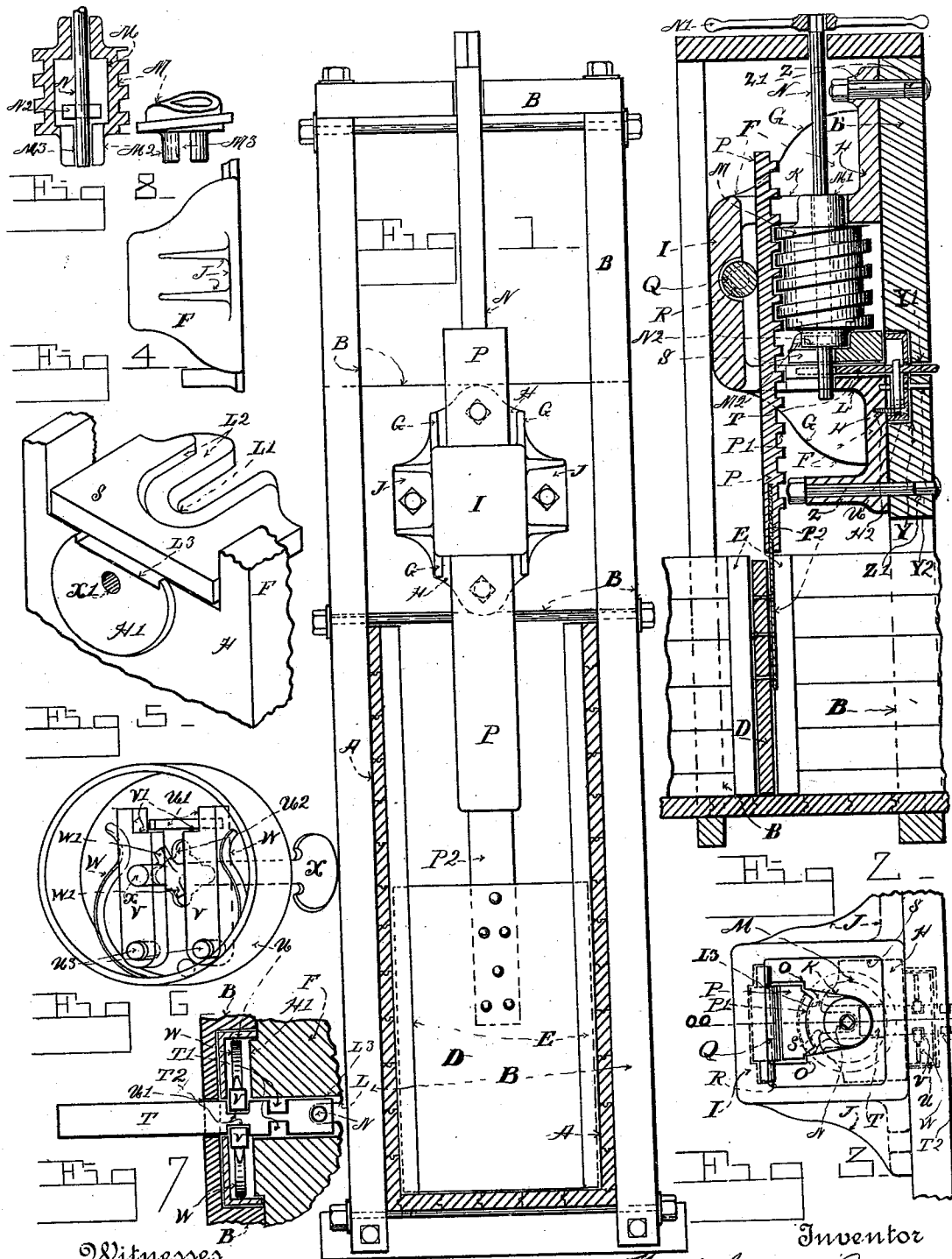


(No Model.)

F. C. BROWN.
HEAD GATE OPERATING MECHANISM.

No. 542,238.

Patented July 9, 1895.



Witnesses

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HEAD-GATE-OPERATING MECHANISM.

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To all whom it may concern:

Be it known that I, FRANK CORNING BROWN, a citizen of the United States of America, residing at Highland Lake, in the county of Weld and State of Colorado, have invented certain new and useful Improvements in Head-Gate Operating Mechanism; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in head-gates for ditches, flumes, and sluice-boxes.

The objects of my invention are, first, to provide means for raising or lowering and locking the gate at any desired distance or number of inches or fractions of an inch above the bottom of the flume; second, to provide a head-gate operating and locking mechanism, which when set in any desired position cannot be changed by removing the bolts or screws used to secure it together and to its supporting parts of the flume without destroying some of its parts or its supports; third, to provide a head-gate operating and locking mechanism especially adapted to control the gates of irrigating flume-boxes, and one in which the locking mechanism can only be unlocked by a properly-formed key. I attain these objects by the mechanism illustrated and described in the accompanying drawings and specification, in which—

Figure 1 represents an elevation, partially in section, of a flume and gate and my improved operating mechanism. Fig. 2 represents a side elevation in partial section through line o o of Fig. 3, the operating mechanism being drawn to a larger scale and the flume portion to a smaller one. Fig. 3 represents a plan view of the operating mechanism with only a fragment of a portion of the flume. Fig. 4 represents a side elevation of the worm-box. Fig. 5 represents a fragment in perspective. Fig. 6 represents a fragment in perspective. Fig. 7 represents a plan and section of a fragment. Fig. 8 represents two views of the worm-gear.

Similar letters of reference refer to similar parts throughout the several views.

Referring to Fig. 1, A designates the flume; B, the supports for the gate-operating mechanism; D, the gate; E, guides between which the gate is raised and lowered vertically.

F is a cast-box. It comprises two sides G, a back H, a front piece I, which closes the central part of the front of the box, projecting side wings J, adapted to receive securing-bolts, and two interior partial transverse partitions K and L, which, with the front I, form a partially-inclosed chamber, which has an opening its full size through the back H. The partial partitions K and L are formed with semicircular openings in vertical alignment with one another. The upper one is, however, the largest in diameter. They are arranged near the back H and are adapted to form a lateral support for the top hub of the worm-gear M and the lower end of the actuating-rod N. From these semicircular walls of the partitions the sides thereof diverge toward the front I and sides G, and are provided with steps O, which are adapted to partially inclose and form guides for the spiral rack P to move vertically in. This rack is provided with spirally-arranged teeth P', which mesh with those of the worm.

A roller Q, which is provided with trunnions R, is journaled in suitable semicircular recesses in the front to bear against the back of the rack, thereby holding it in mesh with the worm-gear and providing an almost frictionless support for it. An extension P², which forms a part of or is secured to it, is secured to the gate. The worm-gear M is provided with hubs M' and M² at its ends. The gear is supported in the chamber of the box by the hub M', bearing in the semicircular wall of the partition K, and by the hub M², bearing in an independent block S, which rests on the lower partition L. This block S is provided with an open space through it extending into it from one side and terminating in a semicircular wall L', which forms a lateral support for the lower end of the round actuating-rod N. Concentric with this rod bearing in the block a semicircular sunken step and wall L² is formed in the block of larger diameter, which supports the lower hub of the worm and receives its end-thrust.

The step and wall also extend out to the side of the block concentric with the smaller opening through it. This block is adapted to fit closely but freely in the chamber of the box, and is prevented from moving by its sides and the support B and the rack.

The worm-gear is cast with a hollow center and hubs, the hole in the center of the worm being made larger than those through the hub, as shown in dotted lines in Fig. 2, for a purpose which will be hereinafter described.

The actuating-rod N is preferably a round rod. At its upper end it is squared and a wrench N' is fitted to it. Adjacent to its lower end a key or pin N² is rigidly secured centrally in it to project a distance on each side equal to the thickness of the shell of the hub M². Diametrically across the hub a slot M³ is cut, adapted to receive the key, and in which it can freely move vertically. This slot extends through the hub into the chamber of the worm, which is of larger diameter than the key, to allow the key to be drawn up into it by drawing the rod vertically through the worm. The lower partition is provided with a sunken recess L³ in its center, which forms a passage-way for a locking-bolt T under the said block. (See Fig. 5.)

U designates preferably a circular tumbler-case. It fits over a boss H', cast to the back H. It is secured to the back by a screw H². The tumbler-case is provided with a slot U', through which the locking-bolt extends; also, a keyway U². Two pins U³ are arranged in the case, (see Fig. 6,) on which pivot two tumblers V. The opposite ends of the tumblers are provided with a step V', which forms both a seat and a shoulder. The seat passes under the locking-bolt and the shoulder and end strike against the edges of recesses T' and T² cut in the bolt to receive them. Springs W are arranged and secured in the case to hold each tumbler against the edge of the locking-bar.

X designates a key. Its lock end is provided adjacent to its extreme end with oppositely-arranged projections W'. Its extreme end fits into a hole X', formed in the boss H'. When the key is inserted in the case, the projections register between and against the tumblers, and if the key be turned they are thereby separated and moved back away from the locking-bar, swinging on their pivots against the springs. The lock-case fits into a hole Y, bored into the support B, to receive it. A slot Y' for the locking-bar and also a keyway Y² are cut through it. Consequently the lock-case is inaccessible.

N' designates a handle by which the actuating-rod is turned.

Z are bolts for securing the box to the support B.

When the device is secured to a flume, the top and bottom bolts cannot be removed, as their nuts are arranged to come directly behind and close to the rack and rod to be taken off.

It has been the general practice in head-gate-locking mechanism to arrange the securing-bolts where they could be easily gotten at, and farmers desiring to steal water during the night hours have only to remove the bolts and lift the gate and operating mechanism bodily, carefully returning the same to its normal position before morning. It is impossible to do this with my device, as the bolts cannot be removed. I preferably use carriage-bolts for this purpose, which have a round head and square shank in juxtaposition to it, as shown at Z', which prevents the bolts turning in their holes. Consequently they must be driven out after the nuts are removed, which cannot be done without taking the device to pieces, and this cannot be done until the device is unlocked.

The operation is as follows: In Fig. 2 the gate is unlocked. The key of the rod N is in the hub of the worm. By manually turning the wrench the worm is turned by the key of the rod. This causes the rack to move upward. The pitch of the teeth of the worm for ordinary sized gates is preferably one inch, which gives one inch vertical movement of the gate to each full revolution of the wrench, rod, and worm. The gate can also be set at any fraction of an inch, as it can be locked at any desired point in the revolution of the wrench. Most gates in use can be locked only on the quarters, which is a serious defect. To lock the gate, lift the rod vertically through the worm until its projections are in the chamber of the worm and high enough to raise its end above the end of the locking-bar, as shown in dotted lines in Fig. 2. Then insert the key in the tumbler-case through the support B and separate the tumblers by turning it until the bolt can be moved in. Then withdraw it. The tumblers, when the mechanism is unlocked or in the position shown in Fig. 2, are in the recesses T', which prevents the bolt being withdrawn entirely. As soon as the bolt is released from the tumblers, push it under the end of the rod until the tumblers spring into the recess T², which locks it there. Then allow the rod to rest on the bolt, as shown by the fragment in Fig. 7. To unlock the device, the tumblers must be first separated by the key and the bolt drawn back to the recesses T', which will allow the rod to drop down, when it can be turned until its projections register with the slot in the hub, when it will drop until they contact with the step of the block S. This gate operating and locking mechanism is simple, durable, compact, and efficient.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A head gate operating mechanism comprising a worm gear having hubs, a rack meshing in said gear and secured to the gate, a box adapted to receive and support said gear and rack, a manually operating rod having a projection adjacent to its lower end, a hollow

chamber in said gear, cores of smaller diameter through said hubs, and a slot in the lower end or hub communicating with said chamber, adapted to receive said operating rod projection, substantially as set forth.

2. In a head gate operating mechanism the combination of the box having a chamber therein, a worm journaled therein, a rack in mesh with said gear, a roller supporting said rack, and a manually operating rod adapted to turn said worm.

3. In a head gate operating mechanism the combination of the box having the transverse partial partitions, the worm, the rack and gate, and the roller support.

4. In a head gate operating mechanism the combination with the box having the transverse partition, of the worm having hubs, a hollow chamber, cores through said hubs communicating therewith, a diametrical slot in said hub, and an independent block supporting the lower hub.

5. In a head gate operating mechanism the combination with the worm and rack and box support, of a manually operated rod arranged in said worm substantially as shown and an independent removable bearing block adapted for the lower bearing of the worm.

6. In a head gate operating mechanism the combination with the worm, rack and operating rod, of a cast box support having partial transverse partitions, one of which is adapted to support one end of said worm, an independent block supported by said second partition and adapted to support the opposite end of said worm, and means for securing said box to the flume box supports to prevent its displacement by removing its bolts or fastenings.

7. In a head gate operating mechanism the combination with the worm, rack and operative rod of a cast box support for said parts having two of its fastening bolts arranged at opposite ends thereof and behind and close to said rod and rack, whereby the said bolts of their nuts cannot be removed and the operating device moved from its normal position.

8. The combination with the worm, and rack having teeth meshing with one another, and the operating rod of the independent block having a stepped bearing for the worm and an opening therethrough for the end of said rod.

9. The combination with the worm and operating rod, of the box support having partitions, a groove in the lower partition, an independent bearing block, a locking bar adapted to slide under said block in said groove under the end of said operating rod, a tumbler case and tumblers arranged and adapted to lock said bar both in a position of use and

disuse, relatively to said bar, and a key for manipulating said tumblers.

10. The combination with the worm, operating rod and rack, of the box support, the independent bearing block, a lock case secured to said box having a locking bar having two sets of notches arranged therein and adapted to be moved laterally under said block and the end of said operating rod, notches in the edges of said bar, two spring actuated tumblers pivoted in said case to bear in said notches, whereby it may be locked either in a position of use or disuse, and a key for separating said tumblers and releasing said bar.

11. The combination with the worm and box of the lock case, the spring actuated tumblers and the locking bar.

12. In a head gate operating mechanism the combination of the box, the worm, the rack, the operating rod, the roller, the independent bearing block, the lock case, the spring actuated tumblers, the locking bar and the key, substantially as specified.

13. In a head gate operating mechanism the combination with the box of a lock case secured thereto to project therefrom, a support for said box forming a portion of said flume, having a recess therein extending partially through it and adapted to receive said case, and openings therethrough adapted to pass the key and locking bolt into said case.

14. In a head gate operating mechanism the combination of the box and lock case and a cross support provided with a recess adapted to receive and conceal said lock case.

15. The combination of the cast box, the worm, the operating rod, the rack and extension, the gate, the roller, the independent bearing block, the locking bar, the locking case, the spring actuated tumblers, the key, a hole in said box adapted to receive the end of said key, the top flume piece for supporting said operating rod and the lock case supporting flume piece having a recess therein adapted to receive and conceal in said cross piece the said case.

16. In a head gate operating mechanism the combination of the box, the worm, the operating rod, the block, the locking bar, the locking case, the spring actuated tumblers, and means for supporting said box and rod and for concealing said locking case, all arranged substantially as herein set forth.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK CORNING BROWN.

Witnesses:

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F. S. WATKINS.