No. 651,333. Patented June 12, 1900.

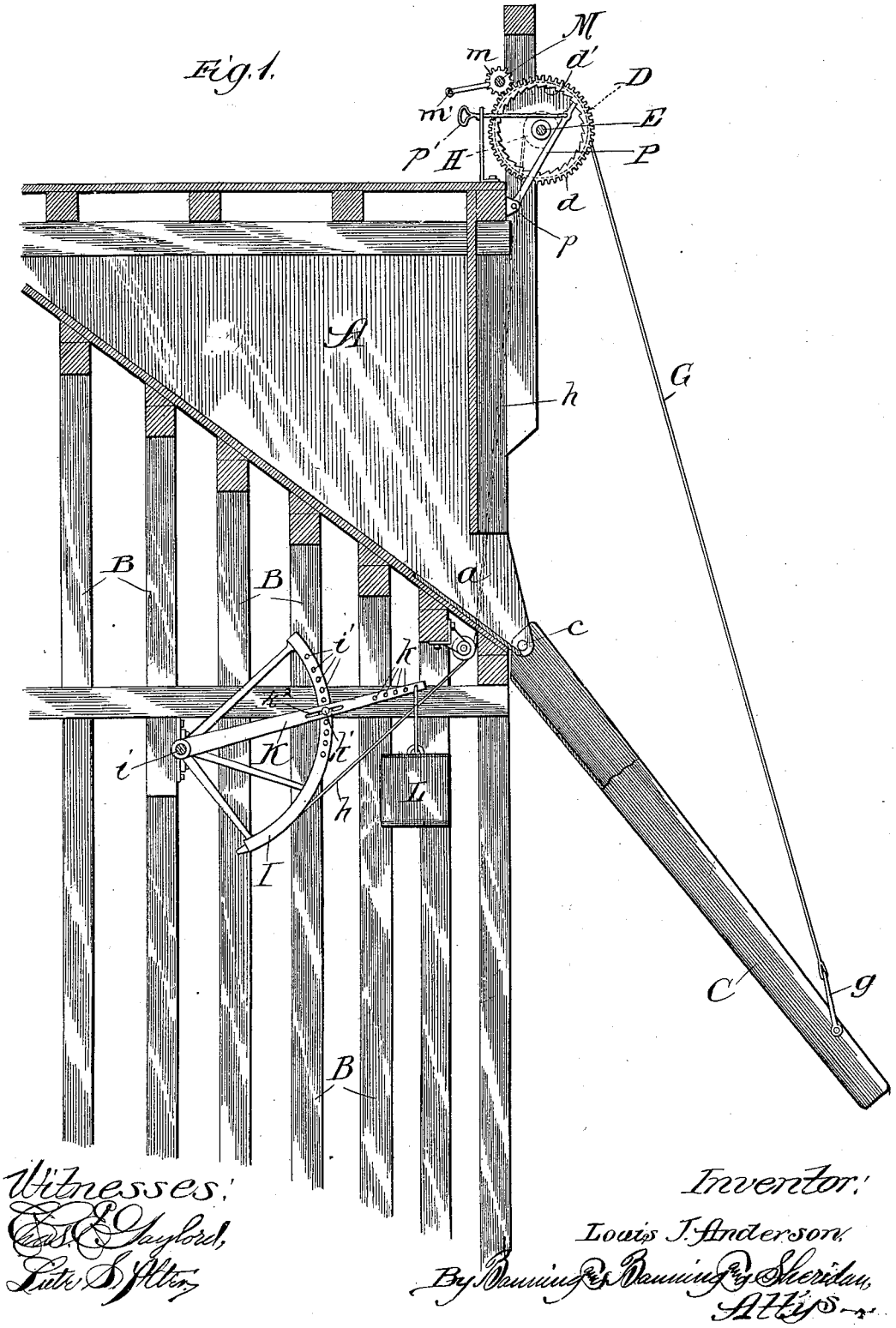
L. J. ANDERSON.

COUNTERBALANCED CHUTE.

(Application filed June 15, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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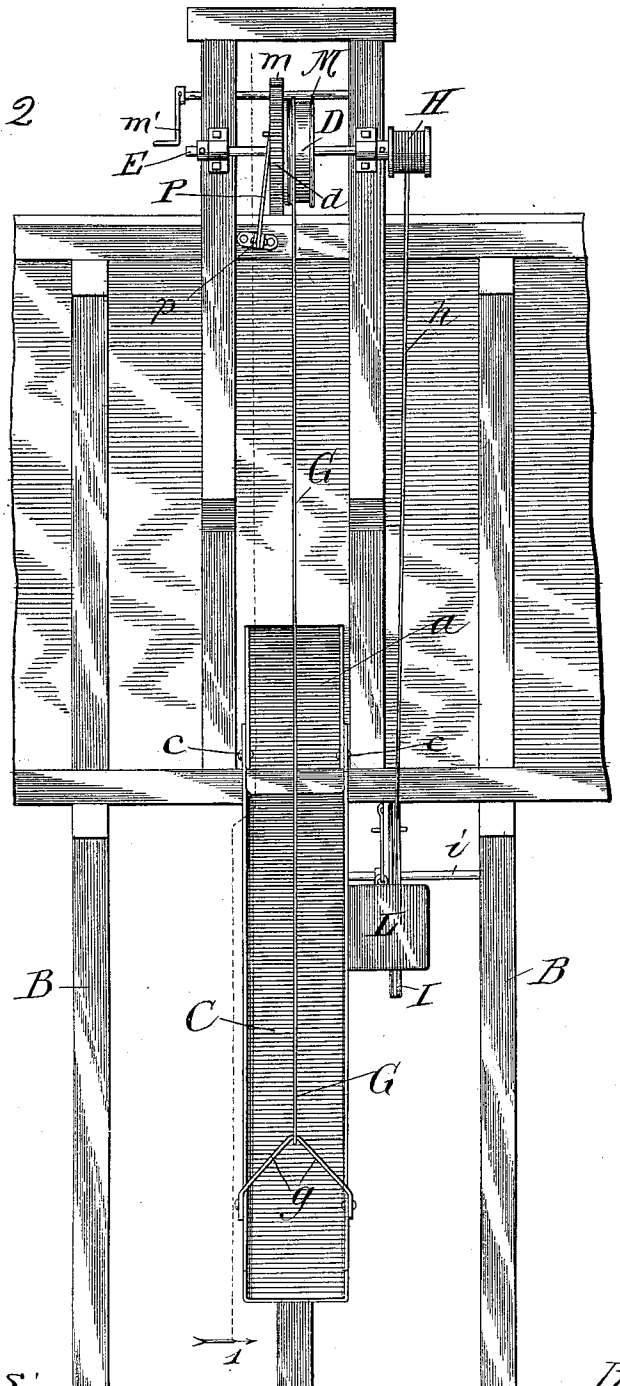
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COUNTERBALANCED CHUTE.

(Application filed June 15, 1899.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 2



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UNITED STATES PATENT OFFICE.

LOUIS J. ANDERSON, OF ESCANABA, MICHIGAN.

COUNTERBALANCED CHUTE.

SPECIFICATION forming part of Letters Patent No. 651,333, dated June 12, 1900.

Application filed June 15, 1899. Serial No. 720,710. (No model.)

To all whom it may concern:

Be it known that I, LOUIS J. ANDERSON, a citizen of the United States, residing at Escanaba, in the county of Delta and State of Michigan, have invented certain new and useful Improvements in Counterbalanced Chutes, of which the following is a specification.

My invention relates particularly to that class of chutes which are used in connection with ore-bins, and especially to the means by which the chute is counterbalanced and raised and lowered into its inoperative and operative positions.

The principal object of my invention is to provide a simple, economical, and efficient counterbalanced chute; and the invention consists in the features, combinations, and details of construction hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a vertical elevation, partly in section, of an ore-bin, discharge-chute, and counterbalancing mechanism constructed and arranged in accordance with my improvements; and Fig. 2, a front elevation of the same.

In the art to which this invention relates it is well known that it is desirable and, indeed, essential to counterbalance the discharge-chute of an ore-bin as perfectly as possible, first, for the purpose of enabling the workmen to raise and lower the chute with the least expenditure of time and labor, and, second, to prevent the rapid wear or destruction of the parts.

The principal object of my invention, therefore, is to provide an ore-bin with a pivoted chute, counterbalancing mechanism, and means for raising and lowering it which will have the advantages above noted, the details of which will be more fully hereinafter set forth.

In constructing my improvements a hopper bin or pocket A is provided, made of metal or other suitable material and of the size, shape, and strength to hold the desired quantity of ore. This pocket is secured to and supported on suitable framework or staging B on a dock or other place where it is economical or desirable to store the ore and hold it until such time as it may be necessary to dump it into cars or boats for transportation.

In order to discharge the ore into a suitable vehicle for transportation, a discharge-chute C is provided and pivoted at *c* to the ore-pocket at or near its discharge-opening *a*. It is necessary at different times to raise and lower this chute, and as it is generally made of a heavy piece of cast or wrought iron, steel plates, or other material and weighs in the neighborhood of from two to three thousand pounds it is desirable to counterbalance it, so that the labor of raising and lowering it and the time occupied in these operations may be minimized as much as possible. In order to accomplish this result, a primary winding-drum D is provided and mounted upon a winding-shaft E, having suitable bearings on the framework. This winding-drum is provided with a cable, cord, or similar element G, having one end fixed thereto so as to be wound around the same, and the other end secured to a "bail" *g*, which is pivotally secured to the discharge-chute at or near its free end, the parts being so arranged that during the operations of the winding and unwinding the cable the chute is raised and lowered.

To counterbalance the weight of the chute, so that it may be raised and lowered with the least expenditure of labor and time, a second winding-drum H is provided and also mounted upon the winding-shaft. This second winding-drum is provided with a cable, cord, or similar element which has one end attached to the same, so as to be oppositely wound around it, and the other to a segmental lever I, which is pivotally secured to the supporting-framework at *i*. Independently secured to the same pivotal point as the segmental lever is a straight lever K of greater length than the radius of the segmental lever and which is provided with a plurality of holes *k* at or near its free end, into which a counterbalancing-weight L may be secured. The periphery of the segmental lever is also provided with a plurality of holes *i'* and the straight lever with a pin *k'*, passing through a slot k^2 in the lever to permit the insertion of the pin in different holes *i'*, so that the position of engagement of the segmental lever with the straight lever may be changed whenever it is desirable or necessary, as will more fully hereinafter appear.

An inspection of the drawings will show

that the periphery of the segmental lever is eccentric with its pivotal point for the purpose of increasing or decreasing the leverage action on the cable at the proper times—that is, to provide the longest leverage of weight when it is desirable to have the most weight and the shortest leverage of weight when it is desirable to have the least weight. In this way the effect of the weight of the counterbalance on the chute and the chute on the counterbalance change to suit or compensate for the variation of weight caused by the different positions which the discharge-chute assumes as it is raised and lowered. By this arrangement a uniform application of power is all that is necessary to raise the chute at any time, and the effect of the counterbalancing-weight is also uniform to sustain the chute in any desired position.

The adjustable connection of the straight and segmental levers is provided for the purpose of permitting the counterbalance-weight to swing through a longer or shorter arc or to change the ratio of the counterbalanced weight with the chute whenever it may seem desirable or necessary.

For the purpose of applying power to the winding-shaft, with its drums, when necessary so to do a counter-shaft M is provided, having a pinion *m* engaging with a gear *d* on the primary winding-drum. This counter-shaft is also provided with a bell-crank *m'*, which the operator may take hold of to wind or unwind the drums.

To hold the parts in any desired position and at the same time prevent the dropping of the discharge-chute when ore is passing through the same, a pawl P is provided and pivoted at *p* to the pocket. This pawl is arranged so as to engage ratchet-teeth *d'* on the inner side of the main winding-drum and is provided with a handle *p'*, by which it may be pulled out of its locking engagement with the ratchet-teeth.

While I have described my invention with more or less minuteness as regards details of construction and arrangement, I do not desire to be limited thereto unduly or any more than is pointed out in the claims. On the contrary, I contemplate all proper changes in form, construction, and arrangement, the omission of immaterial elements, and the substitution of equivalents as circumstances may suggest or necessity render expedient.

I claim—

1. In mechanisms of the class described, the combination of a hopper bin or pocket provided with a discharge-opening, a discharge-chute pivotally secured to the hopper adjacent to the discharge-opening, a winding-drum provided with a cable secured to the discharge-chute to raise and lower the same, a lever having an eccentrically-curved peripheral surface, a winding-drum, a cable connected with the winding-drum and the peripheral curved lever, a counterbalancing-weight adjustable in relation to the pivot of the curved lever, and a changeable support for the counterbalancing-weight on the curved lever for adjusting the counterbalancing-weight and lever to properly raise and lower the chute by shifting the relation of the support of the weight and lever, substantially as described.

2. In mechanisms of the class described, the combination of a pocket adapted to receive and hold ore and provided with a discharge-opening, a discharge-chute pivotally secured to the hopper or pocket adjacent to the discharge-opening, a primary winding-drum, a cable secured to the primary winding-drum and to the discharge-chute at its front end, a second winding-drum, a segmental pivoted lever having its periphery eccentric with the pivotal point, a cable secured to the second winding-drum and to the periphery of the segmental lever, a counterbalancing-weight adjustable in relation to the segmental lever, and a changeable support for the weight on the segmental lever for adjusting the weight in relation to the lever to assist in raising and lowering the chute by shifting the position of the support between the weight and the lever, substantially as described.

3. In mechanisms of the class described, the combination of a hopper-bin for the material provided with a discharge-opening at its lower portion, a discharge-chute pivotally secured to the hopper-bin at its discharge-opening, a winding-shaft, a primary winding-drum on such shaft, a cable connecting the primary winding-drum with the discharge-chute at its free end, a second winding-drum of relatively-smaller diameter than the primary winding-drum secured to the winding-shaft, a segmental pivoted lever having its periphery eccentric with the pivotal point, a cable secured to the second winding-drum and to the periphery of the segmental lever, a counterbalancing-weight adjustable in relation to the pivotal point of the segmental lever, and a movable support for the weight on the lever for adjusting the weight properly to assist in raising and lowering the discharge-chute and counterbalancing the chute by shifting the position of the support between the weight and the lever, substantially as described.

4. In mechanisms of the class described, the combination of a hopper-bin provided with a discharge-opening at its lower portion, a discharge-chute pivotally secured to the hopper-bin at the discharge-opening, a main winding-shaft, a primary winding-drum on such shaft, a cable connected with the primary winding-drum and with the discharge-chute at its free end, a second winding-drum, a segmental pivoted lever having its periphery eccentric with its pivot, a cable connecting the second winding-drum with the periphery of the segmental lever, a pivoted straight lever carrying a counterbalanc-

ing-weight, and a movable support for the straight lever on the segmental lever, substantially as described.

5. In mechanisms of the class described, the combination of a hopper-bin provided with a discharge-opening at its lower portion, a discharge-chute pivotally secured to the hopper-bin at the discharge-opening, a main winding-shaft, a primary winding-drum on such shaft, a cable connected with the primary winding-drum and with the discharge-chute at its free end, a second winding-drum, a segmental pivoted lever having its periphery eccentric with its pivot, a cable connecting the second winding-drum and the periphery of the segmental lever, a pivoted straight lever of greater length than any radius of the segmental lever, an adjustable weight on the straight lever, and a movable support between the straight lever and the segmental lever for changeably engaging the two levers, substantially as described.

6. In mechanisms of the class described, the combination of a hopper-bin provided with a discharge-opening at its lower portion, a discharge-chute pivotally secured to the hopper-bin at its discharge-opening, a main winding-shaft, a primary winding-drum on such shaft, a cable secured to the primary winding-drum and to the discharge-chute at its free end, a second winding-drum on the winding-shaft, a segmental pivoted lever provided with a periphery of increasing radii, a cable secured to the periphery of the segmental lever and to the second winding-drum, a substantially-straight lever pivoted at the same point as the segmental lever and of greater length than the radius of the segmental lever, a counterbalancing-weight secured to the straight lever at its free end, and means for adjustably securing the straight and segmental levers together, substantially as described.

7. In mechanisms of the class described, the combination of a hopper-bin provided with a discharge-opening at its lower end, a discharge-chute pivotally secured to the hopper-bin adjacent to the discharge-opening, a main winding-shaft, a primary winding-drum on said shaft, a cable secured to the primary winding-drum and to the discharge-chute at its free end, a second winding-drum of relatively-smaller diameter than the primary winding-drum, a segmental pivoted lever having a periphery of gradually-increasing radii, a cable connecting the segmental lever with the second winding-drum, a straight lever of greater length than any radius of the segmental lever, a counterbalancing-weight, means for securing the counterbalance-weight in different positions to the straight lever and at different distances from its pivotal point, and means for adjustably securing the straight and segmental levers together, substantially as described.

8. In mechanisms of the class described, the combination of a hopper bin or pocket provided with a discharge-opening at its lower end, a discharge-chute pivotally secured to the hopper-bin adjacent to the discharge-opening, a main winding-shaft, a primary winding-drum on said shaft, a cable, secured to the primary winding-drum and to the discharge-chute at its free end, a second winding-drum of relatively-smaller diameter than the primary winding-drum, a segmental pivoted lever having a curved periphery of increasing radii, a cable, connecting the segmental lever with the second winding-drum, a straight lever of greater length than the radius of the segmental lever, a counterbalancing-weight, means for securing the counterbalance-weight in different positions to the straight lever at its free end and at different distances from the pivotal point, means for adjustably securing the straight and segmental levers together, a gear on the main winding-drum, a crank-handled counter-shaft provided with a pinion engaging with the gear on the main winding-drum, and ratchet-and-pawl mechanism to hold the parts in the desired position, substantially as described.

LOUIS J. ANDERSON.

Witnesses:
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THOMAS B. MCGREGOR.