May 29, 1928. 1,671,875

C. F. SEITZ

AUTOMATIC CROSSING BARRIER

Filed Dec. 27, 1926 2 Sheets-Sheet 1

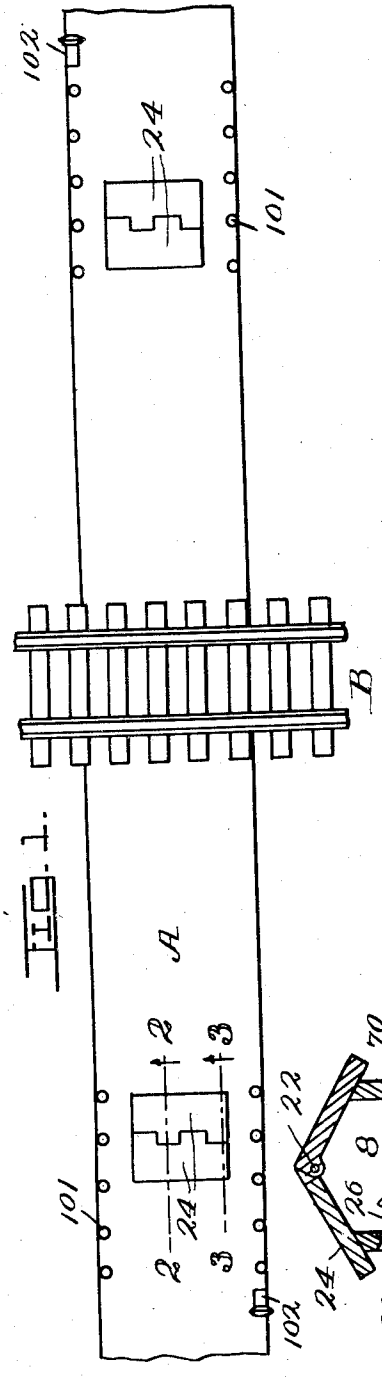


FIG. 1.

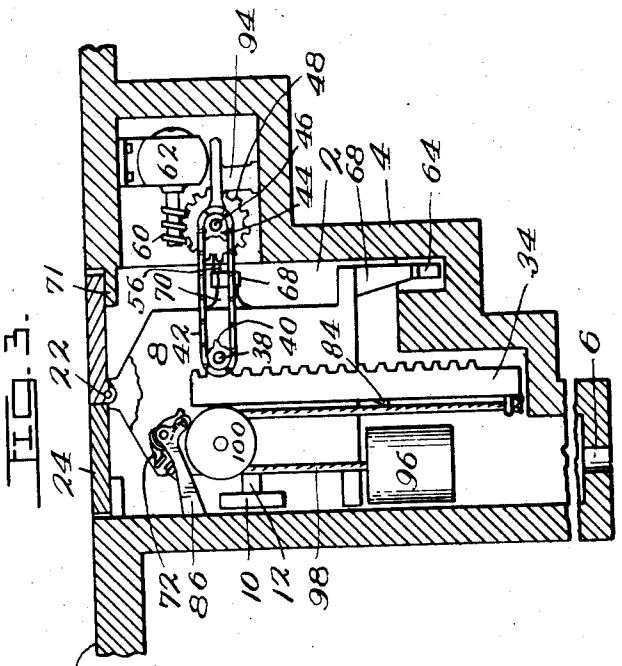


FIG. 3.

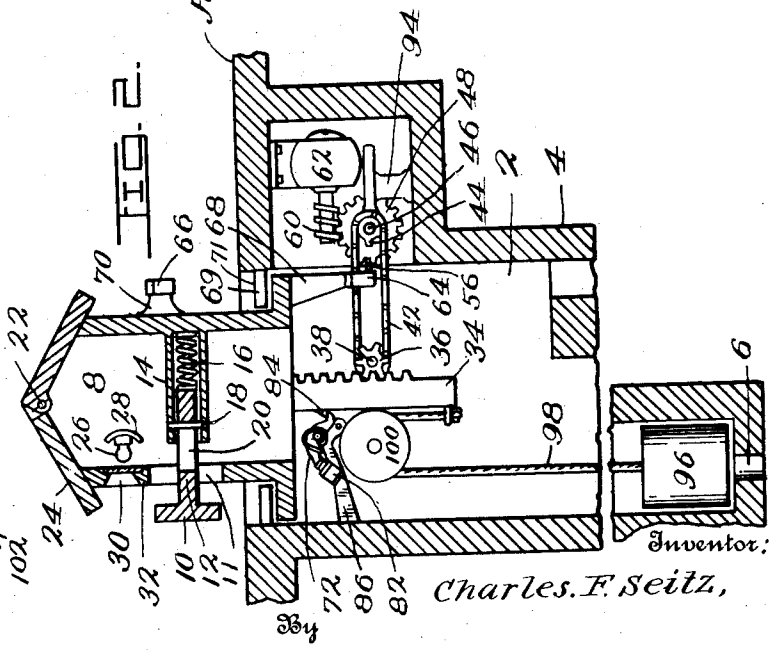


FIG. 2.

Witness:
Fred C. Fischer.

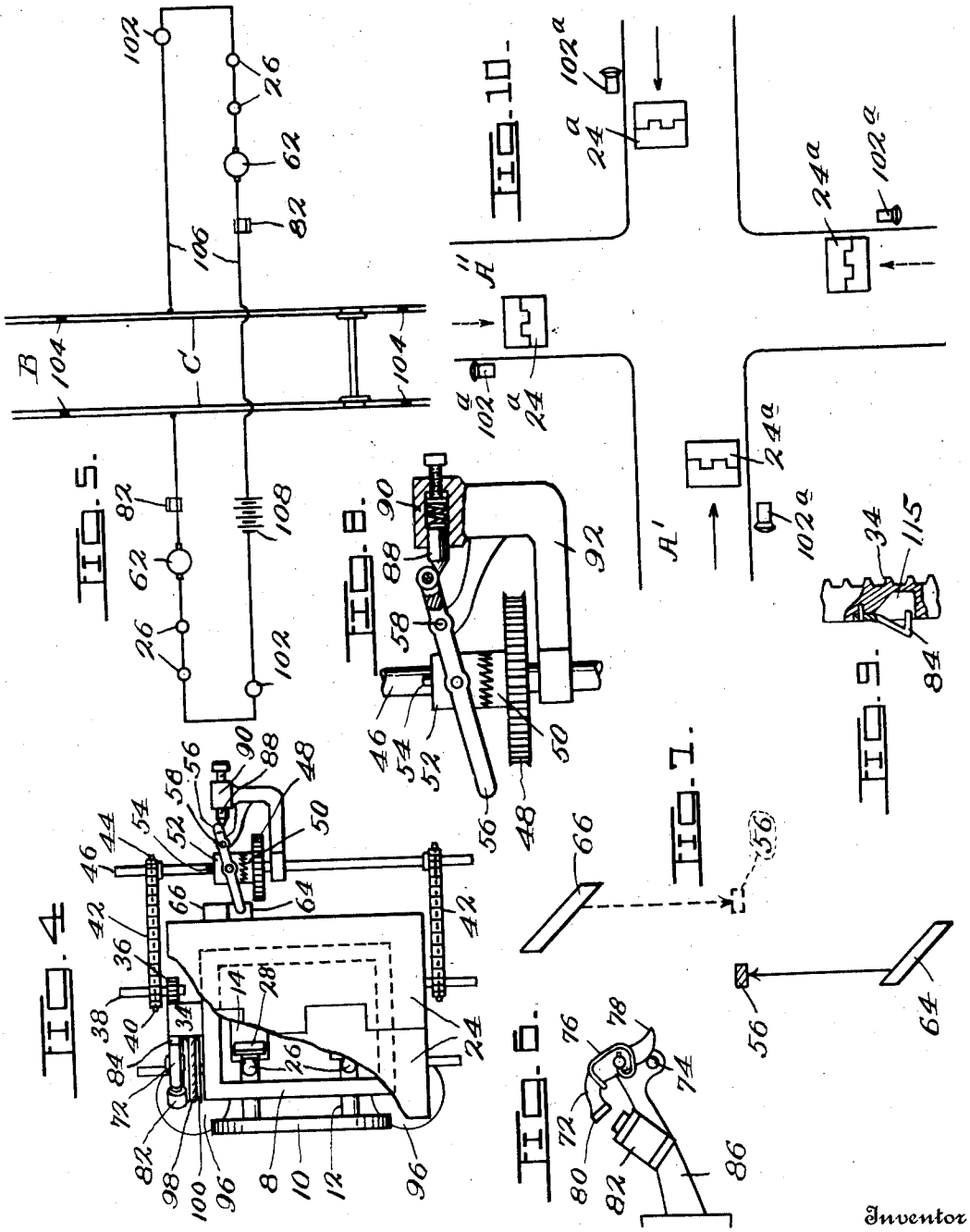
Inventor:
Charles F. Seitz,
By
F. G. Fischer,
Attorney.

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AUTOMATIC CROSSING BARRIER

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Inventor

Charles F. Seitz,

By

F. G. Fischer,

Attorney.

Witness:

Fred G. Fischer.

Patented May 29, 1928. 1,671,875

UNITED STATES PATENT OFFICE.

CHARLES F. SEITZ, OF KANSAS CITY, MISSOURI, ASSIGNOR OF ONE-THIRD TO FRANK NICHOLS AND ONE-THIRD TO FLOYD A. ADKINS, BOTH OF KANSAS CITY, MISSOURI.

AUTOMATIC CROSSING BARRIER.

Application filed December 27, 1926. Serial No. 157,196.

My invention relates to highway barriers which may be used to advantage at railroad grade crossings, and one object is to provide an apparatus of this character embodying vertically movable members adapted to obstruct the grade crossing and prevent vehicles from reaching the railroad track when a railway vehicle or a train is approaching.

A further object is the provision of a barrier which is automatically raised to obstruct the road on the approach of a train and which automatically moves to inactive position to clear the road after the passage of the train.

A further object is to provide a barrier which can be used at street intersections to advantage for controlling traffic, and in order that the invention may be fully understood reference will now be had to the accompanying drawings, in which:

Fig. 1 is a plan view of the apparatus located at a grade crossing.

Fig. 2 is an enlarged broken sectional view on line 2—2 of Fig. 1, showing one of the barriers in raised position for obstructing the highway.

Fig. 3 is an enlarged broken sectional view on line 3—3 of Fig. 1, showing the barrier in lowered position to clear the highway.

Fig. 4 is a broken detail plan view partly in section of one of the barriers and its actuating mechanism removed from the associate pit.

Fig. 5 is a diagram of an electric circuit employed in carrying out the invention.

Fig. 6 is a detail of a portion of one of the latch means for holding the associate barrier in raised position.

Fig. 7 is a diagram of means for throwing the motor out of gear with the associate barrier as the latter reaches the end of its upward movement and for throwing the motor in gear with said barrier as it reaches the end of its downward movement.

Fig. 8 is a plan view showing a spring-pressed pin for holding a lever in either of its shifted positions.

Fig. 9 is a fragmentary section of a rack and a shoulder employed in carrying out the invention.

Fig. 10 is a plan view showing the invention applied to a street intersection.

Referring in detail to the different parts, A designates the highway which crosses the railroad track B. At a suitable distance from each side of the track B a pit 2 is formed in the highway and each pit is lined with concrete or other masonry 4 formed with a drainage opening 6 in its lower portion to prevent the accumulation of water.

8 designates a vertically movable barrier, one of which is arranged within each pit 2 and adapted to be elevated to the position disclosed by Fig. 2, for the purpose of obstructing the highway A. As the construction of each barrier 8 and its actuating mechanism are alike a detailed description of one will suffice. The barrier 8 is of sufficiently substantial construction to withstand the impact of an automobile in the event that the driver fails to stop when the barrier is in raised position. However, to relieve the impact caused by a colliding motor vehicle I provide the barrier 8 with a forwardly projecting bumper 10 having arms 12 reciprocably mounted within tubular supporting members 14 fixed within said barrier. The bumper 10 is of such width and upon such level as to receive the impact from the spring bumpers with which motor vehicles are usually equipped and said bumper 10 is free to move backwardly until it enters an opening 11 in the front wall of the barrier.

The bumper 10 is yieldably held in outward position by coil springs 16 which are interposed between the rear ends of the arms 12 and the inner surface of the rear wall of the barrier 8, Fig. 2. The springs 16 are prevented from pushing the bumper arms 12 out of the supporting members 14 by pins 18, extending transversely through said supporting members and slots 20 formed in the arms 12 to permit the latter to move in and out with the bumper 10.

The two opposite sides of the barrier 8 slope downwardly from upper central points and are provided with a pintle 22 upon which a pair of plates 24 forming the top of said barrier are mounted, so that said plates can assume the inclined position shown by Fig. 2 when the barrier 8 is raised, or, as shown by Fig. 3, occupy a position level with the surface of the highway for the passage of vehicles when the barrier is in lowered position.

The barrier 8 is provided at its upper inner portion with one or more signal lamps 26 equipped with reflectors 28 which project the light outwardly upon the highway through openings 30 in the upper portion of

the front wall 32 of said barrier 8. The lamps 26 are in an electrical circuit hereinafter described.

Referring now more particularly to the mechanism for elevating the barrier 8, 34 designates a pair of vertically-disposed racks fixed to the opposite side walls of said barrier 8 and intermeshing with a pair of cog wheels 36, each of which is fixed upon a stub shaft 38 carrying a fixedly mounted sprocket wheel 40 operably connected by an endless sprocket chain 42 to a sprocket wheel 44.

The sprocket wheels 44 are fixedly mounted upon a shaft 46 equipped with a loosely mounted worm wheel 48 having a clutch member 50 for engagement with a companion clutch member 52, which is slidably mounted upon the shaft 46 and caused to rotate therewith through the intermediary of a groove-and-feather connection 54. The clutch member 52 is shifted in and out of engagement with the clutch member 50 by a lever 56, Figs. 4 and 8, which is fulcrumed at 58. The worm wheel 48 intermeshes with a worm 60 fixedly mounted upon the shaft of an electric motor 62 arranged in the upper portion of the associate pit 2. The lever 56 is actuated by lower and upper inclined shifting members 64 and 66 carried by an arm 68 and a bracket 70, respectively, secured to the barrier 8. The shifting member 64 causes the lever 56 to shift the clutch member 52 out of engagement with the clutch member 50 as the barrier 8 reaches the end of its upward movement, so that the worm gearing 48 and 60 and the electric motor 62 will not prevent the barrier 8 from descending when released by the latch mechanism 72. The shifting member 66 causes the lever 56 to shift the clutch member 52 into engagement with the clutch member 50 as the barrier 8 reaches the end of its downward movement, so that the worm gearing 48 and 60 will be in position to raise the barrier 8 when the motor 62 is energized. An opening 69 is left in the ledge 71 at the top of the pit 2 for the passage of the shifting member 66 and the bracket 70, as the barrier 8 moves up and down.

The latch members 72 which support the barrier 8 in raised position after the clutch member 52 has been thrown out of engagement with the clutch member 50, are normally held in retracted position against stops 74 by springs 76, Fig. 6, and each has a lip 78 at one end and an armature 80 at its opposite end. The armatures 80 are adapted to be attracted by electromagnets 82 which are in an electric circuit hereinafter referred to. The lips 78 are adapted to engage under shoulders 84 on the racks 34 and thus support the barrier 8 in raised position until the electromagnets 82 are deenergized. The latch members 72 and the electromagnets 82 are supported out of the path of the barrier 8 by arms 86 projecting from an adjacent wall of the pit 2.

88 designates a spring-pressed pin for coacting with the shifting members 64 and 66 in shifting the lever 56 after the latter has swung through a little more than half of its movement. Said pin 88 also yieldably holds the lever 56 in either of its shifted positions. The pin 88 is reciprocably mounted in a support 90 carried by an arm 92 projecting from a stand 94.

96 designates a pair of counter-weights which coact with the motor 62 in elevating the barrier 8. The combined specific gravity of the two counter-weights 82 is less than that of the barrier 8, so that the latter will automatically descend to its lowermost position when the latches 72 are disengaged from the shoulders 84. The counter-weights 96 are connected to the lower portions of the racks 34 by cables 98 running over sheaves 100 which bear against said racks 34 to coact with the cog wheels 36 in guiding said racks and the barrier 8 up and down.

As disclosed by the diagram Fig. 5, a block consisting of two rail sections C of suitable length is separated from the remainder of the track B by insulating material 104, which is placed at sufficient distances from opposite sides of the highway A, to permit the barriers 8 to be fully elevated a suitable period of time before a train reaches the crossing. An electric circuit 106 has one terminal connected to one rail section C and its opposite terminal connected to the other rail section C so that the circuit will be open until the entrance of a train within said block. The circuit 106 is energized from a suitable source such as a battery 108 and in addition to being connected to the motors 62 and the signal lamps 26, connects with signal lamps 102 placed at opposite sides of the roadway in advance of the barrier plates 24 as shown by Fig. 1.

A line of posts 101 is placed between each side of the highway and the barriers 8 to prevent a vehicle from running around the ends of said barriers 8 and reaching the track B when the barriers are in raised position.

Briefly stated the operation is as follows: As a train or railway vehicle enters the block the electric circuit is closed and the lights 26 and 102 are illuminated. The motors 62 are energized and through the intermediary of the intervening gearing elevate the respective barriers 8 to active position, said motors 62 being aided in the operation by the counterweights 96. Should a vehicle traveling upon the highway be crossing the plates 24 of either of the barriers 8 as they start upwardly from the pits 2, said vehicle can safely cross over the plates 24 which provide inclined crossings until the barriers

8 have lifted said plates 24 from the surface of the highway.

As the barriers 8 reach the end of their upward movement the inclined shifting members 64 contact with the respective levers 56 and cause the same to open the clutch members 52, so that when the barriers 8 start to descend the worm gearing 48—60 and the motors 62 will remain idle. As the barriers 8 reach the end of their upward movement and the clutch members 52 are disengaged from the clutch members 50, said barriers are supported by the latches 72 until the train or railway vehicle leaves the block and thereby deenergizes the electromagnets 82 by opening the circuit 106. The barriers 8 then descend to their lowermost position and as they reach said position the inclined shifting members 66 shift the levers 56 from the dotted line position to the full line position Fig. 7, thereby causing said levers to engage the clutch members 52 with the clutch members 50 so that when another train or railway vehicle enters the block said motors 62 will be geared to the barriers 8 to again lift the same. The inclined members 64 and 66 are aided in shifting the levers 56 by the spring-pressed pins 88 which impart the final movement to said levers 56 and yieldably hold the latter in either of their shifted positions.

When the circuit 106 is energized by a train entering the block the electromagnets 82 are energized and cause the latches 72 to bear against the racks 34 as they move upwardly with the barriers 8, so in order that the shoulders 84 may pass the latches 72 said shoulders 84 are made of spring metal so that they may be forced by the latches into recesses 115, Fig. 9, in the racks.

In the diagram shown by Fig. 10, four barriers are employed and spaced suitable distances from the intersection of the streets A′ and A″. The barriers and their plates 24^a are placed adjacent to the curbing to permit the passage of fire apparatus, ambulances and other vehicles responding to an emergency call. An electric lamp 102^a is placed in advance of each barrier to give notice that the latter is about to be elevated. The barriers may be raised and lowered with the same mechanism hereinbefore described, excepting that the electric circuits will be opened and closed at suitable intervals by any well-known make-and-break contact.

While I have shown a preferred form of the invention I reserve all rights to such changes in the construction, combination and arrangement of parts as properly fall within the spirit and scope of the invention as claimed.

Having thus described my invention, what I claim and desire to secure by Letters Patent, is:

1. In an appliance of the character described, a vertically movable barrier adapted to obstruct a highway and consisting of a rectangular body operably arranged in a pit beneath the highway, two opposite sides of said body having upper edges sloping downwardly from a central point, and a pair of plates operably connected to the upper portions of said sides to assume a sloping position with said edges as the barrier moves upwardly to obstruct the highway or assume a level position with the highway when the barrier is in lowered position to clear the highway.

2. In an apparatus of the character described, a vertically movable barrier having an opening in its front wall, a bumper adapted to move in and out of said opening, arms projecting rearwardly from said bumper, tubular supporting means within the barrier and in which said arms are movably mounted, and springs arranged within said supporting means and pressing against the rear ends of the arms.

3. In an apparatus of the character described, a vertically movable barrier, a motor geared to said barrier to raise the same, clutch means for connecting and disconnecting said gearing, a lever for actuating said clutch means, shifting means for causing said lever to open the clutch means as the barrier reaches the end of its upward movement, and shifting means for closing said clutch means as the barrier reaches the end of its downward movement.

4. In an apparatus of the character described, a vertically movable barrier, a motor geared to said barrier to raise the same, clutch mechanism for engaging and disengaging said gearing, a lever for actuating said clutch mechanism, an inclined shifting member movable with the barrier and adapted to cause said lever to open the clutch means as the barrier reaches the end of its upward movement, and an inclined shifting member movable with the barrier and adapted to cause said lever to close the clutch mechanism as the barrier reaches the end of its downward movement.

5. In an apparatus of the character described, a vertically movable barrier, a motor geared to said barrier to raise the same, clutch means for connecting and disconnecting said gearing, a lever for actuating said clutch means, shifting means for causing said lever to open the clutch means as the barrier reaches the end of its upward movement, shifting means for closing said clutch means as the barrier reaches the end of its downward movement, and spring-pressed means coacting with said shifting means in actuating the lever and adapted to yieldably hold the latter in its shifted positions.

In testimony whereof I affix my signature.

CHARLES F. SEITZ.