

(No Model.)

3 Sheets—Sheet 1.

W. DAVY.

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

No. 389,551.

Patented Sept. 18, 1888.

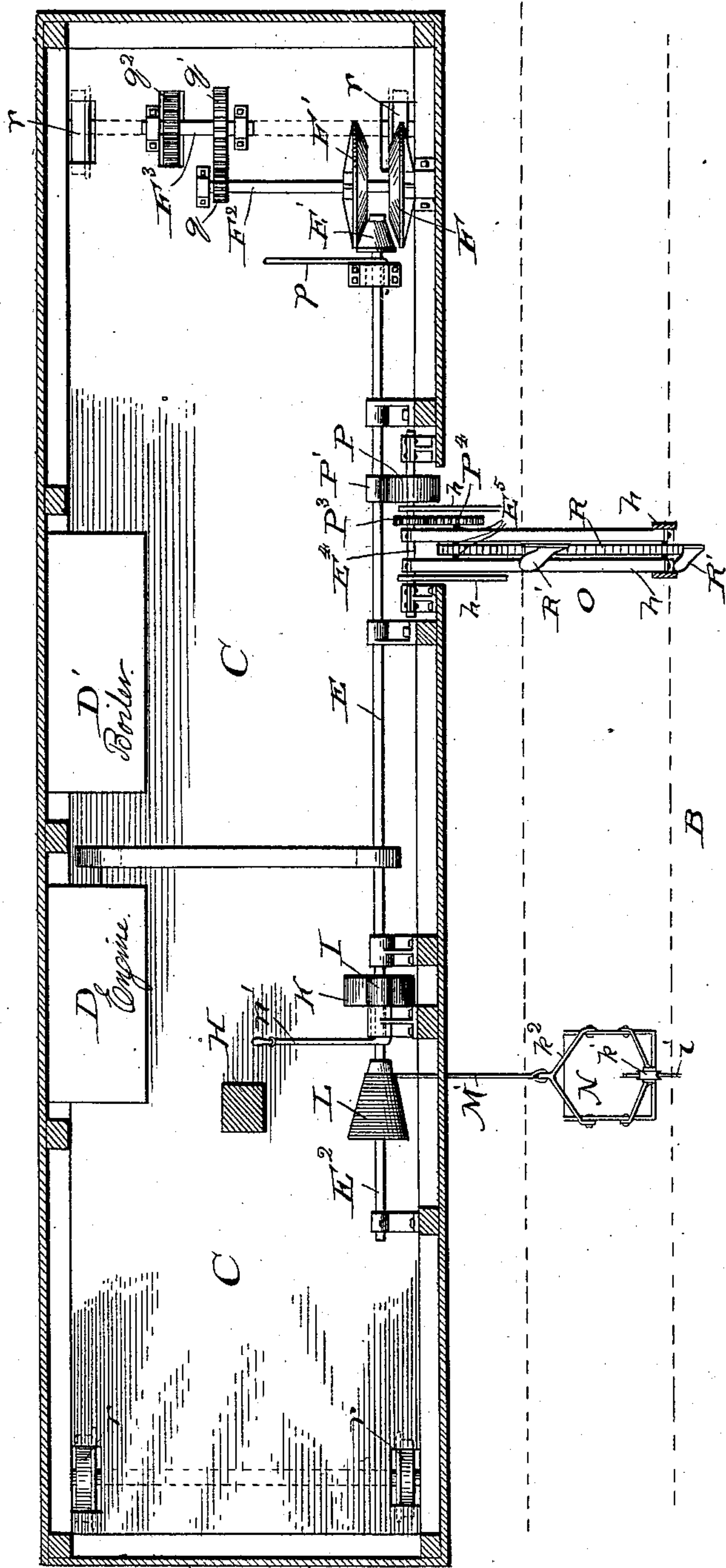


Fig.

Witnesses:  
 Jas. P. Gaylord,  
 C. E. Gorton.

Inventor:  
William Davy,  
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Attys

(No Model.)

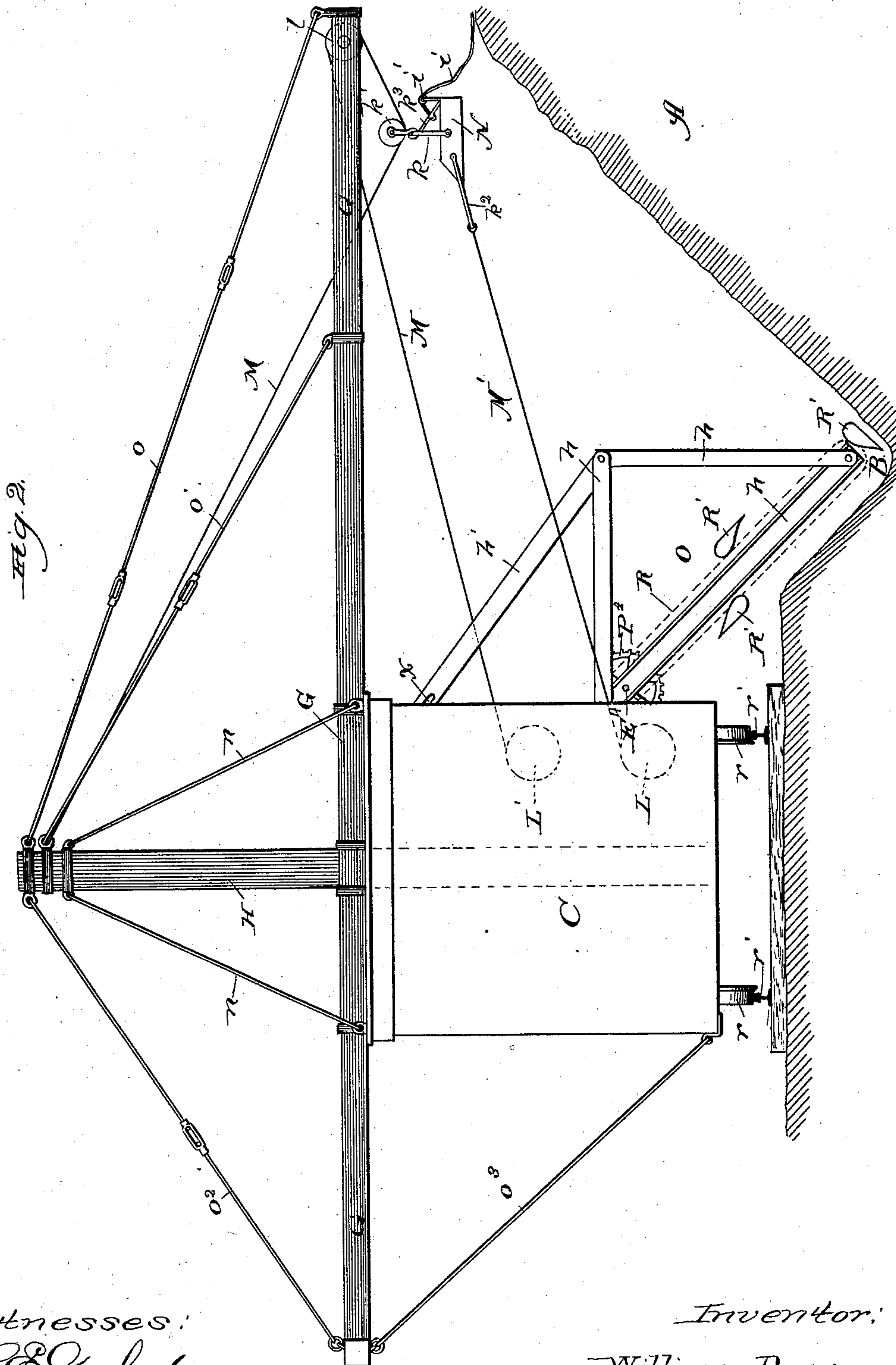
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Witnesses:

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Inventor:

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By Dyrenforth & Dyrenforth  
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(No Model.)

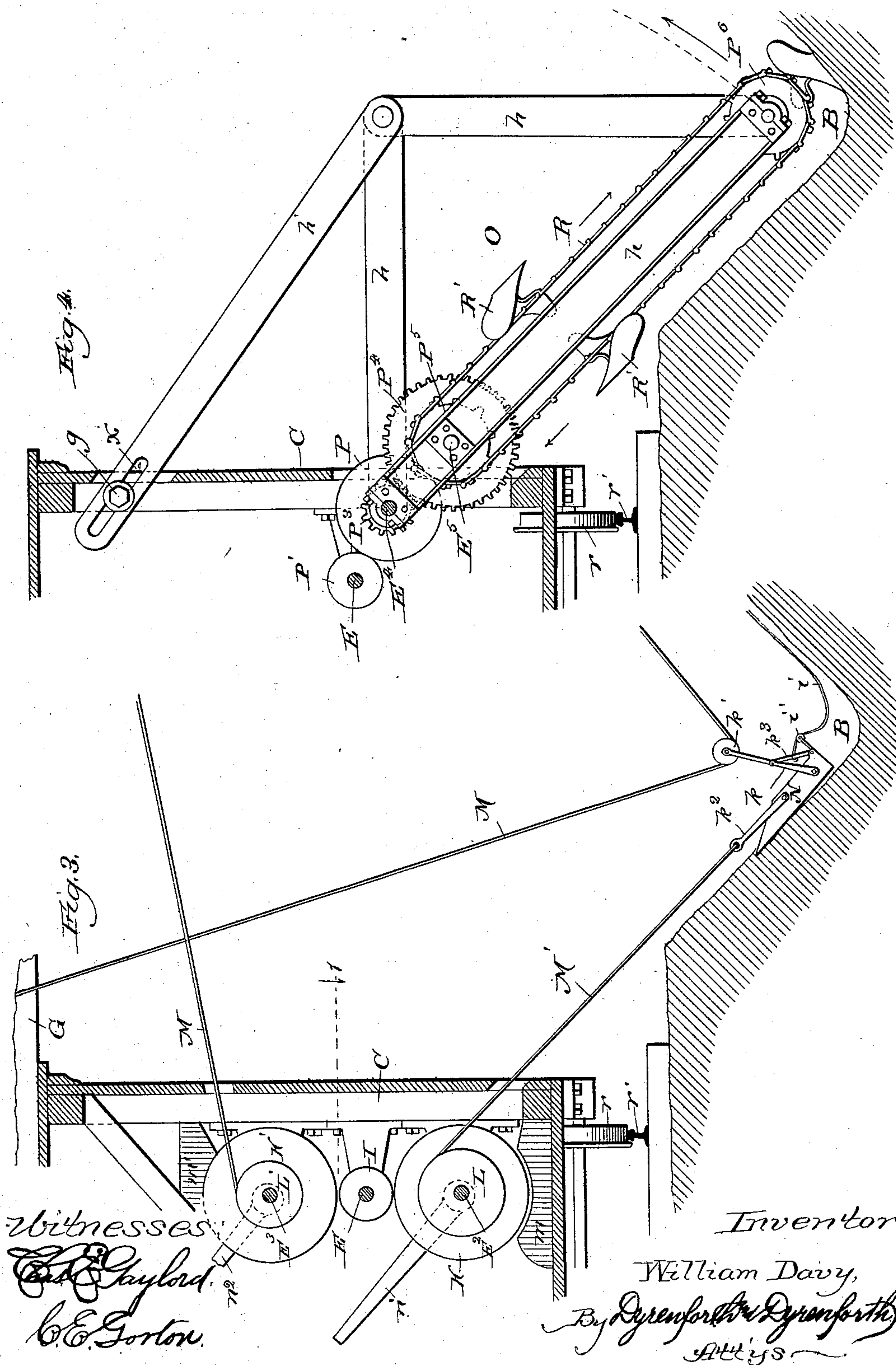
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Witnesses  
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Inventor:  
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# UNITED STATES PATENT OFFICE.

WILLIAM DAVY, OF KENOSHA, WISCONSIN.

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

SPECIFICATION forming part of Letters Patent No. 389,551, dated September 18, 1888.

Application filed December 3, 1887. Serial No. 256,870. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM DAVY, a citizen 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.

My invention relates to an improved apparatus which I have provided for use particularly in the practice of my method of burning clay, set forth in Letters Patent of the United States No. 305,432, granted me on the 23d day of September, 1884, and No. 371,042, granted me on the 4th day of October, 1887. In the last-named patent, in which the general principle of the invention covered by my aforesaid first patent is employed, details suggested by experiment and experience for accomplishing the work in an improved manner and improving the product are set forth and clearly explain the full proceeding by which I practice at the present time the burning of clay to produce ballast and paving material, and the following brief description thereof is given in the present connection to render clear the operation of the apparatus forming the subject of the present application.

The burning is performed in the open air. A location is selected on ground containing clay. On the ground kindling material is laid in a straight line, by preference a thousand or more feet in length, and is covered with clay dug from along one side of the line of kindling, a few feet away from the latter, the digging of the clay forming a trench. The intervening spaces produced in the piling between the wood and clay are then filled with coal in a manner to leave holes at intervals in the top of the pile through which to introduce coal-oil or similar inflammable material and at which the fire is ignited. After ignition coal is dropped into the holes, whereupon they are filled up with clay. When the fire has made sufficient headway, coal is scattered over the pile throughout its entire length, and when the long pile becomes a glowing mass another covering of clay dug like the first from the trench is piled upon it, and the alternate "slacking" with coal and applying layers of clay are continued until the pile has reached desired di-

mensions. Other steps are resorted to during the process of burning—such as drawing or raking, undermining the fire to precipitate it into the trench, and forming shoulders near the edge of the top of the pile; but the foregoing description of the more essential steps of the operation is sufficient for a full understanding of the purpose and construction of the apparatus hereinafter described.

Hitherto in burning clay according to my improved method a large force of workmen has been required to dig the clay from the trench and pile it upon the heap or "fire," which, as it grew in dimensions, necessitated the provision of platforms upon it within the reach of the diggers in the trench, and upon which to throw the clay, whence it was transferred by throwing with shovels by other hands stationed on the platforms upon the burning pile, thus subjecting many of the men to the disagreeable and injurious effect of the smoke generated by the burning.

My present invention has for its object the provision of an apparatus by means of which the clay to be burned shall be fed to the fire automatically by digging it from the supply along the heap or fire, thereby forming the desired longitudinal trench and conveying it to the points thereof where it is required to be dumped; and I thus save the employment of a large number of hands (the machine will readily in a given time perform the work of fifty men during the same time) and avoid the subjection of hands to the effects of the smoke.

To this end my invention consists in the general construction of my improved apparatus; and it also consists in details of construction and combinations of parts.

In the drawings, Figure 1 is a sectional plan view of my improved apparatus in operative position, taken on the line 1 of Fig. 3; Fig. 2, an end elevation of the same; Fig. 3, a broken sectional side elevation showing details of construction, and Fig. 4 a similar view showing other details.

A is the fire or long burning pile, and B the trench from which the clay to be burned is fed to the fire by means of my improved apparatus.

C is a housing, preferably in the form of a car, movable upon wheels *r* on a track, *r'*, laid



parallel to the fire on one side of the latter, and which may be shifted from the trench as the latter increases in cross-section by the removal of clay. Within the car are an engine, 5 D, and boiler D', Fig. 1, which furnish the power of locomotion for the apparatus by suitable connection of the engine through a main or driving shaft, E, (which extends within the car longitudinally of the same, as shown,) with 10 the driving mechanism, comprising a cone-pulley, E', of the variety formed of paper and operating by friction, two beveled friction-wheels, F and F', on a transverse shaft, F<sup>2</sup>, and between which the friction-pulley E' extends, 15 and reducing-gear *q* on the shaft F<sup>2</sup> and *q'* *q'*<sup>2</sup> on a short transverse shaft, F<sup>3</sup>, through which the power of the driving-shaft E is transmitted to the axle of the wheels *r* near one end of the car. The shaft E revolves at great speed to 20 obtain the required driving-power, while it is desired that the motion of the car shall be very slow; hence the provision of the reducing-gear thus described. A lever, *p*, serves as a means to force the cone-pulley into contact with the 25 wheel F or F', and by the friction turn which-ever of the wheels against which it is forced, depending upon the direction of movement desired for the car. Cog-wheel mechanism could be employed instead of the wheels E', F, 30 and F', but not to so great advantage, as the teeth of the former are liable to be stripped, and it does not permit the gradual starting possible with the friction-wheel mechanism.

The car C is surmounted by a transverse 35 "boom," G, so called, which is of ordinary construction, being somewhat like the boom in hoisting machinery and comprising two timbers or beams, preferably converging toward one end, and intermediate transverse braces 40 near opposite ends. The boom G extends from opposite sides of the car—on the one side over the fire A, whence it is braced by ordinary brace-rods, *o* and *o'*, Fig. 2, extending from it to a vertical mast, H, projecting through the 45 roof of the car, which mast is in turn braced from the roof by brace-rods *n*. The boom G and mast are further braced from the base of the car, as shown, by rods *o*<sup>2</sup> and *o*<sup>3</sup>. This manner of bracing may be changed without 50 departing from my invention.

At the end of the main shaft E opposite that provided with the friction-pulley E', (which shaft, as shown in Fig. 1, is supported in suitable bracket-bearings,) and inside the 55 car, is a friction-pulley, I, also by preference of the paper variety. Below the shaft E, near the end carrying the friction-pulley I, is a counter-shaft, E<sup>2</sup>, supported like the main shaft and carrying directly below the pulley I 60 a friction-drum, K, provided with a cam-lever, *n'*, Fig. 3, and normally resting against a concave block, *m*, on the floor of the car, which block affords a brake to the drum. Beyond the drum K the counter-shaft E<sup>2</sup> carries a cone-pulley, L, the tapering end of which points 65 toward the drum K. A counter-shaft, E<sup>3</sup>, Fig. 3, is supported in the car above the main

shaft E, and carries a friction-drum, K', in line with the drum K, provided with a cam-lever, *n*<sup>2</sup>, and controlled by a brake, *m'*, sup- 70 ported above it, and in form like the brake *m*, and the counter-shaft E<sup>3</sup> also carries a pulley, L', above the pulley L.

M is a cable fastened at one end to the mast H, whence it extends around a sheave, *l*, at the 75 end of the boom G, which projects toward the fire A, and is fastened at its opposite end, passing through the side of the car to the pulley L'.

N is a shovel or scoop, of ordinary construc- 80 tion as to its body portion and provided with a bail, *k*, at which it is suspended from a pulley, *k'*, loosely supported on the cable M. A toggle-lever, *k*<sup>2</sup>, abutting at opposite ends, re- 85 spectively, against the bail and scoop, as shown, serves, when straight, to sustain the latter, which is hung upon the bail behind its center of gravity, against capsizing, while cap- 90 sizing thereof, to empty it, results from bending the toggle-joint, which is accomplished through the medium of a cable, *i*, passing from the 95 toggle-lever through an eye or over a pulley, *i'*, on the rear end of the scoop. A cable, M', is fastened at one end to a bail, *k*<sup>2</sup>, secured to the scoop, preferably forward of its center of 95 gravity, and passes at its opposite end through the side of the car, wherein it is fastened to the pulley L near its larger end.

From the side of the car adjacent to the fire and provided with the scoop-operating mech- 100 anism already described, and between the latter and the end of the car, at which the car-driving mechanism E' F F', &c., is provided, is a plowing device, O, for loosening the clay 105 prior to its being taken up by the scoop and fed thereby to the fire. The device O comprises a triangular frame, *h*, supported at one angle upon a counter shaft, E<sup>4</sup>, (in brackets below and to one side of the main shaft E,) 110 and extending into the car at the side of the latter for the purpose. The counter-shaft E<sup>4</sup> carries a friction-pulley, P, engaged by a paper friction-pulley, P', on the main shaft E, and it also carries a pinion, P<sup>3</sup>, in mesh with 115 a cog-wheel, P<sup>4</sup>, on a counter-shaft, E<sup>5</sup>, supported, as shown, in bearings in the frame *h* outside the car C, and carrying, also, a sprocket-wheel, P<sup>5</sup>, having a companion sprocket-wheel, P<sup>6</sup>, supported at the opposite 120 end of the hypotenuse of the triangular frame *h*, and an endless chain, R, surrounds the sprocket-wheels and carries plowshares R', preferably at equal distances apart, and ar- 125 ranged to have one always plowing the soil during the operation and operating to turn the soil in the direction toward the scoop. The frame *h* is further supported and steadied by an arm, (or arms,) *h'*, extending from the 130 right angle of the frame into the car, where it is slotted longitudinally, as shown at *x*, and adjustably secured to change the pitch of the plowing device to the side of the car by means of a set-screw, *g*.

It will be noticed that the gear P' P P<sup>4</sup> is



also a reducing-gear, to reduce the traveling speed of the plowing device below that of the driving-shaft E.

The operation is as follows: After the trench 5 B has been formed incipiently by digging therefrom by hand with shovels the clay used before starting the fire, as hereinbefore described, the power of the engine D is transmitted to the driving-shaft E, which slowly 10 moves the car on the track  $r'$  along the fire A and actuates the plow device O to plow the soil in an upward transverse and, owing to the slow forward motion of the car, slightly oblique slanting direction from or from near 15 the base of the trench along the side thereof farthest from the fire to the upper edge of the trench. The drum K is then raised from its brake-seat  $m$  into contact with the friction-pulley I, whereby the cone-pulley 20 L is rotated and rapidly winds upon it (from the tapering toward the flaring end) the cable  $M'$ , whereby the pulley  $L'$  (released for the purpose) unwinds the cable M and causes the bucket or scoop N, lowered into 25 the trench, to be dragged up the inclined side thereof, previously plowed, and fill itself with clay. When so filled, the drum K is lowered upon its brake and stopped when the drum  $K'$  is brought into contact with the 30 rotary friction-pulley I, whereby the cable  $M'$  is unwound from the cone-pulley L and the cable M wound upon the pulley  $L'$  until the bucket or scoop N is raised to the desired point on the pile A, (to which it may be 35 guided,) when it is capsized and its contents dumped by pulling upon the cable  $i$  to bend the toggle-joint of the lever  $k^3$ . The tapering form of the pulley L regulates the winding of the cable  $M'$  upon it to produce a quick return 40 of the scoop to the trench and a slow fill. When the car reaches the end of its journey—that is, the end of the fire opposite that from which it started—its motion is reversed by forcing the pulley  $E'$  against the proper wheel, 45 F or  $F'$ , as the case may be, and the operation continued (after shifting the track  $r'$ , if necessary) in the manner already described, provided a second plowing device, O, is provided on the side of the scoop opposite that already 50 described, which may, if desired, be done, when the one behind the scoop could always be maintained inoperative, though the same end may be accomplished with one plow device by having it capable of plowing at least as much 55 more than can be taken up by the scoop in the movement of the apparatus in one direction as will suffice to feed it in the return of the apparatus.

Although I particularly design my improved 60 apparatus for the immediate purpose stated, I do not of course wish to be understood as limiting myself to the particular use described, but desire to claim it for any purpose to which it may be applicable.

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

1. In an apparatus substantially for the

purpose set forth, the combination of a boom on a suitable support, a cable, M, passing over 70 the boom and connected with suitable winding mechanism,  $L'$ , a scoop or scraper, N, hung upon the cable N, and a cable,  $M'$ , connecting the scoop or scraper with suitable winding mechanism, L, whereby the scraper may be 75 operated automatically to scoop soil from near the base toward the edge of an inclined plane, carry it to the place of dumping, and return to the inclined plane, substantially as described.

2. In an apparatus substantially for the pur- 80 pose set forth, the combination of a car, C, a boom, G, supported thereon, a cable, M, passing over the boom and connected with suitable winding mechanism,  $L'$ , on the car, a scoop or scraper, N, hung upon the cable M, 85 and a cable,  $M'$ , connecting the scoop or scraper with suitable winding mechanism, L, on the car, whereby the scoop or scraper shall move with the car and may be operated automatically to scoop soil from near the base toward 90 an edge of an inclined side of a trench alongside of the car, carry the soil to the place of dumping, and return to the trench, substantially as described.

3. In an apparatus substantially for the pur- 95 pose set forth, the combination of a car, C, a boom, G, a scoop or bucket, N, operating to scoop soil and carry it to the place of dumping, and a plowing device, O, substantially as described. 100

4. In an apparatus substantially for the purpose set forth, the combination of a car, C, a boom, G, a track,  $r'$ , upon which the car moves and adapted to be shifted laterally, a scoop or 105 bucket, N, operating to scoop soil and carry it to the place of dumping, and a plowing device, O, substantially as described.

5. In an apparatus substantially for the purpose set forth, the combination of a car, C, a boom, G, a track,  $r'$ , upon which the car moves 110 and adapted to be shifted laterally, a scoop or bucket, N, operating to scoop soil and carry it to the place of dumping, and an adjustable plowing device, O, substantially as described.

6. In an apparatus substantially for the pur- 115 pose set forth, the combination of a car, C, a boom, G, supported on the car, a track,  $r'$ , alongside a trench and upon which the car moves, and adapted to be shifted with reference to the edge of the trench, a scoop or 120 bucket, N, movable with the car lengthwise of the trench and operating to scoop soil from near the base toward the edge of an inclined side of the trench and carry it to the place of dumping, and a plowing device, O, movable 125 with the car and operating to plow the soil along the said inclined side of the trench, substantially as described.

7. In an apparatus substantially for the purpose set forth, the combination of a car, C, 130 provided with driving mechanism, a boom, G, supported on the car transversely thereof, a pulley,  $L'$ , rotated by the said driving mechanism, a cable, M, secured at one end to a



rigid object, passed thence over a pulley, *l*, on the boom, and secured at its opposite end to the pulley *L'*, a scoop, *N*, suspended from the cable *M*, a pulley, *L*, rotated by the said driving mechanism, and a cable, *M'*, secured at one end to the scoop and at its opposite end to the pulley *L*, substantially as described.

8. In an apparatus substantially for the purpose set forth, the combination of a car, *C*, provided with driving mechanism, a boom, *G*, supported by the car transversely thereof, a pulley, *L'*, rotated by the said driving mechanism, a cable, *M*, secured at one end to a rigid object, passed thence over a pulley, *l*, on the boom, and secured at its opposite end to the pulley *L'*, a scoop, *N*, suspended from the cable *M*, a pulley, *L*, rotated by the said driving mechanism, a cable, *M'*, secured at one end to the scoop and at its opposite end to the pulley *L*, and a plowing device, *O*, actuated by the said driving mechanism, substantially as described.

9. In an apparatus substantially for the pur-

pose set forth, the combination of a car, *C*, provided with driving mechanism, a mast, *H*, extending through the roof of the car, a boom, *G*, supported on the car transversely thereof and braced from opposite ends to the mast and car, a rotatory pulley, *L'*, supported inside the car and connected with the said driving mechanism, a cable, *M*, secured at one end to a rigid object, passed thence over a pulley, *l*, on the boom, and secured at its opposite end to the pulley *L'*, a scoop, *N*, suspended from the cable *M*, a rotary pulley, *L*, supported inside the car and connected with the said driving mechanism, a cable, *M'*, secured at one end to the scoop and at its opposite end to the pulley *L*, and a plowing device, *O*, connected with and actuated by the said driving mechanism, substantially as described.

WILLIAM DAVY.

In presence of—

J. W. DYRENFORTH,

CHAS. E. GAYLORD.

It is hereby certified that in Letters Patent No. 389,551, granted September 18, 1888, upon the application of William Davy, of Kenosha, Wisconsin, for an improvement in "Feeding Apparatus for Use in Burning Clay to Make Ballast, &c.," an error appears in the printed specification requiring the following correction: In line 72, page 3, the reference letter "N" should be stricken out and the reference letter *M* inserted instead; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 16th day of October, A. D. 1888.

[SEAL.]

D. L. HAWKINS,  
*Assistant Secretary of the Interior.*

Countersigned:

BENTON J. HALL,  
*Commissioner of Patents.*