

[54] SELF-CLEANING ENDLESS BELT

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[56] References Cited

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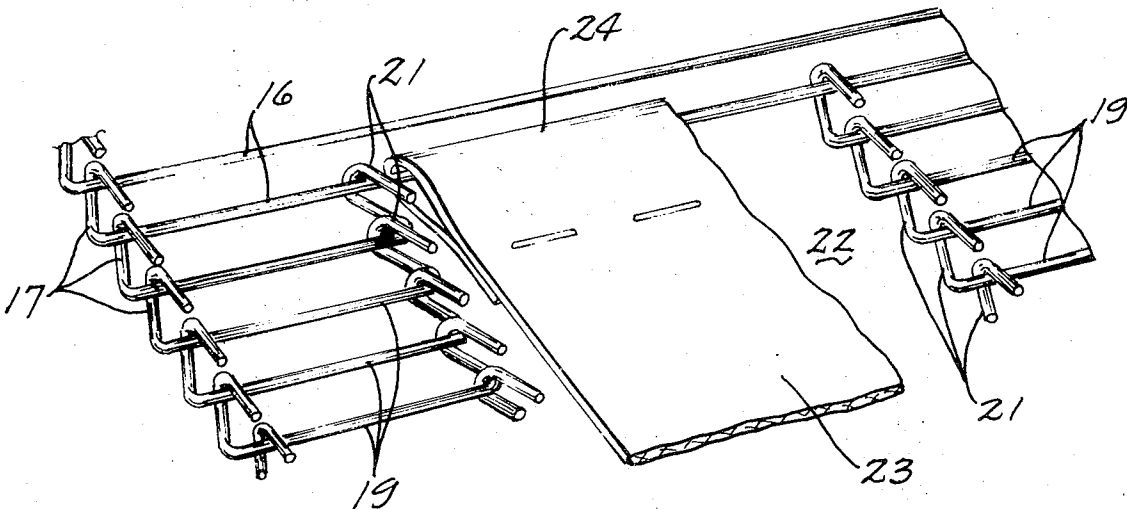
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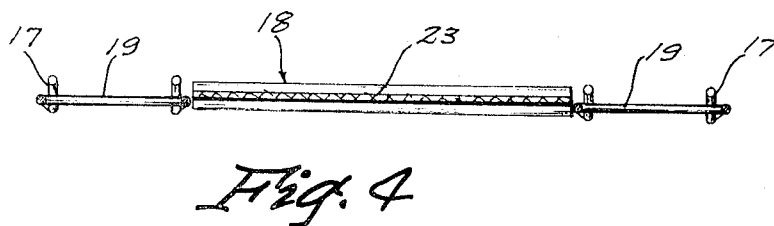
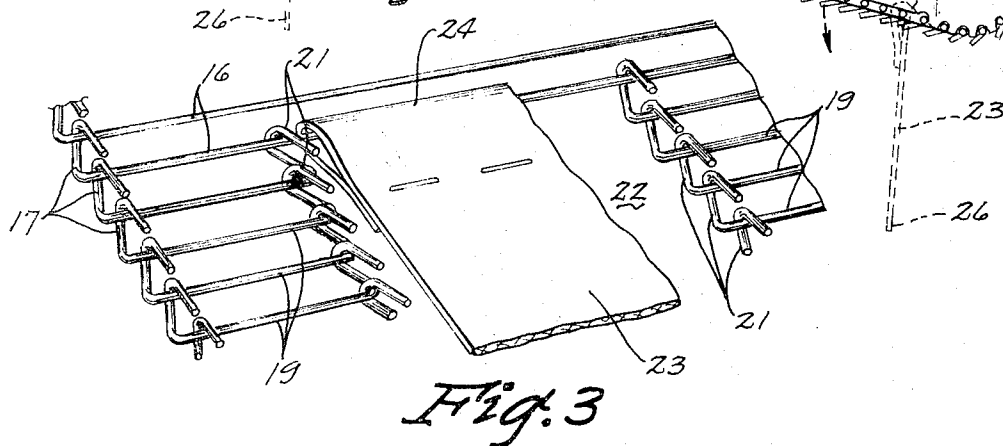
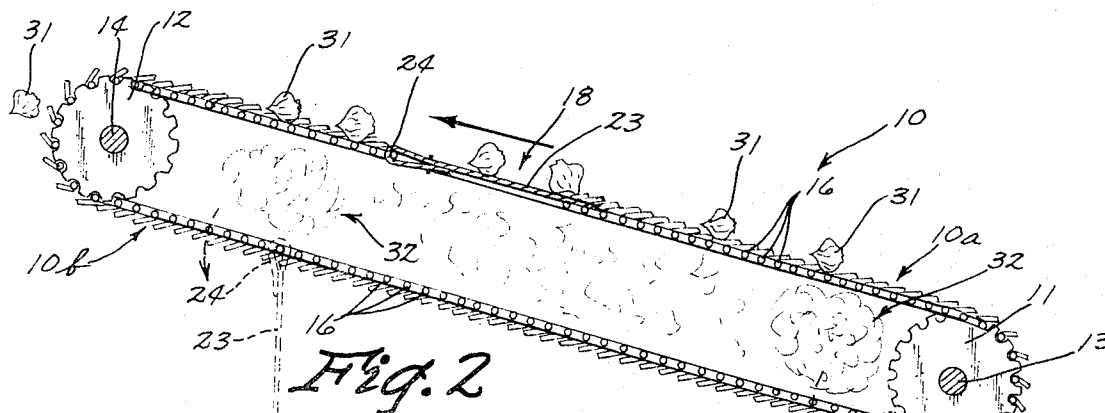
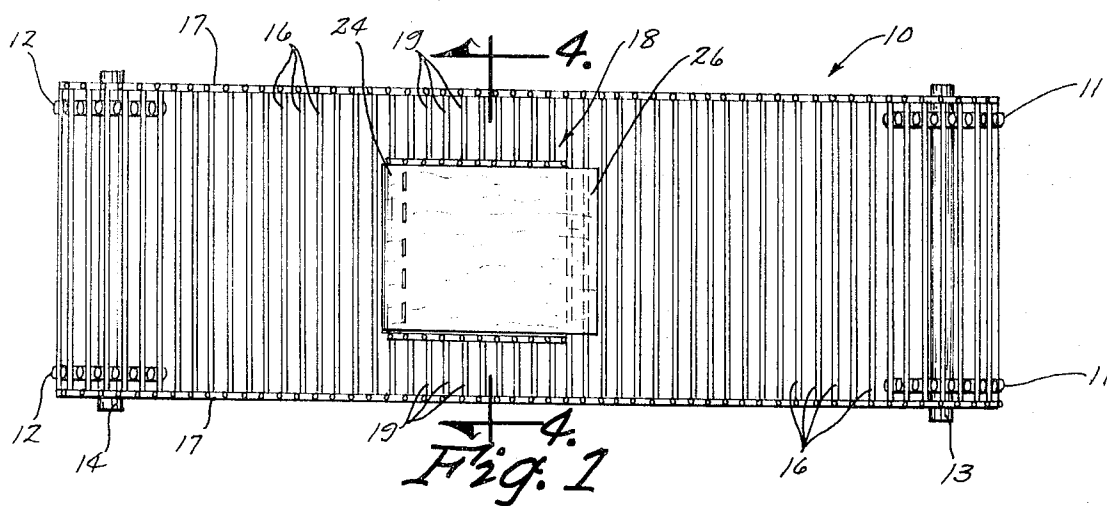
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ABSTRACT

An endless belt having an upper train and a lower train and comprised of a plurality of spaced, parallel links running transversely to the direction of movement of the belt, and with at least one opening formed intermediate the side edges of the belt and having in conjunction therewith a single piece of material pivotally connected across the leading edge of the opening so as to pivot about an axis parallel to the transverse links, such that when the piece of material is riding about the upper train it covers the opening to aid in transporting that which is being moved by the belt, and when riding about the lower train it drops away from the opening and exposes the interior of the belt.

6 Claims, 4 Drawing Figures





SELF-CLEANING ENDLESS BELT

BACKGROUND OF THE INVENTION

In many instances of harvesting articles such as potatoes, beets and the like, endless belts comprised of spaced parallel links are used as a part of the harvesting equipment. Belts such as this are shown with particularity in U.S. Pat. No. 2,901,048, and generally in U.S. Pat. Nos. 3,399,766 and 3,629,890. The structure of the U.S. Pat. No. 3,399,766 has been manufactured with such an endless belt used in the place of the conveyor 16 of rolls specified therein, and the problem of the removal of waste and foreign material during the harvesting is elaborated on therein.

It is a known fact that during the harvesting of potatoes, beets and like articles by the use of such endless belts, waste and foreign material fall through the upper train of the belt and collect within the trains of the belt. At times the collection attains the size of a large ball, for example, large enough to affect the efficiency of the belt. In certain instances, a sprocket has actually been jammed sufficiently to shut down operation of the belt.

It is to the elimination of this problem that this invention is directed.

SUMMARY OF THE INVENTION

An opening is formed in the belt intermediate the side edges, such that enough of the belt remains for driving purposes, and a cover is pivotally connected across the leading edge of the opening to cover the opening when the cover is riding across the upper train of the belt, and to uncover the opening when the cover piece is riding across the lower train of the belt, thereby exposing the interior and permitting any refuse to fall through the opening; effecting a self cleaning of the belt every time the opening portion of the belt moves across the lower train.

It is an object of this invention to provide a new and novel endless belt of the parallel link type.

It is another object of this invention to provide an endless, link-type belt which is capable of continually self-cleaning its interior.

Yet another object of this invention is the provision of a movable cover for an opening formed in an endless belt whereby the cover covers the opening for that which is being transported, and uncovers the opening when not transporting.

Still another object of this invention is to provide a self-cleaning link-type endless belt for harvesting potato, beet and like articles.

It is another object of this invention to provide a self-cleaning endless belt capable of attaining the above designated objectives which is economical, serviceable, and efficient.

These and other objects and advantages of this invention will become readily understandable upon reference to the following specification and the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view of an endless link-type belt embodying the present invention;

FIG. 2 is a side elevational view of the belt of FIG. 1 in use for transporting articles, dotted lines being used for clarity of invention;

FIG. 3 is an enlarged fragmentary view of the belt, showing a portion of the closure member and opening; and

FIG. 4 is an enlarged cross-sectional view as taken along line 4—4 in FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring particularly to FIGS. 1 and 2, a preferred embodiment of the invention is illustrated generally at 10. The belt 10 comprises an upper train 10a (FIG. 2) and a lower train 10b with a pair of drive sprockets 11 and a pair of idler sprockets 12 at each end of the belt 10, with a drive shaft 13 for rotating the drive sprockets 11, and with the idler sprockets 12 mounted on an idler shaft 14.

The belt 10 comprises particularly a plurality of links 16 (FIGS. 1 and 3) with their outer ends 17 formed as particularly illustrated in FIG. 3 to provide a detachable connection of each link 16 with the adjacent link 16. By this arrangement, the links 16 are articulately connected so as to extend parallel to each other and with a spacing therebetween for a purpose hereinafter described.

A trash clean out unit 18 is provided integral with the belt 10, and is constructed by removing the intermediate portion of a plurality of adjacent links 16 such that a plurality of stub links 19 (FIGS. 1 and 3) remain of the outer portions of the original links 16. The inner ends 21 (FIG. 3) of the stub links 19 are formed as illustrated so as to again provide an articulated connection of the stub links 19 with each other and with an appropriate link 16 for defining a clean out opening 22 formed intermediate the side edges of the belt.

The trash clean out unit 18—further a cover or closure member 23 (FIGS. 1—4). The closure member 23 is of a flexible material such as rubber, leather or the like, having one end 24 looped about a link 16 at the lead end of the opening 22, with the looped end 24 stitched to the remainder of the closure member 23 such that the member 23 is movable and pivotal about the lead link 16. The trailing end 26 of the closure member 23 is disposed behind the lead end 24 and above several of the links 16 at the rear of the opening 23 as is best illustrated in FIGS. 1 and 2. By "lead" is meant the end of the opening 22 which is closest to the direction of movement of the upper train 10a of the belt 10; in this instance as illustrated by arrows in FIGS. 1 and 2, the belt moves in a circular counterclockwise direction about the sprockets 11 and 12, thus the lead end of the opening 22 is at the forward or lead end 24 of the closure member 23, and with of course the opposite end 26 being the trailing end thereof.

It will be noted from the illustrations that the closure member 23 completely covers the opening 22 and is of a sufficient rigidity such that it will support any articles 31 such as potatoes, beets or the like which are being moved over the upper train 10a by the belt 10 for discharge at the left end thereof as is viewed in FIG. 2. It will be noted further that the size of the opening 22 is at least one half the transverse width of the belt 10.

In operation of the belt, with the belt being rotated in the counterclockwise direction as is illustrated in FIGS. 1 and 2, the belt 10 may be a part of a harvesting machine (not shown) which is being used in the field for lifting the articles 31 from the soil, for separating the articles from their stalks, leaves and the like, and

for also cleaning the articles — that being the removal therefrom of mud, dirt and other foreign material. During this process, the combined amount of foreign material which we shall term trash may pass downwardly through the spaces between the links 16 in the upper train 10a. As some of the trash does not pass on through the spaces between the links 16 in the lower train 10b, large balls 32 and bunches of the trash are formed between the upper and lower trains 10a and 10b. Eventually these bunches or bundles of trash 32 effect the efficiency of the belt 10 and the drive arrangement.

It will be noted from FIG. 2 particularly that the closure member 23 aids in transporting the articles 31 as they are moved across the upper train 10a, the closure member 23 laying relatively flat as it moves along the upper train 10a. This is due to gravity and to the fact that the closure member 23 itself is relatively flat although flexible in this regard. It may be inflexible, nevertheless, and still operate as efficiently as the flexible material. Upon the closure member 23 being moved toward and into the lower train 10b, the force of gravity again causes the closure member 23 to pivot about the lead link 16 at its lead end 24 and thus assume a downwardly hanging or depending position as best illustrated by dotted lines on the left side as viewed in FIG. 2. In this condition, the opening 22 has been uncovered such that any trash 32 at the upper or left hand side of the belt 10, as viewed in FIG. 2, can fall through the opening 22 to the ground. As the belt 10 continues to move in its counterclockwise direction, the closure member 23 moves on to the right as again shown by dotted lines in FIG. 2. It is evident therefore that as the closure member 23 and the opening 22 move along the lower train 10b of the arrangement, an opening is presented all along the under side of the upper train 10a such that any trash 32 can fall through the opening 22 to the ground, thus a self-cleaning of the interior of the endless belt 10 is attained every time the trash cleanout unit 18 passes across the lower train 10b of the belt 10.

As the depending closure member 23 is brought about to the upper train 10a, it again assumes a flattened out condition covering the opening 22 such that the transportation of articles 31 across the upper train 10 is not effected nor is its efficiency impaired in any way by the trash cleanout unit 18.

I claim:

1. An endless belt comprising:

a plurality of bars having their outer ends formed for articulated connection with an adjacent outer end, said bars being spaced apart and extended parallel each other and transversely to the direction of movement of the belt;

means for moving the belt unidirectionally in a circular manner such as to have an upper train and a lower train;

a plurality of adjacent ones of said bars, less than the total number thereof, having their intermediate portions removed, leaving shortened portions at each end thereof, the inner ends of the shortened portions formed for articulated connection with an adjacent bar, whereby at least one opening is formed within the belt;

means movably connected to said belt for covering the opening when the opening is in the upper train, said covering means self-movable away from the opening when the opening is in the lower train.

2. An endless belt as described in claim 1, and further wherein said covering means comprises a relatively flat closure member capable of covering said opening.

3. An endless belt as described in claim 2 and further wherein said closure member has a portion thereof movably connected to a bar at the leading end of the opening toward the direction of movement of the belt such that during movement across the upper train the closure member lays relatively flat over the opening, and during movement across the lower train the closure member swings downwardly about the said bar and uncovers the opening.

4. An endless belt as described in claim 3, and further wherein said closure member extends rearwardly from said movable connection, relative to the direction of movement of the belt, and extends over a portion of the belt rearwardly of said movable connection.

5. An endless belt as described in claim 4, and further wherein the opening comprises at least one half the transverse width of the belt.

6. An endless belt as described in claim 5, and further wherein said closure member has a rigidity sufficient to enable it to support that which the belt is moving.

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