

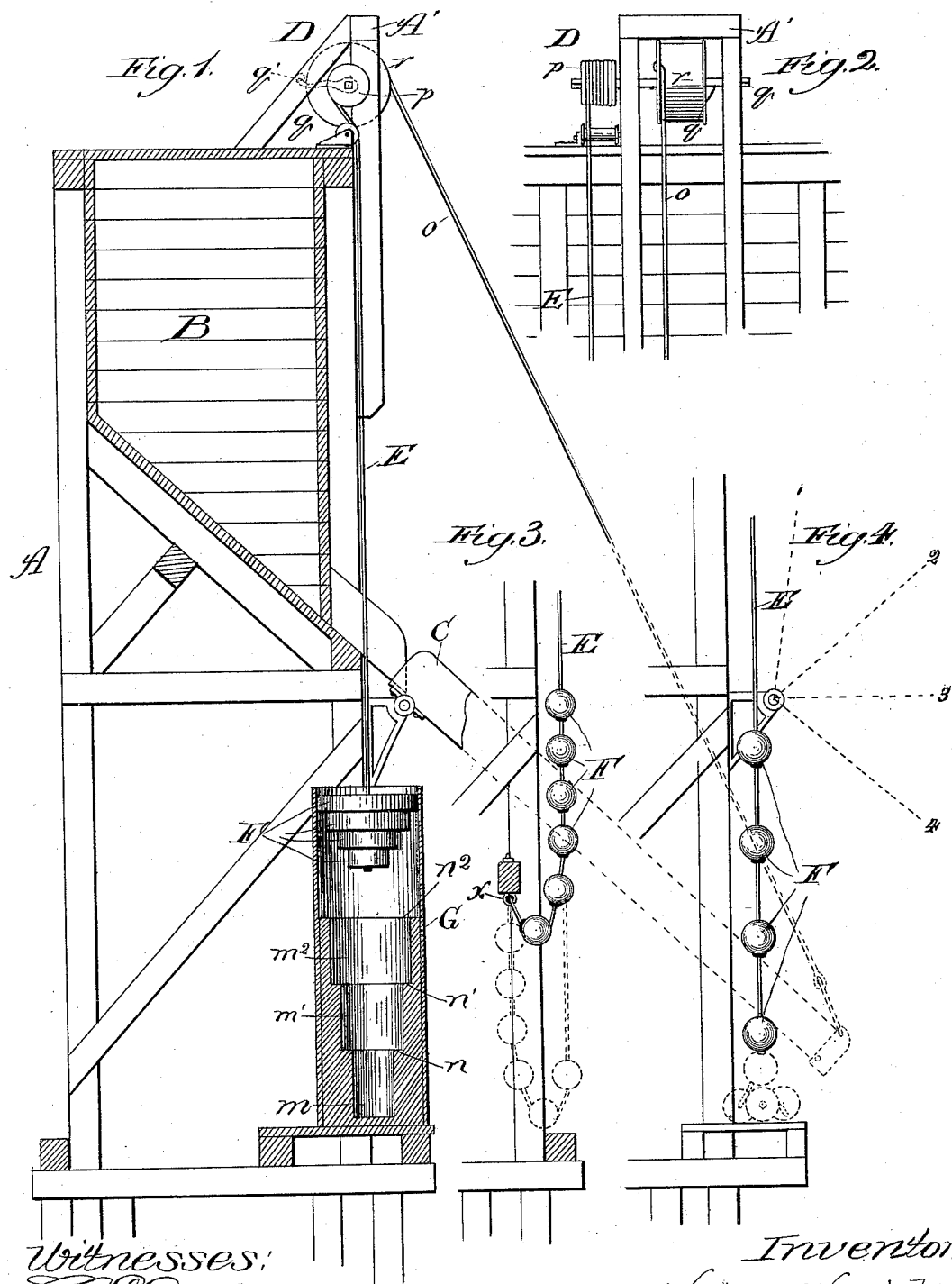
(No Model.)

W. W. RICH.

DISCHARGE APPARATUS FOR COAL OR ORE BINS.

No. 422,094.

Patented Feb. 25, 1890.



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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. 422,094, dated February 25, 1890.

Application filed December 13, 1889. Serial No. 333,614. (No model.)

To all whom it may concern:

Be it known that I, WATSON W. RICH, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, 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, more particularly stated, to improved means for effecting the desired counterbalancing of the vertically-adjustable chute at the bin of a coal or ore dock, whereby to raise and lower it shall not require the exertion of power greater or materially greater than is needed to overcome the friction of parts.

The means forming my improvement involve a cable, chain, or othersuitable flexible medium connected at one end with the chute, whence it extends to and is engaged by the hoisting mechanism, and having confined upon or secured at intervals to it toward its opposite end counter-weights capable of exerting sufficient resistance to counterbalance or nearly counterbalance the chute in its lowest or discharging position, wherein it offers the greatest resistance, and which counter-weights as the resistance of the chute decreases in its rise are thereby successively neutralized as to their effect upon the chute, and as the resistance of the chute in its descent increases are thereby successively "picked up," or brought into position to exert their gravity against the chute.

My improvement is illustrated in the accompanying drawings, in which—

Figure 1 represents an ore or coal dock in broken side elevation, provided with my improved counterbalancing medium in one of its forms. Fig. 2 is a broken view of the upper portion of the dock in front elevation; Fig. 3, a broken sectional view illustrating another form of my improved counterbalancing means; and Fig. 4, a view similar to that presented in Fig. 3, showing still another arrangement of my improved counter-balance.

A is the frame-work of the dock supporting the bin B, from the discharge-opening of which extends, as usual, the pivotal chute or spout C, the bin being surmounted by suitable hoisting mechanism D.

I prefer to provide the common form of the hoisting mechanism illustrated, though any other construction thereof which will serve to operate my improved counter-balance is intended to be included as within my invention. That shown comprises a drum *r* on a rotary shaft *q*, adapted to be turned by a winch *q'*, (shown in dotted lines in Fig. 1,) and journaled in the frame A', and carrying also a smaller drum *p*; and a cable *o* or analogous flexible medium serves to connect the chute from near its forward or free end with the drum *r*.

The parts thus far described involve no features of novelty, being common in the discharge apparatus of coal and ore bins.

E is a cable (though any other form of flexible medium—such as a chain or rope—will answer the same purpose) suspended at one end from the drum *p* in a manner to cause it to be wound upon the last-named drum in turning the shaft *q* to unwind from the drum *r* the cable *o*. Toward its opposite end the cable E is provided with weights F, secured to it in any manner that will not interfere with its necessary flexibility, and preferably, as shown, at predetermined intervals.

The construction illustrated in Fig. 1 involves a housing or guide-tube G, near the base of the dock, and into which the cable E, with its weights F, extends. At the base of the guide-tube are offsets *n*, *n'*, and *n''* around openings *m*, *m'*, and *m''*, each of a size to admit into it the weight F, for which it is provided, the lowest weight being the smallest and the size of the others increasing in order, as shown. Then when the weights are at their lowest positions the first rests on the base of the opening *m*, the second on the offset *n* around the base of the opening *m'*, the third on the offset *n'* around the base of the opening *m''*, and the fourth around the offset *n''* at the top of the opening *m''*. The number of the weights and of the rests for them may of course be regulated according to particular desire or requirement.

By turning the shaft *q* in a direction to effect raising of the chute C the weights F will come to rest on their respective supports successively, thereby decreasing their resistance to that of the chute as or substantially as

the resistance of the chute decreases in its rise. In lowering the chute toward its position for the discharge, whereby its resistance gradually increases, the weights F are raised in turn from the lowermost upward, or "picked up," all, or all that are required, being suspended when the chute reaches its lowest or operative position, wherein it presents the greatest resistance, and at which it is indicated in Fig. 1.

The modification illustrated in Fig. 3 involves the same principle as the construction already described, the difference being that the cable E instead of being free at its weighted end is fastened at a point *x*, to which it just or a little more than reaches when the opposite end is wound to or nearly to the full extent on the drum *p*, and the chute occupies its lowest position. Then all the weights F are suspended from the drum *p* and resist the chute, which, in being raised and thus presenting less and less resistance, entails unwinding of the cable E, which causes more and more of its length to hang suspended from the point *x* until when the chute reaches its highest position all the weights may be so suspended, where their effect on the chute is neutralized. In Fig. 4, wherein the various positions assumed by the chute in describing its arc are indicated by the dotted lines 1 to 4, inclusive, the principle of the mechanism is the same as of that described with reference to Figs. 1 and 3, the operation being substantially like that of the apparatus in Fig. 1—namely, that the effect of the weights is gradually neutralized or brought into play according as the chute is raised or lowered, by stopping or intercepting them on a suitable support in the one instance and picking them up successively in the other instance.

The same principle may be applied in various other modified forms, all of which I desire to be understood as included within my invention.

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 chute C and its hoist D, of a cable E, suspended from the hoist and provided toward its lower end with a series of weights F, and means, substantially as described, for neutralizing, as the chute is raised, the resistance to it of the weights in succession, and for bringing them successively into play against the resistance of the chute as it is lowered, substantially as and for the purpose set forth.

2. In a discharge apparatus for coal and ore bins, the combination, with the chute C and its hoist D, comprising a rotary shaft *g*, carrying the drum *r*, connected with the chute by the cable *o*, and the drum *p*, of a cable E, suspended from the drum *p* to be wound thereon by lowering of the chute, and provided toward its lower end with a series of weights F, and means, substantially as described, for neutralizing as the chute is raised the resistance to it of the weights in succession, and for bringing them successively into play against the resistance of the chute as it is lowered, substantially as and for the purpose set forth.

3. In a discharge apparatus for coal and ore bins, the combination, with the chute C and its hoist D, comprising a rotary shaft *g*, carrying the drum *r*, connected with the chute by the cable *o*, and the drum *p*, of a cable E, suspended from the drum *p* to be wound thereon by lowering the chute, and provided toward its lower end with a series of weights F, and a series of supports for the weights, one above the other, below the said weights, the whole being constructed and arranged to operate substantially as described.

WATSON W. RICH.

In presence of—

J. D. KOREN,

JOHN W. TAYLOR.