

No. 686,964.

Patented Nov. 19, 1901.

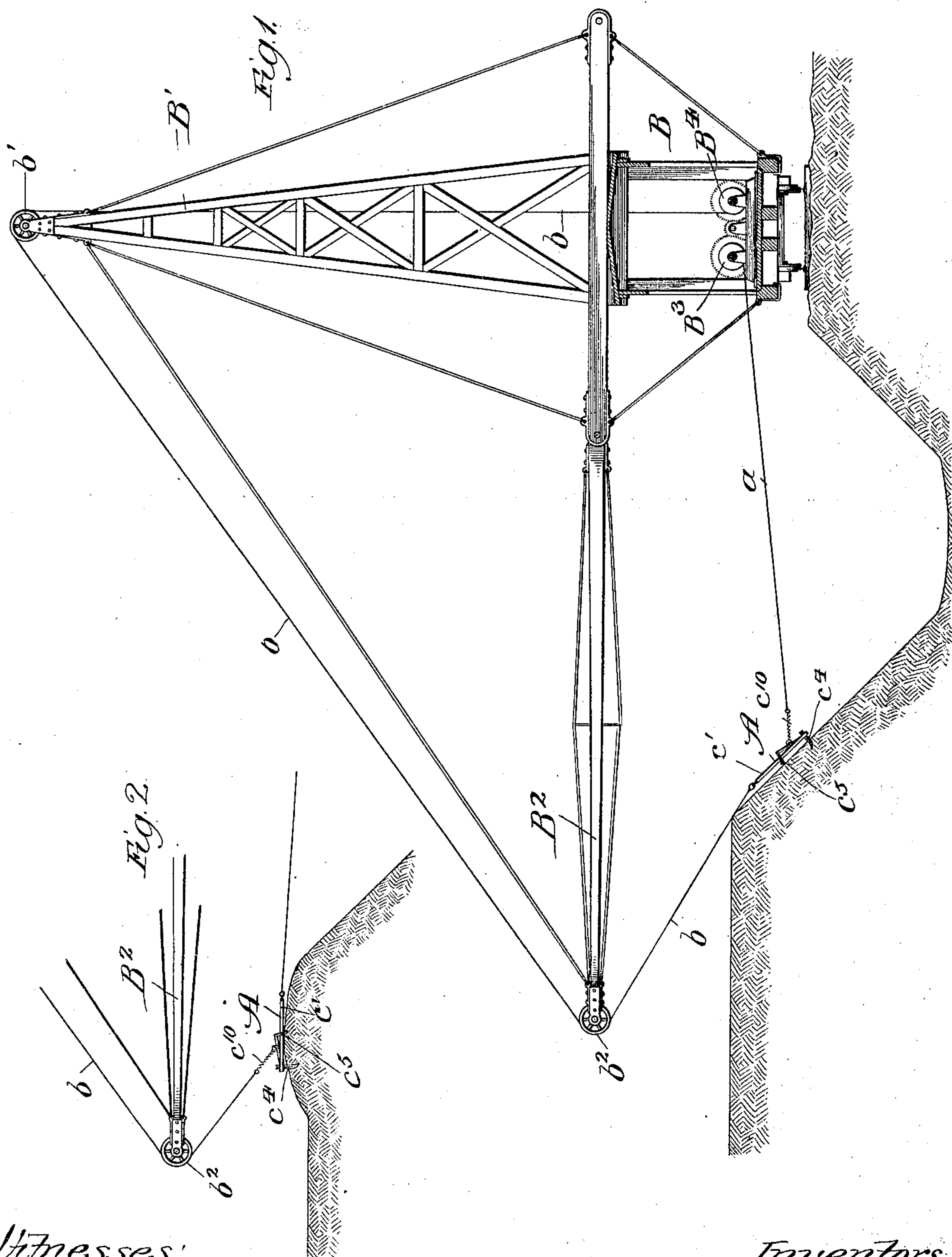
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APPARATUS FOR USE IN PRODUCING BURNT CLAY BALLAST.

(Application filed Nov. 12, 1900.)

(No Model.)

2 Sheets—Sheet 1.



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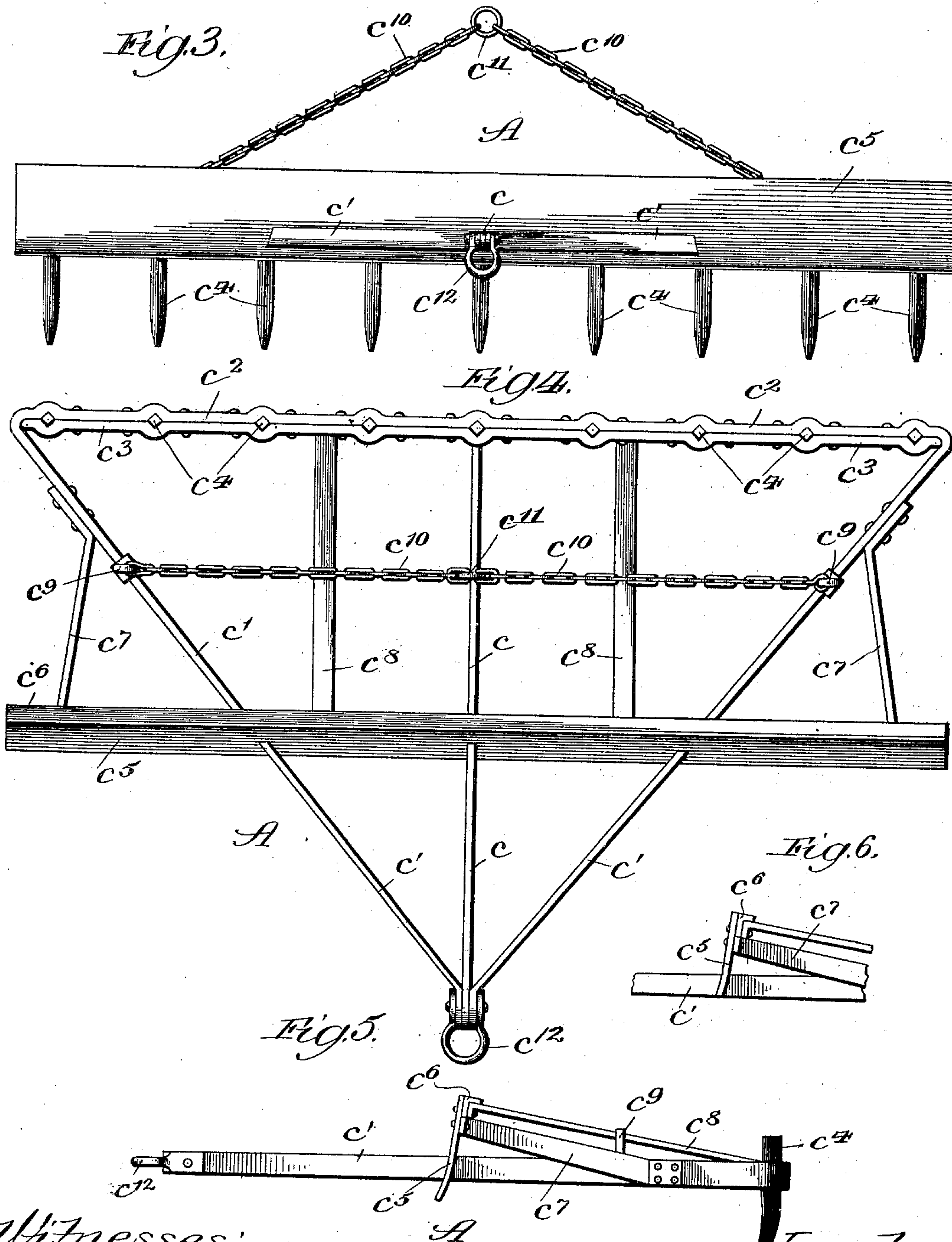
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APPARATUS FOR USE IN PRODUCING BURNT CLAY BALLAST.

(Application filed Nov. 12, 1900.)

(No Model.)

2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR USE IN PRODUCING BURNT-CLAY BALLAST.

SPECIFICATION forming part of Letters Patent No. 686,964, dated November 19, 1901.

Application filed November 12, 1900. Serial No. 36,282. (No model.)

To all whom it may concern:

Be it known that we, GEORGE M. BENNETT, a citizen of the United States, and THOMAS FORGHAM, a citizen of Great Britain, both residing at Kenosha, in the county of Kenosha and State of Wisconsin, have invented a new and useful Improvement in Apparatus for Use in Producing Burnt-Clay Ballast, in which the following is a specification.

Our invention relates particularly to apparatus for use in the production of burnt-clay ballast for mixing fresh fuel with that portion of the forming ballast which has not become thoroughly burned in the firing operation and for further use in other necessary handling of the heated mass.

Our primary object is to provide means for accomplishing this part of the process of producing burnt-clay ballast more cheaply, easily, and efficiently than heretofore.

In the production of burnt-clay ballast it is common to establish a bank of any desired length where the firing operation is carried on. It is usual to spread first a layer of fuel upon the ground and then to take clay from one side thereof and spread the same over the fuel, after which the mass is fired—as described, for instance, in patent to Butler and Simmons, No. 447,460, March 3, 1891. After firing there remains a crust of considerable depth, throughout which the clay is dried (kiln-dried) but not burned. It is necessary to break up this crust and mix fresh fuel with the same, after which other additional fuel and a fresh supply of clay are added. After a bank is established, one of whose sloping sides is in the same plane as one side of the adjacent ditch, the fresh supplies of fuel and clay are sprinkled over the top of the bank and the sloping surface, which extends from said top to the bottom of the ditch. In practice it is necessary to draw the unburned material at the top over onto the sloping bank, for the reason that it is impossible to develop sufficient heat near the surface to thoroughly burn the top layer of clay. Machines for distributing coal to the bank and supplying clay as required are now in common use.

In the accompanying drawings is shown our improved apparatus for breaking up the surface layer at the bank, mixing fresh coal

therewith, and moving the outer layer of the top of the bank, and by means of this apparatus what has heretofore been a laborious and expensive portion of the process of producing ballast of this nature is rendered very easy and comparatively inexpensive.

In the drawings, Figure 1 is a view representing a cross-section of a bank for producing burnt-clay ballast and apparatus for harrowing the bank, moving certain portions thereof, and mixing coal with the surface layer of the bank; Fig. 2, a broken view showing another position of the harrowing device; Fig. 3, an enlarged view, in front elevation, of the harrowing device detached from its cables; Fig. 4, a plan view of said harrowing device; Fig. 5, a view in side elevation of the same, and Fig. 6 an illustration of a modification.

A represents a combined harrowing device or drag and scraper, and B a mounted car of common construction, equipped in the usual manner with a mast B', a boom B², and drums B³ and B⁴. From the drum B³ a cable *a* passes to the device A, and from the drum B⁴ a cable *b* passes about a sheave *b'* at the top of the mast B', thence about a sheave *b*² at the end of the boom B², and thence to the device A. The car is equipped with a suitable motor for rotating the drums B³ and B⁴.

The device A comprises a central tongue or pole *c*, brace members *c'*, formed integral with a back section *c*², a companion back section *c*³, curved teeth *c*⁴, clamped between the sections *c*² and *c*³, a curved metallic scraper-plate *c*⁵, connected with the pole *c* and the braces *c'*, a strengthening-angle *c*⁶ at the upper margin of said plate *c*⁵, side braces *c*⁷, joining the braces *c'* and the extremities of the plate *c*⁵, intermediate braces *c*⁸, joining the back sections to the plate *c*⁵, eyes *c*⁹, connected with the braces *c'* in the rear of the plate *c*⁵, chain-sections *c*¹⁰, connected therewith, a ring *c*¹¹, connecting said chain-sections, and a clevis *c*¹², connected with the front end of the pole *c* and the adjacent ends of the braces *c'*.

When it is desired to harrow the sloping side of the bank, the cable *a* is connected with the ring *c*¹¹ of the device A and the cable *b* is connected with the clevis *c*¹² thereon. This is illustrated in Fig. 1, from whence it

will be seen that the cable *b* at this time serves as a draft-cable and the cable *a* serves as a depth-regulating cable and also to return the harrowing device to the foot of the incline after it has been pulled up the incline by the cable *b*.

When it is desired to draw the surface layer of the top of the bank over onto the inclined surface, the cable *a* is connected with the clevis *c*¹² and the cable *b* is connected with the ring *c*¹¹. When thus connected, the cable *a* becomes the draft-cable and the cable *b* serves to regulate the depth and to retract the harrowing device. The pole and various members of the frame also serve to limit the depth of cut.

The curved teeth *c*⁴ serve to hold the device down and cause the scraper to fill properly during the operation. (Illustrated in Fig. 2.) From a view of Fig. 1 it will be understood that it is possible to thoroughly harrow the sloping surface of the bank from the base to the top. In practice after a bank of fuel and clay is properly formed and the mass has been ignited it is left to burn until the lower strata of clay are properly burned, after which there will remain a surface layer of dry hard material which has not been properly burned. After the mass has burned the required length of time coal is distributed over the top and sloping surface of the bank, after which the sloping surface is harrowed, as illustrated in Fig. 1. The surface layer of the top of the bank is then dragged over onto the sloping surface, as illustrated in Fig. 2. A layer of coal is then distributed to the sloping surface of the bank and to the top of the bank adjacent to the sloping surface, after which a layer of clay of the desired depth is added and the mass left to continue burning until the proper time to repeat the operation just described. It is preferable to drag the surface layer of the top of the bank over onto the sloping surface after each harrowing and mixing operation performed on the sloping surface.

The car *B* is movable parallel to the bank in a manner now well understood, and the equipment of the car itself is now in common use for operating a shovel for supplying clay to the bank. By means of our improved device *A*, connected to cables disposed as described, it is possible to produce a thorough burning or firing clear down to the base of the incline, thereby rendering it possible to preserve an even base-surface for the bal-
last to rest upon; also, an easy means for mechanically removing the surface layer at the top of the bank is provided. Moreover, by reason of the improved manner of handling the mass it is possible to make the operations succeed each other in more rapid succession, it being now unnecessary to allow so long a period for the mass to burn as formerly.

It is believed to be wholly novel to provide a device for harrowing the inclined surface of the bank from the base to the top in combination with means for mechanically moving said harrowing device in the manner described. The harrowing device itself is believed to be wholly novel. Accordingly no limitation is intended by the foregoing detailed description except as shall appear from the appended claims.

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

1. In apparatus of the character described, the combination of a harrowing device, having harrowing-teeth substantially perpendicular to the surface engaged but inclined slightly forward and means for advancing said device from the base of the incline of a bank to the top of said bank while said device is in operative engagement with said inclined surface, said device operating to stir but not to collect the material engaged, substantially as described.

2. In apparatus of the character described, the combination of a harrowing device disposed so as to permit it to be drawn up the inclined surface of a bank having harrowing-teeth substantially perpendicular to the surface engaged and inclined slightly forward, a pulley located in advance of said device, a draft-cable passing about said pulley, and disposed and equipped to draw said harrowing device up said inclined surface and a retracting-cable connected with the device, said device operating to stir but not to collect the material engaged, substantially as described.

3. In apparatus of the character described, the combination of a frame provided at its front end with cable-attaching means, a transversely-extending scraper located centrally of the frame, and downwardly-extending forwardly-curved harrowing-teeth located in the rear of said scraper, substantially as described.

4. The combination of a suitably-braced draft-pole, a transversely-extending scraper located some distance from the front end thereof, and downwardly-extending forwardly-curved harrowing-teeth located some distance in the rear of said scraper, substantially as described.

5. The combination of a rigid frame provided with a draft device, a transversely-extending forwardly and downwardly inclined scraper rigidly secured thereto, and forwardly and downwardly extending rigid teeth connected with the frame in the rear of and projecting beneath the level of said scraper, substantially as described.

6. In apparatus of the character described, the combination of a car supplied with a boom, a pulley connected with said boom, a cable passing about said pulley, a combined scraper and harrowing device connected some distance from the advance end with said cable,

said device comprising a transversely-extending forwardly and downwardly inclined scraper, and teeth in the harrow of said scraper and projecting a considerable distance beneath the level of the same, and a draft-cable connected with the front end of said device and leading to winding mechanism on

said car, substantially as and for the purpose set forth.

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THOMAS FORGHAM.

In presence of—

D. W. LEE,
ALBERT D. BACCI.