No. 827,635. PATENTED JULY 31, 1906.

G. J. HONE.

GRAB.

APPLICATION FILED MAR. 13, 1905.

3 SHEETS—SHEET 1.

Fig. 1.

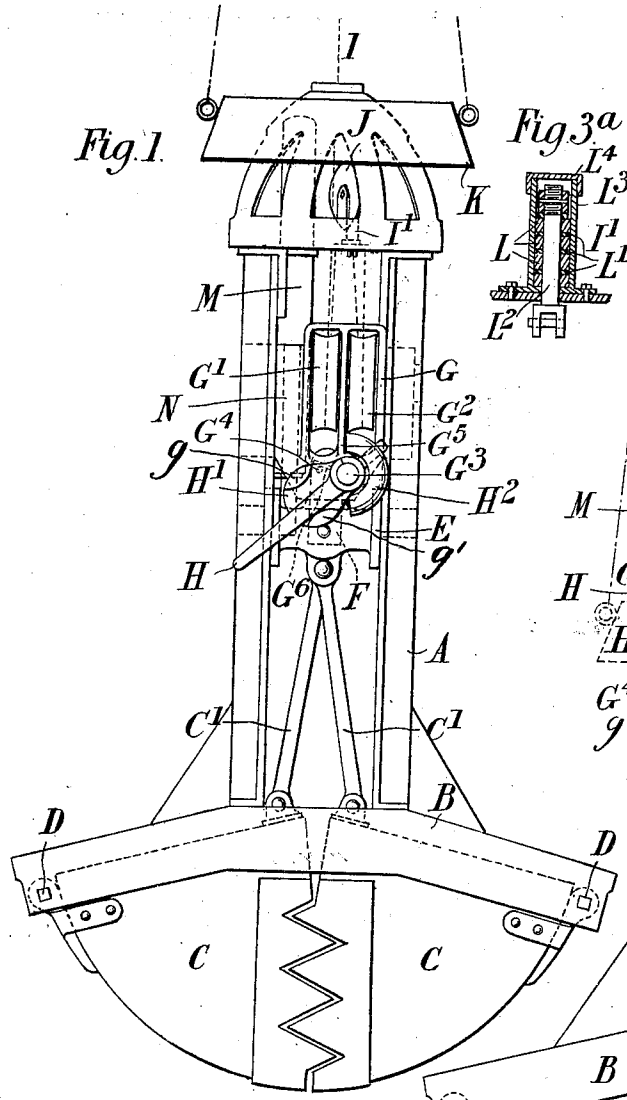
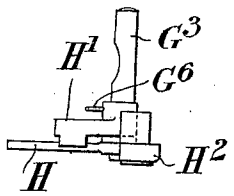


Fig. 3a

Fig. 2.

Fig. 3.



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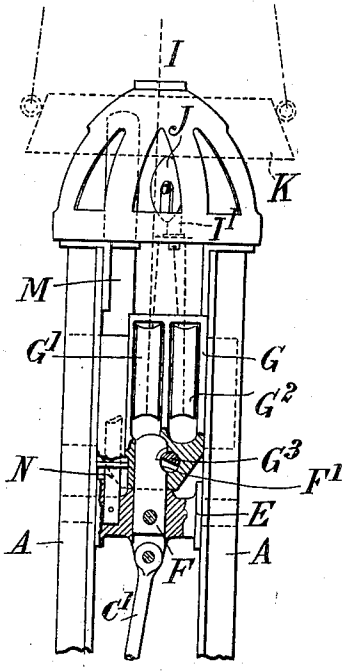
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3 SHEETS—SHEET 2.

Fig. 1a



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3 SHEETS—SHEET 3.

Fig. 5

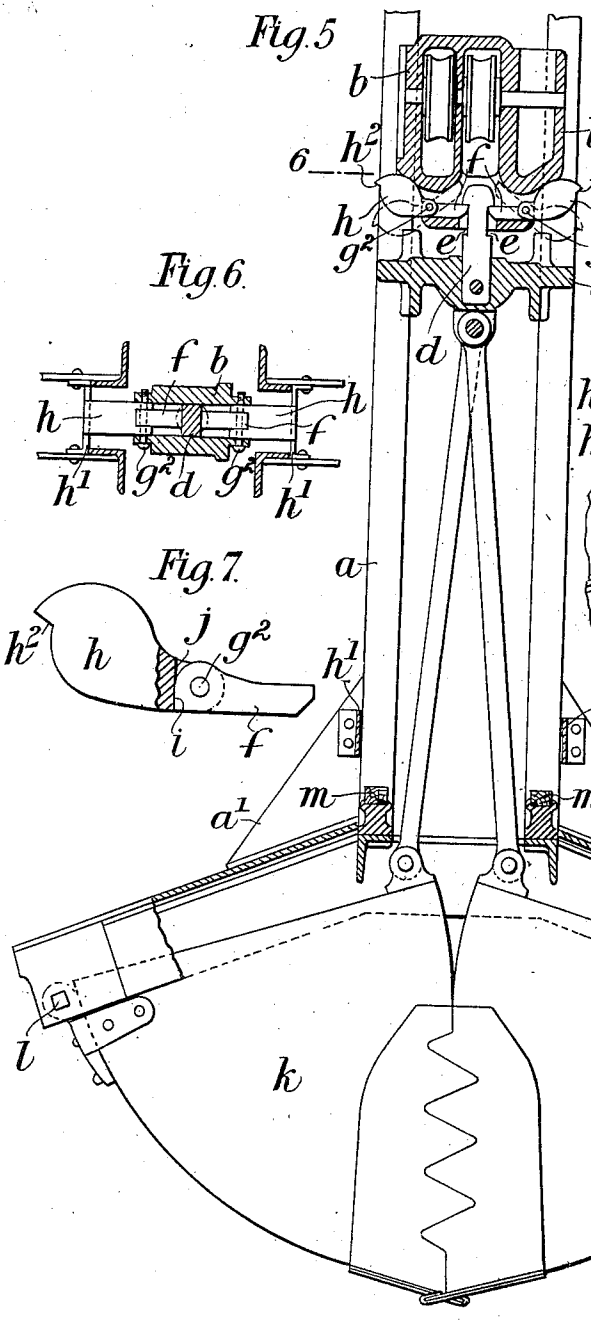


Fig. 6

Fig. 7

Fig. 8

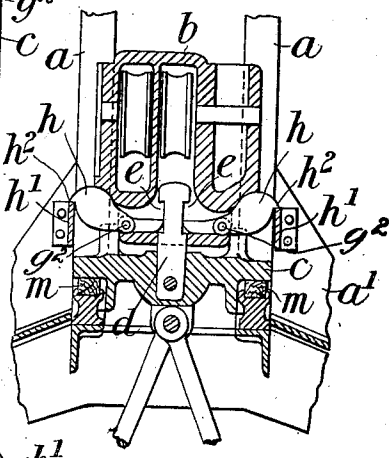
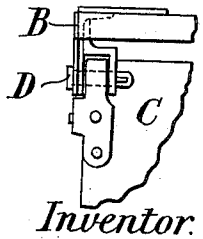


Fig. 4



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GRAB.

No. 827,635. Specification of Letters Patent. Patented July 31, 1906.

Application filed March 13, 1905. Serial No. 249,925.

To all whom it may concern:

Be it known that I, GEORGE JAMES HONE, a subject of the King of Great Britain, residing at Clarence House, 176 Romford road, Forest Gate, Essex, England, have invented new and useful Improvements in Grabs, of which the following is a specification.

This invention relates to grabs or excavators for coal, coke, clay, and other material, and comprises the improvements hereinafter described.

In the accompanying drawings, Figure 1 is an elevation of a grab of the single-chain type and having certain of the improvements applied thereto, the buckets being shown closed. Fig. 1[a] is a view of the upper part of the frame, together with the pulley-block and cross-head, the pulley-block and cross-head being in partial section. Fig. 2 is a view similar to Fig. 1, showing the grab with the buckets open. Fig. 3 is a view of a detail hereinafter described. Fig. 3[a] is a section of a spring-buffer hereinafter described. Fig. 4 is a view of a further detail hereinafter described. Fig. 5 is a sectional side elevation of a modified construction of the grab. Fig. 6 is a section on the line 6 6, Fig. 5. Fig. 7 is a sectional elevation of a detail hereinafter described; and Fig. 8 is a view similar to Fig. 5, showing the parts in different relative positions.

Referring first to the construction of grab illustrated in Figs. 1 to 4, A is an upright frame, to the lower end of which is secured the frame B, the latter frame B serving to support the buckets C C. Each of these buckets C is hinged to the frame B by means of a pair of short external hinge-pins D D, as clearly shown in Fig. 4. By mounting the buckets in this manner the latter can have given to them an enlarged or extended sweep. Furthermore, by arranging the hinges externally of the buckets two short hinge-pins D D can be utilized in lieu of a single longer pin, this being of considerable advantage in practice. C′ C′ are connecting-rods which are hinged at their lower ends to the buckets C and at their upper ends to the lower end of a cross-head E, adapted to move in the frame A. F is a removable pin or bolt which is fitted in the upper part of the cross-head E, the said pin being formed with a segmental notch F′. G is a pulley-block which is mounted in the frame A above the cross-head E and is provided with two sheaves G′ and G[2]. The said block is also formed with a socket, into which the pin F can enter, and which can be locked therein by means of the horizontal pin G[3], the said pin G[3] being mounted in the block G and being adapted to fit into the recess or notch F′ in the pin F. The two parts are disengaged by bringing the notch in the pin G[3] opposite the recess F′ in the pin F. A weight H′ is rigidly secured to the pin G[3] and tends to turn the said pin into the position shown in Fig. 1[a], in which position when the pin F is in proper position it locks the said pin F securely to the block G. A lever H is loosely mounted on the pin G[3] and extends outwardly between the lugs *g g′* on the weight H′. This lever has a short extension on the opposite side of the pin G[3], and to such extension is secured the weight H[2], tending to keep the longer arm of the lever H in contact with the upper lug *g* of the weight H′. The pin G[3] is provided with the pin G[6], which engages a notch in the bearing of the pin G[3] and limits the movement of the latter in a well-known way. The function of the ring K is to release the buckets of the grab and permit them to discharge their contents. It is loosely suspended from the jib-head of the crane by ropes or chains in order to accommodate itself to the varying positions of the hauling-chain employed in raising and lowering the grab. I is the hauling-chain from the crane, the said chain passing down into the frame A, round the sheave G′, thence up and round the sheave J, which is mounted in the upper end of the frame A, and down and round the sheave G[2], and finally up again to the top of the frame A, to which it is attached through the medium of the spring-buffer I′. (Shown in Fig. 1 and detached at Fig. 3[a].) This spring-buffer I′ is advantageously formed by elastic blocks L, with interposing washers L′, up through which passes the connecting-link L[2], having a screw-nut on the end of the link bearing on the topmost washer, all being inclosed in a cylindrical case L[3], with a metal cap L[4].

The operation of the grab is as follows: The grab is lowered with the buckets open, as shown in Fig. 2, onto the material to be raised, and when the buckets are in contact with the material the block G slides down the frame A under the action of gravity until the

pin F enters the socket in the block G. The weight H′ is at this moment holding the pin G^3 in the position shown in Fig. 1ª, and as the cross-head descends the upper end of the pin F comes in contact with the somewhat inclined face of the notched portion of said pin G^3 and turns the pin to permit the upper end of the pin F to pass the same. This turning of the pin G^3 raises the weight H′. As soon as the notch F′ comes into alinement with the pin G^3 the weight H′ returns the pin G^3 to the position shown in Fig. 1ª, thereby securely locking the pin F. The grab is now raised. As the block G and cross-head E approach the highest part of their upward movement the outer end of the lever H engages the ring K and is moved downward. This movement of the lever H does not effect any change of the parts, as it is loosely mounted on the pin G^3 and is not moved downward far enough to engage the lug g' on the weight H′. As soon as the lever H is free from the ring K the weight H^2 raises it again in contact with the lug g of the weight H′. When it is desired to discharge the contents of the grab, the cross-head and block G are allowed to descend. As they pass through the ring K the lever H again engages the ring and being in contact with the lug g of the weight H′, which is rigidly secured to the pin G^3, turns the weight and pin, bringing the notch in the pin G^3 opposite the pin F, releases the latter, permits the cross-head to fall, and the buckets to discharge.

Figs. 5 to 8 illustrate a construction of the grab wherein the use of the ring K and the aforementioned oil-cylinder are dispensed with for releasing the buckets. In this arrangement, *f f* are pawls or catches which are loosely mounted upon hinge-pins g^2 g^2, fixed in the pulley or sheave block *b*, the said pawls being adapted to engage with the lateral notches *e e* in the pin *d*, as hereinafter described. *h h* are balance-weights which are also freely mounted upon the hinge-pins g^2 g^2 and which control the pawls, as hereinafter described. Each pawl is provided with a face *i*, which coacts with a corresponding face *j* upon the balance-weight controlling the said pawl, as clearly shown in Fig. 7, in such a manner that the pawl is prevented from dropping to a position below the plane of the bottom of the balance-weight, but is unconfined with respect to its upward movement. *h′ h′* are stops secured to the gussets *a′ a′* of the frame *a*, the said stops engaging the projections or noses h^2 upon the balance-weights to release the pawls, as hereinafter described. *k k* are the buckets, each of which is hinged to the frame *a* by means of a pair of short external hinge-pins *l l* in the manner before described.

The operation of the grab is as follows: Supposing it to be hanging empty, with the buckets open, then the sheave-block *b* will be at its topmost position in the frame *a*, and the balance-weights *h* and pawls *f* will occupy a position similar to that indicated by dotted lines in Fig. 5, and the cross-head *c* will be resting on the stops *m* in its lowest position. The grab being lowered onto the material to be lifted, the chain is "paid out," and the sheave-block *b*, acting as an overhauling-weight, moves down the frame until the projections h^2 on the balance-weights *h* engage with the stops *h′* and are supported thereby, so that the pawls *f* are free to fall into the notches *e e*, as shown in Fig. 8. The gear is now locked, and on the chain being hauled in the cross-head *c* is raised and travels up to the top of the frame with the sheave-block *b*, so that the buckets are closed and the grab fills itself. This position is shown in Fig. 5. On further hauling of the chain the grab is lifted clear of the material, the weight of the buckets and load being supported by the vertical pin *d* bearing on the ends of the pawls *f*. The grab and load are now transported to the point where it is desired to discharge. For this purpose the grab is allowed to rest on the previously-deposited material or on any suitable support provided, whereby the weight of the bucket and load is taken off the vertical pin *d*, and the pawls are only kept engaged in the notches by the balance-weights. The chain is then paid out slightly to allow the sheave-block *b* to fall a distance equal to the space between the bottom of the said block and the top of the cross-head *c*. This allows the balance-weights *h* to fall and throw the pawls *f* out of gear. The chain is then hauled in again and first lifts the sheave-block back to its topmost position against the upper stops, further hauling of the chain raising the grab from the heap or other support provided, thus allowing the buckets to open slowly and deposit the load.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a grab, the combination with a frame having a sliding pulley-block, of a pair of buckets hinged to said frame by short external hinge-pins, a cross-head sliding in said frame connected with the moving sides of said buckets, and means for connecting said cross-head to and disengaging it from the pulley-block, substantially as described.

2. In a grab, the combination with a frame having a sliding pulley-block, of a pair of buckets hinged to said frame by short external hinge-pins, a cross-head sliding in said frame connected with the movable sides of said buckets, and means comprising a locking construction having weighted parts for effecting certain of the movements of said locking construction, substantially as described.

3. In a grab, the combination with the

frame, of a pair of buckets hinged to said frame, a cross-head movably mounted in said frame, a pulley-block also movably mounted in the frame, and means for connecting the said pulley-block and cross-head including a locking construction having weighted parts, said weights effecting a part of the movements of the locking construction, substantially as described.

4. In a grab, the combination of the movable pulley-block with the movable cross-head, of means for connecting and disconnecting said parts, comprising a pin rigidly secured to said cross-head and having a notch or recess, a notched revoluble pin on the pulley-block and means for turning the pin on the pulley-block, substantially as described.

5. In a grab, the combination with the movable pulley-block, of a movable cross-head, and means for connecting and disconnecting said parts comprising a rigid segmentally-notched pin on the cross-head, a notched revoluble pin on the pulley-block, a weight secured to the said revoluble pin, normally holding such pin in locking position and a lever for causing the pin to make a partial revolution, substantially as described.

6. The combination with the movable pulley-block, of the movable cross-head, and means for connecting and disconnecting the said parts, comprising a segmentally-notched pin rigidly secured to the said cross-head and a notched revoluble pin mounted on the pulley-block provided with a weight tending to maintain the pin in locking position, said weight having two lugs, a lever extending between said lugs, the distance between said lugs being greater than the width of the lever, substantially as described.

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