

(No Model.)

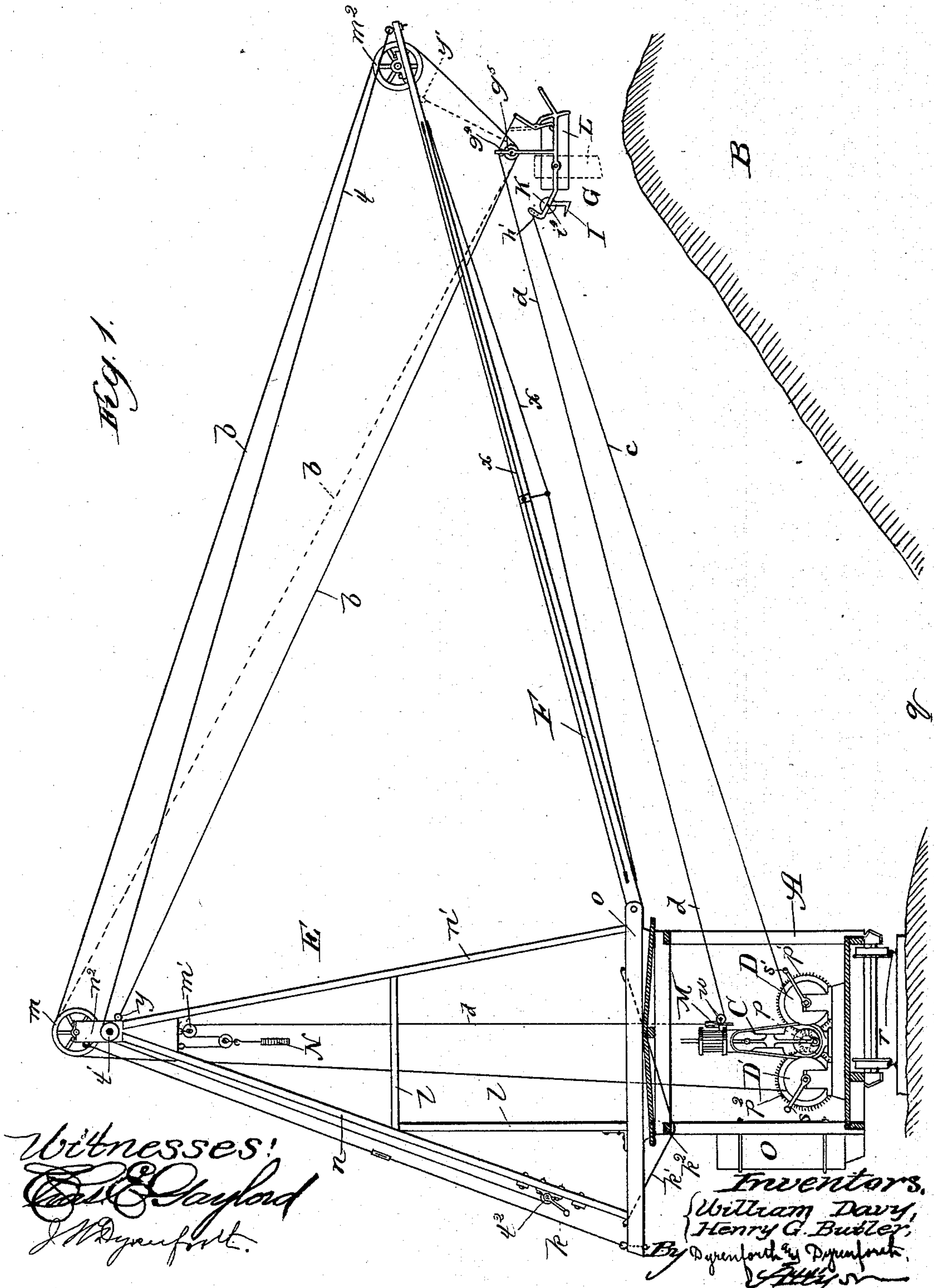
3 Sheets—Sheet 1.

W. DAVY & H. G. BUTLER.

FEEDING APPARATUS FOR USE IN BURNING CLAY TO MAKE  
BALLAST, &c.

No. 413,361.

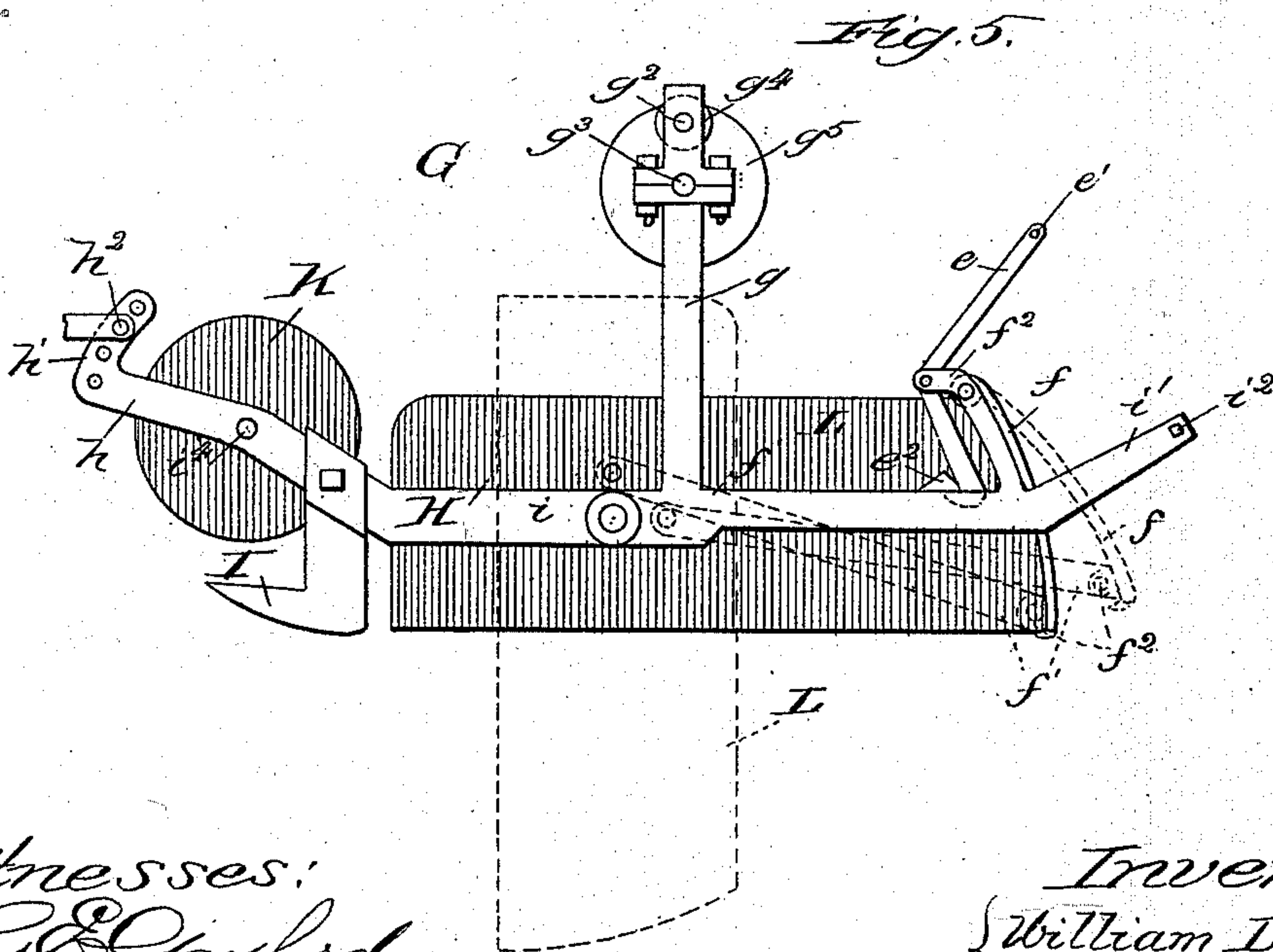
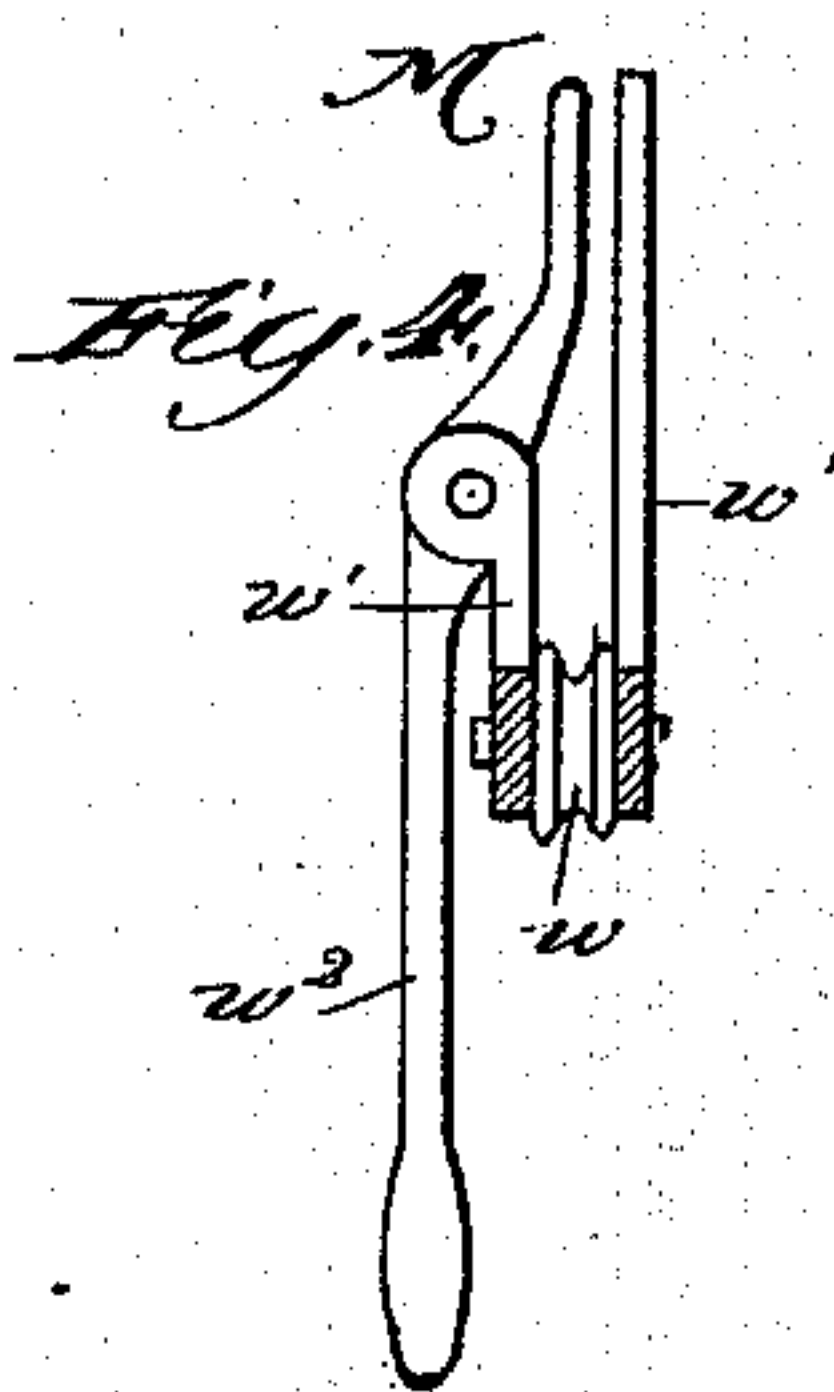
Patented Oct. 22, 1889.



3 Sheets—Sheet 2.

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 { William Davy,  
 { Henry G. Butler,  
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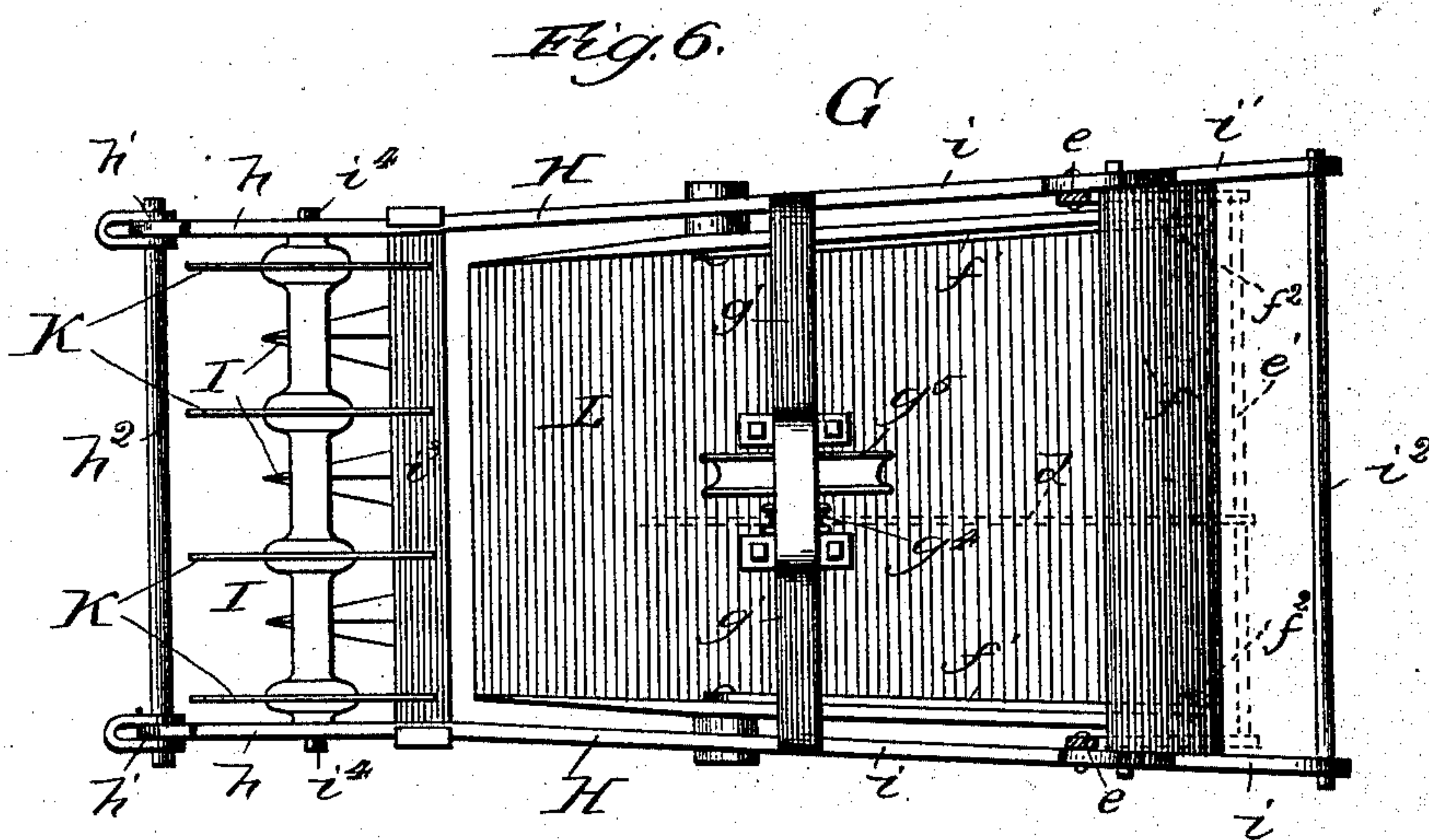


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# UNITED STATES PATENT OFFICE.

WILLIAM DAVY AND HENRY G. BUTLER, OF KENOSHA, WISCONSIN, ASSIGNORS TO THE DAVY CLAY BALLAST COMPANY, OF ILLINOIS.

FEEDING APPARATUS FOR USE IN BURNING CLAY TO MAKE BALLAST, &c.

SPECIFICATION forming part of Letters Patent No. 413,361, dated October 22, 1889.

Application filed April 1, 1889. Serial No. 305,504. (No model.)

*To all whom it may concern:*

Be it known that we, WILLIAM DAVY and HENRY G. BUTLER, citizens of the United States, residing at Kenosha, in the county of Kenosha and State of Wisconsin, have invented a new and useful Improvement in Feeding Apparatus for Use in Burning Clay to Make Ballast, &c., of which the following is a specification.

Our invention relates particularly to improvements in the apparatus set forth in Letters Patent of the United States No. 389,551, granted on the 18th day of September, 1888, to William Davy. Like that apparatus, our improvement is designed particularly to afford means for saving labor by automatically feeding to a fire burning clay in the open air, to make ballast and the like, the clay to be burned, by digging it from the ground along the "fire" or heap, thereby forming longitudinally of the heap a trench, and conveying the clay thus dug to and depositing it upon the heap; and our improved apparatus is designed especially for use in burning clay (meaning thereby any suitable dirt) according to the method practiced as set forth in Letters Patent of the United States No. 371,042, granted to William Davy on the 4th day of October, 1887, or according to the improvement in the said method set forth in an application for Letters Patent of the United States, Serial No. 305,508, filed concurrently herewith on the 1st day of April, 1889, and invented by William Butler and Henry G. Butler.

Generally stated, the apparatus set forth in the aforesaid Letters Patent No. 389,551, and upon which our present apparatus is stated to be designed to afford an improvement, involves a boom on a suitable support, winding mechanism, and a scoop or scraper supported from the boom and connected with the winding mechanism to be controlled thereby. In our present improved apparatus we employ the elements thus stated in general terms as being used in the said former apparatus, but we have changed the latter as to the general as well as details of the construction of its parts, thereby simplifying the mechanism and rendering it more efficacious in its purpose.

In the accompanying drawings, Figure 1 represents our improved apparatus in side elevation, with the car supporting it shown in sectional end elevation. Fig. 2 is a view in rear elevation of the mast. Figs. 3 and 4 show different views of a clutch detail and Figs. 5 and 6 are views respectively in side elevation and plan of our improved combined scoop or scraper and dirt-loosening device.

A is an ordinary box-car, which we prefer to employ as the medium for supporting the mechanism forming our improved apparatus, and which is movable on a track *r* at the side of the trench *q* opposite that at which the pile or fire B is built. Within the car is a suitable engine C, serving to rotate a pinion *p*, flanked on opposite sides by cog-wheels *p'* and *p''*, with which the pinion meshes to rotate them simultaneously in the opposite direction, and extending from corresponding sides of which cog-wheels are the winding-drums D and D', provided with suitable ordinary clutch mechanism, (not shown in detail,) operated by the levers *s s'* to throw them in and out of gear with the shafts of the wheels *p'* and *p''*.

E is a mast, comprising parallel beams *o o*, extending transversely across the roof of the car A, preferably near an end of the latter, and supporting the mutually-converging beams *n* from near the ends of the beams *o*, which extend purposely a considerable distance, as shown, beyond the outer side of the car, or side farthest from the trench, and from near their opposite ends mutually-converging beams *n'*, which pairs of beams converge toward their upper ends, where they are firmly secured together by a head-block *n''* and carry a sheave *m*. The beams *n* and *n'* are braced between them by means of light rectangular frame-work *l*, secured to them and to the transverse or base beams *o*, and the mast is strengthened by means of suitable stay-rods *k* and by means of transom-rods *k'*, secured at opposite ends near those of the beams *o*, and passing between their extremities under a car-wall plate *k''*, which rods *k'*, as thus applied, tend to prevent springing or bending upward of the beams *o* with the strain they are required to bear.

The foregoing construction of the mast ren-



ders it very light and strong in proportion to its height, which is about twenty-five feet from the roof of the car.

F is the boom, extending from the inner ends (or ends nearest the trench) of the beams *o*, to which it is hinged, as shown, the boom being suitably braced by stay-rods *x* and supported from the mast by means of cables *t*, secured to its outer end, passing thence over pulleys *t'* on opposite sides of the head-block, near the upper end of the mast, to rotatory drums *t''*, supported on the rear side of the mast near its base, as shown in Fig. 2, and provided with winches *t'''*, by which to turn them, and thus wind upon and unwind from the drums *t''* the cables, thereby to raise and lower the boom and hold it in any position to which it is adjusted, ordinary means (not shown) for the last-named purpose—such as pawl- and -ratchet mechanism—being provided.

G is the combined scoop or scraper and dirt-loosening device, involving the following construction, and formed as to all its parts preferably of steel.

H is a frame or "cradle," comprising two bars *i*, preferably converging, as shown in Fig. 6, and each having at one end an angular extension *i'*, at which the bars are connected together by a rod *i''* or other suitable connecting medium, and at its opposite end an extension *h*, having perforated ears *h'* at their extremities through coinciding perforations, in which they are connected by a draft-bar *h''*, removable to permit its adjustment into any coinciding pair of the perforations to gage the depth of insertion of the scoop into the dirt to be dug; and about centrally with reference to the gravity of the cradle, between the parts *h* and *i'* on each side bar *i*, is an upright bar *g*, the bars *g* being connected from their upper ends, as by a cross-bar *g'*, Fig. 6, and below their upper ends are shafts *g''* and *g'''*, the former carrying a small pulley *g'''*, and the latter, to one side of and below the pulley *g'''*, a larger pulley *g''''*.

Between the extensions *h* of the side bars *i*, and near their junction with the latter, are secured a series of plowshares *I*, extending from a bar *i''*, and affording a plowing device, and forward of the plowing device are steel disks *K*, sharp around their edges and affording wheel-colters, each having a hub at which it is supported on a shaft *i'''*, having its bearing in the extensions *h*, and which hubs maintain the disks apart and permit them to be rotated independently of each other. The plowshares *I* extend between the disks *K* and alternate with the latter.

L is the scoop or scraper, open at its front and rear ends and pivotally supported forward of its center of gravity between the side bars *i* of the cradle H. At the rear end of the cradle is hinged a back *f*, to open outward from the base of the scoop, and on opposite sides near its lower edge the hinged back is pivotally connected by links *f'* (in-

dicated by dotted lines in Fig. 5) with the opposite inner sides of the scoop or scraper, preferably above and in line with the pivotal support of the latter. To ears *f''* on the hinge of the back *f*, and near opposite lateral edges of the back, are pivotally connected bent arms *e*, forming dogs united by a rod *e'*, at which to handle them simultaneously, and engaging with catches *e''* on the outer surfaces of the sides of the scoop behind the pivotal support of the latter, to hold it in horizontal position while being filled, and by their disengagement with the catches *e''* to permit upsetting of the scoop or scraper to dump its contents. From the handle *e'* extends a cable *d*, passing over the pulley *g''''*, and thence through a clutch M, hereinafter described, in the car A, through the roof of the latter, and over a pulley *m'*, suspended from the head-block *n''*, between the sides of the mast E near its upper end, the cable *d* being secured at its opposite end to the head-block at one side of the pulley *m'*, and supporting between the latter and point at which it is secured a weight N.

The clutch M may comprise the construction illustrated in Figs. 3 and 4, involving a pulley *w*, supported in a frame *w'*, on one side of which is fulcrumed a lever *w''*, oscillatory above its fulcrum back and forth with relation to the opposite side of the frame, whereby the rope or cable *d* may be gripped above the pulley *w* between the lever and opposing side of the frame *w'*, as and for a purpose hereinafter explained; and the clutch may be attached to the engine C, as affording a conveniently-accessible position for it.

The bar *h''*, connecting the perforated ears *h'* of the cradle H, has secured to it one end of a cable *c*, Fig. 1, extending therefrom to the winding-drum D, to which it is fastened at its opposite end.

The combined scoop or scraper and dirt-loosening device is suspended at the pulley *g'''* on a cable *b*, secured as represented in full lines at one end to the mast E at *y*, passing thence over a pulley *m''* on the end of the boom, and thence back over the pulley *m*, at the top of the mast, to the winding-drum D', on which it is fastened or adjusted, as indicated by the dotted line *b*, which saves a considerable length of the cable by fastening it, instead of to the mast, as at *y*, to the boom, as at *y'*, and extending it thence to the drum D' over the pulley *m*.

The weight of the boom, device G, and appurtenances is counteracted, to prevent tendency in the car A to capsize toward the trench, by providing the car-wheels, as shown, toward that side of the car, and supporting on the opposite side thereof the water and coal receptacles *o*.

The operation is as follows: As the apparatus is illustrated in Fig. 1 the device G, after being filled, has been carried out to the point of dumping and dumped. To retract and fill it, the clutch mechanism of the wind-



ing-drum D is controlled from the handle  $s'$  to engage that drum with the shaft of the cog-wheel  $p'$ , and that of the winding-drum D' is controlled from the handle  $s$  to disengage that drum from the shaft of the cog-wheel  $p^2$ , thereby causing the cable  $c$  to be wound and the cable  $b$  to unwind. Winding of the cable  $c$  draws the device G toward the trench; and when it reaches the latter the sliding impact of the scoop portion L on the ground raises it from its hanging or dumping position (shown in Fig. 1) to its horizontal position, at which it is sustained by the catches  $e^2$  being forced by the gravity of the cradle H past the engaging ends of the dogs  $e$ . As the device G is dragged by the continued winding of the cable  $c$  up the inclined side of the trench  $q$ , the colters K cut the dirt to the desired depth, the plowshares I loosen it as it is so cut, and the scoop L, following the colters and plows, takes it up. As soon as the scoop has been filled the operator, who watches the filling from the car, which is open in its side to permit, reverses the clutches at the levers  $s$  and  $s'$ , thereby causing the cable  $b$  to be wound, which unwinds the cable  $c$ . This raises the device G out of the trench and carries it to the pile B. Just previous to the device G reaching the desired part on the pile (to the particular point of dumping on which it may be steered by workmen) the operator actuates the clutch M from the lever  $w^2$  to grip the cable  $d$ , thereby causing the impetus of the moving device G to disengage the dogs  $e$  from the catches  $e^2$  and permitting the scraper H to fall to its hanging position, and thus discharge its contents. The falling of the scraper causes the arms  $f'$  to raise the back  $f$  on its hinge, to let the rear end pass, and, as the scraper is caused on again reaching the trench to assume in the manner described its horizontal position, the arms  $f'$  effect closing of the back  $f$ , which, as it comes into contact with the rear edge of the scraper, knocks off any dirt which may adhere thereto. At or about the same time that the operator actuates the clutch M in the manner described he operates the levers  $s$  and  $s'$  to effect winding of the cable  $c$  and permit unwinding of the cable  $b$ , as and for the purpose already described, when the filling and dumping operations are continued in the manner stated.

In practice we ordinarily employ two of the apparatuses (masts, booms, and devices G) on one car, operating them from the same engine, which is thus caused to actuate two sets of the winding mechanism D D', and this number of the apparatuses used on one car may be increased.

What we claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus substantially for the purpose set forth, the combination, with its support A, of means for supporting therefrom a scoop and the cables for controlling it, comprising a mast E, having hinged to it a boom F, and formed of parallel beams  $o$  on the sup-

port A and converging pairs of mutually-converging beams  $n$  and  $n'$ , secured together near their upper ends and strengthened with light frame-work  $l$ , secured between the beams  $n$  and  $n'$  and to the beams  $o$ , substantially as described.

2. In an apparatus substantially for the purpose set forth, the combination, with a car A, forming its support, of means for supporting therefrom a scoop and the cables for controlling it, comprising a mast E, strengthened with light frame-work  $l$ , and having hinged to it a boom F and transom-rods  $k'$ , secured at their extremities to the base-beams  $o$  of the mast toward the opposite ends of the said base-beams, and passing between their fastened extremities around the beams  $k^2$  of the car-frame, substantially as described.

3. In an apparatus substantially for the purpose set forth, the combination of a boom on a suitable support, a cable  $b$ , connected with the said boom and with suitable winding mechanism D', a combined scoop or scraper and dirt-loosening device hung on the cable  $b$ , and a cable  $c$ , connecting the said device with suitable winding mechanism D, substantially as described.

4. In an apparatus substantially for the purpose set forth, the combination of a boom on a suitable support, a cable  $b$ , connected with the said boom and with suitable winding mechanism D', a combined scoop or scraper and dirt-loosening device G, hung on the cable  $b$  and having a cradle H, carrying colters K, plowing mechanism I, and a pivotally-supported scraper L, and a cable  $c$ , connecting the device G with suitable winding mechanism D, substantially as described.

5. In an apparatus substantially for the purpose set forth, the combination of a car A, carrying winding mechanism D D' and an engine for actuating it, a mast E, supported on the car and having connected with it a boom F, a cable  $b$ , connected with the boom and mast and with the winding mechanism D', a combined scoop or scraper and dirt-loosening device G, hung on the cable  $b$  and having a cradle H, carrying colters K, plowing mechanism I, and a pivotally-supported scraper L, suitable supporting means  $e$  on the cradle for the scraper, a weighted cable  $d$ , secured at one end to the said means  $e$  and fastened at its opposite end to the mast, and a cable  $c$ , connecting the device G with the winding mechanism D, substantially as described.

6. In an apparatus substantially for the purpose set forth, the combination of a car A, carrying winding mechanism D D' and an engine for actuating it, a mast E, supported on the car and having hinged to it a boom F, a cable  $b$ , connected with the boom and mast and with the winding mechanism D', a combined scoop or scraper and dirt-loosening device G, hung on the cable  $b$  and having a cradle H, carrying colters K, plowing mechanism I, and a pivotally-supported scraper L, suitable supporting means  $e$  on the cradle for



the scraper, a clutch M, a weighted cable *d*, secured at one end to the said means *e*, passed thence through the clutch M, and fastened at its opposite end to the mast, and a cable *c*,  
5 connecting the device G with the winding mechanism D, substantially as described.

7. In an apparatus substantially for the purpose set forth, the combination of a car A, carrying winding mechanism D D' and an  
10 engine for actuating it, a mast E, supported on the car and having hinged to it a boom F, a cable *b*, connected with the boom and mast and with the winding mechanism D', a combined scoop or scraper and dirt-loosening de-

vice G, hung on the cable *b* and having a  
15 cradle H, provided with a hinged back *f* and carrying colters K, plowing mechanism I, and a pivotally-supported scraper L, linked to the hinged back, suitable supporting means  
e on the cradle for the scraper, and a cable *c*,  
20 connecting the device G with the winding mechanism D, substantially as described.

WILLIAM DAVY.

HENRY G. BUTLER.

In presence of—

M. J. BOWERS,

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