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(54) Title: A METHOD TO LOAD A CREEL

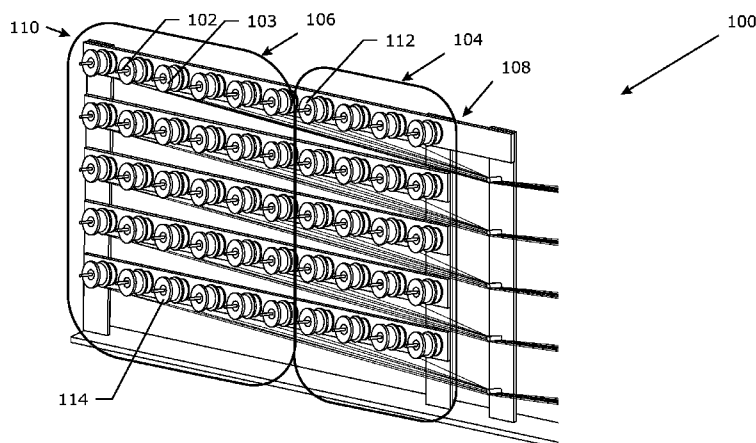


Fig. 1

(57) Abstract: The invention relates to a method of loading a creel (100) for feeding wire products from a number of spools into a manufacturing process, providing a creel, said creel having a number of stands (102) for positioning spools (103), said number of stands comprising a first group of stands (104) and a second group of stands (106), said first group of stands being located at the front side (108) of said creel, said second group of stands being located at the back side (110) of said creel; providing at least a first type of spools (112) and a second type of spool (114), said first type of spools being provided with a wire product having a length L1, said second type of spools being provided with a wire product having a length L2, with L2 being higher than L1; positioning said first type of spools on stands of said first group of stands and positioning said second type of spools on stands of said second group of stands.

A method to load a creel

Description

Technical Field

[0001] The invention relates to a method to load a creel with spools provided with a wire product.

Background Art

[0002] The use of creels for unwinding wire products such as steel wire products from spools and for feeding such wire products into a manufacturing process which uses and/or further processes the wire products is known in the art. Creels are for example used in the manufacturing of steel reinforced rubber articles, for example belts or plies, such as plies which are assembled to form tyres.

[0003] A creel typically contains some hundreds of spools, for example between 600 and 1400 spools.

When during the creel run one spool is exhausted of wire product the manufacturing process is shut down. The spool is then removed and a full spool is installed. This results in substantial down-time of the manufacturing process every time the wire product of a spool is exhausted. In order to reduce the down-time, all spools are replaced with full spools once one spool is exhausted irrespective of the amount of wire product remaining on the other spools. The result is the wasting of substantial amounts of wire product remaining on the spools which are not exhausted.

Disclosure of Invention

[0004] It is an object of the present invention to provide a method of loading a creel avoiding the drawbacks of the prior art.

It is another object of the present invention to provide a method of loading a creel thereby reducing the amount of scrap i.e. the amount of wire product remaining on the spools.

[0005] According to a first aspect of the present invention a method of loading a creel with a number of spools is provided. Each of the spools comprises a wire product coiled on the spool. The method according to the present invention comprises the following steps

- providing a creel, said creel having a number of stands for positioning spools, said number of stands comprising at least a first group of stands and a second group of stands, said first group of stands being located at the front side of said creel, said second group of stands being located at the back side of said creel. The front side of the creel is located at the pay-off side of the creel whereas the back side of the creel is located at the opposite side, i.e. away from the pay-off side of the creel;
- providing at least a first type of spools and a second type of spool, said first type of spools being provided with a wire product having a length L1, said second type of spools being provided with a wire product having a length L2, with L2 being higher than L1;
- positioning said first type of spools on stands of said first group of stands and positioning said second type of spools on stand of said second group of stands.

[0006] The wire product preferably comprises steel, for example low carbon steel, high carbon steel or stainless steel.

[0007] As wire product any type of wire product can be considered. Examples of wire products comprise wires, filaments, strands or cords.

Preferred examples of wire products comprise steel wires, steel filaments, steel strands or steel cords.

[0008] The wire product is for example provided with a coating layer, for example a zinc or zinc alloy layer.

- [0009] The number of stands of the creel is preferably higher than 100, for example between 600 and 1400, for example 800, 1000 or 1200. The stands are preferably arranged in rows, each row comprising at least two spools. Preferably each row comprises between 30 and 140 spools, for example 50 spools.
- [0010] The number of stands of the first group of stands ranges preferably between 10 and 50 % of the total number of stands of the creel. More preferably, the number of stands of the first group of stands ranges between 20 and 40 % of the total number of stands of the creel.
- [0011] In a preferred embodiment the creel has a total number of stands equal to 800. Between 20 and 40 % of these stands belong to the first group of stands, the other stands, i.e. between 60 and 80 % of the stands belong to the second group of stands.
- [0012] The stands comprise for example spindles.
- [0013] Possibly, the stands are provided with tensioning devices or breakage monitoring systems.
- [0014] A creel used in the method according to the present invention comprises at least a first group of stands and a second group of stands. For a person skilled in the art, it is clear that the number of groups of stands 'n' can be more than two. The number of groups of stands n is for example equal to 3, 4 or 5.
The first group of stands is located at the pay-off side of the creel, the nth group of stands is located at the other side, i.e. away from the pay-off side of the creel.
- [0015] The number of different types of spools 'm' can be two or higher than two. The number of different types of spools m is for example 3, 4 or 5. Preferably, the number of different types of spools is equal to the number

of groups of stands n . This means that in case the creel has a first group of stands and a second group of stands, the number of types of spools is 2, a first type having a wire product having a length $L1$ and a second type having a wire product having a length $L2$, with $L2$ being higher than $L1$. In case the creel has a first group of stands (located at the pay-off side of the creel), a second group of stands (located between the first group of stands and the third group of stands) and a third group of stands (located away from the pay-off side of the creel), the number of types of spools is 3: a first type having a wire product having a length $L1$, a second type having a wire product having a length $L2$, and a third type having a wire product having a length $L3$, with $L3$ being higher than $L2$ and $L2$ being higher than $L1$.

[0016] Preferably, the difference in length between $L2$ and $L1$ is ranging between 1 and 10 meter, for example between 2 and 6 meter, such as 3, 4 or 5 meter.

More generally, the difference in length between L_m – the length of the ‘ m ’ type of spools - and L_{m-1} – the length of the ‘ $m-1$ ’ type of spools - is preferably ranging between 1 and 10 meter, for example between 2 and 6 meter, such as 3, 4 or 5 meter whereby L_{m-1} is smaller than L_m .

[0017] The method of loading a creel according to the present invention is in particular suitable in methods for feeding wire products as for example in the manufacturing of strands, cords, ropes or in the manufacturing of reinforced rubber articles such as plies or belts.

[0018] An advantage of the method according to the present invention is that the amount of wire product that is remaining on the spools is drastically reduced. This results in a reduction of scrap.

[0019] It is common practice that the wire product of a certain percentage of spools of a lot of spools for a creel is subjected to some quality tests (for example straightness, torsions, arc height, breaking force, ...). Commonly

about 20 till 30 % of the spools is subjected to such tests. To perform such tests a certain length of the wire product, for example 3 till 5 meter is necessary. This means that the length of the wire product on the tested spool is shorter compared to the non-tested spools. According to the present invention the tested spools having a shorter length can be positioned on the stands of the first group, i.e. at the pay-off side of the creel, whereas the non-tested spool can be positioned on the stands of the second group.

Brief Description of Figures in the Drawings

[0020] The invention will now be described into more detail with reference to the accompanying drawings whereby

- Figure 1 is a schematic illustration of a creel used in the method of loading a creel according to the present invention.

Mode(s) for Carrying Out the Invention

[0021] The present invention will be described with respect to particular embodiments and with reference to certain drawings but the invention is not limited thereto but only by the claims. The drawings described are only schematic and are non-limiting. In the drawings, the size of some of the elements may be exaggerated and not drawn on scale for illustrative purposes. The dimensions and the relative dimensions do not correspond to actual reductions to practice of the invention.

[0022] Figure 1 is a schematic of a creel 100. The creel 100 comprises stands 102 for positioning spools 103 provided with a wire product, for example steel cord.

The steel cords are unwound from the creel 100 and are calendered parallel to one another in rubber to form a steel cord reinforced ply for further processing in a tyre.

[0023] The stands 102 of the creel 100 are divided in a first group 104 and a second group 106. The first group 104 is located at the front of the creel

100, i.e. at the pay-off side 108 of the creel 100, the second group 106 is located at the back 110 of the creel 100, i.e. away from the pay-off side of the creel 100.

- [0024] A first type of spools 112 having steel cord having a length L_1 meter are positioned on stands of the first group 104. A second type of spools 114 with steel cord having a length L_2 meter larger than L_1 are positioned on stands of the second group 106. The difference in length between L_1 and L_2 ranges between 1 and 10 meter and is for example equal to 3, 4 or 5 meter.
- [0025] After the mounting of the creel, the steel cord beginnings of all spools are collected and drawn the calender entry where they are organised side-by-side. The calender operation is then started.
- [0026] During the calender operation the spools of both first and second type are drawn empty at equal pace. When the spools are running to their end they will all fall slack within a small length as the spools farthest from the calender entry have a larger length than those closer to the calender entry.
- [0027] In the prior art way of operation, a short spool – e.g. a spool that had been tested for residual torsions - situated far from the entry of the calender would run out much earlier than all other spools necessitating the stopping of the creel and the scrapping of the remaining steel cord.
- [0028] The novel and inventive way of operation prevents this excessive scrap generation.

Claims

1. A method of loading a creel for feeding wire products from a number of spools into a manufacturing process, the method comprises the steps of
 - providing a creel, said creel having a number of stands for positioning spools, said number of stands comprising at least a first group of stands and a second group of stands, said first group of stands being located at the front side of said creel, said second group of stands being located at the back side of said creel;
 - providing at least a first type of spools and a second type of spool, said first type of spools being provided with a wire product having a length L1, said second type of spools being provided with a wire product having a length L2, with L2 being higher than L1;
 - positioning said first type of spools on stands of said first group of stands and positioning said second type of spools on stand of said second group of stands.
2. A method according to claim 1 wherein said wire product comprises a wire, strand or cord.
3. A method according to claim 1 or claim 2, wherein said number of stands for positioning spools is higher than 100.
4. A method according to any one of the preceding claims, wherein the number of said first group of stands ranges between 10 and 50 % of the total number of stands.
5. A method according to any one of the preceding claims, wherein the difference in length of L2 and L1 is between 1 and 10 meter.
6. A method according to any one of the preceding claims, wherein said creel has n groups of stands, with n ranging from 2 to 5.

7. A method according to any one of the preceding claims, wherein the creel is loaded with m types of spools, with m ranging from 2 to 5.
8. A method according to any one of the preceding claims, wherein the number of groups of stands n is equal to the number of types of spools m .

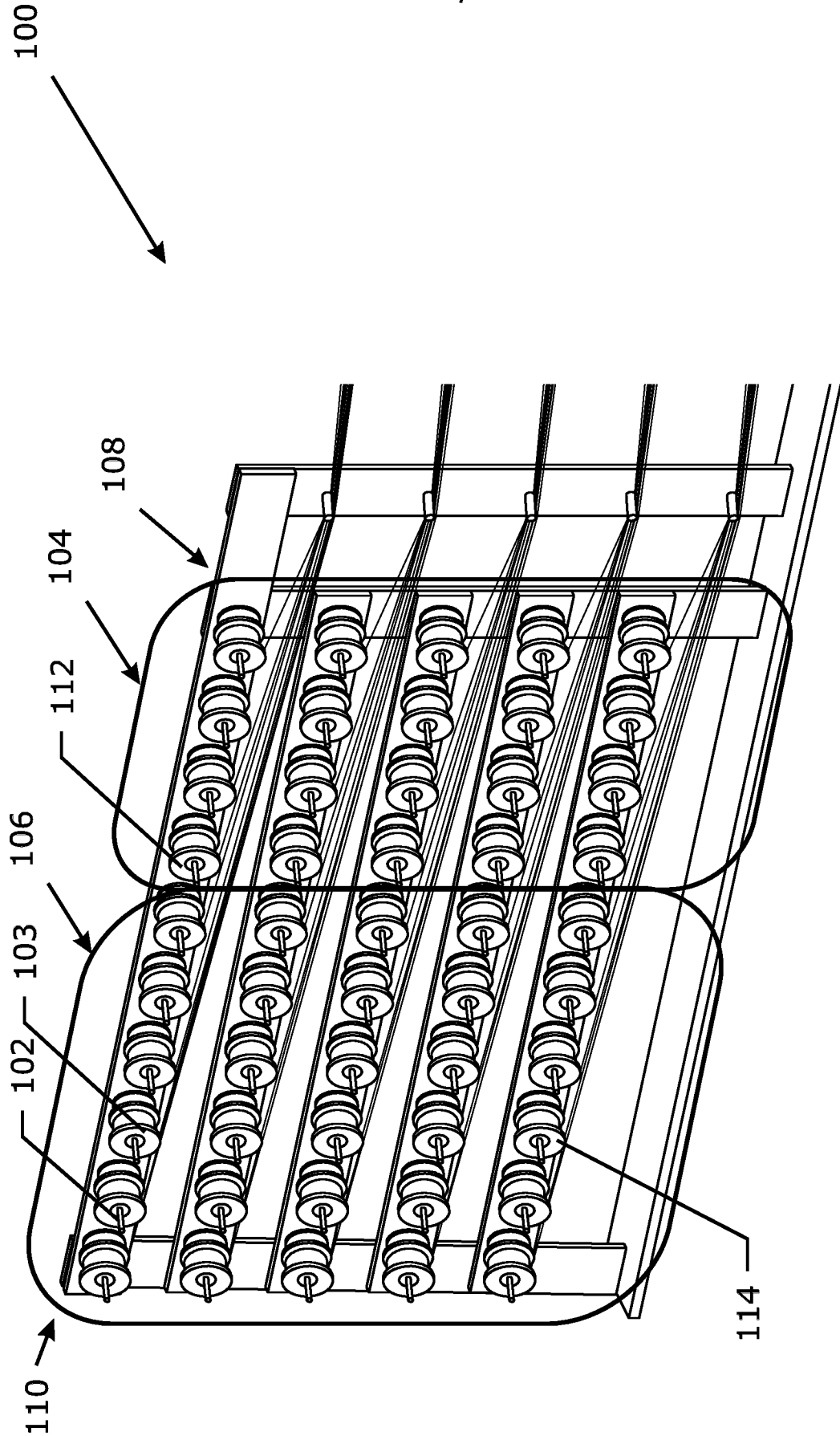


Fig. 1

INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER
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ADD.

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)
B65H D02H

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 practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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X	JP S64 68534 A (ASAHI KASEI TEXTILE KK) 14 March 1989 (1989-03-14) figures -----	1,2,6-8
A	EP 0 616 063 A1 (KIKUCHI KOGYO [JP]) 21 September 1994 (1994-09-21) column 1, lines 31-44 -----	1
A	GB 1 203 669 A (SEMPERIT AG [AT]) 3 September 1970 (1970-09-03) page 1, lines 26-43 ----- -/-	1



Further documents are listed in the continuation of Box C.



See patent family annex.

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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2015/061684

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 90 10 256 U1 (HAUERS) 13 September 1990 (1990-09-13) page 1 -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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