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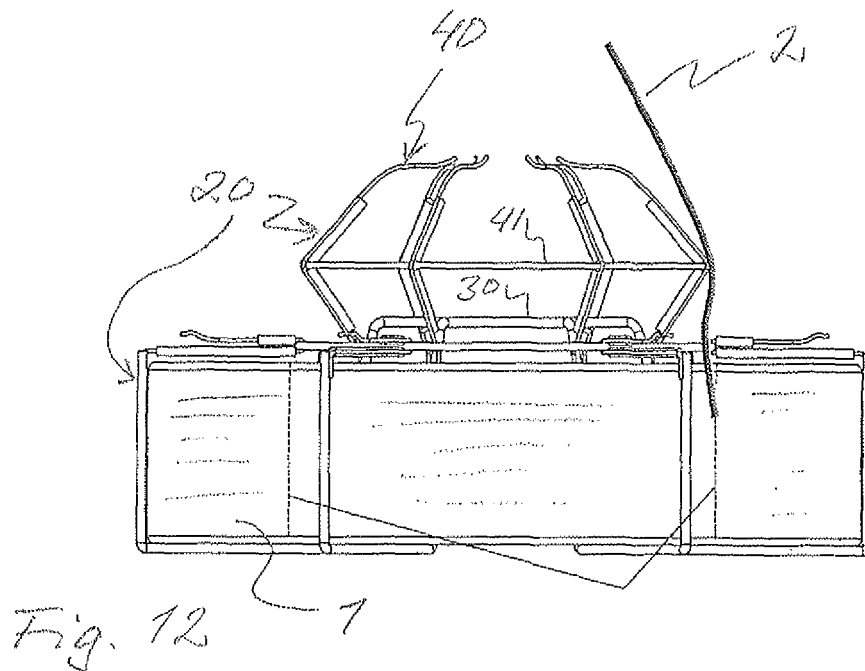
(30) Priority: **04.08.2008 SE 0801755**

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(54) **Device for packaging and unwinding wire**

(57) A device for packaging a coil of wire and for unwinding wire (2) from the coil (1) has a strap assembly

(20) which, in a packaging mode tightens the coil (1) and which in an unwinding mode forms wire guiding means (40).



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Description

Technical Field

[0001] The present invention generally relates to packaging and unwinding of long-length stock, such as wire, strip, cable, strand, yarn or thread. More specifically the invention concerns a device for packaging a coil of wire and for unwinding the wire from the coil.

Background

[0002] Metal wire, in particular so-called industrial wire, is widely used in many different industries for a large variety of purposes. It may be used as starting material for further processing into nails, rivets, etc., or the metal wire is used more or less as-is to tie things together.

[0003] In production of industrial wire, the wire is produced as a continuous length of metal. The wire fed out of the machine is often stored in a continuous length in the form of a coil or reel, or on a core such as a spool or the like, or in exact-cut lengths or bar lengths. When a long enough length of wire has been produced, the wire is cut.

[0004] A coil of wire may be wound in different ways, with different winding pattern and in different shapes. Although other shapes of coils exist, two common prior-art shapes are illustrated in Figs 1 and 2, where Fig. 1 shows a hollow cone shaped coil 100 with a sloping outer surface, and where Fig. 2 shows a hollow cylindrical coil 200.

[0005] Depending on the winding pattern, the wire has to be unwound from either an outer surface 100a, 200a; an inner surface 100b, 200b; or an end surface 100c, 200c of the coil, as shown in Figs 1-2.

[0006] The wire may either be stored as is, without a holding device, or it may be stored on a holding device, such as a central core which typically is hollow (a tube). If stored on a core, the wire may easily be handled by lifting and moving the core with the attached wire. If the wire is stored without core, the coil is often tied up by means of flat bands, such as flat steel bands, to keep the coil in order (assembled) during handling and transport. Further, a coil is often placed on a carrier, such as a pallet, in order to make the transport and handling easier.

[0007] A drawback of using cores is that they are expensive, that they often have to be returned to the wire manufacturer when all of the wire has been unwound or otherwise removed, and also that the empty cores require storage space. Therefore, many wire producers and suppliers prefer delivering the wire in coils without cores. Fig. 3 illustrates a prior-art coil 300 wound on a core 301 and tied up by steel bands 302. The coil 300 can be handled by a forklift truck 303. The core 301 used for the coil 300 is shown separately in Fig. 4.

[0008] When the wire has reached the user, it is often refined in high-speed processes where several meters of wire have to be fed into a processing machine each second. Such high-speed feeding increases the risk of

wire getting entangled or stuck before being fed into the machine. To reduce this risk of so-called "snagging", the coil may be placed in a special unwinding unit for enabling easy unwinding of the wire. An unwinding unit of this kind is referred to as a "pay-out unit" by persons skilled in the art.

[0009] Pay-out units come in different embodiments depending on the intended use, depending on the characteristics of the wire and depending on the winding pattern created by the wire producer when winding the wire onto the coil.

[0010] A common type of pay-out unit 400 is shown in Fig. 5 and it comprises a core 401, a hat 402 and a cone 403. These components 401-403 are often made from heavy and sturdy steel pipes that are bent and welded together to form the parts. The prior-art pay-out unit 400 of Fig. 5 is typically used for coils adapted to be unwound from an end surface, or sometimes from the outside of the coil.

[0011] For coils adapted to be unwound from the outer surface, other types of pay-out units are used, where the coil is placed on a rotating table or the like. Often, such pay-out units comprise a compression assembly in which the coil may be positioned before the tied bands are cut off. The compression assembly provides an axial compression force to the coil, for example by axially compressing the coil between two end discs. This type of arrangement has to be adjusted if it is to be used with coils of varying shapes and sizes. The compression assembly keeps the coil compressed during the entire period the coil is unwound. Once the coil is compressed, the tie bands may be cut in order to make the coil ready for unwinding. During unwinding of the coil, it has to be rotated by a rotation device, such as a rotating table. Then "snagging" is likely to occur if no tensioning means are used, since the outermost layers of wire, close to the end surfaces of the coil, tend to slip along the end surface of the coil.

[0012] Coils adapted to be unwound from the end side or the inside of the coil are often unwound via a "hat" as shown in Fig. 6. The hat 402 is cone formed and placed around the core 401 with the widest end of the hat 402 directed upwards. The wire is led along the outside of the hat 402 which leads the wire being pulled of the coil outwards, away from the vertical centre axis of the coil, in order to open the wire spirals and reduce the risk of tangling.

[0013] Typically, the cone 403 has the same maximum diameter as the hat 402 and it is placed straight above the same. The wire W is led inside the cone 403 and it leads the wire W towards and through a hole in the narrowest end of the cone 403. After the wire W has passed through the hole in the narrow part of the cone 403, it is led directly into the processing machine (not shown), but sometimes a straightening device (not shown) is placed in between the cone 403 and the processing machine in order to further reduce the risk of "snagging". In this type of prior-art arrangement the core 401 is normally posi-

tioned inside the coil so that a centre axis of the coil is vertically oriented. As shown in Fig. 5, the core 401 may have a lower support surface for keeping the wire W from falling off the core 401. Further, the core 401 is often long enough to protrude above the top part of the coil, so that a coil positioned on the core 401 may be handled by lifting the core in its protruding parts.

[0014] Before the wire W can be unwound from the pay-out unit 400, the tie bands holding the wire coil together during transport have to be removed (cut) and disposed.

[0015] A prior-art arrangement which is basically of the type described above is illustrated in a pamphlet issued by the Belgian company Bekaert-Tinsley and entitled "Orbits - Good Run for Your Money".

[0016] As to further prior-art arrangements, certain U.S. Patents may be referred to as background.

[0017] US-A-4,651,948 discloses a package for a toroidal coil of a filled wire generally centered on an axis and having axially oppositely directed end faces and radially oppositely directed inner and outer peripheries and a holder having one axial end lying against one end face of the coil, an outer structure engaging radially inward on the outer periphery of the coil, and an opposite axial end juxtaposed with the other end face of the coil. The opposite axial end is formed in part by a circular ring of a diameter smaller than that of the inner periphery and formed in turn with an inwardly open notch tapering in the direction the coil is wound. The holder is radially inwardly open so that the wire can be pulled from the inner periphery of the coil. Thus as each turn is pulled off the inner periphery it will be jarred slightly when passing the notch. This will loosen the turns from each other and will ensure that the wire feeds smoothly.

[0018] A disadvantage with package known from US-A-4,651,948 is that it may only dispense wire adapted to be unwound from the inside of the coil. Further, this prior-art package takes up a lot of space even if it is emptied. Also, the known package cannot easily be resealed. Further, heavy coils packaged in packages according to US-A-4,651,948 have to be carried on external carriers, such as pallets. Another drawback is that this known device requires extra equipment for handling the wire.

[0019] US-A-4,763,854 shows a container for continuous supply of wire, wherein a coil of wire is supported between two side members joined at their outer peripheries. One of the side members has a continuously circular opening formed by a bar with a central circular section and axially spaced ends extending in opposite directions to the periphery of the side member. Wire from the inner surface of a coil of wire held in the container is supplied through the circular opening and the end of the wire from the outside of the coil is disposed above one end of the bar and below the other end of the bar so that it can be connected to another coil of wire and wire can be supplied continuously from successive containers.

[0020] A disadvantage with the container known from US-A-4,763,854 is that it may only unwind wire from the

inside of the coil. The container is cumbersome even when it is emptied, and the container cannot easily be resealed. Further-more, coils packaged in containers according to US-A-4,763,854 have to be carried on carriers, such as pallets.

[0021] US-A-4,591,110 discloses a storage and dereeling apparatus for storing and dispensing magnet wire or other reeled material. The apparatus includes a container member in which a reel of magnet wire is placed with the axis thereof vertically disposed; and the apparatus includes a cover member. The cover member is automatically indexed to either of two rotational positions; and the cover member is releasably latched in a storage and transporting position wherein the cover member is adjacent to the spool of wire, to a preferred dereeling position wherein a space is provided intermediate of the reel of wire and the cover member to allow dereeling of the wire, and to an alternate dereeling position wherein the space between the reel of wire and the cover member is somewhat larger.

[0022] A general disadvantage of the apparatus known from US-A-4,591,110 is that it is complicated, and it is expensive to produce for large coils. Furthermore, it takes up a lot of space even after the wire has been fully unwound.

[0023] As to further prior art, the wire dereeling device of US-A-2,274,128 should be mentioned as well.

Summary

[0024] From the background discussed above, it can be concluded that there is room for improvements. Hence, a device for handling wire:

- being inexpensive,
 - taking up a reduced amount of space when the wire has been fully unwound,
 - enabling easy handling of the wire, and
 - enabling the wire to be easily unwound without using pay-out arrangements,
- would be advantageous.

[0025] An object of the present invention is to mitigate, alleviate or eliminate one or more of the deficiencies of prior art. This object is achieved by the new concept defined in the appended independent claims. Preferred embodiments of the invention are set forth in the dependent claims.

[0026] According to a first aspect of the inventive concept defined in claim 1, the straps which are used for tightening the coil in the packaging mode are configured to form a wire guiding means to be used in the unwinding mode. By this novel and ingenious combined use of the straps for dual purposes, there is no need for a special pay-out unit for the unwinding operation. The strap assembly used for packaging purposes is used also for unwinding purposes. In the packaging mode, the strap assembly serves to tighten and keep the coil together

whereas in the unwinding mode certain portions of the released strap assembly are reshaped to form wire guiding means.

[0027] In a preferred embodiment, the wire guiding means formed from portions of the released straps is disposed at one end of the coil, for unwinding of wire either from the inside of the coil or from one end of the same. Again, the straps are effectively used in the unwinding mode.

[0028] In another embodiment, the wire guiding means comprises at least one wire guiding ring which in the unwinding mode is spaced from the associated end of the coil. Preferably, the wire guiding ring is circular with a diameter larger than the diameter of the channel of the coil. This wire guiding ring provides for a secure unwinding operation.

[0029] Furthermore, it is preferred that the wire guiding means be frusto-conical in its lower portion close to associated end of the coil. Again, this structure promotes secure unwinding of the wire.

[0030] In a second aspect of the inventive concept defined in claim 6, the device comprises at least one end member which is attached to a respective end of the coil and which in the unwinding mode keeps the coil together for allowing unwinding of wire from the wall portion of the coil. The released straps are disposed at the ends of the coil away from the wall portion of the coil. By this arrangement, there is no need for a pay-out unit and the wire can be unwound from the side of the coil.

[0031] Preferably, the end member is a flat element having a central aperture with an inner diameter corresponding to the diameter of the channel of the coil, and with an outer diameter corresponding to the outer diameter of the coil in the packaging mode. This structure promotes an effective packaging and an advantageous unwinding.

[0032] According to an embodiment, there are two end members applied to a respective end of the coil which provide for a secure compression of the coil there improving packaging, handling and unwinding.

[0033] In still another embodiment of the second aspect of the invention, the device comprises - in the unwinding mode - wire guiding means formed from portions of released straps.

[0034] In a preferred embodiment applicable to both aspects of the inventive concept, the straps comprise rigid portions for stiffening of the wire guiding means in the unwinding mode, and semi-rigid or flexible portions configured to be bent around the coil in the packaging mode. This new and unique structure of the straps promotes the dual function of the same, that is to securely tighten the coil in the packaging mode and to form the wire guiding means in the unwinding mode. The ingenious strap structure with both stiff and semi-stiff/flexible portions improves packaging, handling and unwinding, and it keeps the coil together. Costs can be reduced due to the dual function of the strap structure which preferably is discarded after use. However, it can also be reused

and recycled.

[0035] Preferably, the device comprises a handle means which is disposed at one end of the coil outside the channel thereof and which has a portion spaced from the end of the coil for gripping purposes. For instance, this integrated handle means can be gripped by a fork of a forklift truck which makes the coil package easy to handle.

[0036] In one aspect of the inventive concept, a coil or reel package is provided which comprises a device having the combined and dual features discussed above.

Brief description of the drawings

[0037] In the following, embodiments of the inventive concept as well as its advantages and features will be described in more detail reference being had to the appended schematic drawings which illustrates non-limiting examples and in which:

Fig. 1 shows a hollow cone shaped coil,
 Fig. 2 shows a hollow cylindrical coil,
 Fig. 3 shows a known coil, tied up with bands, positioned on a core and carried by a forklift truck,
 Fig. 4 shows the core illustrated in Fig. 3 separately,
 Fig. 5 shows a known pay-out unit,
 Fig. 6 shows a cone of the pay-out unit illustrated in Fig. 5,
 Fig. 7 is a perspective view of a device according to a one aspect of the invention, shown in its storage or transportation position,
 Fig. 8 is a side view of the device of Fig. 7 shown in its unwinding position,
 Fig. 9 is an exploded view of the device shown in Figs 7-8,
 Fig. 10 is a side view of a device according to another aspect of the invention, shown in its unwinding position,
 Fig. 11 is a perspective view of the device of Fig. 10,
 Fig. 12 is a side view of a device according to a modified embodiment of the invention, shown in its unwinding position,
 Fig. 13 is a perspective view of the device of Fig. 12, and
 Fig. 14 shows certain parts of the device of Figs 12-13.

Detailed description of embodiments

[0038] With reference to Figs 7-9, a device is provided for handling a reel or coil 1 of wire 2 to be unwound from the outer sidewall surface of the coil 1 which has a central channel 1' coaxial with a centre axis C of the coil 1. The device according to this aspect of the invention includes four U-shaped coil shaping means 3-6, three handling and transport securing means 7-9, and two end discs 10-11. Both the coil shaping means 3-6 and the handling and transport securing means 7-9 are of metal and may

be made of a combination of hard or rigid portions and less hard, semi-rigid or flexible portions, which are welded or otherwise attached to each other. The coils shaping means 3-6 and handling/transport securing 3-9 means may also be referred to as straps.

[0039] Each coil shaping means 3-6 comprises a U-shaped part 3a-6a made of a sturdy material, such as hard steel wire. The U-shaped parts 3a-6a are dimensioned to withstand the forces produced during winding of the wire 2 into the shaping unit (not shown), so that the desired shape of coil 1 is achieved. Each coil shaping means 3-6 also comprises a first and a second end part 3b-6b and 3c-6c, respectively, which are both made of ductile steel wire, so that they may be bent into any desired shape and so that they may be tied together by twisting the ends of the parts around each other. By having a well defined shape of the coil 1, the outer layers of wire 2, close to the end surfaces 1a-1b of the coil 1, are prevented from sliding along the end surface of the coil 1 and cause the wire 2 to entangle during unwinding.

[0040] In the embodiment according to Fig. 7, each handling and transport securing means 7-9 comprises a central, substantially U-shaped portion 7a-9a turned upside down, two upper portions 7b-9b and two lower portions 7c-9c. The upper and lower portions 7b-9b and 7c-9c, respectively, may be provided with locking means 7d-9d or with an extra length or wire to allow the upper and lower portions 7b-9b and 7c-9c, respectively, to be locked together by twisting them around each other. The central portion 7a-9a protrudes over and is spaced from the end surface of the coil 1 so that it may function as a handle for use when lifting the coil 1.

[0041] The central portions 7a-9a of the securing means 7-9 are rigid or semi-rigid, preferably of a metal providing a suitable stiffness. The portions 7b-9b and 7c-9c, respectively, are preferably flexible for instance made of ductile steel wire.

[0042] The handling and transport securing means 7-9 have two main functions:

- to tie up the wire coil 1 and end discs 10, 11 during handling and transport, so that the wire 2 is kept from entangling, and so that the end disc(s) is/are kept from falling off; and
- to provide a handle protruding above the end surface of the coil 1 to enable easy handling of the coil 1 using a forklift truck or similar (cf. Fig. 3).

As shown in Fig. 7, the tie up function and the handle function are integrated into the same portion 7a-9a, but it should be understood that those functions may as well be provided by other parts or implemented as individual parts, preferably also wire designs similar to the coil shaping means and the handling and transport securing means.

[0043] As can also be seen in Fig. 7, the coil shaping means 3-6 are positioned equally spaced round the common centre axis C with the openings outwards for receiving

wire 2. A holder (not shown) can be provided for firmly positioning the coil shaping means 3-6 during production of the coil 1. When producing the coil 1, the wire 2 is continuously wound into the coil shaping means 3-6 so that the wire 2 is firmly tensioned in a substantially circular shape. When the coil shaping means 3-6 are fully loaded with wire 2, the wire 2 is cut and the handling and transport securing means 7-9 are wrapped around the coil 1 and tensioned to secure it during transport and handling. This is referred to as the packaging position or mode.

[0044] With further reference to Fig. 7, the handling and transport securing means 7-9 may be wrapped around an end disc 10 to which is applied to the coil 1 during transport and handling. The end disc 10 is preferably positioned on the outside of the U-shaped coil shaping means 3a-6a when a device according to this aspect of the invention is in its storage and handling position, that is the packaging mode. There may be a similar end disc 11 under the coil 1, as shown in Fig. 8, but this disc is optional.

[0045] Fig. 8 shows the device of Fig. 7 in its unwinding position or mode. Hence, the first ends of the coil shaping means 3-6 are bent upwards into small holes or recesses in the end disc 10 in so that the end disc 10 is kept in place by the coil shaping means 3-6. In this position, the second ends of the coil shaping means 3-6 are also bent so that they do not interfere with the wire 2 during unwinding from the circumferential wall portion of the coil 1. The second ends of the coil shaping means 3-6 are shown as bent downwards, but it should be understood that they may be bent in any direction as long as they do not interfere with the wire during unwinding of the wire, such as horizontal along a planar floor (not shown).

[0046] The end discs 10, 11 are flat elements having a central aperture 10a with a diameter matching the diameter of the central channel 1' of the coil 1 and an outer diameter matching the outer diameter of the coil 1 in the packaging mode. Preferably, the end discs 10, 11 are of metal but other materials are feasible.

[0047] In a variant (not shown), the upper end disc 10 does not have a central aperture but cut portions forming a star-shaped cut-out which matches and is inserted on the upper portions of the means 7-9 (cf. Fig. 7). By this structure, the coil 1 is kept together in an efficient manner.

[0048] As an option, the device of this embodiment may have wire guiding means G formed by portions of released straps, as is schematically shown in Fig. 8. These wire guiding means promotes safe unwinding of the wire 2.

[0049] The device according to the embodiment shown in Figs 7-9 is in particular, but not exclusively, applicable to rather thin wires of metal, for instance with diameters from below 1 mm up to about 3 mm.

[0050] According to another aspect of the invention a device is provided for handling a reel or coil of wire to be unwound from an upper end surface of the coil 1. With reference to Figs 10-11, a device of this kind comprises a plurality of handling and transport securing means gen-

erally denoted 20 and wire guiding means generally denoted 40.

[0051] The handling and transport securing means 20 may be made of a combination of rigid portions 20a and less rigid, semi-rigid or flexible portions 20b which are welded or otherwise attached to each other. The handle 30 and transport securing means 20 according to this aspect to the invention are similar to the one of the previous aspect of the invention, but the upper end portions of the handle and transport securing means are provided with hard or rigid parts attached thereto.

[0052] The wire guiding means 40 may comprise a guiding disc or ring 41 with a central opening so that it may be laid on top of the coil 1 with the central parts of the handling and transport securing means 20 protruding through the opening, such as when the device is in its transport and handling position (not shown). The wire guiding means 40 has a lower frusto-conical portion increasing in diameter from the channel 1' of the coil 1 to the wire guiding ring 41 which has a diameter larger than the diameter of the channel 1'.

[0053] The rigid portions 20a define a compartment in which guide surface means may be supported when the device is in its unwinding position. The ductile upper portions of the handling and transport securing means 20 are dimensioned to be strong enough to firmly support the guide surface means, and at the same time being able to be manually bent into the desired shape for holding the guide surface means.

[0054] When the wire 2 is unwound from the coil 1, the wire 2 is picked from the upper end surface of the coil 1 until the wire 2 is fully wound off at the bottom of the coil 1. During the unwinding operation, the wire 2 then moves radially from the central channel 1' of the coil 1 to the outer periphery of the same, as is shown in dotted lines in Fig. 10 (see double arrow A).

[0055] The device configured according to the embodiment of Figs 10-11 is in particular, but not exclusively, suitable for metal wires having a diameter from about 2,5 mm to about 5 mm.

[0056] In a variant shown in Figs 12-13, the wire 2 is unwound from the coil 1 between upper and lower wire guiding surface means for controlling the movement of the wire 2 during unwinding so that "sagging" is avoided. The handling and securing means 20 are similar to corresponding means 20 shown in Figs 10-11. Furthermore, the wire guiding means 40 is also of the same basic structure, as well as the handle means 30.

[0057] The handle portion and the coil shaping portions may be made in one piece from a hard steel wire.

[0058] When the wire 1 is unwound it is picked up from the inner channel surface on the coil 1, indicated by the dashed lines in Fig. 14, and slides around the upper and lower guide surface means.

[0059] The device of the embodiment depicted in Figs 12-13 is in particular, but not exclusively, suitable for metal wires having a diameter from about 9 mm to about 16 mm.

[0060] All embodiments described above provide an advantageous for coil package.

The means used for packaging and keeping the coil together are also used for guiding the wire in the unwinding mode. This is a novel and advantageous feature.

[0061] The above-mentioned joined or attached strap portions may be joined by welding, soldering, gluing or the like. Any bent portions may be produced by bending straight metal to the desired shape. The wire put on the coil may be steel wire, and the different wire parts may have different properties, such as hardness, dimensions, coatings and profiles.

[0062] Compared to conventional coil packages using tie bands with a substantially wide and low cross-section, being stiff in only one direction, the straps of this inventive concept may have a circular cross-section which makes them stiff in "all" directions perpendicular to the longitudinal axis of the strap. Straps of circular cross section are easier to form and can define a substantially fixed outer shape for supporting the wire coil in order to keep the layers of the coil from moving around on the coil and thereby avoid "snagging".

[0063] The guide surface means may be a circular ring 41 made of a piece of metal that has been bent and then had its ends joined, for example by welding, punching, riveting, twisting or screwing, but it may also be any other arrangement that provides one or more surfaces that the wire 2 may slide along during unwinding. Further, the guide surface means may be provided with attachment means, such as hooks or loops, for providing specific connection points where end parts, such as wire, may be attached. Preferably, such attachment means protrude inwards, in order for a wire 2 sliding along the outer periphery of the guide ring 41 to slide smoothly. Further, the guide ring 41 may have some other ring-shape than circular, such as oval or rectangular with smooth corners.

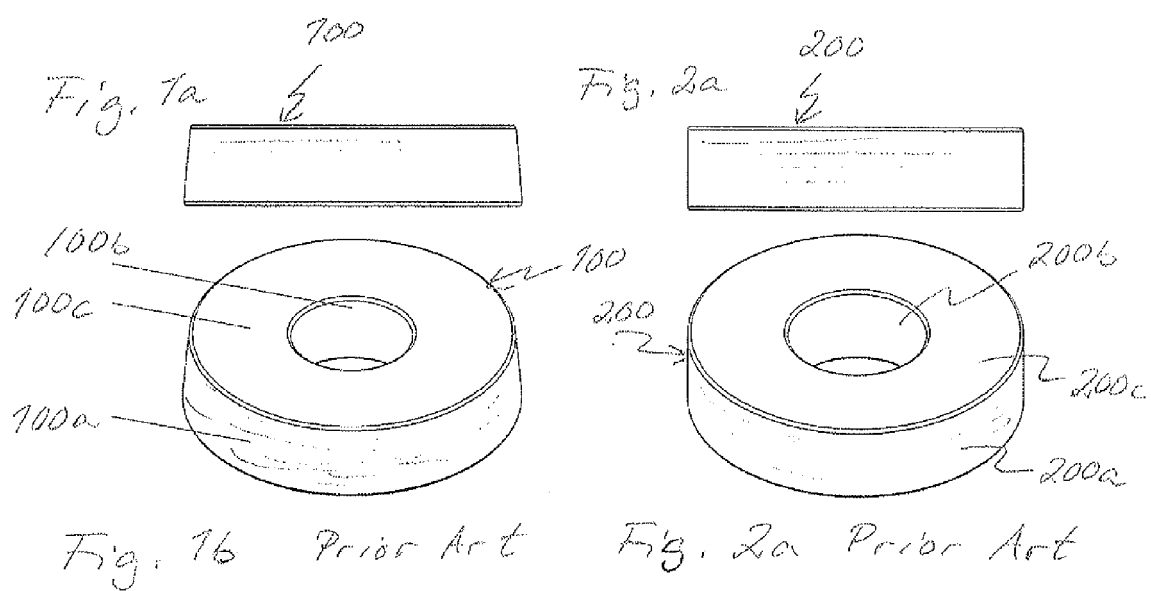
[0064] The inventive coil packaging and unwinding concept is applicable to many various types of stock, such as very thin metal wires or threads having a diameter below one millimetre and up to fairly thick cables with diameters ranging up to a couple of hundred millimetres. The advantages of the invention are achieved independent of the thickness of the wire or cable stock it is used for.

[0065] Hence, it should be noted that the inventive concept is by no means limited to the embodiments and examples described above, and several modifications are feasible within the scope of the invention as defined in the appended claims. Although the general term wire has been used throughout the description, it should be understood that the invention is not limited to devices for only wire, and that any other type of long-length product or stock, such as strip, cable, strand, yarn or thread, could be applied instead of wire.

Claims

1. A device for packaging a coil of wire and for unwind-

- ing wire from the coil, said coil having two ends, a circumferential wall portion and a central channel extending between said ends and being coaxial with a centre axis of said coil, said device comprising straps which in a packaging mode are tightened around said coil at spaced positions and which extend along the outer surfaces of said wall portions and said ends and also along the inner surface of said channel, wherein said straps in an unwinding mode are released in order to allow unwinding of wire from said coil and wherein said straps in said unwinding mode form means for guiding wire being unwound from said coil, said wire guiding means being formed by portions of said released straps.
2. A device as claimed in claim 1, wherein said wire guiding means is disposed at one of said ends of said coil aligned with said channel, for unwinding of said wire from the inside of said channel or from said one end of said coil.
3. A device as claimed in claim 1 or 2, wherein said wire guiding means comprises at least one wire guiding ring which in said unwinding mode is spaced from one of said end of said coil.
4. A device as claimed in claim 3, wherein said wire guiding ring is circular with a diameter larger than the diameter of said channel of said coil.
5. A device as claimed in claim 4, wherein said wire guiding means has a frusto-conical portion increasing in diameter from said channel of said coil and to said wire guiding ring.
6. A device for packaging a coil of wire and for unwinding wire from the coil, said coil having two ends, a circumferential wall portion and a central channel extending between said ends and being coaxial with a centre axis of said coil, said device comprising straps which in a packaging mode are tightened around said coil at spaced positions and which extend along the outer surfaces of said wall portions and said ends and also along the inner surface of said channel, wherein said straps in an unwinding mode are released in order to allow unwinding of wire from said coil, wherein said device further comprises at least one end member which is applied to an end of said coil and which in said unwinding mode keeps said coil together for allowing unwinding of wire from said wall portion, said released straps in said unwinding mode being disposed at said ends of said coil away from said wall portion of said coil.
7. A device as claimed in claim 6, wherein said at least one end member is a flat element having a central aperture with an inner diameter matching the diameter of said channel of said coil and having an outer diameter matching the outer diameter of said coil in said packaging mode.
8. A device as claimed in claim 6 or 7, comprising two end elements applied to a respective end of said coil.
9. A device as claimed in any one of claims 6-8, which in said unwinding mode comprises wire guiding means formed from portions of released straps.
10. A device as claimed in any one of the preceding claims, wherein said straps comprise both rigid portions for stiffening said wire guiding means in said unwinding mode, and semi-rigid or flexible portions configured to be bent around said coil in said packaging mode.
11. A device as claimed in any one of the preceding claims, further comprising handle means disposed at one end of said coil aligned with said channel thereof, said handle means having a portion spaced from said end for gripping purposes.
12. A coil package comprising a device as claimed in any one of the preceding claims.



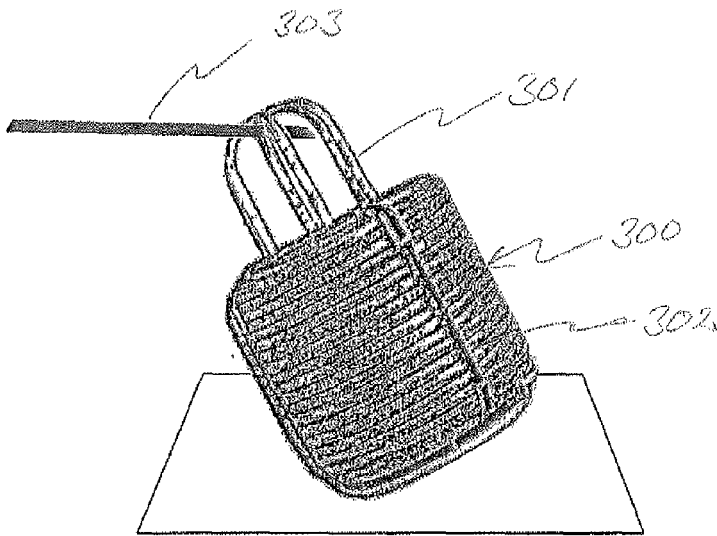


Fig. 3
Prior Art

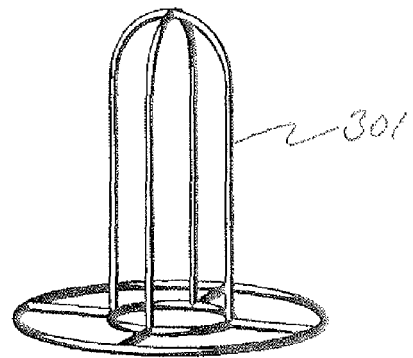


Fig. 4
Prior Art

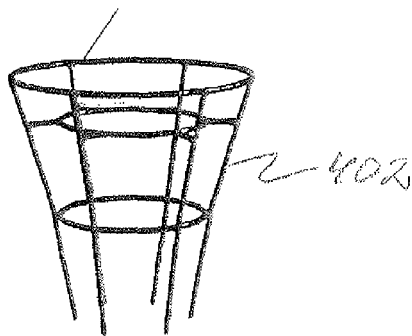


Fig. 6
Prior Art

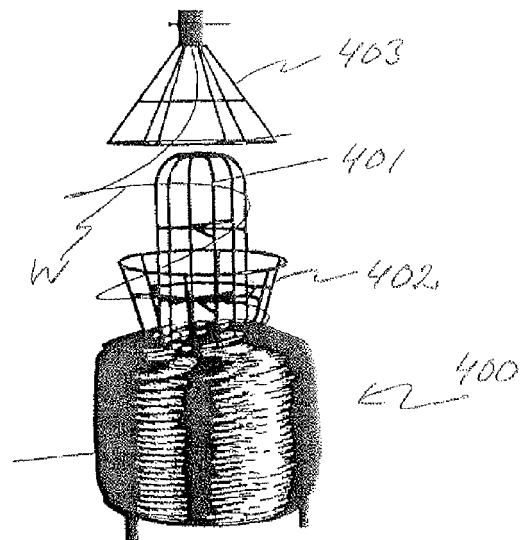
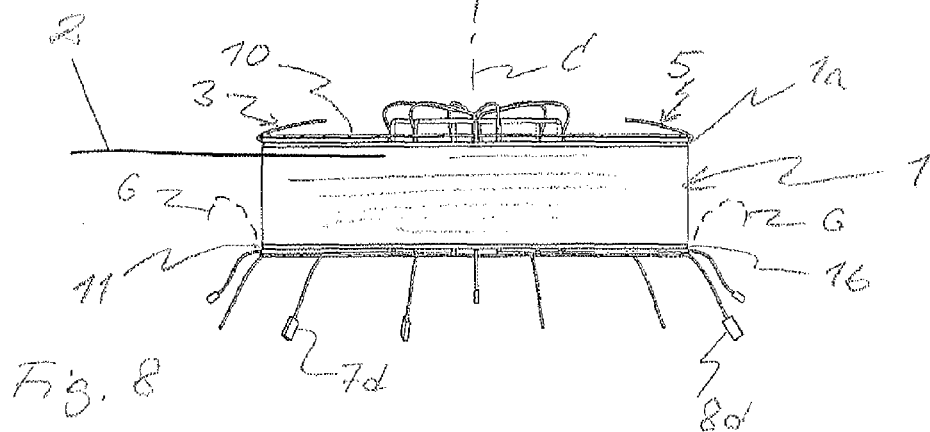
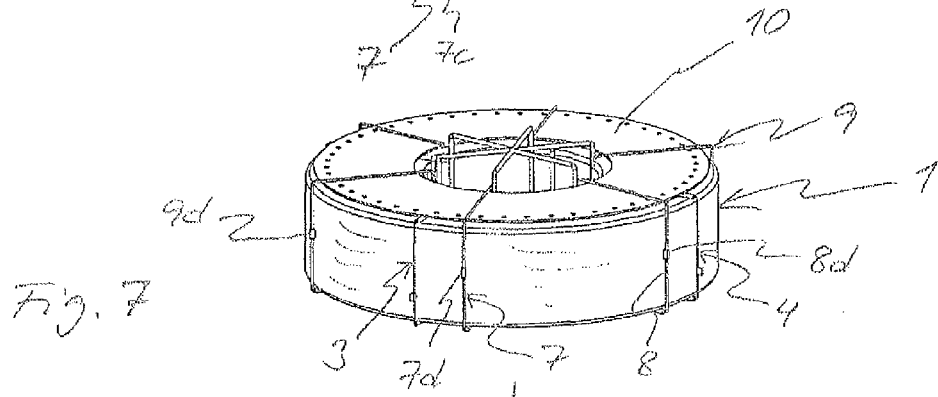
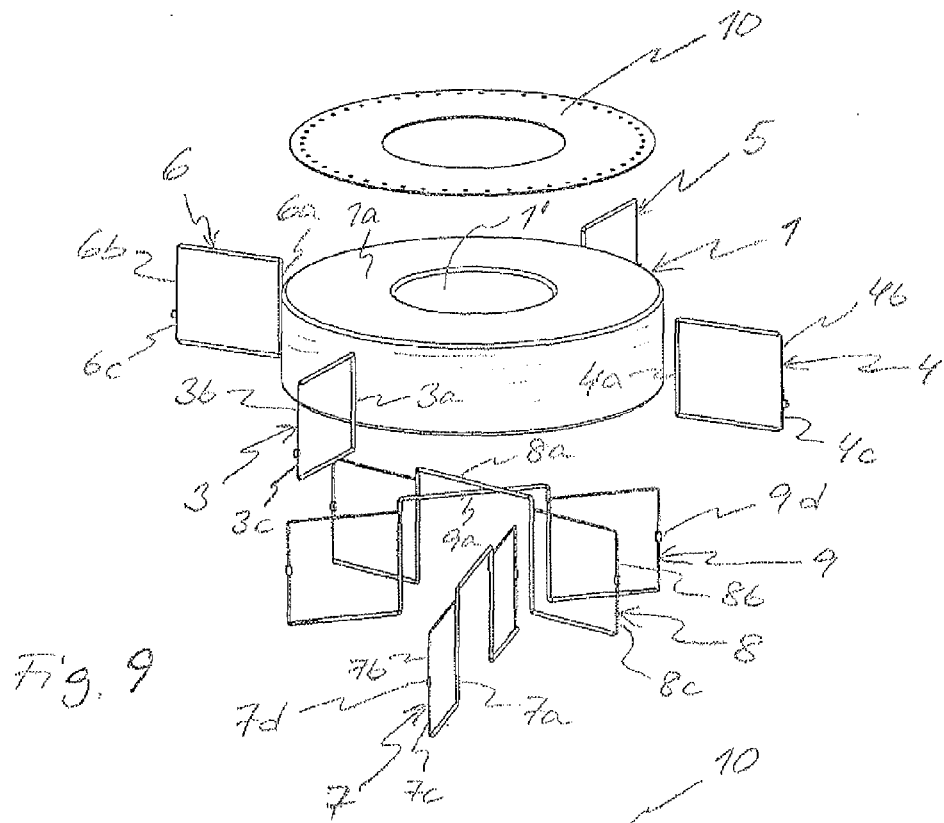


Fig. 5
Prior Art



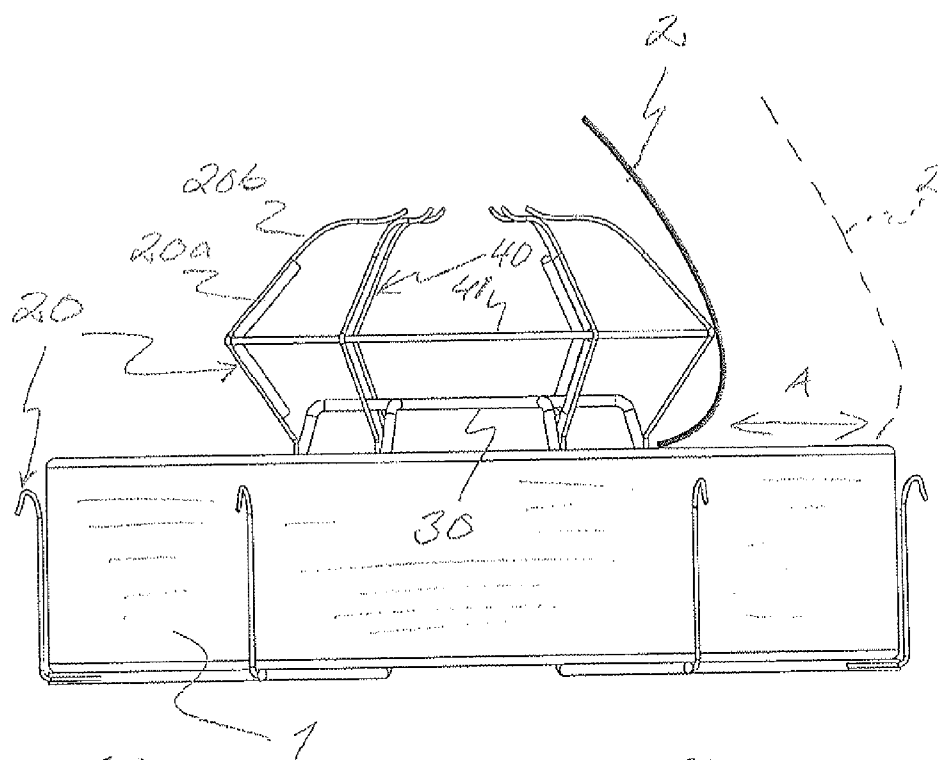


Fig. 10

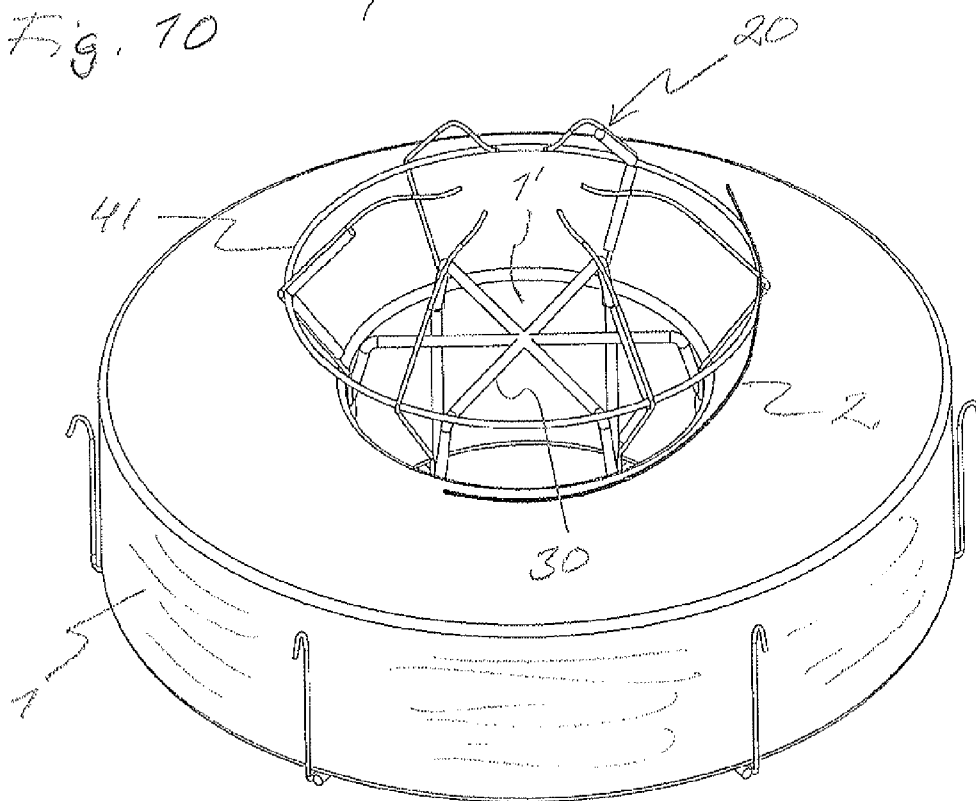


Fig. 11

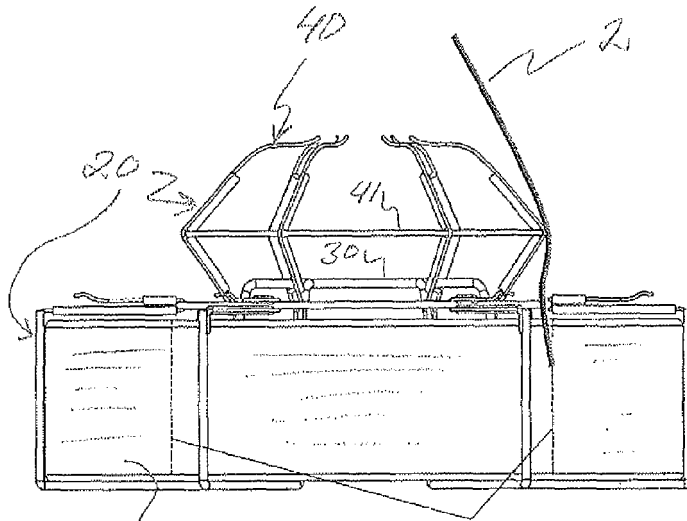


Fig. 12

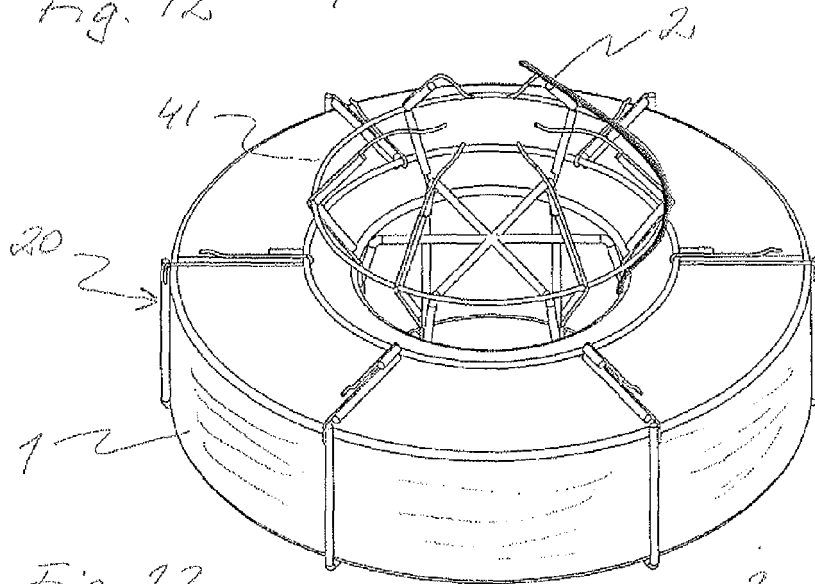


Fig. 13

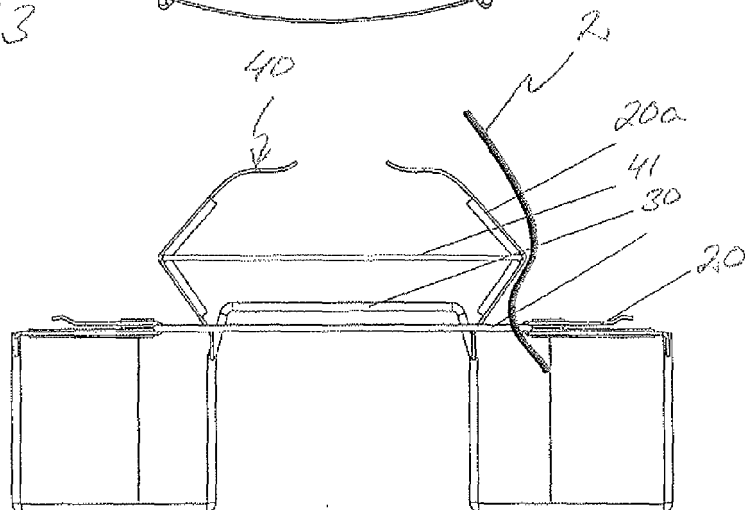


Fig. 14

REFERENCES CITED IN THE DESCRIPTION

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