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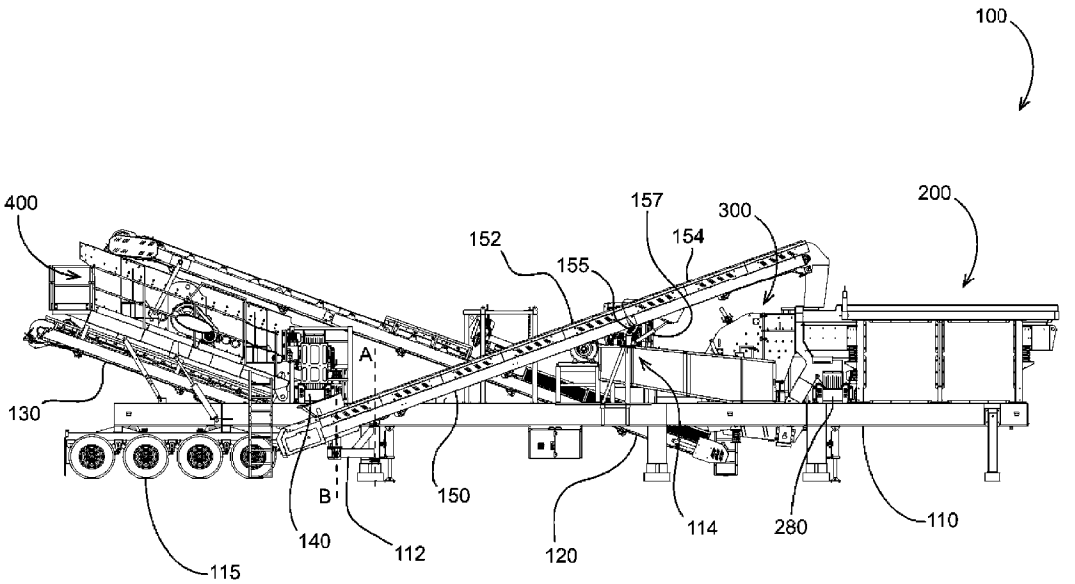
(54) Title: RECIRCULATING CRUSHING PLANT



(57) Abrégé/Abstract:
[0015] Systems, methods and apparatus are provided for crushing aggregate material. In some ernbodiments, in an operating configuration a recirculating conveyor deposits material previously crushed by a crusher into the feed inlet of the crusher. In some embodiments, the recirculating conveyor is pivoted inward about a vertical axis into the operating configuration.

ABSTRACT

[0015] Systems, methods and apparatus are provided for crushing aggregate material. In some embodiments, in an operating configuration a recirculating conveyor deposits material previously crushed by a crusher into the feed inlet of the crusher. In some embodiments, the recirculating conveyor is pivoted inward about a vertical axis into the operating configuration.

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RECIRCULATING CRUSHING PLANT

BACKGROUND

[0001] Crushing plants include crushers for crushing material such as aggregate material. Some crushing plants include recirculating conveyors.

BRIEF DESCRIPTION OF THE DRAWINGS

[0002] FIG. 1 is a side elevation view of an embodiment of a recirculating crushing plant.

[0003] FIG. 2 is a top view of the recirculating crushing plant of FIG. 1.

[0004] FIG. 3 is a side elevation view of another embodiment of a recirculating crushing plant.

[0005] FIG. 4 is a top view of the recirculating crushing plant of FIG. 3.

DESCRIPTION

[0006] Referring to the drawings, wherein like reference numerals designate identical or corresponding parts throughout the several views, FIGs. 1 and 2 illustrate a recirculating crushing plant 100 including a chassis 110 which is optionally portable or mobile (e.g., on wheels 115, powered tracks, non-powered tracks, etc.). A vibratory feeder 210 (e.g., a grizzly feeder having an array of grizzly bars 220) is optionally supported on the chassis 110. The feeder 210 optionally receives a feed of material onto a region R_1. Vibration of the feeder 210 optionally moves the feed of material to a region R_2 where the material is optionally classified, with undersized material falling onto a cross-conveyor 280 for conveying away from the plant 100. The feeder 210 optionally deposits oversized material (either directly or via an intermediate conveyor or feeder) into a crusher such as a horizontal shaft impact crusher 300 (or in other embodiments another crusher such as a vertical shaft impact crusher, cone crusher, jaw crusher, etc.). The crushed output of crusher 300 is optionally deposited (either directly or via an intermediate conveyor or feeder) onto a conveyor 120.

[0007] Conveyor 120 optionally deposits material onto a vibratory classifier 400 (e.g., multi-deck incline screen, multi-deck horizontal screen, etc.). A conveyor 130 is optionally disposed to receive

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undersize material passing through the classifier 400 for conveyance away from the plant 100. A cross-conveyor 140 is optionally disposed to convey material onto a recirculating conveyor 150.

[0008] Recirculating conveyor 150 optionally has a transport configuration in which the length of the conveyor 150 is generally aligned with the chassis 110 and/or the travel direction of the chassis 110. Recirculating conveyor 150 optionally has an operating configuration pivoted inboard (generally about the direction D_R shown in FIG. 2) such that a head end H of conveyor 150 is disposed to deposit material onto region R_1 or R_2 of the vibratory feeder 200. In some embodiments, the conveyor 150 deposits material generally in the transverse center of the feed of material on vibratory feeder 200.

[0009] In some embodiments, conveyor 150 is at least partially supported on a distal end of a pivot arm 112 for pivoting about a generally vertical axis B. A proximal end of pivot arm 112 is optionally pivotally supported on chassis 110 for pivoting about a generally vertical axis A. The conveyor 150 is optionally supported on a support 114 (e.g., pivotal support) which also optionally permits pivoting about a vertical axis.

[0010] Pivoting of the pivot arm 112 and/or conveyor 150 permits inboard pivoting of the conveyor 150 about the direction D_R. One or more actuators (not shown) are optionally disposed to pivot the pivot arm 112 relative to chassis 110 and/or to pivot the conveyor 150 (e.g., by pushing a generally forward portion of the conveyor 150 in an inboard direction).

[0011] The conveyor 150 optionally has a rearward portion 152 and forward portion 154 joined at a horizontal pivot 155. An actuator 157 is optionally disposed to raise and lower the forward portion 154 (e.g., for operation and transport, respectively, and/or for positioning of head end of conveyor 150 relative to crusher 300).

[0012] Referring to FIGs. 3 and 4, another embodiment of a plant 100' is illustrated having a modified conveyor 150' configured (e.g., sized) to deposit material (e.g., directly) into a feed inlet 302 of the crusher 300 in the operational configuration of the conveyor 150'. In some embodiments, the conveyor 150' includes a chute 159 or other intermediate structure disposed at a head end of the conveyor 150 and configured to guide material to the inlet 302. In some embodiments, the conveyor 150' is configured to deposit material generally at a lateral center of

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the feed inlet 302 in the operational configuration of the conveyor 150'. Material entering the lateral center of the feed inlet 302 is optionally laterally centered on a blow bar rotor of the crusher 300.

[0013] In some embodiments, an intermediate structure such as a slide, chute, etc. is disposed under and optionally attached supported by the head end of conveyor 150 (or conveyor 150'). The intermediate structure is optionally configured to receive at a first deposition location from the conveyor 150, slidingly support material deposited by the conveyor 150 as the material moves downward by gravity and inboard toward a second deposition location at which the material falls from the intermediate structure. The second deposition location is optionally aligned with the lateral center of the feed inlet of the crusher along a vertical plane extending in the travel direction of the plant 100. In various embodiments, the second deposition location is located above the crusher inlet, above the feeder, etc.

[0014] Although various embodiments have been described above, the details and features of the disclosed embodiments are not intended to be limiting, as many variations and modifications will be readily apparent to those of skill in the art. Accordingly, the scope of the present disclosure is intended to be interpreted broadly and to include all variations and modifications within the scope and spirit of the appended claims and their equivalents. For example, any feature described for one embodiment may be used in any other embodiment.

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CLAIMS

1. A portable recirculating crushing plant, comprising:

a portable chassis;

a crusher supported on said chassis having a feed inlet;

a vibratory classifier supported on said chassis;

a first conveyor disposed to convey material from said crusher to said vibratory classifier; and

a second conveyor disposed to receive material from said vibratory classifier, said second conveyor having a transport configuration and an operating configuration, said second conveyor being pivotably supported on said portable chassis; said second conveyor being pivotable between said transport configuration and said operating configuration, wherein in said operating configuration a head end of said second conveyor is disposed to deposit material over said feed inlet, wherein in said transport configuration said head end is disposed outboard of said crusher.

2. The portable recirculating crushing plant of claim 1, further comprising a pivot arm pivotally coupled to said chassis, wherein said second conveyor is pivotally coupled to said pivot arm.

3. The portable recirculating crushing plant of claim 1, wherein in said operating configuration said second conveyor is disposed to deposit material onto a lateral center of said feed inlet.

4. The portable recirculating crushing plant of claim 1, wherein said second conveyor comprises a chute, said chute being disposed to deposit guide into said feed inlet.

5. The portable recirculating crushing plant of claim 4, wherein said crusher comprises a horizontal shaft impact crusher.

6. The portable recirculating crushing plant of claim 1, wherein said crusher comprises a horizontal shaft impact crusher.

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7. The portable recirculating crushing plant of claim 1, further comprising:

a vibrating feeder supported on said chassis, wherein said crusher is disposed to receive material from said vibrating feeder.

8. A portable recirculating crushing plant, comprising:

a portable chassis;

a vibrating feeder supported on said chassis;

a crusher supported on said chassis having a feed inlet, wherein said crusher is disposed to receive material from said vibrating feeder;

a vibratory classifier supported on said chassis;

a first conveyor disposed to convey material from said crusher to said vibratory classifier; and

a second conveyor disposed to receive material from said vibratory classifier, said second conveyor having a transport configuration and an operating configuration, said second conveyor being pivotably supported on said portable chassis; said second conveyor being pivotable between said transport configuration and said operating configuration, wherein in said operating configuration a head end of said second conveyor is disposed to deposit material over said vibrating feeder, wherein in said transport configuration said head end is disposed outboard of said vibrating feeder.

9. The portable recirculating crushing plant of claim 8, further comprising a pivot arm pivotally coupled to said chassis, wherein said second conveyor is pivotally coupled to said pivot arm.

10. The portable recirculating crushing plant of claim 8, wherein in said operating configuration said second conveyor is disposed to deposit material onto a lateral center of said feed inlet.

11. The portable recirculating crushing plant of claim 8, wherein said second conveyor comprises a chute, said chute being disposed to deposit guide into said feed inlet.

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12. The portable recirculating crushing plant of claim 11, wherein said crusher comprises a horizontal shaft impact crusher.

13. The portable recirculating crushing plant of claim 8, wherein said crusher comprises a horizontal shaft impact crusher.

14. A method of crushing material, comprising:

depositing a feed of material from a vibratory feeder;

with a crusher, crushing material from said feed of material;

conveying material from said crusher to a vibratory classifier;

classifying material from said crusher;

conveying a subset of classified material in an at least partially inboard direction; and

depositing said subset of material into said crusher.

15. The method of claim 14, wherein said step of crushing material comprises impacting material against a plurality of surfaces by a blow bar rotor.

16. The method of claim 15, wherein said step of conveying material from said crusher to a vibratory classifier comprises centering said material on said blow bar rotor.

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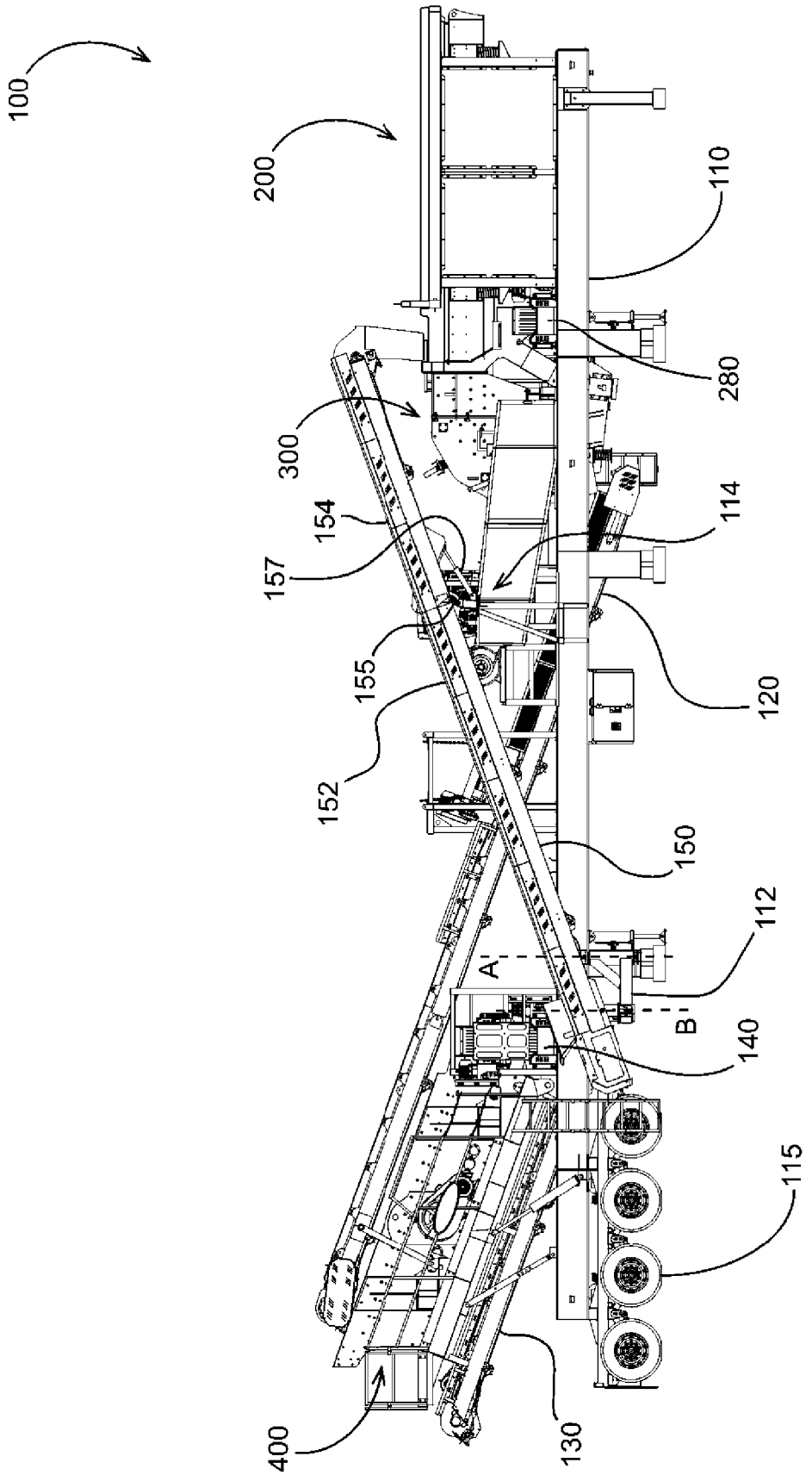

FIG. 1

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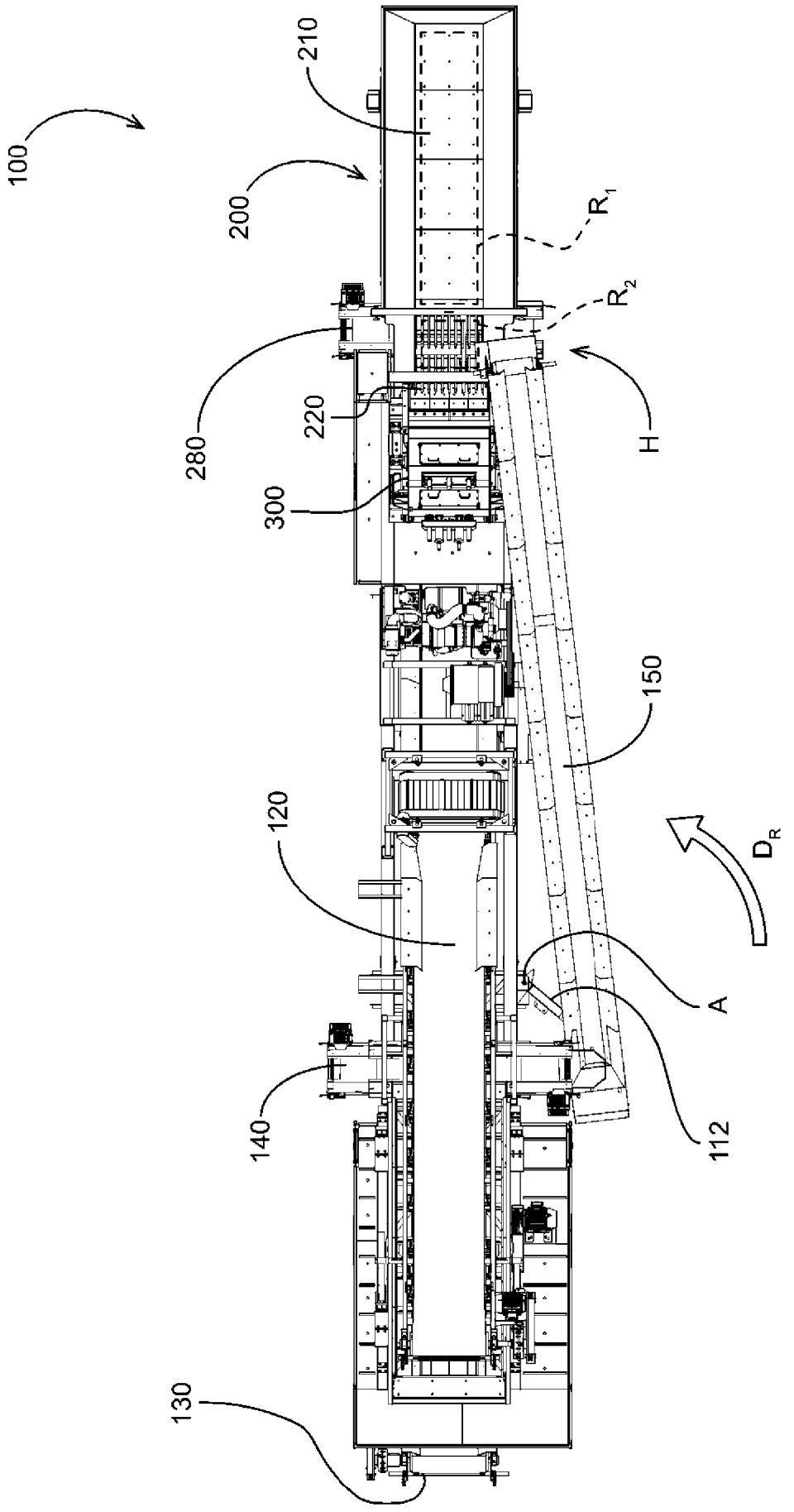

FIG. 2

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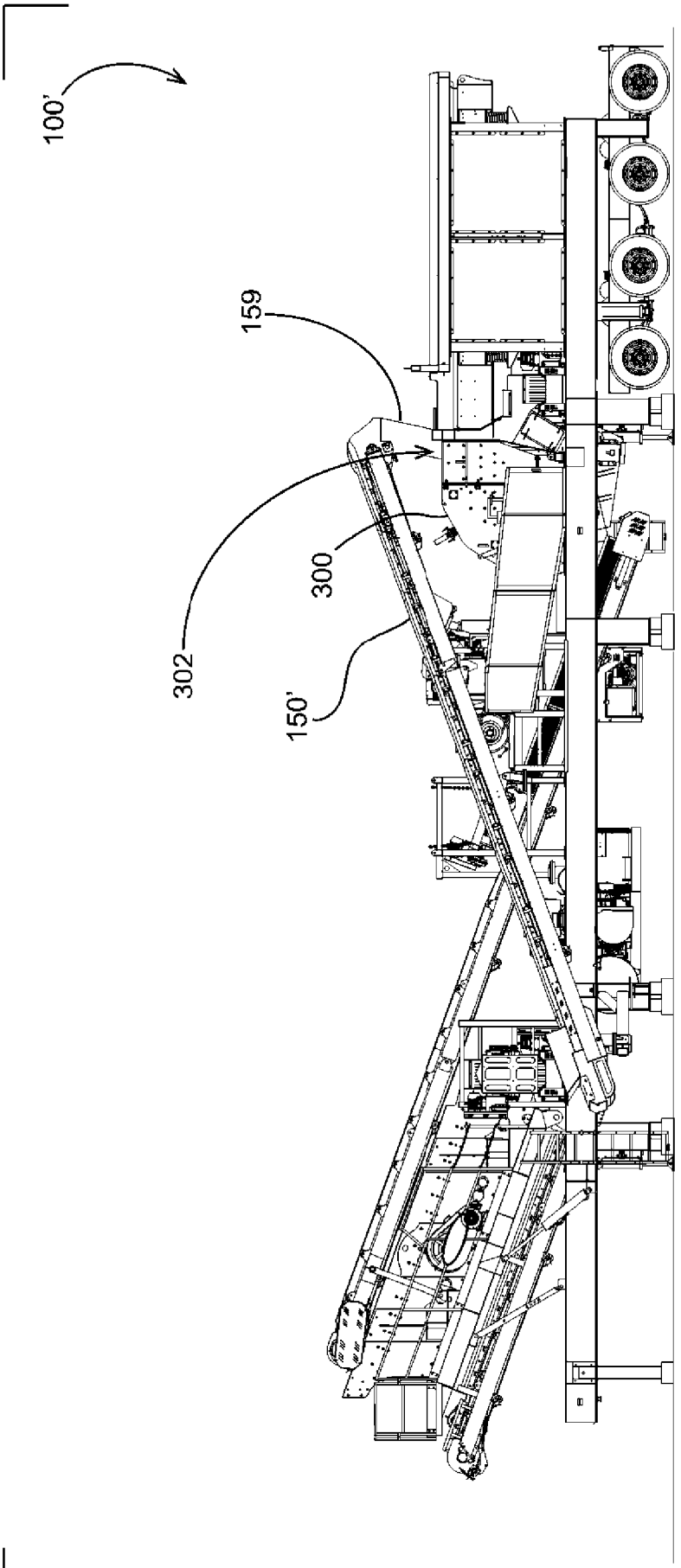

FIG. 3

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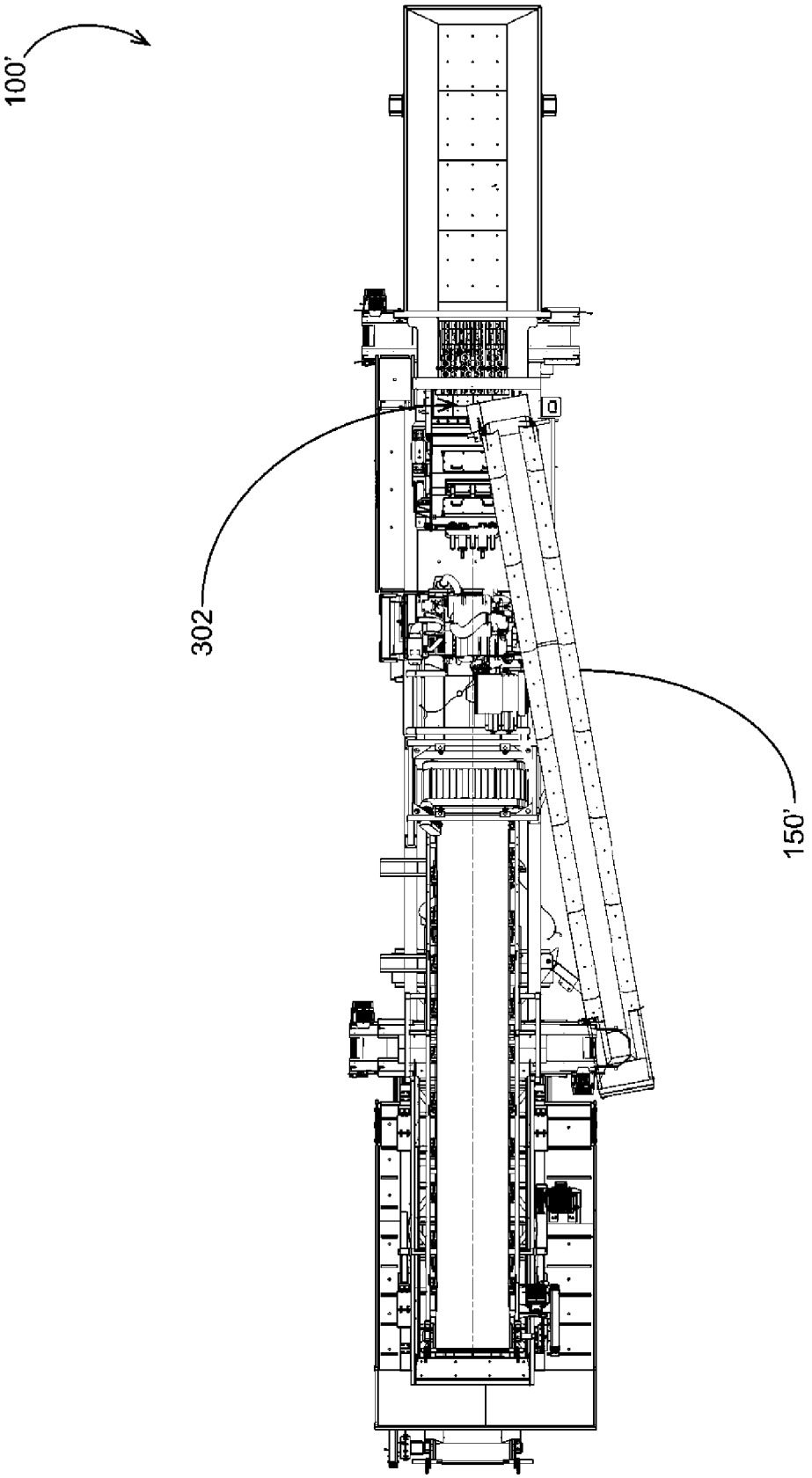

FIG. 4

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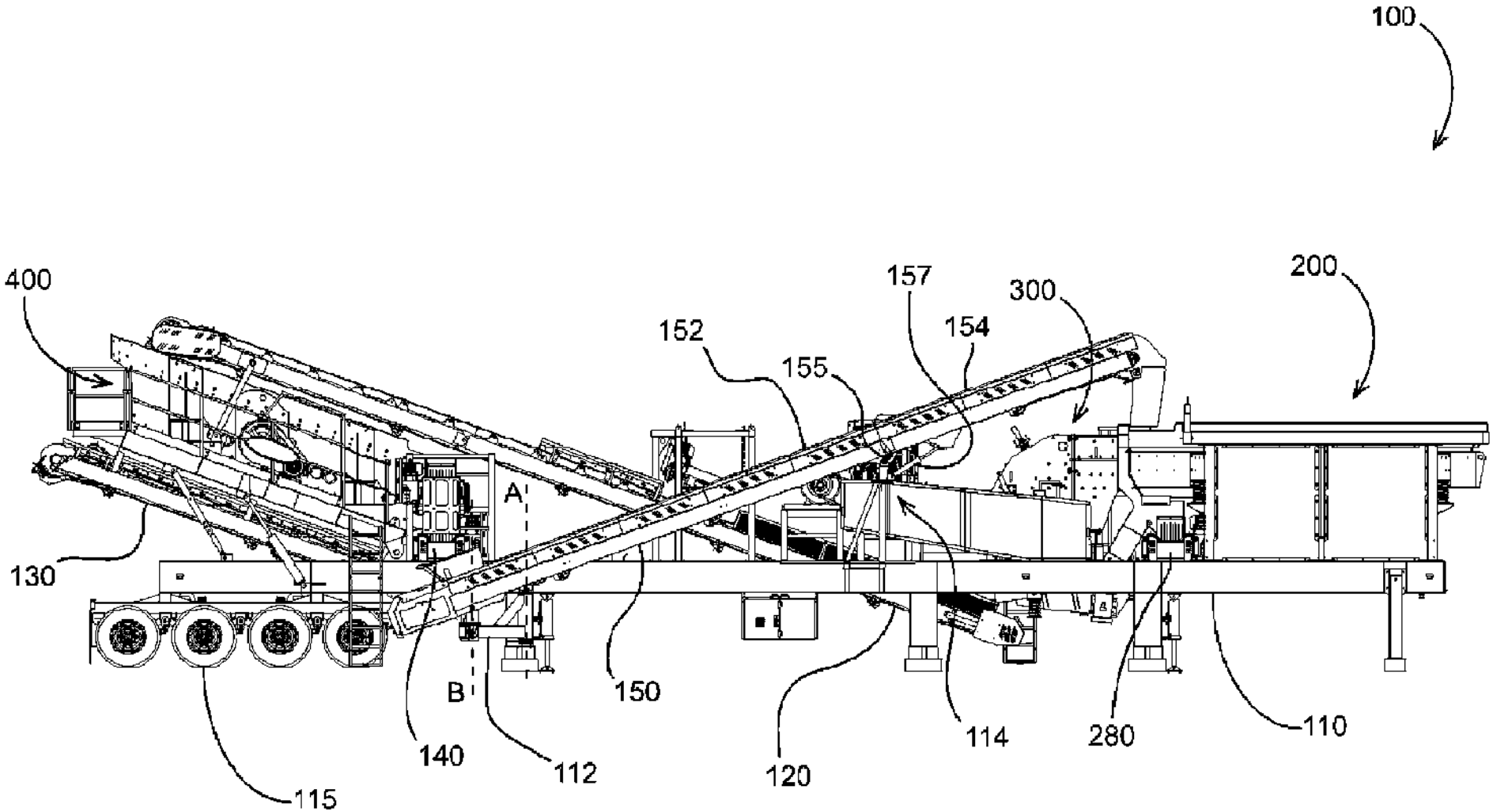
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