



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : B65G 15/42	A3	(11) International Publication Number: WO 98/33728 (43) International Publication Date: 6 August 1998 (06.08.98)
(21) International Application Number: PCT/US98/01427 (22) International Filing Date: 26 January 1998 (26.01.98) (30) Priority Data: 08/794,919 4 February 1997 (04.02.97) US (71) Applicant: MORRISON COMPANY, INC. [US/US]; 107 South Lawrence, Anthony, KS 67003 (US). (72) Inventor: ARNOLD, D., Brink; 502 N. Bluff, Anthony, KS 67003 (US). (74) Agent: ERIKSEN, Clarence, E.; Arnold, White & Durkee, P.O. Box 4433, Houston, TX 77210-4433 (US).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> (88) Date of publication of the international search report: 5 November 1998 (05.11.98)
(54) Title: BELT WITH TRAINING RIBS TO FACILITATE THE SELFADAPTATION TO THE CONVEYOR SYSTEM		
(57) Abstract A belt (10) for use in a conveyor system has ribs (12, 14, 23, 24, 26, 30) to aid in the training of the belt. The invention comprises a belt (10) with a body (18) having an inner surface (16), an outer surface, and a first set of longitudinal ribs (12, 14, 23) disposed on the inner surface (16) of the belt. The ribs function to lessen the surface area of the belt contacting a roller (32) of the system during the training period. Accordingly, the new belt adheres to the rollers of the conveyor system less aggressively, reducing lateral coplanar forces having the potential to damage the belt and/or the conveyor system. The height of the ribs with respect to the body diminishes over time due to normal frictional wear during the use of the belt in the conveyor system. In some embodiments, the belt includes a second set of ribs (24, 26, 30) disposed on the outer surface (28) of the belt. The height of the second set of ribs with respect to the body also diminishes over time due to normal frictional wear during the use of the belt in the conveyor system. The sets of ribs may comprise two ribs (12, 14, 24, 26) running along the edges (20, 22) of the belt. A wider belt may require additional ribs (23, 30) located between the two edge ribs. The belt may be used in a system of rollers (32) and training guides (34). The training guides (34) function to maintain the alignment of the belt with respect to the rollers.		

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

INTERNATIONAL SEARCH REPORT

Intern. Application No

PCT/US 98/01427

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 B65G15/42

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 B65G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2 264 685 A (CABLE BELT LTD) 8 September 1993 see figure 2	1-3
X	US 3 679 044 A (MCGINNIS HEBERT E) 25 July 1972 see figures 1,2	1,2
X	US 4 998 325 A (STAEHELI PAUL ET AL) 12 March 1991 see figure 4	1,2
X	US 4 899 872 A (HOKAO NAOMI) 13 February 1990 see figure 3	1,2
	-/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

4 May 1998

Date of mailing of the international search report

14. 09. 98

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Sundqvist, S

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 98/01427

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 109 784 A (HARTMANN KARL) 29 August 1978 see figure 4 -----	1,2

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 98/ 01427

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see separate sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1, 2, 3

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International Application No. PCT/ US 98/01427

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 206

1. Claims: 1, 2, 3

A BELT COMPRISING A BODY HAVING AN INNER SURFACE, AN OUTER SURFACE, AND A FIRST PLURALITY OF LONGITUDINAL RIBS DISPOSED ON SAID INNER SURFACE EXTENDING SUBSTANTIALLY THE ENTIRE LENGTH OF SAID BODY, further characterised in that the body has first and second opposing edges, and said first plurality of ribs comprises a first rib disposed on said inner surface adjacent the first edge of said body and a second rib disposed on said inner surface adjacent the second edge of said body.

2. Claims: 1, 4, 5, 6, 9, 10, 13, 14, 16

A BELT COMPRISING A BODY HAVING AN INNER SURFACE, AN OUTER SURFACE, AND A FIRST PLURALITY OF LONGITUDINAL RIBS DISPOSED ON SAID INNER SURFACE EXTENDING SUBSTANTIALLY THE ENTIRE LENGTH OF SAID BODY, further characterised by a second plurality of longitudinal ribs disposed on said outer surface extending substantially the entire length of said body.

3. Claims: 1, 7

A BELT COMPRISING A BODY HAVING AN INNER SURFACE, AN OUTER SURFACE, AND A FIRST PLURALITY OF LONGITUDINAL RIBS DISPOSED ON SAID INNER SURFACE EXTENDING SUBSTANTIALLY THE ENTIRE LENGTH OF SAID BODY, further characterised in that each of said first plurality of ribs has a height of about 0.025 inches above said inner surface of said body.

4. Claims: 1, 8

A BELT COMPRISING A BODY HAVING AN INNER SURFACE, AN OUTER SURFACE, AND A FIRST PLURALITY OF LONGITUDINAL RIBS DISPOSED ON SAID INNER SURFACE EXTENDING SUBSTANTIALLY THE ENTIRE LENGTH OF SAID BODY, further characterised in that each of said first plurality of ribs has a width of about 0.05 to 0.1 times the width of said body.

5. Claims: 1, 11

A BELT COMPRISING A BODY HAVING AN INNER SURFACE, AN OUTER SURFACE, AND A FIRST PLURALITY OF LONGITUDINAL RIBS DISPOSED ON SAID INNER SURFACE EXTENDING SUBSTANTIALLY THE ENTIRE LENGTH OF SAID BODY, further characterised in that each of said first plurality of ribs comprises a plurality of

INTERNATIONAL SEARCH REPORT

International Application No. PCT/ US 98/01427

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 206

longitudinal ridges and corresponding channels extending essentially the entire length of each said rib.

6. Claims: 1, 12

A BELT COMPRISING A BODY HAVING AN INNER SURFACE, AN OUTER SURFACE, AND A FIRST PLURALITY OF LONGITUDINAL RIBS DISPOSED ON SAID INNER SURFACE EXTENDING SUBSTANTIALLY THE ENTIRE LENGTH OF SAID BODY, further characterised in that each of said first plurality of ribs follows a wavy path.

7. Claims: 1, 15

A BELT COMPRISING A BODY HAVING AN INNER SURFACE, AN OUTER SURFACE, AND A FIRST PLURALITY OF LONGITUDINAL RIBS DISPOSED ON SAID INNER SURFACE EXTENDING SUBSTANTIALLY THE ENTIRE LENGTH OF SAID BODY, further characterised in that said body is constructed of a first material, said first plurality of ribs is constructed of a second material, and said first material has a greater resistance to wear than said second material.

8. Claims: 17, 18, 19

A conveyor system, comprising:

a) a belt, SAID BELT COMPRISING A BODY HAVING AN INNER SURFACE, AN OUTER SURFACE, AND A FIRST PLURALITY OF LONGITUDINAL RIBS DISPOSED ON SAID INNER SURFACE EXTENDING SUBSTANTIALLY THE ENTIRE LENGTH OF SAID BODY, and

b) a plurality of rollers, at least one of said rollers contacting said first plurality of ribs during traverse of said belt through said conveyor system.

9. Claims: 20, 21

A method for training a belt on a conveyor system, the conveyor system comprising a belt, a plurality of rollers, and a first training guide, THE BELT HAVING A BODY WITH AN INNER SURFACE, AN OUTER SURFACE, AND A FIRST PLURALITY OF LONGITUDINAL RIBS DISPOSED ON SAID INNER SURFACE EXTENDING SUBSTANTIALLY THE ENTIRE LENGTH OF SAID BODY, the method comprising the steps of:

the a) installing the belt on the conveyor system such that first plurality of ribs contacts at least a first roller;

b) adjusting the first training guide to maintain the

INTERNATIONAL SEARCH REPORT

International Application No. PCT/ US 98/01427

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 206

alignment of the belt with respect to the plurality of rollers; and

c)operating the conveyor system and repeating step (b) until the height of the first plurality of ribs diminishes through normal frictional wear such that essentially the entire inner surface of the belt contacts the first rollers.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 98/01427

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2264685 A	08-09-1993	AU 3370093 A CA 2090916 A ZA 9301506 A	09-09-1993 05-09-1993 03-09-1994
US 3679044 A	25-07-1972	AU 456545 B AU 3679171 A BE 777865 A CA 945927 A DE 2200518 A GB 1335801 A NL 7200379 A	19-12-1974 14-06-1973 02-05-1972 23-04-1974 17-08-1972 31-10-1973 17-07-1972
US 4998325 A	12-03-1991	DE 3827822 A EP 0355503 A JP 2080622 A	22-02-1990 28-02-1990 20-03-1990
US 4899872 A	13-02-1990	AT 115504 T DE 68919881 D DE 68919881 T EP 0334686 A	15-12-1994 26-01-1995 20-04-1995 27-09-1989
US 4109784 A	29-08-1978	DE 2602613 A AT 353167 B AT 17077 A CA 1047957 A FI 770126 A,B, FR 2338873 A GB 1567074 A JP 1341887 C JP 52097568 A JP 56049803 B SE 431738 B SE 7700633 A	28-07-1977 25-10-1979 15-03-1979 06-02-1979 25-07-1977 19-08-1977 08-05-1980 14-10-1986 16-08-1977 25-11-1981 27-02-1984 25-07-1977