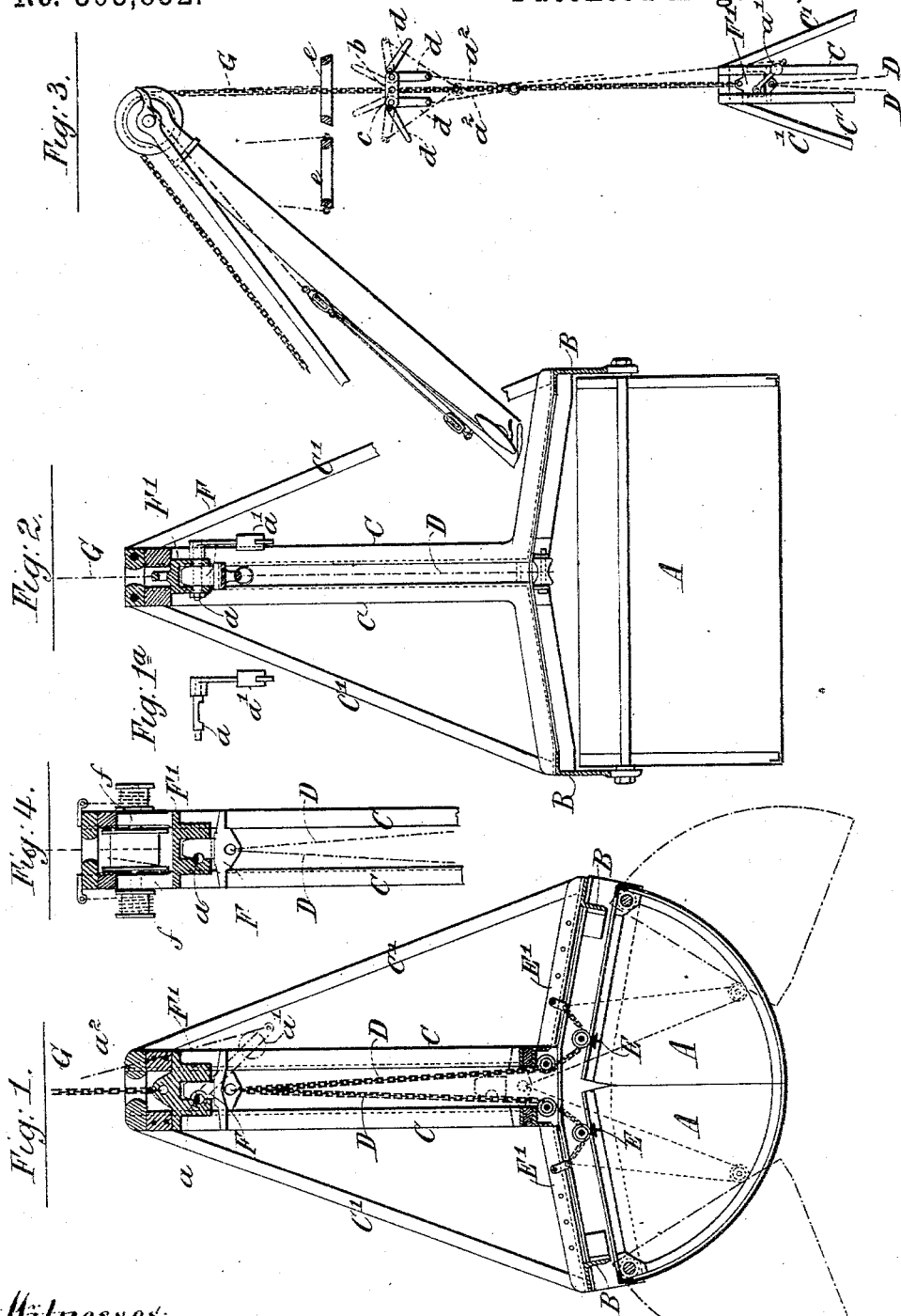


(No Model.)

G. J. HONE.

APPARATUS FOR ELEVATING AND DISCHARGING GRAIN, MUD, &c.
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UNITED STATES PATENT OFFICE.

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APPARATUS FOR ELEVATING AND DISCHARGING GRAIN, MUD, &c.

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To all whom it may concern:

Be it known that I, GEORGE JAMES HONE, of Poplar, in the county of Middlesex, England, have invented certain Improvements in Apparatus for Elevating and Discharging Grain, Mud, and other Materials, of which the following is a specification.

This invention relates to that class of elevator apparatus in which grabs, skips, buckets, or forks are used for hoisting grain, mud, ballast, and other materials, the hoisting being effected by means of a single chain; and the object of the invention is to simplify the construction of such apparatus, whereby its efficiency will be increased and the cost of production greatly reduced.

In the accompanying drawings, Figure 1 is a side elevation of my improved apparatus. Fig. 2 is an end view of the same, and Fig. 3 shows a means for discharging the loaded buckets.

A are the grabs, skips, or buckets, (or they may be forks,) of the usual form of two segments of a cylinder, and pivoted near their outer edges to a rectangular frame, B. Standing up from this frame are vertical guides C C, which are maintained in a vertical position by stay-rods C' C', secured to the angles of the frame B, and connected together at top by a cross-head. These stay-rods C' C' serve not only to support the guides C C, but also to prevent the skips or buckets catching under the hatchway of the vessel as they are being hauled up from the hold. The two halves of the skips or buckets are drawn together by means of chains D, secured thereto near their lower meeting edges, or to a T-iron cross-stay, E, or in any other convenient manner. In some kinds of materials the leverage required to close the skips or buckets is very great, and in that case I prefer to secure the chains D by means of an adjustable fastening to cross-bars E', fitted to the frame B, and carry them round pulleys conveniently secured to the cross-stays E of the skips or buckets A, as shown in Fig. 1. The upper ends of the chains D, I attach to a slide-piece, F, which slides in the guides C C. The upwardly-projecting portion of this slide F is intended to enter a

socket formed in the under side of a second slide-piece, F', also sliding in the guides C C, and which may carry the ordinary multiplying-gear, as hereinafter explained, or to which the hauling-chain G may be attached, thus forming a permanent attachment between the hauling-chain and the bucket-frame B. The two parts F and F' are secured together by means of a tumbling or rocking catch or pin, a, (shown detached at Fig. 1^a,) the rounded part of which fits into a notch formed in the projection of the piece F. As the parts F and F' are brought together, which will be effected by lowering the part F' (by paying out the hauling-chain) onto the part F, which will be in the dotted position shown in Fig. 1, the projection of F will enter the socket, strike against the flattened portion of the pin a at one side of its axial center, thereby turning the pin sufficiently to bring the flattened part of the pin into position to allow the projection to pass it. When the projection is in position, the pin will rock in the opposite direction under the influence of the counter-weight a', and the two parts F and F' will be securely locked or coupled together, as shown in the drawings. As shown in Fig. 1^a, the flattened portion of the pin a is about equal in length to the diameter of the projection on the part F, and hence the portions of the pin which are journaled in the part F' are circular. Consequently when the slide piece or part F' is raised by the chain G, the downward pull of the projection on the slide-piece F has no tendency to turn the pin a, and the latter prevents the disengagement of the parts F F' as securely as would a locking-pin cylindrical throughout its length. When the parts F F' are coupled, it will be only necessary in order to close the buckets and hoist to haul on the chain G.

The discharge of the buckets may be effected directly by the attendant at the winch, who, by means of a chain or line, a², attached to the counter-weight a' and carried over the jib-head, will trip the catch or pin a at the proper time and release the piece F, and with it the buckets, which can thus be discharged either in mid-air or on the ground, as desired.

Any suitable and well-known apparatus may be employed to take up the slack of the tripping chain or line. I prefer, however, that the discharge of the skips, buckets, or forks shall be effected automatically by means of a trip-lever arrangement, such as that shown at Fig. 3. This arrangement consists of a collar, *b*, or its equivalent, which surrounds the hauling-chain *G*, and is secured thereto at any desired point by a pin, *c*, passing through a link of the chain. To the collar are pivoted in any convenient manner two bell-crank levers, *d*, one arm of each of which is connected with the tripping chain or line *a*², the other arms each having a tripping extension-piece.

At a suitable distance below the jib-head of the crane is fixed or suspended, so as to be capable of vertical adjustment, a ring, *e*, through which the trip-lever arrangement will pass as the chain *G* is hauled in, the pivoted extension-pieces on the arms of the bell-cranks *d* permitting of such passage.

To effect their discharge the buckets will be lowered, so that the pivoted extension-pieces of the bell-cranks come into contact with the ring *e*. As the lowering continues the bell-cranks *d* will be turned into the dotted position, thereby pulling on the tripping-chain *a*² and tripping the catch or pin *a*, as before explained.

To provide for the movements above described, it is only necessary that the extension-pieces of the two bell-crank levers *d* be attached to the said levers by shouldered and spring-actuated hinge-joints of any well-known kind, which will permit the extension-pieces to be deflected without affecting the bell-crank levers as they rise through the ring *e*, but which will cause the extension-pieces to impart movement to the said levers as the extension-pieces come against and are arrested and moved by the ring *e* in their descent.

Instead of altering the position of the trip-lever arrangement on the chain *G* according to the level at which it is desired to discharge, the ring *e*, which may be supported by chains passing through eyebolts or over pulleys at the jib-head of the crane and secured by tackle in any convenient manner, may be adjusted at any desired level for the same purpose. By this means the buckets may be filled at one level and discharged at a lower level—a matter sometimes of great convenience.

It will be evident that the trip-lever arrangement, instead of being made automatic, may be actuated by an attendant on the wharf or elsewhere.

At Fig. 4 I have shown a mode of applying the ordinary multiplying-gear to my improved apparatus. In this case I form the sliding piece *F*¹ with upwardly-projecting lugs or straps *f*, which slide in the guides *C*, and in these lugs or straps are formed the bearings for the axles of the hoisting-drums.

It will be observed that the multiplying-drums are outside the guides *C* *C*. I am

therefore enabled to change or remove them with great facility as desired. When the multiplying-gear is not required, the multiplying-chains will be unhooked and the main drum will be locked in any convenient manner.

The operation of multiplying-gear as applied to this class of apparatus is well understood, and further reference thereto will be unnecessary.

Having now described my said invention, I wish it to be understood that I claim—

1. In apparatus for hoisting grain and other materials, the combination of a rectangular frame, *B*, grabs, skips, buckets, or forks *A*, pivoted at their outer edges to opposite sides of said frame, whereby they are caused to move away from each other in discharging, the vertical guides *C* *C*, and the stay-rods and guards *C'* *C'*, all substantially as and for the purpose herein described.

2. In apparatus for hoisting grain and other materials by means of a single hoisting-chain, the coupling arrangement for connecting the bucket-chains with the single hoisting-chain, such coupling arrangement consisting, essentially, of a sliding piece, *F*, connected with the bucket-chains *D*, and provided with a notched upwardly-projecting piece, and a sliding piece, *F'*, connected to the single hoisting-chain *G*, and provided with a recess to receive the projecting piece of *F*, and a tumbling or rocking catch or pin, *a*, to secure the same, and the counter-weight *a'*, all constructed and operating substantially as herein shown and described.

3. The combination of the buckets *A*, rectangular frame *B*, vertical guides *C*, bucket-chains *D*, cross-stays *E*, and pulleys, cross-bars *E'*, coupling arrangement *F* *F'*, and hoisting-chain *G*, substantially as and for the purpose herein shown and described.

4. The combination, with the sliding piece *F'*, the multiplying-gear, and the hoisting-chain *G*, connected therewith, of the sliding piece *F*, and a locking device for connecting the pieces *F* and *F'*, all substantially as and for the purpose herein described.

5. The combination of the buckets *A*, bucket-chains *D*, coupling-pieces *F* *F'*, multiplying-gear, and hoisting-chain *G*, all substantially as described.

6. The means for automatically discharging the buckets, such means consisting of a collar, *b*, attached by the pin *c* to a link of the hauling-chain *G*, and carrying bell-crank levers *d*, one arm of each of which is attached by a chain, *a*², to the counter-weight *a'* of the tumbling or rocking catch or pin *a* of the sliding piece *F'*, and the suspended ring *e*, all arranged and operating substantially as herein described.

7. The means for automatically discharging the buckets, consisting of a collar, *b*, attached to the hoisting-chain *G*, bell-crank levers *d*, pivoted in said collar, and each pro-

vided with a pivoted extension-piece, as described, the coupling composed of the parts F F', and the weighted rocking catch or pin *a a'*, for connecting said parts, the chains *a²*,
5 each connecting one arm of a bell-crank lever, *d*, with said catch or pin *a a'*, and the suspended ring *e*, for tripping said levers *d*, said ring being vertically adjustable, substantially as and for the purpose herein described.

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