Nov. 9, 1937. J. H. FRASER 2,098,284

GATE CONSTRUCTION

Filed May 22, 1933

FIG. 2

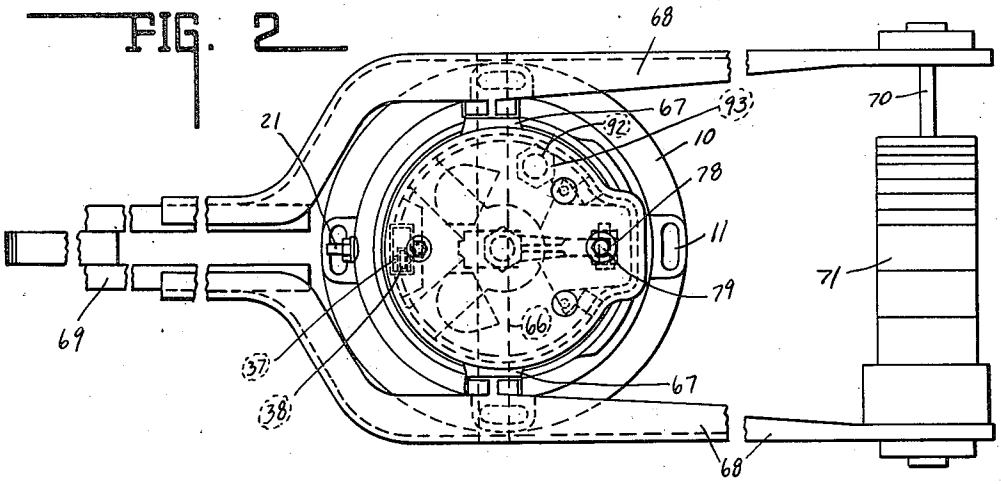


FIG. 1

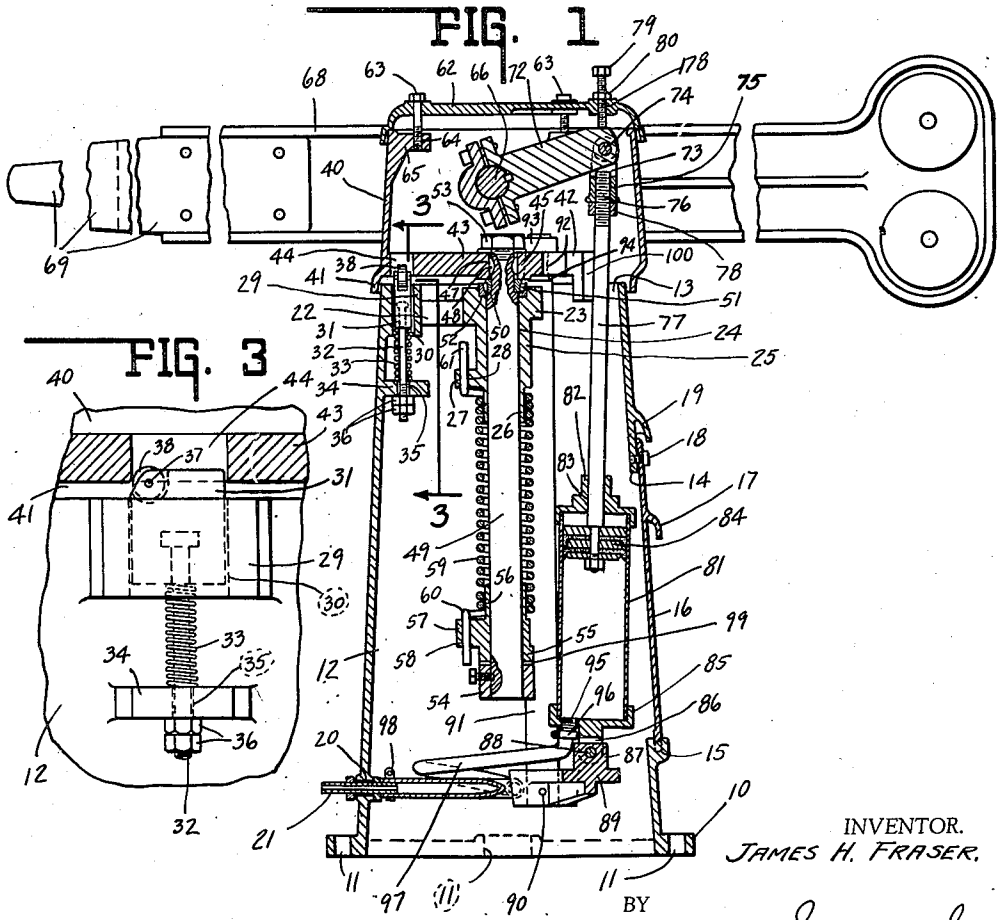


FIG. 3

INVENTOR.
JAMES H. FRASER.

BY
Lockwood Lockwood Goldsmith & Galt
ATTORNEYS.

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GATE CONSTRUCTION

James H. Fraser, Louisville, Ky.

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7 Claims. (Cl. 39—7)

This invention relates to a crossing gate construction comprising the gate arm, a supporting horizontal turnable head and a hollow head supporting pedestal, the gate arm being tiltable about a horizontal axis by a power mechanism that may be pressure operable and if desired, arranged for operation in one direction only, movement of the gate arm in the opposite direction, in such event, being obtained by the use of a counterbalance associated with the arm, the horizontal movement of the head being due to an external constraining force imposed thereon and the horizontally movable head being automatically returnable to a predetermined position on release of the constraining force.

The chief object of this invention is to simplify the construction of a crossing gate embodying the aforesaid general arrangement and to improve the operation thereof.

Herein the invention is illustrated as of the counterbalance raising and power lowering type, although the reverse operation may be readily obtained or the raising and lowering, as initially suggested, may be of the power operable type, as well understood in the art to which this invention applies.

The chief feature of the invention consists in supporting upon the head structure of most of the mechanism for causing gate arm movement.

Other features of the invention will appear more fully hereinafter.

The full nature of the invention will be understood from the accompanying drawing and the following description and claims:—

In the drawing, Fig. 1 is a central sectional view of a crossing gate embodying the invention, a portion of the gate arm being omitted.

Fig. 2 is a top plan view of the mechanism shown in Fig. 1.

Fig. 3 is a sectional view taken on line 3—3 of Fig. 1, and in the direction of the arrows.

In the drawing 10 indicates the flange having the anchoring openings 11, said flange constituting the base for the hollow pedestal 12, which has an open upper end 13. The pedestal includes a lateral or side opening 14 and the lower wall of said opening is provided with a groove structure 15 adapted to seat a door or cover 16 having the hand grip 17 thereon. The cover is secured as at 18 to the pedestal, the latter also, adjacent thereto, is provided with a drip guard 19.

An opening 20 provides an inlet for the supply line 21 by which the operating fluid pressure medium is introduced to the power mechanism. The upper end of the pedestal includes a pair of inwardly directed arms 22 which terminate in an axial hub portion 23 that is centrally apertured as at 24, and the tubular extension 25 depends from said hub. The lower end terminates in a sleeve extension 26 and adjacent the connection between the extension and the sleeve is an offset 27 apertured as at 28 for the purpose hereinafter set forth.

The two arms 22, herein adjacent their connection to the side wall of the pedestal, are connected by a portion 29 and said portion includes a slot 30 therethrough, in which is slidably mounted a block 31 carried by a stem member 32 about which is coiled a spring 33 that at its upper end bears on the lower end of the block and at its lower end bears upon a projection 34 also integral with the pedestal and apertured as at 35, the aperture 35 being in alignment with the slot 30. The member 32 extends through the aperture 35 and a pair of lock nuts 36 adjustably secures the same in assembled relation so that the block 31 normally is projected upwardly due to the pressure of spring 33 and the degree of upward movement is limited by the lock nuts before mentioned. The purpose of this block will be set forth more fully hereinafter.

A tubular head 40 at its lower end 41 is telescopically associated with the upper end of the pedestal. Adjacent the lower end there is provided a spider formation including two diverging arms 42 and another arm 43, the latter being apertured as at 44 to receive the block 31 which upon the pivot 37 supports a roller 38. An elevation of this roller and its supporting block is shown in Fig. 3 and its purpose will be set forth more fully hereinafter.

The intersecting portions of the inwardly directed arms 42 and 43 terminate in a central portion 45, apertured as at 46 and provided with keyways 47 to receive keys 48 which are seated in registering keyways carried by the upper end of a shaft 49, the latter including a shoulder 50 that supports one race member of an anti-friction construction 51. The other race member is supported by the recessed portion 52 of the central hub portion 23. The upper end of the shaft 49 is threaded and is suitably and rigidly secured to the central hub portion 45 by the nut 53.

The shaft 49 is rotatably mounted in the extension 25 and the sleeve 26 and at its lower end, supports a retainer 54 and associated therewith is a collar 55 that includes an upwardly directed sleeve portion 56, said collar having a laterally projecting portion 57 apertured as at 58.

A coil spring 59 has its lower end 60 seated in

the aperture 58 and its lowermost coils concentrically arranged with respect to the sleeve portion 56. It also has its uppermost coils concentrically associated with the sleeve 26 and its upper end 61 seated in the aperture 28 in the laterally projecting portion 27.

The adjacent faces of members 54 and 55 are provided with radially directed teeth 99 so that the initial tension imparted to the torsion spring 59 may be readily adjusted by elevating the member 55 and subsequently rotating with respect to the member 54, and then lowering the same so that the two adjacent radial faces nest one in the other in an adjusted position.

When the head structure is forcibly turned upon its horizontal axis, it is turned in opposition to the spring 59 and upon such turning movement, the roller engages the wall of the slot or aperture 44 and the roller is cammed downwardly with the block, compressing spring 33. Upon release from the constraint, the spring 59 becomes operative and returns the head structure to its original position and upon attaining its original position, the spring 33 immediately projects the roller with the block into the recess 44, as shown in Fig. 1. This prevents overrunning return movement.

Each arm 42 of the upper spider includes a depending portion 100 that projects downwardly into the open upper end 13 of the pedestal 12 and is adapted to protect piston rod 77 and does so by engaging the box 30 supported by the upper end of the pedestal, the adjacent arms 22 of the pedestal hub lying below the plane of the lower ends of portion 100. The limit of turning movement, therefore, is approximately 110° before the stop becomes effective. In this turning movement, it will, of course, be understood that the torsion spring is increasingly tightened so that the rate of movement of the gate arm is decreased as it approaches the 110° turn for the same force applied. Naturally, in the event of failure of said torsion spring, the stops also serve as a check or safeguard against complete turning and breaking or bending of the piston rod 77.

The block, as shown in Fig. 3, has its roller eccentrically positioned or positioned in offset relation, at one corner, the other corner being square.

It will be apparent that when a crossing gate is positioned to protect one-half of a street at a railway crossing, or the like, or extends entirely across the street, the gate at the leaving side, having reference to the side of the street that the traffic approaches the crossing, must be so arranged that the gate will swing with the traffic in the event the gate is engaged by a trapped vehicle, such as an automobile, to cause the gate to swing from its position across the street to a position extending away from the track, this to permit the vehicle to escape. The gate at the approach side, in the event the driver of the vehicle is unable to stop when the gate is down or in guarding position, will be shattered and will provide concrete evidence of the driver's contributory negligence. The roller arrangement at one side of the block permits the head to readily swivel upon a horizontal axis to accommodate such movement. Immediately upon release of such constraint, the head returns to its original position and as soon as the aperture 44 registers with the block, the latter, as before mentioned, is projected into the aperture and the gate will not swing beyond that position and, therefore, movement of the gate across the tracks will be prevented.

The opposite corner of the block is not provided with a roller so that the edge of the block opposite from the roller engages the edge of one wall of the slot 44 and locks the head against further return movement beyond the predetermined initial position.

The head 40 is herein shown tubular in character and is closed by a cap 62, the latter being secured thereto by the bolts 63 threaded into openings 64 in lugs 65 carried by the upper end of the tubular head.

The tubular head pivotally supports a transverse rockshaft 66 and the latter projects through the bearings 67 at opposite sides of the head and upon the exposed projecting ends there is mounted the gate arm structure, indicated generally by the numeral 68 which between them at one end support the relatively light guarding and shatterable portion 69 of the gate arm and at the opposite end are connected together as at 70 and the member 70 is adapted to support a suitable number of counterweights 71.

Herein the counterweighting is arranged to normally move the gate arm into the elevated position. Power means is provided for moving the gate arm into the lowered or guarding position in opposition to the counterweighting. A lever arm 72 is rigidly secured—see Fig. 1—to rock shaft 66 at one end and its opposite end is pivotally associated with a yoke 73 as at 74. The yoke has a tubularly threaded portion 75 which threadedly receives the threaded end 76 of a piston rod 77. A lock nut 78 is adapted to determine the exact adjusted connection between the yoke and the rod. The cap 62 is threadedly apertured as at 178 and an adjustable stop in the form of a bolt 79 is positioned therein and locked by the nut 80. This stop 79 is engaged by the lever 72 and the lowering movement of the gate is limited by such contact.

A cylinder 81, in the form of a tube, has a head 82 which is apertured as at 83 and slidably supports the rod 77 which projects into the cylinder and terminates in a piston construction 84. The opposite end of the cylinder is closed by a head 85 which terminates in a pair of ears 86 straddling a projecting portion 87 that supports a pivot 88. The portion 87 is carried by a bracket 89 rigidly secured as at 90 to a depending support 91, the upper end of which is secured to one of the spider arms 42 by extending through the opening 92 in said arm and mounting a nut 93. The member 91 adjacent its connection to the head is shouldered as at 94 so that member 91, which is in the form of a depending rod, is rigidly anchored at its upper end in suspending relation to the head and at its lower end receives the bracket 89 and the latter is pinned thereon by the pin 90.

As shown clearly in Fig. 2, the gate operating mechanism may be readily reversed by reversing the position of the block 31 by turning it end for end and by positioning the member 91 in the other opening 92. In other words, the cap and the head structure is so arranged that either right or left hand parts may be manufactured from the same castings.

The lower end 85 of the cylinder, since this mechanism operates as described, is provided with an intake 95 and a coupling or clamp 96 secures on the exposed end thereof a flexible conduit 97, in turn secured by the clamp 98 to one end of the member 21. This permits fluid pressure to be applied to the cylinder thereby supplying the pressure-medium to the cylinder

which, when the same occurs, elevates the piston to rock shaft **66** and lowers the gate. Upon release of the pressure-applying medium, the counterweight will not only elevate the gate but will also force downwardly the piston **84** to discharge the previously applied fluid.

A slightly modified form of the aforesaid construction is disclosed in Fig. 3 of the co-pending application Serial No. 667,465, filed April 22, 1933, and entitled, "Highway crossing gate and control system". The claims herein are directed to the common disclosure of the aforesaid and that specifically disclosed herein, the application referred to being directed to other subject matter.

It will be apparent from an examination of the drawing that adjustments may be readily effected by removing either the cover closure or the cap and that access may be readily had to the interior mechanism for replacement or repair purposes whenever desired or required.

The invention claimed is:—

1. The combination with a gate arm, a horizontally turnable, gate arm supporting head, a rock shaft carried by the head and arranged for tilting said gate arm, a head supporting pedestal structure, of a shaft rotatably supported at the upper end by a pedestal structure and rigid with the head, means operatively associated with the head and the pedestal including a spring mounted on said second mentioned shaft for returning said head to predetermined position when released from a constraining head turning force, a cylinder and piston construction operatively connected at one end to the rock shaft, and a fluid pressure supply connected to said construction for causing relative movement between the elements thereof to secure gate arm tilting movement, of means independent of the second mentioned shaft and carried by said head and supporting said construction.

2. In a gate structure, the combination with a pedestal member, a gate arm supporting head member and a gate arm turnable and tiltable relative to the pedestal, of means operatively interposed between the head and pedestal, comprising a latch carried by one member, and means constraining the latch toward the other member, the other member having a latch receiving recess therein cooperating with the latch to permit turning of the head in one direction from the receiving position and preventing reverse movement of the head in the opposite direction beyond the receiving position.

3. In a crossing gate, a housing, a head revolubly supported by the housing, a gate arm hinged to the head to swing vertically, an arm operating cylinder, a cylinder supporting member dependingly carried by the head eccentric of the axis of revolution, a lever interconnected with said arm, a piston in the cylinder, and a piston rod extending from the piston and connected with said lever, said cylinder being rockably carried by said member whereby the cylinder may rock in conformity with the varying angularity of the rod with the lever as the piston moves in the cylinder whereby the piston is held against rocking in the cylinder.

4. A device as defined by claim 1, characterized by the head including a spider near its lower end and supporting the second mentioned shaft, and the said means including a member depending from the spider and offset from the second mentioned shaft for construction support.

5. A device as defined by claim 1, characterized by the addition of stop means adjustably supported by the head in juxtaposition to the construction and rock shaft operative connection for limiting tilting of the rock shaft.

6. A device as defined by claim 2, characterized by the addition of stop means adjustably supported by the head limiting tilting of the gate arm.

7. A device as defined by claim 1, characterized by the head including a spider near its lower end and supporting the second mentioned shaft, and the said means including a member depending from the spider and offset from the second mentioned shaft for construction support, the pedestal having spaced arms near its upper end for second shaft association, the construction projecting upwardly between the arms of the spider and pedestal, and by the addition of stop means carried by the spider and positioned for pedestal arm engagement for limiting turning movement of the head and preventing shearing or bending of the construction between the respective arms.

JAMES H. FRASER.