

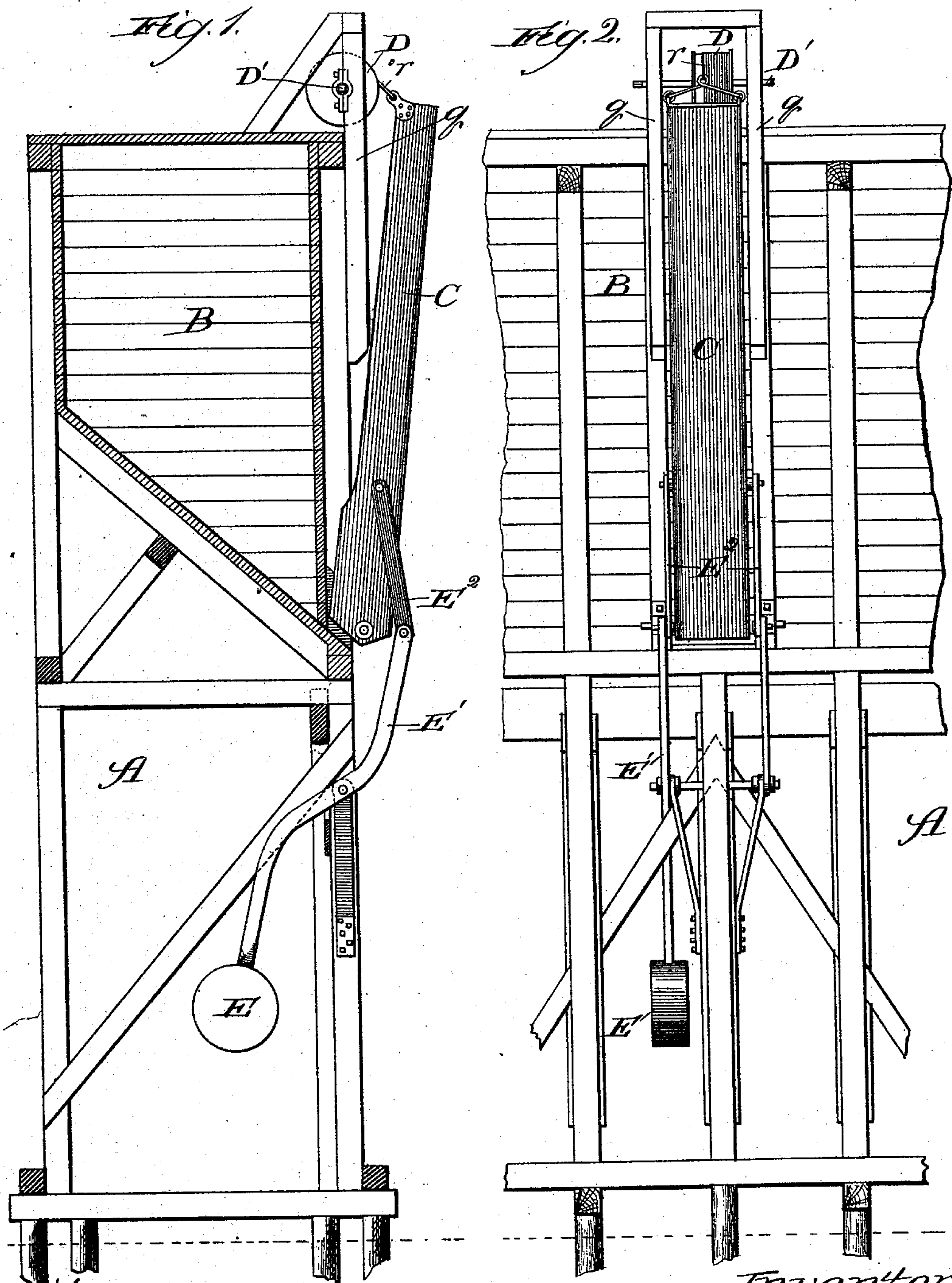
(No Model.)

J. V. ERICSON.

DISCHARGE APPARATUS FOR COAL OR ORE BINS.

No. 412,376.

Patented Oct. 8, 1889.



Witnesses:

*Edw. Dayland.*  
*J. H. Dymallyford.*

Inventor:

*John V. Ericson,*  
*By Dymallyford & Dymallyford,*  
*Attys.*



# UNITED STATES PATENT OFFICE.

JOHN V. ERICSON, OF ESCANABA, MICHIGAN, ASSIGNOR TO THE PETTIBONE,  
MULLIKEN & COMPANY, OF CHICAGO, ILLINOIS.

## DISCHARGE APPARATUS FOR COAL OR ORE BINS.

SPECIFICATION forming part of Letters Patent No. 412,376, dated October 8, 1889.

Application filed May 21, 1889. Serial No. 311,609. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN V. ERICSON, a citizen of the United States, residing at Escanaba, in the county of Delta and State of Michigan, have invented a new and useful Improvement in Discharge Apparatus for Coal or Ore Bins, of which the following is a specification.

My invention relates to improvements in the class of apparatus in use particularly on docks for the transfer from the latter to vessels of coal, ore, &c.; and it relates more especially to improvement in that form of the apparatus in which the heavy pivotal chute for directing the discharge from the bin is raised out of the way when not in use and lowered to its operative position by suitable mechanism for the purpose, but without resistance from the weight of the chute, the latter being counterbalanced in all positions it assumes, in being raised and lowered by means increasing and decreasing in resistance as the resistance of the chute increases and decreases.

The object of my improvement is to provide for the chute a counterbalancing medium of simple construction, and which shall be effective and reliable in performing its function.

To this end my invention consists in employing a weight of required gravity on a lever pivotally connected at one end with the chute and fulcrumed between such connection and the weight, which is extended by the lever behind and below the chute.

In the accompanying drawings, Figure 1 represents a cross-section of an ore-dock having the bin it supports provided with my improved counterbalanced discharge apparatus, and Fig. 2 is a broken front elevation of the same.

A is a dock supporting a bin B, at the discharge-opening of which is a pivotally-supported chute C, connected from near its outer end by a cable or chain  $r$  with a drum D on a shaft D', journaled in a frame  $q$  on the bin, whereby turning of the drum will wind or unwind the cable or chain and raise or lower the chute on its pivot. Were the chute not counterbalanced, it would, owing to its weight, require the exertion of great power to operate

and control it, and the power exerted must increase in proportion to the increase in the resistance of the chute as it is lowered.

To counterbalance the chute, I provide a weight E of proper gravity on one end of a lever E', which should be bent, as shown, and fulcrumed below the chute to a stationary object, as the dock, its opposite end being pivotally connected with the chute near its inner end or base by a link E<sup>2</sup>, the link and part of the lever E' connected therewith being by preference, for the sake of the strength thereby attained, duplicated on opposite sides of the plane of the chute, as shown in Fig. 2.

The disposition of the counter-balance is such that the weight is always behind and below the chute and a dead-center avoided. As the chute is raised toward the position illustrated its resistance decreases, as also that of the weight, which is thereby lowered toward a position in vertical line with its fulcrum, and as the chute is lowered toward its inclined operative position, thereby increasing its resistance, the weight is raised toward a horizontal position, thereby increasing its resistance.

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

1. In a discharge apparatus for coal and ore bins, the combination, with the pivotal chute and means for operating it, of a lever E', pivotally connected at one end with the chute and carrying a weight E below and behind the chute and fulcrumed between the weight and its pivotal connection, substantially as and for the purpose set forth.

2. In a discharge apparatus for coal and ore bins, the combination, with the pivotal chute and means for operating it, of a lever E', fulcrumed between its extremities and linked from one end to the chute and carrying at its opposite end a weight E, extending below and behind the chute, substantially as and for the purpose set forth.

JOHN V. ERICSON.

In presence of—

J. W. DYRENFORTH,  
M. J. BOWERS.