

(No Model.)

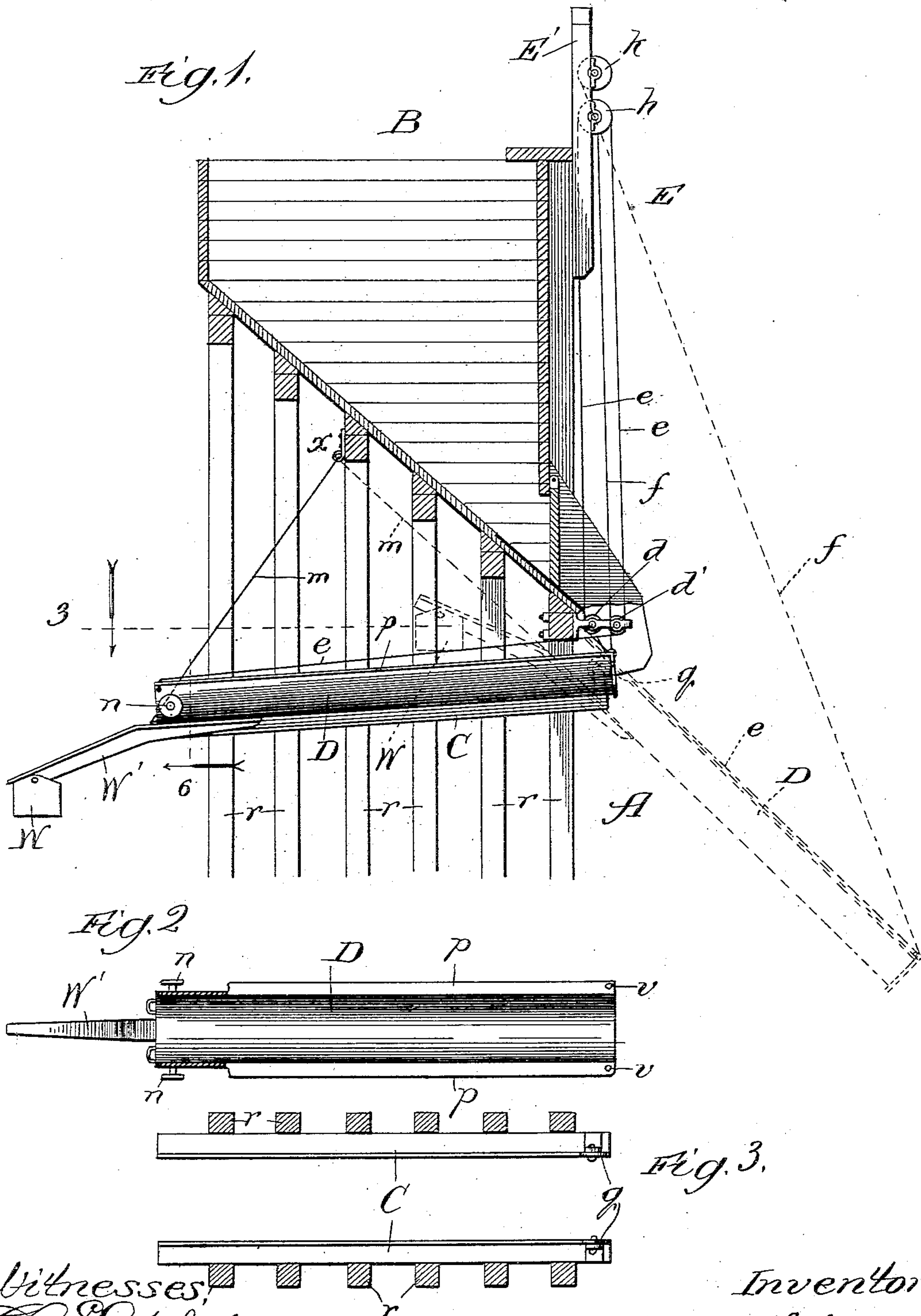
2 Sheets—Sheet 1.

R. W. ERICSON.

DISCHARGE APPARATUS FOR COAL OR ORE BINS.

No. 504,673.

Patented Sept. 5, 1893.



Witnesses,
Chas. E. Taylor,
E. R. Shipley.

Inventor:
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(No Model.)

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Fig. 4.

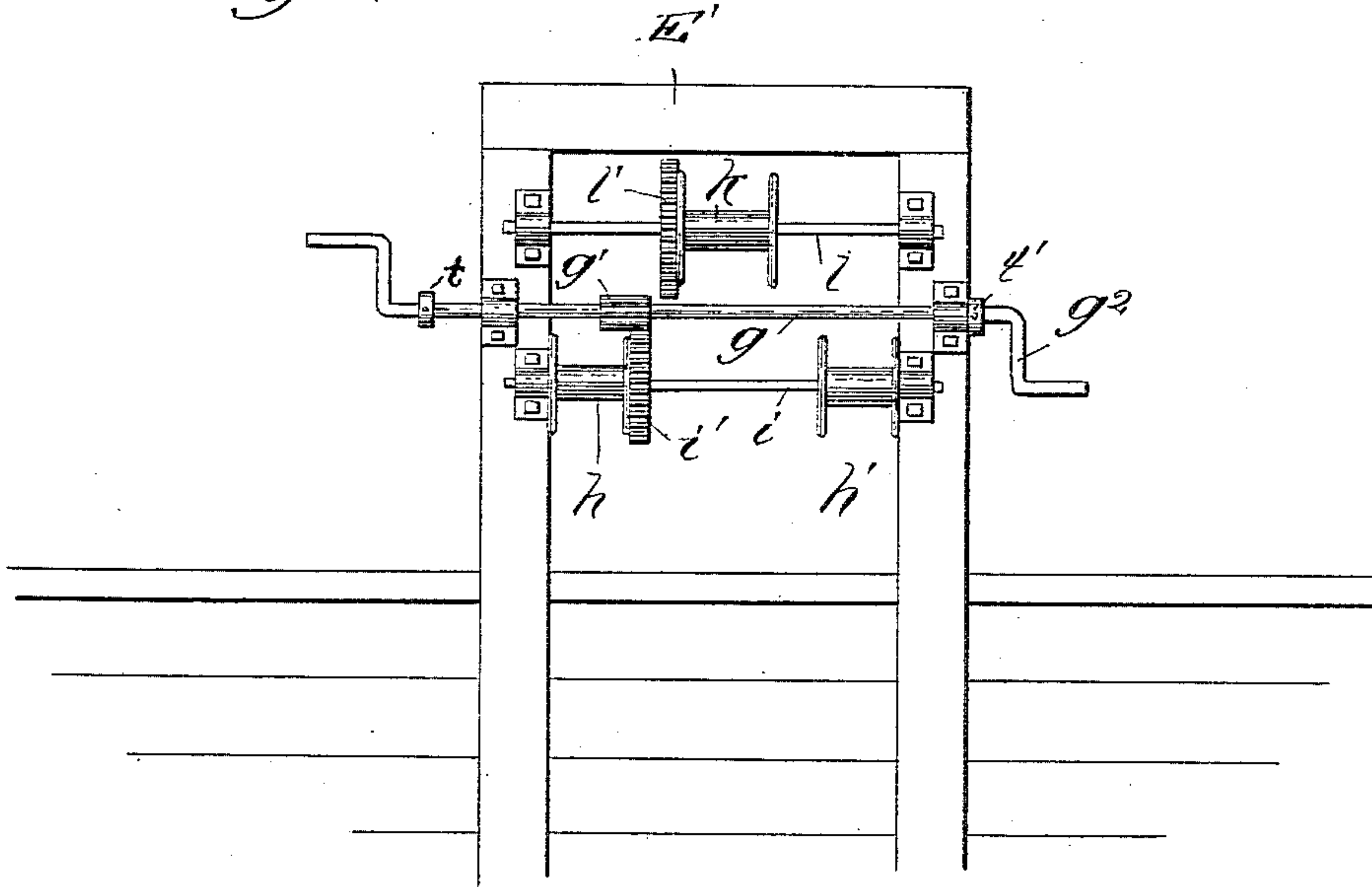


Fig. 5.

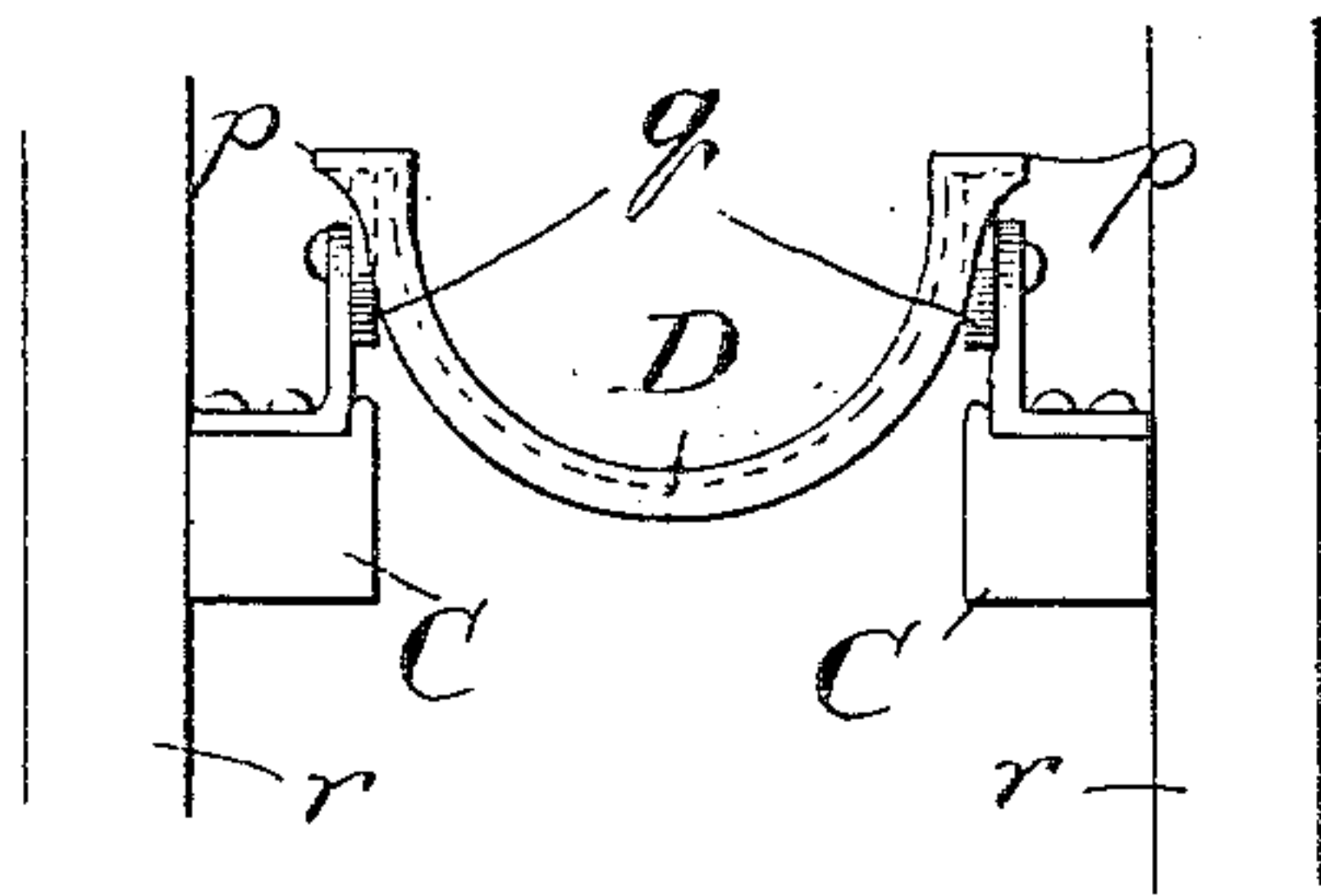
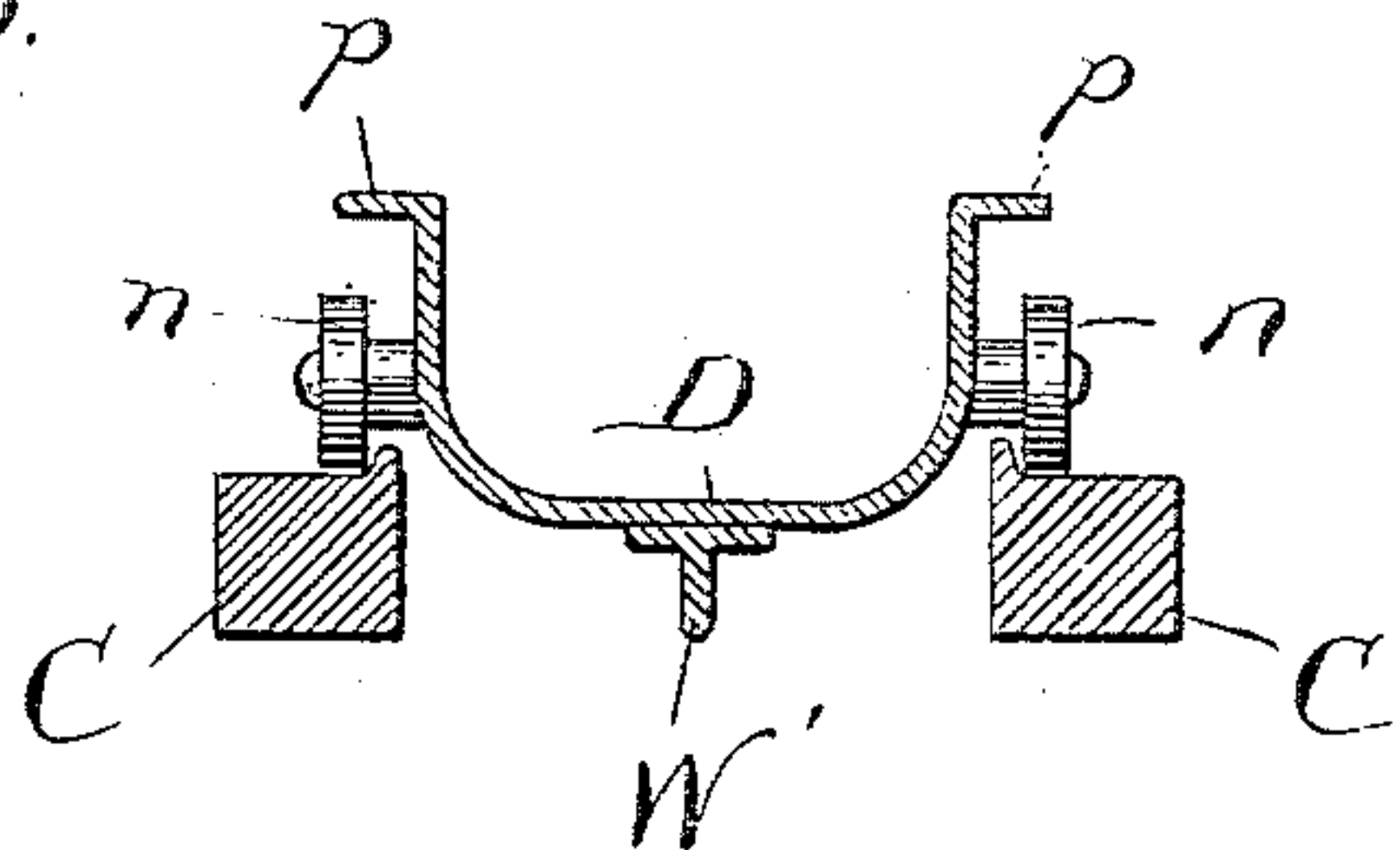


Fig. 6.



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UNITED STATES PATENT OFFICE.

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DISCHARGE APPARATUS FOR COAL OR ORE BINS.

SPECIFICATION forming part of Letters Patent No. 504,673, dated September 5, 1893.

Application filed May 12, 1893. Serial No. 474,005. (No model.)

To all whom it may concern:

Be it known that I, RICHARD W. ERICSON, a citizen of the United States, residing at Aurora, in the county of Kane and State of Illinois, 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 an improvement in the class of apparatus employed at coal, ore, and other docks, in which a discharge-chute is adapted, for the purpose of loading from the bin, to be let down to extend from the bin-opening to the vessel, and to be raised up out of the way when not in use.

Hitherto it has been common to pivot, permanently, to the bin the chute at its inner end, to adapt it to be lowered on its pivot for use and to be raised thereon when out of use; and the aim has been to counterbalance, as nearly as possible, the chute at every point throughout its rise and fall, on its inner, permanently, pivoted end, the means most commonly used for this purpose being a weight so connected with the hoisting mechanism of the apparatus as to tend to control the chute in the desired manner.

My present object is to provide for removing the chute out of the way, when not in use, in a novel manner for apparatus of the class to which my improvement relates, by withdrawing it endwise and supporting and thus housing it, below its bin, whereby it need not be so carefully or approximately counterbalanced, or counterbalanced by such complicated means as have hitherto been employed for the purpose, (a weight attached to its rear end sufficing,) since to lower it into operative position requires merely that it be drawn out till the longitudinal extent brought to project beyond the support is sufficient to enable it to be tilted downward, under control of the hoisting mechanism with which it is connected, into operative position; and to raise it, the hoisting mechanism is adapted to elevate it into horizontal position and then to withdraw it endwise backward into place.

Referring to the accompanying drawings—Figure 1 is a broken view representing, in sectional side elevation, an ore-dock provided with my improvement, the chute being shown by full lines in its withdrawn, or housed, po-

sition, and indicated by dotted lines in its extended, operative, position. Fig. 2 is a plan view, partly broken and in section, of the chute. Fig. 3 is a section taken at the line 3 on Fig. 1 and viewed in the direction of the vertical arrow, with the chute removed. Fig. 4 is an enlarged view in elevation showing a preferred arrangement of the hoisting mechanism. Fig. 5 is a front-end view of the chute on its track. Fig. 6 is a section taken at the line 6 on Fig. 1 and viewed in the direction of the arrow, showing the manner of supporting the chute toward its rear end.

A denotes an ore, coal or like dock, B being one of the bins thereon of usual or any suitable construction. Below the bin, on the timbers *r*, is supported a track C, which should incline slightly downward in a backward direction, and at the forward ends of the rails of which are the anti-friction rollers *q*, raised above the plane of the track.

D is the chute of usual general form, but provided along its upper edges with lateral flanges *p*, which ride on the rollers *q*; and near its rear end, below the flanges, it is provided with wheels *n* journaled to extend at the sides of the chute. A cable or chain *m* connects the chute from its rear end with a stationary part of the dock, as at *x*, below the bin.

E is the mechanism, for operating the chute, and which I term the hoisting mechanism. It is supported, as usual, in a suitable frame *E'* extending above the front side of the bin, and comprises a rotary shaft *l* carrying a drum *k* and a ratchet-wheel *l'*; a lower rotary shaft *i*, parallel with the shaft *l* and carrying drums *h* and *h'* near its opposite ends and a ratchet-wheel *i'* near the drum *h*, slightly to one side of the ratchet-wheel *l'*; and a rotary, longitudinally adjustable, crank-shaft *g*, interposed between the shafts *l* and *i* and carrying a pinion *g'*, somewhat elongated to engage, at will, simultaneously, both ratchet-wheels *l'* and *i'* and drive the shafts *l* and *i*. The shaft *g* is adapted to be moved lengthwise in its bearings within the limits of stops *t* and *t'*, flanking the side-uprights of the frame *E'*, to engage the pinion *g'* with both ratchet-wheels *l'* and *i'* at once, or with either

alone, at will, for a purpose hereinafter described. A cable or chain *f* is fastened, at one end, to the drum *k* and at its opposite forked end to eyes *v*, in the flanges *p*, near the outer end of the chute. A pair of chains or cables *e* are fastened at corresponding ends to the eyes *v* of the chute, pass thence upward about guide-rollers *d* flanking the discharge-opening in the base of the bin, and wind, respectively, with several turns each, about the drums *h* and *h'*, whence they descend, passing about guide-rollers *d'*, forward of the rollers *d*, to the rear end of the chute, to which they are fastened.

The operation is as follows: To lower the chute *D* to the dotted position illustrated in Fig. 1 from that (its normal position) thereon illustrated by the full-line representation, the shaft *g* is drawn lengthwise, as far as the stop *t'* will permit, to produce engagement of the pinion *g'* solely with the ratchet *i'*, in a direction to cause turning the shaft at the cranks *g²* to shorten, or wind up on the drums *h* and *h'*, the lengths of the cables *e* which are connected with the rear end of the chute *D*, whereby the chute is pulled out lengthwise on its track *C*. Obviously while the length referred to of the cables *e* is being wound on the said drums, the lengths thereof connected with the forward end of the chute are paying out or lengthening. When the chute has thus been drawn out to an extent that overbalances the rear portion still remaining on the track and the weight *W* on an arm *W'* extending backward from the rear end of the chute, the chute tilts downward and, under the control of the hoist, slides into the dotted position represented in Fig. 1; the cable *f* meantime paying out freely. To replace the chute into its normal place from the operative position, the shaft *g* is moved lengthwise in its bearings, till obstructed by the stop *t*, to engage the pinion *g'* solely with the ratchet-wheel *l'*, whereupon the shaft *g* is turned in the proper direction to wind upon its drum *k* the cable *f* and thereby raise the chute, on its inner end, to a horizontal or approximately horizontal position. In this position the chute is held (as by a dog and ratchet device, not shown, on the shaft *l*) while the shaft *g* is adjusted lengthwise to cause its pinion *g'* to engage both ratchets *l'* and *i'*, when by continuing to turn the shaft *g*, the ends of the cables *e* which are connected with the forward end of the chute are wound up on the drums *h* and *h'*, or shortened, while the opposite cable-ends, or those connected with the rear portion of the chute, pay out or lengthen, and the chute is thus drawn, upon its track, backward underneath the bin, the winding of the cable *f* on the drum *k* meantime taking up slack therein.

The particular mechanism illustrated and herein described in detail, for operating the chute to extend and withdraw it, while the best now known to me for the purpose, is subject of variation without departure from my

invention; hence I do not wish to be understood as limiting thereto my invention, but as claiming it in its broadest sense as involving a lengthwise withdrawable and extensible chute and any suitable means for operating it.

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

1. In combination with a coal, ore, and the like, dock, a chute-track below the bin, extending from the forward portion of the dock backward, a chute supported normally on said track, and hoisting mechanism operative above the bin and having a flexible connection with the chute for moving it lengthwise on the track to extend it into operative position at the front of the dock and to hoist it and withdraw it therefrom under the bin, substantially as described.

2. In combination with a coal, ore, and the like, dock, a chute-track below the bin, extending from the front of the dock backward, a chute carrying a balancing weight at its rear end and supported by anti-friction rollers normally on said track, and fastened at its rear end to the dock, and hoisting mechanism operative above the bin and having a flexible connection with the chute for moving it lengthwise on the track to extend it into operative position at the front of the dock and to hoist it and withdraw it therefrom under the bin, substantially as described.

3. In combination with a coal, ore, and the like, dock, a chute-track *C* below the bin, extending from the front of the dock backward, a chute fastened at its inner end to the dock and weighted at its rear end and adapted to rise lengthwise on the track to be extended into operative position at the front of the dock and withdrawn therefrom on the track, and chute-operating hoisting mechanism *E* comprising a frame *E'* supporting a rotary shaft *l* carrying a drum *k* and a ratchet *l'*, a rotary longitudinally adjustable crank-shaft *g* carrying a pinion *g'*, and a rotary shaft *i* carrying drums *h* and *h'* and a ratchet *i'*, a flexible medium *f*, connecting the drum *k* with the chute near its outer end, and flexible connections *e*, fastened to the chute near its inner end, extending thence over guides *d'* about the drums *h*, *h'* and thence over guides *d* to, and fastened to, the chute toward its outer end, substantially as described.

4. In combination with a coal, ore, and the like, dock, a chute-track *C* below the bin, extending from the front of the dock backward, and provided near its forward end with anti-friction rollers *q*, a chute *D* adapted to ride lengthwise on the track and carrying, toward its rear end, anti-friction rollers *n* and an arm *W'* provided with a weight *W*, a flexible connection *m* between the inner end of the chute and the dock, and chute-operating hoisting mechanism *E* comprising a frame *E'* supporting a rotary shaft *l* carrying a drum *k* and a ratchet *l'*, a rotary longitudinally adjustable crank-shaft *g* carrying a pinion *g'*, and a ro-

tary shaft *i* carrying drums *h* and *h'* and a ratchet *i'*, a flexible medium *f*, connecting the drum *k* with the chute near its outer end, and flexible connections *e*, fastened to the chute
5 near its inner end, extending thence over guides *d'* about the drums *h*, *h'* and thence over guides *d* to, and fastened to, the chute toward its outer end, the whole being constructed and arranged to operate substantially as described.

RICHARD W. ERICSON.

In presence of—

F. W. PAGEL,

F. H. FALK.