

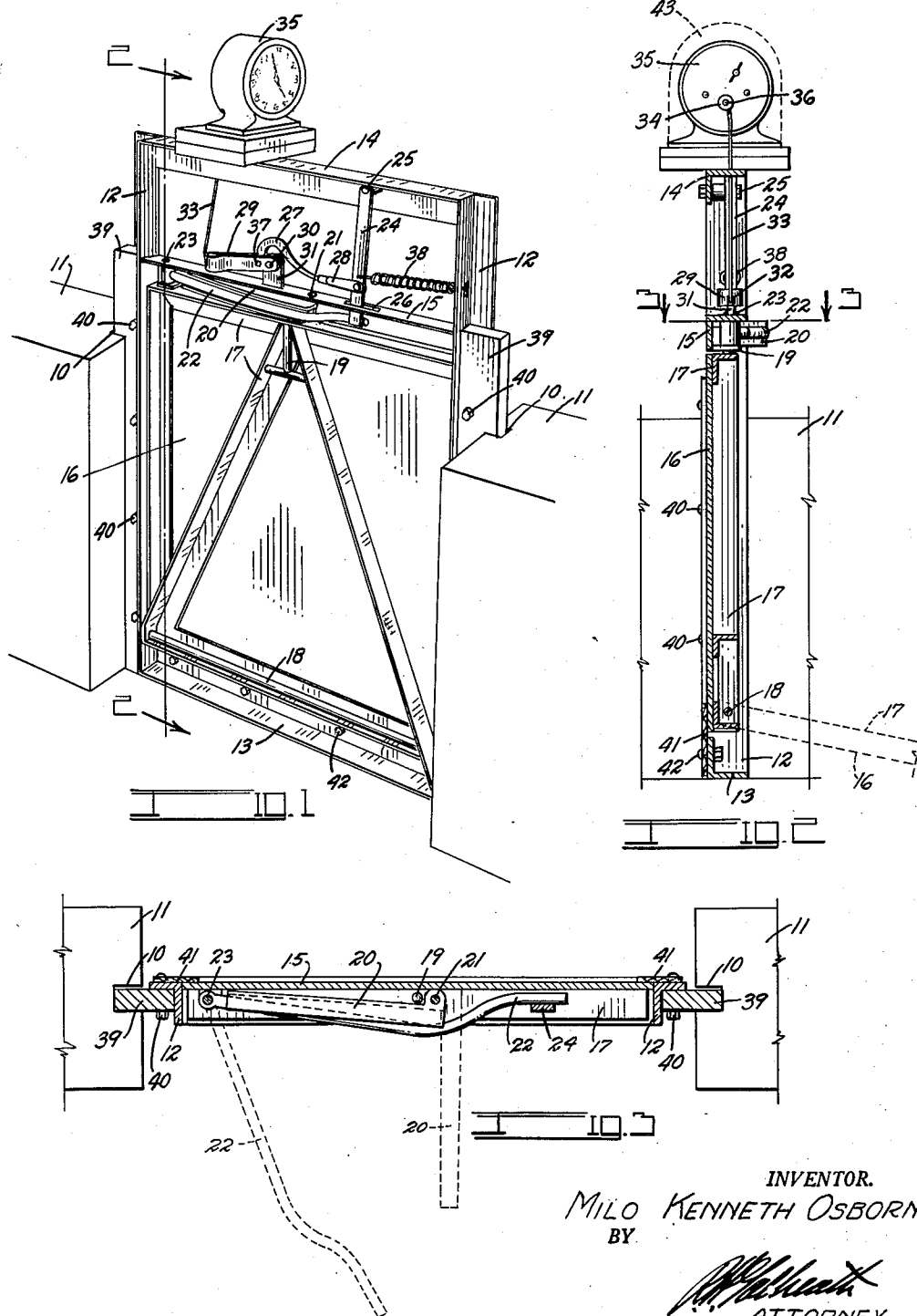
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AUTOMATICALLY OPENING HEAD GATE

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AUTOMATICALLY OPENING HEAD GATE

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This invention relates to an automatic irrigation gate. It is more particularly designed for use in farm irrigation laterals, and has for its principal object the provision of a time-controlled head gate which can be pre-set to open at any selected time during the day or night.

Another object of the invention is to so construct the device that the weight of the head of water against the gate will not interfere with the automatic opening function thereof, and which will be so constructed that it can be opened by a simple clockwork mechanism, regardless of the weight of water thereagainst.

A further object is to so construct the gate that it will be portable so that it may be moved from one lateral or turnout to another to obtain the desired irrigation results.

Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy, and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention, reference is had to the accompanying drawing which forms a part hereof. Like numerals refer to like parts in all views of the drawing and throughout the description.

In the drawing:

Fig. 1 is a perspective view, illustrating the downstream side of the improved gate in the closed position;

Fig. 2 is a vertical section therethrough, taken on the line 2—2, Fig. 1; and

Fig. 3 is a horizontal section, taken on the line 3—3, Fig. 2.

The gate is designed to fit into a receiving groove 10 formed in the opposite sides of a gate opening in a retaining or ditch wall 11. The gate comprises an outer frame consisting of two vertical side angle irons 12 joined at their bottoms by means of a horizontal bottom angle iron 13 and at their tops by means of a horizontal top angle iron 14. A cross angle iron 15 extends between the two side angle irons 12 in parallel relation to the top angle iron 14.

A gate plate 16, mounted on a stiffening framework 17, is hinged upon a hinge shaft 18 extending horizontally across between the side irons 12 parallel to the bottom iron 13. A latch stud 19 extends upwardly from the gate frame 17 to a position in the rear of the vertical leg of the cross angle iron 15.

When the gate is closed, the latch stud 19 is caught behind a swinging channel member or lever 20 which is mounted on the cross iron 15

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upon a hinge pin 21 positioned at its inner extremity.

The outer extremity of the channel member 20 rests against a horizontally swinging bar 22. The bar 22 is hinged to the cross iron 15 at its outer extremity upon a suitable hinge pin 23. The channel member 20 bears against the bar 22 adjacent the hinge pin 23, and the bar projects inwardly beyond the hinged extremity of the channel member, where it curves to a position in the rear of the vertical leg of the angle iron 15.

The upper extremity of the bar 22 bears against a vertical, swinging lever arm 24 which is hingedly suspended from a hinge pin 25 on the upper angle iron 14. The swinging lever arm 24 depends downwardly through an elongated slot 26 in the cross angle 15.

The lever arm 24 is swung sidewardly so as to disengage the extremity of the bar 22 by means of a hook-shaped connecting rod 27 which terminates in a split clevis 28, which is hinged to the lever 24 adjacent the free extremity of the latter. The hooked extremity of the connecting rod 27 is pivotally connected by means of a pivot member 37 to an actuating lever 29.

The actuating lever 29 is mounted on a hinge pin 30 in an upstanding lever bracket 31 on the cross angle 15. The lever 29 is preferably formed from a single strip of metal folded back upon itself so that its two extremities will lie on opposite sides of the connecting rod 27 and the bracket 31. The bracket 31 is sufficiently high to allow the pivot member 37 to drop below the center line between the hinge pin 30 and the point of connection between the clevis 28 and the swinging lever arm 24 so as to provide a self-locking position for the connecting rod 27. A tension spring 38 is stretched between the lever arm 24 and one of the side irons of the frame to constantly urge the arm 24 to the releasing position.

The free extremity of the actuating lever 29 has an upwardly extending notch 32 for detachably receiving the knotted extremity of a draw cord 33. The draw cord 33 extends to, and is secured on, a winding spool 34 mounted on an alarm winding shaft 36 of a conventional alarm clock 35.

When the gate is closed, the channel member 20 is folded against the latch stud 19. The swinging bar 22 is then folded against the channel member 20. The swinging lever arm 24 is then positioned over the extremity of the rod 22 by lowering the actuating lever 29 to below the "dead center" or locking position of Fig. 1 against the action of the spring 38.

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The alarm clock 35 is now set to release at any desired time. When this time arrives, the alarm winding shaft 36 rotates the spool 34 to wind in the cord 33. This lifts the actuating lever 29 and raises the pivot member 37 above the axis of the hinge pin 30, so as to allow the spring 38 to snap the swinging lever arm 24 outwardly. This releases the cord 33 from its notch 22, and also releases the extremity of the bar 22 from the lever arm 24, allowing the bar 22 to swing outwardly under the influence of the channel member 20, as shown in broken line in Fig. 3. This releases the channel member 20 and allows it to swing outwardly, as shown in broken line, under the influence of the latch stud 19 so that the gate will fall to the open or broken line position of Fig. 2.

It is desired to call attention to the fact that the latch stud 19 is positioned closely adjacent the hinge pin 21, and that the extremity of the swinging channel member 20 bears against the bar 22 closely adjacent its hinge pin 23. It will also be noted that the clevis 28 is connected to the lever 24 adjacent the free extremity of the latter, and to the actuating lever 29 closely adjacent the hinge pin 30, so that a four-stage, multiplied leverage is obtained which in the embodiment illustrated, requires the clock and cord to only act against approximately $\frac{1}{24}$ of the pressure exerted by the latch stud 19.

Two guide strips 39 are mounted on the vertical side angle irons 12 by means of suitable attachment bolts 40. These strips may be of wood or metal and are designed to slide vertically into the receiving grooves 13 of the retaining wall 11 so that the entire gate structure can be lifted from place.

The gate is sealed against the water on its upstream side by means of a relatively wide, flexible sealing gasket 41 of impregnated canvas or the like, which is secured along the side irons 12 by means of the bolts 40 and along the bottom angle iron 13 by means of bolts 42 so as to overlap the adjacent edges of the gate plate 16.

The clock 35 has been illustrated as uncovered for the sake of clarity. In actual use however it would be protected by a weather proof hood as indicated in broken line at 43 in Fig. 2.

While a specific form of the improvement has been described and illustrated herein, it is to be understood that the same may be varied, within the scope of the appended claims, without departing from the spirit of the invention.

Having thus described the invention, what is claimed and desired secured by Letters Patent is:

1. An automatically opening irrigation gate comprising: a vertical, rectangular gate frame; a gate hinged at its lower extremity in said gate frame and adapted to swing within the confines of the latter; a cross member in said gate frame above said gate; a latch member extending upwardly from said gate to a position adjacent said cross member; a first lever member hinged to said cross member adjacent said latch member and adapted to be swung horizontally against said latch member to lock same to said cross member; a second lever member hinged to said cross member beyond the free extremity of said first lever member and arranged to swing horizontally against the extremity of said first lever member to lock the latter against said latch member; and clock-actuated means for releasing the free extremity of said second lever member.

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2. An automatically opening irrigation gate comprising: a vertical, rectangular gate frame; a gate hinged at its lower extremity in said gate frame and adapted to swing within the confines of the latter; a cross member in said gate frame above said gate; a latch member extending upwardly from said gate to a position adjacent said cross member; a first lever member hinged to said cross member adjacent said latch member and adapted to be swung horizontally against said latch member to lock same to said cross member; a second lever member hinged to said cross member beyond the free extremity of said first lever member and arranged to swing horizontally against the extremity of said first lever member to lock the latter against said latch member; a lever arm suspended from said frame so that its lower free extremity will swing over the free extremity of said second lever; an actuating lever mounted on said cross member so as to swing in the vertical plane of said gate; a hinge pin hingedly mounting said actuating lever to said cross member so that it will extend normally away from said lever arm; a connecting rod extending from said lever arm across the hinge point of said actuating lever to a pivotal connection with the latter, said pivotal connection being arranged to swing below a line joining the hinge point of the actuating lever and the connecting point between the connecting rod and the lever arm to lock the latter against movement away from said second lever; a spring urging said lever arm away from said second lever; and means for moving said actuating lever upwardly past its locked, dead-center position to allow said spring to release said reciprocating lever from said second lever.

3. An automatically opening irrigation gate comprising: a vertical, rectangular gate frame; a gate hinged at its lower extremity in said gate frame and adapted to swing within the confines of the latter; a cross member in said gate frame above said gate; a latch member extending upwardly from said gate to a position adjacent said cross member; a first lever member hinged to said cross member adjacent said latch member and adapted to be swung horizontally against said latch member to lock same to said cross member; a second lever member hinged to said cross member beyond the free extremity of said first lever member and arranged to swing horizontally against the extremity of said first lever member to lock the latter against said latch member; a lever arm suspended from said frame so that its lower free extremity will swing over the free extremity of said second lever; an actuating lever mounted on said cross member so as to swing in the vertical plane of said gate; a hinge pin hingedly mounting said actuating lever to said cross member so that it will extend normally away from said lever arm; a connecting rod extending from said lever arm across the hinge point of said actuating lever to a pivotal connection with the latter, said pivotal connection being arranged to swing below a line joining the hinge point of the actuating lever and the connecting point between the connecting rod and the lever arm to lock the latter against movement away from said second lever; a spring urging said lever arm away from said second lever; a clock-actuated spool mounted on said frame above said actuating lever; and releasable means connecting said spool with said actuating lever to enable said clock-actuated mechanism to lift said actu-

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ating lever upwardly past the dead-center position.

4. An automatically-opening irrigation gate construction comprising: a gate member; an outer frame completely surrounding said gate member; a hinge hingedly mounting said gate member at one side to said outer frame; a latch stud fixedly projecting from the other side of said gate member and extending across the outer frame at said latter side; a swinging bar hinged at its one extremity to the latter side of said frame at one side of said latch stud and positioned so that its free extremity will swing across said stud at right angles thereto to releasably hold said stud and said gate member against said frame; and means for releasing the free extremity of said swinging bar at pre-set times.

5. An automatically-opening irrigation gate construction as recited in claim 4 in which the means for releasing the free extremity of said swinging bar comprises: a lever arm hingedly suspended over the free extremity of said swinging bar when the latter is against said stud, the hinge axis of said lever arm being at right angles to the hinge axis of said swinging bar so that said lever arm may swing lengthwise of said swinging bar and away from the extremity of the latter to release said swinging bar; a spring urging said lever arm away from said swinging bar; and a clock-actuated releasing mechanism holding said lever arm in engagement with said swinging bar.

6. An automatically-opening irrigation gate

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construction as recited in claim 5 in which the clock-actuated mechanism comprises: an actuating lever hinged at its one extremity so as to swing in the plane of said lever arm; a hooked connecting rod connected between said lever arm and said actuating lever and extending across the hinged extremity of the latter so as to pass beyond the dead-center point of the pivot of said actuating lever; and clock-actuated means for returning said actuating lever from said dead-center point to cause said connecting rod to swing said actuating lever to allow said lever arm to release said swinging bar.

7. An automatically-opening irrigation gate construction as recited in claim 4 having a channel member hinged to said frame on the opposite side of said stud from the hinge of said swinging bar and extending along the latter toward the hinged extremity thereof and positioned between said stud and said swinging bar to communicate the thrust of said stud to said bar.

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