

May 7, 1968

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AUTOMATIC FARM GATE

3,381,412

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2 Sheets-Sheet 1

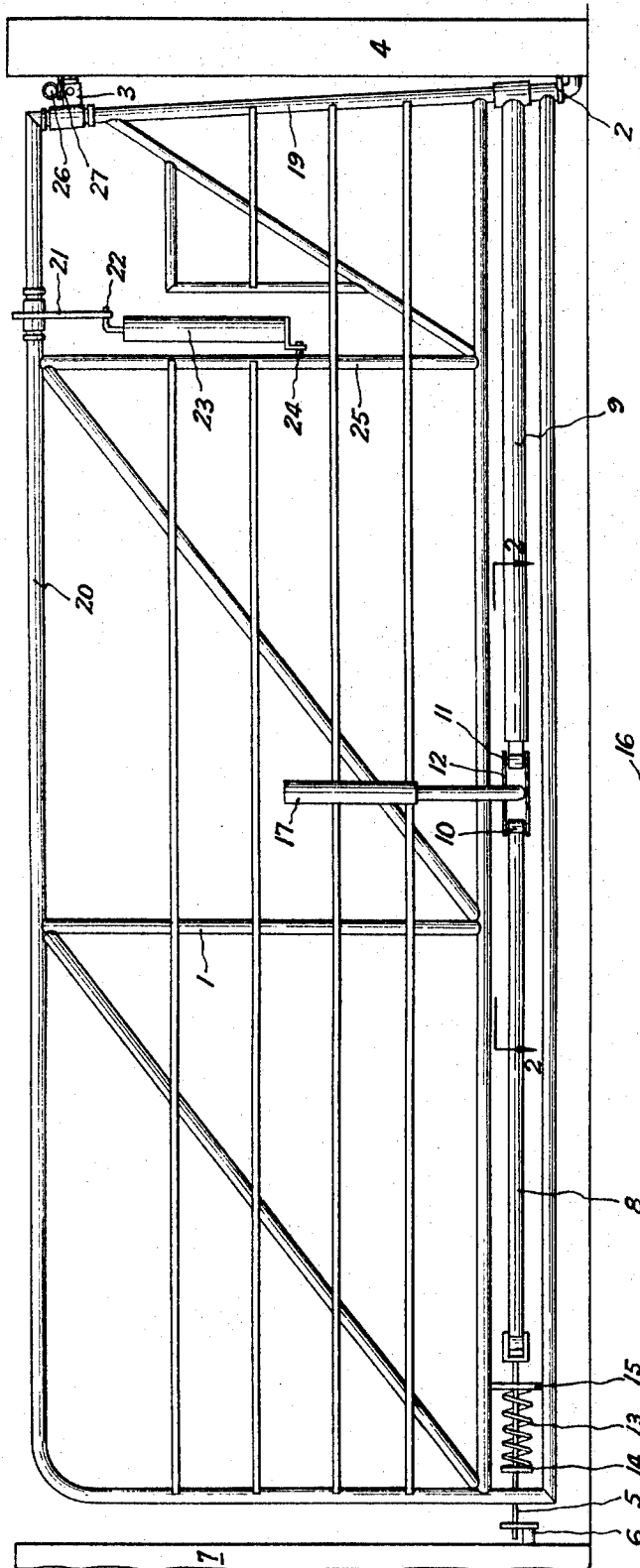


Fig. 1.

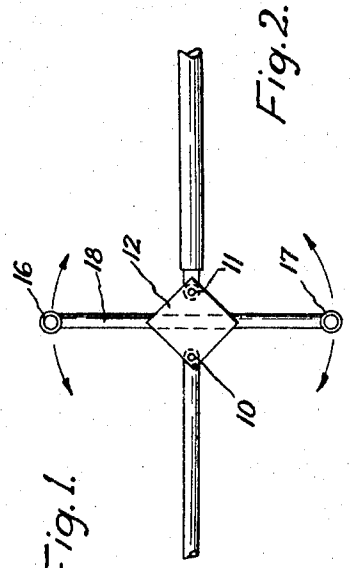


Fig. 2.

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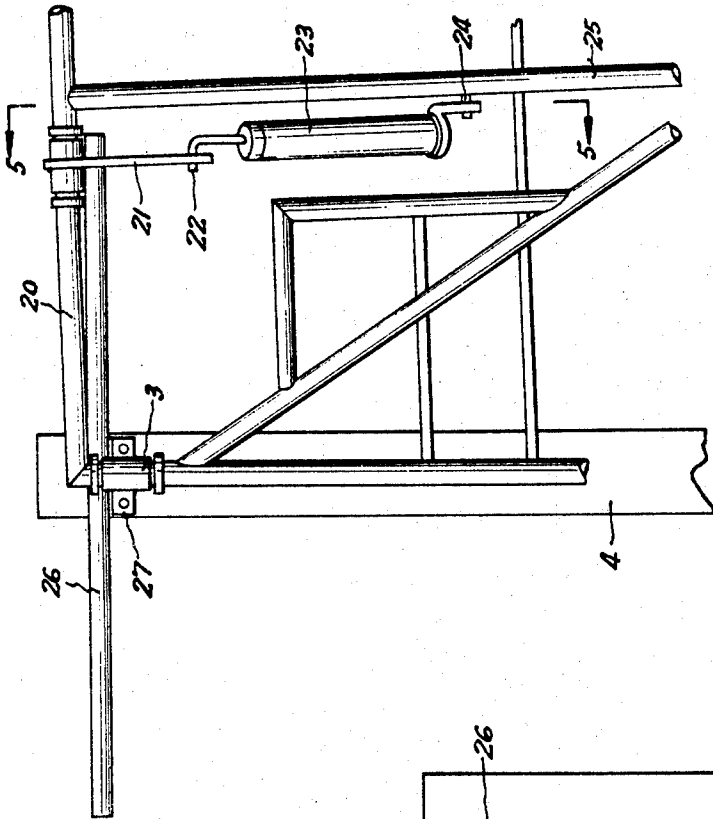


Fig. 4.

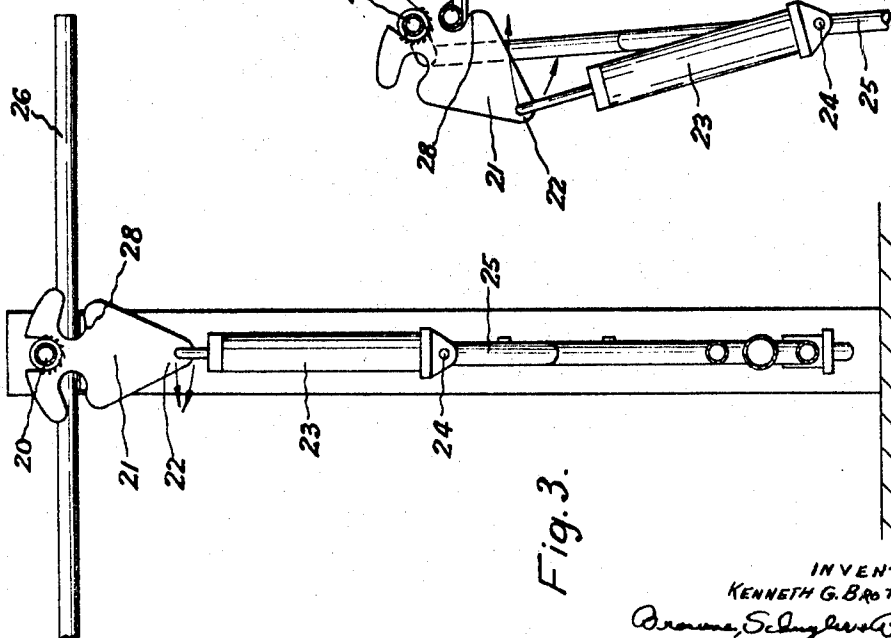


Fig. 5.

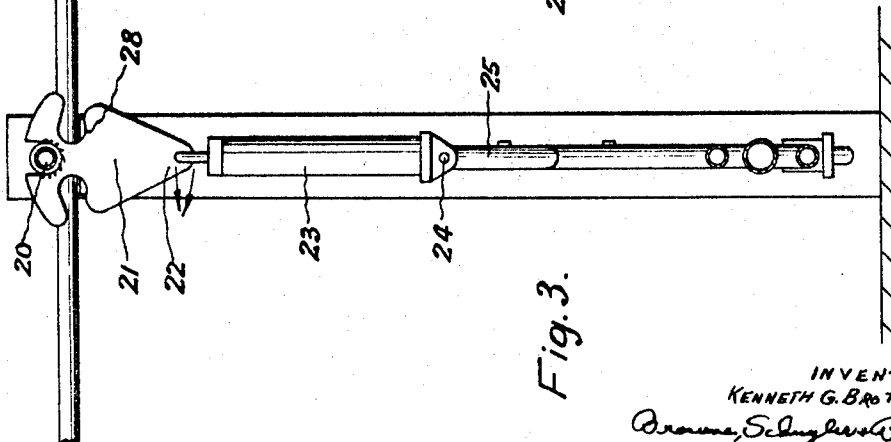


Fig. 3.

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**AUTOMATIC FARM GATE**

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4 Claims. (Cl. 49—236)

**ABSTRACT OF THE DISCLOSURE**

In a gate which is gravity biased to closed position, a delay latching mechanism including a stationary latch bar extending transversely at the gate hinge, and a profile plate mounted on the gate and having an aperture dimensioned to receive the latch bar when the gate is in the fully open position. Normally, when the gate is in closed position, the center of the aperture in the profile plate is positioned slightly below the axis of the latch bar. A hydraulic cylinder is pivotally connected to the gate frame and has a piston shaft pivotally connected to the profile plate. When the gate is moved to fully open position, the profile plate engages the latch bar and pivots in one direction causing the latch bar to be received in the profile plate aperture. This also causes pivoting of the cylinder in an opposite direction and extension of the piston shaft. Depending on the hydraulic fluid controls associated with the hydraulic cylinder, the fluid in the cylinder may be maintained therein a predetermined time to delay unlatching of the profile plate from the latch bar.

This invention relates to automatic gates, and more particularly to self-closing gates of the kind adapted to be initially opened temporarily by the passage of vehicles.

In such systems it is desirable to provide an arrangement whereby the closing of the gate is suitably delayed so that the gate does not foul the operative vehicle during the return motion which terminates by again locking the gate in its rest position.

It is an object of the present invention to provide a simple, reliable, improved automatic gate having an arrangement of the last-mentioned kind.

According to the invention therefore, an automatic gate comprises, in combination, pressure sensitive means adapted to both unlock and open said gate under the influence of a moving vehicle, means to re-close and re-lock said gate after said influence has ceased, and time delay means whereby energy stored in said gate during its opening motion is returned to said gate at a lower rate during its closing motion.

One embodiment of a time delay mechanism constructed in accordance with the present invention includes a stationary latch bar extending transversely of the gate generally at the gate hinge. A profile plate having an aperture is mounted on the gate frame to receive the stationary latch bar in the aperture when the gate is in the fully open position. Normally, when the gate is in the closed position, the center of the aperture in the profile plate lies slightly below the axis of the latch bar. A hydraulic cylinder is employed to mount the profile plate and also to control the closing of the gate. One end of the hydraulic cylinder is pivotally connected with respect to the gate frame while the piston rod of the hydraulic cylinder is pivotally connected to the profile plate. When the gate is moved to fully open position, the profile plate engages the latch bar and pivots causing the latch bar to be received in the profile plate aperture. This also causes pivoting of the cylinder in an opposite

direction and also extension of the piston shaft. Depending on how long the hydraulic fluid is maintained in the cylinder as may be controlled by any suitable hydraulic system, the gate will remain in the open position by virtue of the reception of the stationary latch bar in the aperture of the profile plate. When the fluid is exhausted from the hydraulic cylinder, then the gravity return mechanism of the gate will cause the gate to move to the closed position.

One particular embodiment of the invention will now be described with reference to the accompanying drawings in which similar references indicate corresponding parts, and in which:

FIG. 1 shows, in front elevation, a gate constructed in accordance with the invention,

FIG. 2 shows, in plan view, and partly in section, the pressure sensitive unlocking and opening means of the arrangement shown in FIG. 1,

FIG. 3 shows, in end elevation and partly in section, a view from the left-hand side of the arrangement in FIG. 1,

FIG. 4 shows a view from the same position as in FIG. 3 when the gate is open, and

FIG. 5 shows, in elevation and partly in section, a view along the line 5—5 of FIG. 4.

Upon referring to the drawings, it will be seen that a gate 1 is supported by means of hinges 2 and 3 which are in turn fastened to a gate-post 4. In the normally closed and locked position illustrated, the lock-rod 5 engages a hole in the bracket 6 which is fastened to the gate-post 7. This is a consequence of the fact that the movable connecting rods 8 and 9, which are connected at their innermost ends by means of pins 10 and 11 to the control plate 12, are urged into a substantially collinear position under the influence of the spring 13 which tends to push the collar 14 (which is attached to the lock-rod 5) to the left away from the washer 15 which is, in turn, attached to the frame of the gate 1.

The buffers 16 and 17 which protrude substantially at right angles to the plane of the gate 1, and on opposite sides thereto, are attached via the connecting bar 18 to the control plate 12 to which, in turn, the connecting rods 8 and 9 are attached via the pins 10 and 11. Hence, in use, the arrangement so far described is adapted to be operated by a moving vehicle in the following manner.

Upon impinging said vehicle, or some part of it, upon, say, the buffer 17, thus applying pressure to the gate 1 in the axial direction of the bar 18 which connects the buffers 17 and 16, the buffer 17 tends to swing through a small arc either to the left or right (and hence the buffer 16 tends to swing through an equally small arc in the opposite direction in either case) thereby causing the control plate 12 to displace the pins 10 and 11 to opposite sides of the common rest axis of the connecting rods 8 and 9. In view of the fact that the right hand or hinge end of the rod 9 is immobilised against longitudinal movement, the resultant tendency to shorten the overall length of the system of rods 8 and 9, taken together, causes the displacement, generally to the right, of the connecting rod 8 which thus causes the collar 14 to be drawn towards the washer 15 against the action of the spring 13, so that the lock-rod 5 is withdrawn from its coating hole in the bracket 6, thus freeing the gate 1 from its locking engagement with said bracket. Upon continuing the application of pressure to the buffer 17 the vehicle causes the gate 1 to swivel about its hinges 2 and 3 until the gate is fully opened. Preferably, however, the system is so dimensioned that the amount of pressure necessary to unlock the gate is sufficient also to open the gate fully.

After the fully opened position has been reached, the gate 1, as a consequence of the inclination of the member

19 from the vertical (caused by offsetting the hinges 2 and 3), ensures that the gate will now tend to dispose of the potential energy which has been stored within it by commencing to swing backwards to its initial position in which its centre of gravity is at a lower level. In order to prevent the closing motion of the gate from causing the latter to foul the vehicle, which may not yet have passed completely through the gateway opening, said closing motion is delayed by means of the apparatus now to be described principally with reference to FIGS. 3, 4, and 5 of the drawings.

Upon referring to these figures of the drawings, it will be seen that the uppermost rail 20 of the gate has pivoted with respect thereto a profile plate 21 which is in turn pivoted with respect to a shaft 22, which is in turn connected to a piston (not shown) which moves within a hydraulic cylinder 23. Said cylinder is in turn pivoted by means of a shaft 24 to the member 25 which forms part of the gate 1. A rail 26 is attached to the gate-post 4 by means of the bracket 27 to which the hinge 3 is also attached. The purpose of this rail is to engage the cam 28 (which is formed in the profile plate 21) when the latter has been brought into proximity with said rail when the gate swings open to the position shown in FIGS. 4 and 5. That is to say, the cam 28 which is below the level of the rail 26 in the closed position of the gate illustrated in FIG. 3, is brought to a somewhat higher elevation so as to engage said rail when the gate is in the open position. In this open position the rail 26 after having fully engaged the cam 28 as best shown in FIG. 5, causes the profile plate to be tilted from its normally substantially vertical position so that the shaft 22 is urged both laterally and upwardly, thus drawing the piston in part from the hydraulic cylinder 23. By a suitable arrangement of valves or the like in the hydraulic system of which said cylinder forms a part, the gravitational force which tends to close the gate acts against the force which tends to keep the piston from re-entering the hydraulic cylinder, and hence the gate closes after a time delay which may be predetermined as desired by a suitable design of the hydraulic system. In view of the fact that a rail such as 26 extends to both sides of the closed gate, and since the profile plate 21 possesses a cam such as 28 on both sides, a similar time delay effect occurs when the gate is opened in the opposite direction from that above described, and then subsequently allowed to close.

If desired, the gate may be opened manually and operated in conventional manner, whether by manipulating the buffers 16 or 17 so as to displace them laterally, or alternatively, a separate manual control (not shown) may be provided for the temporary extraction of the lock-rod 5 from the coacting hole in the bracket 6.

I claim:

1. In a gate or similar closure having a frame and hinge means for causing gravity return of the frame from an open to closed position; a delayed latching mechanism including in combination, a stationary latch bar and

means adjacent said hinge means mounting the latch bar to extend generally transverse to the plane of the gate frame generally adjacent the hinge means, a profile plate having one end pivotally connected with respect to a first portion of the gate frame, a hydraulic cylinder having one end pivotally connected to a second portion of the gate frame below said first portion, said hydraulic cylinder having a piston and an extendible and retractable piston rod pivotally connected at its free end to the other end of the profile plate, said profile plate having an aperture intermediate its ends dimensioned to receive said latch bar when the gate is in open position, said hydraulic cylinder and profile plate being constructed and positioned in the frame such that when the gate is in closed position the hydraulic cylinder and profile plate extend substantially vertically with the piston rod in a retracted position and the center of the aperture lying below the axis of the stationary latch bar, and thereafter when the gate is moved to open position the profile plate engages the latch bar and pivots in one direction to pivot the cylinder in an opposite direction and extend the piston rod until the latch bar is received in said aperture.

2. The delay latching mechanism as defined in claim 1 wherein said first portion of the gate frame includes an elongated rail and wherein the pivotal connection of the profile plate to the frame includes an aperture in the said one end of the profile plate received about the rail.

3. The delay latching mechanism as defined in claim 2 wherein said profile plate has a generally planar construction and includes two apertures intermediate its ends for alternately receiving the stationary latch bar depending on the direction in which the gate is opened.

4. The combination defined in claim 1 further including a latch means located on the free end of the gate for latching the free end of the gate to a gate post or the like, and means located on the gate intermediate the ends thereof and operatively connected to said last defined latch means for retracting said latch means to permit movement of the gate to open position in response to engagement by a vehicle or the like.

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