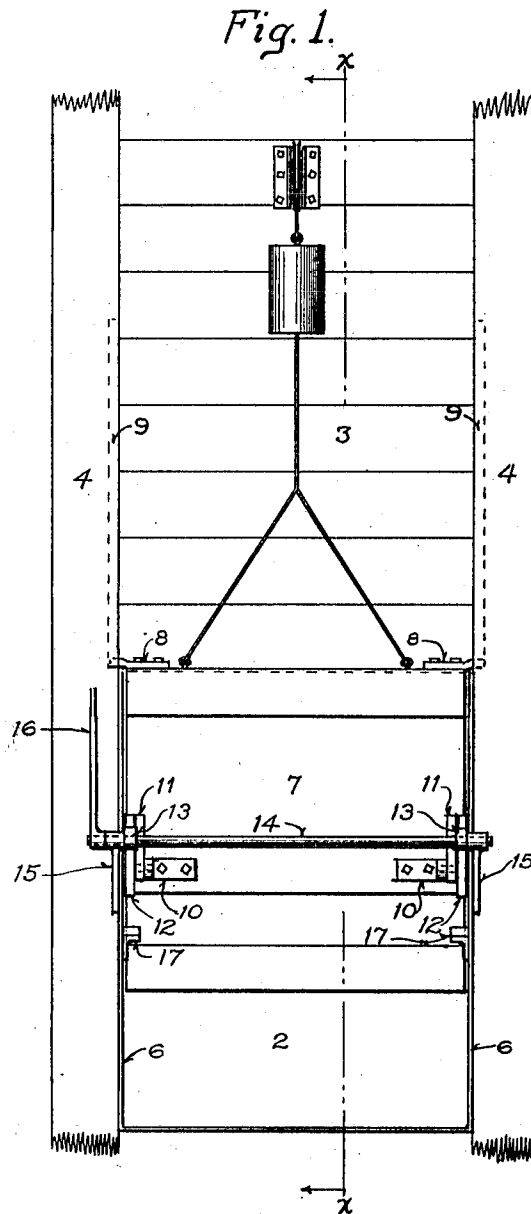


R. B. PEARSON.
 DOOR MECHANISM FOR ORE POCKETS OR SIMILAR RECEPTACLES.
 APPLICATION FILED APR. 14, 1911.

1,040,237.

Patented Oct. 1, 1912.
 2 SHEETS—SHEET 1.



WITNESSES:

Carroll L. Graff
 Floyd M. Fuller

INVENTOR

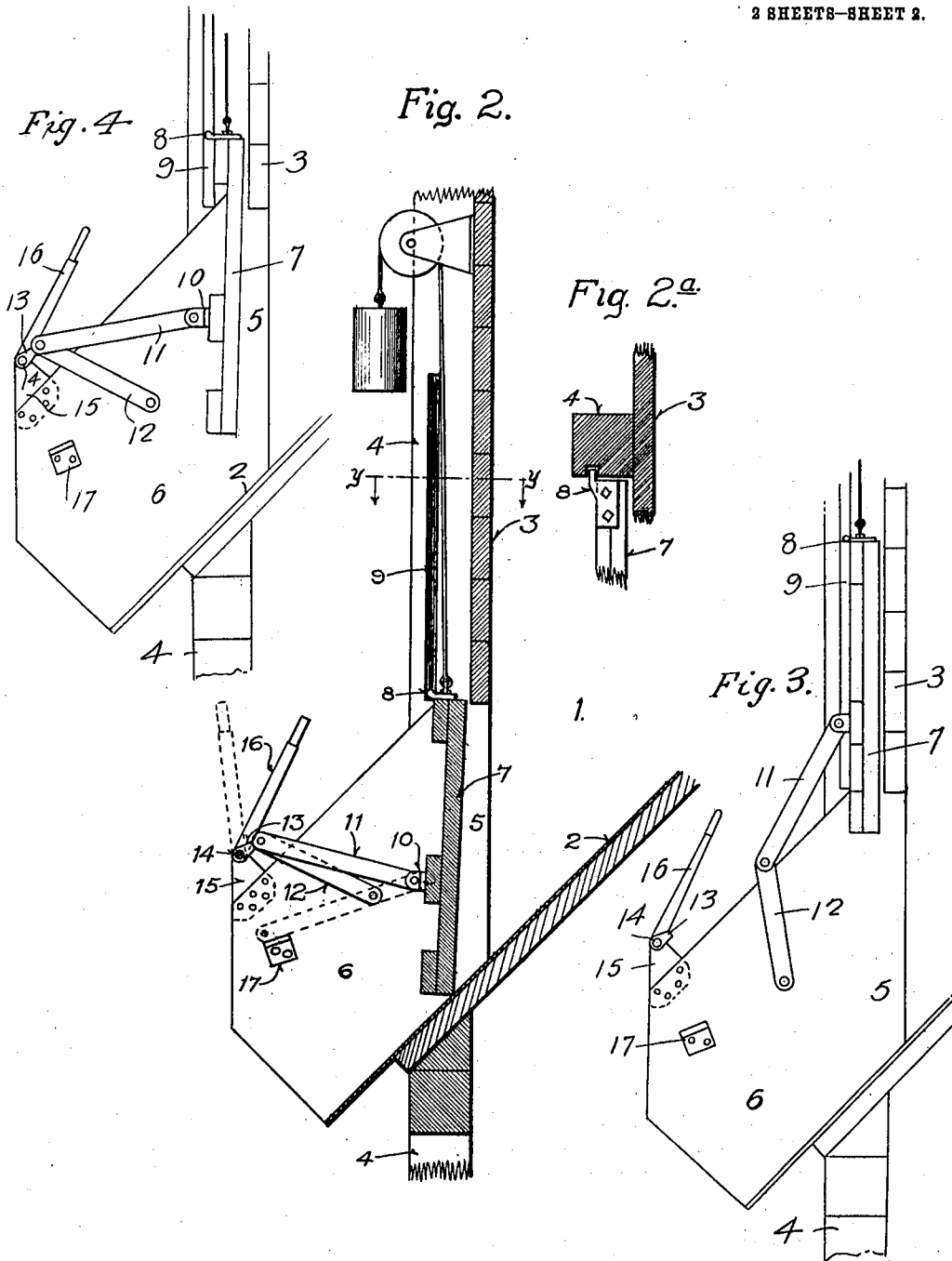
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UNITED STATES PATENT OFFICE.

ROBERT B. PEARSON, OF DULUTH, MINNESOTA.

DOOR MECHANISM FOR ORE-POCKETS OR SIMILAR RECEPTACLES.

1,040,237.

Specification of Letters Patent.

Patented Oct. 1, 1912.

Application filed April 14, 1911. Serial No. 621,136.

To all whom it may concern:

Be it known that I, ROBERT B. PEARSON, a citizen of the United States, and a resident of Duluth, in the county of St. Louis and State of Minnesota, have invented certain new and useful Improvements in Door Mechanisms for Ore-Pockets or Similar Receptacles, of which the following is a specification.

This invention relates more particularly to that class of ore pockets, bins or similar receptacles adapted to store one or more carloads of ore or other granular material at a time; and having a discharge opening wherefrom it is desired to deliver the material very rapidly and still be able to cut off the delivery thereof at will of the operator, and has particular reference to the construction and arrangement of the door mechanism by means of which this object may be attained, as will more fully hereinafter appear.

The principal object of my invention is to so construct the door and attached mechanisms as to provide a simple, economical and efficient door action which will be semi-automatic in opening and comparatively easy of closure against a head of ore or other material in the pocket when it is desired to stop the flow of same. This object I attain in the manner hereinafter set forth.

The invention consists principally in the novel structural features and combination and arrangement of parts, or mechanisms, whereby the door is held in place and its movements controlled, as hereinafter illustrated, described and claimed.

In illustrating and describing these improvements I have only illustrated and will describe that which I consider to be new, taken in connection with so much as is old as will properly disclose the invention to others and enable those skilled in the art to practice the same, leaving out of consideration other and well known elements, which if set forth herein would only tend to confusion, prolixity and ambiguity.

In the art to which this invention relates it is well known that with the present size of doors used, the ore when damp or sticky frequently arches clear across the door opening, causing much difficulty, and involving considerable time, labor and expense to break the arched material—generally from below—by manual labor before the remaining material can be discharged.

The principal object, therefore, of this invention is to provide a mechanism whereby a larger and wider door than heretofore used, can be handled and controlled economically, thus insuring a more rapid delivery of material with greatly lessened liability to choking and arching because of the larger discharge opening, thus eliminating considerable delay and expense incident to the operation thereof.

In the accompanying drawings Figure 1 is a front elevation of a portion of an ore pocket, having a door and door mechanism embodying my invention, while Fig. 2 is a vertical sectional elevation taken on the line $x-x$ of Fig. 1, looking in the direction of the arrows; Fig. 2^a an enlarged plan sectional detail taken on line $y-y$ of Fig. 2. Figs. 3 and 4 are diagrammatic views illustrating the operation of the door.

Referring to the drawings, 1 is the ore pocket having a bottom portion 2 inclined toward the discharge opening 5 in the front wall 3. This front wall 3 is reinforced by the posts 4, one on each side of the outlet 5, to which posts the side plates 6 of the opening 5 are fastened. This opening 5 is closed by a door 7, said door being supported in place by novel semi-automatic mechanism which forms the basis of this invention and will herein be described in detail.

Referring again to the drawings, the door 7 preferably of comparatively large size to facilitate the unloading of the pocket, is provided at the upper portion of its lateral edges with gudgeons 8 sliding in grooves 9 in the vertical posts 4. The respective lower lateral edges of the door are attached pivotally by means of the lugs 10 to simple link motions, each of which consists of struts 11 and links 12 pivoted together at their outer ends and having their opposite or inner ends pivoted respectively to the door 7 and side plates 6 substantially as shown, the bearing on the pocket being preferably somewhat below that on the door and outwardly therefrom, the struts and links being free to revolve about their pivots through part of a circle in a vertical plane at right angles or approximately so to the door 7 or front wall 3 of the pocket.

The object in placing the fixed pivot of the link motion below the level of the door pivot at its lowest or closed position is to so proportion the several parts of the link motion as to give the outer ends of the struts

and links a uniformly downward movement about the fixed pivot from the thrust of the material in the bin, thus holding the outer ends of the struts and links against the cams or dogs or causing them to drop with certainty to the stops 17 when the cams 13 are disengaged by the operator.

A short distance above the level of the door pivots when the door is in the closed position, and just outside the path of the outer ends of the links 12 extends a cam shaft 14 parallel to the door 7 and revolvably attached to the side plates 6 by means of the brackets 15 or in any other suitable manner, said cam shaft having keyed or pinned thereto, a controlling handle 16 and two cams or dogs 13 adapted to be projected into the path of said links 12 at some little distance above the level of the door pivots of struts 11 when door is in the closed position; in such a manner as to serve as a stop for the outer ends of said struts and links 11 and 12 holding the same at such a height that the door 7 can be forced down through a flow of ore in the discharge opening to the closed position, the link motion comprising parts 11 and 12 holding the door against the thrust of the ore while the cams remain in place.

When it is desired to open the door, the cams 13 are withdrawn from the path of the links 12 by means of the shaft 14 and handle 16 thereon; when the outer ends of the links 12 revolve downwardly about their pivots, from the thrust of the door through the struts 11, until the said links 12 strike the stops 17 which project from and are attached to the side plates 6 at such a point below and in the path of the links 12 that when said links 12 are resting on said stops 17 the outer ends of the struts 11, which are pivoted to the outer ends of links 12, will be so much lower than the door pivots of struts 11 that said struts 11 will be at such an angle with the door that the pressure of the ore or other material against the door will cause struts 11 to revolve upwardly about their outward pivots in links 12 (held stationary by the stop 17) thus raising the door bodily out of the course of the ore. To facilitate the opening action and retain the door in the raised position after opening it is counterbalanced in a suitable manner, as the door may weigh several hundred pounds when of large size and substantially built, as is herein contemplated.

In Fig. 1, the door is shown closed. In Fig. 3, the door is shown raised or wide open, leaving the chute free for discharge of ore or other material. In Fig. 4, the door is shown lowered to the position where it begins to cut off the flow of ore. The dogs 13 are set to stop the links 12 in the upper position, so that as the door goes down into the ore the struts 11 turn on the

pivots which attach them to the ends of the links.

The door is pushed down by hand, the struts taking the thrust of the ore against the door almost entirely, and after the door gets below a certain position, the resultant of the thrust of the ore and the thrust of the struts 11 forces the door further downward and holds it down so long as the outer pivots of the struts and links are held in the upper position by means of the dogs 13.

In actual construction there will be conditions at times when the stops 17 would probably be unnecessary, such as; should the link motion be attached nearer to the bottom of the door, the bottom of the chute might serve as a stop; also when link 12 is considerably shorter than struts 11 the stop might not be necessary, but would however, be desirable to render the action steadier and more reliable; and it is understood that other changes in the details or proportions as may be desired by one skilled in the art, can be made without departing from the intents and purposes of this invention as illustrated and described herein.

Having thus illustrated and described my invention, I claim and desire to secure by Letters Patent.

1. The combination of an ore-bin having vertical lateral guideways, a door having its top provided with pivots adapted to slide in the vertical guides and its lower lateral edges pivoted to simple link motions, which in turn are pivoted to the ore discharge, means for controlling the positions of the outer centers of said link motions by which the outer center may be held at a desired height to hold the door against the thrust of the ore when closing same, means for lowering the outer center when desired, in order that the thrust of the ore may be utilized in combination with the link motion, to raise the door above the flow of ore, substantially as described.

2. The combination with an ore receptacle and chute having a discharge opening, the chute being provided with vertical guideways, of a door having its top provided with pivots adapted to slide in the guideways, a pair of struts pivoted to the lower lateral edges of the door and extending outward, a pair of links pivoted to the sides of the chute, the outer ends of the links and struts being also pivoted together, and means for locking the outer ends of the links against the thrust of the struts and the door, and means for releasing the same, as described.

3. The combination with a chute having a discharge opening and vertical guides, of a gate adapted to close said opening and provided with pivots adapted to slide in the guides, a pair of struts pivoted to the door and extending outwardly therefrom, a pair of links which are shorter than the struts

and pivoted to the sides of the chute, their outer ends being also pivoted to the struts, a pair of cams adapted for engagement with the outer ends of the links, and a rotatable 5 transverse shaft on which the cams are fixed, said shaft being provided with a handle for rotating it, the cams being thus adapted to serve as stops when engaged with the links, thus locking the same against the thrust of 10 the door or releasing the latter at the will of the operator, as described.

4. The combination with an ore bin having a discharge opening, of a door having a counterbalance and adapted to slide vertically and a link mechanism pivotally connected with the door and the latter adapted 15 to move outwardly and upwardly when unlocked, means for keeping the outer center of the link mechanism in the uppermost position when it is desired to close the door 20 and to lock the door in place when closed, and means for locking and unlocking the link mechanism, as described.

5. The combination with a storage bin 25 for ore, or other granular material, provided with vertical guideways and a discharge opening, of a door adapted to close said opening, said door having the top lateral 30 edges provided with pivots adapted to slide in said guideways and having the respective lower lateral edges pivoted to a pair of struts extending outwardly therefrom, means for fixing the position of the outer 35 ends of said struts during the closing of the door, and as long as it is desired to keep

door closed, links pivoted to the sides of the chute and their outer ends pivoted to said struts; means for lowering the position of the outer pivots of said struts and links to release door substantially as described. 40

6. The combination with a storage bin 40 for ore, or other granular material, provided with vertical guideways and a discharge opening, of a door adapted to close said opening, said door having the top lateral 45 edges provided with pivots adapted to slide in said guideways and having the respective lower lateral edges thereof pivoted to a pair of struts extending outwardly therefrom and having their outer ends pivoted to links 50 which are in turn pivoted to the front of the bin, means for holding the outer ends of the links against the thrust of the door, means for releasing same when desired together with means for stopping same at proper 55 position when closing door.

7. A device of the class described, comprising, in combination, a bin having an opening in one wall thereof, a closure for said opening adapted for compound move- 60 ment in a vertical and horizontal direction, a strut on said closure and means associated with said strut adapted to control the path of travel of the free end thereof, substantially as described.

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Witnesses:

FLOID M. FULLER,
OSCAR T. MITCHELL.