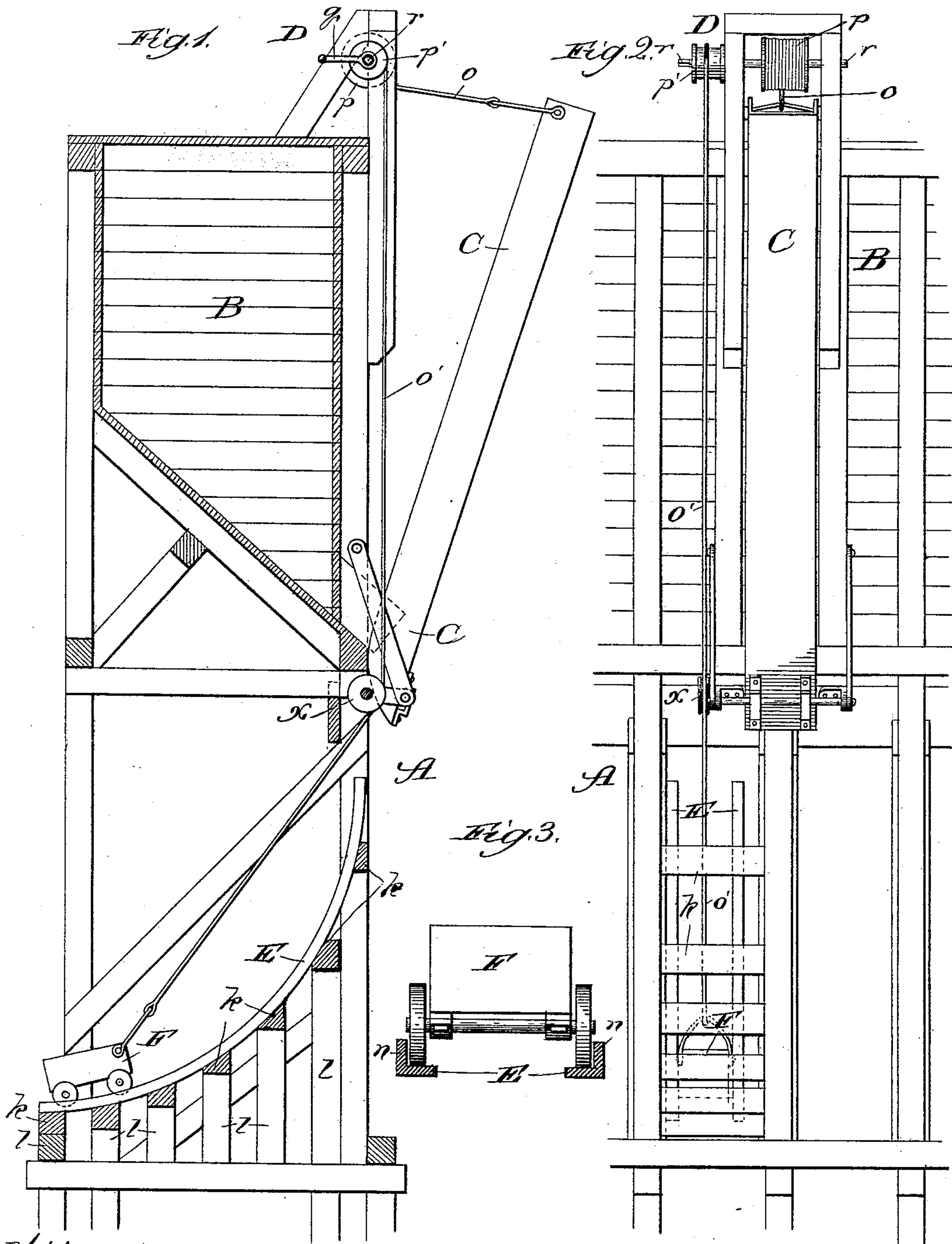


(No Model.)

E. S. EATON.
COUNTER BALANCE FOR THE DISCHARGE CHUTES OF COAL OR ORE BINS.
No. 435,356. Patented Aug. 26, 1890.



Witnesses:
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UNITED STATES PATENT OFFICE.

ELIAS SUMNER EATON, OF GLADSTONE, MICHIGAN, ASSIGNOR TO W. W. RICH, OF MINNEAPOLIS, MINNESOTA.

COUNTER-BALANCE FOR THE DISCHARGE-CHUTES OF COAL OR ORE BINS.

SPECIFICATION forming part of Letters Patent No. 435,356, dated August 26, 1890.

Application filed May 29, 1890. Serial No. 353,585. (No model.)

To all whom it may concern:

Be it known that I, ELIAS SUMNER EATON, a citizen of the United States, residing at Gladstone, in the county of Delta and State of Michigan, have invented a new and useful Improvement in Counter-Balances for the Discharge-Chutes of Coal or Ore Bins, of which the following is a specification.

My invention is designed to afford an improvement in the construction of the counterbalance mechanism shown and described in Letters Patent of the United States, No. 412,374, granted October 8, 1889, to John V. Ericson, and which I believe to be therein so generically claimed as to dominate my present improvement.

My object is to provide a guide for the counter-weight which shall produce less friction and be stronger and more reliable in performing its function than the slack-cable track shown and described in the aforesaid Letters Patent.

In the accompanying drawings, Figure 1 represents a cross-section of an ore-dock having the pivotal chute through which to discharge the contents of a bin counterbalanced by means involving my improvement. Fig. 2 is a view in rear elevation of so much of the dock as is represented in Fig. 1; and Fig. 3 is an enlarged view of the movable chute-counterbalancing weight on its rigid curved supporting and guide track, shown in section.

The bin B of the dock A, the pivotal chute C, and the hoisting means D, comprising a rotary shaft *r*, supported above the bin to be actuated by hand from a crank *q*, as shown, or by other means requiring other motive power, and carrying the drum *p*, connected by a chain *o* or the like with the chute near its free end, and a cable or rope *o'* or the like, secured at one end to a drum *p'* on the shaft *r*, to be wound thereon in controlling the weight in the direction opposite that of winding the chain *o*, may all be of known or any suitable construction, and need not therefore be herein described in detail.

Below the bin B, I provide a track E, comprising, preferably, two rails *n*, as shown, which may be formed of angle-iron, and are

correspondingly bent, preferably into the form of a curve, as shown, so as to afford a guide for the weight F, hereinafter described, at all points of its changing position thereon; but the degree and formation of the curve are such as to avoid material sustainment of the weight at the sacrifice of its gravity to be exerted (by being secured to the cable *o'*, passing over a guide-pulley *x*) through the hoisting mechanism upon the chute. The rigid track E is, furthermore, more desirable than the slack-cable track, hereinbefore referred to, inasmuch as its use avoids a considerable portion of the friction of the weight on a slack cable, and therefore is worked the more easily and uniformly.

I support the track formed of the double curved rails *n* on posts *l* at the base of the dock, suitably graduated as to height and connected in corresponding pairs by ties *k*, on which the track is laid.

For the double-rail-track construction the weight is in the form of a carriage supported on wheels arranged to run on the rails. It is not, however, necessary that the track should be formed with two rails, as one may suffice, from which the weight could be suspended to run on one wheel, and such construction is intended to be included within the spirit of my improvement as also having the carriage-weight illustrated provided with only two wheels on a central axle, instead of the four shown, when the tension of the rope *o'* would be relied on to maintain the box of the carriage in upright position.

The mechanism constituting my improvement is so constructed and arranged that when the chute C is at its highest position, as shown, where the gravity of the weight F is mainly exerted in a lateral direction on the track, or at its lowest position, where it offers the greatest resistance, and the weight is at its innermost location on the track, where it is practically suspended in a perpendicular line with the rope *o'* and exerts its greatest gravity, the chute is counterbalanced, requiring the mere friction of parts to be overcome to move it, and that the counterbalancing effect of the weight is exerted upon the chute

while being raised or lowered at any intermediate point on the track to which the weight is thereby moved.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a discharge apparatus for coal or ore bins, the combination, with the pivotal chute C, connected with and actuated by hoisting mechanism D, of a rigid bent track E, supported on graduated posts *k* at the base of the dock, and a wheeled weight F to run on the track and connected with the hoisting mechanism to be raised and lowered on the track, respectively, by the lowering and raising of the chute, substantially as described.

2. In a discharge apparatus for coal or ore bins, the combination, with the pivotal chute C, connected with and actuated by hoisting mechanism D, of a rigid bent track E, comprising parallel rails *n*, laid on ties *k*, connecting graduated posts *l* at the base of the dock, and a weight F, comprising a box on wheels to run on the track and connected with the hoisting mechanism to be raised

and lowered on the track, respectively, by the lowering and raising of the chute, substantially as described.

3. In a discharge apparatus for coal or ore bins, the combination, with a bin B, of the pivotal chute C, hoisting mechanism D, comprising a rotary shaft *r*, supported above the bin and carrying a drum *p*, with which the chute is connected from near its free end by a chain *o* or the like, and a drum *p'*, a rigid curved track E, comprising parallel rails *n*, laid on ties *k*, connecting graduated posts *l* at the base of the dock, and a weight F, comprising a box on wheels to run on the track and connected with the drum *p'* by a rope *o'* or the like guided on a pulley *x* and arranged to be wound on its drum while the chain *o* is being unwound from its drum, the whole being constructed and arranged to operate substantially as described.

ELIAS SUMNER EATON.

In presence of—

RICHARD MERTZ,
C. N. KALK.