United States Patent [19]

Liess

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[54] **MULTI-FLIGHT CONVEYOR FOR SELF-LOADING SCRAPERS**

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[52] **U.S. Cl.** **37/8**, 198/188, 198/198, 214/83.36

[51] **Int. Cl.** **B60p 1/36**

[58] **Field of Search** 37/4, 8; 198/188, 198/189, 195, 198, 203, 159, 102; 214/83.36

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[57] **ABSTRACT**

An elevator assembly is mounted on a bowl of a self-loading scraper and comprises a plurality of endless chains having transversely disposed flight members secured thereto. The flight members are arranged in three vertically aligned groups with each of the groups being positioned in an offset, staggered relationship with respect to each of the other groups.

7 Claims, 5 Drawing Figures

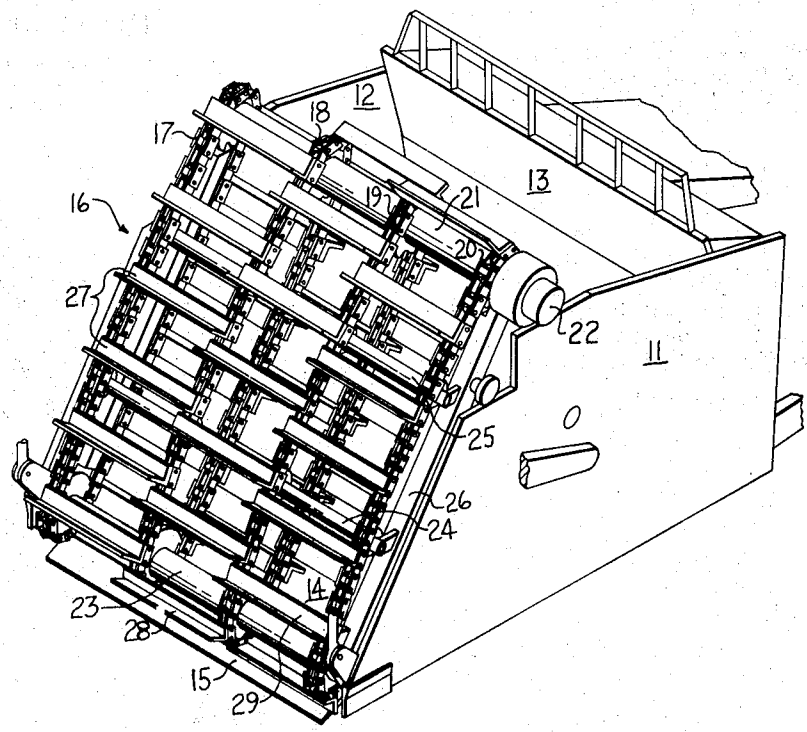

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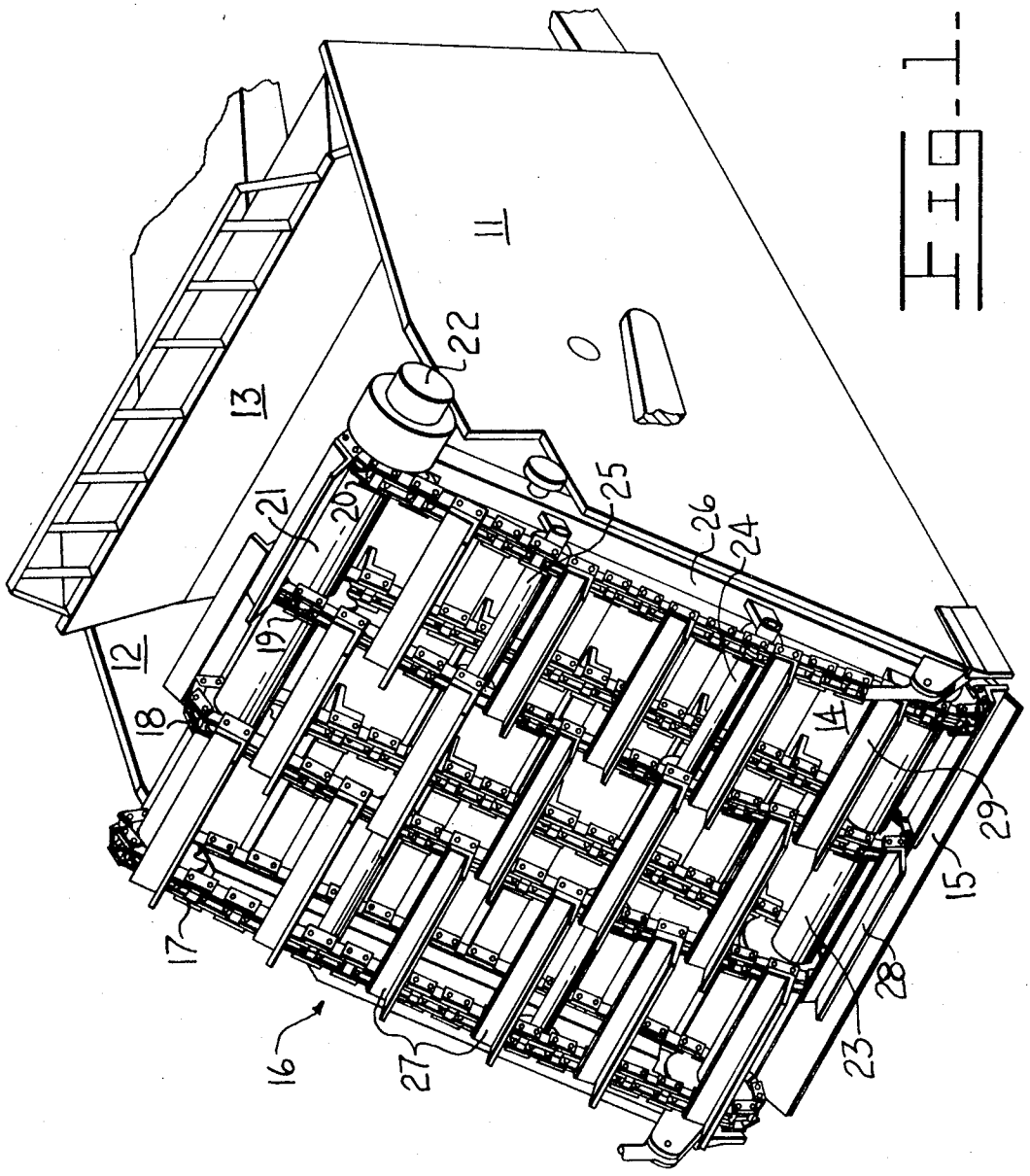
FIG. 1



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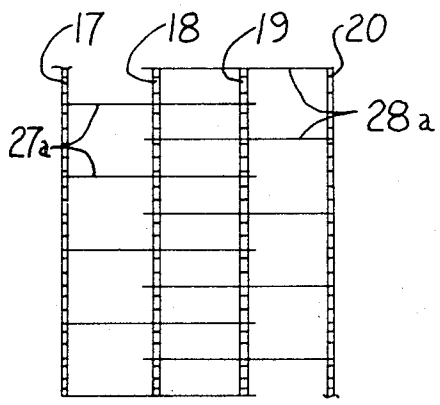

Fig. 2.

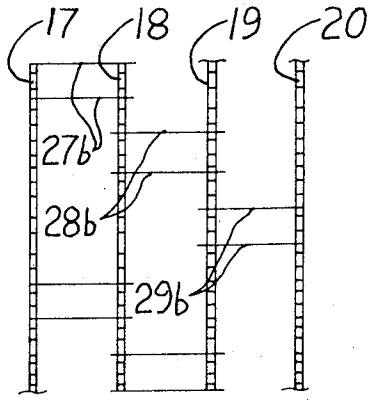

Fig. 3.

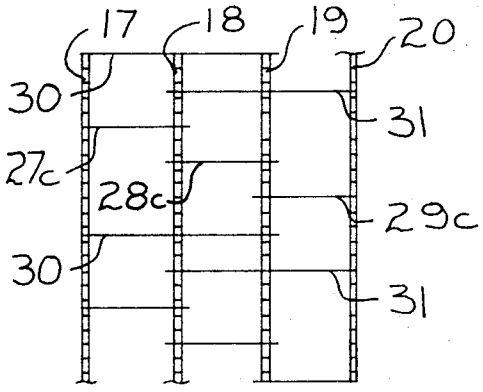

Fig. 4.

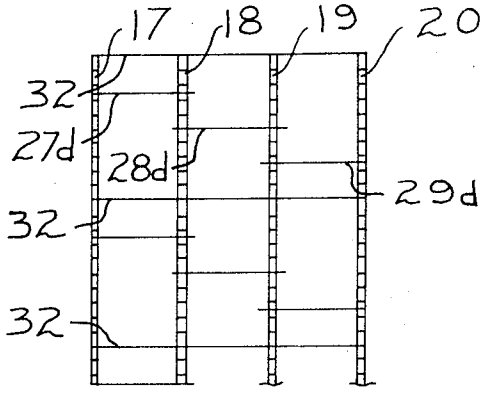

Fig. 5.

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MULTI-FLIGHT CONVEYOR FOR SELF-LOADING SCRAPERS

BACKGROUND OF THE INVENTION

The advent of self-loading, elevating-type scrapers has greatly aided in the efficient performance of earth-working operations. Conventional scrapers normally comprise an elevator assembly having a plurality of vertically spaced flight members extending substantially the full width of the scraper bowl. During an earthloading operation, the individual flight members engage the ground over the entire length thereof. Attempts have been made to increase the loading capabilities of such scrapers, such as by increasing the power input to the elevator assembly.

SUMMARY OF THE INVENTION

An object of this invention is to provide a non-complex and economical elevator assembly for a self-loading scraper adapted to increase the loading capability and efficiency thereof. Such elevator assembly comprises a plurality of endless chains and a plurality of transversely disposed flight members attached thereto. At least some of the flight members are staggered in a transverse direction relative to other flight members to continuously provide ground contact pressures of high magnitude.

BRIEF DESCRIPTION OF THE DRAWINGS

Further objects of this invention will become apparent from the following description and accompanying drawings wherein:

FIG. **1** is a perspective view of a portion of the bowl assembly of a self-loading, elevating scraper employing a preferred elevator assembly embodiment thereon; and

FIGS. **2–5** schematically illustrate alternative embodiments of staggered flight members, employed in an elevator assembly.

DETAILED DESCRIPTION

The self-loading, elevating scraper illustrated in FIG. **1** comprises a bowl assembly **10** having integrated sidewalls **11** and **12,** a rear wall **13** and a floor **14.** A horizontally disposed cutting blade **15** is mounted on a lower, forward end of the bowl assembly in a conventional manner. A generally vertically disposed elevator assembly **16** is mounted on the open, forward end of the bowl assembly to have its lower end positioned closely adjacent to the cutting blade.

Endless chains **17–20** are suitably mounted at their upper ends on drive sprockets secured to a drive shaft **21** adapted to be selectively rotated by an electric or hydraulic drive motor **22.** The chains are guided in their movements by their engagement with idler rolls secured to shafts **23, 24** and **25,** rotatably mounted on a frame **26** of the elevator assembly. Further details of a similar type of elevator assembly, including means for attaching flight members **27, 28** and **29** to the chains, are disclosed in U.S. Pat. No. 3,378,133, assigned to the assignee of this application.

This invention generally relates to the positioning of the flight members on the endless chains so that they are staggered in a transverse direction relative to each other. As shown in FIG. **1,** the first group of vertically aligned flight members **27** are attached to first and second chains **17** and **18** whereas the second group of vertically aligned flight members **28** are attached to second and third chains **18** and **19.** The third group of flight members **29** are attached to third and fourth chains **19** and **20** respectively.

In this embodiment of the invention, each adjacent pair of overlapping flight members of each adjacent group are spaced vertically from each other in an offset, staggered relationship to provide ground contact pressures of high magnitude during a loading operation. In addition, the flight members have substantially identical transverse lengths and are shorter than conventional ones thereby reducing peak loads in the conveyor drive train. Furthermore, reduction of the peak loads results in reducing the twisting moments in the flight members so that they can be fabricated from lighter weight material.

FIGS. **2–5** schematically illustrate alternative embodiments wherein flight members are also arranged in a staggered relationship in a transverse and vertical direction relative to each other. In FIG. **2,** a first group of vertically aligned flight members **27*a*** are attached to chains **17, 18** and **19** whereas a second group of staggered and vertically aligned flight members **28*a*** are attached to chains **18, 19** and **20.**

In FIG. **3,** each group of flight members **27*b*, 28*b*** and **29*b*** are arranged in pairs with each pair of flight members of each group being transversely and vertically staggered with respect to an adjacent pair of flight members of an adjacent group.

In FIG. **4,** flight members **30** and **31,** attached to chains **17, 18** and **19** and chains **18, 19** and **20,** respectively, are disposed vertically between each series of three flight members **27*c*, 28*c*** and **29*c*** of the respective groups.

In FIG. **5,** each series of adjacent flight members **27*d*, 28*d*** and **29*d*** have a flight member **32** positioned therebetween which is attached to all of the chains **17–20.**

In addition, three chains could be employed in lieu of the above disclosed four chain systems. For example, in FIGS. **1–5,** each fourth chain **20** could be eliminated along with the flight members or portions thereof extending between the third and fourth chains.

What is claimed is:

1. A self-loading scraper comprising

a bowl assembly,

a horizontally disposed cutting blade mounted on a lower, forward end of said bowl assembly, and

a generally vertically disposed elevator assembly mounted on the forward end of said bowl assembly to have its lower end positioned adjacent to said cutting blade, said elevator assembly comprising

at least three generally vertically disposed and laterally spaced endless chains, and

a plurality of vertically spaced flight members attached to said chains to extend in a transverse direction relative thereto, at least some of said flight members disposed in vertical and transverse off-set staggered relationship with respect to other flight members.

2. The invention of claim **1** wherein the lengths of all of said flight members in said transverse direction are substantially equal.

3. The invention of claim **2** wherein each adjacent pair of flight members are staggered relative to each other in overlapping relationship.

4. The invention of claim 3 wherein four of said endless chains have a plurality of said flight members attached thereto.

5. The invention of claim 4 wherein a first group of vertically aligned flight members are attached solely to adjacent first and second endless chains, a second group of vertically aligned flight members are attached solely to said second endless chain and an adjacent third endless chain and a third group of vertically aligned flight members are attached solely to said third endless chain and an adjacent fourth endless chain.

6. The invention of claim 5 wherein each flight member of each of said first, second and third groups of flight members is spaced vertically from the adjacent flight member of the next adjacent group of flight members.

7. The invention of claim 6 wherein each flight member of said second group is spaced vertically below the adjacent flight member of said first group and each flight member of said third group is spaced vertically below the adjacent flight member of said second group.

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