April 9, 1935. L. H. PRANGER 1,997,199

RAILWAY CROSSING GATE

Original Filed Nov. 20, 1930

Fig. 1.

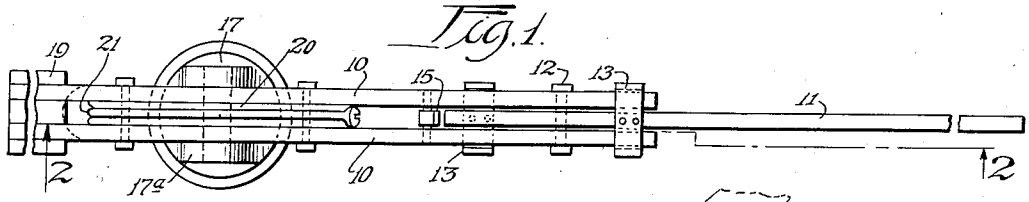


Fig. 2.

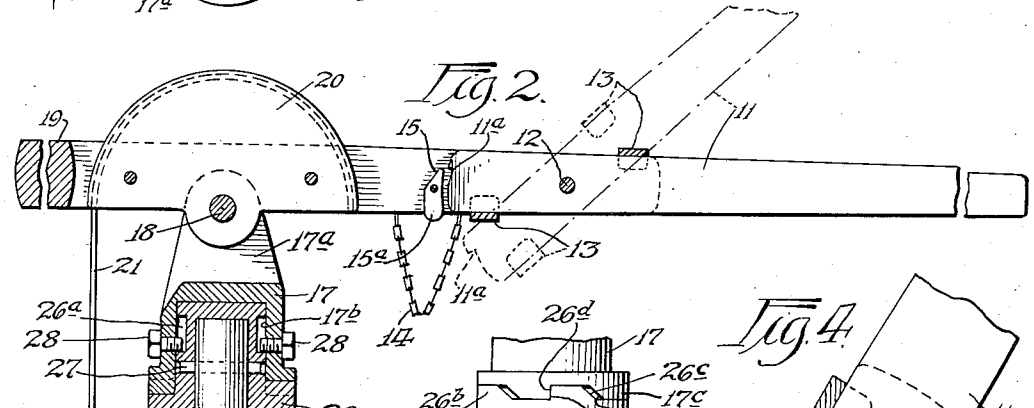


Fig. 3.

Fig. 4.

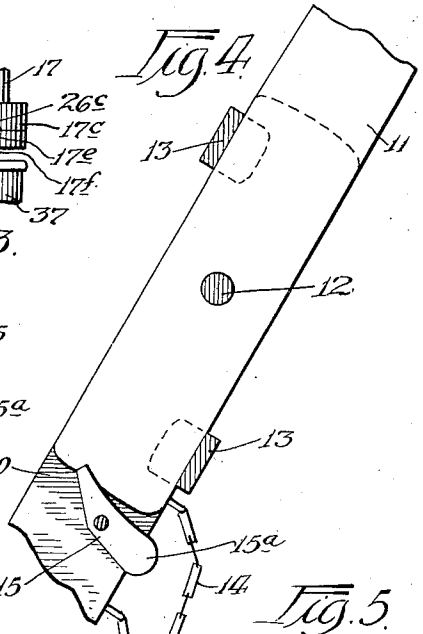
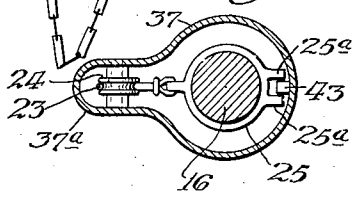


Fig. 5.



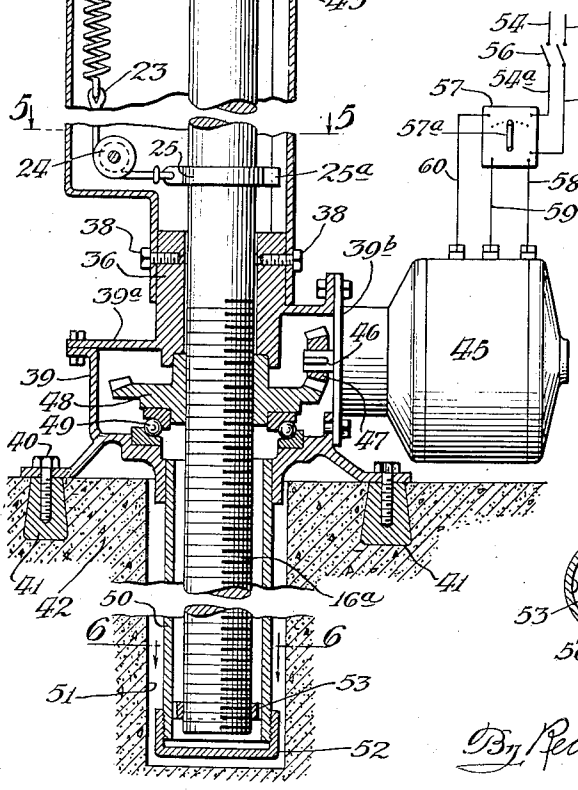
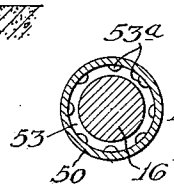


Fig. 6.



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UNITED STATES PATENT OFFICE

1,997,199

RAILWAY CROSSING GATE

Louis H. Pranger, Racine, Wis.

Original application November 20, 1930, Serial No. 496,878. Patent No. 1,945,295, dated January 30, 1934. Divided and this application July 27, 1932, Serial No. 625,007

6 Claims. (Cl. 39—92)

This invention relates to railway crossing gates and its purpose is to provide an improved safety gate adapted to be lowered across a street or highway crossing to warn pedestrians and the occupants of vehicles of the approach of a railway train. The present application is a division of my co-pending application Serial No. 496,878, filed November 20, 1930. The principal object of the present invention is to provide an improved railway crossing gate comprising relatively movable parts which are adapted to yield in the event that the gate is lowered upon an automobile or other vehicle positioned on the railway track, thereby preventing damage to the gate or the vehicle. A further object of the invention is to provide a railway crossing gate adapted to occupy a horizontal position when closed and to be tilted upwardly to an inclined position when open, the gate being formed of pivotally connected parts, one of which is free to move upwardly in the event that the gate encounters an obstruction when it is lowered toward its closed position. Still another object of the invention is to provide a tilting railway crossing gate made up of pivotally connected sections one of which is adapted to swing upwardly in the event that the gate encounters an obstruction while it is being lowered, in combination with means for automatically preventing relative movement of the sections of the gate when it is tilted upwardly during the normal operation of opening the gate. Other objects relate to various features of construction and arrangement which will appear more fully hereinafter.

The nature of the invention will be understood from the following specification taken with the accompanying drawing, in which one embodiment of the invention is illustrated. In the drawing,

Fig. 1 shows a top plan view of one form of the improved safety gate of the present invention;

Fig. 2 shows an enlarged detail sectional view on the line 2—2 of Fig. 1, looking in the direction of the arrows, with parts broken away;

Fig. 3 shows a front elevation of the connection between the shaft and the gate which permits the gate to be turned in one direction only;

Fig. 4 is a vertical section taken longitudinally of the gate, showing means for automatically locking the hinged sections of the gate together when the gate is elevated;

Fig. 5 is a detail section taken on the line 5—5 of Fig. 2; and

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

As illustrated in the drawing, the improved safety gate comprises a pair of parallel bars 10 which are spaced apart to receive between them the single gate bar 11. The bars 10 and 11 are pivotally connected by a pin 12 and the bar 11 is normally maintained in alignment with the bars 10 by means of two metal clips 13 which are secured to the upper and lower sides of the bar 11 in diagonal relationship to the pin 12 so that one clip adjacent one end of the bar 11 embraces the under sides of the pivot bars 10, while the other clip 13, on the upper side of the bar 11, engages the upper sides of the bars 10 at the opposite side of the pivot 12. This arrangement permits the bar 11 to swing upwardly with respect to the bars 10 but prevents the downward movement of the bar 11. The bars 10 and 11 are adapted to be lowered across the street or roadway at the railway crossing and if the gate is accidentally lowered upon an automobile, for example, the bar 11 swings upwardly to prevent damage. The extent of the upward swinging of the bar 11 with respect to the bars 10 is limited by a chain 14 which is attached to the bars 10 and to the rear end of the bar 11. When the gate is elevated as hereinafter described, the bar 11 is prevented from swinging away from the bars 10 by a detent 15 which is pivoted between the bars 10 and which has a weighted head 15a so that when the gate is elevated, the detent is moved by the action of gravity on the head 15a to cause it to engage the notch 11a formed in the end of the bar 11, as shown in Fig. 4, thereby holding the bars in alignment.

The gate comprising the relatively movable and pivotally connected parts described above is adapted to swing upwardly about a pivotal axis when it is being opened and to swing downwardly about the same axis when it is closed. This swinging movement of the gate may be effected by various forms of gate operating mechanism but in the accompanying drawing there has been illustrated the form of operating mechanism which is described and claimed in the co-pending application above referred to. The gate is adapted to be raised and lowered by a vertical operating shaft 16 and the gate is mounted on the upper end of this shaft through intermediate parts which include a bracket 17 having arms 17a which extend upwardly on opposite sides of the gate bars 10 to receive the pin 18 upon which the bars are pivotally mounted. A counterweight 19 is secured on the end of the bars 10 opposite the bar 11 and a grooved sector 20 of a pulley is secured between the bars 10 with its

axis concentric with the axis of the pin 18. A cable 21 has one extremity attached to one end of the pulley sector 20 and then the cable extends over this pulley and thence downwardly with its lower end attached to a coil spring 22. This coil spring has its lower end attached to another cable 23 which extends around a pulley 24 and is attached to a collar 25 mounted on the shaft 16 so that when the shaft 16 is elevated, a downward pull is exerted on the cable 21 which operates through the pulley sector 20 to turn the gate about the pivot 18 simultaneously with the elevation of the gate.

The bracket 17 which carries the gate is provided at its lower end with a socket 17b which is arranged to receive a cap member 26 secured upon the upper reduced extremity of the shaft 16 by means of a transverse pin 27. The cap member 26 is provided with an annular groove 26a which is engaged by set screws 28 passing through the wall of the bracket so that the bracket is retained in position on the cap member although having a slight upward movement thereon due to the width of the groove 26a. This relative upward movement of the bracket and cap member is for the purpose of permitting rotation of the cap member in one direction which may be desirable to permit the escape of a vehicle which is caught between two gates on a railway track, in which case pressure exerted against the gate on the inner side thereof will force it away from the track and permit the vehicle to move off of the track. For this purpose, the lower annular flange of the cap member 26 is provided with a number of upwardly extending lugs 26b each of which has an inclined face 26c at one end and a vertical face 26d at the other end. The lower end of the socket portion of the bracket 17 is provided with similar depending lugs 17c having inclined end faces 17e and other vertical end faces 17f. When the gate is in its normal position, the lugs 26b and 17c have the interlocking relation shown in Fig. 3, wherein the coaction of the vertical faces 17f and 26d prevents rotation of the bracket 17 about the cap member 26 in a direction which would permit the gate to be swung inwardly toward the railway track, but, in the event that pressure is exerted on the gate from the inner side thereof, the lugs 17c of the bracket ride upwardly on the inclined faces 26c of the lugs carried by the cap member to permit a rotation of the bracket sufficient to allow the gate to swing away from the railway track. During this movement, the set screws 28 move upwardly in the groove 26a and the spring 22 is elongated enough to compensate for the relative angular movement of the gate on the shaft.

The upward movement of the bracket 17 for the purpose of raising the gate, as well as the lowering movement thereof, are effected by the longitudinal movement of the shaft 16 in a vertical direction. This shaft is mounted to slide in bearings 35 and 36 which are mounted at the upper and lower ends, respectively, of a tubular casing 37 which surrounds the intermediate portion of the shaft and which is secured to the bearing members by cap screws 38. The lower bearing member 36 is formed integrally with the top cover 39a of a gear casing 39 which is secured by cap screws 40 to blocks 41 embedded in the pavement 42, as shown in Fig. 2. One end wall 39b of this casing also forms a part of the casing of an electric motor 45 which is thus supported by the casing 39. The shaft 46 of the motor has a bevel pinion 47 fixed thereon and this pinion meshes with a bevel gear 48 having a hub 48a which is internally threaded to mesh with the threaded portion 16a of the operating shaft. A roller bearing 49 is interposed between the gear 48 and the lower part of the casing 39 to receive the downward thrust upon the gear and to carry the weight of the superimposed parts during the operation of the device. The upper end of the gear hub engages the lower end of the bearing 36 so that vertical displacement of the gear within the casing is thereby prevented. The casing 39 has a tubular downward extension 50 which extends into an aperture 51 formed in the pavement 42 and the lower end of this tubular extension of the casing is closed by a cap 52, thus forming a well or recess into which the lower part of the threaded portion 16a of the operating shaft extends. The shaft 16 is prevented from rotating by a pair of lugs 25a which are formed on the collar 25 and which extend on opposite sides of a vertical rib 43 which is secured to the inner side of the housing 37. The housing 37 has a lateral extension 37a in which the pulley 24 is mounted and through which the cable 21 and spring 22 extend. When the gear 48 is driven by the motor 45, the shaft is either raised or lowered by reason of its threaded connection with the gear, depending upon the direction of rotation of the gear, so that the bracket 17 and the gate are thereby raised or lowered, depending upon the direction of movement. The lower end of the shaft 16 is centered in the tubular extension 50 of the housing by means of a collar 53 which is secured in the end of the shaft and which is provided with notches 53a to permit the passage of oil by the collar during the vertical movement of the shaft.

In order that the single shaft 16 and the motor 45 may be utilized for both raising and lowering the gate, the electric motor 45 is provided with suitable windings and controlling devices so that its direction of rotation may be reversed at the will of the attendant. These connections are illustrated somewhat diagrammatically in Fig. 2, where two line conductors 54 and 55 are shown as supplying the current from a suitable source of supply to a double pole controlling switch 56 which has its other terminals connected to the line conductors 54a and 55a which lead to a rheostat and reversing switch 57. From this device two line conductors 58 and 59 lead to the terminals of the motor 45 and a conductor 60 leads to the field winding thereof so that when the operating handle 57a of the device 57 is thrown to the proper positions, the motor 45 is operated to rotate in the desired direction. When the shaft is elevated, the bracket 17 is carried therewith so that the bars of the gate are moved upwardly to the inclined position illustrated in Fig. 4. During this movement, the upward movement of the shaft causes a downward pull on the cable 21 so that the pulley sector is turned and the gate tilted at the same time that its pivot 18 is elevated. When the shaft 16 is lowered, the operation is reversed and the gate swings downwardly by gravity about the pivot 18 as the pivot is lowered.

Although one form of the invention has been shown and described by way of illustration, it will be understood that it may be constructed in various other embodiments within the scope of the appended claims.

I claim:

1. In a safety gate, a gate arm adapted to pivot about a horizontal axis between a horizontal

closed position and an upwardly tilted open position, said gate arm comprising a body portion and an extension which are pivotally connected for relative movement in a vertical plane, supporting means for preventing relative pivotal movement of said extension and said body portion in one direction from a position in which said extension and said body portion are in alignment while permitting relative movement in the other direction, and latching means operable when said gate arm is tilted upwardly for preventing relative pivotal movement of said extension with respect to said body portion.

2. In a safety gate, a gate arm mounted for pivotal movement between a normal horizontal position and an upwardly tilted open position, said gate arm comprising a body portion and an extension which are normally in alignment, means for pivotally connecting said body portion and said extension to permit relative movement of said extension upwardly about said body portion, and latching means operable when said gate arm is tilted upwardly for engaging said extension and preventing relative pivotal movement of said body portion and said extension, said latching means being inoperative when said gate is in its normal horizontal position.

3. In a safety gate, a gate arm adapted when actuated to move to horizontal and tilted positions, said gate arm comprising pivotally connected bars, means for preventing pivotal movement of said bars in one direction, and means for automatically preventing relative pivotal movement of said bars in the other direction when said gate has been tilted upwardly.

4. In a safety gate, a gate arm mounted for pivotal movement in a vertical plane and comprising relatively movable parts overlapping each other in vertical planes, means for pivotally connecting said relatively movable parts for movement about a horizontal axis, and supporting means engaging said relatively movable parts on opposite sides of said pivotal connection for permitting relative pivotal movement of said parts in one direction only.

5. In a safety gate, a gate arm mounted for pivotal movement in a vertical plane and comprising relatively movable parts overlapping each other in vertical planes, means for pivotally connecting said relatively movable parts for movement about a horizontal axis, and means engaging said relatively movable parts on opposite sides of said pivotal connection for permitting relative pivotal movement of said parts in one direction only, and means for preventing said relative pivotal movement when said gate is in an upper inclined position.

6. In a safety gate, a gate bar mounted for movement from a horizontal position to an upper inclined position, said gate bar comprising complementary overlapping sections, means for pivotally connecting said sections to permit relative movement thereof about a horizontal axis, means for preventing relative movement in one direction from a position in which said sections are in alignment with each other, and a weighted latch member pivoted on one of said sections and adapted to interlock automatically with the other of said sections when said gate is tilted upwardly for preventing relative pivotal movement of said sections when said gate is in said upper inclined position.

LOUIS H. PRANGER.