ROLLER CONVEYOR GAP BLOCKER

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of U.S. Provisional Patent Application No. 63/081,410, filed September 22, 2020, which is hereby incorporated by reference in its entirety herein.

FIELD

[0002] This disclosure relates to roller conveyors and, more specifically, to gap blockers that block gaps between rollers of roller conveyors.

BACKGROUND

[0003] Roller conveyors are used to transfer objects from one location to another, such as packages in a package distribution center and products in a manufacturing environment. Roller conveyors may utilize rollers that are rotatably supported at fixed positions. The rollers contact an object on the roller conveyor to transfer the object in a downstream direction along the roller conveyor. Roller conveyors have gaps between the rollers to permit the rollers to turn without contacting one another.

[0004] Occasionally, an item may fall through one of the gaps between rollers and into an underlying area. Objects that fall through the gaps between rollers may damage an underlying structure, such as jamming a belt that drives the rollers and associated mechanisms. As another example, a portion of an object such as a corner of a box may become lodged in a gap between rollers. These situations may adversely affect the operation of the roller conveyor and the surrounding environment.

SUMMARY

[0004a] According to a first aspect of the present invention, there is provided a gap blocker for a roller conveyor including rollers for conveying an object in a downstream longitudinal direction and a gap therebetween, the gap blocker comprising:

a body to be positioned in the gap between the rollers;

an upper blocking portion of the body to inhibit an object carried by the rollers from falling through the gap;

leg portions of the body connected to the upper blocking portion at longitudinally spaced apart locations so that the leg portions have a space therebetween extending in the longitudinal direction;

the leg portions having an initial, undeflected configuration with at least one of the leg portions having a first orientation relative to the upper blocking portion;

the leg portions of the body shiftable relative to one another to decrease a distance across the space between the leg portions to facilitate advancing the body into the gap;

the leg portions of the body having an operating configuration with the body in the gap, the at least one of the leg portions having the first orientation relative to the upper blocking portion with the leg portions in the operating configuration;

upper contact portions of the upper blocking portion and lower contact portions of the leg portions for contacting the rollers and supporting the body in the gap; and

outer surface portions of the body configured to be in clearance with the rollers with body in the gap and the leg portions in the operating configuration, the outer surface portions of the body intermediate the upper and lower contact portions along the rollers.

[0004b] According to a second aspect of the present invention, there is provided a gap blocker for a roller conveyor including rollers for conveying an object in a downstream longitudinal direction and a gap between the rollers, the gap blocker comprising:

a body to be positioned in the gap;

an upper blocking portion of the body having upstream and downstream contact portions configured to contact the rollers above a narrowest portion of the gap;

a resilient lower portion of the body having upstream and downstream lower protrusions for contacting the rollers, the resilient lower portion of the body having a deflected configuration wherein the resilient lower portion is narrower than the narrowest portion of the gap to permit the resilient lower portion of the body to be advanced through the narrowest portion of the gap and into an operative position below the narrowest portion of the gap;

the resilient lower portion of the body having an undeflected configuration wherein the upstream and downstream lower protrusions are below the narrowest portion of the gap; and

upstream and downstream clearance surface portions of the resilient lower portion of the body intermediate the upper blocking portion of the body and the upstream and downstream lower protrusions along a height of the body, the upstream and downstream surface portions of the resilient lower portion of the body configured to be in clearance with the rollers with the body in the operative position.

[0004c] According to a third aspect of the present invention, there is provided a roller conveyor comprising:

rollers rotatable to convey an object in a downstream, longitudinal direction, the rollers having outer diameters;

a gap between the rollers;

a drive member extending around the rollers to transfer rotation of one of the rollers to the other roller, the drive member having upper and lower portions extending across the gap spaced apart from one another, the drive member having a distance between the upper and lower portions of the drive member;

a gap blocker supported in the gap by the first and second rollers, the gap blocker having an upper blocking portion above a narrowest portion of the gap, a lower portion below the narrowest portion of the gap, and an intermediate portion extending in the narrowest portion of the gap;

the gap blocker having a height that is less than the outer diameter of either of the rollers and that is less than the distance between the upper and lower portions of the drive member so that the gap blocker is in clearance with the drive member.

[0004d] According to a fourth aspect of the present invention, there is provided a roller conveyor comprising:

upstream and downstream rollers, the upstream and downstream rollers having outer diameters;

a drive belt to contact the upstream and downstream rollers, the drive belt being movable to rotate the upstream and downstream rollers and cause the upstream and downstream rollers to convey the object in a downstream, longitudinal direction;

a gap between the upstream and downstream rollers;

a gap blocker supported in the gap by the upstream and downstream rollers, the gap blocker having an upper blocking portion above a narrowest portion of the gap, the gap blocker having a lower upstream member including an upstream free end portion to contact the upstream roller and a lower downstream member including a downstream free end portion to contact the downstream roller;

wherein the lower upstream member and the lower downstream member are shiftable toward each other relative to the upper blocking portion to a deflected configuration to facilitate removal of the gap blocker from the gap; and

wherein the gap blocker has a height that is less than the outer diameter of either of the upstream and downstream rollers so that the gap blocker is in clearance with the drive belt.

[0005] ~~In one aspect of the present disclosure, a~~A gap blocker is provided for a roller conveyor having rollers and a gap therebetween. The gap blocker includes a body to be positioned in the gap between the rollers, an upper blocking portion of the body to inhibit an object carried by the rollers from falling through the gap, and leg portions of the body

both of the rollers, the resilient lower portion returns the clearance surface portions into clearance with the rollers once the object has been conveyed downstream of the gap blocker.

[0012] ~~In another aspect of the present disclosure, a~~A roller conveyor is provided that includes rollers, a gap between the rollers, and a drive member extending around the rollers to transfer rotation of one of the rollers to the other roller. The drive member, such as an o-ring, has upper and lower portions or runs extending across the gap spaced apart from one another by a distance therebetween.

[0013] The roller conveyor further includes a gap blocker supported in the gap by the first and second rollers. The gap blocker has an upper blocking portion above a narrowest portion of the gap, a lower portion below the narrowest portion of the gap, and an intermediate portion extending in the narrowest portion of the gap. The gap blocker has a height that is less than the outer diameter of either of the rollers and that is less than the distance between the upper and lower portions of the drive member. The gap blocker may be in clearance with the drive member whether the gap blocker is installed with a portion of the gap blocker extending in an opening formed by the upper and lower portions of the drive member and the rollers or shifts laterally into the opening during roller conveyor operation. In this manner, the gap blocker protects the gap from a conveyed object falling therethrough while avoiding interference with the drive member rotating the rollers.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] FIG. 1 is a perspective view of a roller conveyor system including rollers that are turned by a drive belt to convey an object in a longitudinal, downstream direction and gap blockers extending laterally in gaps between the rollers;

[0015] FIG. 2 is a cross-sectional view taken across line 2-2 in FIG. 1 showing one of the gap blockers in a gap between upstream and downstream rollers, the gap blocker having an upper surface that is recessed from the tops of the rollers to facilitate movement of an object across the rollers without contacting the gap blocker;

[0016] FIG. 3 is an elevational view of the gap blocker of FIG. 2 showing an upper blocking portion and lower leg portions of the gap blocker;

[0017] FIG. 4 is a perspective view of the gap blocker of FIG. 3 showing a thicker