Jan. 9, 1923. 1,441,608.

R. W. STEWART.

BIN GATE.

FILED AUG. 5, 1920.

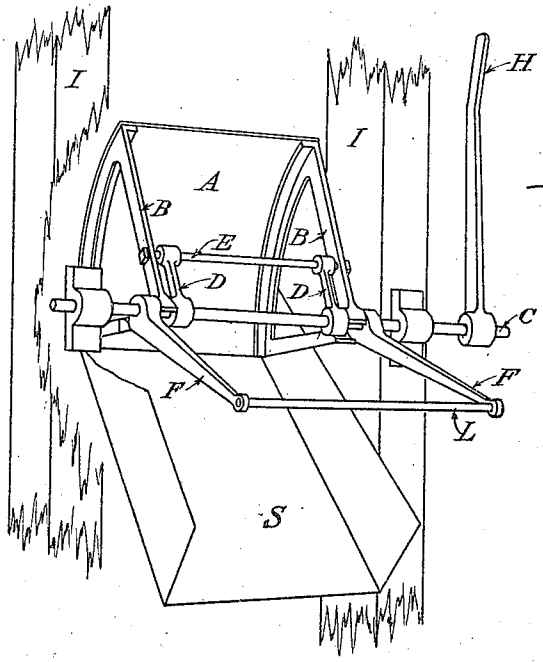



Fig. 1.

Fig. 2.

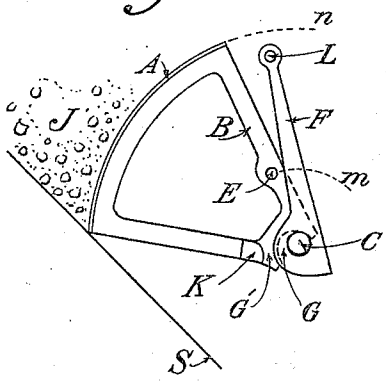
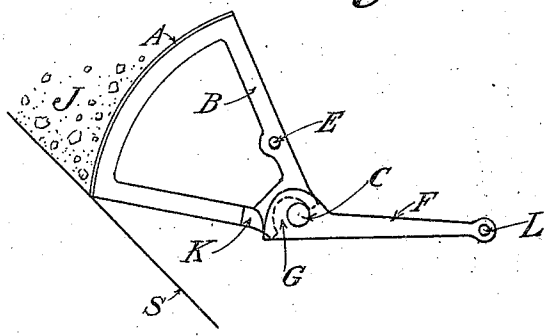



Fig. 3.




WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## BIN GATE.

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*To all whom it may concern:*

Be it known that I, RALPH WM. STEWART, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Bin Gate, of which the following is a specification.

My invention relates to improvements in gates by which the material stored in bins or reservoirs is retained and released by means of a closure member. The closure member of this class of gates commonly has an arcuate surface usually called a "quadrant" which revolves about or with a shaft, the shaft occupying a position on the concave side of the quadrant along or near the center of curvature of same, the material in the bin or reservoir, when retained, reposing against the convex face of the quadrant.

Gates of this type are in common use at outlets in the sides of sand or gravel bins. When so used they are commonly known as "quadrant bin gates". Two requisites of a gate of this type when used with granular material are that it may be readily opened when a mass of material having a high co-efficient of friction is pressing heavily against it, and that it may be closed while material is flowing from the opening in the bin which it serves. If the material is liquid or semi-liquid it is desirable that the gate should close tightly against the opening which it serves so that leakage will be prevented.

I have therefore devised a gate having a closure member which rotates about shafts and which when desired by the operator thereof can be quickly and easily caused to recede from the material which presses against it as it commences its opening movement and, after having been opened, caused to advance so that it will return to its original position when closed.

The invention will be understood by reference to the accompanying drawings, wherein:—

Fig. 1 is a perspective view showing the asembled parts of the gate attached to the wall of a bin together with a discharge chute leading from the opening in the bin wall served by the gate. Fig. 2 is an end elevation of the gate in closed position with its mechanism set for easy opening. Fig. 3 is an end elevation of the gate in closed position.

Referring particularly to Fig. 1, A represents the arcuate face member of the gate, B the arms attached thereto, C a shaft having a fixed center of rotation, D arms which extend from shaft C to shaft E. By means of arms D shaft E is caused to revolve about shaft C, when shaft C is rotated. F and F are cam levers rotating on shaft C; for convenience they are connected at their outer ends by bar L. S represents the chute usually provided to control the direction of the flow of material released by the gate. I and I are parts of the wall of the bin to which the gate is attached. Part of the chute S and part of the bin wall are shown as cut away so that a portion of the gate will not be hidden from view. H represents a handle by means of which shaft C may be rotated. Other means for rotating this shaft could be used.

Shaft E passes through arms B with a fit which permits arms B to rotate about it. Shaft C passes through a recess or opening in arms B, the recess or opening being larger than shaft C.

In Fig. 2 all letters appearing in Fig. 1 designate the same members as in Fig. 1. For clearness the arms D, handle H, and portions of bin wall I and I are omitted. J represents the confined material in the bin reposing against the convex side of the arcuate face A of the gate. K represents a projection from the side of arm B. In the position shown shaft C is in contact with the upper side of the recess in arm B, through which it passes, leaving a gap G between shaft C and the side of the recess in arm B which is toward the bottom of the material J in the bin. Also cam lever F is shown rotated to a position which leaves a gap G′ betwen it and projection K.

If now, shaft C is rotated in such a manner as to cause shaft E to move along arc *m* the face A of the gate will not commence to rotate along arc *n* until either gap G or gap G′ closes, but members B will revolve with reference to shaft E in a direction opposite to the direction in which shaft C revolves, and that portion of the face of gate A below the plane passed through the center lines of shafts C and E will move away from the confined material J which reposes against it. As soon as gap G or G′ closes the face A of the gate readily revolves upward along arc *n*, the frictional resistance to such motion being greatly re-

duced by the movement of the face A of the gate away from material J before lifting. After the gate opens by movement of its face A along arc *n* cam levers F drop by gravity or may be lowered by hand until the pressure of cam levers F against projection K has caused arms B to rotate a sufficient distance about shaft E to bring arms B in contact with the top of shaft C thereby fully opening gap G. The gate will then close with its members in the position shown in Fig. 3 and may be easily reopened by first rotating cam levers F to the position shown in Fig. 2.

When the gate is used to confine liquid, semi-liquid, or soft compressible substances it may be adjusted so that its face A may be brought to a vary firm bearing against the opening which it serves by pressure exerted by cam lever F on projection K, thereby preventing leakage.

This pressure can be released as above described in order to open the gate.

What I claim is:

1. In a device of the class described, the combination of a wall having an opening therein, and a structure for controlling said opening, said structure comprising a closure member provided with rigid arms mounted on two shafts in such a manner that it can rotate about one shaft a distance limited by the construction of the arms and about the other shaft a distance limited by the structure to which the device is attached.

2. A bin gate having a closure member with arms rigidly connected to the same mounted on two axes, in such a manner that said closure member must remain the same distance from one axis, but that its distance from the other axis may be varied.

3. A bin gate having a closure member with rigid arms which, together, form a rigid body mounted on one fixed axis and one moving axis which revolves about said fixed axis.

4. A bin gate having a closure member with arms attached in such a manner that said closure member and its arms make a rigid assembly mounted on two shafts, one shaft only having a fixed axis, said shafts being connected by arms other than the arms of said closure member, the arms of said closure member being so mounted on said shafts that if, when the gate is in closed position, it is opened by rotation of the shaft having a fixed axis it will, before opening, revolve a short distance with reference to the shaft having a moving axis.

5. A bin gate comprising a closure member with rigid arms, an axis mounted on said rigid arms, a fixed axis upon which said arms are mounted, said closure member and its arms being so mounted on the two axes that if, when in closed position, the gate is opened by rotation about the fixed axis, the face of said closure member or a portion thereof, will, before opening by rotation about said fixed axis move closer thereto.

6 A bin gate comprising in combination a fixed axis, a revoluble axis, means pivotally securing said revoluble axis to said fixed axis, and a closure member pivotally mounted on said revoluble axis and having means limiting its pivotal movement.

RALPH WM. STEWART.