

As. 118.925

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 11-157966-00006-0000

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Act. 329 CTOINFORMACION Folios: 100

Señor

DIRECTOR DIVISIÓN DE NUEVAS CREACIONES

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

E.

S.

D.

REF: Expediente No. **11.157.966** solicitud de patente de invención a favor de
FLSMIDTH A/S Título **APARATO TRANSPORTADOR**

PETICION TRAMITE ACELERADO DE PATENTES

JUAN PABLO CADENA SARMIENTO, portador de la tarjeta profesional No. 57.492 del C.S.J., obrando como apoderado de la sociedad solicitante me permito presentar los siguientes documentos para participar en el programa de trámite acelerado de patentes. La solicitud de examen de patentabilidad fue radicada el 21 de diciembre de 2012.

- a. Copia de la acción oficial de patentabilidad emitida por la USPTO junto con la traducción al español.
- b. Copia del arte previo citado en la acción oficial US 6,296,109
- c. Copia de la respuesta presentada por el solicitante en respuesta a la acción oficial junto con las reivindicaciones modificadas junto con la traducción al español.
- d. Copia del índice de reivindicaciones (index of claims) en donde se establece cuáles son las reivindicaciones concedidas mediante el símbolo (=).
- e. Copia de la notificación de concesión (notice of allowability) en donde se establece que las reivindicaciones concedidas son las 1,3,4,6-9,11-21 y 24.

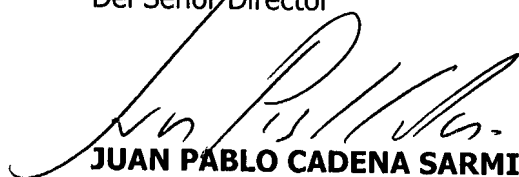
- 2
- f. Notificación de aceptación en donde se establece que la solicitud ha sido examinada y aceptada para conceder la patente.
 - g. Notificación de aceptación (issue notification) en donde se establece el número y fecha de la patente.
 - h. Copia de la patente US 7,997,406 del 16 de agosto de 2011 junto con la traducción de las reivindicaciones concedidas.
 - i. Tabla de correspondencia entre las reivindicaciones concedidas por la USPTO y las reivindicaciones modificadas en Colombia el 30 de octubre de 2012.

Conclusión

De acuerdo a los documentos adjuntos, concluimos que las reivindicaciones pendientes actualmente en Colombia corresponden a las reivindicaciones patentadas en Estados Unidos teniendo en cuenta que el alcance es idéntico.

En consecuencia, solicitamos a su Despacho tener en cuenta el examen de patentabilidad y las reivindicaciones concedidas por la USPTO y proceder con la concesión de la patente para la solicitud en Colombia.

Del Señor Director


JUAN PABLO CADENA SARMIENTO

T.P. No. 57.492 del C.SJ.

C.C. 80.410.337 de Usaquén

Calle 70 A No. 4 - 41

Anexo 1

**Copia de la acción oficial de patentabilidad emitida por la USPTO junto
con la traducción al español.**



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/465,834	05/14/2009	Scott D. Schafer	9144-00142	4500
7590 Daniel DeJoseph FLSmith Inc. 2040 Avenue "C" Bethlehem, PA 18017-2188			EXAMINER	
			DEUBLE, MARK A	
			ART UNIT	PAPER NUMBER
			3651	
			MAIL DATE	DELIVERY MODE
			03/11/2011	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

5

Office Action Summary	Application No. 12/465,834	Applicant(s) SCHAFER, SCOTT D.	
	Examiner MARK A. DEUBLE	Art Unit 3651	

– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☐ Responsive to communication(s) filed on ____.

2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 1-24 is/are pending in the application.

4a) Of the above claim(s) ____ is/are withdrawn from consideration.

5) ☐ Claim(s) ____ is/are allowed.

6) ☒ Claim(s) 1-24 is/are rejected.

7) ☐ Claim(s) ____ is/are objected to.

8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
 Paper No(s)/Mail Date ____.

4) ☐ Interview Summary (PTO-413)
 Paper No(s)/Mail Date. ____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: ____.

Notice of References Cited	Application/Control No. 12/465,834	Applicant(s)/Patent Under Reexamination SCHAFFER, SCOTT D.	
	Examiner MARK A. DEUBLE	Art Unit 3651	Page 1 of 1

U.S. PATENT DOCUMENTS					
*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-6,296,106	10-2001	Marchesini, Vainer	198/608
*	B	US-2,267,419	12-1941	RAY OSTER	209/241
*	C	US-1,089,306	03-1914	Bell	104/6
*	D	US-3,623,597	11-1971	Arndt, Charles J.	198/316.1
*	E	US-4,202,434	05-1980	Herron, Charles R.	198/316.1
*	F	US-3,051,295	08-1962	DUFFIELD MOY PETER CHARLES	198/313
*	G	US-2,530,496	11-1950	WATSON HAROLD R	198/314
*	H	US-1,462,510	07-1923	LISTER CHARLES H	198/313
*	I	US-4,585,384	04-1986	Richard et al.	414/141.1
*	J	US-5,013,201	05-1991	Grathoff et al.	414/139.4
*	K	US-1,510,479	10-1924	HOVEN GEORGE T	198/592
*	L	US-2,675,118	04-1954	MORRISON WALTER E	198/463.3
*	M	US-2,777,564	01-1957	RUSSELL JR GEORGE E	414/794.5

FOREIGN PATENT DOCUMENTS						
*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N	JP 02305718 A	12-1990	Japan	OSHITA, JUNICHI	198/318
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS		
*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 10, 13 and 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 10 states that “at least one frame portion is attached to at least one idler or at least one troughed idler aligned with an axis of movement defined by a plurality of hinges attaching the tail portion to the head portion.” However, it appears from the specification that while the position of the axis of the hinges 21 is fixed, each of the axes of idlers 41 attached to the second, third and fourth frame portions 26-28, and especially the axis of the idler on the fourth frame portion 28 closest to the axis of the hinges, moves when the head and tail sections are repositioned so that none of the axis of the idlers remain aligned with the axis defined by the hinges during the operation of the apparatus as suggested by the claim. Additionally, it conflicts with the language of claims 13 and 24 which describe the apparatus as not including a fixed bend pulley aligned with an axis of rotation that defines a path of movement for the head portion. This discrepancy between claims and between the claims and specification renders the scope of the claims impossible to ascertain.

Additionally, it should be noted that the use of negative limitations as in claims 13 and 24 have in the past been held to be indefinite it was viewed as an attempt to claim the invention by excluding what the inventors did not invent rather than distinctly and particularly pointing out

what they did invent. While some later cases contradict this, there is a level of uncertainty about the definitiveness of the claim language that the applicant may wish to clear up by claiming, for example, a pulley with a floating axis arranged adjacent to an axis of rotation that defines a path of movement for the head portion.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Nohl (US 6,296,109).

Nohl shows stacker apparatus with a base 30-34 that supports a conveyor apparatus 20. The conveyor apparatus includes a tail portion 38 moveably connected to a head portion 40 such that the head portion is moveable relative to the tail portion from a first position to a second position located lower or higher than the first position. The head and tail portions support a flexible elongate conveyor member 26 that moves from the tail portion to the head portion and is supported indirectly by first, second, third, and fourth frame portions. A first frame portion 70 is moveably positioned between the tail portion and the head portion such that the at least one frame portion moves when the head portion moves from the first position to the second position (see Figs. 4 and 5). The first frame portion is moveably attached directly to the tail portion at 80 and the upper leg of the triangular first frame portion extends from the tail portion to the head portion. A second frame portion 62 having a first side 92 and a second side 66 opposite the first

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side is moveably attached to the first frame portion adjacent to the first side of the second frame portion and attached to the tail portion adjacent to the second side of the second frame portion.

A third frame portion 96 having a first side 104 and a second side 98 opposite the first side of the third frame portion is movably attached to the first frame portion adjacent to the first side of the third frame portion and movably attached to the head portion adjacent to the second side of the third frame portion. Thus Nohl shows all the structure required by claims 1-5, and 11-12, and 14-19

A fourth frame portion is formed by members 48 and 50 that are attached to a plurality of idlers through the frame members 44/46 of the head and tail sections. While the figures do not show a fixed bend pulley at the axis of rotation that defines a path of movement for the head portion, some of these idlers may be broadly said to be aligned with the axis of movement defined by hinges 56 attaching the head portion and the tail section in that the axes of these idlers would be parallel to the axes of the hinges. The fourth portion has a first side 55 and a second side 100 (see Fig. 5) opposite the first side of the fourth frame portion. The fourth frame portion is moveably attached to the second frame portion adjacent to the first side of the fourth frame portion and to the third frame portion adjacent to the second side of the fourth frame portion. It is recognized that this fourth frame portion is not a unitary frame member that is movable relative to the head and tail sections as shown in the specification of the current application. However, the language of the claims is silent about relative movement of the fourth frame portion to the head and tail section, only requiring a "frame portion", and the members 48 and 50 clearly make up a portion of the frame assembly. Thus, Nohl shows all the structure required by claims 6-10, 13 and 20-24.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARK A. DEUBLE whose telephone number is (571)272-6912. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gene O. Crawford can be reached on (571) 272-6911. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark A. Deuble/
Primary Examiner
Art Unit 3651

md

Oficio técnico

Rechazo de objeciones – 35 USC § 112

1. El siguiente es un aparte del segundo párrafo de 35 U.S.C. 112:

La especificación debe concluir con una o más reivindicaciones que indiquen de manera particular y reivindiquen de manera distintiva la materia que el solicitante reclama como su invención.

2. Las reivindicaciones 10, 13 y 24 han sido rechazadas bajo el segundo párrafo de 35 U.S.C. 112 por ser indefinidas al no indicar de manera particular y reivindicar de manera distintiva la materia que el solicitante reclama como invención suya.

La reivindicación 10 establece que *"por lo menos una porción de la estructura está conectada a por lo menos una polea o por lo menos una polea ondulada alineada con un eje de movimiento definido por una pluralidad de articulaciones conectando la porción de cola a la porción de cabeza."* A partir de la presente solicitud, sin embargo, resulta aparente que mientras la posición de los ejes de las articulaciones 21 permanece fija, cada uno de los ejes de las poleas 41 acoplados a la segunda, tercera y cuarta porción de la estructura 26-28 y específicamente el eje de la polea en la cuarta porción de la estructura 28 más cercana al eje de las articulaciones, se desplazan cuando las secciones de la cabeza y la cola son reposicionadas de manera que ninguno de los ejes de las poleas permanezca alineado con el eje definido por las articulaciones durante la operación del aparato, según sugiere dicha reivindicación. Esto último, adicionalmente, entra en conflicto con el lenguaje de las reivindicaciones 13 y 24 que describen al aparato como carente de una polea de inflexión fija alineada con el eje de rotación que define un trayecto de movimiento para la porción de cabeza. Esta discrepancia entre reivindicaciones y entre las reivindicaciones y la descripción impide definir con precisión el alcance particular de las reivindicaciones presentadas.

De manera adicional, resulta preciso indicar que el uso de reivindicaciones negativas, como en las reivindicaciones 13 y 24, han sido denotadas previamente como indefinidas dado que estas reivindican la invención mediante la exclusión de aquello que los inventores no inventaron, antes que indicar de manera distintiva y particular aquellos elementos producto de su invención. Aunque algunos casos posteriores puedan contradecir esta consideración, existe un grado de incertidumbre sobre el alcance particular que busca el lenguaje empleado en la reivindicación, por ejemplo, una polea con un eje adyacente a un eje de rotación que define una trayectoria de movimiento para la porción de cabeza.

Rechazo de reivindicaciones- 35 US § 102

3. El siguiente es un aparte de los párrafos apropiados de 35 U.S.C. 102 que constituyen la base de las objeciones presentadas en la presente sección de este oficio:

Una persona será intitulada a una patente a menos que:

(b) la invención haya sido patentada o descrita en una publicación impresa en este o en un país extranjero o en dominio público o en venta en este país, más de un año previo a la fecha de aplicación de patente en los Estados Unidos.

4. Se objeta las reivindicaciones 1-24 bajo 35 U.S.C. 102 (b) al ser anticipadas por Nohl (US 6, 296,109).

Nohl enseña un aparato apilador con una base 30-34 que soporta un dispositivo de transporte 20. El dispositivo de transporte incluye una porción de cola 38 conectada de manera movable a la porción de cabeza 40 de tal forma que la porción de cabeza es movable respecto a la porción de cola desde una primera posición hasta una segunda posición localizada más abajo o más arriba que la

primera posición. Las porciones de cabeza y cola soportan un miembro de transporte flexible alargado 26 que se desplaza desde la porción de cola hasta la porción de cabeza y es soportada indirectamente mediante una primera, segunda, tercera y cuarta porción de la estructura. Una primera porción de la estructura 70 se posiciona moviblemente entre la porción de cola y la porción de cabeza de manera que al menos una porción de la estructura se desplaza cuando la porción de cabeza se mueve desde la primera posición a la segunda posición (ver Figs. 4 y 5). La primera porción de la estructura es acoplada de manera movable y directa a la porción de cola 80 y la pierna superior de la primera porción triangular de la estructura se extiende desde la porción de cola a la porción de cabeza. Una segunda porción de estructura 62 que tiene un primer lado 92 y un segundo lado 66 opuesto al primer lado se acopla de manera movable a la primera porción de la estructura adyacente al primer lado de la segunda porción de la estructura y acoplada a la porción de cola adyacente al segundo lado de la segunda porción de estructura. Una tercera porción de estructura 96 comprendiendo un primer lado 104 y un segundo lado 98 opuesto al primer lado de la tercera porción de la estructura se acopla de manera movable a la primera porción de estructura adyacente al primer lado de la tercera porción de estructura y se acopla de manera movable a la porción de cabeza adyacente al segundo lado de la tercera porción de la estructura. En consecuencia, Nohl revela toda la estructura requerida por las reivindicaciones 1-5, y 11-12, y 14-19.

Una cuarta porción de la estructura se forma por los miembros 48 y 50, acoplados a una pluralidad de poleas a través de los miembros estructurales 44/46 de las secciones de cabeza y cola. Si bien las figuras no muestran una polea de inflexión fija sobre el eje de rotación que define una trayectoria de movimiento para la porción de cabeza, algunas de estas poleas podrían considerarse como alineadas con el eje de movimiento definido por las articulaciones 56 que acoplan la porción de cabeza y la sección de cola, en la medida en que los ejes de estas poleas serían paralelos a los ejes de las articulaciones. La cuarta porción tiene un primer lado 55 y un segundo lado 100 (ver fig. 5) opuesto al primer lado de la cuarta porción de la estructura. La cuarta porción de la estructura se acopla de manera movable a la

segunda porción de la estructura adyacente al primer lado de la cuarta porción de la estructura y a la tercera porción de la estructura adyacente al segundo lado de la cuarta porción de la estructura. Es reconocido que esta cuarta porción de la estructura no constituye un elemento estructural unitario móvil respecto a las secciones de cabeza y cola, según lo enseña la especificación de la presente solicitud. Sin embargo, el lenguaje de las reivindicaciones no hace referencia al movimiento relativo de la cuarta porción de la estructura respecto a las secciones de cabeza y cola, requiriendo únicamente una "porción de estructura", y los miembros 48 y 50 configuran claramente una porción del ensamble de la estructura. En consecuencia, Nohl enseña toda la estructura requerida por las reivindicaciones 6-10, 13 y 20-24.

Anexo 2

Copia del arte previo citado en la acción oficial US 6,296,109



US006296109B1

(12) **United States Patent**
Nohl

(10) **Patent No.: US 6,296,109 B1**
(45) **Date of Patent: Oct. 2, 2001**

(54) **FOLD LINKAGE AND METHOD OF USING SAME**

(75) **Inventor: Jerry Nohl, Morris, MN (US)**

(73) **Assignee: Astec Industries Inc., Chattanooga, TN (US)**

(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) **Appl. No.: 09/496,909**

(22) **Filed: Feb. 2, 2000**

(51) **Int. Cl.⁷ B65G 21/10**

(52) **U.S. Cl. 198/632; 198/861.3**

(58) **Field of Search 198/313, 538, 198/632, 861.2, 861.3**

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,085,675 4/1963 Feiteira, Jr.

3,134,480	5/1964	Loosli	
3,417,882	12/1968	McConnell	
3,616,893	* 11/1971	Knadle et al.	198/632
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5,360,097	11/1994	Hibbs	
5,662,210	9/1997	Toews	
5,819,950	* 10/1998	McCloskey	198/313
6,186,311	* 11/1998	Conner	198/313

* cited by examiner

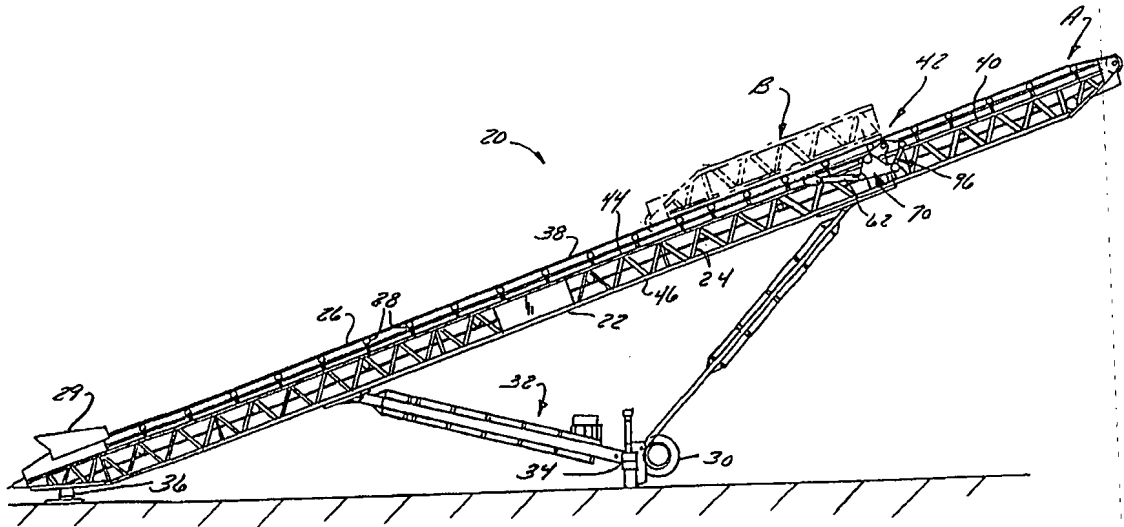
Primary Examiner—Joseph E. Valenza

(74) *Attorney, Agent, or Firm*—Nilles & Nilles SC

(57) **ABSTRACT**

A fold linkage is provided that is usable in combination with a conveyor assembly having a foldable conveyor section and a main conveyor section. The fold linkage includes linkage members and hinge sections that are rotatably attached to each other and that are connectable to the conveyor sections without interference with the conveyor assembly truss members. The fold linkage further includes a pressure operated cylinder that is extendable and retractable so as to fold and unfold the conveyor assembly.

8 Claims, 7 Drawing Sheets



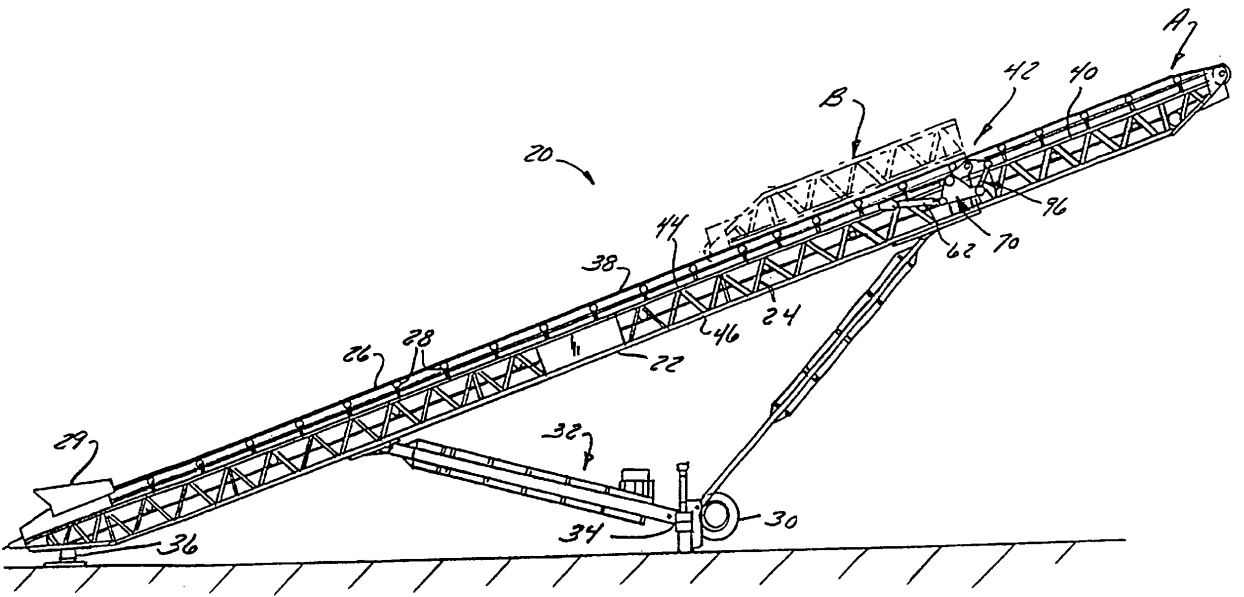


Fig. 1

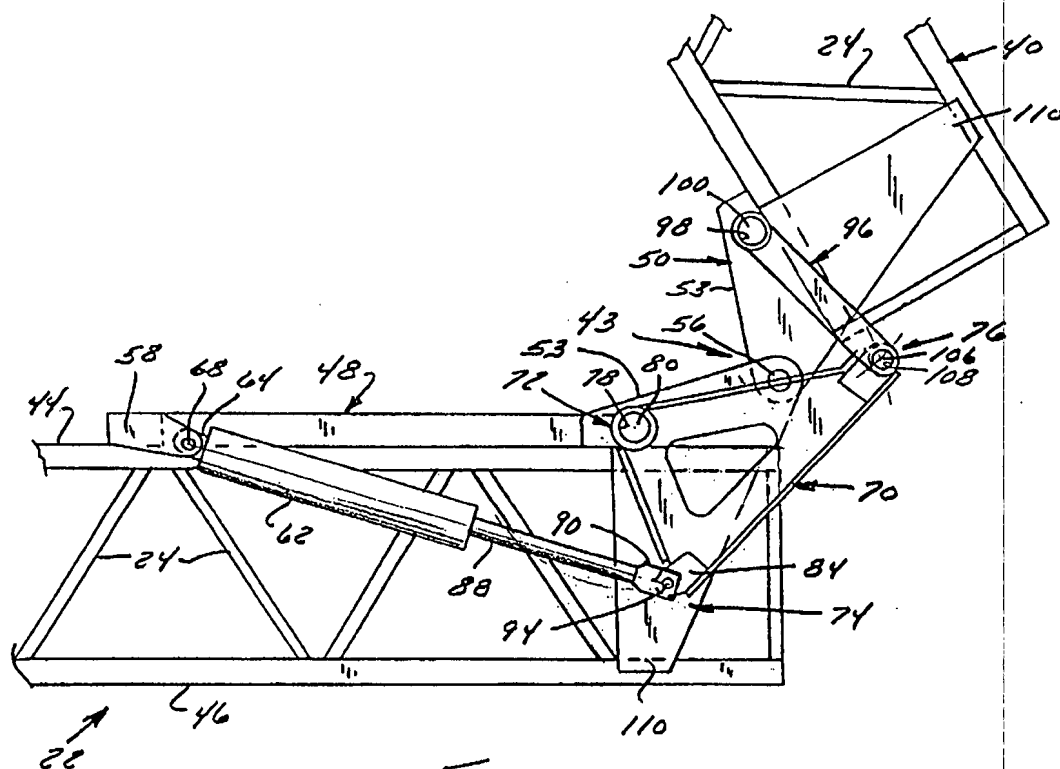


FIG. 3

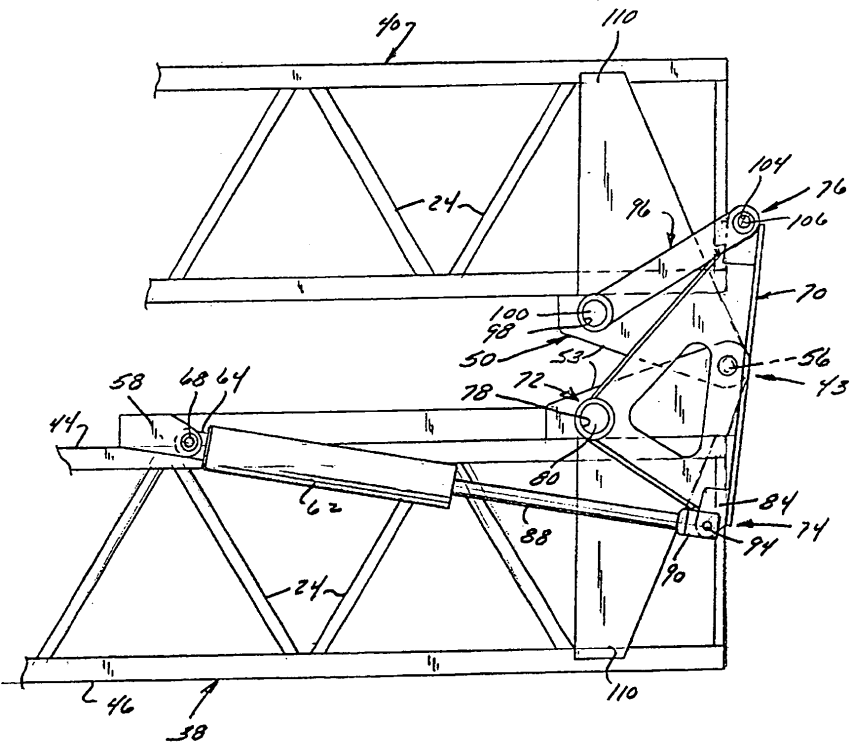
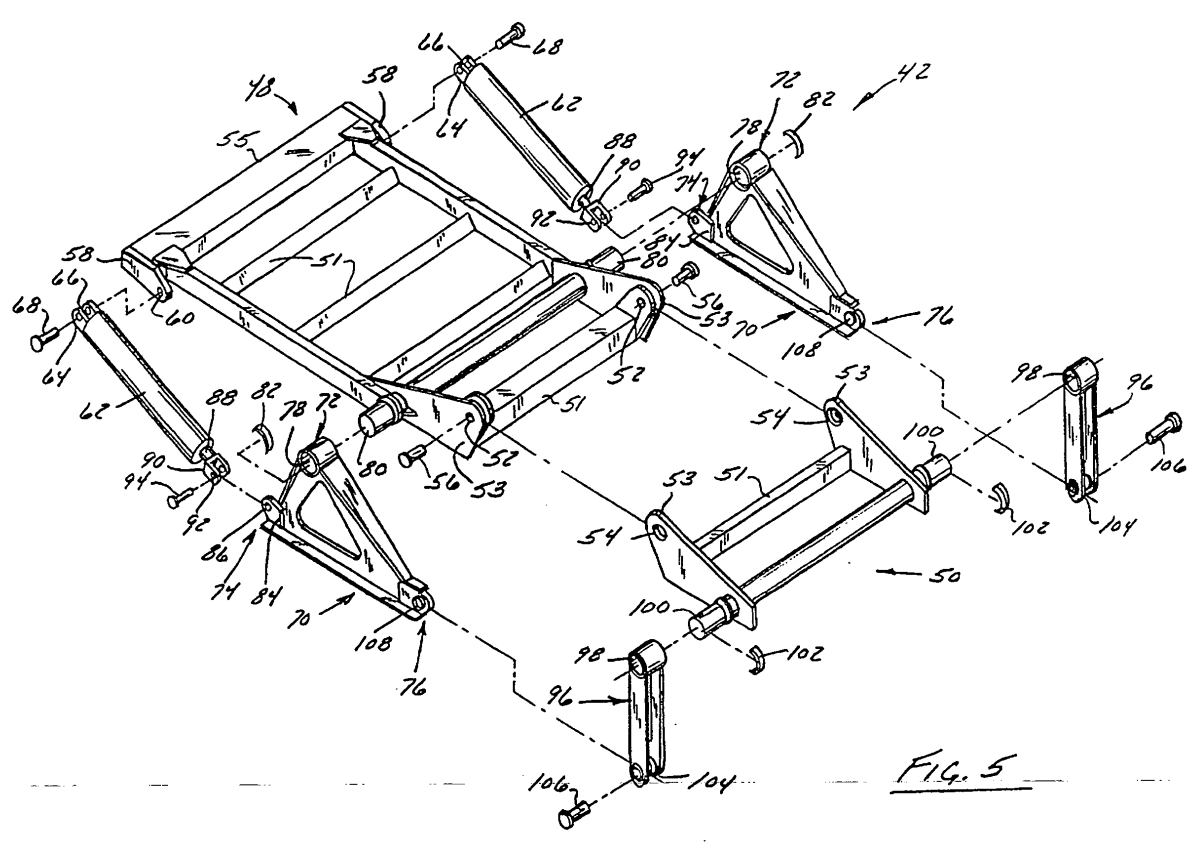


FIG. 4



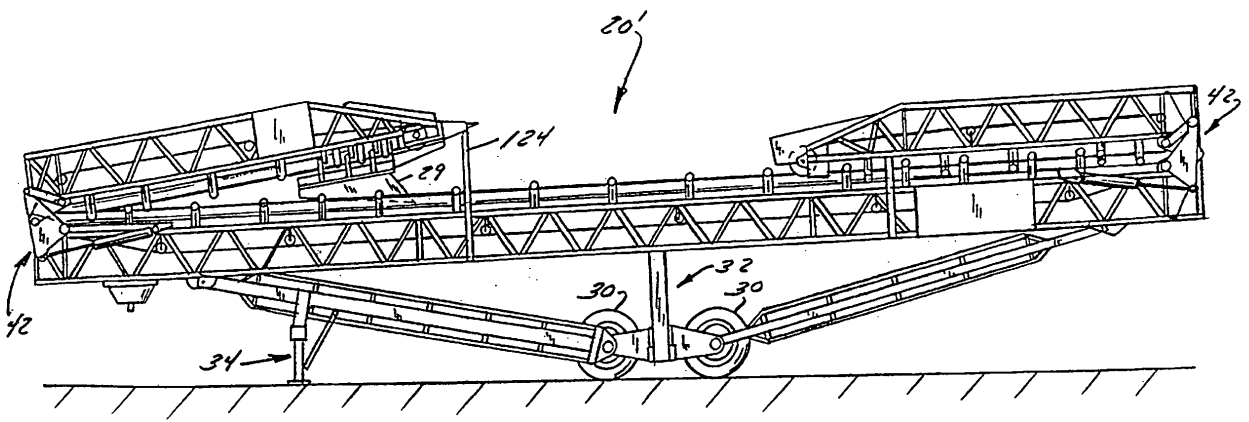


FIG. 6

1

FOLD LINKAGE AND METHOD OF USING SAME

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to a fold linkage for a conveyor that permits the conveyor to be folded for transport, and more particularly, relates to a fold linkage that may be preassembled and mounted onto the conveyor while avoiding modification of the conveyor frame.

2. Discussion of the Related Art

Methods for folding a conveyor to facilitate transport are well known. Prior assemblies typically include a foldable conveyor section that is hingedly attached to a main conveyor section via a fold linkage, which includes a plurality of linkage members that are attached to the conveyor frame. Typically, the fold linkage includes a fluid operated cylinder having an extendible piston that is attached to one of a plurality of the linkage members, which are rotatably attached to each other via a corresponding plurality of joints. More specifically, the joints may rotatably connect the linkage members to the rod, the main conveyor section, and/or the folding conveyor section. As a result, actuation of the hydraulic cylinder correspondingly folds or unfolds the foldable conveyor section about the main section via the fold linkage until the conveyor is configured for transport or operation, respectively.

Conventional fold linkages suffer from several drawbacks. Specifically, because a plurality of the joints attaches the linkage members directly to the truss frame members, manufacture of prior fold linkages is expensive and inefficient. The truss frame is therefore modified within tight tolerances in order to accommodate the joints of the fold linkage. This requires significant time and expense.

Additionally, in some prior fold linkage assemblies, the first and second linkages are joined by links that extend through the conveyor, resulting in further necessary modifications to the truss members. The interaction between prior fold linkages and truss members prohibits manufacture of a modular fold linkage prior to attaching the linkage onto the conveyor. Instead, the fold linkage needs to be assembled while, at the same time, integrated with the truss members and frame.

What is therefore needed is a fold linkage for a conveyor that is modular so as to allow the fold linkage to be preassembled before being mounted onto the conveyor, and that includes joints that are free from contact and interference with the truss members.

OBJECTS AND SUMMARY OF THE INVENTION

It is therefore an object of the invention to provide a fold linkage that is usable in combination with a conveyor to fold and unfold the conveyor.

It is a further object of the invention to provide a fold linkage that is modular and that is configured so as to be pre-assembled into a fixture prior to being mounted onto the conveyor.

It is a further object of the invention to provide a fold linkage that does not require modification of the truss members of the conveyor when the fold linkage is mounted onto the conveyor.

It is a further object of the invention to provide a fold linkage having a relief valve to accommodate a hopper that is disposed on the conveyor.

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It is a further object of the invention to provide a method of producing a fold linkage that incorporates at least some of the above-mentioned objects.

It is a further object of the invention to provide a method of operating a fold linkage in accordance with an embodiment of the invention.

In accordance with a first aspect of the invention, a conveyor includes a foldable conveyor section that is foldable with respect to a main conveyor section. The foldable and main conveyor sections are hingedly attached to each other via a fold linkage, which includes a first hinge section that is hingedly attached to a second hinge section. The first hinge section is mounted onto the main conveyor section, and the second hinge section is mounted onto the foldable conveyor section. The fold linkage in accordance with the preferred embodiment includes a pair of pressure operated cylinders disposed on opposite sides of the fold linkage, each of which includes corresponding pistons that are extendable and retractable so as to actuate a plurality of linkage members to rotate the second hinge section relative to the first hinge section. Extension of the pistons thereby rotates the foldable conveyor section from an unfolded position to a folded position to facilitate transport of the conveyor. The foldable conveyor section becomes unfolded, thereby rendering the conveyor operational, when the pistons are retracted. Advantageously, the rods of the cylinders are protected from potential hazards during operation of the conveyor.

In accordance with another aspect of the invention, the first and second hinge sections are rotatably attached to one another, and are further rotatably attached to the linkage members associated with the fold linkage. Furthermore, the linkage members are not connected to the truss members. Moreover, the linkage members do not extend through the truss frame. As a result, the fold linkage in accordance with an embodiment of the invention may be preassembled into a fixture prior to being mounted onto the conveyor.

In accordance with another aspect of the invention, the link members in accordance with an embodiment of the invention are rotatably attached to other link members or to a hinge section. As a result, the link members are not attached to the truss members of the conveyor frame. Accordingly, the truss members do not require modification in order to accommodate the fold linkage.

In accordance with another aspect of the invention, the foldable conveyor section includes a conventional hopper that is disposed at an end of the section opposite the end that is connected to the main section. In order to protect the hopper or other conveyor or fold linkage members from damage when the foldable conveyor section is folded, the cylinders include a relief valve that is operable to limit the amount of pressure that is accumulated within the cylinders once the pistons extend to a predetermined distance. The limited pressure within the cylinders correspondingly limits the force that causes the pistons to extend, thereby limiting the force with which the foldable conveyor section is biased towards the main conveyor section. The fold linkage and conveyor section are thereby protected from potential damage.

In accordance with another aspect of the invention, a method of assembling a fold linkage in accordance with an embodiment of the invention includes rotatably connecting a first hinge section to a second hinge section. A pair of hydraulic cylinders is rotatably connected to the first hinge section at one end, and to a corresponding pair of pivot arms at a second, opposite end. The pivot arms are also rotatably

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connected to the first conveyor section at another location, and to a corresponding pair of link arms at still another location. The pair of link arms is rotatably connected to the second hinge section. The first and second hinge sections are mounted onto the main and foldable conveyor sections, respectively.

In accordance with another aspect of the invention, a method of operating a fold linkage in accordance with an embodiment of the invention includes extending the pistons of the pressure operated cylinders when the conveyor is in an unfolded position. Extending the pistons folds the foldable conveyor section about the main conveyor section until the conveyor is folded for transport. Likewise, to unfold the conveyor, the pistons are retracted to unfold the foldable conveyor section about the main section so as to render the conveyor operational.

Other objects, features, and advantages of the present invention will become apparent to those skilled in the art from the following detailed description and the accompanying drawings. It should be understood, however, that the detailed description and specific examples, while indicating preferred embodiments of the present invention, are given by way of illustration and not of limitation. Many changes and modifications may be made within the scope of the present invention without departing from the spirit thereof, and the invention includes all such modifications.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred exemplary embodiments of the invention are illustrated in the accompanying drawings in which like reference numerals represent like parts throughout, and in which:

FIG. 1 is a side elevation view of a conveyor having a fold linkage in constructed in accordance with a preferred embodiment of the invention;

FIG. 2 is a side elevation view of the fold linkage of FIG. 1;

FIG. 3 is a side elevation view of the conveyor and fold linkage of FIG. 2 showing the conveyor in a partially folded position;

FIG. 4 is a side elevation view of the conveyor and fold linkage of FIG. 3 showing the conveyor in a folded position;

FIG. 5 is an exploded perspective view of the fold linkage of FIG. 2 being assembled in accordance with the preferred embodiment;

FIG. 6 is a side elevation view of a conveyor having a fold linkage in accordance with the preferred embodiment and a fold linkage in accordance with an alternate embodiment; and

FIG. 7 is a schematic illustration of a pressure operated cylinder having a relief valve in accordance with an embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Pursuant to a preferred embodiment of the invention, a fold linkage includes a first hinge section that is rotatably connected to a second hinge section. A plurality of linkage members is rotatably connected to the hinge sections and to one another via respective joints. A pair of fluid pressure operated cylinders and corresponding pistons are operable to permit the second hinge section to be rotated relative to the first hinge section. The first hinge section is mounted onto the top of a main conveyor section of a conveyor, and the second hinge section is mounted onto the top of a foldable

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conveyor section, which is rotatably connected to the main conveyor section. The foldable conveyor section is unfoldable with respect to the main conveyor section to permit operation of the conveyor, and is foldable to allow the conveyor to be easily transported. Advantageously, the fold linkage is modular and may be preassembled into a fixture before being mounted onto the conveyor. Furthermore, the joints are arranged so as to avoid interference with the conveyor and its associated truss members when the fold linkage is mounted.

Referring initially to FIG. 1, a conveyor assembly 20 includes a conveyor frame 22 that is supported by truss members 24. An endless conveyor 26 surrounds a plurality of rollers 28, which are attached to the conveyor frame 22. Additionally, a hopper 29 is located at one end of the conveyor assembly 20, as is well known in the art. The assembly 20 includes a main conveyor section 38 and a foldable conveyor section 40, which is foldable from the operating position A to the transport position B via a fold linkage 42, shown in FIG. 1. While the fold linkage 42 is preferably formed from steel, any other suitable material may be used in accordance with the preferred embodiment.

When in the operating position, the conveyor assembly 20 is supported by a undercarriage assembly 32 and a support 36. When the assembly 20 is to be transported, a releasable brake mechanism 34 is released, which allows the conveyor to be transported via wheels 30, as is well known in the art.

Referring now also to FIGS. 2 and 5, the conveyor frame 22 includes an upper frame member 44 and a lower frame member 46. The fold linkage 42 comprises a first hinge section 48 that is mounted onto the top of the main conveyor section 38 via a conventional welding operation, and a second hinge section 50 that is mounted onto the top of the foldable conveyor section 40 also via welding. While welding is used in accordance with the preferred embodiment, it should be appreciated that any other suitable method and apparatus could be used. The hinge sections 48 and 50 include a plurality of support members 51, and a corresponding pair of generally triangular flanges 53 that are rotatably connected to each other as will be described in further detail below. The first hinge section 48 further includes a rear plate 55 having a corresponding pair of flanges 58 disposed on an outer edge of the rear support plate. The main conveyor section 38 and foldable conveyor section 40 include reinforcing plates 110 that are located at joint 43.

The first and second hinge sections 48 and 50 include holes 52 and 54 (FIG. 5), respectively, that are aligned and that are secured via pins 56. A fluid pressure operated cylinder and corresponding piston, comprising a hydraulic cylinder 62 and rod 88 in the preferred embodiment, includes a flange 64 having opening 66 that mates with a corresponding hole 60 on flange 58 to attach the cylinder to the hinge section 48 via a locking pin 68. The cylinder 62 is thereby rotatably connected to the hinge section 48. The size of the hinge sections 48 and 50 are designed in accordance with the size of the conveyor section to which they are attached in order to accommodate the stresses associated with operation.

While the fold linkage 42 includes two sets of linkage members that are generally aligned with each other and disposed on opposite sides of the hinge sections 48 and 50, only one set will be described in detail.

The fold linkage 42 further includes a pivot arm 70 having first, second, and third joints 72, 74, and 76 respectively. Joint 72 includes a generally cylindrical sleeve 78 that is

mounted onto ends of a pivot shaft 80 that extends through the hinge section 48. A keeper 82 is then attached to the ends of the pivot shaft 80 to secure the rotatable connection of the pivot arm 70 to the hinge section 48. The pivot arm 70 includes a flange 84 having a generally circular opening 86 to partially form the second joint 74. The hydraulic cylinder 62 includes an extendible rod 88 having a coupler 90 that includes holes 92 that mate with opening 86. A pin 94 is inserted through the holes 92 and 86 to rotatably connect the pivot arm 70 to the hydraulic cylinder 62.

A link arm 96 is rotatably connected to the hinge section 50 via a generally cylindrical sleeve 98 and ends of a corresponding pivot shaft 100. A keeper 102 is attached to the pivot shaft 100 to secure the connection. The link arm 96 further includes a coupler 104 that mates with a generally cylindrical opening 108 of the third joint 76. A locking pin 106 is inserted into the coupler 104 and corresponding opening 108 to secure the rotatable connection of the pivot arm 70 to the link arm 96. Advantageously, because the fold linkage 42 is mounted to the upper frame member 44, the truss members require no modification to accommodate the fold linkage. Additionally, the fold linkage 42 may be preassembled before being mounted onto the conveyor 20.

Referring to FIG. 2, the fold linkage 42 is shown as being in an unfolded position when the rod 88 of the hydraulic cylinder 62 is in a retracted position. In operation, as the cylinder rod 88 extends as shown in FIG. 3, the pivot arm 70 rotates about the first joint 72, thereby biasing the link arm 96 to rotate the hinge section 50 and corresponding foldable conveyor section 40 about joint 43 towards the folded position relative to the main conveyor section 38. Therefore, when the cylinder rod 88 is in an extended position, as shown in FIG. 4, the assembly 20 is fully folded, thereby enabling the conveyor to be transported. Likewise, the rod 88 is retracted to rotate the foldable conveyor section 40 to the unfolded position (FIG. 2) thereby rendering the conveyor assembly 20 operational. Advantageously, the rod 88 is retracted during operation of the cylinder, thereby protecting it from potential hazards.

Referring now also to FIGS. 6 and 7, the hydraulic cylinder 62 includes a three-way valve assembly 117 that, when in an "extend position" 118, supplies pressure to the hydraulic cylinders 62 from a source 114. When the valve assembly 117 is in a "lock position" 120, the pressure within the cylinders 62 will remain constants thereby locking the position of rods 88. When the valve assembly 117 is in a "retract position" 122, the fluid within the cylinders 62 will return to a tank 116 to reduce the pressure within the cylinders 62 and retract the rods 88.

The valve assembly further includes check valves 119 that prevent the release of fluid due to the forces associated with folding and unfolding the foldable conveyor section 40. For example, as the foldable conveyor section 40 is being folded past the "half-way" point (FIG. 3), the forces associated with gravity acting on the relatively large conveyor section could cause the valve assembly 117 to fail. The check valve 119 resists the fluid pressure that results from these forces, and ensures that the valve assembly 117 will be able to accommodate a full folding and unfolding operation without undergoing failure. In operation, as is well known in the art, a variable-resistance spring element acts in conjunction with a pilot pressure to either permit or restrict fluid flow through the check valve. When closed, the valve will permit only unidirectional fluid flow from the source 114 to the cylinder 62.

The valve assembly 117 may also include a relief valve 112 to accommodate the hopper 29. More specifically, the relief valve 112 allows pressure to escape from the cylinder 62 once the rod 88 has extended beyond a predetermined

distance. The amount of permitted extension will be limited by the limited amount of permissible folding of the foldable conveyor section 40 in order to compensate for the hopper 29. Once the folding is completed, the rod 88 will be extended beyond the location of the relief valve 112. The relief valve 112 then activates, and the pressure within the cylinder 62 is limited. The limited pressure within the cylinder 62 correspondingly limits the amount of force applied to the members of the fold linkage 42 and the conveyor assembly 20 when the foldable conveyor section 40 is folded. For example, the amount of force that is supplied by the cylinder 62 when the rod 88 is extended beyond the location of the relief valve 112 may be a fraction of the force that is supplied before the rod 88 is extended beyond the location of the relief valve. The relief valve 112 thereby protects the hopper 29 and other members of the fold linkage 42 and conveyor assembly 20 from potential damage.

When the valve assembly 117 is in the "extend position" 118 and the rod 88 is extended beyond a predetermined distance, the relief valve will operate to allow pressure within the cylinder to escape into the tank 116. The amount of force with which the foldable conveyor section 40 is being biased against the main conveyor section is thereby limited. A stop 124 may also be attached to the main conveyor section 38 to support the foldable conveyor section 40 when it is in the folded position.

While the valve assembly has been described in accordance with an embodiment of the invention, it should be appreciated that other suitable arrangements incorporating a relief valve may be used.

Many other changes and modifications may be made to the invention without departing from the spirit thereof. The scope of the changes will become apparent from the appended claims.

I claim:

1. A modular fold linkage comprising:

- a first section;
- a second section that is rotatably connected to the first section;
- a pivot arm having first, second, and third joints, wherein the first joint is rotatably connected to the first section;
- a link arm connected to the second joint at one end, and to the second section of the conveyor at a second, opposite end; and
- an actuator that is attached to the first section at one end, and to the third joint at a second, opposite end, wherein actuation of the power device rotates the pivot arm so as to effect one of a folding and unfolding motion of the fold linkage.

2. The fold linkage of claim 1, wherein the first and second sections of the fold linkage are connected to corresponding first and second sections of a conveyor frame.

3. The fold linkage of claim 2, wherein all contact points between the linkage and the conveyor frame are free from contact with any internal members of the frame.

4. The fold linkage of claim 2, wherein the actuator comprises a fluid pressure operated cylinder and piston.

5. The fold linkage of claim 4, wherein the cylinder includes a relief valve to limit the pressure within the cylinder once the piston has extended beyond a predetermined distance.

6. The fold linkage of claim 5, wherein the piston is in a retracted position when conveyor is unfolded.

7. The fold linkage of claim 5, wherein the relief valve limits pressure within the cylinder so as to be one of equal to and less than a predetermined value.

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8. A method for folding a foldable conveyor section about a main conveyor section, wherein a first hinge section is connected to the main conveyor section, and wherein a second hinge section is connected to the foldable conveyor section, and wherein the first hinge section is rotatably 5 connected to the second hinge section, the method comprising:
extending a piston of a pressure operated cylinder, wherein the cylinder is connected to a first hinge section, and wherein the piston is connected to a pivot arm;

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rotating the pivot arm, wherein the pivot arm is connected to the first hinge section at a first location, and wherein the pivot arm is connected to the piston at a second location, and wherein the pivot arm is connected to a link arm at a third location; and
actuating the link arm, wherein the link arm is connected to the second hinge section, and wherein actuating the link arm rotates the foldable conveyor section relative to the main conveyor section.

* * * * *

Anexo 3

Copia de la respuesta presentada por el solicitante en respuesta a la acción oficial junto con las reivindicaciones modificadas junto con la traducción al español

REMARKS

CLAIM REJECTIONS - 35 USC§ 112

With regard to the attached amendment to the claims, Claim 10 has been deleted. The amendments to claims 13 and 24 now definitively point out the subject matter which is regarded as the invention, and it is submitted said amendments overcome the Examiner's rejection under 35 U.S.C. §112.

CLAIM REJECTIONS - 35 USC§ 102

Claims 1-24 are rejected under Section 102 based upon the teachings of US Patent 6,296,109 to Nohl. While the aforementioned patent does contain a conveyor apparatus, the Applicant respectfully submits that the prior art does not teach its invention. Nohl discloses a conveying apparatus that folds at a linkage point for easy transport of the apparatus. Nohl does not teach or suggest an apparatus having any first frame portion that includes multiple members nor any second, third, or fourth frame portions that are interconnected to each other and to the head and tail portions of the conveyor as required by claims 2-13 and 15-24. It is apparent that the examiner has broadly construed the term "frame portion" to include hydraulic cylinders (62 as shown in Nohl) as the second frame portion and a welded hinge (48 and 50 as shown in Nohl) as the fourth frame section. Applicant respectfully submits that such broad construction is not supported in the specification as Applicant defines actuation mechanisms, such as pistons, separately in the specification (see page 7 line 20). In addition, the fourth frame section is to be moveably attached to the other frame portions (see page 9 line 7). The hinge sections in Nohl are not moveably connected, but in fact are welded. Notwithstanding the above, Applicant has made amendments to claims 2-13 and 15-24 to better define the invention.

Also to that end, the Applicant has made amendments to claims 1 and 14 to better define the invention in the independent claims. The crux of this invention is the creation of a conveying

apparatus that allows for a smoother transition between the tail portion and head portion of a conveyor with a movable head portion over which a belt (and material) can ride when the head portion changes elevations. The smoother transition allows material to maintain contact with the belt and the idlers guiding the belt thereby discouraging the material from sliding at extreme head portion elevations. This sliding of material occurs in typical luffing conveyor systems that do not have this invention. When the material slides, it creates an undesired surge of material at the discharge of the head portion of the conveyor when the head portion has a very low elevation. In the present invention, the smoother transition maintains the contact between the material and the belt and idlers, thereby increasing the range of elevations the head portion of the conveyor can effectively operate.

The aforementioned improved transition is obtained by moveably attaching at least one frame portion to the head section and tail section of the conveyor apparatus where the frame portion has one or more idlers attached to it, which allows the belt and material to ride upon it. Claims 1 and 14 have been amended to capture this important element. This transition becomes even smoother when more frame portions (and idlers) are added to the apparatus. The prior art cited neither teaches nor suggests creating such a movable conveyor where frame portions attached between the head portion and tail portion have idlers attached to them for the belt and material to ride upon.

Lastly, Applicant respectfully disagrees with the Examiner's position set forth on page 4 line 8 of the office action ("A fourth frame portion is formed by members 48 and 50 that are attached to a plurality of idlers through the frame members 44/46 of the head and tail sections;"). If Applicant understands the Examiner's position correctly, a frame portion is considered to be attached to a set of idlers simply because the idlers are connected to the head or tail portions,

which in turn is then attached to the subject frame portion. This is essentially saying the ankle is attached to the wrist by virtue of it being connected to the shin bone, which is attached to the knee bone and so forth until there is a final connection to the wrist bone. From a structural standpoint, Applicant respectfully submits that such a position is unreasonable.

It is respectfully submitted that, with the amendments made to the claims 1-24, the Examiner's rejections for under Section 102 have been overcome. Applicant also submits that these amendments are supported in the specification.

It is therefore submitted that this response addresses all of the grounds of rejection that were raised in the Office Action mailed March 11, 2011. Reconsideration of the rejection of the claims and their allowance in amended form is respectfully requested. Should the Examiner determine that a discussion of the content of this response or the application would be helpful, the Examiner is encouraged to contact the Applicant's attorney at the telephone number or email address shown below.

Respectfully submitted,

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AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A conveyor apparatus comprising:
 a tail portion moveably connected to a head portion such that the head portion is moveable relative to the tail portion from a first position to a second position located lower or higher than the first position; ~~and~~
 at least one frame portion moveably positioned between the tail portion and the head portion such that the at least one frame portion moves when the head portion moves from the first position to the second position; ~~and~~
at least one idler attached to said at least one frame portion.

2. (Cancelled).

3. (Currently Amended) The conveyor apparatus of claim ~~2~~1 wherein the at least one frame portion ~~is also further comprised of:~~
a first frame portion having a first end and a second end attached between the tail portion and the head portion having a first member and a second member, the first frame portion being moveably attached to at least one of the tail portion and the head portion;
 a second frame portion, the second frame portion having a first ~~side~~end and a second ~~side~~end opposite the first ~~side~~end, the second frame portion being moveably attached to the first frame portion adjacent to the first ~~side~~end of the second frame portion and the second frame portion attached to one of the tail portion ~~and/or~~ the head portion adjacent to the second ~~side~~end of the second frame portion.

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4. (Currently Amended) The conveyor apparatus of claim 3 wherein the at least one frame portion is further comprised of:

~~also~~ a third frame portion having a first sideend and a second sideend opposite the first sideend of the third frame portion and wherein the second frame portion is attached to the tail portion, the third frame portion moveably attached to the first frame portion adjacent to the first sideend of the third frame portion, the third frame portion attached to the head portion adjacent to the second sideend of the third frame portion.

5. (Cancelled).

6. (Currently Amended) The conveyor apparatus of claim 53 wherein the first end of the first frame portion is attached to the tail portion and the second end of the first frame portion is attached to the head portion. ~~at least one frame portion is also comprised of a fourth frame portion having a first side and a second side opposite the first side of the fourth frame portion, the fourth frame portion moveably attached to one of the second frame portion and the third frame portion adjacent to the first side of the fourth frame portion and the fourth frame portion attached to the other of the second frame portion and the third frame portion adjacent to the second side of the fourth frame portion.~~

7. (Currently Amended) The conveyor apparatus of claim 4 wherein each of the members of the first frame portion have a pivot point at which the first end of the second frame portion and the second end of the third frame portion are moveably attached.

~~4 wherein the at least one frame portion is also comprised of a fourth frame portion having a first side and a second side opposite the first side of the first frame portion, the fourth frame portion moveably attached to one of the second frame portion and the third frame portion adjacent to the first side of the fourth frame portion and the fourth frame portion attached to the other of the second frame portion and the third frame portion adjacent to the second side of the fourth frame portion.~~

8. (Currently Amended) The conveyor apparatus of claim 7 wherein said at least one frame portion is further comprising a fourth frame portion, the fourth frame portion having a first end and a second end opposite the first end of the fourth frame portion, the fourth frame portion moveably connected to one of the second frame portion or the third frame portion adjacent to the first end of the fourth frame portion and the fourth frame portion attached to the other of the second frame portion or the third frame portion adjacent to the second end of the fourth frame portion, the fourth frame portion moving when the head portion moves from the first position to the second position and the fourth frame portion being positioned adjacent to the pivot points of the members of the first frame portion.

~~claim 7 wherein the fourth frame portion is moveably attached to the third frame portion and the second frame portion is moveably attached to the tail portion and the third frame portion is moveably attached to the head portion.~~

9. (Currently Amended) The conveyor apparatus of ~~claim 18~~ wherein at least one idler or at least one troughed idler ~~at least one frame portion is attached to at least one idler or at least one troughed idler~~ each of said second, third and fourth frame portions.

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10. (Cancelled).

11. (Currently Amended) The conveyor apparatus of claim 23 wherein the members of the first frame portion are elongated members that extend~~is comprised of at least one member extending~~ from the tail portion to the head portion.

12. (Original) The conveyor apparatus of claim 1 further comprising a flexible elongated member configured to move from the tail portion to the head portion, the flexible elongated member supported by the head portion, the tail portion and the at least one frame portion.

13. (Currently Amended) The conveyor of claim 1 ~~wherein the conveyor apparatus does not include~~ further comprising a fixed bend pulley with a floating axis arranged adjacent to ~~aligned with~~ an axis of rotation that defines a path of movement for the head portion.

14. (Currently Amended) A stacker comprising a base that supports a conveyor apparatus, the conveyor apparatus comprising a tail portion moveably connected to a head portion such that the head portion is moveable relative to the tail portion from a first position to a second position located lower or higher than the first position and at least one frame portion moveably positioned between the tail portion and the head portion such that the at least one frame portion moves when the head portion moves from the first position to the second position and at least one idler attached to said at least one frame portion.

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15. (Currently Amended) The stacker of claim 14 wherein the at least one frame portion further comprises:

a first frame portion attached between the tail portion and the head portion having a first member and a second member, the first frame portion being moveably attached to at least one of the tail portion and the head portion;

a second frame portion, the second frame portion having a first end and a second end opposite the first end, the second frame portion being moveably attached to the first frame portion adjacent to the first end of the second frame portion and the second frame portion attached to one of the tail portion or the head portion adjacent to the second end of the second frame portion.

~~wherein the at least one frame portion is comprised of frame means configured to move when the head portion moves from the first position to the second position.~~

16. (Currently Amended) The stacker of claim 15 wherein the at least one frame portion further comprises a third frame portion having a first end and a second end opposite the first end of the third frame portion and wherein the second frame portion is attached to the tail portion, the third frame portion moveably attached to the first frame portion adjacent to the first end of the third frame portion, the third frame portion attached to the head portion adjacent to the second end of the third frame portion. ~~14 wherein the at least one frame portion is comprised of a first frame portion attached between the tail portion and the head portion, the first frame portion being moveably attached to at least one of the tail portion and the head portion such that~~

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~~the first frame portion moves when the head portion moves from the first position to the second position.~~

17. (Currently Amended) The stacker of claim 16 wherein each of the members of the first frame portion have a pivot point at which the first end of the second frame portion and the second end of the third frame portion are moveably attached. ~~16 wherein the at least one frame portion is also comprised of a second frame portion, the second frame portion having a first side and a second side opposite the first side, the second frame being moveably attached to the first frame portion adjacent to the first side of the second frame portion, the second frame portion attached to one of the tail portion and the head portion adjacent to the second side of the second frame portion.~~

18. (Currently Amended) The stacker of claim 17 wherein said at least one frame portion is further comprising a fourth frame portion, the fourth frame portion having a first end and a second end opposite the first end of the fourth frame portion, the fourth frame portion moveably attached to one of the second frame portion or the third frame portion adjacent to the first end of the fourth frame portion and the fourth frame portion attached to the other of the second frame portion or the third frame portion adjacent to the second end of the fourth frame portion, the fourth frame portion moving when the head portion moves from the first position to the second position and the fourth frame portion being positioned adjacent to the pivot points of the members of the first frame portion. ~~17 wherein the at least one frame portion is also comprised of a third frame portion having a first side and a second side opposite the first side of the third frame portion and wherein the second frame portion is attached to the tail portion, the~~

~~third frame portion moveably attached to the first frame portion adjacent to the first side of the third frame portion, the third frame portion attached to the head portion adjacent to the second side of the third frame portion.~~

19. (Currently Amended) The stacker of claim 18 wherein at least one idler or at least one troughed idler is attached to each of said second, third and fourth frame portions. 17 wherein ~~the at least one frame portion is also comprised of a third frame portion having a first side and a second side opposite the first side of the third frame portion and wherein the second frame portion is attached to the head portion, the third frame portion moveably attached to the first frame portion adjacent the first side of the third frame portion, the third frame portion attached to the tail portion adjacent to the second side of the third frame portion.~~

20. (Currently Amended) The stacker of claim ~~19~~ 14 wherein the members of the first frame portion are elongated members that extend from the tail portion to the head portion. ~~wherein the at least one frame portion is also comprised of a fourth frame portion having a first side and a second side opposite the first side of the fourth frame portion, the fourth frame portion moveably attached to one of the second frame portion and the third frame portion adjacent to the first side of the fourth frame portion and the fourth frame portion attached to the other of the second frame portion and the third frame portion adjacent to the second side of the fourth frame portion.~~

21. (Currently Amended) The stacker of claim ~~18~~ 14 further comprising a plurality of actuation mechanisms positioned between the head portion and the tail portion to drive

movement of the head portion from the first position to the second position, wherein the at least
~~one frame portion is also comprised of a fourth frame portion having a first side and a second~~
~~side opposite the first side of the fourth frame portion, the fourth frame portion moveably~~
~~attached to one of the second frame portion and third frame portion adjacent to the first side of~~
~~the fourth frame portion and the fourth frame portion is attached to the other of the second frame~~
~~portion and the third frame portion adjacent to the second side of the fourth frame portion.~~

22. (Cancelled).

23. (Cancelled).

24. (Currently Amended) The conveyor of claim 14 ~~wherein the conveyor apparatus does~~
~~not include~~ further comprising a fixed bend pulley with a floating axis arranged adjacent to
~~aligned with~~ an axis of rotation that defines a path of movement for the head portion.

Objeción de reivindicaciones – 35 USC § 112

En relación con las reivindicaciones modificadas adjuntas, la reivindicación 10 ha sido eliminada. Las modificaciones a las reivindicaciones 13 y 24 definen ahora de manera inequívoca la materia considerada como la invención, y se advierte que dichas modificaciones permiten conciliar la objeción del examinador bajo 35 U.S.C. § 112.

Objeción de reivindicaciones – 35 USC § 102

Las reivindicaciones 1-24 han sido rechazadas bajo la sección 102 con base a lo revelado en la patente US 6, 296,109 de Nohl. Si bien la patente mencionada contiene efectivamente un aparato de transporte, el solicitante se permite señalar respetuosamente que el arte previo no anticipa su invención. Nohl revela un aparato de transporte que se pliega sobre un punto de unión para facilitar su transporte. Nohl no enseña ni sugiere, sin embargo, un aparato con una primera porción de estructura que incluya múltiples miembros ni tampoco una segunda, tercera o cuarta porción de estructura interconectadas entre sí y a las porciones de cabeza y cola del transportador, como lo requiere las reivindicaciones 2-13 y 15-24. Resulta aparente que el examinador ha construido de manera vaga el término "porción de la estructura" para incorporar cilindros hidráulicos (62, según se menciona en Nohl) como la segunda porción de la estructura y una articulación soldada (48 y 50, según se menciona en Hohl) como la cuarta sección de la estructura. El solicitante se permite señalar respetuosamente que tal construcción, realizada de forma tan amplia, no encuentra su equivalente en la presente solicitud toda vez que el solicitante define mecanismos actuadores, tales como pistones, de manera separada en la solicitud (ver pag. 7, línea 20). De manera adicional, la cuarta porción de la estructura debe ser acoplada de manera movable a las otras porciones de la estructura (ver pag. 9, línea 7). Las secciones de articulaciones en Hohl, por otra parte, no se encuentran conectadas de forma movable, sino que de hecho se encuentran soldadas. No obstante lo anterior, el solicitante ha efectuado modificaciones sobre las reivindicaciones 2-13 y 15-24 para definir más apropiadamente la presente invención.

Así mismo, en búsqueda de tal fin, el solicitante ha realizado modificaciones sobre las reivindicaciones 1 y 14 para definir más apropiadamente la invención en las reivindicaciones independientes. La esencia de la presente invención es la creación de un

aparato de transporte que permita una transición más suave entre la porción de la cola y la porción de la cabeza de un transportador con una porción de cabeza móvil sobre la cual una correa (y material) pueden viajar cuando la porción de cabeza cambia su elevación. La transición más suave permite que el material mantenga contacto con la correa y con las poleas que guían la correa, evitando por tanto que el material se deslice a elevaciones extremas de la porción de cabeza. Este deslizamiento de material ocurre en sistemas típicos de transportadoras de elevación que no presentan la presente invención. Cuando el material se desliza, este crea una agitación indeseada de material en la descarga de la porción de cabeza del transportador cuando la porción de cabeza tiene una elevación muy baja. En la presente invención, la transición más suave mantiene el contacto entre el material y la correa y poleas, incrementando por tanto el rango de elevaciones en el cual la porción de cabeza del transportador puede operar efectivamente.

Esta transición mejorada, según se mencionó previamente, se obtiene al acoplar de manera movable al menos una porción de la estructura a la sección de cabeza y a la sección de cola del aparato transportador, en donde la porción de la estructura tiene una o más poleas acopladas a ella, lo que permite el movimiento de la correa y del material sobre ella. Las reivindicaciones 1 y 14 han sido modificadas para incluir este elemento fundamental. Esta transición resulta aún más suave cuando más porciones de la estructura (y poleas) se adicionan al aparato. El arte previo citado no enseña ni sugiere la creación de tal transportador móvil en donde las porciones de la estructura acopladas entre la porción de cabeza y la porción de cola tengan poleas acopladas a ellas para el desplazamiento de la correa y del material sobre ella.

Por último, el solicitante respetuosamente se permite discrepar con la posición del examinador presentada en la página 4, línea 8 del oficio técnico ("Una cuarta porción de la estructura se forma por los miembros 48 y 50 que están acoplados a una pluralidad de poleas a través de los miembros de la estructura 44/46 de las secciones de cabeza y cola"). Si el solicitante ha interpretado correctamente la posición del examinador, la porción de la estructura se acopla a un conjunto de poleas simplemente por estar estas conectadas a la porción de cabeza o a la porción de cola, de manera que se acoplan consecuentemente a la porción de la estructura. Esto diría, esencialmente, que el tobillo de una persona se conecta a la muñeca por estar el tobillo conectado a la tibia, la cual se

acopla al hueso de la rodilla y así sucesivamente hasta llegar a la conexión final con el hueso de la muñeca. Desde un punto de vista estructural, el solicitante afirma respetuosamente que tal consideración resulta irrazonable.

Se menciona entonces, respetuosamente, que las modificaciones hechas sobre las reivindicaciones 1-24, las objeciones del examinador bajo la sección 102 han sido superadas. El solicitante advierte, adicionalmente, que estas modificaciones se encuentran soportadas por la solicitud correspondiente.

Se advierte, por tanto, que la presente respuesta ha considerado todos los marcos de la objeción presentada por el oficio técnico presentado en Marzo 11, 2011. Se solicita, por tanto, la reconsideración de las objeciones presentadas sobre las reivindicaciones y la aceptación de las mismas en su forma modificada.

REIVINDICACIONES MODIFICADAS
OFICIO TECNICO USPTO

1. Un aparato transportador que comprende:

Una porción de cola conectada en forma movable a una porción de cabeza de manera que la porción de cola se mueva en relación con la porción de cola desde una primera posición a una segunda posición localizada más abajo o más arriba que la primera posición; and

Por lo menos una porción de la estructura movable ubicada entre la porción de cola y la porción de cabeza de manera que por lo menos una porción de cabeza se mueve cuándo la porción de cabeza se mueve desde la primera posición a la segunda posición, y

Por lo menos una polea conectada a por lo menos una porción de la estructura.

2. Cancelada

3. (actualmente modificada) El aparato transportador de la Reivindicación 1 en el cual por lo menos una porción de la estructura además comprende:

Una primera porción de la estructura que tiene un primer extremo y un segundo extremo conectado entre la porción de cola y la porción de cabeza que tiene un primer miembro y un segundo miembro,

siendo la primera porción de la estructura movable conectada a por lo menos una de la porción de cola y la porción de cabeza;

Una segunda porción de la estructura, teniendo la segunda porción de la estructura un primer extremo y un segundo extremo opuesto al primer extremo, estando la porción de la segunda estructura conectada en forma movable a la primera porción adyacente al primer extremo de la segunda porción de la estructura y la segunda porción de la estructura conectada a una de las porciones de cola o de las porciones de cabeza adyacentes al segundo lado de la segunda porción de la estructura.

4. El aparato transportador de la Reivindicación 3 en el cual por lo menos una porción de la estructura además comprende

~~También~~ una tercera porción de la estructura que tiene un primer ~~lado~~-extremo y un segundo lado extremo opuesto al primer ~~lado~~ extremo de la tercera porción de la estructura y donde la segunda porción de la estructura está conectada a la porción de cola, la tercera porción de la estructura está conectada en forma movable a la tercera porción de la estructura adyacente al primer extremo de la tercera porción de la estructura, la tercera porción de la estructura conectada a la porción de cabeza adyacente al segundo extremo de la tercera porción de la estructura.

5. (cancelada)

6. (actualmente modificada) El aparato transportador de la Reivindicación 53 en el cual el primer extremo de la primera porción

de la estructura está conectada a la porción de cola y el segundo extremo de la primera porción de la estructura está conectada a la porción de cabeza ~~por lo menos una porción de la estructura también está comprendida de una cuarta porción de la estructura que tiene un primer lado y un segundo lado opuesto al primer lado de la cuarta porción de la estructura, la cuarta porción de la estructura está conectada en forma movable a una de la segunda porción de la estructura y la tercera porción de la estructura adyacente al primer lado de la cuarta porción de la estructura y la cuarta porción de la estructura adjunta a la otra porción de la segunda porción de la estructura y la tercera porción de la estructura adyacente al segundo lado de la cuarta porción de la estructura.~~

7. El aparato transportador de la Reivindicación 53 en el cual cada uno de los miembros de la primera porción de la estructura tiene un pivote en el cual el primer extremo de la segunda porción de la estructura y el primer extremo de la tercera porción de la estructura se conecta en forma movable en el cual por lo menos una ~~porción de la estructura también está comprendida de una cuarta porción de la estructura que tiene un primer lado y un segundo lado opuesto al primer lado de la primera porción de la estructura, la cuarta porción de la estructura está conectada en forma movable a una de la segunda porción de la estructura y la tercera porción de la estructura adyacente al primer lado de la cuarta porción de la estructura y la cuarta porción de la estructura conectada a la otra de la segunda porción de la estructura y la tercera porción de la estructura adyacente al segundo lado de la cuarta porción de la estructura.~~

8. (actualmente modificada) El aparato transportador de la Reivindicación 7 en el cual por lo menos una porción de la estructura además comprende una cuarta porción de la estructura, teniendo la cuarta porción de la estructura un primer extremo y un segundo extremo opuesto al primer extremo de la cuarta porción de la estructura, la cuarta porción de la estructura conectada en forma movable a una de la segunda porción de la estructura o la tercera porción de la estructura adyacente al primer extremo de la cuarta porción de la estructura y la cuarta porción de la estructura conectada a la otra de la segunda porción de la estructura o la tercera porción de la estructura adyacente al segundo extremo de la cuarta porción de la estructura, moviéndose una cuarta porción de la estructura cuando la porción de cabeza se mueve desde la primera posición a la segunda posición y la cuarta porción de la estructura ubicada adyacente a los puntos en pivote de los miembros de la primera porción de la estructura. ~~Reivindicación 7 en el cual la cuarta porción de la estructura está conectada en forma movable a la tercera porción de la estructura y la segunda porción de la estructura está conectada en forma movable a la porción de cola y la tercera porción de la estructura está conectada en forma movable a la porción de cabeza.~~

9. (actualmente modificada) El aparato transportador de la Reivindicación 1 8 en el cual por lo menos una polea o por lo menos una polea ondulada está conectada a ~~por lo menos una polea o por lo menos una polea ondulada~~ a una segunda, tercera o cuarta porciones de la estructura.

10. (cancelada)

11. (actualmente modificada) El aparato transportador de la Reivindicación 2 3 en el cual los miembros de la primera porción de la estructura son miembros alargados que se extienden un miembro ~~que se extiende~~ desde la porción de cola a la porción de cabeza.

12. (original) El aparato transportador de la Reivindicación 1 que comprende además un miembro flexible alargado configurado para moverse desde la porción de cola a la porción de cabeza, estando el miembro flexible alargado apoyado por la porción de cabeza, la porción de cola y por lo menos una porción de la estructura.

13. El aparato transportador de la Reivindicación 1 ~~en el cual el aparato transportador no incluye~~ que además comprende una polea con un eje flotante dispuesto adyacente a un eje de rotación que define una trayectoria de movimiento para la porción de cabeza.

14. Una apiladora que comprende una base que soporta un aparato transportador, comprendiendo el aparato transportador una porción de cola movable conectada a una porción de cabeza de manera que la porción de cabeza se mueve en relación con la porción de cola desde una primera posición a una segunda posición localizada más abajo o más arriba que la primera posición y por lo menos una porción movable ubicada entre la porción de cola y la porción de cabeza de manera que por lo menos una porción de la estructura se mueve cuando la porción de cabeza se mueve desde la primera posición a la segunda posición y por lo menos una polea conectada a por lo menos esa porción de la estructura.

15. (actualmente modificada) La apiladora de la Reivindicación 14 en la cual por lo menos una porción de la estructura comprende además:

una primera porción de la estructura conectada entre la porción de la cola y la porción de cabeza que tiene un primer miembro y un segundo miembro, la primera porción de la estructura conectada de forma movable a la porción de cabeza o a la porción de cola;

una segunda porción de la estructura, la segunda porción de la estructura que tiene un primer extremo y un segundo extremo opuesto al primer extremo, la segunda porción de la estructura conectada de forma movable a la primera porción de la estructura adyacente al primer extremo de la segunda porción de la estructura y la segunda porción de la estructura conectada a la porción de cabeza o a la porción de cola adyacente el segundo extremo de la segunda porción de la estructura

~~en la cual por lo menos una porción de la estructura está comprendida de medios de la estructura configurada para moverse cuando la porción de cabeza se mueve desde la primera posición a la segunda posición.~~

16. (actualmente modificada) La apiladora de la Reivindicación 15 en la cual al menos una porción de la estructura comprende además una tercera porción de la estructura que tiene un primer extremo y un segundo extremo opuesto al primer extremo y en donde la segunda porción de la estructura está conectada a la porción de cola,

la tercera porción de la estructura conectada de forma movable a la primera porción de la estructura adyacente al primer extremo de la tercera porción de la estructura, la tercera porción de la estructura conectada a la porción de cabeza adyacente al segundo extremo de la tercera porción de la estructura.

~~en la cual por lo menos una porción está comprendida de una primera porción de la estructura conectada entre la porción de cola y la porción de cabeza, estando la primera porción de la estructura conectada en forma movable a por lo menos una de la porción de cola y la porción de cabeza de manera que la primera porción de la estructura se mueve cuando las porciones de cabeza de mueven desde la primera posición a la segunda posición.~~

17. (actualmente modificada) La apiladora de la Reivindicación 16 en donde cada uno de los miembros de la primera porción de la estructura tiene un pivote al cual se conectan de forma movable el primer extremo de la segunda porción de la estructura y el primer extremo de la tercera porción de la estructura ~~16 en la cual una primera porción también comprende una segunda porción de la estructura, teniendo la segunda porción de la estructura un primer lado y un segundo lado opuesto al primer lado, estando la segunda estructura conectada en forma movable a la primera porción de la estructura adyacente al primer lado de la segunda porción de la estructura, la segunda porción de la estructura conectada a una de la porción de cola y la porción de cabeza adyacente al segundo lado de la segunda porción de la estructura.~~

18. (actualmente modificada) La apiladora de la Reivindicación 17 en donde al menos una porción de la estructura comprende además una cuarta porción de la estructura que tiene un primer extremo y un segundo extremo opuesto al primer extremo, la cuarta porción de la estructura conectada de forma movable a la segunda porción de la estructura o a la tercera porción de la estructura adyacente al primer extremo de la cuarta porción de la estructura y la cuarta porción de la estructura conectado a la segunda porción de la estructura o a la tercera porción de la estructura adyacente al segundo extremo de la cuarta porción de la estructura, la cuarta porción de la estructura se mueve cuando la porción de cabeza se mueve de la primera posición a la segunda posición y la cuarta porción de la estructura se ubica adyacente a los pivotes de los miembros de la primera porción de la estructura.

~~17 en la cual por lo menos una porción de la estructura también está comprendida de una tercera porción de la estructura que tiene un primer lado y un segundo lado opuesto al primer lado de la tercera porción de la estructura y en la cual la segunda porción de la estructura está conectada a la porción de cola, la tercera porción de la estructura conectada en forma movable a la primera porción adyacente al primer lado de la tercera porción de la estructura, la tercera porción de la estructura conectada a la porción de cabeza adyacente al segundo lado de la tercera porción de la estructura~~

19. (actualmente modificada) La apiladora de la Reivindicación 18 en la cual por lo menos una polea o por lo menos una polea ondulada está conectada a cada una de las mencionadas segunda, tercera o cuarta porciones de la estructura.

~~17 en la cual por lo menos una porción de la estructura también está comprendida de una tercera porción de la estructura que tiene un primer lado y un segundo lado opuesto al primer lado de la tercera porción de la estructura y en la cual la segunda porción de la estructura está conectada a la porción de cabeza, la tercera porción de la estructura conectada en forma movable a la primera porción de la estructura adyacente al primer lado de la tercera porción de la estructura, la tercera porción de la estructura conectada a la porción de cola adyacente al segundo lado de la tercera porción de la estructura~~

20. (actualmente modificada) La apiladora de la Reivindicación 19 14 en el cual los miembros de la primera porción de la estructura son miembros alargados que se extienden desde la porción de cola hasta la porción de cabeza.

~~en la cual por lo menos una porción de la estructura también está comprendida de una cuarta porción de la estructura que tiene un primer lado y un segundo lado opuesto al primer lado de la cuarta porción de la estructura, la cuarta porción de la estructura conectada en forma movable a una de la segunda porción de la estructura y la tercera porción de la estructura adyacente al primer lado de la cuarta porción de la estructura y la cuarta porción de la estructura conectada a la otra de la segunda porción de la estructura y la tercera porción de la estructura adyacente al segundo lado de la cuarta porción de la estructura~~

21. (actualmente modificada) La apiladora de la Reivindicación 18 14 que además comprende una pluralidad de mecanismos actuadores posicionados entre la porción de cabeza y la porción de cola que imparten movimiento a la porción de cabeza desde la primera posición hasta la segunda posición.

~~en la cual por lo menos una porción de la estructura también está comprendida de una cuarta porción de la estructura que tiene un primer lado y un segundo lado opuesto al primer lado de la cuarta porción de la estructura, la cuarta porción de la estructura conectada en forma movable a una de la segunda porción de la estructura y una tercera porción de la estructura adyacente al primer lado de la cuarta porción de la estructura y la cuarta porción de la estructura está conectada a la otra de la segunda porción de la estructura y la tercera porción de la estructura adyacente al segundo lado de la cuarta porción de la estructura~~

22. (cancelada)

23. (cancelada)

24. La apiladora de la Reivindicación 14 ~~en donde el aparato transportador no incluye~~ que además comprende una polea con un eje flotante dispuesto adyacente a un eje de rotación alrededor del cual se mueve la porción de cabeza.

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Anexo 4

Copia del índice de reivindicaciones (index of claims) en donde se establece cuáles son las reivindicaciones concedidas mediante el símbolo (=).

Index of Claims 	Application/Control No. 12465834	Applicant(s)/Patent Under Reexamination SCHAFER, SCOTT D.
	Examiner MARK A DEUBLE	Art Unit 3651

✓	Rejected
=	Allowed

-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

☒ Claims renumbered in the same order as presented by applicant										
☐ CPA										
☐ T.D.										
☐ R.1.47										
CLAIM		DATE								
Final	Original	03/09/2011	06/02/2011							
	1	✓	=							
	2	✓	-							
	3	✓	=							
	4	✓	=							
	5	✓	-							
	6	✓	=							
	7	✓	=							
	8	✓	=							
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	20	✓	=							
	21	✓	=							
	22	✓	-							
	23	✓	-							
	24	✓	=							

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Search Notes 	Application/Control No. 12465834	Applicant(s)/Patent Under Reexamination SCHAFER, SCOTT D.
	Examiner MARK A DEUBLE	Art Unit 3651

SEARCHED			
Class	Subclass	Date	Examiner
198	318-320		
	592		
	861.3	3/9/11	md
above	updated	6/2/11	md

SEARCH NOTES		
Search Notes	Date	Examiner
see EAST prior art search	3/9/11	md

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner
	see EAST interference search	6/2/11	md

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[illegible][illegible]

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	19	
/MARK A DEUBLE/ Primary Examiner.Art Unit 3651	6/2/11	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Complete if Known

Application Number	12/465 834
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Filing Date	05/14/2009
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First Named Inventor	Scott D. Schafer
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Art Unit	3651
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Examiner Name	Deuble, Mark A.
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Attorney Docket Number	9144-00142
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Sheet	1	of	1
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Examiner Signature		Date Considered	
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. ¹ Applicant's unique citation designation number (optional). ² See Kinds Codes of USPTO Patent Documents at www.uspto.gov, or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Anexo 5

Copia de la notificación de concesión (notice of allowability) en donde se establece que las reivindicaciones concedidas son las 1,3,4,6-9,11-21 y 24.

Notice of Allowability	Application No.	Applicant(s)	
	12/465,834	SCHAFFER, SCOTT D.	
	Examiner	Art Unit	
	MARK A. DEUBLE	3651	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the amendment of 5/23/11.

2. ☒ The allowed claim(s) is/are 1,3,4,6-9,11-21 and 24.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some* c) ☐ None of the:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. _____.

3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.

(a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached

1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.

(b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)	5. ☐ Notice of Informal Patent Application
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)	6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
3. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____	7. ☐ Examiner's Amendment/Comment
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material	8. ☐ Examiner's Statement of Reasons for Allowance
	9. ☐ Other _____

/MARK A DEUBLE/ Primary Examiner Art Unit: 3651	
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EAST Search History

EAST Search History (Prior Art)

< This search history is empty >

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	11	((198/318) or (198/319) or (198/320) or (198/592) or (198/861.3)).CCLS.	US-PGPUB; UPAD	OR	OFF	2011/06/02 14:53
L2	16	(convey\$3 head tail frame (idler or roller) position move\$3).clm.	US-PGPUB; USPAT; UPAD	AND	ON	2011/06/02 14:55

6/ 2/ 11 2:57:00 PM
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\ 12525375.wsp

Anexo 6

**Notificación de aceptación en donde se establece que la solicitud ha sido
examinada y aceptada para conceder la patente.**



NOTICE OF ALLOWANCE AND FEE(S) DUE

7590 06/21/2011
Daniel DeJoseph
FLSmith Inc.
2040 Avenue "C"
Bethlehem, PA 18017-2188

EXAMINER	
DEUBLE, MARK A	
ART UNIT	PAPER NUMBER
3651	

DATE MAILED: 06/21/2011

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/465,834	05/14/2009	Scott D. Schafer	9144-00142	4500

TITLE OF INVENTION: CONVEYOR APPARATUS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	09/21/2011

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

- A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.
- B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

- A. Pay TOTAL FEE(S) DUE shown above, or
- B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or **Fax (571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

7590 06/21/2011
Daniel DeJoseph
FLSmith Inc.
2040 Avenue "C"
Bethlehem, PA 18017-2188

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

	(Depositor's name)
	(Signature)
	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/465,834	05/14/2009	Scott D. Schafer	9144-00142	4500

TITLE OF INVENTION: CONVEYOR APPARATUS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	09/21/2011

EXAMINER	ART UNIT	CLASS-SUBCLASS
DEUBLE, MARK A	3651	198-312000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363). ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached. ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.	2. For printing on the patent front page, list (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 1 _____ 2 _____ 3 _____
---	--

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)
PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.
(A) NAME OF ASSIGNEE _____ (B) RESIDENCE: (CITY and STATE OR COUNTRY) _____

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted: ☐ Issue Fee ☐ Publication Fee (No small entity discount permitted) ☐ Advance Order - # of Copies _____	4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above) ☐ A check is enclosed. ☐ Payment by credit card. Form PTO-2038 is attached. ☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).
--	---

5. Change in Entity Status (from status indicated above)
☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____	Date _____
Typed or printed name _____	Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

67



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/465,834	05/14/2009	Scott D. Schafer	9144-00142	4500
7590		06/21/2011	EXAMINER	
Daniel DeJoseph		DEUBLE, MARK A		
FLSmith Inc.		ART UNIT		
2040 Avenue "C"		PAPER NUMBER		
Bethlehem, PA 18017-2188		3651		

DATE MAILED: 06/21/2011

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 240 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 240 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Anexo 7

Notificación de aceptación (issue notification) en donde se establece el número y fecha de la patente.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/465,834	08/16/2011	7997406	9144-00142	4500

7590 07/27/2011

Daniel DeJoseph
FLSmith Inc.
2040 Avenue "C"
Bethlehem, PA 18017-2188

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment is 240 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Scott D. Schafer, Spokane, WA;

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Anexo 8

**Copia de la patente US 7,997,406 del 16 de agosto de 2011 junto
con la traducción de las reivindicaciones concedidas.**



US007997406B2

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(12) **United States Patent**
Schafer

(10) **Patent No.:** **US 7,997,406 B2**
(45) **Date of Patent:** **Aug. 16, 2011**

(54) **CONVEYOR APPARATUS**

(75) **Inventor:** **Scott D. Schafer, Spokane, WA (US)**

(73) **Assignee:** **FLSmith A/S (DK)**

(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 240 days.

(21) **Appl. No.:** **12/465,834**

(22) **Filed:** **May 14, 2009**

(65) **Prior Publication Data**
US 2010/0288603 A1 Nov. 18, 2010

(51) **Int. Cl.**
B65G 21/10 (2006.01)
(52) **U.S. Cl.** **198/861.3; 198/318; 198/592**
(58) **Field of Classification Search** **198/318-320, 198/592, 861.3**
See application file for complete search history.

(56) **References Cited**

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FLSmith Brochure Materials.

* cited by examiner

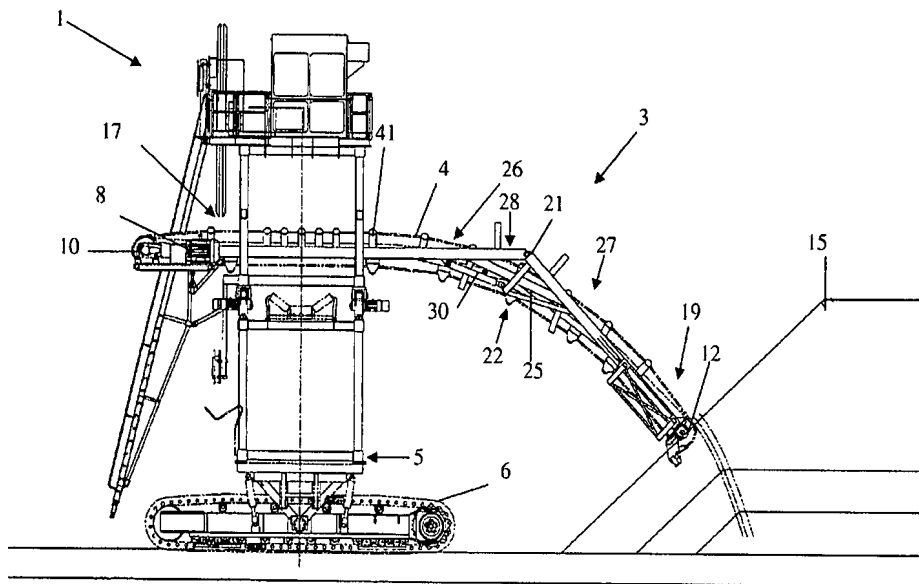
Primary Examiner — Mark A Deuble

(74) *Attorney, Agent, or Firm* — Aaron M. Pile; Daniel DeJoseph

(57) **ABSTRACT**

A conveyor apparatus includes a tail portion connected to a head portion such that the head portion is moveable relative to the tail portion from a first position to a second position located lower than the first position. It should be appreciated that such movement of the head portion can permit the drop height of the conveyor apparatus to be adjusted. At least one frame portion is moveably positioned between the tail portion and the head portion. A stacker is also provided that includes the conveyor apparatus.

19 Claims, 9 Drawing Sheets



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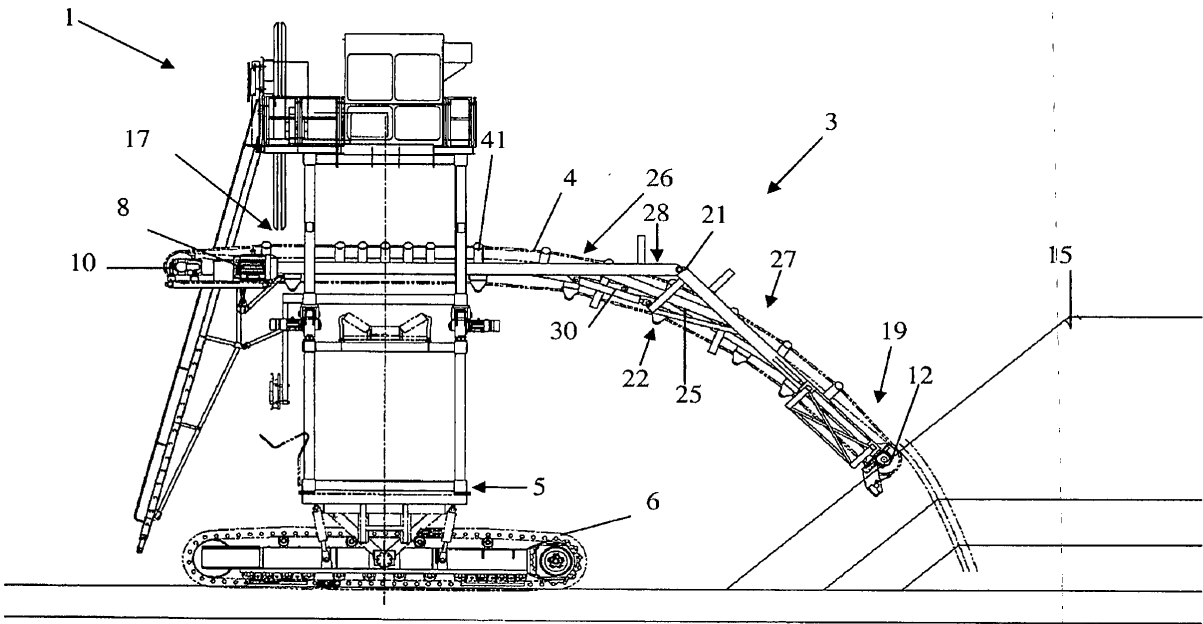


Figure 1

74

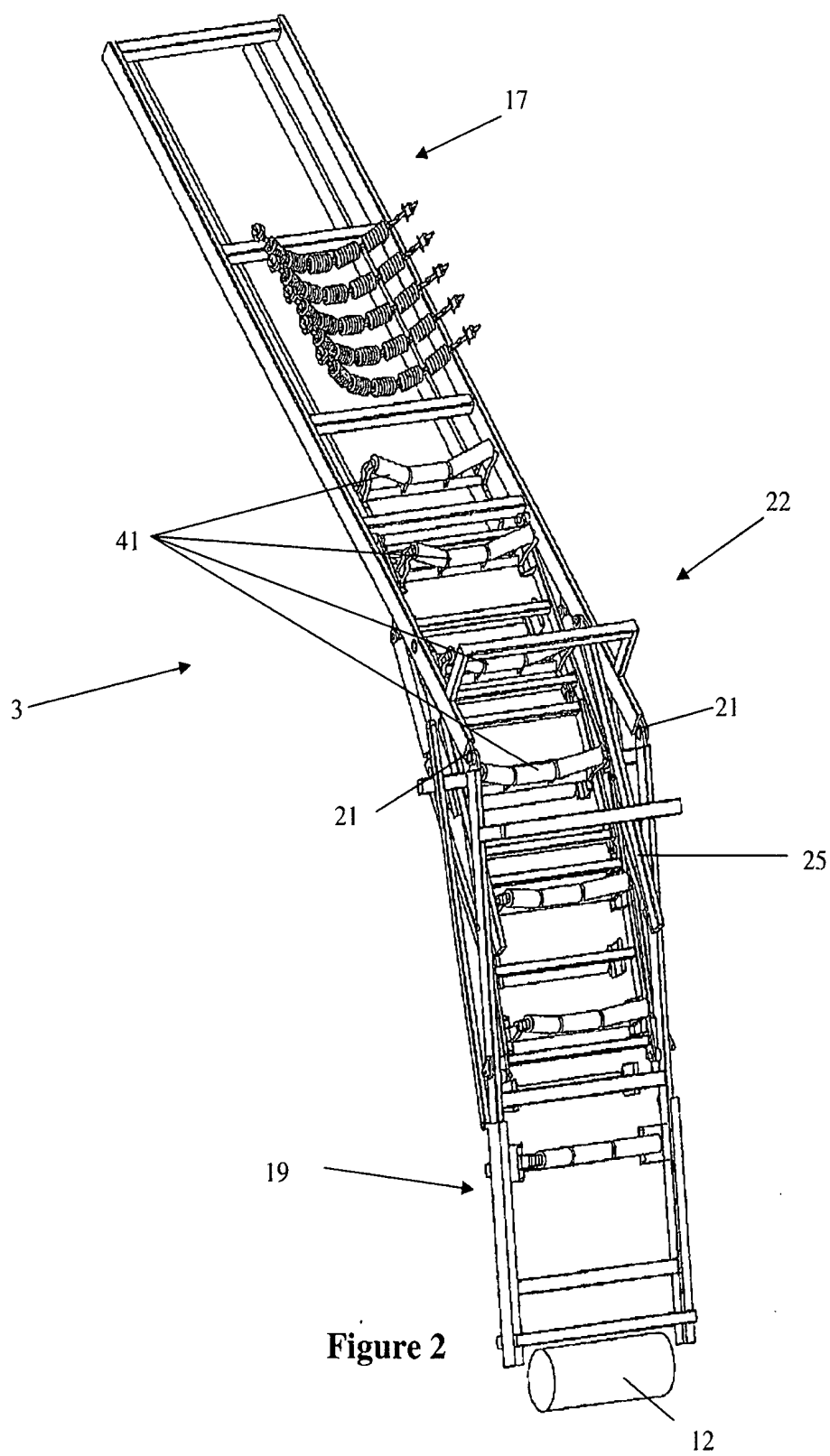


Figure 2

75

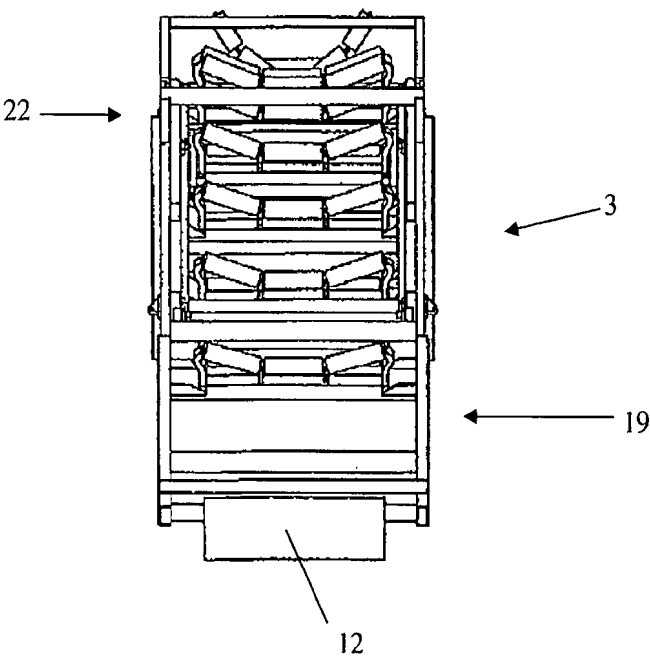


Figure 3

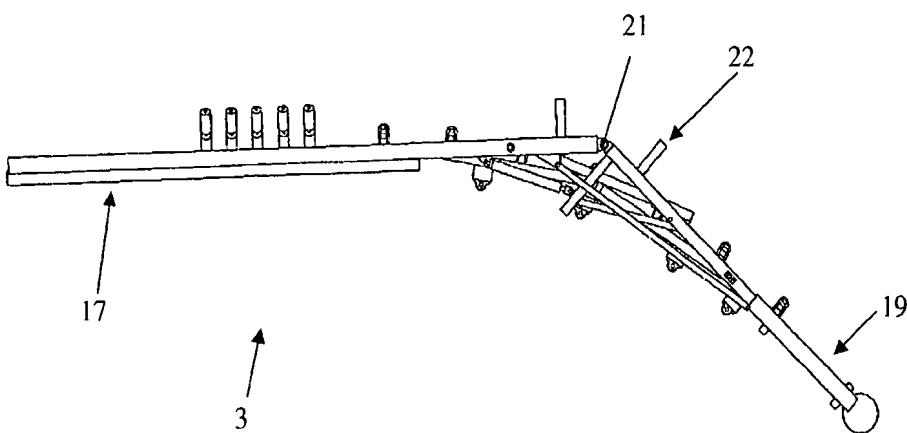


Figure 4

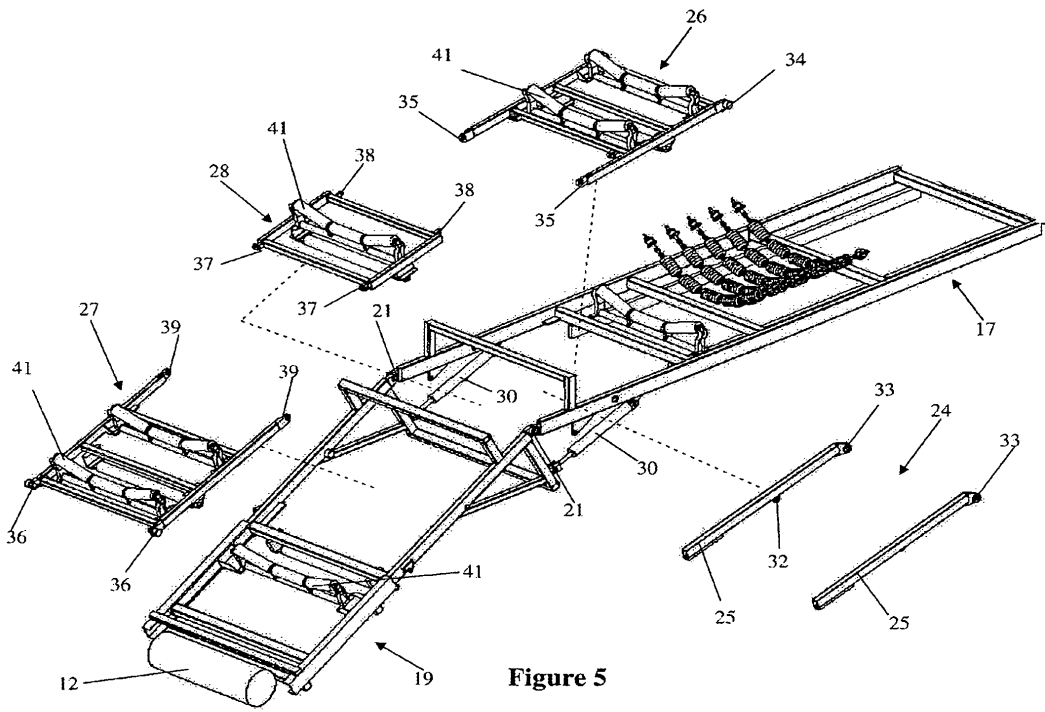


Figure 5

76

27

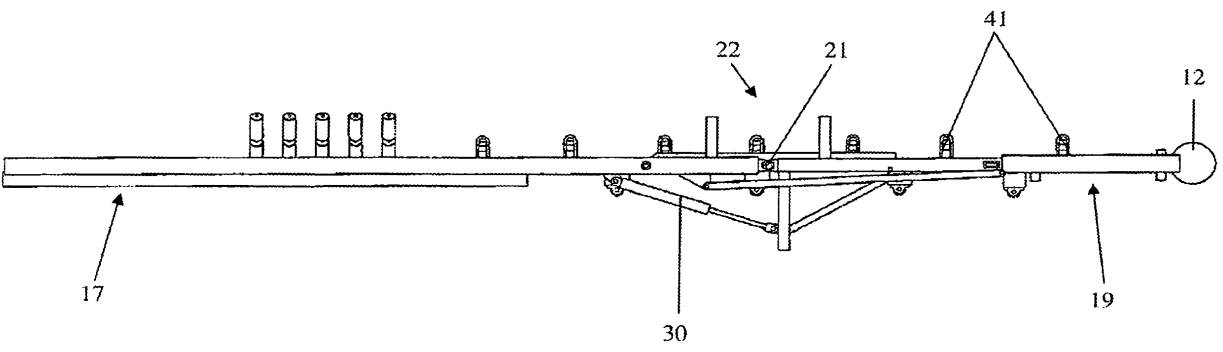


Figure 6

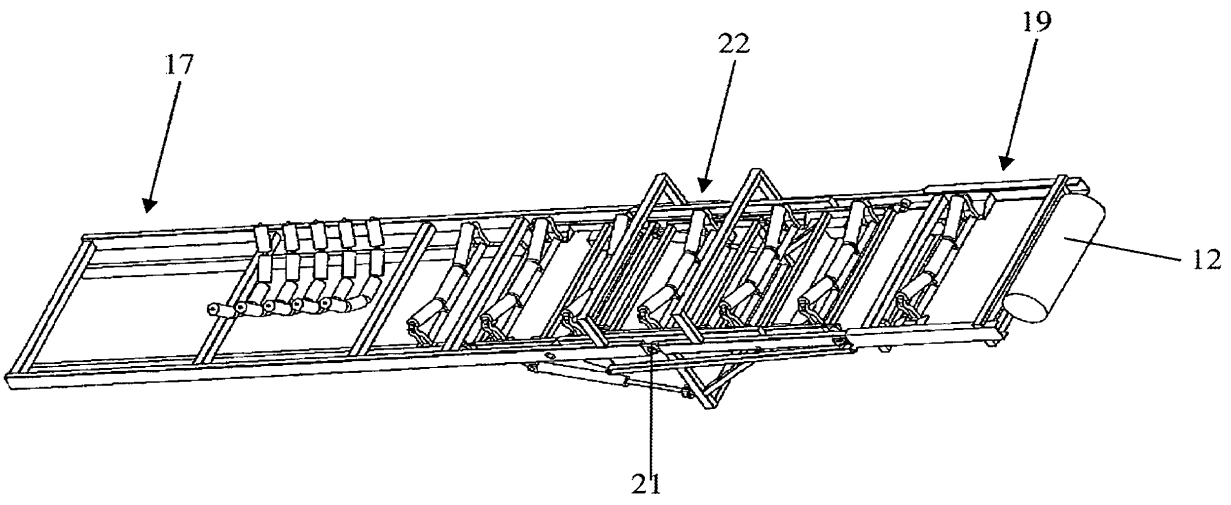


Figure 7

7d

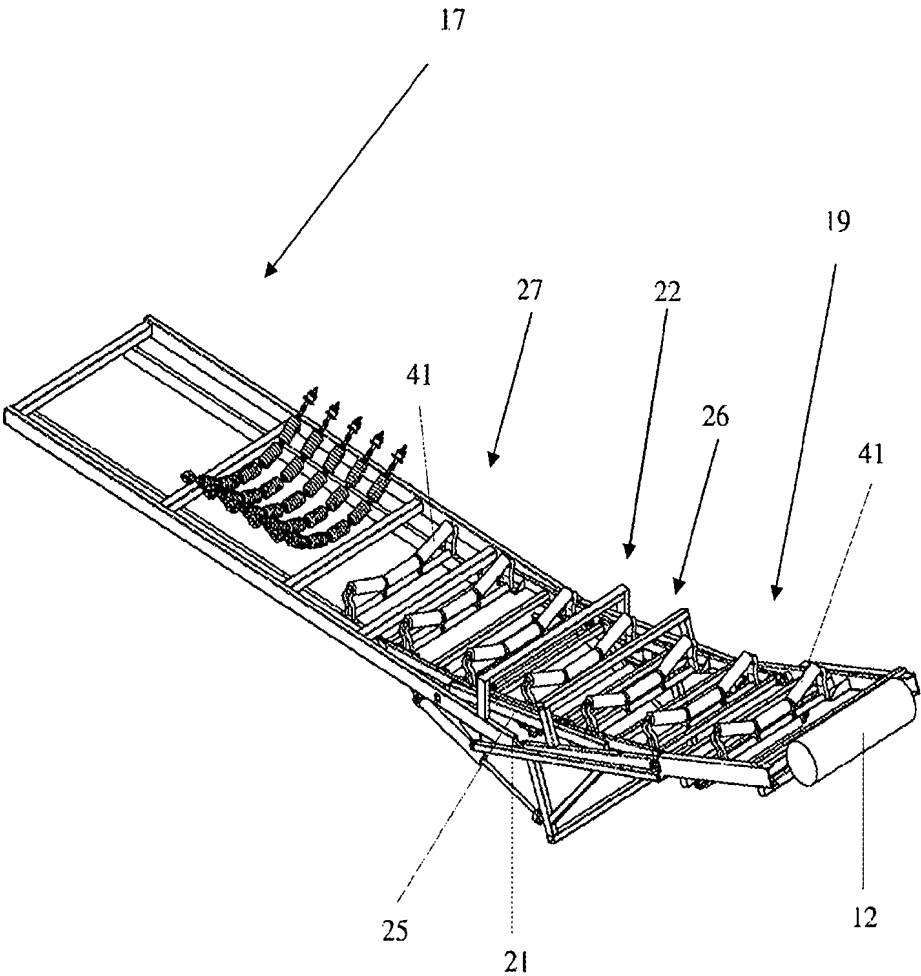


Figure 8

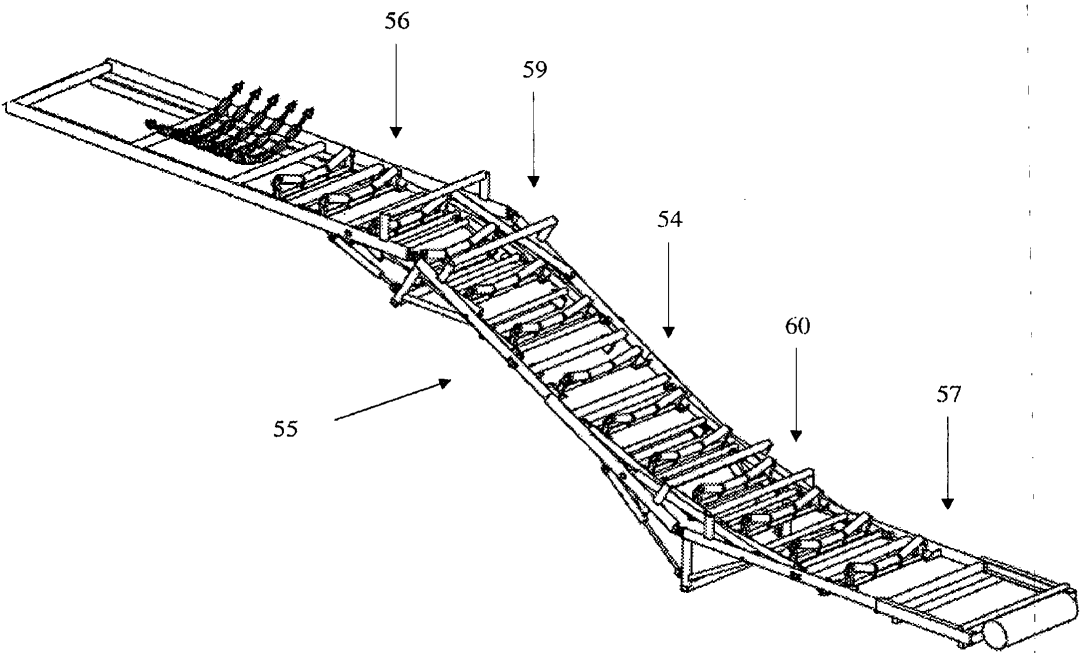


Figure 9

90

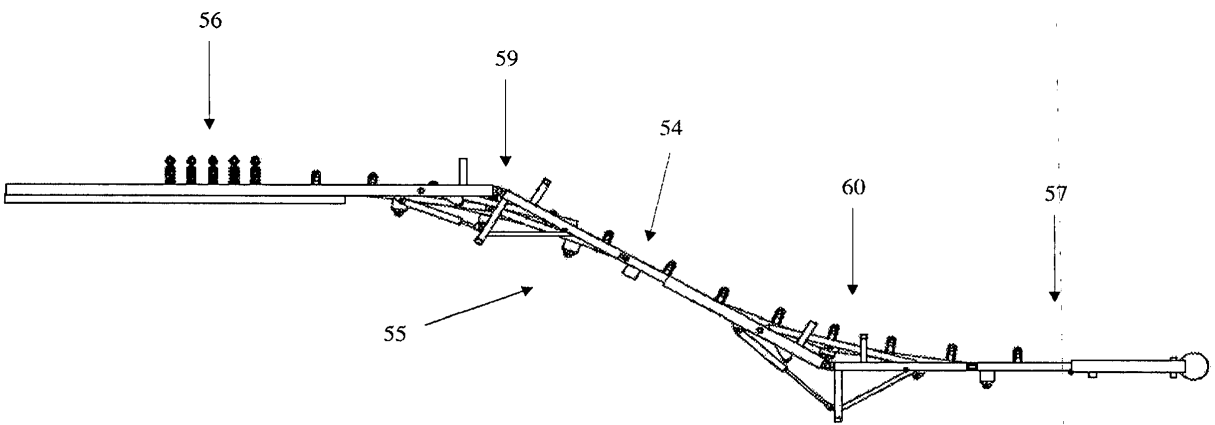


Figure 10

1
CONVEYOR APPARATUS

FIELD OF THE INVENTION

The present invention relates to material handling and, more particularly, to stackers and conveyors.

BACKGROUND OF THE INVENTION

Conveyors are used to discharge material at a fixed height above ground to stack material such as agglomerated material, ore, or minerals. Such conveyors are typically included in stackers or other devices used to discharge material at a fixed height. U.S. Pat. Nos. 3,185,290, 4,029,200, 4,245,732, 4,406,361, 4,629,060, 4,907,932, 5,181,600, 6,360,876, and 6,896,123 disclose different types of conveyor apparatuses or stackers.

Some conveyed materials such as agglomerated ore are sensitive to drop height. Often, luffing conveyors are used to reduce the drop height of the material. Reducing the drop height can help reduce degradation or spoilage of the material being stacked. Many types of luffing conveyors are configured to move the whole conveyor, which complicates its receiving hopper and can substantially increase the cost of such machines.

In alternative luffing conveyor designs, a luffing conveyor includes a luffing end that can be affixed to a fixed conveyor to lower the drop height of a stacker or other stacking device or conveyor apparatus. Typically, a hinged luffing conveyor has a bend pulley affixed at the hinge point of the conveyor. The conveyor belt must transition from a troughed area to a flat portion and back to a troughed area in a relatively short distance. At some luffing discharge angles, the material can lift off of the belt as it transitions over the hinge pulley such that the material falls back on the belt at a higher velocity than the belt speed, losing traction between the material and the belt. As a result, material may fall from an undesirably high height, which increases degradation and spillage. This is particularly true for large luffing discharge angles.

A conveyor apparatus is needed to more consistently convey material to a desired drop height, particularly at large luffing discharge angles. Preferably, such a conveyor apparatus eliminates the need for a fixed bend pulley and can increase the belt life of the conveyor.

SUMMARY OF THE INVENTION

A conveyor apparatus is provided that includes a tail portion moveably connected to a head portion such that the head portion is moveable relative to the tail portion from a first position to a second position located lower or higher than the first position. The conveyor apparatus also includes at least one frame portion moveably positioned between the tail portion and the head portion such that the one or more frame portions move when the head portion moves from the first position to the second position.

In some embodiments of the conveyor apparatus, the one or more frame portions may include a first frame portion attached between the tail portion and the head portion. The first frame portion may be moveably attached to the tail portion or the head portion or both the tail portion and head portion. Preferably, the first frame portion includes a first elongated member and a second elongated member that each extends from the tail portion to the head portion and is moveably attached to at least one of the tail portion and the head portion.

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The one or more frame portions may also include additional frame portions. For example, in some embodiments, the one or more frame portions may include a second frame portion that is moveably attached to the first frame portion adjacent to a first side of the second frame portion. The second frame portion may also be attached to the tail portion or the head portion adjacent to a second side of the second frame portion that is opposite the first side of the second frame portion. For instance, the second side of the second frame portion may be moveably attached to the tail portion or the head portion.

As another example, the one or more frame portions could also include a third frame portion. The third frame portion could be moveably attached to the first frame portion adjacent to a first side of the third frame portion and may also be attached to the head portion or tail portion at a second side of the third frame portion opposite the first side of the third frame portion. In embodiments where the second frame portion is attached to the tail portion, the second side of the third frame portion can be attached to the head portion. In embodiments where the second frame portion is attached to the head portion, the second side of the third frame portion may be attached to the tail portion. Preferably, the second side of the third frame portion is moveably attached to the head portion or tail portion.

As yet another example, the one or more frame portions could also include a fourth frame portion. The fourth frame portion could be moveably attached to the second frame portion or the third frame portion adjacent to the first side of the fourth frame portion and can be attached to the other of the second frame portion and the third frame portion adjacent to the second side of the fourth frame member opposite the first side of the fourth frame member.

Preferably, at least one frame member portion of the one or more frame member portions is attached to at least one idler or troughed idler. In some embodiments of the conveyor apparatus, one frame portion of the one or more frame portions is attached to at least one idler or troughed idler that is aligned with an axis of movement defined by a plurality of hinges moveably attaching the tail portion to the head portion.

It should be understood that embodiments of the conveyor apparatus may include a flexible elongated member configured to move from the tail portion to the head portion. The flexible elongated member can be supported by the head portion, tail portion and the one or more frame portions. Preferably, the flexible elongated member is configured as a continuous chain or continuous belt.

In some embodiments of the conveyor apparatus, the conveyor apparatus does not need to include a fixed bend pulley aligned with an axis of rotation that defines a path of movement for the head portion.

Embodiments of the conveyor apparatus may also include at least one first frame portion moveably attached between the tail portion and an intermediate portion. At least one second frame portion may be moveably attached between the head portion and the intermediate portion. The one or more first and second frame portions may be configured to move when the head portion is moved from a first position to a second position to adjust a conveying path. For instance, a head portion and the intermediate portion may be moved such that the conveying path is adjusted from an S-shaped path to a linear or horizontal path.

A stacker is also provided. The stacker includes a base that supports the conveyor apparatus. The conveyor apparatus may include any of the above discussed conveyor apparatus embodiments. For instance, the conveyor apparatus may include a tail portion moveably connected to a head portion

such that the head portion is moveable relative to the tail portion from a first position to a second position located lower or higher than the first position. The conveyor apparatus may also include at least one frame portion moveably positioned between the tail portion and the head portion.

In some embodiments of the stacker, the frame portions may include frame means configured to move when the head portion moves from the first position to the second position. For instance, the frame means may include one moveable frame portion, interconnected frame portions, or a first set of interconnected frame portions attached to one end of an intermediate portion and to a head portion and a second set of interconnected frame portions attached at the opposite end of the intermediate portion and the tail portion. It should be understood that embodiments of the conveyor apparatus may also include such frame means.

It should be appreciated that embodiments of the stacker may also include multiple conveyor apparatuses attached to each other. For instance, a stacker may have a first conveyor apparatus attached to a second conveyor apparatus such that the conveying path of the stacker may include different moveable configurations such as an S-shaped configuration or other path configurations that may require the use of multiple interconnected conveyor apparatuses.

It should be appreciated that embodiments of the stacker can be configured to adjust the drop height of the conveying apparatus or the stacker. For example, the head portion may be moved from a lower height to a higher height.

Other details, objects, and advantages of the invention will become apparent as the following description of certain present preferred embodiments thereof and certain present preferred methods of practicing the same proceeds.

BRIEF DESCRIPTION OF THE DRAWINGS

Present preferred embodiments of the conveyor apparatus and a stacker that includes such a conveyor apparatus are shown in the accompanying drawings in which:

FIG. 1 is a side view of a first present preferred embodiment of a stacker having a first present preferred embodiment of the conveyor apparatus in a first position. The belt of the conveyor apparatus and the track of the stacker base are illustrated in chain line.

FIG. 2 is a perspective view of the first present preferred embodiment of the conveyor apparatus in the first position.

FIG. 3 is a front view of the first present preferred embodiment of the conveyor apparatus in the first position.

FIG. 4 is a side view of the first present preferred embodiment of the conveyor apparatus in the first position.

FIG. 5 is an exploded view of the first present preferred embodiment of the conveyor apparatus in the first position.

FIG. 6 is a side view of the first present preferred embodiment of the conveyor apparatus in a second position, which is higher than the first position.

FIG. 7 is a perspective view of the first present preferred embodiment of the conveyor apparatus in the second position.

FIG. 8 is a perspective view of the first present preferred embodiment of the conveyor apparatus in a third position, which is higher than the second position and the first position.

FIG. 9 is a perspective view of a second present preferred embodiment of the conveyor apparatus.

FIG. 10 is a side view of the second present preferred embodiment of the conveyor apparatus.

DETAILED DESCRIPTION OF PRESENT PREFERRED EMBODIMENTS

Referring to FIG. 1, a present preferred embodiment of a stacker 1 that includes a present preferred embodiment of a

conveyor apparatus 3 is shown. The stacker 1 has a base 5 that includes tracks 6 configured to move the stacker 1. The base 5 of the stacker also supports the conveyor apparatus 3.

The conveyor apparatus 3 includes a belt 4 or other flexible elongated member configured to rotate about the conveyor apparatus. A belt drive 8 or other motor is provided adjacent to the tail portion 17 of the conveyor apparatus. A drive pulley 10 is connected to the belt drive 8 and rotates to move the belt 4. A belt pulley 12 is provided adjacent to a head portion 19 of the conveyor apparatus 3. The belt pulley rotates to help the conveyor belt rotate about the head portion 19 of the conveyor apparatus. The conveyor apparatus 3 includes a number of idlers 41 positioned along the conveyor apparatus 3. The idlers engage the belt 4 and help guide the movement of the belt 4.

As may be appreciated from FIGS. 2-7, the head portion 19 of the conveyor apparatus 3 is attached to the tail portion 17 at hinges 21 such that the head portion 19 may move from a first position, such as the position of the head portion 19 shown in FIGS. 1-5, to a second position, such as the position of the head portion shown in FIGS. 6-7. The head portion may also be moved from the first or second positions to a third position, which is shown in FIG. 8. It should be understood that the first position is lower than the second position since the drop height of the head portion is lower when it is in the first position than when it is in the second position and the third position is higher than the second position because the head portion has a higher drop height when it is in the third position than when it is in the second position.

The hinges 21 define an axis of rotation about which the head portion moves. It should be appreciated that the head portion 19 may also move to other positions between the first position and the second position. Shock absorbers 30, struts, or gas springs may be provided to help support the movement of the head portion for a smoother, less strain inducing movement. Pistons or other actuation mechanisms may be provided between the head portion 19 and tail portion 17 adjacent to the hinged connection 21 to help drive movement of the head portion 19 to different positions.

The movement of the head portion 19 permits the drop height of the stacker 3 to be adjusted for different material being stacked or to adjust the stacking of material for different weather conditions. For example, a lower drop height may be preferred for windy days of operation while a higher drop height may be acceptable for calm days that have little or no wind.

The conveyor apparatus 3 includes multiple moveable frames 22 between the head portion 19 and tail portion 17. A first frame 24 includes two members 25. Each member 25 is rotatably attached to tail portion 17 and is also attached to the head portion 19.

A pivot point 32 is located at a middle portion of each member 25 of the first frame 24. A second frame 26 and third frame 27 are both pivotally attached to the first frame 24 at these pivot points 32 of the members 25. The second frame 26 is attached to the members 25 at attachment portions 35 located adjacent to the first side of the second frame 26. The third frame 27 is attached to the members 25 at the attachment portions 39 located adjacent to the first side of the third frame 27. Each attachment portion 35 may also be configured for interconnection with a respective attachment portion 39.

The second frame 26 is also attached to the tail portion 17 at attachment portions 34 located adjacent to a second side of the second frame 26 that is opposite the first side of the second frame 26. The second frame 26 may be attached to the tail portion 17 at attachment portions 34 such that it is affixed to the tail portion 17 or such that the second frame 26 is rota-

tionally or moveably attached to the tail portion 17. The second frame 26 may move relative to the tail portion 17 when the head portion 19 is moved from the first position to the second position or the third position.

The third frame 27 is also attached to the head portion 19 adjacent to a second side of the third frame 27, which is located opposite the first side of the third frame 27. The third frame 27 may be attached to the head portion 19 at attachment portions 36 located such that it is affixed to the head portion 19 or such that the third frame 27 is rotationally or moveably attached to the head portion 19. The third frame 27 may move relative to the head portion 19 when the head portion 19 is moved from the first position to the second position.

A fourth frame 28 is attached to the second frame 26 adjacent to its first side at attachment portions 38 and is also attached to the third frame 27 adjacent to its second side at attachment portions 37. The fourth frame 28 may be moveably or rotationally attached to the second frame 26, the third frame 27, or both the second frame 26 and third frame 27. Preferably, the fourth frame is positioned adjacent to the hinged connections 21 between the tail portion 17 and the head portion 19.

It should be understood that the attachment portions 34, 35, 36, 37, 38 and 39 may include different attachment mechanisms or portions of such mechanisms. For instance, attachment portions 34, 35, 36, 37, 38 and 39 may each form at least a portion of a pivotal connection or a slideable connection. As a more particular example, the attachment portions may include pivot pins or slides.

One or more idlers 41 may be attached to each of the frame members 26, 27, and 28. Preferably, an idler 41 of the fourth frame 28 is aligned with the hinges 21 such that the idler may support a portion of the belt 4 that travels about the hinged area of the conveyor apparatus 3. Most preferably, the idlers 41 of the second, third and forth frames are troughed idlers and the idlers of the multiple frames are equally spaced apart.

Due to the moveable interconnections between the first frame 24, the second frame 26, the third frame 27 and fourth frame 28, it has been determined that the conveyor apparatus 3 does not need a fixed bend pulley adjacent the hinge points between the head portion 19 and the tail portion 17 or in alignment with the rotational axis defined by the hinge points. Indeed, it has been found that the replacement of a bend pulley with the moveable interconnected frame portions lowers belt stress and increases belt life of the conveyor apparatus 3. Moreover, the multiple moveably connected frames reduce, if not eliminate, the occurrence of material falling off the belt or losing traction with the belt after passing from the tail portion to the head portion when the head portion 19 is positioned lower than the tail portion 17.

It is contemplated that variations may be made to the conveyor apparatus 3. For instance, it is contemplated that alternative embodiments of the conveyor apparatus 3 can include members 25 of the first frame 24 that are moveably or rotationally attached to both the tail portion 17 and the head portion 19 or just rotationally attached to the head portion 19. As another example, the fourth frame 28 may also be configured for moveable attachment to the first frame 24. It should also be understood that the conveyor apparatus 3 may be included in different type of stackers or other material handling devices.

It is also contemplated that larger conveyor apparatuses may be formed by combining or moveably interconnecting multiple conveyor apparatuses 3 with at least one intermediate portion. For instance, as shown in FIGS. 9-10, a conveyer apparatus 55 has a tail portion 56 moveably attached to a head portion 57 by an intermediate portion 54. Moveable frame

portions 59 and 60 are attached between the tail and head portions such that the conveying path of the conveyor apparatus 55 may be adjusted into different configurations, such as, for example, the S-shaped configuration shown in FIGS. 9-10. It should be appreciated that the moveable frame portions 59 and 60 may be configured similarly to frames 22 discussed above. Frame portions 59 include at least one frame portion moveably positioned between the tail portion 56 and the intermediate portion 54. Frame portions 60 include one or more frame portions moveably positioned between the intermediate portion 54 and the head portion 57.

Stackers may also be configured to include such a conveyor apparatus 55. Such stackers preferably have a base that at least partially supports the conveyor apparatus 55. The base may be moveable or may be affixed in a particular location.

While certain present preferred embodiments of the conveyor apparatus and stackers including such conveyor apparatuses have been shown and described above, it is to be distinctly understood that the invention is not limited thereto but may be otherwise variously embodied and practiced within the scope of the following claims.

What is claimed is:

1. A conveyor apparatus comprising:
 - a tail portion moveably connected to a head portion such that the head portion is moveable relative to the tail portion from a first position to a second position located lower or higher than the first position;
 - at least one frame portion moveably positioned between the tail portion and the head portion such that the at least one frame portion moves when the head portion moves from the first position to the second position; and
 - at least one idler attached to said at least one frame portion.
2. The conveyor apparatus of claim 1 wherein the at least one frame portion further comprises:
 - a first frame portion having a first end and a second end attached between the tail portion and the head portion having a first member and a second member, the first frame portion being moveably attached to at least one of the tail portion and the head portion;
 - a second frame portion, the second frame portion having a first end and a second end opposite the first end, the second frame portion being moveably attached to the first frame portion adjacent to the first end of the second frame portion and the second frame portion attached to one of the tail portion or the head portion adjacent to the second end of the second frame portion.
3. The conveyor apparatus of claim 2 wherein the at least one frame portion is further comprised of:
 - a third frame portion having a first end and a second end opposite the first end of the third frame portion and wherein the second frame portion is attached to the tail portion, the third frame portion moveably attached to the first frame portion adjacent to the first end of the third frame portion, the third frame portion attached to the head portion adjacent to the second end of the third frame portion.
4. The conveyor apparatus of claim 2 wherein the first end of the first frame portion is attached to the tail portion and the second end of the first frame portion is attached to the head portion.
5. The conveyor apparatus of claim 3 wherein each of the members of the first frame portion have a pivot point at which the first end of the second frame portion and the second end of the third frame portion are moveably attached.
6. The conveyor apparatus of claim 5 wherein said at least one frame portion is further comprising a fourth frame portion, the fourth frame portion having a first end and a second

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end opposite the first end of the fourth frame portion, the fourth frame portion moveably connected to one of the second frame portion or the third frame portion adjacent to the first end of the fourth frame portion and the fourth frame portion attached to the other of the second frame portion or the third frame portion adjacent to the second end of the fourth frame portion, the fourth frame portion moving when the head portion moves from the first position to the second position and the fourth frame portion being positioned adjacent to the pivot points of the members of the first frame portion.

7. The conveyor apparatus of claim 6 wherein at least one idler or at least one troughed idler is attached to each of said second, third and fourth frame portions.

8. The conveyor apparatus of claim 2 wherein the members of the first frame portion are elongated members that extend from the tail portion to the head portion.

9. The conveyor apparatus of claim 1 further comprising a flexible elongated member configured to move from the tail portion to the head portion, the flexible elongated member supported by the head portion, the tail portion and the at least one frame portion.

10. The conveyor of claim 1 further comprising a pulley with a floating axis arranged adjacent to an axis of rotation that defines a path of movement for the head portion.

11. A stacker comprising a base that supports a conveyor apparatus, the conveyor apparatus comprising a tail portion moveably connected to a head portion such that the head portion is moveable relative to the tail portion from a first position to a second position located lower or higher than the first position and at least one frame portion moveably positioned between the tail portion and the head portion such that the at least one frame portion moves when the head portion moves from the first position to the second position and at least one idler attached to said at least one frame portion.

12. The stacker of claim 11 wherein the at least one frame portion further comprises:

- a first frame portion attached between the tail portion and the head portion having a first member and a second member, the first frame portion being moveably attached to at least one of the tail portion and the head portion;
- a second frame portion, the second frame portion having a first end and a second end opposite the first end, the second frame portion being moveably attached to the

first frame portion adjacent to the first end of the second frame portion and the second frame portion attached to one of the tail portion or the head portion adjacent to the second end of the second frame portion.

13. The stacker of claim 12 wherein the at least one frame portion further comprises a third frame portion having a first end and a second end opposite the first end of the third frame portion and wherein the second frame portion is attached to the tail portion, the third frame portion moveably attached to the first frame portion adjacent to the first end of the third frame portion, the third frame portion attached to the head portion adjacent to the second end of the third frame portion.

14. The stacker of claim 13 wherein each of the members of the first frame portion have a pivot point at which the first end of the second frame portion and the second end of the third frame portion are moveably attached.

15. The stacker of claim 14 wherein said at least one frame portion is further comprising a fourth frame portion, the fourth frame portion having a first end and a second end opposite the first end of the fourth frame portion, the fourth frame portion moveably attached to one of the second frame portion or the third frame portion adjacent to the first end of the fourth frame portion and the fourth frame portion attached to the other of the second frame portion or the third frame portion adjacent to the second end of the fourth frame portion, the fourth frame portion moving when the head portion moves from the first position to the second position and the fourth frame portion being positioned adjacent to the pivot points of the members of the first frame portion.

16. The stacker of claim 15 wherein at least one idler or at least one troughed idler is attached to each of said second, third and fourth frame portions.

17. The stacker of claim 11 wherein the members of the first frame portion are elongated members that extend from the tail portion to the head portion.

18. The stacker of claim 11 further comprising a plurality of actuation mechanisms positioned between the head portion and the tail portion to drive movement of the head portion from the first position to the second position.

19. The conveyor of claim 11 further comprising a pulley with a floating axis arranged adjacent to an axis of rotation that defines a path of movement for the head portion.

* * * * *

**TRADUCCION REIVINDICACIONES
CONCEDIDAS**

1. Un aparato transportador que comprende:

Una porción de cola conectada en forma movable a una porción de cabeza de manera que la porción de cola se mueva en relación con la porción de cola desde una primera posición a una segunda posición localizada más abajo o más arriba que la primera posición;

Por lo menos una porción de la estructura movable ubicada entre la porción de cola y la porción de cabeza de manera que por lo menos una porción de cabeza se mueve cuándo la porción de cabeza se mueve desde la primera posición a la segunda posición, y

Por lo menos una polea conectada a por lo menos una porción de la estructura.

2. El aparato transportador de la Reivindicación 1 en el cual por lo menos una porción de la estructura además comprende:

Una primera porción de la estructura que tiene un primer extremo y un segundo extremo conectado entre la porción de cola y la porción de cabeza que tiene un primer miembro y un segundo miembro, siendo la primera porción de la estructura movable conectada a por lo menos una de la porción de cola y la porción de cabeza;

Una segunda porción de la estructura, teniendo la segunda porción de la estructura un primer extremo y un segundo extremo opuesto al

primer extremo, estando la porción de la segunda estructura conectada en forma movable a la primera porción adyacente al primer extremo de la segunda porción de la estructura y la segunda porción de la estructura conectada a una de las porciones de cola o de las porciones de cabeza adyacentes al segundo lado de la segunda porción de la estructura.

3. El aparato transportador de la Reivindicación 2 en el cual por lo menos una porción de la estructura además comprende

una tercera porción de la estructura que tiene un primer extremo y un segundo extremo opuesto al primer extremo de la tercera porción de la estructura y donde la segunda porción de la estructura está conectada a la porción de cola, la tercera porción de la estructura está conectada en forma movable a la tercera porción de la estructura adyacente al primer extremo de la tercera porción de la estructura, la tercera porción de la estructura conectada a la porción de cabeza adyacente al segundo extremo de la tercera porción de la estructura.

4. El aparato transportador de la Reivindicación 2 en el cual el primer extremo de la primera porción de la estructura está conectada a la porción de cola y el segundo extremo de la primera porción de la estructura está conectada a la porción de cabeza.

5. El aparato transportador de la Reivindicación 3 en el cual cada uno de los miembros de la primera porción de la estructura tiene un pivote en el cual el primer extremo de la segunda porción de la

estructura y el primer extremo de la tercera porción de la estructura se conecta en forma movable.

6. El aparato transportador de la Reivindicación 5 en el cual por lo menos una porción de la estructura además comprende una cuarta porción de la estructura, teniendo la cuarta porción de la estructura un primer extremo y un segundo extremo opuesto al primer extremo de la cuarta porción de la estructura, la cuarta porción de la estructura conectada en forma movable a una de la segunda porción de la estructura o la tercera porción de la estructura adyacente al primer extremo de la cuarta porción de la estructura y la cuarta porción de la estructura conectada a la otra de la segunda porción de la estructura o la tercera porción de la estructura adyacente al segundo extremo de la cuarta porción de la estructura, moviéndose una cuarta porción de la estructura cuando la porción de cabeza se mueve desde la primera posición a la segunda posición y la cuarta porción de la estructura ubicada adyacente a los puntos en pivote de los miembros de la primera porción de la estructura.

7. El aparato transportador de la Reivindicación 6 en el cual por lo menos una polea o por lo menos una polea ondulada está conectada a una segunda, tercera o cuarta porciones de la estructura.

8. El aparato transportador de la Reivindicación 2 en el cual los miembros de la primera porción de la estructura son miembros alargados que se extienden desde la porción de cola a la porción de cabeza.

9. El aparato transportador de la Reivindicación 1 que comprende además un miembro flexible alargado configurado para moverse desde la porción de cola a la porción de cabeza, estando el miembro flexible alargado apoyado por la porción de cabeza, la porción de cola y por lo menos una porción de la estructura.

10. El aparato transportador de la Reivindicación 1 que además comprende una polea con un eje flotante dispuesto adyacente a un eje de rotación que define una trayectoria de movimiento para la porción de cabeza.

11. Una apiladora que comprende una base que soporta un aparato transportador, comprendiendo el aparato transportador una porción de cola movable conectada a una porción de cabeza de manera que la porción de cabeza se mueve en relación con la porción de cola desde una primera posición a una segunda posición localizada más abajo o más arriba que la primera posición y por lo menos una porción movable ubicada entre la porción de cola y la porción de cabeza de manera que por lo menos una porción de la estructura se mueve cuando la porción de cabeza se mueve desde la primera posición a la segunda posición y por lo menos una polea conectada a por lo menos esa porción de la estructura.

12. La apiladora de la Reivindicación 11 en la cual por lo menos una porción de la estructura comprende además:

una primera porción de la estructura conectada entre la porción de la cola y la porción de cabeza que tiene un primer miembro y un

segundo miembro, la primera porción de la estructura conectada de forma movable a la porción de cabeza o a la porción de cola;
una segunda porción de la estructura, la segunda porción de la estructura que tiene un primer extremo y un segundo extremo opuesto al primer extremo, la segunda porción de la estructura conectada de forma movable a la primera porción de la estructura adyacente al primer extremo de la segunda porción de la estructura y la segunda porción de la estructura conectada a la porción de cabeza o a la porción de cola adyacente al segundo extremo de la segunda porción de la estructura.

13. La apiladora de la Reivindicación 12 en la cual al menos una porción de la estructura comprende además una tercera porción de la estructura que tiene un primer extremo y un segundo extremo opuesto al primer extremo y en donde la segunda porción de la estructura está conectada a la porción de cola, la tercera porción de la estructura conectada de forma movable a la primera porción de la estructura adyacente al primer extremo de la tercera porción de la estructura, la tercera porción de la estructura conectada a la porción de cabeza adyacente al segundo extremo de la tercera porción de la estructura.

14. La apiladora de la Reivindicación 13 en donde cada uno de los miembros de la primera porción de la estructura tiene un pivote al cual se conectan de forma movable el primer extremo de la segunda porción de la estructura y el primer extremo de la tercera porción de la estructura.

15. La apiladora de la Reivindicación 14 en donde al menos una porción de la estructura comprende además una cuarta porción de la estructura que tiene un primer extremo y un segundo extremo opuesto al primer extremo, la cuarta porción de la estructura conectada de forma movable a la segunda porción de la estructura o a la tercera porción de la estructura adyacente al primer extremo de la cuarta porción de la estructura y la cuarta porción de la estructura conectado a la segunda porción de la estructura o a la tercera porción de la estructura adyacente al segundo extremo de la cuarta porción de la estructura, la cuarta porción de la estructura se mueve cuando la porción de cabeza se mueve de la primera posición a la segunda posición y la cuarta porción de la estructura se ubica adyacente a los pivotes de los miembros de la primera porción de la estructura.

16. La apiladora de la Reivindicación 15 en la cual por lo menos una polea o por lo menos una polea ondulada está conectada a cada una de las mencionadas segunda, tercera o cuarta porciones de la estructura.

17. La apiladora de la Reivindicación 12 en el cual los miembros de la primera porción de la estructura son miembros alargados que se extienden desde la porción de cola hasta la porción de cabeza.

18. La apiladora de la Reivindicación 11 que además comprende una pluralidad de mecanismos actuadores posicionados entre la porción de cabeza y la porción de cola que imparten movimiento a la porción de cabeza desde la primera posición hasta la segunda posición.

19. La apiladora de la Reivindicación 11 que además comprende una polea con un eje flotante dispuesto adyacente a un eje de rotación alrededor del cual se mueve la porción de cabeza.

Anexo 9

**Tabla de correspondencia entre las reivindicaciones
concedidas por la USPTO y las reivindicaciones modificadas en Colombia
el 30 de octubre de 2012.**

TABLA DE CORRESPONDENCIA ENTRE LAS REIVINDICACIONES CONCEDIDAS POR LA USPTO Y LAS REIVINDICACIONES PENDIENTES EN COLOMBIA

Reivindicaciones patentadas Estados Unidos	Reivindicaciones en Colombia	Explicación de la correspondencia
1. Un aparato transportador que comprende: Una porción de cola conectada en forma movable a una porción de cabeza de manera que la porción de cola se mueva en relación con la porción de cola desde una primera posición a una segunda posición localizada más abajo o más arriba que la primera posición; Por lo menos una porción de la estructura movable ubicada entre la porción de cola y la porción de cabeza de manera que por lo menos una porción de cabeza se mueve cuándo la porción de cabeza se mueve desde la primera posición a la segunda posición, y Por lo menos una polea conectada a por lo menos una porción de la estructura.	1. Un aparato transportador que comprende: Una porción de cola conectada en forma movable a una porción de cabeza de manera que la porción de cola se mueva en relación con la porción de cola desde una primera posición a una segunda posición localizada más abajo o más arriba que la primera posición; Por lo menos una porción de la estructura movable ubicada entre la porción de cola y la porción de cabeza de manera que por lo menos una porción de cabeza se mueve cuándo la porción de cabeza se mueve desde la primera posición a la segunda posición, y Por lo menos una polea conectada a por lo menos una porción de la estructura.	El alcance en ambos casos es idéntico
2. El aparato transportador de la Reivindicación 1 en el cual por lo menos una porción de la estructura además comprende: Una primera porción de la estructura que tiene un primer extremo y un segundo extremo conectado entre la porción de cola y la porción de cabeza que tiene un primer miembro y un segundo miembro, siendo la primera porción de la estructura movable	2. El aparato transportador de la Reivindicación 1 en el cual por lo menos una porción de la estructura además comprende: Una primera porción de la estructura que tiene un primer extremo y un segundo extremo conectado entre la porción de cola y la porción de cabeza que tiene un primer miembro y un segundo miembro, siendo la primera porción de la estructura movable	El alcance en ambos casos es idéntico

conectada a por lo menos una de la porción de cola y la porción de cabeza; Una segunda porción de la estructura, teniendo la segunda porción de la estructura un primer extremo y un segundo extremo opuesto al primer extremo, estando la porción de la segunda estructura conectada en forma movable a la primera porción adyacente al primer extremo de la segunda porción de la estructura y la segunda porción de la estructura conectada a una de las porciones de cola o de las porciones de cabeza adyacentes al segundo lado de la segunda porción de la estructura.	conectada a por lo menos una de la porción de cola y la porción de cabeza; Una segunda porción de la estructura, teniendo la segunda porción de la estructura un primer extremo y un segundo extremo opuesto al primer extremo, estando la porción de la segunda estructura conectada en forma movable a la primera porción adyacente al primer extremo de la segunda porción de la estructura y la segunda porción de la estructura conectada a una de las porciones de cola o de las porciones de cabeza adyacentes al segundo lado de la segunda porción de la estructura.	
3. El aparato transportador de la Reivindicación 2 en el cual por lo menos una porción de la estructura además comprende una tercera porción de la estructura que tiene un primer extremo y un segundo extremo opuesto al primer extremo de la tercera porción de la estructura y donde la segunda porción de la estructura está conectada a la porción de cola, la tercera porción de la estructura está conectada en forma movable a la tercera porción de la estructura adyacente al primer extremo de la tercera porción de la estructura, la tercera porción de la estructura conectada a la porción de cabeza adyacente al segundo extremo de la tercera porción de la estructura.	3. El aparato transportador de la Reivindicación 2 en el cual por lo menos una porción de la estructura además comprende una tercera porción de la estructura que tiene un primer extremo y un segundo extremo opuesto al primer extremo de la tercera porción de la estructura y donde la segunda porción de la estructura está conectada a la porción de cola, la tercera porción de la estructura está conectada en forma movable a la tercera porción de la estructura adyacente al primer extremo de la tercera porción de la estructura, la tercera porción de la estructura conectada a la porción de cabeza adyacente al segundo extremo de la tercera porción de la estructura.	El alcance en ambos casos es idéntico

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4. El aparato transportador de la Reivindicación 2 en el cual el primer extremo de la primera porción de la estructura está conectada a la porción de cola y el segundo extremo de la primera porción de la estructura está conectada a la porción de cabeza.	4. El aparato transportador de la Reivindicación 2 en el cual el primer extremo de la primera porción de la estructura está conectada a la porción de cola y el segundo extremo de la primera porción de la estructura está conectada a la porción de cabeza	El alcance en ambos casos es idéntico
5. El aparato transportador de la Reivindicación 3 en el cual cada uno de los miembros de la primera porción de la estructura tiene un pivote en el cual el primer extremo de la segunda porción de la estructura y el primer extremo de la tercera porción de la estructura se conecta en forma movable.	5. El aparato transportador de la Reivindicación 3 en el cual cada uno de los miembros de la primera porción de la estructura tiene un pivote en el cual el primer extremo de la segunda porción de la estructura y el primer extremo de la tercera porción de la estructura se conecta en forma movable.	El alcance en ambos casos es idéntico
6. El aparato transportador de la Reivindicación 5 en el cual por lo menos una porción de la estructura además comprende una cuarta porción de la estructura, teniendo la cuarta porción de la estructura un primer extremo y un segundo extremo opuesto al primer extremo de la cuarta porción de la estructura, la cuarta porción de la estructura conectada en forma movable a una de la segunda porción de la estructura o la tercera porción de la estructura adyacente al primer extremo de la cuarta porción de la estructura y la cuarta porción de la estructura conectada a la otra de la segunda porción de la estructura o la tercera porción de la estructura adyacente al segundo extremo de la cuarta porción de la estructura, moviéndose una cuarta porción de la estructura cuando la porción de cabeza se mueve desde la primera posición a la segunda posición y la cuarta porción de la estructura ubicada adyacente a los puntos en pivote de los miembros de la primera porción de la estructura.	6. El aparato transportador de la Reivindicación 5 en el cual por lo menos una porción de la estructura además comprende una cuarta porción de la estructura, teniendo la cuarta porción de la estructura un primer extremo y un segundo extremo opuesto al primer extremo de la cuarta porción de la estructura, la cuarta porción de la estructura conectada en forma movable a una de la segunda porción de la estructura o la tercera porción de la estructura adyacente al primer extremo de la cuarta porción de la estructura y la cuarta porción de la estructura conectada a la otra de la segunda porción de la estructura o la tercera porción de la estructura adyacente al segundo extremo de la cuarta porción de la estructura, moviéndose una cuarta porción de la estructura cuando la porción de cabeza se mueve desde la primera posición a la segunda posición y la cuarta porción de la estructura ubicada adyacente a los puntos en pivote de los miembros de la primera porción de la estructura.	El alcance en ambos casos es idéntico

7. El aparato transportador de la Reivindicación 6 en el cual por lo menos una polea o por lo menos una polea ondulada está conectada a una segunda, tercera o cuarta porciones de la estructura.	7. El aparato transportador de la Reivindicación 6 en el cual por lo menos una polea o por lo menos una polea ondulada está conectada a una segunda, tercera o cuarta porciones de la estructura.	El alcance en ambos casos es idéntico
8. El aparato transportador de la Reivindicación 2 en el cual los miembros de la primera porción de la estructura son miembros alargados que se extienden desde la porción de cola a la porción de cabeza.	8. El aparato transportador de la Reivindicación 2 en el cual los miembros de la primera porción de la estructura son miembros alargados que se extienden desde la porción de cola a la porción de cabeza.	El alcance en ambos casos es idéntico
9. El aparato transportador de la Reivindicación 1 que comprende además un miembro flexible alargado configurado para moverse desde la porción de cola a la porción de cabeza, estando el miembro flexible alargado apoyado por la porción de cabeza, la porción de cola y por lo menos una porción de la estructura.	9. El aparato transportador de la Reivindicación 1 que comprende además un miembro flexible alargado configurado para moverse desde la porción de cola a la porción de cabeza, estando el miembro flexible alargado apoyado por la porción de cabeza, la porción de cola y por lo menos una porción de la estructura.	El alcance en ambos casos es idéntico
10. El aparato transportador de la Reivindicación 1 que además comprende una polea con un eje flotante dispuesto adyacente un eje de rotación que define una trayectoria de movimiento para la porción de cabeza.	10. El aparato transportador de la Reivindicación 1 que además comprende una polea con un eje flotante dispuesto adyacente un eje de rotación que define una trayectoria de movimiento para la porción de cabeza.	El alcance en ambos casos es idéntico
11. Una apiladora que comprende una base que soporta un aparato transportador, comprendiendo el aparato transportador una porción de cola movable conectada a una porción de cabeza de manera que la porción de cabeza se mueve en relación con la porción de cola desde una primera posición a una segunda posición localizada más abajo o más arriba que la primera posición y por lo menos una porción movable ubicada entre la porción de cola y la porción	11. Una apiladora que comprende una base que soporta un aparato transportador, comprendiendo el aparato transportador una porción de cola movable conectada a una porción de cabeza de manera que la porción de cabeza se mueve en relación con la porción de cola desde una primera posición a una segunda posición localizada más abajo o más arriba que la primera posición y por lo menos una porción movable ubicada entre la porción de cola y la porción	El alcance en ambos casos es idéntico

de cabeza de manera que por lo menos una porción de la estructura se mueve cuando la porción de cabeza se mueve desde la primera posición a la segunda posición y por lo menos una polea conectada a por lo menos esa porción de la estructura.	de cabeza de manera que por lo menos una porción de la estructura se mueve cuando la porción de cabeza se mueve desde la primera posición a la segunda posición y por lo menos una polea conectada a por lo menos esa porción de la estructura.	
12. La apiladora de la Reivindicación 11 en la cual por lo menos una porción de la estructura comprende además: una primera porción de la estructura conectada entre la porción de la cola y la porción de cabeza que tiene un primer miembro y un segundo miembro, la primera porción de la estructura conectada de forma movable a la porción de cabeza o a la porción de cola; una segunda porción de la estructura, la segunda porción de la estructura que tiene un primer extremo y un segundo extremo opuesto al primer extremo, la segunda porción de la estructura conectada de forma movable a la primera porción de la estructura adyacente al primer extremo de la segunda porción de la estructura y la segunda porción de la estructura conectada a la porción de cabeza o a la porción de cola adyacente el segundo extremo de la segunda porción de la estructura.	12. La apiladora de la Reivindicación 11 en la cual por lo menos una porción de la estructura comprende además: una primera porción de la estructura conectada entre la porción de la cola y la porción de cabeza que tiene un primer miembro y un segundo miembro, la primera porción de la estructura conectada de forma movable a la porción de cabeza o a la porción de cola; una segunda porción de la estructura, la segunda porción de la estructura que tiene un primer extremo y un segundo extremo opuesto al primer extremo, la segunda porción de la estructura conectada de forma movable a la primera porción de la estructura adyacente al primer extremo de la segunda porción de la estructura y la segunda porción de la estructura conectada a la porción de cabeza o a la porción de cola adyacente el segundo extremo de la segunda porción de la estructura.	El alcance en ambos casos es idéntico
13. La apiladora de la Reivindicación 12 en la cual al menos una porción de la estructura comprende además una tercera porción de la estructura que tiene un primer extremo y un segundo extremo opuesto al primer extremo y en	13. La apiladora de la Reivindicación 12 en la cual al menos una porción de la estructura comprende además una tercera porción de la estructura que tiene un primer extremo y un segundo extremo opuesto al primer extremo y en	El alcance en ambos casos es idéntico

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donde la segunda porción de la estructura está conectada a la porción de cola, la tercera porción de la estructura conectada de forma movable a la primera porción de la estructura adyacente al primer extremo de la tercera porción de la estructura, la tercera porción de la estructura conectada a la porción de cabeza adyacente al segundo extremo de la tercera porción de la estructura.	donde la segunda porción de la estructura está conectada a la porción de cola, la tercera porción de la estructura conectada de forma movable a la primera porción de la estructura adyacente al primer extremo de la tercera porción de la estructura, la tercera porción de la estructura conectada a la porción de cabeza adyacente al segundo extremo de la tercera porción de la estructura.	
14. La apiladora de la Reivindicación 13 en donde cada uno de los miembros de la primera porción de la estructura tiene un pivote al cual se conectan de forma movable el primer extremo de la segunda porción de la estructura y el primer extremo de la tercera porción de la estructura.	14. La apiladora de la Reivindicación 13 en donde cada uno de los miembros de la primera porción de la estructura tiene un pivote al cual se conectan de forma movable el primer extremo de la segunda porción de la estructura y el primer extremo de la tercera porción de la estructura.	El alcance en ambos casos es idéntico
15. La apiladora de la Reivindicación 14 en donde al menos una porción de la estructura comprende además una cuarta porción de la estructura que tiene un primer extremo y un segundo extremo opuesto al primer extremo, la cuarta porción de la estructura conectada de forma movable a la segunda porción de la estructura o a la tercera porción de la estructura adyacente al primer extremo de la cuarta porción de la estructura y la cuarta porción de la estructura conectado a la segunda porción de la estructura o a la tercera porción de la estructura adyacente al segundo extremo de la cuarta porción de la estructura, la cuarta porción de la estructura se mueve cuando la porción de cabeza se mueve de la primera posición a la segunda posición y la cuarta porción de la estructura se ubica adyacente a los pivotes de los miembros de la primera porción de la estructura.	15. La apiladora de la Reivindicación 14 en donde al menos una porción de la estructura comprende además una cuarta porción de la estructura que tiene un primer extremo y un segundo extremo opuesto al primer extremo, la cuarta porción de la estructura conectada de forma movable a la segunda porción de la estructura o a la tercera porción de la estructura adyacente al primer extremo de la cuarta porción de la estructura y la cuarta porción de la estructura conectado a la segunda porción de la estructura o a la tercera porción de la estructura adyacente al segundo extremo de la cuarta porción de la estructura, la cuarta porción de la estructura se mueve cuando la porción de cabeza se mueve de la primera posición a la segunda posición y la cuarta porción de la estructura se ubica adyacente a los pivotes de los miembros de la primera porción de la estructura.	El alcance en ambos casos es idéntico

16. La apiladora de la Reivindicación 15 en la cual por lo menos una polea o por lo menos una polea ondulada está conectada a cada una de las mencionadas segunda, tercera o cuarta porciones de la estructura.	16. La apiladora de la Reivindicación 15 en la cual por lo menos una polea o por lo menos una polea ondulada está conectada a cada una de las mencionadas segunda, tercera o cuarta porciones de la estructura.	El alcance en ambos casos es idéntico
17. La apiladora de la Reivindicación 11 en el cual los miembros de la primera porción de la estructura son miembros alargados que se extienden desde la porción de cola hasta la porción de cabeza.	17. La apiladora de la Reivindicación 12 en el cual los miembros de la primera porción de la estructura son miembros alargados que se extienden desde la porción de cola hasta la porción de cabeza.	El alcance en ambos casos es idéntico
18. La apiladora de la Reivindicación 11 que además comprende una pluralidad de mecanismos actuadores posicionados entre la porción de cabeza y la porción de cola que imparten movimiento a la porción de cabeza desde la primera posición hasta la segunda posición.	18. La apiladora de la Reivindicación 11 que además comprende una pluralidad de mecanismos actuadores posicionados entre la porción de cabeza y la porción de cola que imparten movimiento a la porción de cabeza desde la primera posición hasta la segunda posición.	El alcance en ambos casos es idéntico
19. La apiladora de la Reivindicación 11 que además comprende una polea con un eje flotante dispuesto adyacente a un eje de rotación alrededor del cual se mueve la porción de cabeza.	19. La apiladora de la Reivindicación 11 que además comprende una polea con un eje flotante dispuesto adyacente a un eje de rotación alrededor del cual se mueve la porción de cabeza.	El alcance en ambos casos es idéntico