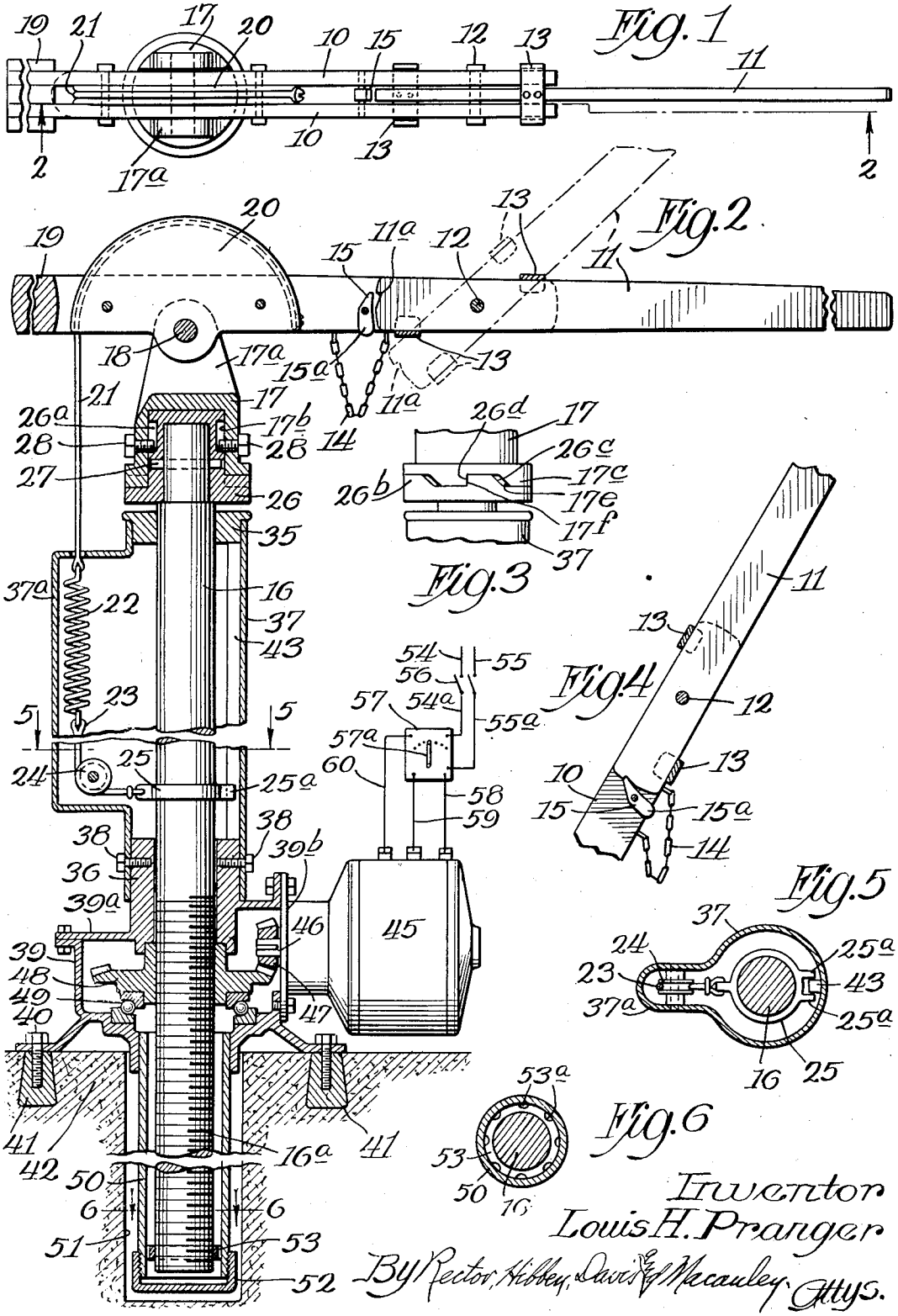
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RAILWAY CROSSING GATE

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RAILWAY CROSSING GATE

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23 Claims. (Cl. 39—7)

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. Railway crossing gates of the types heretofore used have either been manually operated or, in the event they have been mechanically operated, have involved the use of rather complicated and expensive mechanism so that their installation has involved comparatively large expense to the railway companies adopting them. The principal object of the present invention is to provide an improved safety gate which may be mechanically operated to either lower it or raise it by a simplified form of mechanism which may be readily controlled. A further object of the invention is to provide an improved railway crossing gate adapted to be either raised or lowered by an improved electrically operated mechanical device in which both the raising and lowering functions are effected by a single mechanism. Still another object of the invention is to provide an improved safety gate comprising operating mechanism by which the raising and lowering of the gate may be effected very rapidly as compared with the operation of safety gates heretofore in use. 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 15^a so that when the gate is elevated, the detent is moved by the action of gravity on the head 15^a to cause it to engage the notch 11^a formed in the end of the bar 11, as shown in Fig. 4, thereby holding the bars in alignment.

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 17^a 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 17^b 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 26^a 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 26^a. 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 26^b each of which has an inclined face 26^c at one end and a vertical face 26^d at the other end. The lower end of the socket portion of the bracket 17 is provided with similar depending lugs 17^c having inclined end faces 17^e and other vertical end faces 17^f. When the gate is in its normal position, the lugs 26^b and 17^c have the interlocking relation shown in Fig. 3, wherein the coaction of the vertical faces 17^f and 26^d 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 17^c of the bracket ride upwardly on the inclined faces 26^c 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 26^a 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 39^a 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 39^b 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 48^a which is internally threaded to mesh with the threaded portion 16^a 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 16^a of the operating shaft extends. The shaft 16 is prevented from rotating by a pair of lugs 25^a 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 37^a 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 53^a to permit the passage of oil by the collar during the vertical movement of the shaft.

In order that the single shaft 16 and 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 54^a and 55^a 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 57^a 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 20 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.

The construction of the gate whereby relative movement of the parts thereof is permitted when any obstruction is encountered during the lowering of the gate is claimed in my co-pending divisional application Serial No. 625,007, filed July 27, 1932.

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. The combination in a railway safety gate, of a gate bar, a single vertically disposed operating shaft, and means comprising a member carried by and rotatable on said shaft and adapted when operated to actuate said shaft for raising and lowering said gate bar.

2. The combination in a railway safety gate, of a gate bar, a shaft having a pivotal connection with and supporting said gate bar, and means for raising and lowering said shaft to pivotally operate said gate to open and closing positions.

3. The combination in a railway safety gate,

of a gate bar adapted to have a lower horizontal position when closed and an upper inclined position when open, a vertical shaft connected to and supporting said gate bar, and means for effecting vertical movement of said shaft to move said gate bar from one of said positions to another.

4. The combination in a railway safety gate, of a gate bar, a threaded shaft connected to said gate bar, a threaded member engaging said shaft, and motor actuated means for rotating said threaded member to advance and retract said shaft and thereby open and close said gate.

5. The combination in a railway safety gate, of a gate bar, a threaded shaft connected to said gate bar, a threaded member engaging said shaft, motor actuated means for rotating said threaded member to advance and retract said shaft and thereby open and close said gate, and means for reversing the direction of rotation of said motor.

6. The combination in a railway safety gate, of a gate bar adapted to assume a horizontal position when closed and an upper inclined position when open, a vertical shaft pivotally connected to said gate bar, said shaft having an externally threaded portion, a rotatably threaded member mounted on said threaded portion of said shaft, and means for rotating said threaded member to move said shaft vertically.

7. The combination in a railway safety gate, of a gate bar adapted to assume a horizontal position when closed and an upper inclined position when open, a vertical shaft pivotally connected to said gate bar, said shaft having an externally threaded portion, a rotatably threaded member mounted on said threaded portion of said shaft, means for rotating said threaded member to move said shaft vertically, and means for reversing the direction of rotation of said threaded member.

8. The combination in a railway safety gate, of a support, a gate bar having an intermediate portion pivotally mounted on said support, means for elevating said support, and means for holding one end portion of said gate bar against upward movement whereby the elevation of said support effects an upward swinging movement of the other end portion of said gate bar.

9. The combination in a railway safety gate, of a support, a gate bar pivotally mounted upon said support, means for elevating said support, and means for turning said gate bar about said pivotal connection when said support is elevated.

10. The combination in a railway safety gate, of a support, a gate bar pivotally mounted upon said support, means for elevating said support, and means actuated by the upward movement of said support for swinging said gate bar about its pivotal connection on said support.

11. The combination in a railway safety gate, of a gate bar adapted to assume a horizontal position when closed and an upper inclined position when open, a shaft pivotally supporting a part of said bar adjacent one end thereof, means for moving said shaft vertically to open and close said gate, and means for turning said gate about its pivot as said shaft is moved vertically.

12. The combination in a railway safety gate, of a gate bar adapted to assume a horizontal position when closed and an upper inclined position when open, a shaft pivotally connected to said bar adjacent one end thereof, means for moving said shaft vertically to open and close said gate, and means carried by said shaft for turning said gate about said shaft during its vertical movement.

13. The combination in a railway safety gate, of a gate bar adapted to assume a horizontal position above the pavement when closed and an upper inclined position when open, an externally threaded shaft having its upper end pivotally connected to said bar inwardly from said end, a casing secured on said pavement and enclosing said shaft, a threaded member engaging said shaft within said casing, means for rotating said threaded member to move said shaft vertically and thereby effect a pivotal movement of said gate about said pivotal connection with said pavement, a pulley sector mounted on said gate bar, and a flexible member connected to said sector and having connections with said shaft to effect the turning of said gate bar when said shaft is elevated.

14. The combination in a railway safety gate, of a gate bar adapted to assume a horizontal position above the pavement when closed and an upper inclined position when open, an externally threaded shaft having its upper end pivotally connected to said bar inwardly from said end, a casing secured on said pavement and enclosing said shaft, a threaded member engaging said shaft within said casing, and means comprising an electric motor carried by said casing for rotating said threaded member to effect vertical movement of said shaft.

15. The combination in a railway safety gate, of a gate bar adapted to assume a horizontal position above the pavement when closed and an upper inclined position when open, an externally threaded shaft having its upper end pivotally connected to said bar inwardly from said end, a casing secured on said pavement and enclosing said shaft, a threaded member engaging said shaft within said casing, means comprising an electric motor carried by said casing for rotating said threaded member to effect vertical movement of said shaft, and an electric circuit for said motor comprising means for reversing the direction of rotation thereof.

16. The combination in a railway safety gate, of a gate bar, a vertical shaft having its upper end pivotally connected to said bar, said shaft being externally threaded, a casing in which said shaft is mounted for vertical movement, a bevel gear having an internally threaded hub mounted on said shaft within said casing, a driving motor, a pinion actuated by said motor and meshing with said gear, and means for holding said shaft against rotation during the rotation of said gear.

17. The combination in a railway safety gate, of a gate bar, a vertical shaft, a bracket mounted on said shaft and pivotally connected to said bar, means for raising and lowering said shaft to open and close said gate bar, and means carried by said bracket and said shaft for preventing angular movement of said gate bar in one direction and permitting angular movement thereof in the opposite direction.

18. The combination in a railway safety gate, of a gate bar, a vertical shaft, a bracket mounted on said shaft and pivotally connected to said bar, a casing enclosing said shaft, means for raising and lowering said shaft to open and close said gate bar, a lug carried by said shaft and having a vertical face at one end and an inclined face at the other, and another lug carried by said bracket and having a vertical face to engage said vertical

face of said first lug when said gate bar is in its normal position.

19. The combination in a railway safety gate, of a gate bar, a support upon which said gate bar is pivotally mounted, and means for elevating said support and thereby raising said gate.

20. The combination in a railway safety gate, of a support, a gate bar pivotally mounted at an intermediate point on said support, means for effecting vertical movement of said support, and means forming a connection between said support and one end portion of said gate bar for causing a swinging movement of said gate bar about its pivotal connection when said support is moved vertically.

21. The combination in a railway safety gate, of a support, a gate bar mounted on said support, means for raising and lowering said support to raise and lower said gate bar, and means for permitting a swinging movement of said gate bar horizontally about said support.

22. The combination in a railway safety gate, of a support, a gate bar, means for supporting said gate bar on said support and permitting angular movement of said gate bar in one horizontal direction and preventing angular movement thereof in the opposite horizontal direction, and means for raising and lowering said support.

23. The combination in a railway safety gate, of a vertical support, a bracket mounted on said support, a gate bar pivoted on said bracket to swing vertically, said bracket comprising relatively movable parts adapted to permit said gate bar to swing horizontally in one direction only, means for raising and lowering said support, and means for causing said gate bar to swing vertically about its pivotal connection on said bracket when said support is moved vertically.

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