44, wire 47, rail 48, and negative side of battery 43. The track battery energizes an electric magnet 49 of the relay, in the same manner, when a train is approaching from the opposite direction.

The main gate battery 50 energizes the high resistance winding of the electric magnet 28 as follows: positive side of the battery 50, line 51, contact finger 52, link 53, contact finger 54, wire 55, contact 56, which is closed, wire 57, high resistance winding of electric magnet 28, wire 58, wire 59, wire 60, and negative side of battery 50.

A train is now entering the insulated section of the track controlling the operation of the gate, at the point marked A, as

in Figure 9. The circuit from the battery 43 is now as follows: positive side of the battery 43, rail 45, wheels and axles of the train, rail 48 and negative side of the battery 43. This is termed a shunt and serves to deprive the electromagnet 44 of current, which causes an armature 61 to fall away from the electromagnet 44 and close the bell and lamp circuit as follows: positive side of battery 50, wire 51, wire 62, armature and contact finger 61 and wire 63, wire 64, bell 39, and light 22, wire 65, and negative side of battery 50. This shunt also causes the coils of the electromagnet 28 to be deprived of current or de-energized becaused of a break in the circuit between the contact finger 52 and the link 53. The gate has now assumed its operative or closed position. As the train enters the section of the track marked BC, the electric magnet 49 of the interlocking relay is de-energized.

We will now assume the train to be just over the insulated rail joints at B. The electromagnet 44 will now pick up its armature 61, in doing so it will lift an armature 66 and contact fingers 52 and 54, so that they will bear against the slightly lifted link 53. As contacts 67 and contact 63 are also mounted on the armatures 61 and 66, they will take the same movement as contacts 52 and 54. The bell and lamp circuit is now broken. Contacts 68 and 69 are now closed. The circuit to the gate is as follows: positive side of battery 50, wire 51, armature 61, 52, 53, 54, 66, wire 55, contact 69, motor 13, wire 70, wire 59, and wire 60, back to negative side of battery 50. A circuit is also established through the contact 68, wire 71, low resistance winding of the electric-magnet 28, and wire 60. The gate is now revolving through the 90 degrees from the operative to the inoperative position. When the gate reaches the position shown by the disk in Figure 5, contacts 68 and 69 will open and contact 56 will have closed. The motor will then cease to revolve and the circuit is carried through the high resistance winding of the electric magnet 28 as explained before. The object of the two windings of the electric magnet 28 is to reduce the amount of power consumed while the gate is in an open, inoperative or normal position. It will be further noted that a train coming from either direction will cause the above described operation.

When the flexible arm of my gate is in an inoperative position, the electric magnet is energized by the gate battery. When a train approaches the highway crossing, the circuit leading to the electric magnet is broken through the function of the interlocking track relay. The de-energized relay now allows the weight of the shaft 3 and its adjoining parts to force the catch 33 by the stop 34, thus causing the rollers 28 rolling on the quadrant 9 to seek the lowest level. Rotation is imparted from the shaft 3 to the shaft 11 through the square portion 14, which in turn rotates the disk 23 which in turn by means of the projections 36 bearing against the peg 37 rotates the bevel-gears 24, 25, and 26. The motion of these gears causes the motor to revolve in a reverse direction, thus creating a snub and causing the arm to move to the opposite position very slow, also relieving the sectional arm of any shock.

As soon as the train has passed over the crossing and departed from the relay, the current is returned to the electric motor and the electric magnet 28 is de-energized. The electric magnet draws the catch 33 out of engagement with the stop 34, and the rotation of the shaft 27 of the electric motor rotates the gears 24, 25, and 26, the disk 23 and shaft 11 which in turn imparts a rotary motion to the shaft 3, thus causing the rollers to move to the highest point of the quadrant 9 and returning the flexible arm to an inoperative position.

In view of the foregoing description of my invention taken in connection with the accompanying drawings, it is thought that any further explanation as to the construction, operation, and objects of my invention is unnecessary.

While I have shown and described the preferred form of my automatic gate, I realize that various minor changes may be resorted to, without departing from the spirit and scope of the invention as claimed, and therefore, I do not wish to limit myself to the exact details of construction shown, nor to the combination and arrangement of parts.

What I claim as new and desire to secure by Letters Patent is:

1. An automatic gate in combination with a railroad track, comprising a housing, a rotatable shaft extending from said housing, a signal arm carried by said shaft, a T-shaped extension formed on the lower extremity of said shaft arranged in said housing, a roller arranged at each end of said T-shaped extension, stationary cam surfaces engaging said rollers for elevating said shaft and signal arm when said shaft is turned, whereby when said shaft is released it will return to its normal position by gravity, and train initiated means for turning and elevating said shaft and arm against the action of gravity.

2. An automatic gate in combination with a railroad track, comprising a housing, a rotatable shaft extending from said housing, a signal arm carried by said shaft, a T-shaped extension formed on the lower end of said shaft, a pair of stationary inclined tracks arranged in said housing, means on

the opposite ends of said T-shaped extension for engaging said inclined tracks for elevating said shaft and arm when said shaft is turned, whereby when said shaft is released it will return to its initial position by gravity, and means for turning and elevating said shaft and signal arm against the action of gravity.

3. An automatic gate in combination with a railroad track, comprising a housing, a rotatable shaft extending from said housing, a signal arm carried by the upper end of said shaft, means in said housing for elevating said shaft and arm when the same is turned whereby when said shaft and arm are released they will return to their initial position by gravity, the lower end of said shaft having a longitudinal opening therein, an electric motor in said housing, a second shaft in said housing adapted to be operated by said electric motor, the upper end of said second shaft adapted to extend in the opening of said first mentioned shaft to turn the same yet permitting the elevating of said second mentioned shaft with relation to said first mentioned shaft.

4. An automatic gate, comprising, in combination with a railroad track, and a relay circuit, of a substantially rectangular housing, a tubular casing secured to the upper extremity of the housing, a rotatable shaft positioned within the said tubular casing, a bracket secured on the upper extremity of the said shaft, a signal arm comprising a plurality of sections, the sections being pivotally connected and having coil springs mounted therein tending to maintain same in alignment, a plurality of weights mounted on the other extremity of the bracket counter-balancing the signal arms, a T-shaped extension formed on the lower extremity of the said shaft, a pair of stub shafts formed on the extremity of the T-shaped extension, rollers rotatably mounted on the said shaft, a cam plate secured in the upper portion of the housing, the rollers being adapted to rotate upon the upper end thereof, a supporting plate positioned somewhat below the said cam plate, a pair of magnetic coils secured to the said supporting plates, a plurality of hinged levers connected adjacent the said magnetic coils, means for actuating the levers by means of the said magnetic coils, a curved extension catch formed on the extremity of the lever, means for engaging the said catch, an actuating motor positioned within the lower portion of the housing, a series of gears adapted to rotate the vertical shaft therein, means for automatically bridging the contact of the magnetic coils, and a hinged door mounted on the side of the housing to permit access thereto.

In testimony whereof, I have affixed my signature in the presence of two witnesses.

GRANT G. WEISER.

Witnesses:
FREEMAN HORN,
PAUL TRUMBOWER.