(No Model.) 3 Sheets—Sheet 1.

L. W. BATES.

EXCAVATOR AND CONVEYER.

No. 539,604. Patented May 21, 1895.

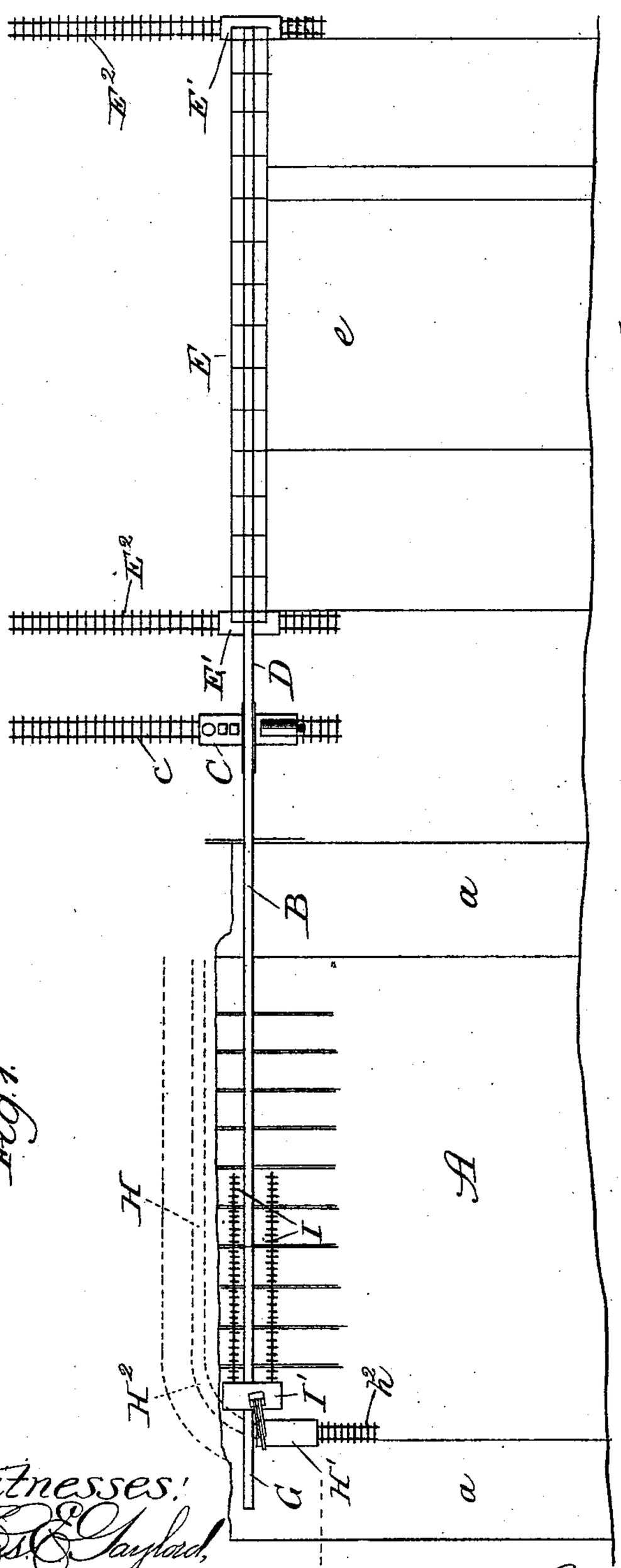

Fig. 1.

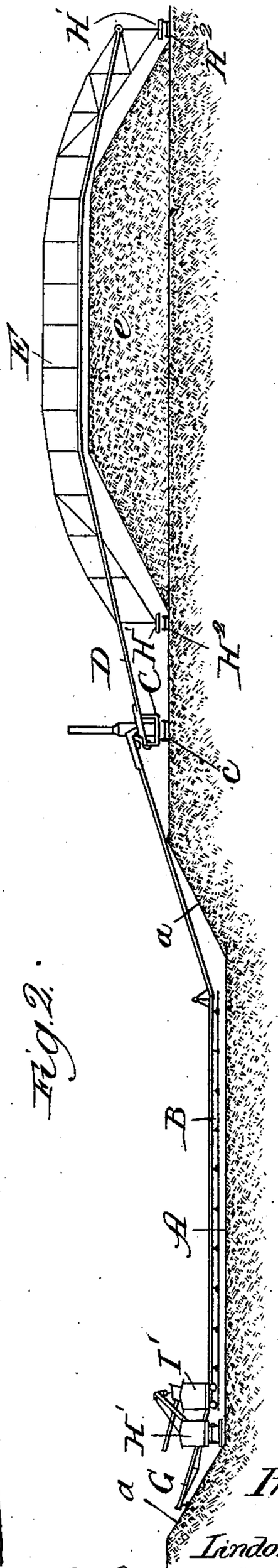

Fig. 2.

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(No Model.) 3 Sheets—Sheet 2.

L. W. BATES.

EXCAVATOR AND CONVEYER.

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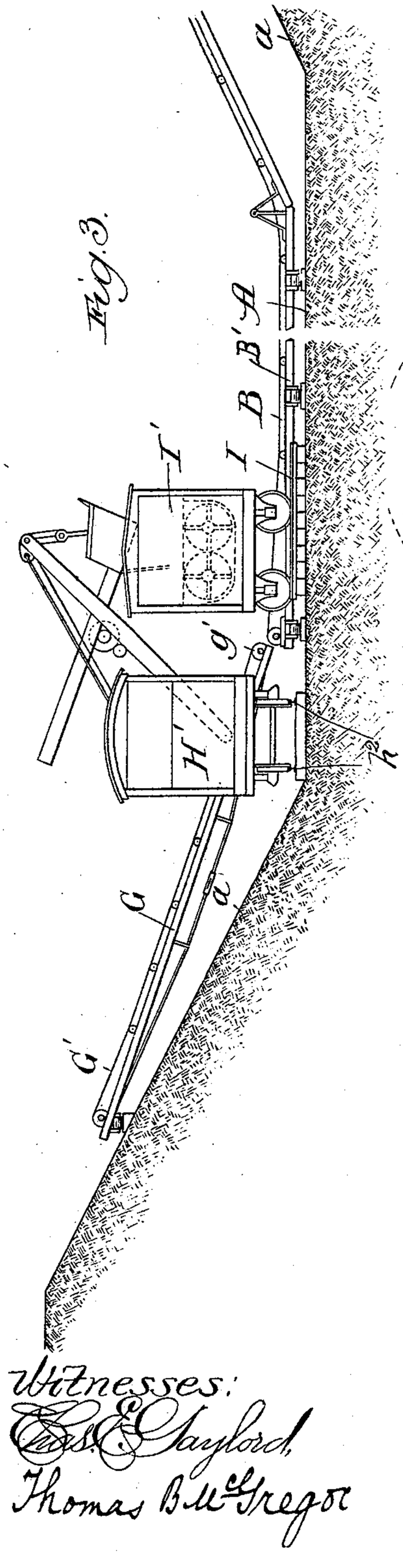

Fig. 3.

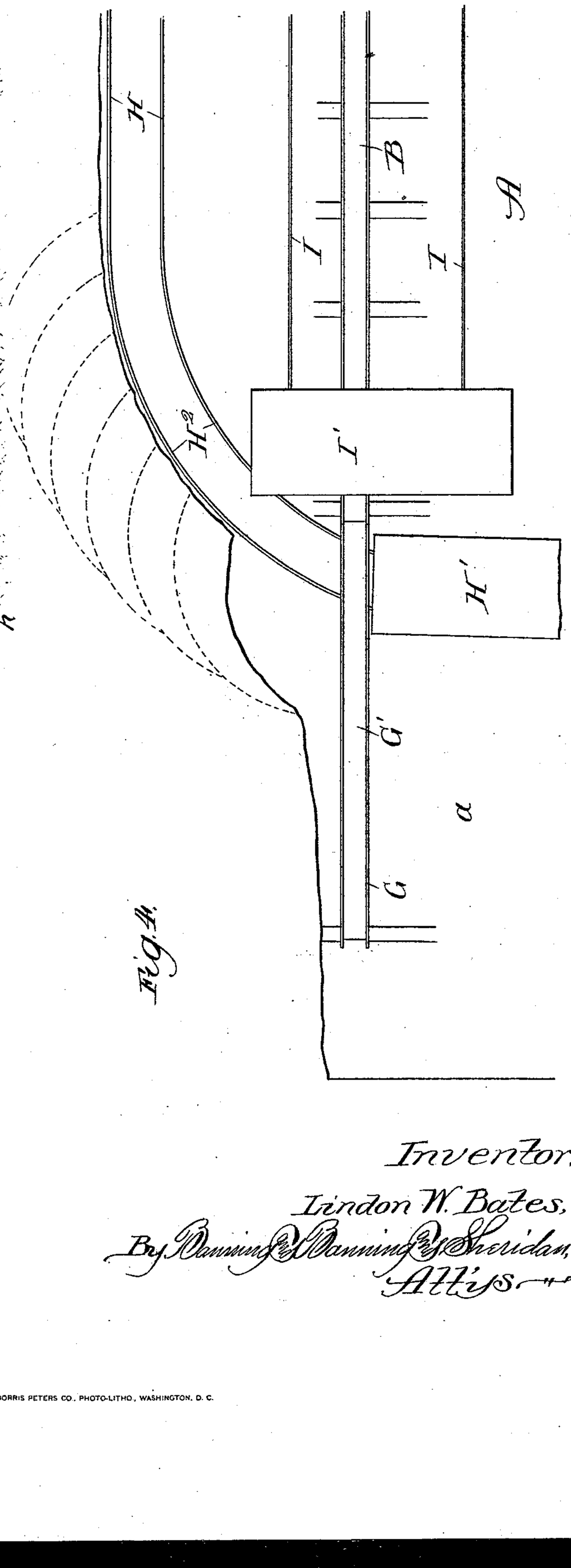

Fig. 4.

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(No Model.) 3 Sheets—Sheet 3.

L. W. BATES.

EXCAVATOR AND CONVEYER.

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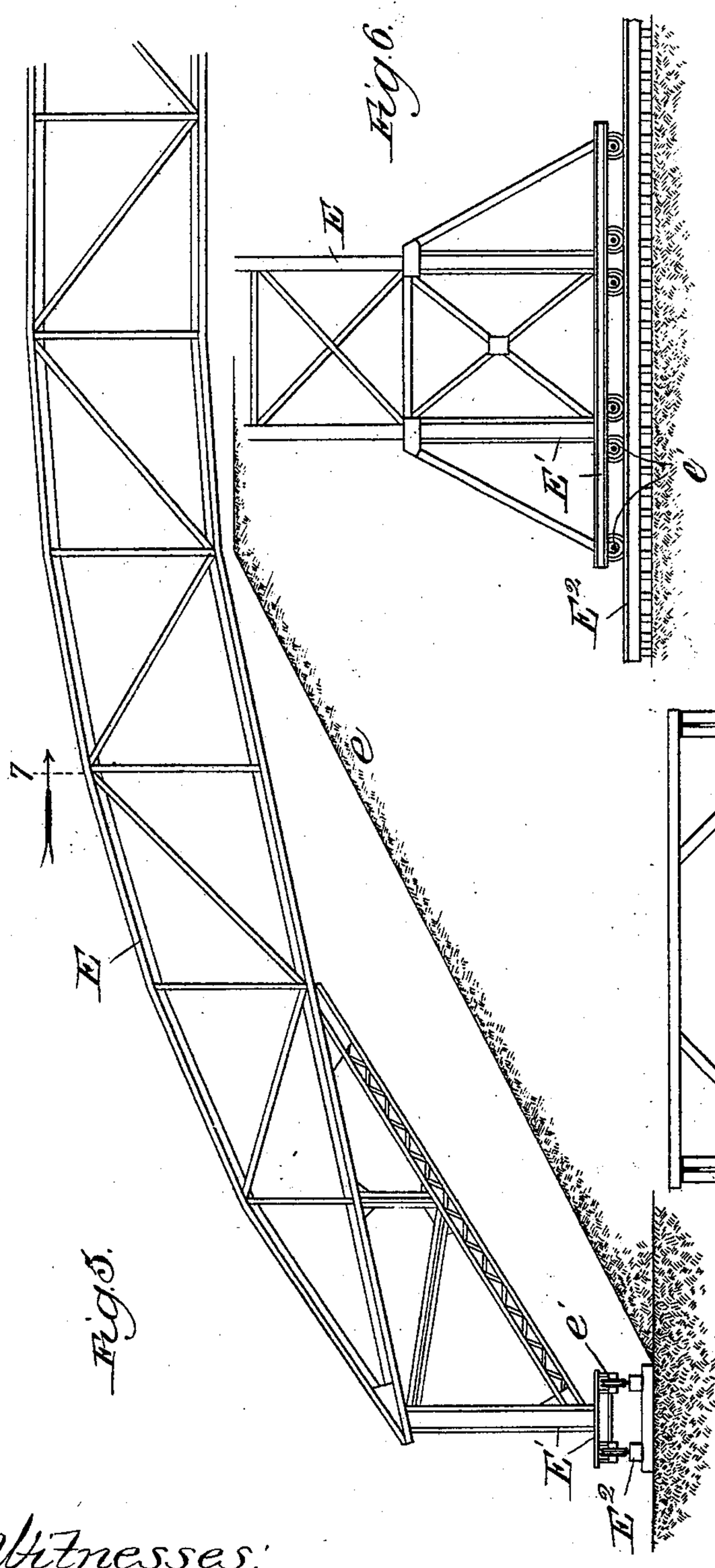

Fig. 5.

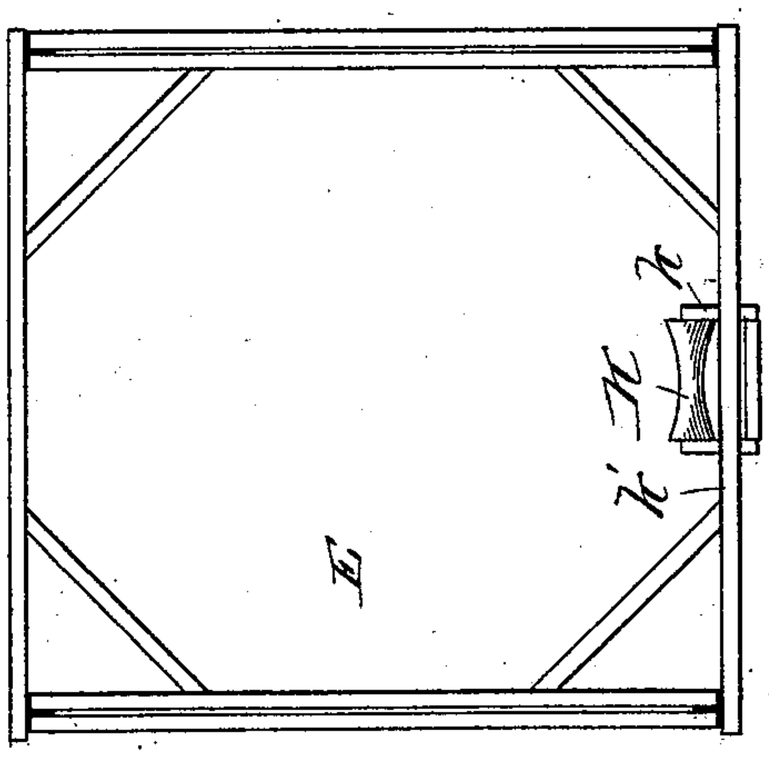

Fig. 7.

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UNITED STATES PATENT OFFICE.

LINDON W. BATES, OF CHICAGO, ILLINOIS.

EXCAVATOR AND CONVEYER.

SPECIFICATION forming part of Letters Patent No. 539,604, dated May 21, 1895.

Application filed August 14, 1894. Serial No. 520,257. (No model.)

To all whom it may concern:

Be it known that I, LINDON W. BATES, of Chicago, Illinois, have invented certain new and useful Improvements in Excavators and Conveyers, of which the following is a specification.

The object of my invention is to provide a simple, new and efficient apparatus for excavating material from a canal bed or ditch, granulating the same and conveying it to a point of deposit; and the invention consists in the features and combinations hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a plan view of my complete apparatus in position for use; Fig. 2, a side elevation thereof, taken on line 2 of Fig. 1, looking in the direction of the arrow; Fig. 3, an enlarged view of a portion of the mechanism shown to the left of Fig. 2; Fig. 4, an enlarged diagrammatic view of a portion of the mechanism, taken to the left of Fig. 1; Fig. 5, an enlarged side elevation of a portion of the trusset-span; Fig. 6, an end view thereof, and Fig. 7 an enlarged section taken on line 7 of Fig. 5.

In the use of excavators, especially in connection with large ditches or canals, similar to the great drainage canal now being constructed in the vicinity of Chicago, the question of the removal of the excavated earth, as well as the cutting, is an important problem. The triangular portion of material which is left on such side of the main cut and located between the bed of the canal and the upper bank is usually the most expensive to remove per cubic yard of any portion of the canal, for the reason that while tracks may be laid in the bed of the canal and the bulk of the material removed therefrom by power, that on the sloping bank cannot be removed in the same way, but generally has to be blasted, excavated and dumped by manual labor into the bed of the canal so that it may be reached by the power shovel or excavator. This, of course, as above stated, involves a large relative expense. Again, by the use of the steam shovel, which has a direct thrust, huge blocks of material are taken out, which should be reduced to a somewhat uniform size in order that they may be carried off quickly, economically, evenly and continuously by means of a power conveyer. The question of depositing the excavated material is also a large item of expense. Heretofore trestle work has been provided, upon which a span is mounted in a movable manner, so as to move along parallel with the bed of the cut and deposit the waste material immediately thereunder. This kind of a structure involved the expense of building trestle work upon which the conveying apparatus may be moved, and which adds largely to the expense per cubic yard of excavating and depositing the material. My invention, therefore, has for its principal object the removal of these objections by the provision of simple, economical and efficient apparatus; and to that end it consists in providing means by which this triangular portion of the material, when it is excavated by hand, may be readily removed to a point of deposit.

It consists further in providing means for excavating the material, granulating or reducing it to a uniform size, and conveying it from the granulator on a belt conveyer continuously to a point of deposit.

It consists finally in providing a movable trussed span for the spoil bank adapted to hold and sustain an endless belt conveyer, such trussed span being built to rest upon tracks laid upon the surface of the ground.

In constructing my improved excavator and conveyer, I locate in the bed of the canal, A, a primary endless belt conveyer, B, which is mounted on a suitable supporting structure, B′, (see Fig. 3) and guided by pulleys rotatably mounted thereon. I provide a second belt conveyer, D, which is passed over a trussed span, E, located over the spoil or waste bank, *e*. To actuate these endless belt conveyers, I prefer to provide a car truck, C, with an engine and boiler having suitable connecting mechanism by which the belt may be driven—but which forms no material part of my invention, and, therefore, I do not deem it necessary to describe it here fully or in detail.

To excavate the triangular portion of material which covers the sloping bank of the canal intermediate the bed of the canal and the edge of the bank, I provide an auxiliary apron, G, having mounted thereon a third auxiliary endless belt conveyer, G′. This auxiliary apron and belt conveyer—as shown in Fig. 3 of the drawings—rests on one of the sloping banks, *a*, of the canal, in such a man-

ner that the operatives in excavating the material may dump it directly upon this conveyer, which is arranged—as at g'—adjacent to the primary belt conveyer, so that it dumps the excavated material thereon to be carried over such primary and secondary conveyers to the point of deposit at a waste or spoil bank. This permits, therefore, of every portion of the canal being reached by a power conveyer, and saves the extra labor of shoveling and dumping this triangular portion of the material into the bed of the canal to be again taken up and deposited on the conveyer.

To more readily excavate and remove the material from the bed of the excavator in the face of the cut, I provide a transverse track, H, upon which I mount an excavator, H′, adapted to work transversely across the face of the cut and excavate the material therefrom. To the rear of this transverse track, H, I provide a second track or tracks, I, upon which I mount a granulator, I′, adapted to move transversely across the face of the cut, and immediately under the granulator and parallel to its tracks, I arrange the primary conveyer, B, above referred to, so that as the material is excavated by the power shovel it is dumped immediately into the granulator, where it is pulverized or crushed in such a manner that it comes out of the granulator in a uniform condition and is deposited on the belt conveyer, to be carried off by the means above described to the waste bank. This, therefore, provides for a means by which the material may be excavated, granulated and conveyed away from the canal or ditch in a continuous manner.

When the material has been excavated from the face of the cut, so that the power shovel can no longer reach it, it is necessary to move the track, and this is done by moving both transverse tracks forward. In order to do this successfully, the transverse track is provided with a curved end, H^2, which has one portion running parallel with the cut, as at h^2. The excavator is moved around upon this portion—as in Fig. 1—by running the auxiliary apron up and back out of the way until it has passed such portion, when it is let down again to its original position and the tracks jacked forward. When the track is moved forward, the curved portion is jacked along with it, so as not to cause a break in its connection, and a small portion of a straight rail is joined to the curve and the straight portion, h^2. After this is done, the excavator removes the earth first around the curve, in the manner shown in the large diagrammatic view of Fig. 4, by being moved along at intervals five feet apart, so as to remove portions of material corresponding to that shown in dotted lines. Instead of using this curve, however, a switch back may be provided, upon which the excavator may be run while the tracks are being moved forward.

To provide an economical, movable, trussed span, E, which may span a spoil bank and sustain the second endless belt conveyer, without the intervention of trestle work, I make a trussed span of the general form shown in Figs. 5, 6 and 7 of the drawings, and provide its end portions with a framework, E′, preferably formed of channel irons and provided with car wheels, e', mounted upon suitable tracks, E^2, which rest directly upon the ground or sleepers arranged thereon. To mount and hold the second endless belt conveyer thereon, I provide concave pulleys, K, which are mounted rotatably in suitable bearings, k, secured immediately to the cross ties, k', of the trussed span, doing away with the necessity of using continuous channel irons or rails. This structure disposes with the usual trestle work, and provides the usual method of spanning the waste or spoil bank, and permits the building of a track parallel to the bed of the cut immediately upon the ground, which is considered the most economical way.

I claim—

In excavating apparatus, the combination of tracks laid transversely across the bed of the cut, a steam shovel mounted thereon, a second track laid transversely across the bed of the cut, a granulator mounted on such second track and adapted to receive the excavated material from the steam shovel and deliver it in uniform condition to a conveyer, a primary endless belt conveyer passed under the granulator and adapted to receive the waste material, a second endless belt conveyer adapted to receive the waste material from the primary conveyer and mounted upon a movable trussed span, and a movable trussed span extended over a spoil bank and having its end portion provided with wheels resting upon the ground upon which it rests and moves, substantially as described.

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Witnesses:
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