A. B. NIMBS.

GRAIN ELEVATOR.

No. 45,337. Patented Dec. 6, 1864.

Fig. 3.

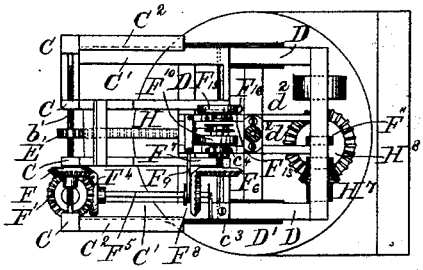


Fig. 4.

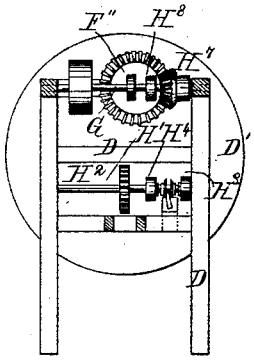


Fig. 1.

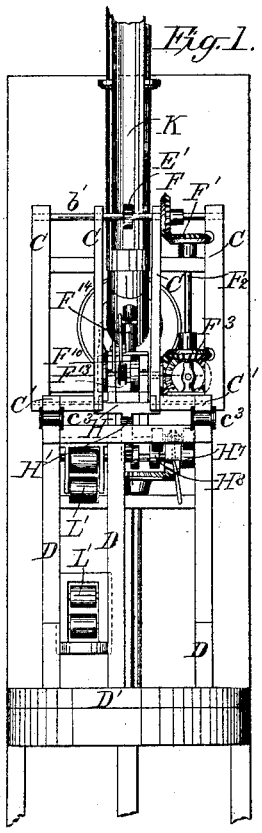
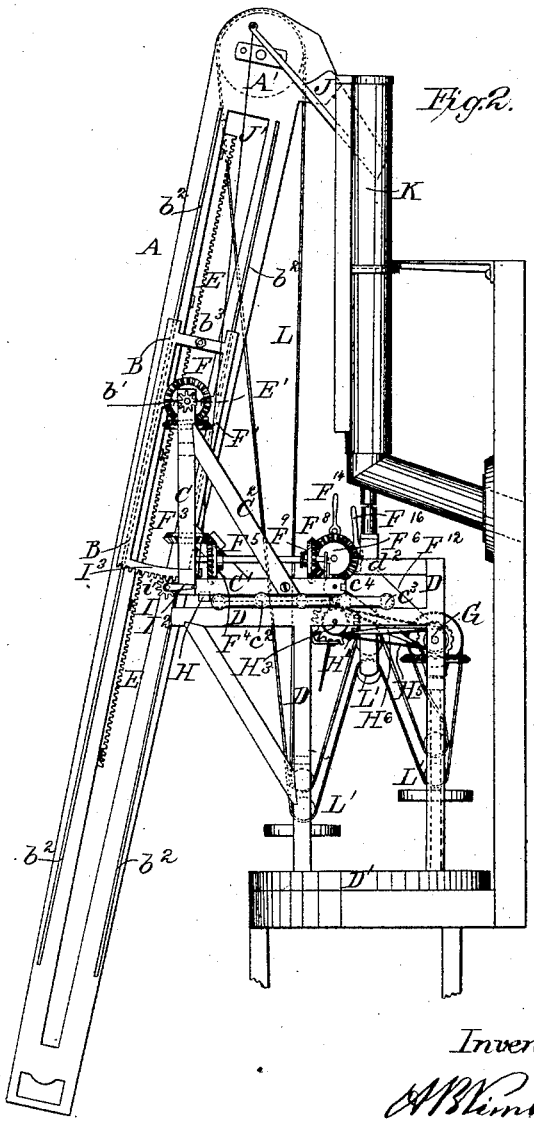


Fig. 2.



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UNITED STATES PATENT OFFICE.

A. B. NIMBS, OF BUFFALO, NEW YORK.

IMPROVED GRAIN-ELEVATOR.

Specification forming part of Letters Patent No. **45,337**, dated December 6, 1864.

To all whom it may concern:

Be it known that I, A. B. NIMBS, of the city of Buffalo, county of Erie, and State of New York, have invented certain new and useful Improvements in Grain-Elevators; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification.

These improvements relate to the mechanism by which the elevator-leg is suspended and its movements controlled. They are designed for, and the drawings represent their application to, the floating grain-elevator, for which Letters Patent were granted to me August 12, 1862, but they are also applicable to other elevators, either floating or stationary.

The nature of the invention consists, first, in suspending the elevating-leg in a movable frame-work or carriage, by means of which it may be moved outward horizontally to such distance as will enable it to enter the hatch of the vessel to be unloaded at such angle as will cause the elevating-buckets to work most effectually; second, in the application of a rack and pinion for the purpose of raising and lowering the leg; third, in controlling the inclination of the elevating-leg to the perpendicular by the action of a pinion upon a gear-segment connected to or formed upon one end of the guiding jaws or frames between which it moves.

For a description of the "hull," receiving-bins, weighing-scales, driving-gear, &c., reference is made to the before-mentioned patent.

Figure I is a front elevation of my improvements. Fig. II is a side elevation of same. Fig. III is a top plan of frame-work, stationary upon the turn-table, and also of the movable elevator-carriage; and Fig. IV is a plan of stationary frame-work and machinery on turn table.

Letters of like name and kind refer to like parts in each of the figures.

A represents an elevator-leg of common construction. The journal-boxes in which the shaft of the head-pulley runs are bolted to the head part of the leg and sustained thereby. The shaft projects through on one side and carries the driving-pulley A′.

B B represent the grooved jaws or frames between which the elevator-leg is placed, and which serve as supports and guides to the leg in its movements. They are hung upon a shaft, b', supported by the upright posts C of the movable elevator-carriage. They each consist of a rectangular frame of wrought-iron, and are of sufficient length to give a firm lateral support to the leg. A longitudinal groove is formed in each side piece of each frame or jaw into which the parallel tongues b^2, secured longitudinaly to each side of the front and back trunks of the leg, fit so that as the leg is raised or lowered between the jaws the tongues slide in the grooves, and hold and guide the leg in its movement. The two jaws are connected firmly together by bolts b^3, passing through between the back and front trunks of the leg. The length of the tongues b^2 is governed by the required movement of the leg through the jaws.

The movable carriage by which the leg is run out horizontally consists of the upright posts C C, (at the upper end of which are formed the journal-bearings in which the shaft b', supporting the jaws B B, is held,) the horizontal timbers C′ C′, into which the posts C C are framed, and the braces C^2 C^2.

D D represent a frame-work raised upon the turn-table D′, which turn-table is supported and operated the same as described in the before-mentioned patent. The movable carriage C C′ C^2 is supported by this frame-work, the bottom horizontal timbers, C′, of the carriage being made to coincide with the top horizontal timbers of the frame-work D D, said timbers extending outboard over the turn-table and strongly braced so as to form a track upon which the movable carriage runs. Friction-rollers C^3 C^3 are interposed to render the movement of the carriage easy. The rollers C^4 C^4, placed at the tail of the movable frame, run under the timbers d^2, belonging to the stationary frame-work D D, and prevent the carriage from tipping up under the weight of the elevator-leg.

E represents a rack equal in length to the distance it is required to raise and lower the elevator-leg, secured to the inside of the front trunk of said leg, and E′ is a pinion keyed upon the suspension-shaft b', which gears with the rack and by its revolution raises the leg through the jaws B B. Motion is given to the shaft b' and pinion E′, as follows:

F is a bevel spur-wheel keyed on the shaft b', which gears with the bevel spur-wheel F′

on the end of the vertical shaft F^2. F^3 is a bevel-gear on the lower end of the vertical shaft F^2, which gears with the bevel-wheel F^4, keyed on the horizontal shaft F^5. The vertical shaft F^3 has its bearing at the top in a cross-piece between the posts C C of the movable carriage and at the bottom in a foot-step sustained on a cross-piece between said posts. The horizontal shaft F^5 is parallel to the line of motion of the movable carriage, and has its bearings at each end on said carriage.

F^6 is a bevel-wheel keyed on the end of shaft F^7, which shaft runs at right angles to the horizontal shaft F^5 in journal-boxes bolted to the timbers d^2, belonging to the stationary frame-work D D. The bevel-wheel F^6 gears with the bevel-wheel F^8 on the horizontal shaft F^5. This bevel-wheel F^8 is held upon the shaft F^5 by a feather, which causes them to revolve together, but allows the shaft to move through the bevel-wheel when the carriage is moving out or in without moving said wheel or throwing it out of gear with the bevel-wheel F^6. A groove is formed in the hub of the bevel-wheel F^8, into which a forked arm, F^9, bolted to the stationary frame-work, enters, and, while allowing said wheel to revolve freely, prevents it from being carried along with the shaft F^5 when moving out or in.

G is the line-shaft, supported by the back posts of the frame-work D D, from which all the machinery for operating the elevator-leg is driven. It receives its motion as described in the before-mentioned patent.

F^{10} is a pulley on the shaft F^7, driven from the pulley F^{11} on the line-shaft G by the belt F^{12}. It runs loose upon its shaft, but is provided with a sliding clutch, F^{13}, of common construction, by which it may be thrown into gear with its shaft and give motion thereto. The clutch is operated by the clutch-lever F^{14}. Motion being given to shaft F^7 by throwing the pulley F^{10} into gear therewith, it is communicated through the train of gears just described (whatever may be the position of the movable carriage) to the suspension-shaft b', carrying the pinion E′, and said pinion acting on the rack E, secured to the leg, moves the leg upward through the jaws.

It is evident that the weight of the leg is more than sufficient to lower itself, consequently when it is desired to lower the leg for use the pulley F^{10} is thrown out of gear with its shaft so as to run loose upon it and the leg allowed to descend, its descent being governed by a friction-brake consisting of the friction-wheel F^{15} on the end of shaft F^7 and brake-lever F^{16}.

The elevator-carriage is moved out or in by means of a rack and pinion, the rack H being supported horizontally on the under side of the carriage-frame, and the pinion H′ being keyed upon a shaft, H^2, which has its bearings on the under side of the timbers of the frame-work D D. Motion is given to this shaft and pinion in either direction, as it may be desired to run the carriage out or in by means of the loose pulleys H^3 H^4 on the shaft H^2, driven in opposite directions by the belts H^5 H^6 (one open and the other crossed) from the pulleys H^7 H^8, keyed upon the line-shaft G, they (the loose pulleys) being provided with a sliding double-clutch, by which either pulley (according to the direction it is desired to move the carriage) may be thrown into gear with and drive the pinion, the action of which on the rack will give the desired motion of the carriage.

I is a pinion on a shaft, i', having bearings bolted near their bottom to the posts C of the carriage. This pinion gears with the segment-gear I^3, formed on or bolted to the lower end of one of the jaws B, and its revolution by means of the winch-handle I^2 causes the jaws to swing upon their suspension-shaft b' in a manner to vary the inclination of the elevator-leg as desired.

J represents a hinged spout connected to the head of the elevator-leg, which may be raised or lowered by means of the rope J′ when the elevator is run out or in on its carriage, so as to maintain a proper connection between the elevator-head and receiving-spout K.

L represents the driving elevator-belt, and L′ tension-pulleys by which the slack occasioned by the movement of the leg is taken up and the belt kept taut.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. Suspending the elevator-leg in a movable carriage, C C′ C^2, by means of which it may be moved outboard horizontally or returned inboard, substantially as and for the purposes set forth.

2. Raising and lowering the elevator-leg by means of rack E and pinion E′, substantially as described.

3. Controlling the inclination of the elevator-leg by means of the pinion I and gear-segment I^3, the gear-segment being formed on or bolted to the end of one of the jaws B, substantially as and for the purpose described.

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