US 20250263240A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2025/0263240 A1**

Tomblin et al. (43) **Pub. Date: Aug. 21, 2025**

(54) **CONVEYOR SYSTEM, BELT TURN OVER SYSTEM AND DIRECTING ASSEMBLY THEREFOR, AND ASSOCIATED METHOD OF TURNING OVER A CONVEYOR BELT**

(71) Applicant: **Stahura Conveyor Products, Inc.**, Lewisville, NC (US)

(72) Inventors: **Rickey Tomblin**, Chapmanville, WV (US); **Andrew J. Stahura, III**, Butler, PA (US)

(73) Assignee: **Stahura Conveyor Products, Inc.**, Lewisville, NC (US)

(21) Appl. No.: **19/055,073**

(22) Filed: **Feb. 17, 2025**

Related U.S. Application Data

(60) Provisional application No. 63/555,116, filed on Feb. 19, 2024.

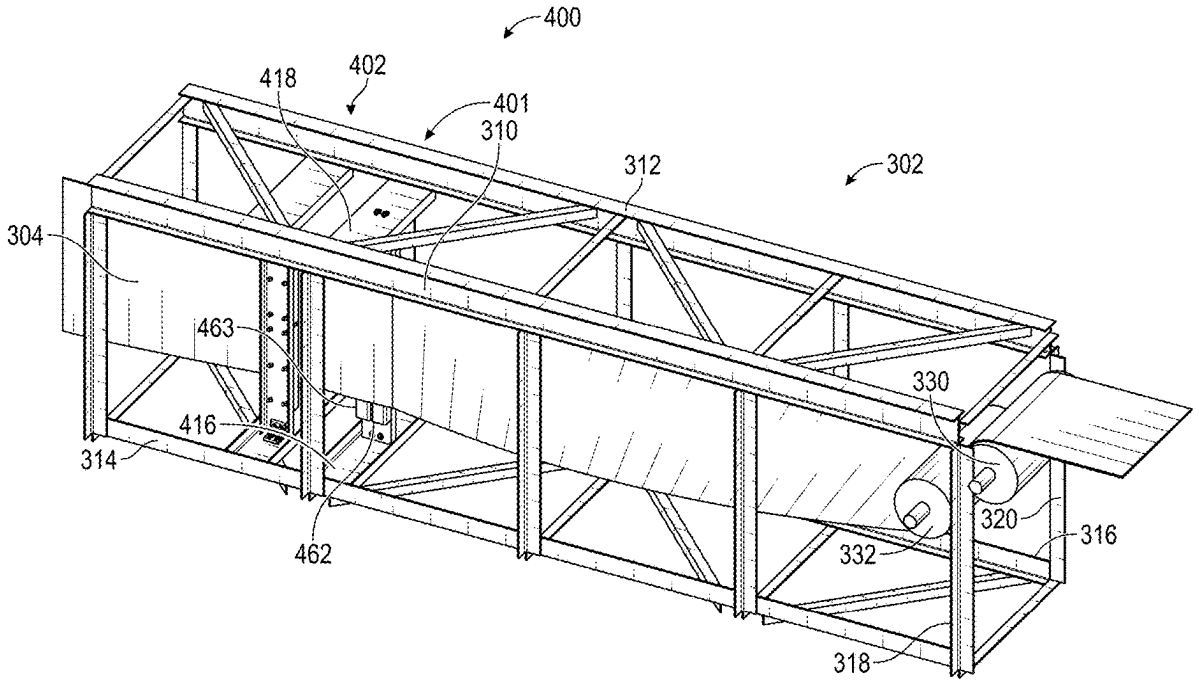
Publication Classification

(51) **Int. Cl.**
B65G 15/64 (2006.01)

(52) **U.S. Cl.**
CPC ***B65G 15/64*** (2013.01); *B65G 2207/48* (2013.01); *B65G 2812/02168* (2013.01)

(57) **ABSTRACT**

A directing assembly of a belt turn over system is for use in a conveyor system. The conveyor system includes a conveyor belt and a plurality of support members. The conveyor belt is configured to move from a first location of the conveyor system to a second location thereof. The directing assembly includes a channel member structured to be coupled to at least one of the plurality of support members, and a plurality of directing members each removably coupled to the channel member and configured to be in a static state with respect to the channel member when the conveyor belt moves from the first location to the second location. The directing members are configured to engage the conveyor belt as the conveyor belt moves from the first location to the second location in order to turn over the conveyor belt.



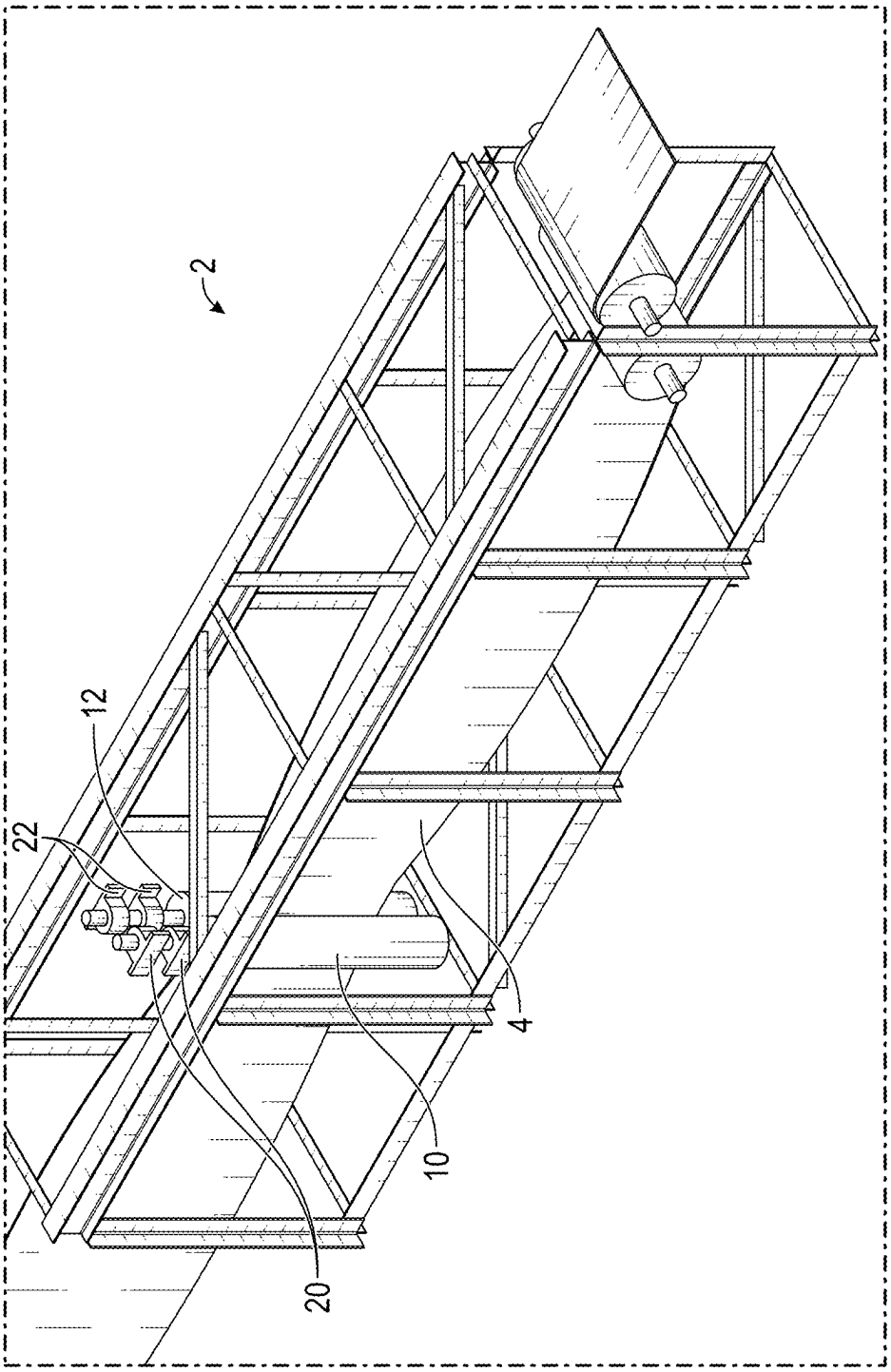


FIG. 1A
(Prior Art)

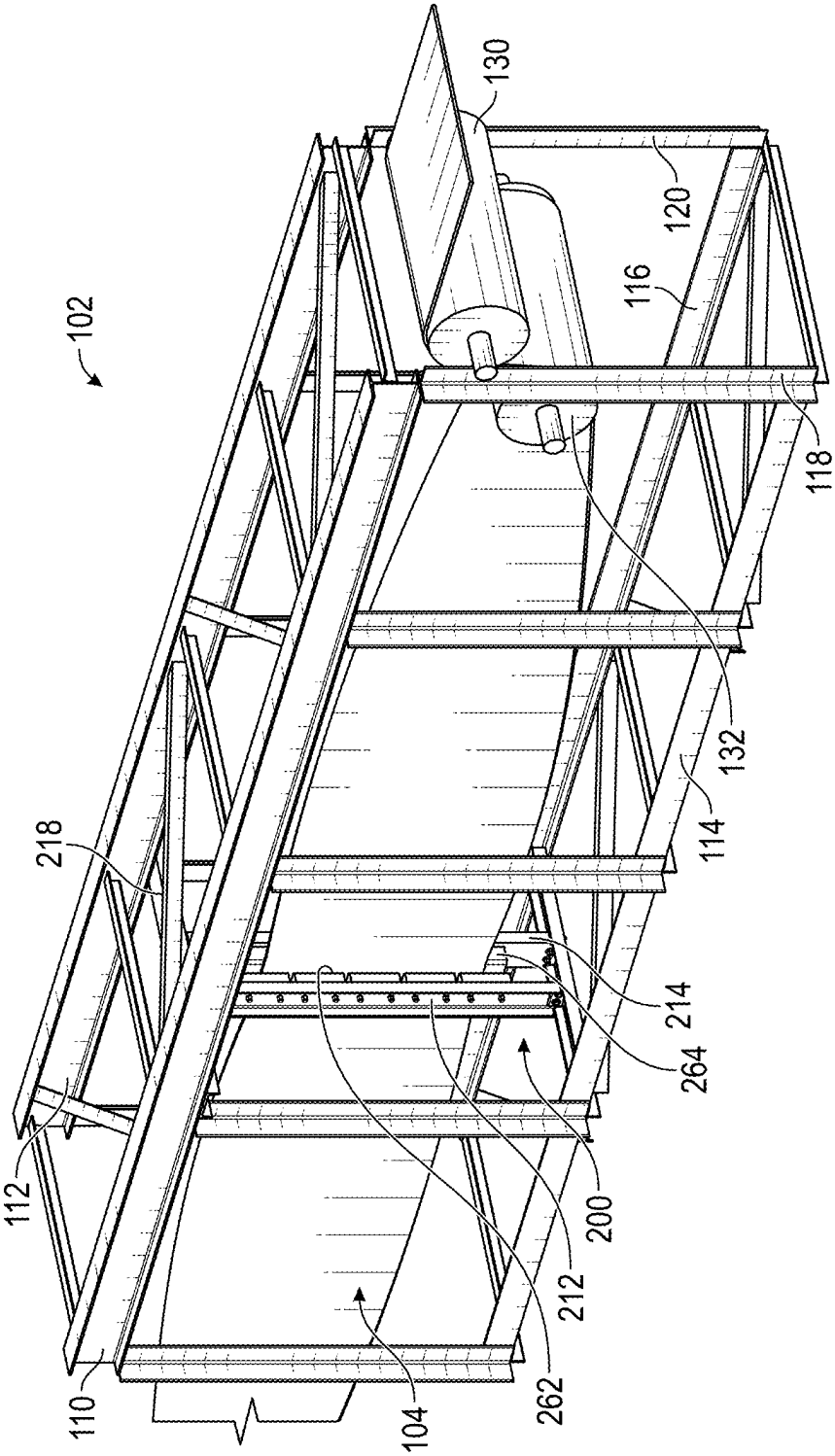


FIG. 1B

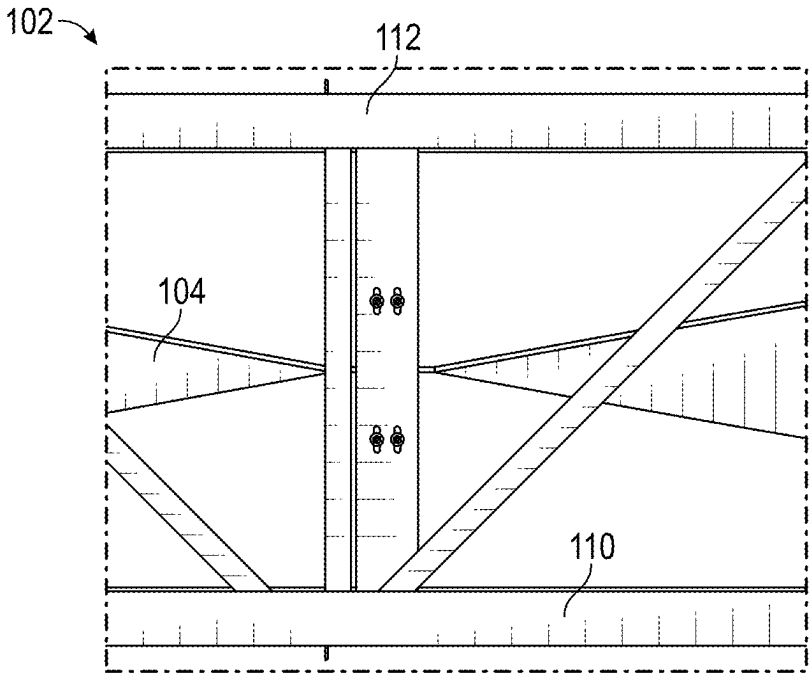


FIG. 2

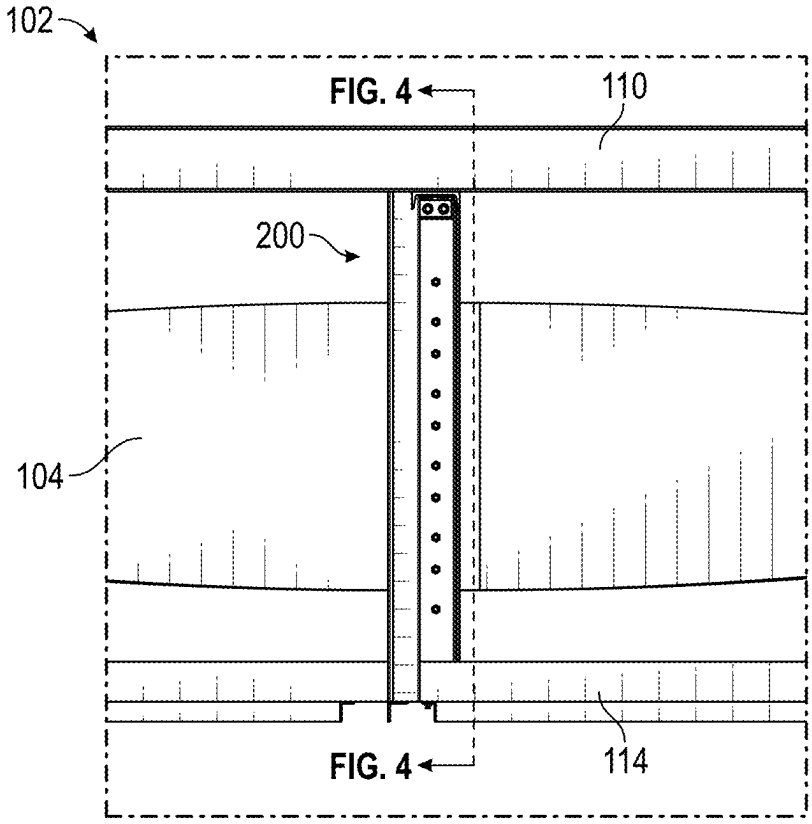


FIG. 3

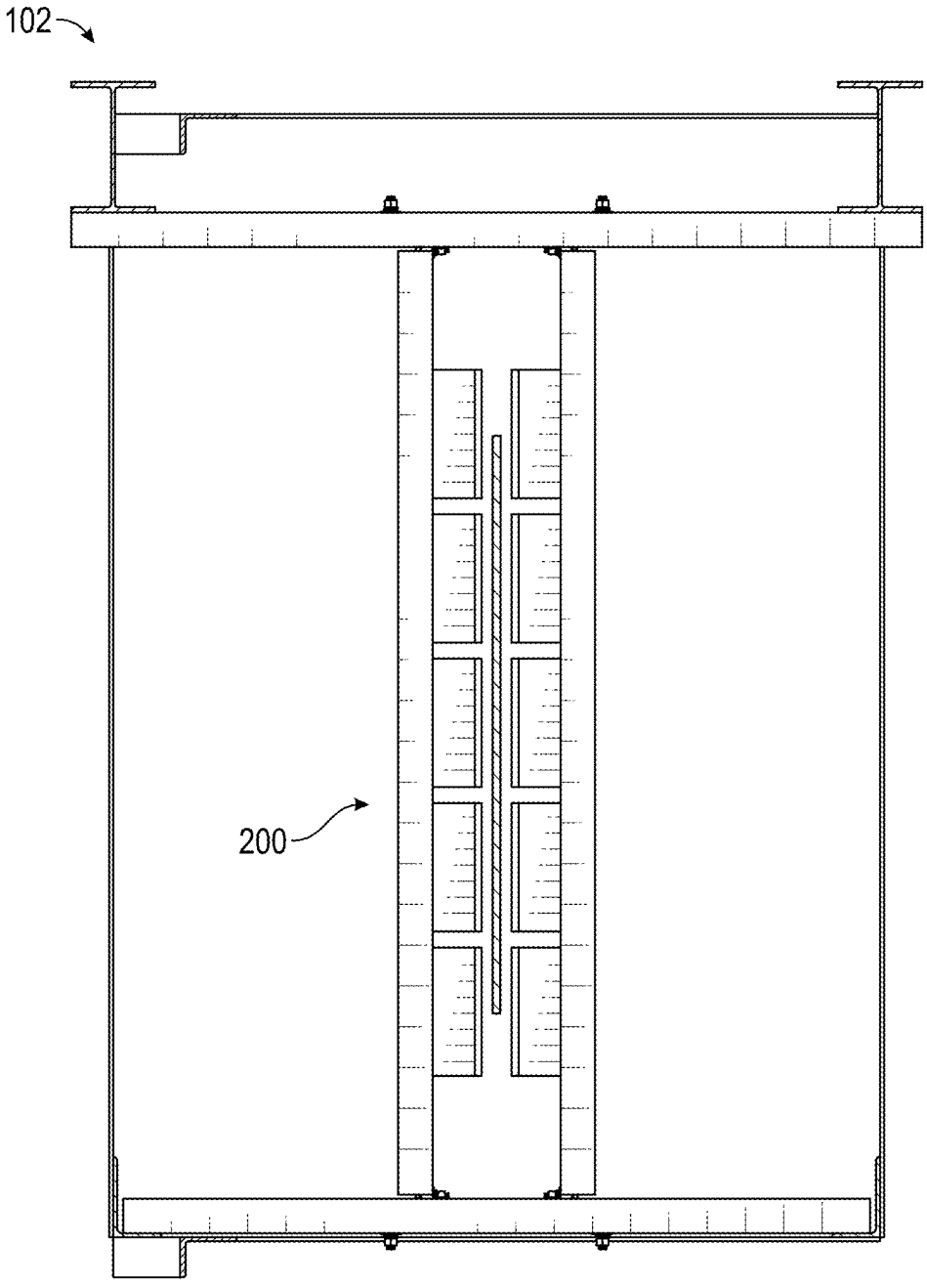


FIG. 4

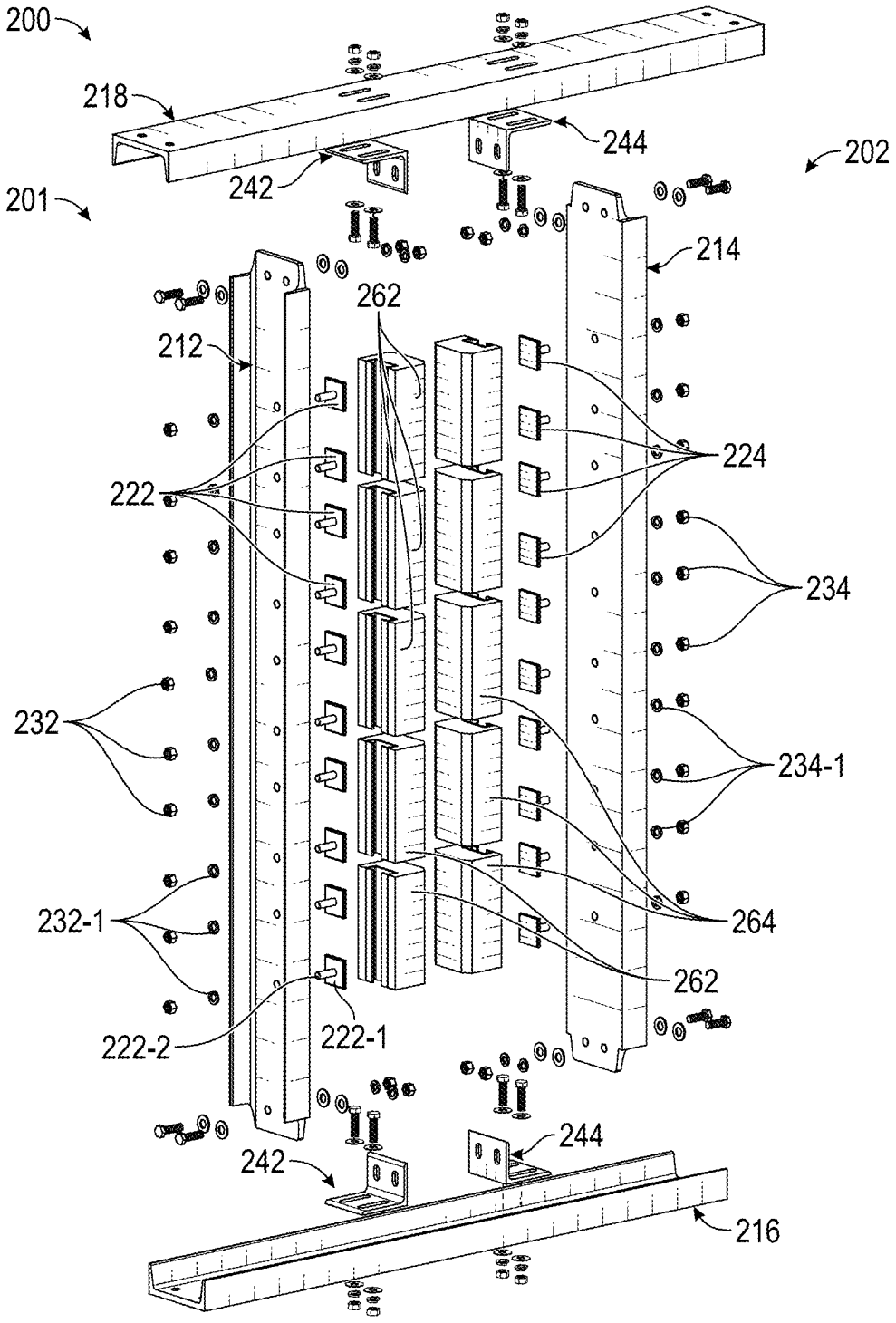

200
218
244
202
242
201
214
262
212
224
222
234
232
234-1
232-1
264
262
222-2
222-1
244
242
216

FIG. 5A

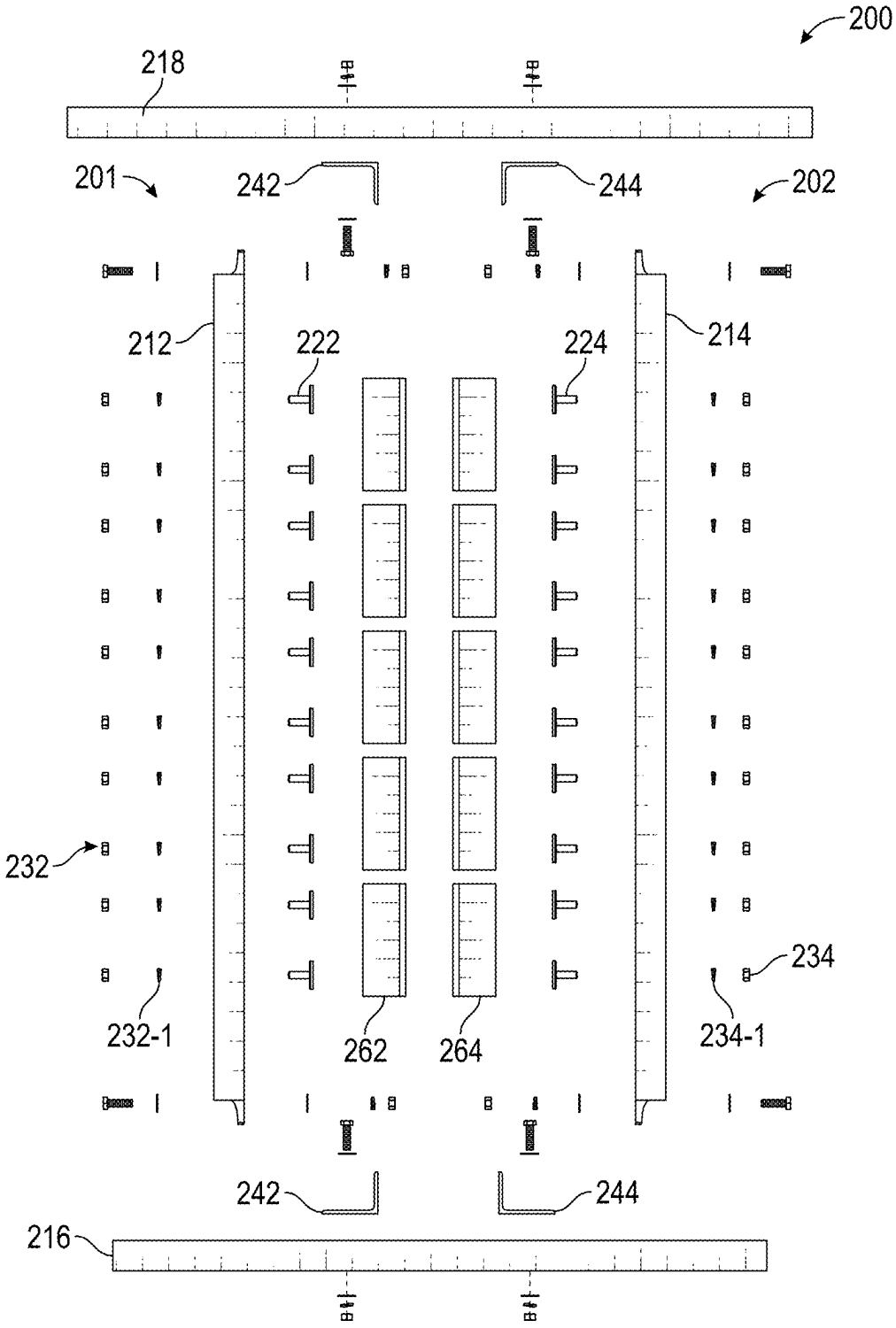

200
218
201
242
244
202
212
222
224
214
232
234
232-1
262
264
234-1
242
244
216

FIG. 5B

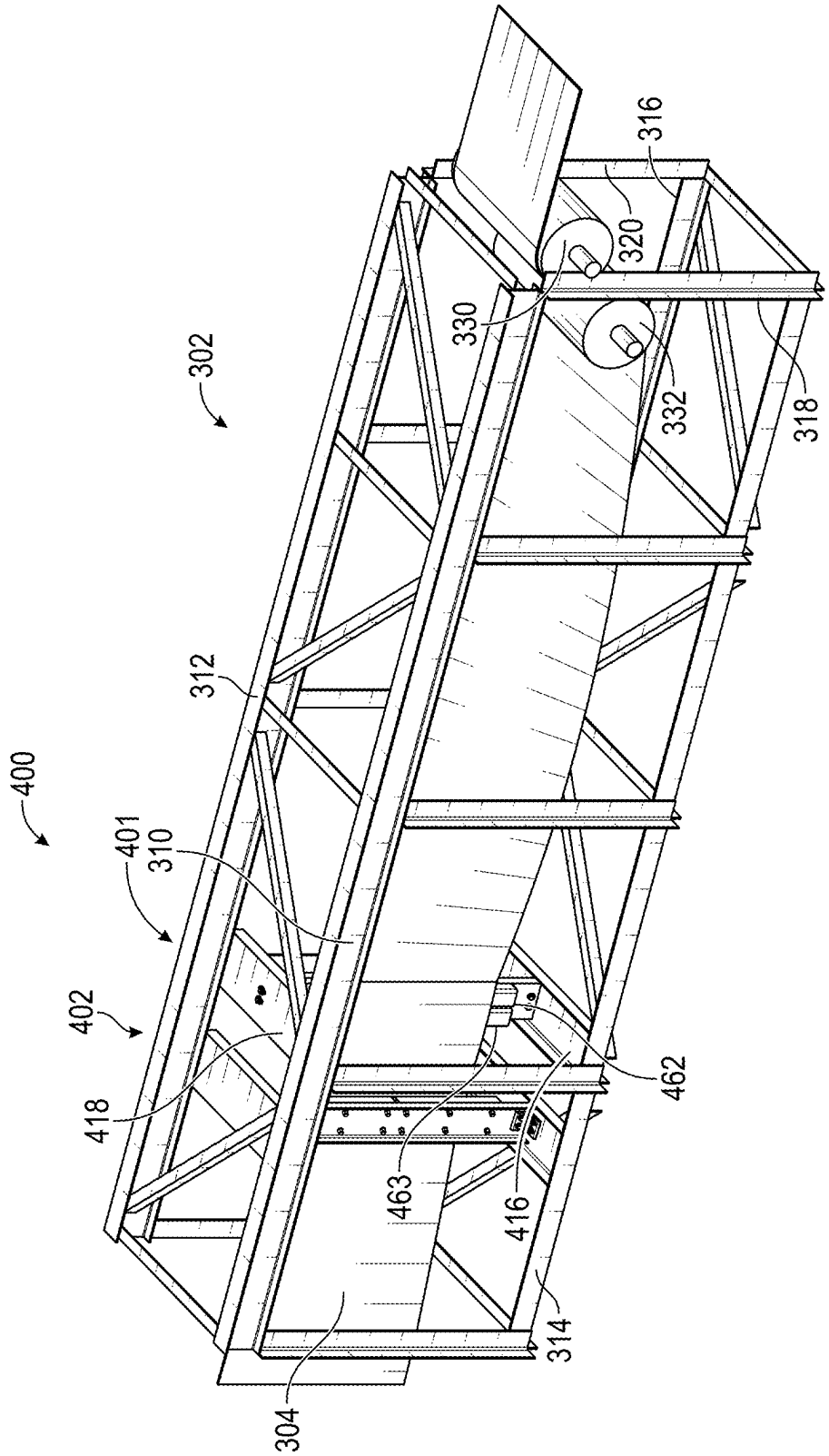

400
401
310
402
418
302
312
304
314
316
320
330
332
318
462
463
416

FIG. 6

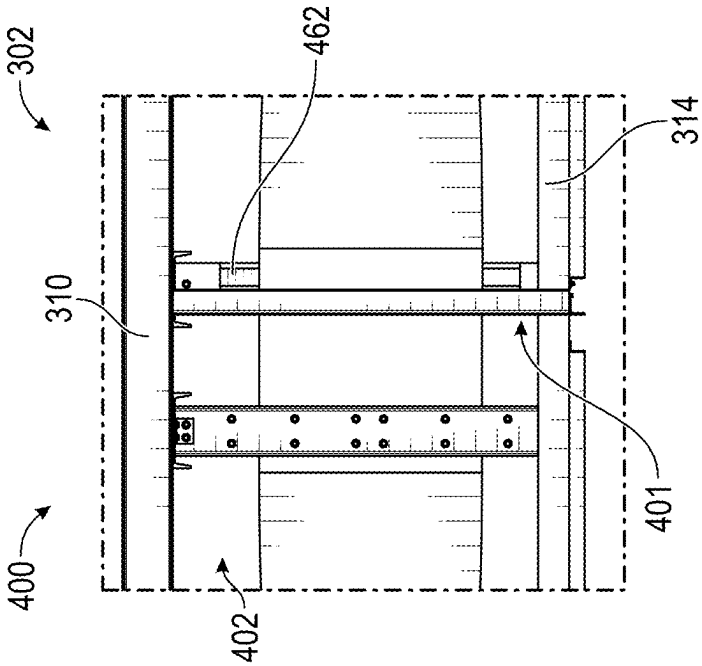


FIG. 8

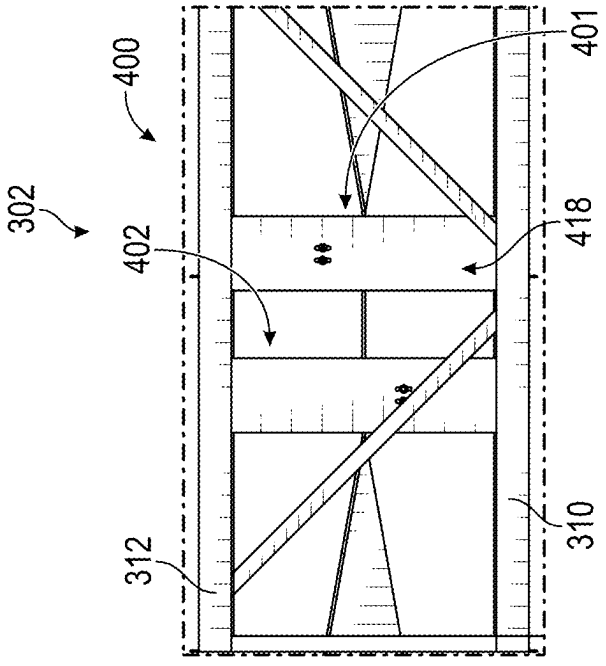


FIG. 7

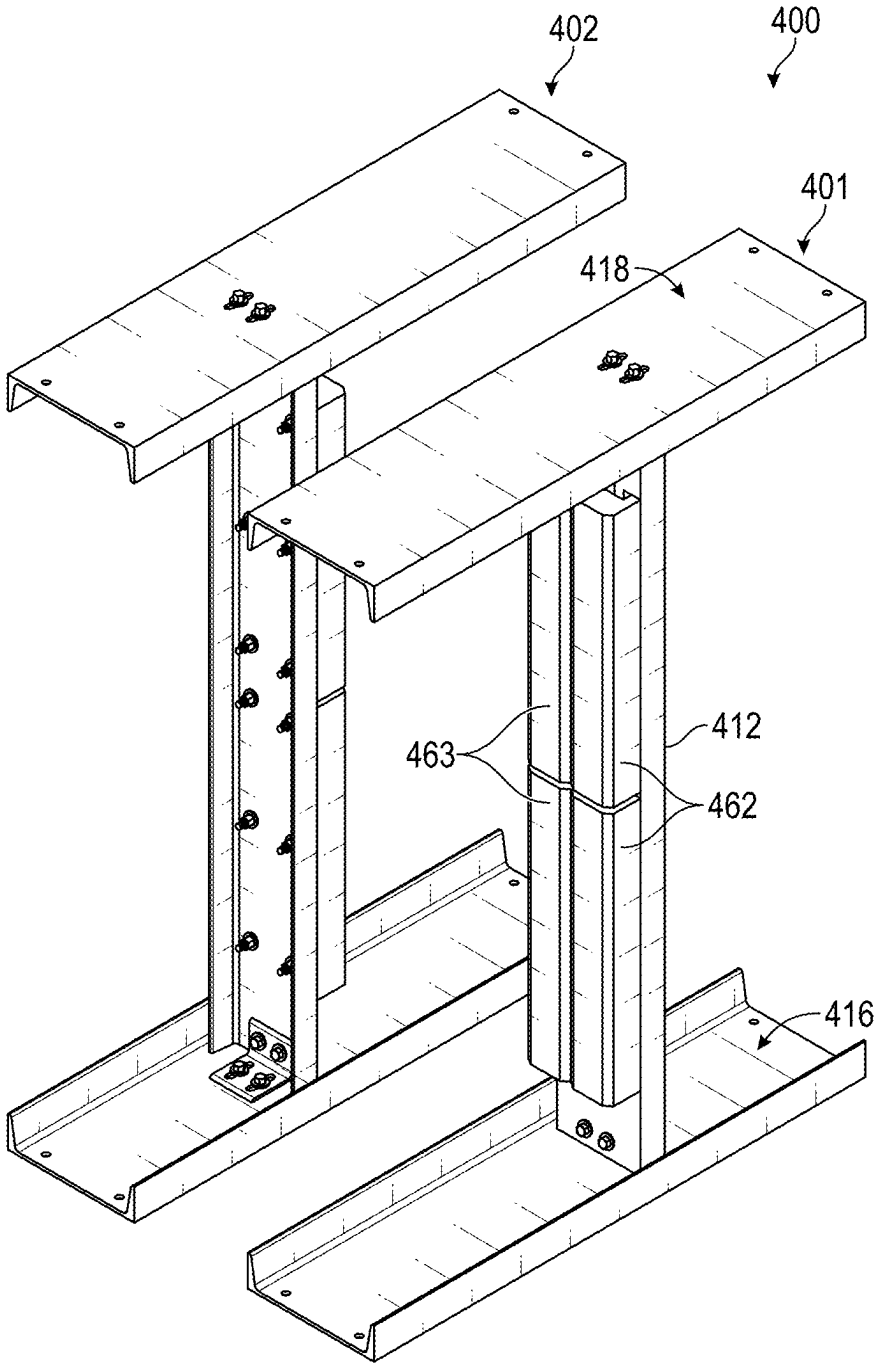


FIG. 9A

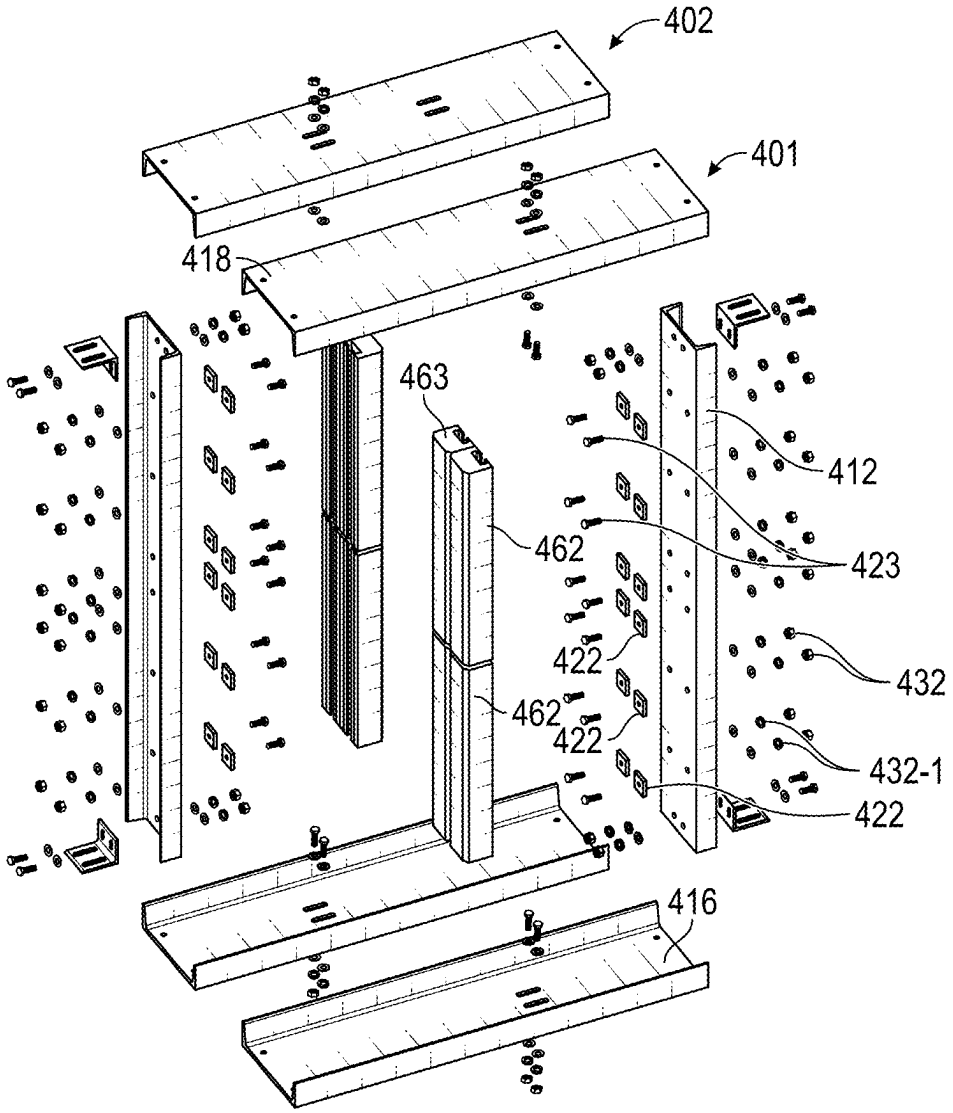


FIG. 9B

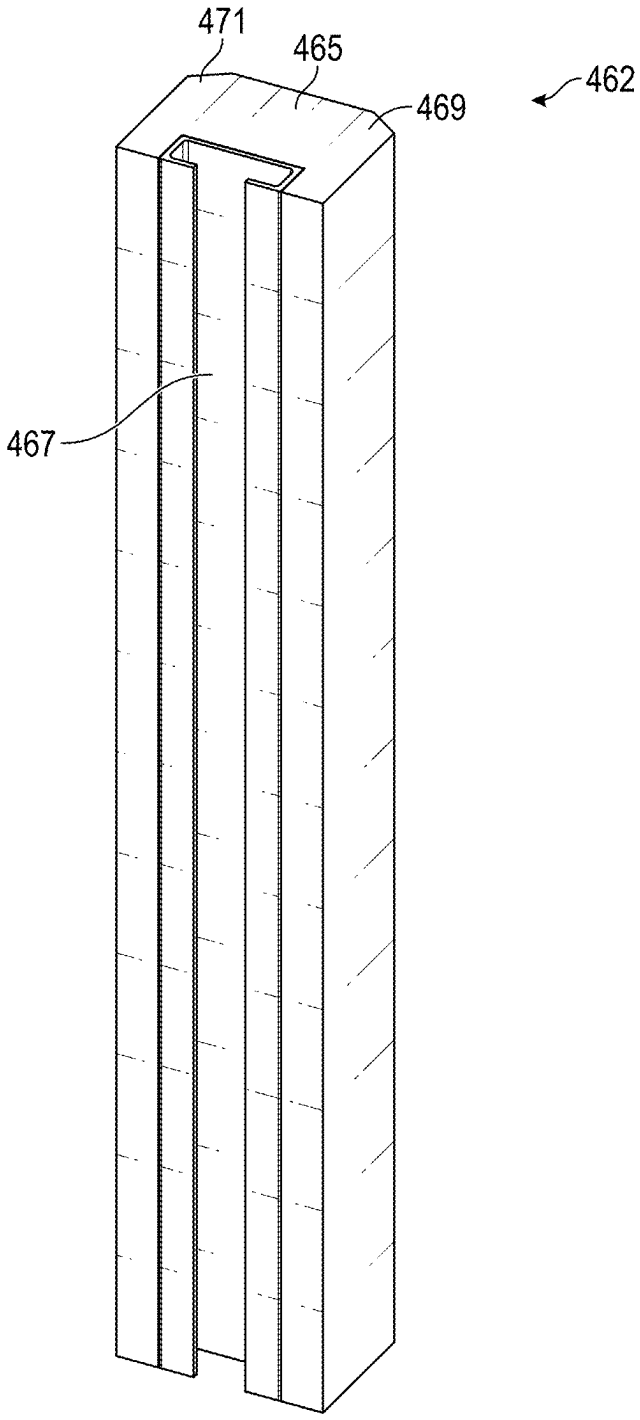


FIG. 10

CONVEYOR SYSTEM, BELT TURN OVER SYSTEM AND DIRECTING ASSEMBLY THEREFOR, AND ASSOCIATED METHOD OF TURNING OVER A CONVEYOR BELT

CROSS REFERENCE TO RELATED APPLICATION

[0001] This application claims priority to and claims the benefit of U.S. Provisional Patent Application Ser. No. 63/555,116, filed Feb. 19, 2024, the contents of which are incorporated herein by reference in their entirety.

BACKGROUND

[0002] For over one hundred years, conveyor systems have been a reliable and economical way to move ore, coal, and large numbers of other materials. As a result, conveyor systems are at the core of a large number of operations. However, known conveyor systems have a number of drawbacks. For example, a portion of one prior art conveyor system **2** is shown in FIG. **1**A. As shown, the system **2** employs a number of bend pulleys **10**, **12** along the length of a conveyor belt **4**, and also employs a number of bearings **20**,**22** for each of the bend pulleys **10**, **12**. This assembly is often employed to turn over the conveyor belt **4** in operation, and commonly takes significant force in order to maneuver the conveyor belt **4**. Furthermore, this setup is undesirably configured such that the pressure distribution on the length of the bend pulleys **10**, **12** tends to cause uneven wear on the bend pulleys **10**, **12**. As a result, this causes premature replacement and significant costs (e.g., due to down time) to be incurred to remove and replace what is a very large and heavy piece of equipment. For example, such equipment tends to be in difficult to get to locations, in terms of geography, structural complexities, and custom mounting requirements per installation. The adverse pressure associated with the bend pulleys **10**, **12** along the length of the conveyor belt **4** also has an impact on the life of the bearings **20**,**22**, which causes the same problems as mentioned above.

[0003] It is with respect to these and other considerations that the instant disclosure is concerned.

SUMMARY

[0004] As one aspect of the disclosed, a directing assembly of a belt turn over system is for use in a conveyor system. The conveyor system includes a conveyor belt and a plurality of support members. The conveyor belt is configured to move from a first location of the conveyor system to a second location thereof. The directing assembly includes a channel member structured to be coupled to at least one of the plurality of support members, and a plurality of directing members each removably coupled to the channel member and configured to be in a static state with respect to the channel member when the conveyor belt moves from the first location to the second location. The directing members are configured to engage the conveyor belt as the conveyor belt moves from the first location to the second location in order to turn over the conveyor belt.

[0005] As another aspect, a belt turn over system including the aforementioned directing assembly is provided.

[0006] As yet another aspect of the disclosed concept, a conveyor system including the aforementioned belt turn over system is provided.

[0007] As a further aspect of the disclosed concept, a method of turning over a conveyor belt with the aforementioned belt turn over system is provided.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIG. **1**A is an isometric view of a portion of a prior art conveyor system.

[0009] FIG. **1**B is an isometric view of a portion of a conveyor system, in accordance with one non-limiting embodiment of the disclosed concept.

[0010] FIGS. **2**-**4** are top, front, and side views, respectively, of portions of the conveyor system of FIG. **1**B.

[0011] FIGS. **5**A and **5**B are exploded isometric and exploded front views, respectively, of a belt turn over system for the conveyor system of FIG. **1**B.

[0012] FIG. **6** is an isometric view of a portion of another conveyor system, in accordance with another non-limiting embodiment of the disclosed concept.

[0013] FIGS. **7** and **8** are top and side views, respectively, of portions of the conveyor system of FIG. **6**.

[0014] FIGS. **9**A and **9**B are front isometric and exploded front isometric views, respectively, of a belt turn over system for use in the conveyor system of FIGS. **6**-**8**, in accordance with another non-limiting embodiment of the disclosed concept.

[0015] FIG. **10** is an isometric view of a directing member for the belt turn over system of FIGS. **9**A and **9**B.

DETAILED DESCRIPTION

[0016] As employed herein, the term "system" shall mean a single assembly or multiple assemblies configured to be connected together via intermediate components, such as support members of a conveyor system.

[0017] As employed herein, the term "coupled" shall mean connected together either directly or via one or more intermediate parts or components.

[0018] As employed herein, the term "coupling member" shall mean a wide variety of fastening mechanisms, including without limitation, bolts, nuts, screws, rivets, pull pins, zip ties, and the like.

[0019] As employed herein, the term "number" shall mean one or an integer greater than one (i.e., a plurality).

[0020] As employed herein, an "exiting position" with respect to a pair of bend pulleys shall mean an orientation of a conveyor belt as the conveyor belt is initially passing beyond engagement with the bend pulleys.

[0021] FIGS. **1**B-**4** show various views of a portion of a conveyor system **102**, shown as employed with a portion of a conveyor belt **104**, in accordance with one non-limiting embodiment of the disclosed concept. It will be appreciated that the portion depicted in FIGS. **1**B-**4** may be near the head end of the conveyor system **102**, such that a corresponding tail end (not shown) of the conveyor system **102** may be similarly structured, e.g., include a belt turn over system the same as or substantially the same as that discussed below in association with the head end of the conveyor system **102**. The conveyor system **102** includes a number of support members **110**, **112**, **114**, **116**, **118**, **120** which cooperatively define a conveyor truss, as well as a pair of bend pulleys **130**, **132** each coupled to a corresponding pair of the support members **118**, **120**. For example, the first, second, third, and fourth support members **110**, **112**, **114**, **116** are each oriented parallel to one another, and the fifth and sixth support

members **118**, **120** are each oriented perpendicular to each of the first, second, third, and fourth support members **110**, **112**, **114**, **116**.

[0022] Additionally, as shown, the conveyor system **102** further includes a belt turn over system **200** (see also FIGS. **5**A and **5**B, for a detailed view) configured to turn or flip the conveyor belt **104** from a first orientation (e.g., right side up) to a second orientation (e.g., upside down) as the conveyor belt **104** moves from a first location of the conveyor system **102** to a second location thereof (e.g., wherein the first and second locations are ends of the conveyor truss defined by the support members **110**, **112**, **114**, **116**, **118**, **120**). As such, it will be appreciated that the conveyor belt **104** may enter the portion of the conveyor system **102** in the first orientation, be turned by the belt turn over system **200**, and exit the portion of the conveyor system **102** via one of the bend pulleys **130**, **132**, before passing to another portion (not shown for ease of illustration) of the conveyor system **102**. Accordingly, the bend pulleys **130**, **132** direct the conveyor belt **104** after the conveyor belt **104** has been turned over by the belt turn over system **200**.

[0023] The belt turn over system **200**, which may be employed as a static system (e.g., no moving parts in operation), will now be discussed in association with the exploded isometric views of FIG. **5**A and FIG. **5**B. It will be appreciated in view of the following disclosure that the belt turn over system **200** advantageously allows for individual portions to be removed and quickly replaced, as opposed to today's arrangements in which entire bend pulleys (e.g., the bend pulleys **10**, **12** in the prior art arrangement of FIG. **1**A) and associated bearings (e.g., the corresponding bearings **20**,**22**) need to be replaced due to uneven wear. By allowing for a directing assembly belt turn over system **200**, localized areas which have been worn can be quickly and easily replaced.

[0024] As shown in FIG. **5**A, the example belt turn over system **200** includes a plurality of elongated channel members **212**,**214**,**216**,**218** each structured to be coupled to at least one of the plurality of support members **110**, **112**, **114**, **116**, **118**, **120**. The first and second channel members **212**,**214** are oriented parallel to and spaced from one another in order to allow the conveyor belt **104** to properly pass therebetween. Moreover, the belt turn over system **200** further includes a plurality of maintaining members (only four of the maintaining members **222**,**224** are indicated on each side of the belt turn over system **200**, for ease of illustration and economy of disclosure), a plurality of coupling members (e.g., only a few coupling members in the form of nuts **232**,**234** and washers **232-1**,**234-1** are indicated on each side of the belt turn over system **200**), and a plurality of brackets **242**,**244** and a corresponding other plurality of coupling members (shown but not labeled) for coupling the channel members **212**,**214**,**216**,**218** together.

[0025] For example, the top brackets **242**,**244** preferably couple top portions of the vertical channel members **212**,**214** to the top channel member **218** (e.g., via coupling members), and the bottom brackets **242**,**244** preferably couple bottom portions of the vertical channel members **212**,**214** to the bottom channel member **216**, such that in operation there is zero and/or de minimis vibration between these components. Moreover, the bottom channel member **216** preferably extends from the third support member **114** (FIG. **1**B) to the fourth support member **116** (FIG. **1**B), and the top channel member **218** preferably extends from the first support member **110** (FIG. **1**B) to the second support member **112** (FIG. **1**B).

[0026] Additionally, as shown in FIG. **1**B, in one example the top channel member **218** extends across and is coupled to the top support members **110**, **112** of the portion of the conveyor system **102**, and the bottom channel member **216** extends across and is coupled to the bottom support members **114**, **116**, in order to position the belt turn over system **200** within the portion of the conveyor system **102**. Put differently, the bottom and top channel members **216**,**218** are each coupled to and oriented perpendicular with respect to the first and second channel members **212**,**214**, and are configured to be oriented perpendicular to the conveyor belt **104** when the conveyor belt **104** is received between the channel members **212**,**214** (e.g., and also directing members **262**,**264**, discussed below).

[0027] Referring again to FIG. **5**A, in accordance with one non-limiting embodiment of the disclosed concept, the belt turn over system **200** further includes a plurality of directing members **262**,**264**. The directing members **262**,**264** may be made of polycarbonate materials, poly-slide with fiberglass, monomeric and/or polymeric materials, urethane materials, ceramic materials, and metallic materials. The directing members **262**,**264**, as shown in FIG. **5**A, may include planar engaging faces with rounded corners for engaging the conveyor belt **104**.

[0028] In one example, the directing members **262**,**264** are removably coupled to the channel members **212**,**214** and are configured to receive the conveyor belt **104** therebetween and turn over the conveyor belt **104** as the conveyor belt **104** moves from the first location to the second location (e.g., ends of the conveyor truss). Thus, when the conveyor belt **104** is located between the directing members **262**,**264**, the conveyor belt **104** is in a first orientation, and when the conveyor belt **104** is in an exiting position with respect to the bend pulleys **130**, **132**, the conveyor belt **104** is in a second orientation perpendicular to the first orientation.

[0029] Moreover, responsive to the conveyor belt **104** moving from the first to second location (e.g., ends of the conveyor truss), the directing members **262**,**264** are each in a static state (e.g., they do not move) with respect to the plurality of channel members **212**,**214**,**216**,**218**. Furthermore, the removable coupling is preferably facilitated via the maintaining members **222**,**224** and the coupling members **232**,**234**. For example, the maintaining members **222**, **224** preferably each include a base portion (one rectangular-shaped base portion **222-1** is labeled in FIG. **5**A) and a stem portion (one stem portion **222-2** is labeled in FIG. **5**A) extending outwardly therefrom (e.g., perpendicularly therefrom). In one example, the stem portion **222-2** may extend through the channel member **212** and be secured thereto via the coupling members **232**,**232-1** that are coupled to the stem portion **222-2**. This securement may be in a threaded manner. Additionally, the maintaining members **224** are configured to likewise be secured to the channel member **214** via the coupling members **234**,**234-1** coupled to corresponding stem portions on outside portions of the channel member **214**. Moreover, as shown in FIGS. **5**A and **5**B, the coupling members **232**,**232-1** and the base portions **222** are located on opposing sides of the first channel member **212**, and the coupling members and base portions associated with the second directing members are located on opposing sides of the second channel member **214**.

[0030] With the stem portions **222-2** loosely coupled to the coupling members **232**,**234** and extending through the channel members **212**,**214**, the directing members **262**,**264**, which are configured to receive and direct the conveyor belt **104** (FIG. **1**B) can be positioned on the base portions **222-1**. That is, the directing members **262**,**264** may each have, in one example, a partially C-shaped cross section which is configured to receive the stem portions **222-2**, but have a narrow enough opening that the base portions **222-1** of the maintaining members **222**,**224** are reliably maintaining therein. Accordingly, once the directing members **262**,**264** are provided with the base portions **222-1** in an interior manner (e.g., within ends of the C-shaped cross section), subsequent tightening of the coupling members **232**,**232-1**, **234**,**234-1** pulls the directing members **262**,**264** toward the channel members **212**,**214**. Additionally, as shown in FIG. **5**A, it will be appreciated that the belt turn over system **200** is advantageously provided with two of the maintaining members **222**,**224** for each one of the directing members **262**,**264**, thereby allowing increased stability of the directing members **262**,**264** during operation. However, suitable alternative belt turn over system configurations are contemplated (e.g., a single larger maintaining member being provided for each one of the directing members **262**,**264**).

[0031] In this manner, the belt turn over system **200** is configured to reliably turn or flip the conveyor belt **104** (FIG. **1**B). That is, the conveyor belt **104** can pass between and be directed by the directing members **262**,**264**. See, for example, FIG. **1**B which shows the conveyor belt **104** being passed between the directing members **262**,**264**, before being straightened out by either of the bend pulleys **130**, **132**. In accordance with one advantageous aspect of the disclosed concept, the belt turn over system **200**, unlike known assemblies (e.g., the system **2** in FIG. **1**A) which commonly rely on bend pulleys to turn a conveyor belt, is configured to provide a number of advantages to users.

[0032] For example, as stated above, the directing members **262**,**264** are preferably removably coupled to the channel members **212**,**214** via the coupling members **232**,**234** and the maintaining members **222**,**224**. As a result, if during operation of the conveyor system **102** (FIG. **1**B), a user notices that any one of the plurality of directing members **262**,**264** is worn out from engagement with the conveyor belt **104** or another conveyor belt, the user need not spend large amounts of capital and time to replace the entire belt turn over system **200**. Rather, all the user need do is remove the individual one of the directing members **262**,**264** which is worn out, and re-couple another new directing member. This may be done by loosening the coupling members **232**,**234**, which may be nuts, and/or by pulling a pin (not shown).

[0033] Compare this with known assemblies which employ bend pulleys, wherein the entire bend pulley, e.g., bend pulleys **10**, **12** in FIG. **1**A, and/or associated bearings, e.g., bearings **20**,**22** in FIG. **1**A, typically needs to be replaced from the uneven wear, a situation which typically requires large numbers of hours, cranes, and multiple men to perform such a job. Put another way, the disclosed belt turn over system **200** is uniquely tailored for scenarios in which uneven wear due to a conveyor belt might result, specifically because that uneven wear can be accommodated by simply replacing the directing member of the system that is most worn out (e.g., not an entire bend pulley and associated bearings). This process of replacing a single directing member **262**,**264** can be done relatively easily when the conveyor system **102** (FIG. **1**B) is shut down and locked out via less than 15 minutes of labor by a single person. Furthermore, the cost of replacing the individual directing member **262**,**264** is a small fraction of the costs associated with replacing a bend pulley under the same wear pattern.

[0034] Although the disclosed concept has been described in association with the belt turn over system **200**, it will be appreciated that suitable alternative belt turn over assemblies (not shown) are contemplated. For example, a suitable alternative belt turn over system (not shown) may employ directing members positioned horizontally on top of each other rather than in the vertical orientation shown in FIG. **5**A, without departing from the disclosed concept. In another suitable example, a plurality (e.g., 5) of individual and relatively small bend pulleys might be removably coupled to each of the channel members **212**,**214**, said bend pulleys being configured to receive the conveyor belt **104** therebetween in a non-static manner, and each be replaceable in a similar manner as the directing members **262**,**264**. Moreover, in a suitable alternative belt turn over system, biasing elements such as springs could be associated with (e.g., engage or indirectly apply a bias thereto) the directing members **262**,**264** in order to automatically adjust the belt turn over system **200** to a varying pressure with respect to the conveyor belt **104**. The biasing elements preferably allow a tension level of the conveyor belt **104** to be adjusted.

[0035] Accordingly, the above disclosed belt turn over system **200** can be understood as comprising first and second directing assemblies **201**,**202** (FIG. **5**A), wherein the two directing assemblies **201**,**202** each respectively include the first and second channel members **212**,**214**, the first and second pluralities of directing members **262**,**264**, and associated coupling members. Furthermore, the first and second directing assemblies **201**,**202** can be understood as sharing the common top and bottom channel members **216**,**218** in order to be mounted within the conveyor system **102**.

[0036] FIGS. **6**-**10** show another conveyor system **302** and belt turn over system **400** therefor, in accordance with another non-limiting embodiment of the disclosed concept. The conveyor system **302** is similar to the conveyor system **102** (FIG. **1**B), and like numbers represent like features (e.g., conveyor belt **304**, support members **310**,**312**,**314**,**316**,**318**, **320**, bend pulleys **330**,**332**). However, the belt turn over system **400**, which functions similar to the belt turn over system **200** (FIGS. **5**A and **5**B) has a pair of independently configured directing assemblies **401**,**402**.

[0037] As shown in FIGS. **9**A and **9**B, the directing assembly **401** of the belt turn over system **400** preferably includes a first channel member **412** configured to be coupled to at least one of the support members **310**,**312**, **314**,**316**,**318**,**320** of the conveyor system **302**, and second and third channel members **416**,**418** extending between and being coupled to top and bottom portions of the first channel member **412** (e.g., via top and bottom brackets and coupling members, shown in FIG. **9**B, but not labeled for ease of illustration and economy of disclosure). Additionally, the directing assembly **401** also includes a first plurality of directing members **462** and a second plurality of directing members **463** arranged next to and parallel to one another.

[0038] In this manner, the second and third channel members **416**,**418** mount the first directing assembly **401** in the conveyor system **302** independently of the second directing assembly **402**. Further, the second directing assembly **402**

also has second and third channel members configured the same as the channel members **416**,**418**, such that both directing assemblies **401**,**402** can be mounted at different locations from one another within the conveyor system **302**. That is, if an operator desires, he or she can mount the first directing assembly **401** at a first location in the conveyor system **302** with respect to the second directing assembly **402**, and also mount the first directing assembly **401** at a second, differently spaced apart location with respect to the second directing assembly **402**. The conveyor system **400** is thus versatile, and allows users to modularly turn over the conveyor belt **304**.

[0039] Moreover, the channel members **416**,**418**, as well as the same channel members of the second directing assembly **402**, are configured to be oriented perpendicular to the conveyor belt **304** when the conveyor belt **304** is received between the directing members **462**,**463** of the first directing assembly **401** and the directing members (shown but not labeled) of the second directing assembly **402**. Further, as shown in FIG. **6**, the top channel member **418** extends from the first support member **310** to the second support member **312**, and the bottom channel member **416** extends from the third support member **314** to the fourth support member **316**. The channel members of the second directing assembly **402** are similarly configured with respect to the support members **310**,**312**,**314**,**316**.

[0040] Referring to FIG. **9**B, the directing members **462**, **463** are removably coupled to the first channel member **412**, like the directing members **262**,**264** (discussed above). As such, the directing members **462**,**463** are configured to be in a static state with respect to the first channel member **412** when the conveyor belt **304** moves from a first location to a second location of the conveyor system **302**. Additionally, the directing members **462**,**463** are configured to engage the conveyor belt **304** as the conveyor belt **304** moves from the first location to the second location in order to turn over the conveyor belt **304**.

[0041] However, unlike the first and second directing assemblies **201**,**202** of the belt turn over system **200** (FIGS. **5**A and **5**B), the first and second directing assemblies **401**,**402** are in a staggered relationship with respect to each other, as shown in FIG. **6**, such that as the conveyor belt **304** moves from the first location to the second location, the conveyor belt **304** engages the directing members of one of the directing assemblies **401**,**402** before engaging the directing members of the other of the directing assemblies **401**, **402**. In this manner, operators are able to have versatility in properly turning over the conveyor belt **304**.

[0042] Regarding coupling, the directing members **462**, **463** and the directing members of the second directing assembly **402**, are preferably coupled to the corresponding channel members **412** similar to the belt turn over system **200**. Specifically, the directing assembly **401** preferably including a plurality of maintaining members **422** each configured to be received within the directing members **462**,**463**, as well as coupling members (e.g., bolts) **423** which extend through the directing members **462**,**463** and the first channel member **412**, as well as securing members (e.g., nuts and washers) **432**,**432-1** which are located on an opposing side of the first channel member **412** from the maintaining members **422**, and which secure the directing members **462**,**463** to the first channel member **412** (e.g., via the coupling members **423**).

[0043] FIG. **10** shows an isometric view of one of the directing members **462**, which may be the same as any of the other directing members **262**,**264**,**463**. As shown, the directing member **462** includes a body **465** and a receiving member **467** associated with (e.g., coupled to, provided as integral therewith (e.g., two portions of the same component)) the body **465**. In one example, the maintaining members **422** are each received within the receiving member **467** in order to removably couple the directing members **462**,**463** to the first channel member **412**. Continuing to refer to FIG. **10**, the receiving member **467** is preferably C-shaped in order to prevent the maintaining members **422** from being pulled out of the directing members **462**,**463**. Furthermore, the body **465** preferably has at least one bevel portion **469**,**471** at an end. The bevel portions **469**,**471** are configured to indicate a wear level of the directing member **462** responsive to engagement with the conveyor belt.

[0044] It will therefore be appreciated that a method of turning over the conveyor belts **104**,**304** include the steps of providing the conveyor systems **102**,**302** with the conveyor belts **104**,**304**, the belt turn over systems **200**,**400**, and the support members **110**, **112**, **114**, **116**, **118**, **120**,**310**,**312**, **314**,**316**,**318**,**320**; providing the belt turn over systems **200**, **400** with the first and second directing assemblies **201**,**202**, **401**,**402**, moving the conveyor belts **104**,**304** from a first location of the conveyor systems **102**,**302** to a second location thereof; maintaining the directing members **262**, **264**,**462**,**463** in a static state with respect to the first and second channel members **212**,**214**,**412** as the conveyor belts **104**,**304** move from the first location to the second location; and receiving the conveyor belts **104**,**304** between the directing members **262**,**264**,**462**,**463** in order to turn over the conveyor belts **104**,**304** as the conveyor belts **104**,**304** move from the first location to the second location.

[0045] While the present disclosure has been described with reference to various implementations, it will be understood that these implementations are illustrative and that the scope of the disclosure is not limited to them. Many variations, modifications, additions, and improvements are possible. More generally, implementations in accordance with the present disclosure have been described in the context of particular implementations. Functionality can be separated or combined in blocks differently in various implementations of the disclosure or described with different terminology. These and other variations, modifications, additions, and improvements can fall within the scope of the disclosure as defined in the claims that follow.

What is claimed is:

1. A directing assembly of a belt turn over system for use in a conveyor system, the conveyor system comprising a conveyor belt and a plurality of support members, the conveyor belt configured to move from a first location of the conveyor system to a second location thereof, the directing assembly comprising:

a channel member structured to be coupled to at least one of the plurality of support members; and

a plurality of directing members each removably coupled to the channel member and configured to be in a static state with respect to the channel member when the conveyor belt moves from the first location to the second location,

wherein the plurality of directing members are configured to engage the conveyor belt as the conveyor belt moves

from the first location to the second location in order to turn over the conveyor belt.

2. The directing assembly according to claim **1**, further comprising a plurality of maintaining members, wherein each of the plurality of directing members comprises a body and a receiving member associated with the body, and wherein the plurality of maintaining members are each received within the receiving member of a corresponding one of the plurality of directing members in order to removably couple the plurality of directing members to the channel member.

3. The directing assembly according to claim **2**, further comprising a plurality of securing members each securing the plurality of maintaining members to the first channel member, and wherein the plurality of maintaining members and the plurality of securing members are each disposed on opposing sides of the first channel member.

4. The directing assembly according to claim **3**, wherein the channel member is a first channel member, wherein the directing assembly further comprises a second channel member and a third channel member, wherein the first channel member is coupled to and extends between each of the second and third channel members, and wherein the second and third channel members are each structured to be coupled to and extend between a top and bottom pair of the plurality of support members, respectively, in order to support the directing assembly in the conveyor system.

5. The directing assembly according to claim **3**, wherein the plurality of directing members is a first plurality of directing members, wherein the directing assembly further comprises a second plurality of directing members each removably coupled to the channel member, and wherein the first plurality of directing members and the second plurality of directing members are oriented parallel to each other.

6. The directing assembly according to claim **3**, wherein the receiving member is C-shaped in order to prevent the plurality of maintaining members from being pulled out of the plurality of directing members.

7. The directing assembly according to claim **3**, wherein each corresponding body has at least one bevel portion at an end thereof, and wherein the at least one bevel portion is configured to indicate a wear level of the corresponding one of the plurality of directing members responsive to engagement with the conveyor belt.

8. A belt turn over system for a conveyor system, the conveyor system comprising a conveyor belt and a plurality of support members, the conveyor belt configured to move from a first location of the conveyor system to a second location thereof, the belt turn over system comprising:

a first directing assembly, comprising:

a first channel member structured to be coupled to at least one of the plurality of support members, and

a first plurality of directing members each removably coupled to the first channel member and configured to be in a static state with respect to the first channel member when the conveyor belt moves from the first location to the second location; and

a second directing assembly, comprising:

a second channel member structured to be coupled to the at least one of the plurality of support members, and

a second plurality of directing members each removably coupled to the second channel member and configured to be in a static state with respect to the first channel member when the conveyor belt moves from the first location to the second location,

wherein the first plurality of directing members and the second plurality of directing members are configured to receive the conveyor belt therebetween and turn over the conveyor belt as the conveyor belt moves from the first location to the second location.

9. The belt turn over system according to claim **8**, wherein the first directing assembly further comprises a third channel member and a fourth channel member, wherein the second directing assembly further comprises a fifth channel member and a sixth channel member, wherein the third and fourth channel members are each coupled to and oriented perpendicular with respect to the first channel member, wherein the fifth and sixth channel members are each coupled to and oriented perpendicular with respect to the second channel member, and wherein the third, fourth, fifth and sixth channel members are configured to be oriented perpendicular to the conveyor belt when the conveyor belt is received between the first plurality of directing members and the second plurality of directing members.

10. The belt turn over system according to claim **9**, wherein the first and second directing assemblies are in a staggered relationship with respect to each other such that as the conveyor belt moves from the first location to the second location, the conveyor belt engages the first plurality of directing members before the second plurality of directing members.

11. The belt turn over system according to claim **9**, wherein the first directing assembly comprises a first top bracket and a first bottom bracket, wherein the second directing assembly comprises a second top bracket and a second bottom bracket, wherein the first and second top brackets couple the third and fifth channel members to top portions of the first and second channel members, respectively, and wherein the first and second bottom brackets couple the fourth and sixth channel members to bottom portions of the first and second channel members, respectively.

12. The belt turn over system according to claim **8**, wherein the first directing assembly further comprises a first plurality of maintaining members, wherein the second directing assembly further comprises a second plurality of maintaining members, wherein the first and second pluralities of maintaining members are each received within a corresponding one of the first and second plurality of directing members, wherein the first plurality of maintaining members and the second plurality of maintaining members are each configured to removably couple the corresponding one of the first and second plurality of directing members to the corresponding one of the first and second channel members.

13. The belt turn over system according to claim **12**, wherein each of the first plurality of directing members and the second plurality of directing members comprises a body and a receiving member associated with the body, and wherein the first plurality of maintaining members and the second plurality of maintaining members are each received within the receiving member of a corresponding one of the first plurality of directing members and the second plurality of directing members.

14. The belt turn over system according to claim **13**, wherein the first directing assembly further comprises a third plurality of maintaining members, wherein the second

directing assembly further comprises a fourth plurality of maintaining members, wherein the third plurality of maintaining members and the fourth plurality of maintaining members are each received within the receiving members of the corresponding one of the first plurality of directing members and the second plurality of directing members in order to removably couple the first plurality of directing members and the second plurality of directing members to the corresponding first and second channel members.

15. A conveyor system, comprising:

a conveyor belt configured to move from a first location of the conveyor system to a second location thereof;

a plurality of support members; and

a belt turn over system comprising:

a first directing assembly, comprising:

a first channel member coupled to at least one of the plurality of support members, and

a first plurality of directing members each removably coupled to the first channel member and configured to be in a static state with respect to the first channel member when the conveyor belt moves from the first location to the second location; and

a second directing assembly, comprising:

a second channel member coupled to the at least one of the plurality of support members, and

a second plurality of directing members each removably coupled to the second channel member and configured to be in a static state with respect to the first channel member when the conveyor belt moves from the first location to the second location,

wherein the first plurality of directing members and the second plurality of directing members are configured to receive the conveyor belt therebetween and turn over the conveyor belt as the conveyor belt moves from the first location to the second location.

16. The conveyor system according to claim **15**, wherein the plurality of support members comprises a first support member, a second support member, a third support member, and a fourth support member, wherein the first directing assembly further comprises a third channel member and a fourth channel member, wherein the second directing assembly further comprises a fifth channel member and a sixth channel member, wherein the third and fourth channel members are each coupled to the first channel member, wherein the fifth and sixth channel members are each coupled to the second channel member, wherein the third, fourth, fifth and sixth channel members are configured to be oriented perpendicular to the conveyor belt when the conveyor belt is received between the first plurality of directing members and the second plurality of directing members, wherein the third and fifth channel members extend from the first support member to the second support member, and wherein the fourth and sixth channel members extend from the third support member to the fourth support member.

17. The conveyor system according to claim **16**, wherein the first and second directing assemblies are in a staggered relationship with respect to each other such that as the conveyor belt moves from the first location to the second location, the conveyor belt engages the first plurality of directing members before the second plurality of directing members.

18. The conveyor system according to claim **15**, further comprising a pair of bend pulleys, wherein the plurality of support members comprises a first support member, a second support member, a third support member, a fourth support member, a fifth support member and a sixth support member, wherein each of the fifth and sixth support members is oriented perpendicular to each of the first, second, third, and fourth support members, and wherein the pair of bend pulleys are each coupled to the fifth and sixth support members in order to direct the conveyor belt after the conveyor belt has been turned over by the belt turn over system.

19. The conveyor system according to claim **18**, wherein, when the conveyor belt is disposed between the first plurality of directing members and the second plurality of directing members, the conveyor belt is in a first orientation, and wherein, when the conveyor belt is in an exiting position with respect to the pair of bend pulleys, the conveyor belt is in a second orientation perpendicular to the first orientation.

20. A method of turning over a conveyor belt, comprising:

providing a conveyor system with the conveyor belt, a belt turn over system, and a plurality of support members;

providing the belt turn over system with a first directing assembly and a second directing assembly, the first directing assembly comprising a first channel member coupled to at least one of the plurality of support members, and a first plurality of directing members each removably coupled to the first channel member, the second directing assembly comprising a second channel member coupled to the at least one of the plurality of support members, and a second plurality of directing members each removably coupled to the second channel member;

moving the conveyor belt from a first location of the conveyor system to a second location thereof;

maintaining the first plurality of directing members and the second plurality of directing members in a static state with respect to the first and second channel members as the conveyor belt moves from the first location to the second location; and

receiving the conveyor belt between the first plurality of directing members and the second plurality of directing members in order to turn over the conveyor belt as the conveyor belt moves from the first location to the second location.

* * * * *