be difficult to both position a transfer plate in the gap and secure the transfer plate to the frame of the conveyor or other structures due to the close proximity of the conveying surfaces.

## Summary

**[0010]** There is disclosed a transfer guard member is provided having a body for being positioned in a gap intermediate conveying surfaces. The body has an upper portion for spanning a gap between adjacent conveying surfaces, such as a single conveyor belt or adjacent belts, pulleys, rollers, and the like. The body has outer portions of the upper body portion for slidingly engaging the conveying surfaces. The body has a pair of spaced, resilient legs having distal end portions for resiliently and slidingly engaging the conveying surfaces. The legs have outer curved surfaces spaced from the conveying surfaces and separating the outer portions of the upper body portion and the distal end portions of the legs along the conveying surfaces to permit movement of the legs in the gap. The resilient legs permit the upper body portion to have a controlled range of motion within the gap to accommodate variations in the conveying surfaces, contact from conveyed objects, and other loading while maintaining sliding engagement with the conveying surfaces during normal operations. Further, the outer portions of the upper body portion and the distal end portions of the spaced legs slidingly engage the conveying surfaces and maintain the transfer guard member in the gap such that the transfer guard member may be installed in the gap without requiring additional structure to maintain the transfer guard member in the gap. This enables a user to easily and quickly install one or more transfer guard members in the gap intermediate the conveying surfaces.

**[0011]** In one form, the body includes an intermediate stop portion spaced from one of the conveying surfaces for being shifted into engagement with the one conveying surface when the body upper portion shifts toward the one conveying surface. The upper body portion may shift toward the one conveying surface, for example, in response to a high wedge force being applied against an upstream one of the outer portions of the upper body portion. This permits the upstream outer portion to shift out of the path of an object, such as an imperfection in the upstream conveying surface, applying the high wedge force until the object can travel beyond the upstream outer portion. The intermediate stop portion controls the amount of movement of the upper body portion permitted within the gap that occurs when a high wedge force is applied to

the upper body portion. If the amount of movement of the upper body portion required to compensate for the high wedge force is beyond a predetermined position, the stop portion may operate with one of the conveying surfaces to eject the transfer guard member from the gap.

**[0012]** There is disclosed a transfer guard member is provided having a body for being positioned in a laterally extending gap between conveying surfaces. The body has at least one attachment member configured for being detachably fixed to a mounting bar and having an upper transfer surface. An outboard portion of the body extends longitudinally outward from the attachment member has an edge for being positioned at one of the conveying surfaces. The body has at least one recess adjacent the attachment member for receiving at least one attachment member of another transfer guard member fixed to the mounting bar so that the upper transfer surfaces of the attachment members are adjacent one another. A lateral width of the outboard portion is greater than a lateral width of the attachment member due to the at least one recess adjacent the at least one attachment member. In this manner, the upper transfer surfaces can support an item traveling over the transfer guard members and keep the item away from a seam or gap between the transfer guard members.

**[0013]** In one form, the at least one recess of the body extends laterally from the at least one attachment member. This permits the upper transfer surfaces to be laterally aligned with the transfer guard members fixed to the mounting bar. The lateral alignment supports an item traveling longitudinally along the transfer guard members and keeps the item from becoming lodged in the gap between the transfer guard members.

**[0014]** The body may also include at least one protrusion extending longitudinally outward from the attachment member. The least one protrusion is configured to interfere with the other transfer guard member fixed to the mounting bar and tightly engage the transfer guard members together on the mounting bar. The interference between the transfer guard members creates a clash therebetween and urges the transfer guard members apart. This clash ensures that the transfer guard members have a tight fit on the mounting bar which minimizes the gap therebetween and reduces the likelihood of an item becoming caught in the interface between the transfer guard members. In one form, the at least one protrusion extends outward from the attachment member adjacent the upper transfer surface and interferes with the other transfer guard member adjacent the upper transfer surface thereof. In this manner, there is a tight fit between the transfer guard members at the upper transfer surfaces thereof which minimizes the

gap between the transfer guard members adjacent the upper transfer surfaces which, in turn, reduces the likelihood of conveyed items becoming caught in the gap.

**[0015]** A transfer guard system is also provided having a mounting bar for extending laterally in a gap intermediate two conveying surfaces and a plurality of longitudinally aligned pairs of upstream and downstream transfer guard members for transferring objects in a longitudinal, downstream direction between the two conveying surfaces. Each pair of upstream and downstream transfer guard members have attachment members configured for detachably fixing the pair of upstream and downstream transfer guard members to the mounting bar. By utilizing longitudinally aligned pairs of upstream and downstream transfer guard members, a high-force impact that detaches an upstream transfer guard member may leave the downstream guard member in place and fixed to the mounting bar. In this manner, the downstream transfer guard member provides some transfer functionality despite the upstream transfer guard having been detached from the mounting bar.

**[0016]** The transfer guard system having pairs of upstream and downstream transfer guard members also provides improved flexibility for installing the transfer guard system. For example, at least one of the pairs of upstream and downstream transfer guard members may include upstream and downstream transfer guard members having different longitudinal lengths. This permits the mounting bar to be mounted off center between conveying surfaces which may be required by the surrounding structures, such as welds or supports of the conveyor system. Further, the plurality of aligned pairs of upstream and downstream transfer guard members may include a first pair of upstream and downstream members having a first longitudinal length and a second pair of upstream and downstream members having a second longitudinal length different than the first longitudinal length. By having pairs of upstream and downstream members with different longitudinal lengths, the transfer guard members may be individually tailored to a particular conveying system without needing to cut the transfer guard members to length as in some prior approaches. Further, the different length pairs of the upstream and downstream transfer guard members may permit the transfer guard system to transfer objects across gaps that vary in size such as due to turns in the conveyor belt system.

**[0017]** There is disclosed a transfer guard system is provided for conveying objects across a gap intermediate two conveying surfaces and bounded by a pair of guide surfaces that extend longitudinally along opposite lateral sides of the

members disposed between the pairs of legs of the other transfer guard member in a configuration resembling the interlocking teeth of a zipper. Such an offset configuration allows the spaced-apart legs for each transfer guard member have an identical size and configuration. Alternatively, the pairs of opposing legs could be configured such that the side surfaces of the transfer guard members are not aligned when the members are mounted end-to-end. Further, the transfer guard member could alternatively have a single pair of opposing legs.

**[0022]** The pairs of opposing legs may be spaced apart such that one of the pairs of spaced-apart legs of a longitudinally adjacent transfer guard member may interdigitate or nest in between the two pairs of legs of the other longitudinally adjacent transfer guard member to provide a substantially uninterrupted upper transfer surface spanning the gap between upstream and downstream conveying surfaces. The legs are spaced apart from one another to tightly fit the mounting member therebetween, and the legs may be formed to be resiliently flexible for being snap fit onto the mounting member. The pairs of legs each include an upstream leg and a downstream leg. The upstream and downstream legs extend laterally and are spaced longitudinally from each other in the belt travel direction so that the upstream leg bears tightly against the mounting bar keeping the transfer guard members fixed against longitudinal shifting in the downstream direction as products are conveyed over the upper surfaces thereof. However, when debris gets lodged between the upstream, receiving edge of one of the transfer guard members and the conveying surface, the resilient legs can resiliently deform to allow the transfer guard member to detach from the mounting bar before the conveying surface is damaged by the stuck debris.

**[0023]** The transfer guard members may be formed from a material presenting a surface with good abrasion resistance and a low coefficient of friction such as UHMW polyethylene, or the like. For transfer guard members that use a mounting member, the mounting member may be formed of a metal or like material providing high strength and durability.

**[0024]** In accordance with an aspect of the present invention, a transfer guard member is provided that includes a unitary, one-piece body for being positioned in a gap longitudinally between conveying surfaces. The body includes an upper transfer surface and a pair of lower resilient legs adapted to be directly detachably fixed to a mounting member. The upper transfer surface includes a plurality of protrusions arranged to contact an object being transferred across the upper transfer surface. The body includes a pair of pockets that receive walls of a mounting member with the legs being intermediate the pockets. Because the object contacts the protrusions, the

object contacts a smaller surface area of the transfer guard member than if the object were contacting a large planar upper surface of a transfer guard member. This reduces dynamic friction between the transfer guard member and the object. Reducing the dynamic friction reduces the frequency of objects getting slowed by the upper surface of the transfer guard member which can adversely affect object flow and spacing throughout an entire conveyor system.

**[0025]** In one form, the upper transfer surface includes an outer periphery and portions of protrusions at or adjacent the outer periphery. The portions of protrusions form protrusions with portions of protrusions of other transfer guard members when the transfer guard members are fixed to the mounting member. In this manner, the portions of the protrusions cooperate to form protrusions at a seam between the transfer guard members that keep an object from becoming caught in the seam between the transfer guard members.

**[0026]** The present invention also provides a transfer guard system for transferring objects across a gap intermediate two conveying surfaces. The transfer guard system includes a mounting member having a channel and a plurality of transfer guard members having upper transfer surfaces for transferring objects in a longitudinal, downstream direction between the two conveying surfaces. The transfer guard members further include lower legs configured to fit in the channel and detachably mount the transfer guard members to the mounting member. Because the transfer guard member lower legs fit in the channel of the mounting member, the connection between the transfer guard members and the mounting member fits within a compact envelope between the conveying surfaces. This makes the transfer guard system suitable for transferring objects across small gaps between conveying surfaces.

**[0027]** The mounting member may include outer upstream and downstream surfaces and the transfer guard members each include a brace member spaced from the lower legs of the transfer guard member. The brace member is configured to contact one of the outer upstream and downstream surfaces of the mounting member. In response to a heavy object transferring onto the upper transfer surface of one of the transfer guard members, the brace member of the transfer guard member can contact the one of the outer upstream and downstream surfaces of the mounting member to resist deflection of the transfer guard member.

**[0028]** There is disclosed a transfer system is provided for transferring objects in a longitudinal direction across a gap between conveying

## Claims

What is claimed is:

1. A transfer guard member comprising:

a unitary, one-piece body for being positioned in a gap longitudinally between conveying surfaces;

a pair of lower resilient legs of the body adapted to be directly detachably fixed to a mounting member;

an upper transfer surface of the body; and

a plurality of protrusions of the upper transfer surface arranged to contact an object being transferred across the upper transfer surface,

wherein the body includes a pair of pockets that receive walls of a mounting member with the legs being intermediate the pockets.

2. The transfer guard member of claim 1 wherein the upper transfer surface includes an outer periphery and portions of protrusions at or adjacent to the outer periphery that form protrusions with portions of protrusions of other transfer guard members when the transfer guard members are fixed to the mounting member.

3. The transfer guard member of claim 1 wherein the upper transfer surface includes an upper planar surface portion and a downwardly inclined tapered surface portion and the protrusions include protrusions upstanding from the downwardly inclined tapered surface portion having a maximum height greater than protrusions upstanding from the upper planar surface portion.

4. The transfer guard member of claim 1 wherein the protrusions are longitudinally elongated.

5. The transfer guard member of claim 1 wherein the protrusions each have a longitudinal length and a lateral width and at least one of the longitudinal length and the lateral width of the protrusions varies along the upper transfer surface.

6. The transfer guard member of claim 1 wherein the protrusions each have a maximum height and the maximum height of the protrusions varies along the upper surface.

7. The transfer guard member of claim 1 wherein the body is made of ultra-high molecular weight polyethylene material and the protrusions wear down with transferring of objects across the upper surface so that an operator can visually identify when the transfer guard member needs to be replaced.

8. The transfer guard member of claim 1 wherein the body includes an outboard portion extending longitudinally of the legs and a brace member depending from the outboard portion to contact the mounting member and resist deflection of the outboard portion.