CLEANING APPARATUS

CROSS-REFERENCE TO RELATED APPLICATION

[0001] The present application claims priority from United States Provisional Application Serial Number 61/495,469 entitled "CONTAINER CLEANING APPARATUS," filed on June 10, 2011, the entire disclosure of which is fully incorporated herein by reference.

BACKGROUND

[0002] Automated container filling systems, such as, for example, those used to fill containers with powdered products (e.g., infant formula), often generate and/or are exposed to dirt, debris, product residue, and other contaminants that can adhere to the outer surfaces of the container. These contaminants may affect adhesion of labels to the containers, and may affect product cleanliness. Known methods for removing such contaminants include the application of pressurized air or vacuum suction, or the placement of bristle brushes along the conveyor line to brush contaminants from a container as the container is conveyed through the system.

SUMMARY

[0003] The present application discloses exemplary embodiments of apparatuses, systems, and methods for cleaning an article, such as, for example, a container. In one embodiment, a cleaning apparatus includes a drive member that is powered to impart a forward motive force on the article and a wiper member that is powered to impart a wiping force on the article.

[0004] ~~Accordingly, in an exemplary embodiment, an apparatus for cleaning an article includes a drive belt and a wiper belt. The drive belt defines a first article engaging surface substantially parallel to a second article engaging surface of the apparatus and positioned to receive the article between the first and second article engaging surfaces. The drive belt is powered to move in a first direction such that the first article engaging surface imparts a forward motive force on a side wall of the article. The wiper belt defines an article wiping surface positioned to contact the article, the wiper belt being powered to move in a second direction opposite the first direction such that the first article wiping surface imparts a rearward wiping force on the article.~~An aspect of the present invention provides an apparatus for cleaning an article, the apparatus comprising: a drive member configured to impart a forward motive force on the article; and a first wiper belt defining a first article wiping surface, the first wiper belt including a plurality of flexible projections formed with the first

wiper belt as an integral elastomeric component, the plurality of flexible projections being sized and positioned to impart a wiping force on the article when the first wiper belt is moved with respect to the article; wherein the first wiper belt is powered to move the first article wiping surface to impart a rearward wiping force on the article; and wherein the drive member is configured to impart a forward rotational force on the article.

[0005] Another aspect of the present invention provides a method for cleaning an article, the method comprising: receiving the article between first and second opposed article engaging surfaces; moving at least the first article engaging surface to impart a forward motive force on a side wall of the article; contacting the article with a first article wiping surface, the first article wiping surface being disposed on a first wiper belt; moving the first wiper belt such that the first article wiping surface imparts a rearward wiping force on the article; and moving the first article engaging surface forward with respect to the second article engaging surface to impart a forward rotational force on the side wall of the article.~~In another exemplary embodiment, an apparatus for cleaning an article includes a means for imparting a forward motive force on the article and a wiper belt. The wiper belt~~

~~defines an article wiping surface and includes a plurality of flexible projections formed with the first wiper belt as an integral elastomeric component. The plurality of flexible projections are sized and positioned to impart a wiping force on the article when the wiper belt is moved with respect to the article.~~

[0006] ~~In an exemplary method of cleaning an article, an article is received between first and second opposed article engaging surfaces. At least the first article engaging surface is moved to impart a forward motive force on a side wall of the article. The article is contacted with a first article wiping surface disposed on a first wiper belt. The first wiper belt is moved such that the first article wiping surface imparts a rearward wiping force on the article.~~Another aspect of the present invention provides an apparatus for cleaning an article, the apparatus comprising: a first drive belt defining a first article engaging surface extending substantially parallel to a second article engaging surface of the apparatus and positioned to receive the article between the first and second article engaging surfaces, the first drive belt being powered to move in a first direction such that the first article engaging surface imparts a forward motive force on an outer surface of the article; a first wiper belt defining a first article wiping surface positioned to contact the article, the first wiper belt being powered to move in a second direction opposite the first direction such that the first article wiping surface imparts a rearward wiping force on the article; and a second wiper belt defining a second article wiping surface substantially coplanar with the first article wiping surface and spaced apart from the first article wiping surface by the first article engaging surface, and positioned to contact the article, the second wiper belt being powered to move in the second direction such that the second article wiping surface imparts a rearward wiping force on the side wall of the article.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] Further features and advantages will become apparent to those of ordinary skill in the art to which the invention pertains from a reading of the following description together with the accompanying drawings, in which:

[0008] Figure 1 illustrates a schematic view of a cleaning apparatus, according to an exemplary embodiment;

[0009] Figure 2 illustrates a schematic view of another cleaning apparatus, according to an exemplary embodiment;

[0010] Figure 3 illustrates a schematic view of still another cleaning apparatus, according to an exemplary embodiment;

[0011] Figure 4 illustrates a front perspective view of a cleaning apparatus, according to an exemplary embodiment;

[0012] Figure 5 illustrates a rear perspective view of the cleaning apparatus of Figure 4;

[0013] Figure 6 illustrates a front perspective view of the cleaning apparatus of Figure 4, with the support frame and cover assemblies removed to illustrate additional features of the cleaning apparatus;

[0014] Figure 7 illustrates a rear perspective view of the cleaning apparatus of Figure 4, with the support frame and cover assemblies removed to illustrate additional features of the cleaning apparatus;

[0015] Figure 8 illustrates an upper perspective view of the cleaning apparatus of Figure 4, with the support frame and cover assemblies removed to illustrate additional features of the cleaning apparatus;