June 17, 1930. E. H. RICK 1,765,178

HIGHWAY CROSSING BARRIER

Filed June 26, 1928 6 Sheets-Sheet 1

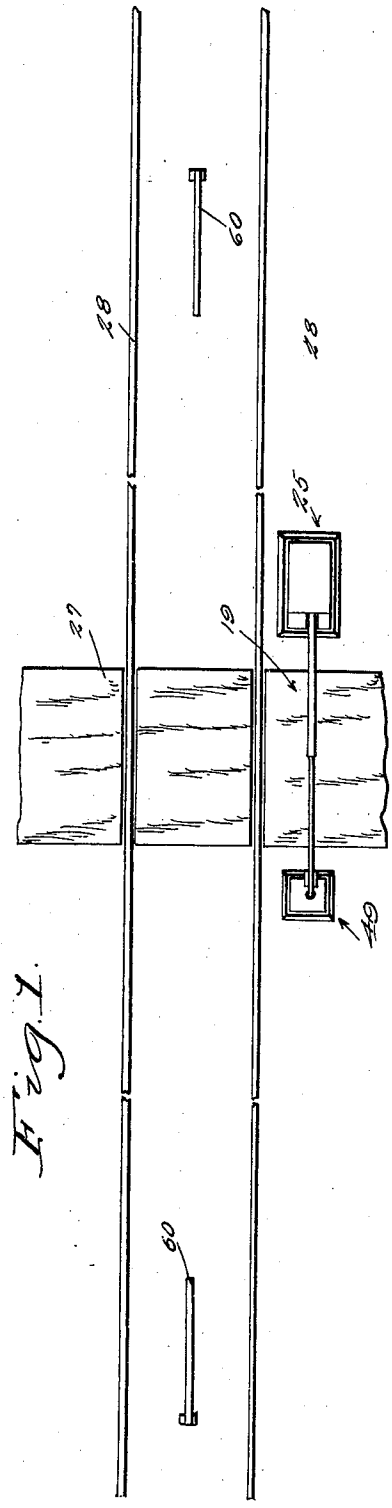


Fig. 1.

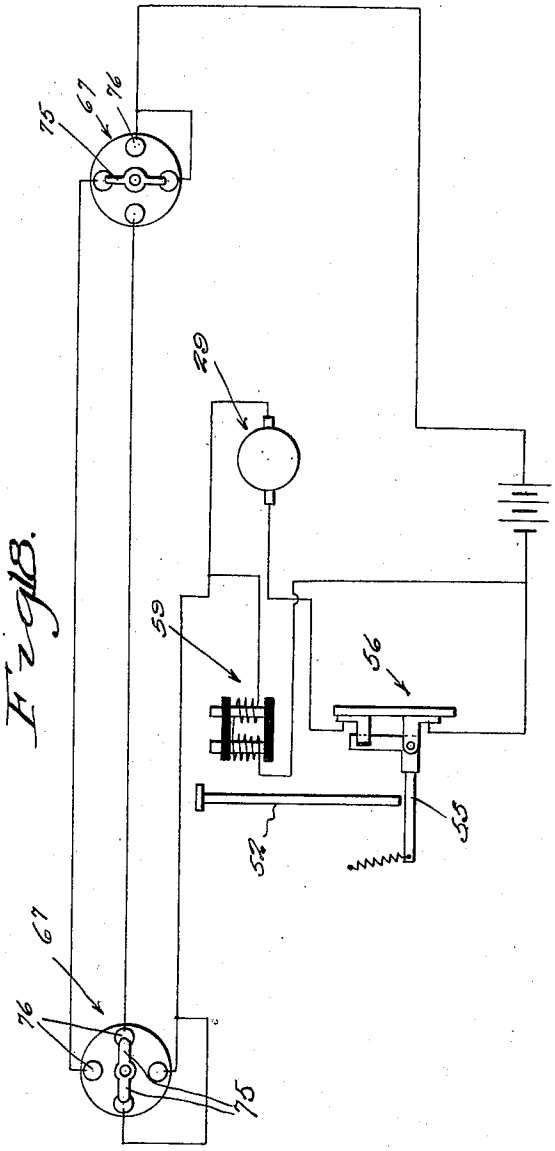


Fig. 2.

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HIGHWAY CROSSING BARRIER

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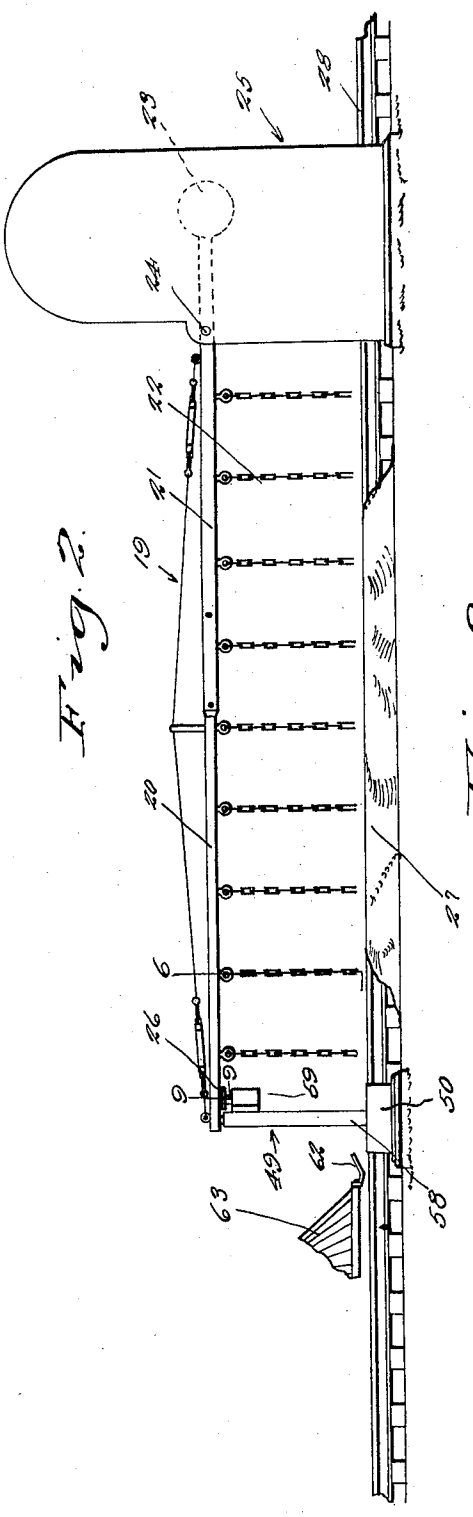


Fig. 2.

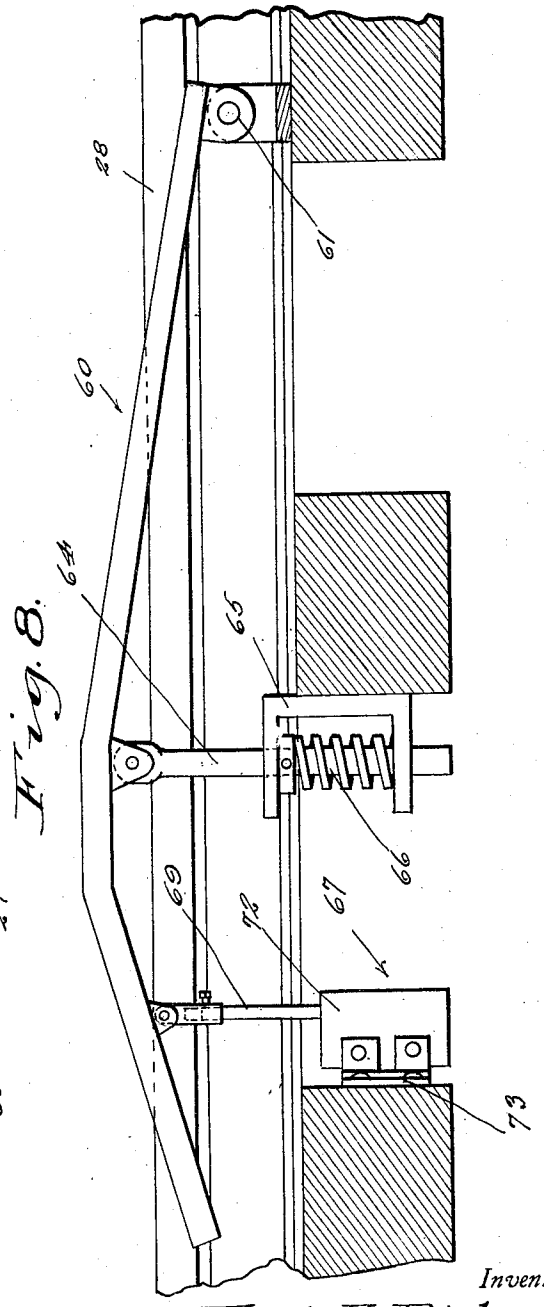


Fig. 8.

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HIGHWAY CROSSING BARRIER

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Fig. 3.

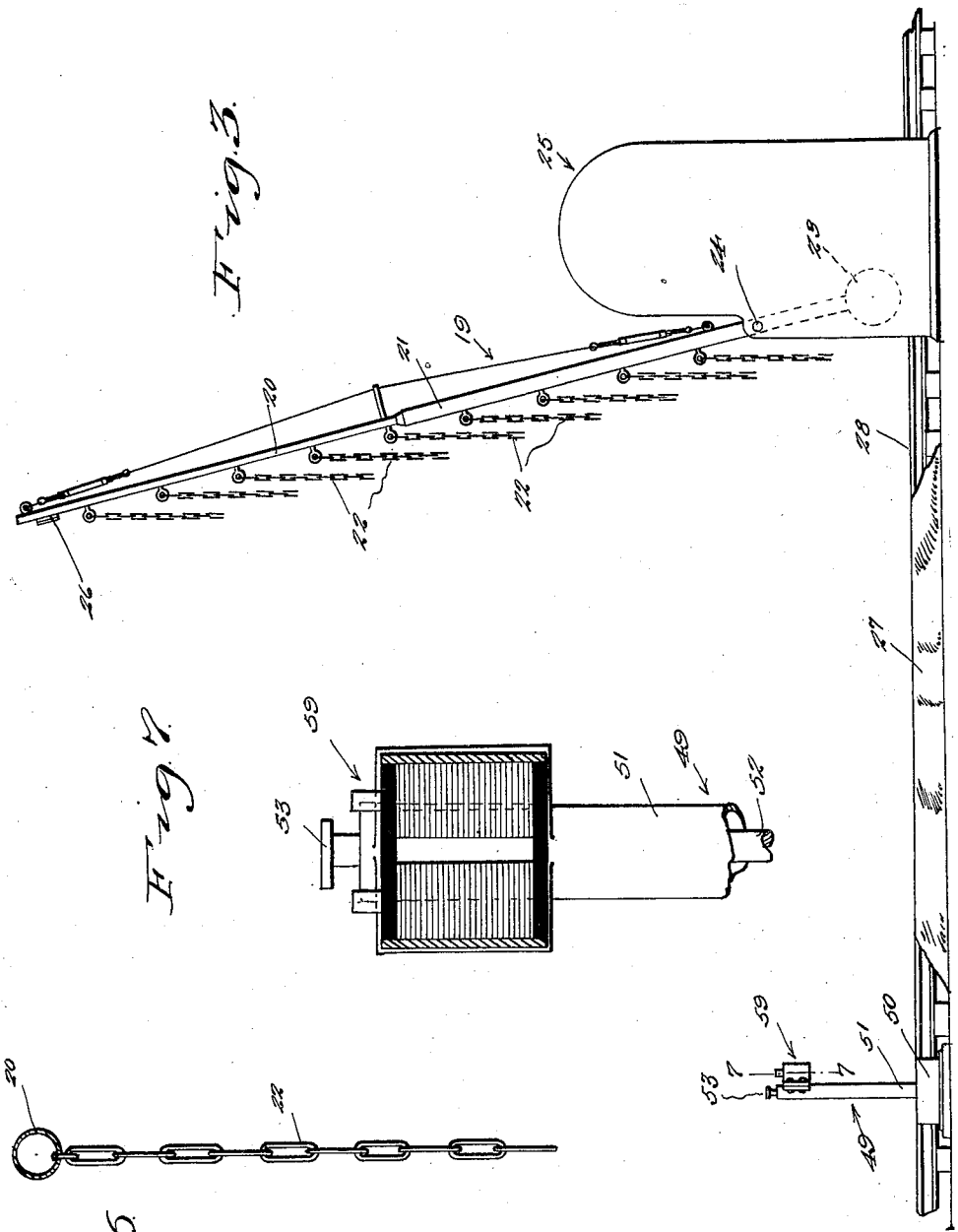


Fig. 7.

Fig. 6.

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HIGHWAY CROSSING BARRIER

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Fig. 3.

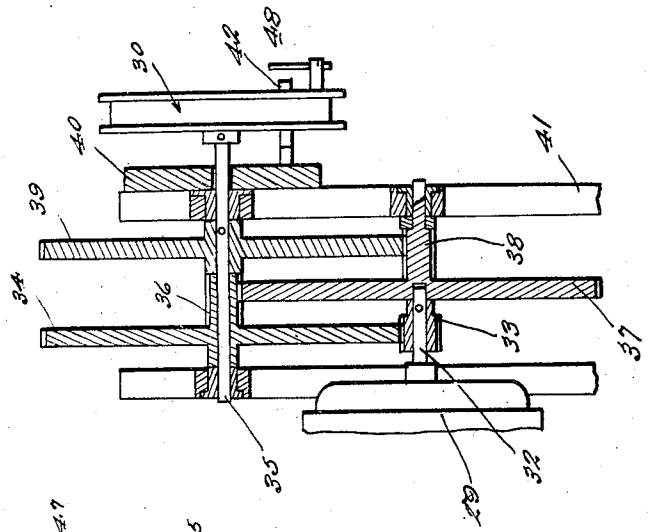
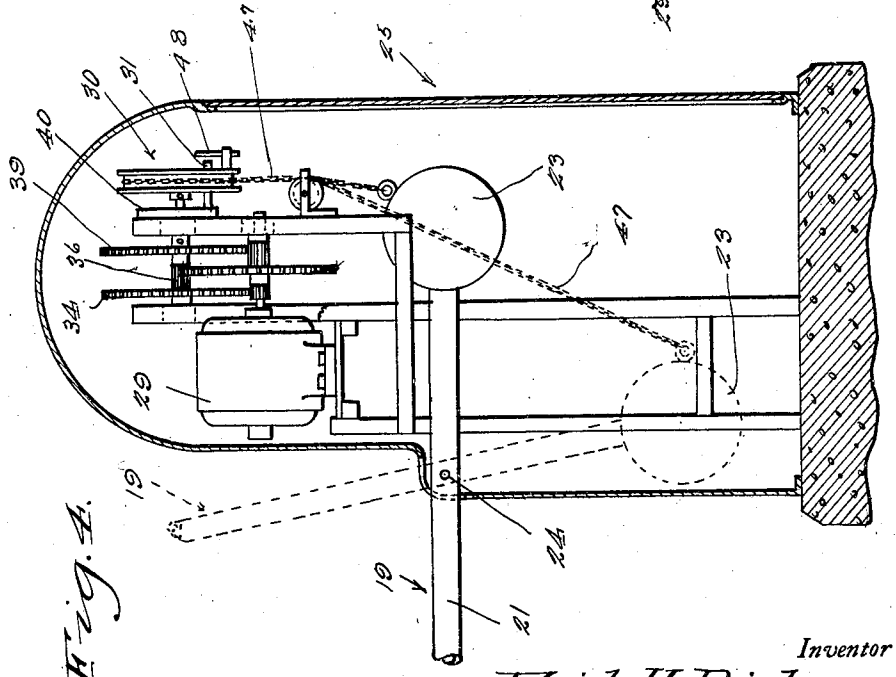


Fig. 4.



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HIGHWAY CROSSING BARRIER

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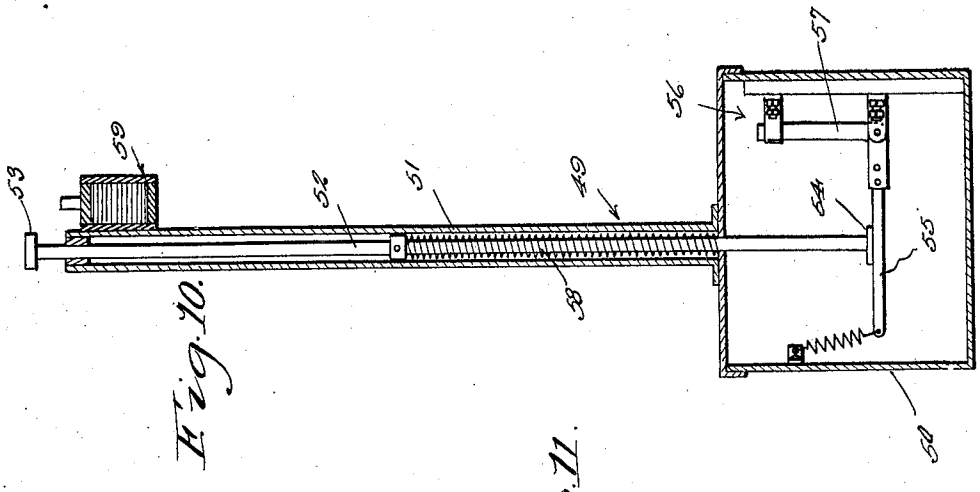


Fig. 10.

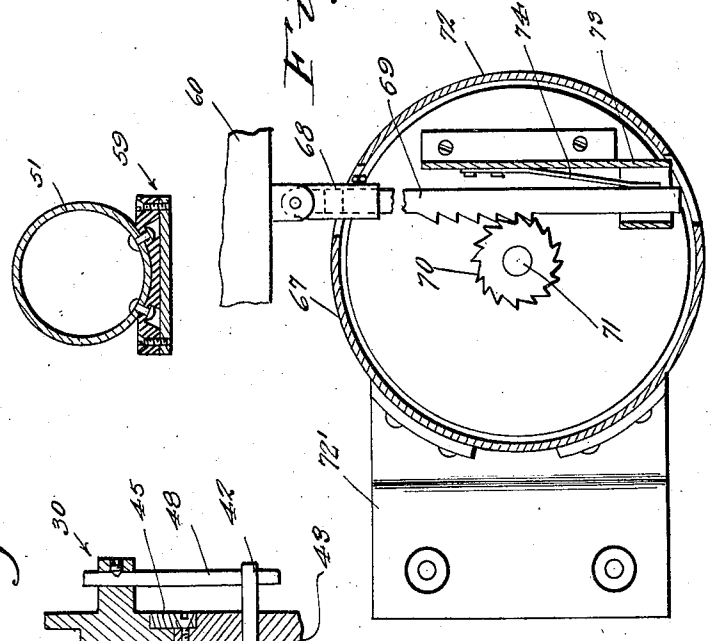


Fig. 11.

Fig. 9.

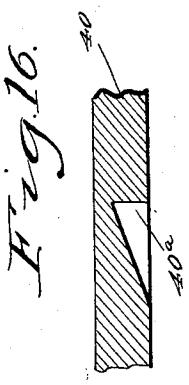


Fig. 16.

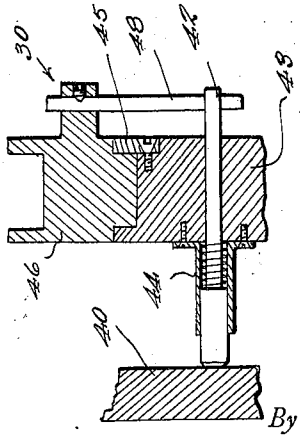


Fig. 14.

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HIGHWAY CROSSING BARRIER

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Fig. 13.

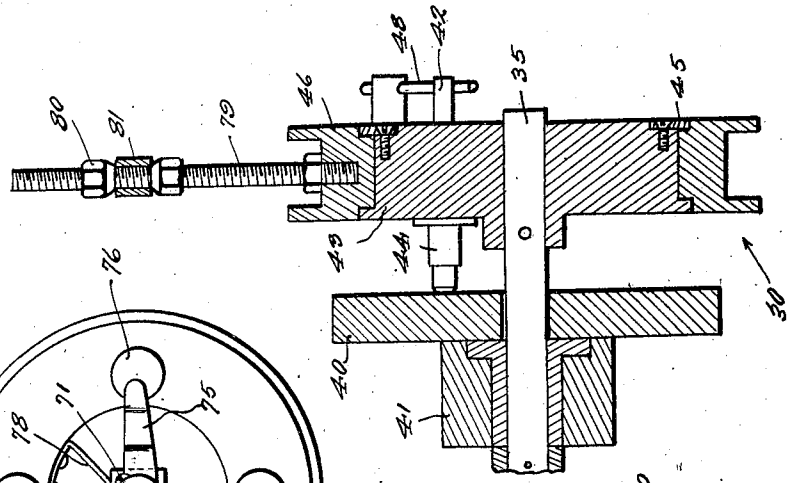


Fig. 14.

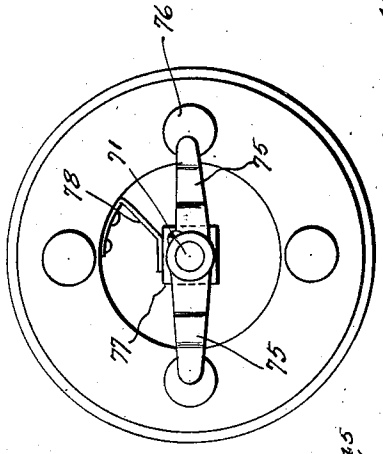


Fig. 12.

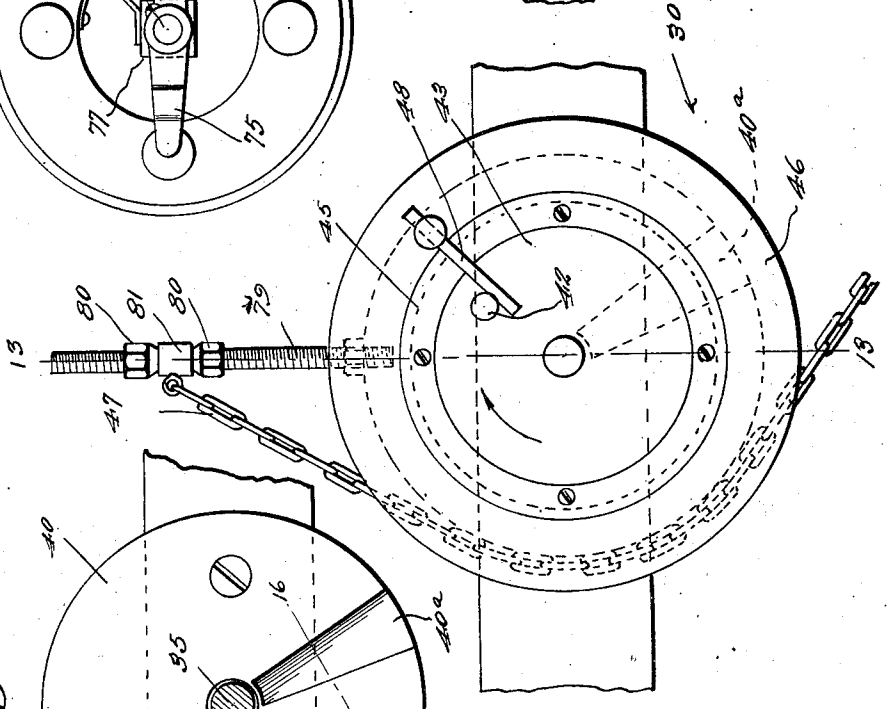


Fig. 15.

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Patented June 17, 1930

1,765,178

UNITED STATES PATENT OFFICE

ERICH HEINRICH RICK, OF KIEL, WISCONSIN

HIGHWAY-CROSSING BARRIER

Application filed June 26, 1928. Serial No. 288,339.

This invention relates to an improved barrier, such as is adapted to extend transversely across a public highway at a point where it crosses a railroad track.

Briefly, the invention has reference to a structure of this class, which embodies a suitably constructed barrier, a support on which the barrier is swingably mounted, and upon which it is normally maintained in a suspended unobstructing position.

Associated with this support and barrier, is an electric motor having operating connection with the barrier, the motor being automatically set into operation by a train controlled track switch. On the opposite side of the highway, is a means which serves to support an electrical retaining device, which holds the barrier down in traffic obstructing position, for a predetermined time.

Cooperating with this means, is an operating device for an additional switch, which serves to stop said motor when the barrier has reached a full closing position.

In addition, there is another switch along the track and which is train-controlled, which switch serves to automatically render the electrical retaining device ineffective at a predetermined time.

One feature of construction is a barrier which is constructed of tubes carrying depending chains, and an adjustable brace.

A further structural feature is the mounting and support for the barrier which has the additional function of a motor and gear housing.

Then too, train controlled track switches, which are centrally located between the rails, are of novel intermittently operable types.

A still further feature of the invention is the post on the opposite side of the highway, which constitutes a support for a barrier actuated operating device, for a second motor switch, and which also constitutes a support for one end of the barrier.

An equally important structural part of the invention is the gearing train; a chain pulley structure constituting an operating connection between the electric motor and the swingably mounted barrier, this being particularly novel in that it embodies an especially designed clutch which is automatically brought into play to permit a rapid return of the barrier to a non-obstructing position.

My principal aim is to provide a structure of this class, which is highly efficient in performance, positive and dependable in action, smooth and quiet in operation, something which is a mechanical achievement in the art as compared to known prior art devices, and a structure which will fulfill the requirements of an invention of this class in a desirable manner.

In the drawings;

Figure 1 is a top plan view showing a portion of the railway track, the barrier extending across the highway near the track, and the train controlled track switches.

Fig. 2 is an enlarged elevational view of the structure shown in Fig. 1.

Fig. 3 is a view similar to Fig. 2, showing the barrier swung up to non-obstructing position.

Fig. 4 is an enlarged vertical sectional and elevational view showing the barrier mounting, and mounting for the motor, gearing train and associated details.

Fig. 5 is a sectional and elevational view showing the gearing train on an enlarged scale.

Fig. 6 is a section on the line 6—6 of Fig. 2.

Fig. 7 is an enlarged fragmentary sectional and elevational view of the upper portion of the small post on the opposite side of the highway, seen at the left in Figs. 1, 2 and 3.

Fig. 8 is an enlarged elevational view of one of the train tripped actuating devices for the switch.

Fig. 9 is a horizontal sectional view thru the casing of the last-named post.

Fig. 10 is a vertical sectional view through the post structure, showing the parts on an enlarged scale.

Fig. 11 is a detail sectional and elevational view of one of the track switches.

Fig. 12 is an elevational view of the special chain pulley structure, located in the motor and gear housing.

Fig. 13 is a section taken approximately upon the line 13—13 of Fig. 12.

Fig. 14 is a fragmentary sectional view of said pulley, and its clutch.

Fig. 15 is an enlarged elevational view of a relatively stationary keeper plate associated with said pulley structure.

Fig. 16 is a cross section on the line 16—16 of Fig. 15.

Fig. 17 is an elevational view of a four-way contact structure, constituting a part of one of the track switches.

Fig. 18 is a wiring diagram.

Referring now to the drawings by reference numerals, it will be observed that the barrier is generally designated by the reference character 19, (see Figs. 2 and 3). This comprises telescopically connected tubes 20 and 21, carrying a plurality of longitudinally spaced depending chains 22. It also embodies a bracing and an adjusting truss of suitable construction. On one end the barrier is provided with a counter-balanced weight 23, and adjacent this weight it is pivotally mounted as at 24, in a hollow supporting casing and housing 25.

On the opposite end, the barrier is provided with a magnetic plate 26, which serves a purpose to be hereinafter described. Obviously, this barrier is intended to extend transversely across the highway 27, in close proximity to the rails 28 of the railway track.

The support and casing structure 25, as detailed in Fig. 4, constitutes a housing for a suitable electric motor 29, resting on an appropriate support. Associated with this motor, is a train of gearing which serves to operate a flanged pulley 30 on which a lowering chain 47 is wound. This chain is fastened at its lower end to the counter-balanced weight 23.

As shown in Fig. 5, the motor shaft 32 carries a small cog 33, in mesh with a gear 34, freely rotatable about the pulley shaft 35. The gear 34 is equipped with an extension cog 36 in mesh with an idler gear 37, carrying a similar cog 38, in mesh with a complemental gear 39, keyed on the shaft 35.

Disposed in spaced parallelism with respect to the inner side of the pulley 30, is a disk 40 rigidly mounted on a supporting standard 41. This disk is provided with a beveled pocket 40^a constituting a keeper for reception of a spring pressed plunger and latch 42, in the hub portion 43 of the pulley. Incidentally this plunger is slidable in a casing 44 mounted on the hub part 43. The hub 43 is provided with a peripheral groove having a stationary flange on one side and a removable retaining flange 45 on the opposite side.

This provides a circular track for rotatable reception of the relatively rotatable rim portion 46 of the pulley. This rim portion is provided with outstanding flanges, between which the chain 47 is disposed. It will be observed that the flanged rim 46 is provided with an outstanding lug carrying a clutch pin 48 cooperable with the normally protruding end of the spring pressed latch 42 as shown in Fig. 14.

Obviously, however, as the pulley, comprising parts 44 and 46 rotates, the clutch pin 42 rides about on the surface of the disk 40. At a predetermined time, however, this clutch pin 42 drops into the pocket 40^a, thus moving it out of the path of the pin 48 and then allowing the part 46 to rotate freely with respect to the hub 3. The purpose of this structure is to allow a quick movement of the barrier and weight 23 from the full line position shown in Fig. 4 to the dotted line position, shown in the same figure.

Hence, it is obvious that the barrier is moved to obstructing position across the highway, through the medium of the electric motor 29, and the gearing train, the pulley 30, and the lifting chain 47. The barrier is allowed however, to return to its normal non-obstructing position by this novel clutch structure embodied in the pulley 30.

As the barrier recedes or drops down into the position shown in Fig. 2, it cooperates with the small post 49. This post and its complemental parts are detailed in Fig. 10. Referring to this figure, it will be seen that the structure embodies a box 50, carrying an upstanding casing or hollow standard, in which an upwardly spring-pressed rod 52 is mounted. This rod is provided on its upper end with a head 53 with which the barrier is engageable. Likewise it is formed on its lower end with a head 54, which is engageable with an arm 55 of a motor switch 56.

The remaining arm 57 of the switch is cooperable with the contacts shown in this figure. A spring is connected with the arm 55 and anchored in the box 50, to normally maintain the switch in the position shown in this figure. Obviously, however, when the barrier is lowered, it strikes upon the head 53 and pushes the rod 52 down against the tension of a spring 58 which is associated therewith. This in turn, forces down on the arm 55 and opens the switch 56.

While considering this figure, I desire to direct attention to an electro-magnet structure generally designated by the reference character 59 and mounted on the upper end of the hollow standard 51. The cores of the magnet cooperate with the aforesaid magnetic plate 26 on the barrier. Incidentally, these magnets are energized at the time the barrier swings down, and they attract the plates 26 and hold the barier down in operating position.

Attention is next invited to Fig. 8, wherein it will be observed that one of the tracks switch operating devices is shown. In other words, the structure here shown is a train-actuated mechanism, for automatically operating the switch, which closes the circuit to start the electric motor.

The numeral 60 designates a depressible bar which is pivotally mounted as indicated at 61 on one of the ties. The free end portion of this bar is shaped for cooperation with the shoe 62, carried by the engine fender 63 (see Fig. 2). On the intermediate portion of this bar, we find a depending pivotally mounted leg 64 slidable through guide openings, in a substantially U-shaped bracket 65 on an adjacent tie. An elevating spring 66 is associated with this leg and bracket, as here shown. In addition, there is a novel switch structure, employed here, and generally designated by the reference character 67. This is described in detail in Fig. 11. It will be seen that the bar 60 carries a pivotally mounted socket 68 which in turn carries a toothed rack 69 meshing with teeth on a ratchet wheel 70, keyed upon a short stub shaft 71, rotatable in a casing 72. This casing is provided with an attaching flange 72′ fastened to the tie.

In addition, the lower end of the rack bar 69 passes down through a suitable guide 73, containing a retention spring 74.

Attention is next invited to Fig. 17, wherein it will be observed that the shaft 71, carries contacts 75, cooperable with complemental circumferentially spaced contacts 76. In addition, the shaft carries a block-like portion 77, with which a stop spring 78 is cooperable. This shaft 71, turns in a step by step manner, to bring the contacts 75 into contacting relation with diametrically opposite pairs of contacts 76.

Considering now Figs. 12 and 13, it will be observed that the flanged rim portion of the aforesaid pulley 30, carries an outstanding screw threaded stem 79, on which nuts 80 are threaded. Between these nuts, is an adjusting sleeve 81, with which the upper end of the aforesaid chain 47 is connected. This provides a chain adjusting device to regulate the sensitivity of operation of the chain.

In considering the operation of this invention, it is advisable to take under consideration, the wiring diagram which is shown in Fig. 18. This has, however, been included merely for the sake of illustration of the operation. In operation, it is understood that as the train approaches a highway 27, the shoe 62, which is centrally located on the fender 63, will engage and depress the bar 60. This will set into operation, the track switch 67.

Incidentally, I am employing the reference character 67 to denote the track switch in either instance, as shown in Fig. 18, so that it is operable in either direction of movement of the train. As the shoe engages this bar, it forces it down against the tension of the switch 67. Likewise, it forces the rack bar 69 down, and actuates the ratchet 70, thus turning the shaft 71, and moving the contact fingers 75, into cooperating and circuit closing position with the contacts 76.

This brings the electric motor 29 into operation, and through the medium of the gearing train, the pulley structure is operated to wind the chain 47 on the pulley and to lower the barrier 19 across the highway. As the barrier descends, the electro-magnetic retaining device 59, which has been previously rendered effective, cooperates with the plate 26, to hold the barrier down. However, as the barrier comes down in this way, it engages the rod 52, in the post structure 49 and opens the switch 56. This stops the motor. However, the magnetic retaining device including the magnets 59 and plate 26 holds the barrier down.

Assuming however that the train is traveling in a direction from right to left in Fig. 18, it is obvious that when the second track switch is reached, the circuit is opened, thereby deenergizing the magnetic retaining means. Then, the counter-balanced weight of the barrier, serves to move the barrier upwardly, at which time the automatic clutch structure, previously described, comes into play, to allow the movement between the hub and rim structure of the pulley, thereby permitting a quick return of the barrier to elevated non-obstructing position.

It is thought that by considering the description in connection with the drawings, a clear understanding of the construction, operation and advantages of the invention will be had. Therefore, a more lengthy description is regarded unnecessary.

Minor changes in shape, size, and rearrangement of parts coming within the field of invention claimed may be resorted to if desired.

Having thus described my invention, what I claim as new is:—

1. In a structure of the class described, in combination, a support, a barrier pivotally mounted on the support, a post adapted to be located opposite the support, said post embodying a box and an upstanding hollow standard, a switch located in said box, a spring pressed rod located in said standard and cooperable with said switch, said barrier being engageable with said rod.

2. In a structure of the class described, in combination, a support, a barrier pivotally mounted on the support, a post adapted to be located opposite the support, said post embodying a box and an upstanding

hollow standard, a switch located in said box, a spring pressed rod located in said standard and cooperable with said switch, said barrier being engageable with said rod, together with an electro-magnetic retaining device on the standard.

3. In a structure of the class described, a hollow casing, a movable barrier adapted for movement into and out of obstructing position across a highway, said barrier having one end portion thereof pivotally mounted within said casing, a counter-balanced weight on said one end portion of said barrier, for normally urging said barrier to a non-obstructing position, a post with which said barrier is adapted to engage, when the latter is moved to an obstructing position upon said highway, train control means for moving said barrier against the action of said counter-balance weight to an obstructing position across said highway for engagement with said post, means operable upon engagement of said barrier with said post for controlling said last mentioned means, whereby said barrier will be maintained in an obstructing position and in engagement with said post against the action of said counter-balance weight.

4. In a structure of the class described, and in combination, a casing, a post disposed oppositely to said casing, a roadway obstructing barrier having one end portion thereof pivotally mounted within said casing, said barrier adapted to be moved into and out of an obstructing position across the highway, the other end of said barrier adapted to engage with said post when said barrier is moved to an obstructing position across the highway, an electric motor arranged within said housing, operating mechanism operatively connecting said motor with said barrier for moving said barrier to an obstructing position against the action of said counter-balancing weight, said mechanism including a clutch mechanism, an electrical circuit embodying said motor, a train controlled switch in said circuit for closing said circuit, whereby said motor is actuated for moving said barrier to an obstructing position across the highway, and whereby said barrier may engage with said post, a second switch arranged in said circuit, and means for closing said second switch when said barrier is moved into engagement with said post for opening the circuit to said motor, and means for retaining said barrier in an obstructing position against the action of said counter-balancing weight, when said motor has been stopped.

5. In a structure of the class described, and in combination, a casing, a post disposed oppositely to said casing, a roadway obstructing barrier having one end portion thereof pivotally mounted within said casing, said barrier adapted to be moved into and out of an obstructing position across the highway, the other end of said barrier adapted to engage with said post when said barrier is moved to an obstructing position across the highway, an electric motor arranged within said housing, operating mechanism operatively connecting said motor with said barrier for moving said barrier to an obstructing position against the action of said counter-balancing weight, said mechanism including a clutch mechanism, an electrical circuit embodying said motor, a train controlled switch in said circuit for closing said circuit, whereby said motor is actuated for moving said barrier to an obstructing position across the highway, and whereby said barrier may engage with said post, a second switch arranged in said circuit, and means for closing said second switch when said barrier is moved into engagement with said post for opening the circuit to said motor, and means for retaining said barrier in an obstructing position against the action of said counter-balancing weight, when said motor has been stopped, and train controlled means for releasing said retaining means whereby said barrier may be moved to a non-obstructing position under the action of said counter-balancing weight.

In testimony whereof I affix my signature.

ERICH HEINRICH RICK.