C. ENACHE.

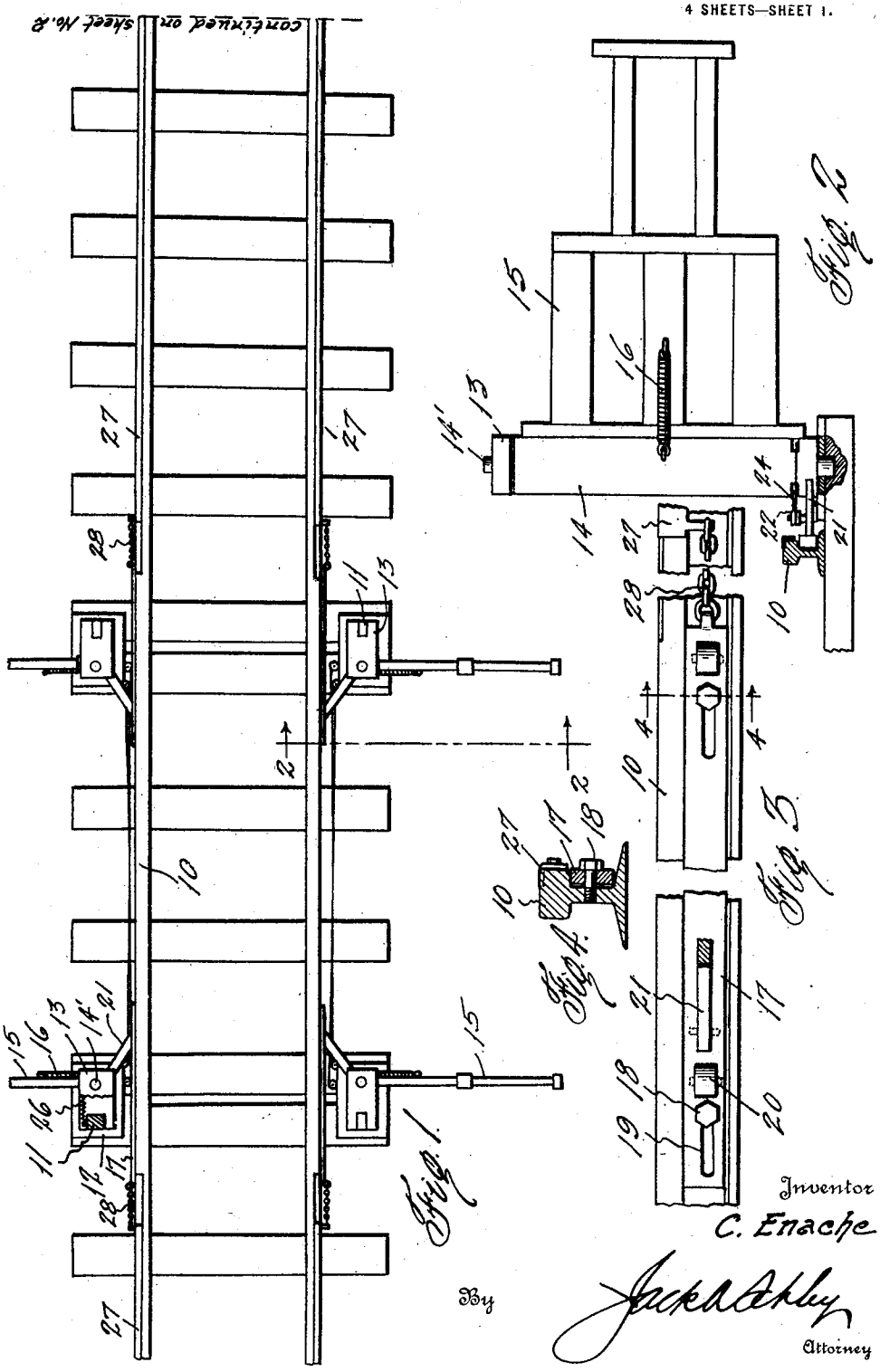
AUTOMATIC SAFETY GATE FOR RAILWAY CROSSINGS.

APPLICATION FILED NOV. 26, 1920.

1,394,813.

Patented Oct. 25, 1921.

4 SHEETS—SHEET 1.



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4 SHEETS—SHEET 2.

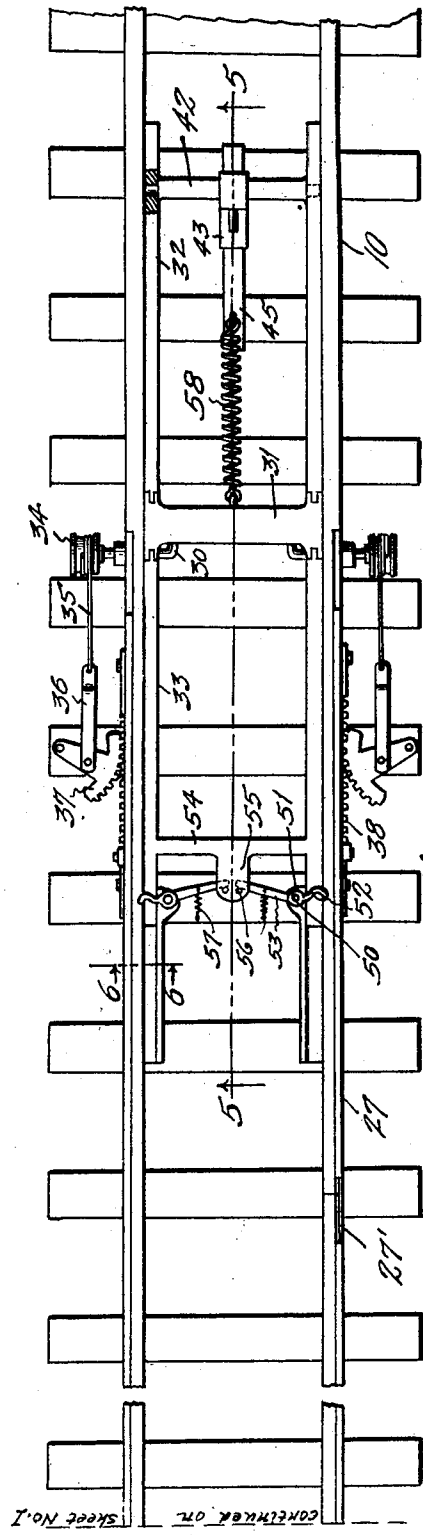


Fig. 1.

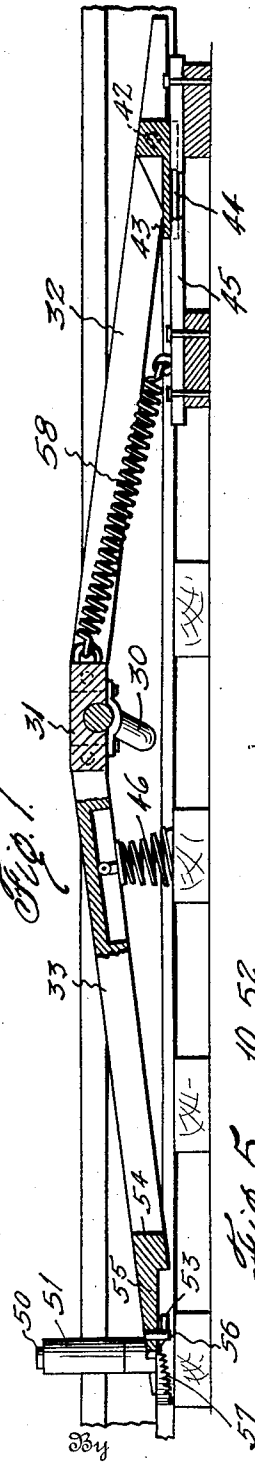


Fig. 5.

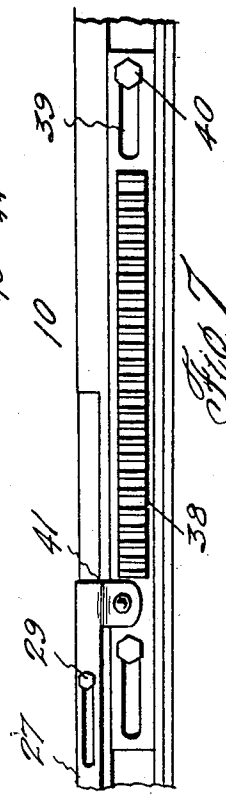


Fig. 7

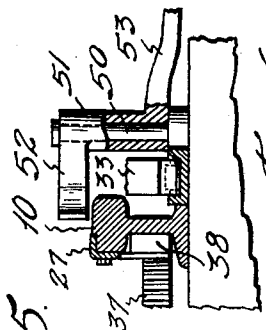


Fig. 6

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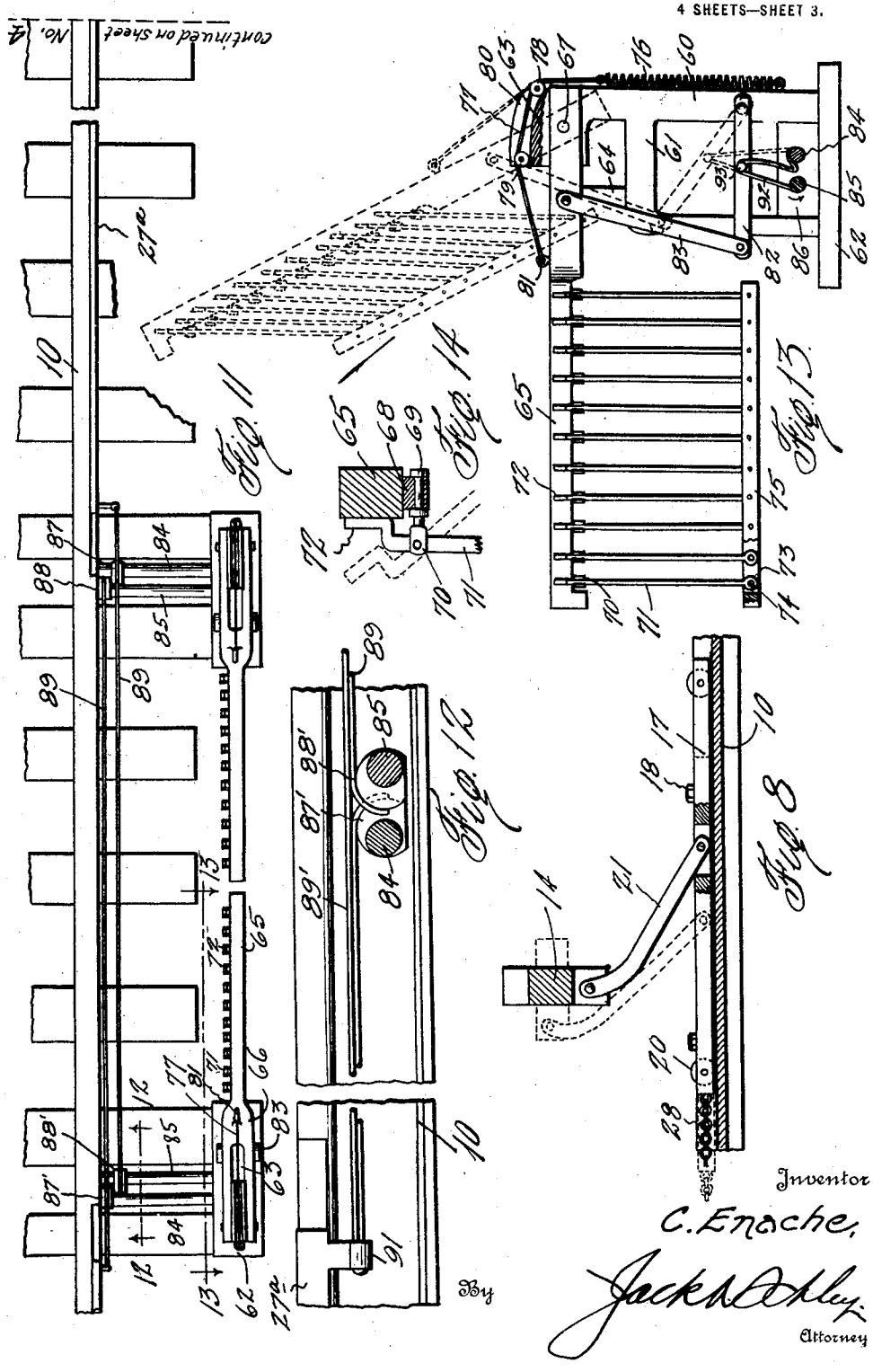
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4 SHEETS—SHEET 3.



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4 SHEETS—SHEET 4.

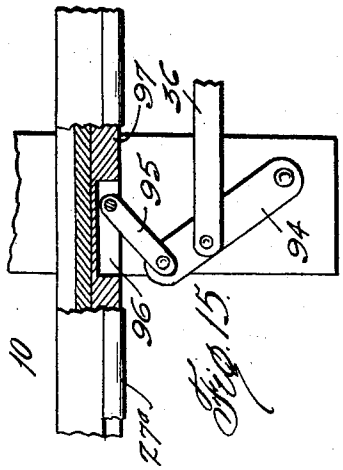


Fig. 15.

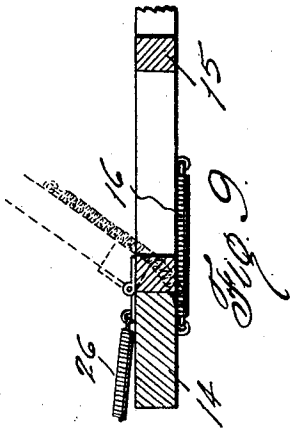


Fig. 9.

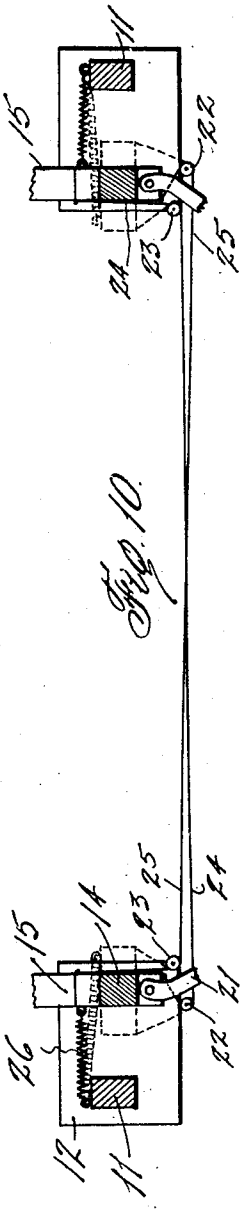


Fig. 10.

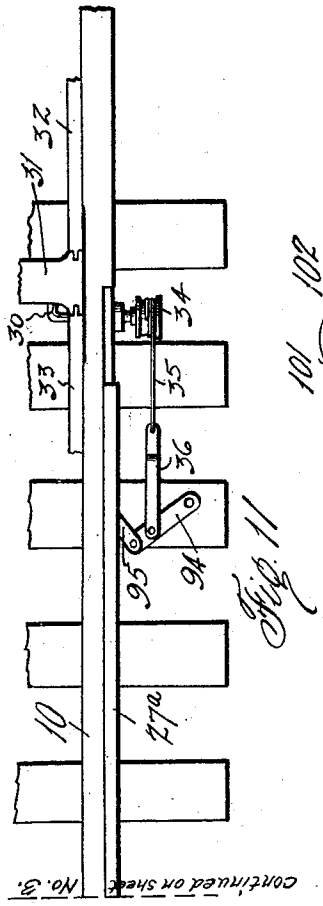


Fig. 11

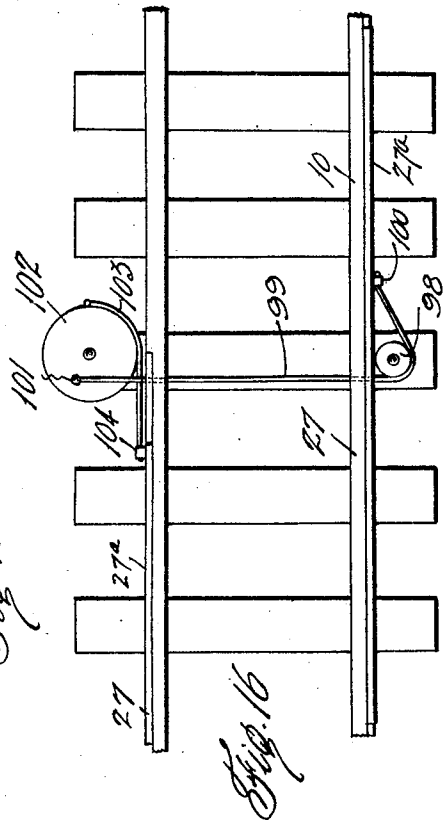


Fig. 16

Continued on Sheet No. 3.

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UNITED STATES PATENT OFFICE.

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AUTOMATIC SAFETY-GATE FOR RAILWAY-CROSSINGS.

1,394,813. Specification of Letters Patent. Patented Oct. 25, 1921.

Application filed November 26, 1920. Serial No. 426,346.

To all whom it may concern:

Be it known that I, COCIU ENACHE, a citizen of the United States, residing at Dallas, in the county of Dallas and State of Texas, have invented certain new and useful Improvements in Automatic Safety-Gates for Railway-Crossings, of which the following is a specification.

This invention relates to new and useful improvements in automatic safety gates for railway crossings.

The invention has particularly to do with that class of swinging gates which are operated by mechanisms which are actuated by the train.

The object of the invention is to provide gates which when swung across the path of traffic will permit the passage of a vehicle from the track, so that if the gates should be closed while a vehicle was crossing the track, said vehicle could continue and pass through the gates. Another object of the invention is to provide means operated by the train for holding the gates in a closed position until after the last car has passed the crossing.

Another feature resides in a safety release latch for preventing disarrangement of the operating mechanism by a train which has passed the crossing. A still further object is to provide a mechanism of the character described which will be durable, efficient, comparatively simple and not likely to get out of working order, as well as to provide a novel form of operating mechanism.

An apparatus designed to carry out the invention will be hereinafter described together with other features of the invention.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawings, in which an example of the invention is shown, and wherein:

Figure 1 which is shown on two sheets of the drawings, is a plan view of an apparatus constructed in accordance with my invention, the gates being open and the mechanism in position to be operated by the approaching train,

Fig. 2 is a transverse vertical sectional view on the line 2—2 of Fig. 1,

Fig. 3 is a side elevation of the gate swinging slide at one side of the track,

Fig. 4 is a cross sectional detail on the line 4—4 of the Fig. 3,

Fig. 5 is a longitudinal sectional view on the line 5—5 of Fig. 1,

Fig. 6 is a cross section on the line 6—6 of Fig. 1,

Fig. 7 is an elevation of one of the rack bars,

Fig. 8 is a sectional detail of the gate swinging means,

Fig. 9 is a sectional detail of the swinging safety panel of the gate,

Fig. 10 is a plan view of the auxiliary gate swinging means,

Fig. 11 is a plan view of a modified form of the invention, the same being shown on Sheets 3 and 4,

Fig. 12 is a cross sectional view on the line 12—12 of Fig. 11,

Fig. 13 is a vertical sectional view taken on the line 13—13 of Fig. 11,

Fig. 14 is a detail of the safety panel hinge,

Fig. 15 is a plan view of the operating toggle lever mechanism, and

Fig. 16 is a plan view of a transmitting mechanism, whereby the operating means on one side of the track may be dispensed with.

In the drawings the numeral 10 designates a pair of track rails approaching and passing over a railway crossing. At each side of the rails are a pair of gate posts 11, the posts of each pair being spaced apart and set on opposite sides of the crossing. As the mechanism on one side of the track is duplicated on the other side, a description of one side will explain both sides.

Each post has a projecting base plate 12 and a top plate 13. Each gate includes a pivot post 14 having trunnions 14′ at its upper and lower ends engaging in the plates 12 and 13 and a laterally extending safety panel 15 as is best shown in Figs. 2, 9 and 10. Each panel is hinged to its pivot post 14 in such a way that when the panel is parallel with the track and the gates closed, said panel may be swung outwardly away from the track, but cannot be swung toward the track. This is a very important feature,

because if a vehicle should be crossing the track toward the gates when they are closed, the panels would yield backward and permit the vehicle to escape. So the inner end of each panel on one end of a coiled spring 16 is attached on the side next to the track and the other end is attached to the pivot post. The tension of this spring 16 is sufficient to hold the panel in line with its pivot when the gate is swung.

For swinging the gates I employ a slide plate 17 for each gate, held against the web of the rail by headed studs 18 extending through slots 19 as is best shown in Figs. 3 and 8. Each plate has rollers 20 near its slots, which rollers ride on the web of the rail, said plate being held against upward and downward displacement by the head and flange of the rail 10. Each plate 17 has one end of a pitman 21 pivoted thereto; the opposite end of the pitman being curved and pivoted to the pivot post 14, see Figs. 2 and 8. Normally the gates stand at substantially right angles to the track and each pitman is at an acute angle to its plate. By exerting a pull on the plate, whereby it is slid and the pitman moved toward the gate, the pivot post and its panel will be swung to its closed position which is parallel to the track.

However, as only one slide plate is moved at a time, means must be provided for swinging the other gate of the pair. For carrying out this operation I provide on each base plate 12 pulleys 22 and 23 respectively and cables 24 and 25 respectively. The cable 24 has one end fastened to one of the gates and passes over the pulley 22 adjacent thereto. This cable 24 then passes over the pulley 23 on the base plate of the opposite gate and has its end attached to said opposite gate beyond the pivot post of the same. The cable 25 passes over the other two pulleys 22 and 23 and has its ends attached to the gates in opposite relation to the cable 24. By this arrangement when one of the gates is swung by its pitman, its pivot post will exert a pull on the cable attached thereto and the opposite end of the said cable being attached to the other gate beyond its pivot post, will swing said other gate; thus both gates will be closed. When one cable is pulled to close a gate the other is slacked. From each gate post 11 a coiled spring 26 extends and has its forward end attached to the gate. When a gate is closed its spring 26 is extended and thus when a gate is released its spring 26 contracts and assists in swinging it to its open position.

It will be seen that when a gate is swung by one of the cables, its correlated slide plate 17 will be slid through the agency of the pitman 21 attached thereto. For operating the plates 17 I provide elongated detents 27, angular in cross section and lying along one edge of the head of each of the rails. Each detent has its forward end connected with a slide plate 17 by means of a chain 28 and thus a gate may slide a plate without disturbing its detent. In order to make the apparatus automatic the detents must be slid by the train. Guide pins 29 having slotted engagement with detents hold the latter on the rails. At the joints between the rails, the detents being made in sections, the detent sections are connected by flexible elements 27′, which may be a cable or the like. The purpose of this flexible element is to allow for the expansion of the detent sections.

A train operating device must be provided on each side of the crossing and each device must be located at such a distance from the crossing as to close the gates before a fast moving train reaches said crossing. A description of one of these devices will explain both. A crank shaft 30 is mounted transversely of the track and is pivoted in the webs of the rails 10. A bridge 31 is pivoted on the shaft and has pivoted to its ends, inclined track bars 32 and 33 respectively, the former extending from one side of the bridge and the latter extending from the other side of the bridge. The track bars are disposed in juxtaposition to the inner sides of the rails 10, so as to be engaged by the flanges of the wheels of the train.

On the outer ends of the crank shaft 30 drums 34 are fastened. Around each drum a cable 35 is wound and has its forward end connected to a link 36 which has its forward end pivoted to a gear segment 37 pivoted on the cross tie. Each gear segment engages a rack bar 38 which has slots 39 receiving headed studs 40, whereby it is slidably confined against the web of the adjacent rail. Each bar 38 has its forward portion connected with one of the detents 27 by means of a depending ear 41, as is best shown in Fig. 7. When a train approaches the crossing the flanges of its wheels (not shown) will ride upon the track bars 32 and depress the same, whereby the bridge 31 will be depressed and the crank shaft 30 rocked. The operation of the shaft revolves the drums 34 and winds the cables 35 thereon. The cables pull the links 36 whereby the segments are swung and the rock bars 38 slide rearwardly; thus sliding the detents 27 and the slide plates 17 which are connected therewith. The sliding of the plates closes the gates as has been described.

The train wheels ride over the bridge 31 and the track bars 33, and then pass over the detents 27. As long as the wheels are rolling on the detents the gates remain closed. The detents terminate adjacent the gates so that all but the extreme rear end of the train will have passed the crossing before the detents are freed and the gates opened. The treads of the wheels traveling

on the detents will hold the same against movement until released. The lower ends of the bars 32 are pivoted to the ends of a cross head 42. The cross head carries a shoe 43 which has depending side flanges 44, which embrace the sides of a guide bar 45 fastened to the ties of the track. When the bars 32 are depressed the shoe slides on the guide bar. When the wheels pass from the bars 33 springs 46 under said bars which have been compressed, expand and raise said bars and the bridge.

It will be seen that a train approaching the operating apparatus after having crossed the crossing, would through its wheel flanges engage the bars 33 and injure the apparatus. To avoid this safety latches are provided. Near the bars 33 upright posts 50 are provided (Fig. 6). On each post a sleeve 51 is rotatably confined. From the upper end of each sleeve an arm 52 overhangs the bar 33. Each arm has its free end curved to receive the flanges of the train wheels. From the lower end of each sleeve an integral finger 53 projects toward the center of the track. The bars 33 are connected by a bridle 54 which carries a central tongue 55 having its underside recessed (Fig. 5) to receive the ends of the fingers and provided with depending pins 56 engaged by the fingers. The fingers are held in contact with the pins by coiled springs 57.

It will be seen that the flanges of the wheels approaching the bars 33 will swing the arms 52, whereby the fingers will be swung in the opposite direction so as to exert a pull on the pins 56 and pull the bridle forward. This will rock the crank shaft 30 forwardly and depress the bars 33 as well as the bridge 31 and bars 32. The forward swing of the shaft will merely unwind the cables 35 from the drums and not affect the segments 37 at all. The shaft 30 is rocked forwardly against the tension of a spring 58 which has its forward end attached to the bridge 31 and its rear end to the bar 45, and thus when the flanges of the wheels free the bars 32, the spring 58 returns the parts to their normal position. The wheels of a train in operating the device to close the gates will swing the arms 52 forwardly, whereby the fingers 53 will be swung rearwardly without operating the bridle 54 and will be returned by the springs 57.

In Figs. 11 to 15, I have shown another form of the invention which while operating in the same manner involves an entirely different construction. A pair of vertically swinging gates are arranged on each side of the track, but only the construction on one side has been illustrated. A description of one gate will explain both. I provide a gate post 60 having a shoulder 61, a base plate 62, an upstanding bracket 63 and a rest 64. A gate arm 65 has a fork 66 at its inner end in which the bracket 63 is received, the fork being pivoted on a transverse pin 67 passing the bracket. On its underside the arm has depending transverse hangers 68 spaced apart. In each hanger a pin 69 is rotatably confined and carries a yoke 70 at its forward end.

In each yoke a vertical rod 71 is pivoted. The upper end of each rod is off-set toward the gate arm to form a stop 72. The rods hang from the gate arm and have eyes 73 (Fig. 13) at their lower ends received in a slotted rail 75. The eyes receive transverse pins 74, whereby the rods and rail are hinged together. The rods and rail form a swinging panel. When the gate arm is raised the rods swing downward by rotating the pins 69 and assume the position shown in dotted lines in Fig. 13, the rail having its inner end against the rest 64. The rods have their stops 72 engaging the side of the arm 65 next to the track and when the gate is lowered the rods cannot be swung toward the track; however the rods may be swung outwardly from the track thus permitting a vehicle caught on the track when the gate is lowered, to pass through the gate panel and escape.

For assisting in raising the gate a coiled spring 76 is employed. The spring has its lower end fastened to the gate post 60 and its upper end attached to a cable 77 which passes over pulleys 78 and 79 mounted in a keeper groove 80 in the top of the bracket 63. The outer end of the cable is attached to an eye 81 on top of the arm 65 at its intersection with the fork 66. When the gate is lowered the cable is pulled over the pulleys, thus extending the spring, which exerts an upward pull on the cable and tends to raise the gate when it is released as hereinafter explained.

For swinging the gate a lever 82 has its inner end pivoted to the post 60 and extends horizontally across the bracket 61. The lower ends of links 83 are pivoted to the outer end of the lever and are normally inclined toward the post with their upper ends pivoted to the fork 66. Parallel shafts 84 and 85 extend through a web 86 in the bottom of the bracket and have their inner ends supported in the web of the adjacent rail 10. On the shaft 84 at one of the gates an eccentric 87 is mounted, while an eccentric 87′ is mounted on the shaft 84 of the other gate; also on the shaft 85 an eccentric 88 is secured, while an eccentric 88′ is mounted on the other shaft 85.

In this form of the invention detents 27ª like the detents 27 are employed. From the end of one of the detents a cable 89 extends from a lug 91 and a cable 89′ extends from the lug 91 of the other detent (Fig. 12). Each cable is doubled at the lug. The cable 89 has one end fastened to the eccentric 87

and the other extended and secured to the eccentric 88′ of the other gate; while the cable 89′ has one end fastened to the eccentric 87′ and the other end secured to the eccentric 88. The eccentrics 87 and 88′ are arranged to swing in the same direction and the eccentrics 87′ and 88 are likewise arranged. From each shaft a short flexible connection or cable 92 extends up to the center portion of the lever 82 and are attached to a stud 93.

When a shaft is rotated the cable 92 attached thereto is wound thereon, thus pulling the lever 82 downward and swinging the gate down or closing the same. The shafts are rotated by the eccentrics. For instance if the detent 27ª attached to the cable 89 is pulled said cable will be pulled and unwound from the eccentrics 87 and 88′, whereby the shaft 84 at the near gate and the shaft 85 at the far gate are rotated and both gates swung downward. If the other detent is pulled the cable 89′ and the parts connected therewith are operated to swing the gates.

For operating the detents I employ the same means as has been described or instead of using the gear and rack bar means, the following mechanism may be employed. The link 36 may be connected to a lever 94 disposed at an acute angle to the rail 10 and having its outer or forward end pivoted on one of the ties of the track. A pitman 95 has its outer or rear end pivoted to the inner or rear end of the lever and its inner or forward end pivoted in a recess 96 formed in the side of a slide bar 97 suitably mounted on the rail 10 and connected with the detent 27ª. When the cable 35 is wound on the drum 34, the link 36 will swing the lever 94 forwardly, which will push the pitman 95 whereby the slide bar 97 will be slid to exert a pull on the detent and close the gates as has been previously described.

It is obvious that the train actuated means may assume either of the forms described and either form may be applied to either gate operating mechanism. Instead of employing the rack bars or slide bars 97 and their operating elements on both rails, I may employ the means shown in Fig. 16, whereby one detent is pulled by the operating means and it transmits motion to the other detent. In carrying this out, a pulley 98 is mounted on the rail tie adjacent the train actuated detent 27. A cable 99 has one end attached to a stud 100 on the actuated detent and passes over said pulley, through the webs of the rails 10 and to a larger pulley 102, to which it is attached by a pin 101. A second cable 103 attached to the periphery of the pulley 102 is connected with the other detent at 104. When the detent is actuated by the train operated means the cable 99 is pulled whereby the pulley 102 is rotated so as to pull the other detent in the same direction as the first one.

The invention is presented as including all such modifications as properly come within the scope of the appended claims.

What I claim is:

1. In apparatus of the character described, a track having rails, one rail being provided in its head with a longitudinal recess, a detent arranged within the recess and adapted to be engaged by the wheels of the train, a support arranged near the track, a movable gate connected with said support, operative connections between the detent and movable gate, a train operated device to move the detent longitudinally in one direction, and train operated means to depress the train operated device.

2. In apparatus of the character described, a track including rails, one rail being provided in its head with a longitudinal recess, a detent mounted to slide longitudinally within the recess and having a substantial length, said detent being adapted to be engaged by the wheels of the train, a support arranged near the track, a movable gate carried by the support, connections between the gate and detent, and a train operated device connected with the detent to shift it longitudinally.

3. In a railway crossing gate, a pair of swinging gates, means for swinging the gates connected therewith and a connection between the gates whereby one gate operates the other gate, train actuated means for actuating the gate swinging means, and means controlled by the train for holding the gates closed until the train has crossed the crossing, said means including detents, slidable upon the rails and adapted to be engaged by the wheels of the train and held upon the rail against movement.

4. In a railway crossing gate, the combination with a pair of swinging gates, of means for swinging the gates including, gate swung elements at the gate, detents attached to said elements and slidable on the rails, wheel depressed members, a crank shaft operated by the members, and means operated by the crank shaft for imparting rectilinear movement to the detents.

5. In apparatus of the character described, a track, a support arranged near the track, a movable gate carried by the support, a rock shaft extending transversely of the track at a point remote from said support and having a crank portion extending upwardly, a bridge pivotally connected with the crank portion, inclined rails arranged upon opposite sides of the bridge and connected therewith and adapted to be engaged by the wheels of the train, yielding means to swing the rock shaft in one direction, connecting means between the rock shaft and the gate, pivoted levers having exten-

sions arranged to be shifted by the wheels of the train, and means whereby the pivoted levers are adapted to shift selected inclined rails longitudinally when the levers are swung in one direction.

6. In apparatus of the character described, a track, a support arranged near the track, a movable gate carried by the support, a rock shaft extending transversely of the track at a point remote from the support and having an upstanding crank, means connecting the rock shaft and movable gate, a bridge pivotally mounted upon said crank, inclined rails disposed upon opposite sides of the bridge and connected therewith, yielding means tending to turn the rock shaft in one direction, pins secured to the ends of the inclined rails upon one side of the bridge, pivoted levers having their inner ends engaging corresponding sides of said pins and provided with fingers arranged near the rails to be engaged by the wheels traveling thereon, and springs to shift the levers in one direction.

7. In apparatus of the character described, a track, a support arranged near the track, a movable gate carried by the support, a train operated device having connection with the movable gate, stop elements carried by the train operated device, levers extending transversely of the track and pivoted to swing longitudinally thereof and having their inner ends engaging corresponding sides of said stops, said levers having extensions upon the opposite sides of their pivots arranged to be actuated by the wheels upon the track, and means to swing the levers toward said stops.

In testimony whereof I affix my signature.

COCIU ENACHE.