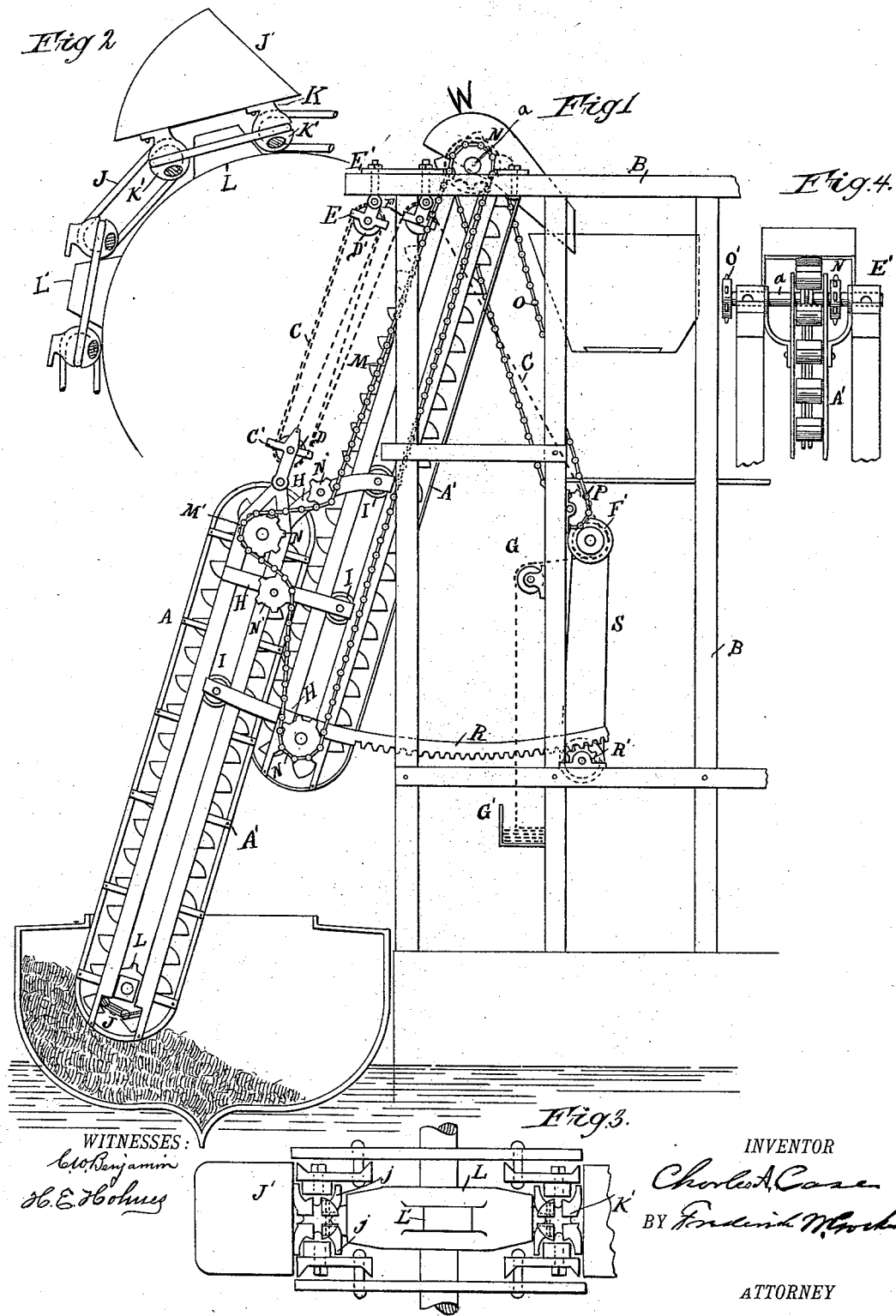


(No Model.)

C. A. CASE.
ENDLESS CHAIN ELEVATOR.

No. 418,839.

Patented Jan. 7, 1890.



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ENDLESS-CHAIN ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 418,839, dated January 7, 1890.

Application filed October 10, 1889. Serial No. 326,618. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. CASE, a citizen of the United States, residing in the city of New York, county and State of New York, have invented a certain new and useful Improvement in Endless-Chain Elevators for Unloading Vessels or Boats, of which the following is a specification.

My invention relates to improvements in elevators used for removing coal from barges to vessels or to storage-pockets, or cargoes of ore or other analogous freight; and it consists of an elevator made in two sections, so situated in relation to each other that the buckets of one section discharge their load into buckets of the other section, which elevate the load to a conducting-chute, where it is discharged. The buckets are attached to an endless chain passing over sprocket or rag wheels at the top and bottom of each elevator-section. The links of the chain are connected by balls rigidly attached to each end of one link, while the adjacent links move in grooves passing around the balls at right angles to the rigid link. Each ball is provided on its respective sides with projections or guards to hold the chain close to the track in which it works. To the top of each ball is cast a bracket or support, to two of which the bucket is secured. The lower section of the elevator is obliquely adjustable by a chain passing over pulleys at its upper end and over pulleys attached to the supporting-frame, and is held in relation to the upper section by arms having at their free ends guide-rollers running in ways or tracks, two pairs running in the track of the upper section and one pair in the track of the lower.

The elevator is laterally adjustable by means of a rack attached to the frame-work of each section, operated by a toothed wheel engaging with said ratchet-iron. To one end of the shafts or axles of the sprocket-wheels located at the top of the outer section and at the top and bottom of the inner section of the elevator are attached, outside the elevator-frame, a set of similar wheels, upon which works a linked chain for transmitting power. On the sprocket-wheel shaft, at the top of upper section, is a rag-wheel, over which and a sprocket-wheel attached to one of the up-

rights of the supporting-frame runs a linked chain, which conveys power to the wheels and chains of the elevator.

In the accompanying drawings, forming a part of this specification, Figure 1 is a side elevation of my improved elevator. Fig. 2 is a view of the sprocket or rag wheel, showing the attachment of the buckets to the rigid links and the position of the sprockets of the wheel therein. Fig. 3 is a plan view of the sprocket-wheel, showing the ball-connection between the links, partly in section; and Fig. 4 is a front elevation of the upper section of the elevator, showing the manner of its attachment to the supporting-frame.

Similar letters of reference indicate corresponding parts.

A is the elevator, composed of two sections A' A', and B the supporting-frame to which it is attached. The lower or outer section A' is obliquely adjustable by means of a chain C, attached to its upper end by a block C', passing over a double pulley D in said block and over a double pulley D' in block E, fastened to the outer end of one of the beams E' of supporting-frame B, then over a single pulley F, also fastened to beam E', to barrel or drum F', attached to one of the upright posts of the supporting-frame, while the upper or inner section A' is hung to an axle a, suitably journaled in beams E', Fig. 4.

The chain C, as it is wound up on drum F', is allowed to unwind at its free end, which passes over wheel G, secured to an upright of the supporting-frame and coiled in box G', also secured to said upright.

Sections A' A' are fastened to each other by arms H, two pairs extending from the outer section and one from the inner section. To the end of each pair are guide-rollers I, which operate in a track within the frames of the elevator A as the outer section is elevated or lowered. The arms serve to steady and keep the sections A' A' in the same relative position to one another.

Within the sections A' A', arranged upon a revolving chain J, are buckets J', attached to brackets K, cast with the balls K'. To the balls K', by means of a groove therein, is connected a movable link lying in a plane at right angles to the rigid link, giving the de-

desirable flexibility to chain J. The balls are provided with projections *j* upon opposite sides to hold the chain snugly to the track. The chain J is revolved by sprocket or rag wheels L, located, respectively, within the frames of sections A' A' of the elevator, at the ends thereof, the sprockets or teeth L' of which engage the rigid links, as shown in Figs. 2 and 3. The power for revolving the sprocket-wheels L is conveyed thereto by a chain M, formed of rectangular links working upon a rag-wheel M', secured to the outer end of axle of sprocket-wheel L, at the upper end of outer section A', and also over sprocket-wheels N, attached to axle of rag-wheels L, located, respectively, at the upper and lower end of inner section A'. Upon the two upper arms H, which carry wheels I, are placed sprocket-wheels N', to take up the slack of the chain M.

The power is transmitted to the chain M by chain O, running over rag-wheel O' upon the axle of sprocket-wheel L at the top of the upper section A', and thence over rag-wheel P, attached to upright of supporting-frame B.

The rack R, attached to both sections of elevator A, in connection with pinion R', adjusts the elevator laterally, and is operated by a belt running upon a wheel attached to axle of rag-wheel P, to which the power for operating the elevator is connected. The shaft of pinion R' is attached by a band S to a band-wheel (not visible in drawings) upon the axle of drum F', and can be thrown in and out of gear by any suitable means.

The manner of using my invention is as follows: After the boat is alongside, the elevator is adjusted by the rack R and pinion R' until outer section A' is at a proper angle, when it is lowered by chain C into the boat. The coal is then elevated by means of the buckets J', attached to chain J of the lower or outer section working over sprocket-wheels L, which upon reaching sprocket-wheel L at top of said section are inverted, discharging their contents into buckets J of the inner or upper section A', which in turn discharge their load into the chute W at top of supporting-frame B. The chains J of sections A' A', carrying buckets J', are worked by power from chain M, passing over sprocket-wheels N, located, respectively, at the top

and bottom of upper or inner section A' and at the upper end of lower or outer section A' of the elevator. To the axle *a*, at the top of the outer or upper section, is attached sprocket-wheel O', connected to sprocket-wheel P upon upright or supporting-frame B by chain O, which transmits the power from the power-shaft to the axle of the sprocket-wheel at the top of supporting-wheel carrying chain M.

When the elevator is not in use, the outer section is raised by chain C, and, when in proper position, by means of the rack R and pinion R', which are thrown into gear by band S, is swung in upon the dock, bringing same within the supporting-frame, so as not to interfere with the rigging of vessels coming alongside. Further, the elevator, owing to its lateral adjustability, can be readily placed upon either side of the keelson of a vessel, thereby avoiding the necessity of shifting the cargo in order to bring it within the reach of the buckets of the elevator.

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

1. In an endless-chain elevator, the combination of the elevator A, supporting-frame B, chain C, operatively connected therewith, chains O and M, and sprocket-wheels P, arranged substantially as shown and described.

2. In an endless-chain elevator, the combination of elevator A, composed of two sections A' A', attached to each other by arms H, provided with rollers I, which move within tracks within the frame of each section, and means for adjusting one section on the other, substantially as shown and described.

3. In an endless-chain elevator, the elevator A, composed of two sections A' A', chain C, for adjusting the outer section obliquely, and the rack R, for adjusting both sections laterally, for the purposes shown and described.

4. In an endless-chain elevator, the elevator A, composed of sections A' A', chains J, having links made rigid by balls K', provided with standards K and projections *j*', said standards carrying buckets J', substantially as shown and described.

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Witnesses:

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