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(54) Title: METHOD AND APPARATUS FOR PROVIDING A TIRE WITH AN INFORMATIVE LABEL, AND TIRE  
PROVIDED WITH SUCH A LABEL

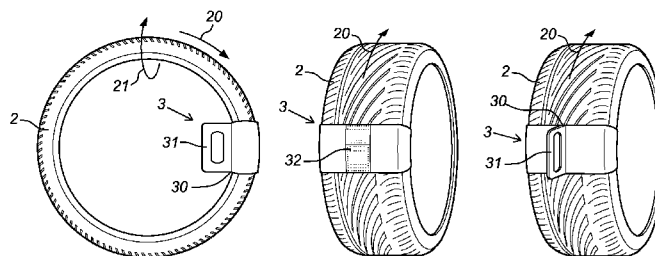


Fig. 5

(57) Abstract: The invention relates to a method for providing a tire with an informative label. The method comprises supporting a tire, supplying a banding material to the tire and wrapping it in a loop around a part of the tire, holding the banding material at the neck of said loop, and connecting opposed areas of the banding material at said neck to form a label wrap. The invention further relates to an apparatus for carrying out the method and to a tire provided with the label. The informative label is easily removed by a mechanic and shows an improved processability and printability. The informative label further does not leave any adhesive or other residuals on a tire.

**Method and apparatus for providing a tire with an informative label, and tire provided with such a label**

5 The present invention relates to a method and apparatus for providing a tire with an informative label. The invention further relates to a tire provided with an informative label that does not leave any adhesive or other residuals on a tire.

Tires are presently provided with an informative label when they leave a tire factory. The informative label carries product information that needs to be conveyed to  
10 stakeholders, such as garage keepers, tire centers and logistic collaborators. In this business chain, conveying product information such as tire size, product line and barcode is vital. Upon mounting a tire on a car, the label is typically removed and disposed of.

15 The known informative labels typically comprise a backing of silicone paper, provided on the back with a relatively thick adhesive layer to ensure adhesion to the tire rubber. The front side of the label is typically a printed polypropylene film. Although the known informative labels have been used for many years their application is not without problems. Labels tend to loosen from a tire after some time, they may become less  
20 readable and when removed may leave adhesive and other residuals on the tire.

It is an object of the present invention to provide an informative label for a tire that does not have some of the disadvantages of the labels known in the art. It is a further object to provide a method and apparatus for providing such a label to a tire.

25 To this end a method for providing a tire with an informative label is provided, the method comprising supporting a tire, supplying banding materials to the tire and wrapping it in a loop around a part of the tire, holding the banding material at the neck of said loop, and connecting opposed areas of the banding material at said neck.

30 The invention further provides an apparatus for providing a tire with an informative label, the apparatus comprising means for supporting a tire, means for supplying banding materials to the tire and wrapping it in a loop around a part of the tire, clamps

for holding the banding material at the neck of said loop, and a device for connecting opposed areas of the banding material at said neck.

5 The method and apparatus in accordance with the invention provide a label for a tire in the form of a wrap. Such a wrap is easily removed by a mechanic which saves time. A further advantage of the wrapped label in accordance with the invention is that its processability and printability in particular is improved. Bleeding out of the adhesive layer in the known label no longer needs to occur which prevents adhesive to adhere to printing machinery and the like.

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In an embodiment of the invention, a method is provided wherein the banding material is guided around the part of the tire by guiding it along a loop shaped guiding structure. This allows to wrap virtually any part of the tire, and in particular a radial section of the tire, which is preferred.

15

Another embodiment of the method according to the invention is provided, wherein the part of the tire to be wrapped is brought within the boundaries of the loop shaped guiding structure by opening the loop of the guiding structure and reclosing it.

20

The guiding structure may be positioned relative to the means for supporting the tire, but an embodiment of the method, wherein the loop of the guiding structure defines a plane, the means for supporting the tire are planar, and the plane of the loop extends perpendicular to the plane of the means for supporting the tire, is preferred because such an embodiment allows to increase production speed considerably.

25

A desirable embodiment of the invention provides a method wherein the tire is provided on its side to the means for supporting the tire. In this position the tire is stable when being wrapped and does not need additional support.

30

Although labels may be applied relatively loosely to a tire for identification, an embodiment of the method according to the invention comprises tensioning a label around the part of the tire after the label has been wrapped around that part. A label applied to a tire in accordance with this embodiment may be more easily printed with (additional) information after it has been wrapped around the tire.

Connecting opposed areas of the banding material at the neck of a wrapped loop may be accomplished by any means in the art, such as by adhesive bonding, knitting, stitching, welding, and other suitable methods. A preferred embodiment of the method according to the invention comprises connecting the opposed parts by welding. In such an embodiment, welding is preferably carried out by contacting the banding material with a hot wire or hot beam or rod. Such contact locally melts or softens the banding material and welds the opposed parts together. A preferred method of welding comprises ultrasonic welding.

The apparatus for providing a tire with an informative label comprises means for supporting a tire, means for supplying a banding material to the tire and wrapping it in a loop around a part of the tire, clamps for holding the banding material at the neck of said loop, and a device for welding opposed areas of the banding material at said neck.

The means for supplying a banding material typically comprise supply reels from which the banding material may be unrolled. It is possible to use a plurality of such reels and the banding material supplied from these reels may be welded together to form a continuous band to be wrapped around the tire.

In order to allow connecting two or more opposed areas of banding material, clamps for holding the banding material at the neck of a wrapped loop are provided, which clamps are preferably positioned adjacent the tire to be wrapped to allow a good fit. A suitable arrangement for the clamping means comprise two pairs of clamping jaws that are positioned at both sides of the area where the opposed parts of the banding material need to be connected. Since the connection, preferably a weld, is made between the two pairs of clamping jaws, the distance between them is preferably small enough to permit a proper seam to be made and prevent a change in the tightness of the loop after releasing the clamping jaws.

In a preferred embodiment of the method, the tire is compressed in a transverse plane to yield a decreased cross-sectional surface area of the tire before connecting opposed areas of the banding material at the neck. The apparatus is thereto provided with compression means that act in a transverse plane of the tire. This ensures that the wrap

is tensioned around the tire when the compression is released. A close fit of the wrap around the tire ensues and this prevents undesirable sliding of the wrap.

5 In order to increase productivity, in particular reducing the holding time of the clamping means, required to produce a reliable welded connection, cooling means may be added to the apparatus for cooling a weld made.

10 In accordance with a further embodiment of the apparatus of the invention, the means for supplying a banding material to the tire and wrapping it in a loop around a part of the tire comprises a loop shaped guiding structure for the banding material.

15 An embodiment of the apparatus wherein the guiding structure is adapted to open its loop has the advantage of being able to wrap intricate parts of the tire by opening the loop, bringing in a part of the tire and closing the loop again, whereby opening and closing may be carried out a number of times to wrap a label or a plurality of labels in one operation.

20 A particularly suitable apparatus according to the invention relates to one wherein the guiding structure comprises at least two parts that can be separated to open the loop.

Another embodiment is directed to an apparatus having a guiding structure comprising at least two parts that form a loop and wherein the loop is interrupted by a permanent opening through which a tire can be brought into the loop. The banding material is then made to adhere to opposing positions of the guiding structure, which positions bridge  
25 the gap in the loop. Suitable means to transport the banding material are provided by (toothed) belts for instance. The banding material is made to adhere to the (toothed) belt by providing a vacuum pressure between the surface of the belt and the banding material.

30 In accordance with a further embodiment of the invention, an apparatus is provided wherein the loop of the guiding structure defines a plane, the means for supporting the tire are planar, and the plane of the loop extends perpendicular to the plane of the means for supporting the tire.

An embodiment of the apparatus according to the invention that allows a stable support for a tire comprises means for supporting the tire adapted to support a tire on its side. Suitable means comprise a conveyor for instance, preferably a roller conveyor. Since the tire is supported on its side no further support means are necessary although they  
5 may be used for further support.

In an other embodiment of the apparatus in accordance with the invention, the apparatus comprises means for tensioning a label after the label has been wrapped around the appropriate part of the tire. Such means for instance comprise a number of  
10 translatable tensioners that are adapted to capture the banding material and perform a translation to tension the gripped banding material.

A further embodiment of the invention provides an apparatus, wherein the connecting means comprise a welding device comprising a hot wire or hot rod or beam. A typical  
15 embodiment of such a connecting means comprises a support element carrying a taut hot wire or beam between two posts of the element and disposed at a spacing from the support element. The use of a hot wire or beam allows to provide a narrow yet strong connection between opposed parts of a wrapped banding material. Ultrasonic welding is also possible. The geometry of the rod or beam can be adapted to obtain a specific shape  
20 of the weld. Such a shape can be used as a logo, or can be functional in that an easily disrupted weld is obtained. Such a weld can for instance be made by leaving a central portion of the weld unconnected, such that a finger is easily introduced in this central portion and the weld disrupted.

25 The apparatus and method according to the invention allow to provide a tire with an informative label that comprises a banding material wrapped in a loop around a part of the tire and connected at the neck of said loop to form a wrap. The apparatus according to the invention allows to provide tires of different dimensions with an informative label.

30

In order to provide the information on the wrap, an embodiment of the apparatus comprises a printing unit. Tire specific information can in such an embodiment be printed on the wrap at the last moment if this should be required.

The apparatus in an embodiment is further provided with means to discard superfluous banding material, such as cutting means and the like.

5 In embodiments of the invention, a tire is provided wherein the informative label is essentially free of adhesives, wherein the front side of the informative label comprises a printed film, preferably a printed polypropylene film, and/or wherein the front side of the informative label comprises a pocket for receiving a printed information carrier.

10 The invention will now be explained in more detail by a description of the accompanying figures, without however being limited thereto. In the figures: Figure 1 schematically shows a perspective view of an embodiment of the apparatus according to the invention;

Figure 2 schematically shows a side view of the embodiment of figure 1;

15 Figure 3 schematically shows a side view of the embodiment of figure 1 with the tire removed and the guiding means in open position;

Figure 4 schematically shows a side view of the embodiment of figure 1 with the tire removed and the guiding means in closed position;

Figure 4 is a view taken in the direction of arrow IV of FIG. 2 on a different scale.

20 Figure 5 schematically shows views of a tire provided with a label in accordance with the invention;

Figure 6 schematically shows a perspective detailed view of an embodiment of a label in accordance with the invention;

Figure 7 schematically shows a side view of another embodiment of the apparatus according to the invention; and

25 Figure 8 schematically shows a side view of the embodiment of figure 7 after the banding material has been looped around a tire.

Referring to figures 1 and 2, an apparatus 1 for providing a tire 2 with an informative label 3 is shown. The apparatus 1 comprises means for supporting a tire 2 on its side in  
30 the form of roller conveyor 4, which progresses in the direction 5. The tire defines an axial direction 20 and a transverse or radial direction 21. Tires 2 that need to be provided with a label 3 are thus fed in the direction 5 whereby the roller converter 4 halts when a tire 2 has arrived in the vicinity of means for supplying a banding material 8 to the tire 2. The halting of the conveyor belt 4 may be achieved by any means known

in the art, such as by an optic device. The means for supplying a banding material 8 to the tire 2 in the embodiment shown in figures 1 and 2 comprise a guiding structure 7 that forms a loop in the closed position, shown in figures 1, 2 and 4 and guides banding material 8 to be wrapped around the tire 2. The guiding structure 7 is adapted to open its  
5 loop by comprising two parts (7a, 7b) that can be separated to open the loop, as shown in figure 3. Opening of the loop is accomplished by translating movable part 7a along the vertical direction 9 upwards, for instance by connecting movable part 7a to a driven translating device 10, and allows a tire 2 to enter the loop formed by parts (7a, 7b). In the closed position, as shown in figure 4, movable part 7a is brought in its lowest  
10 position to form a substantially closed loop with fixed part 7b. The loop of the guiding structure 7 defines a vertical plane, that extends perpendicular to the plane of the roller conveyer 4 which extends substantially horizontal.

The apparatus 1 is further provided with means 11 for supplying banding material 8  
15 under some tension. These means 11 typically comprise a supply reel 12 for banding material 8 (not shown in figures 1 and 2) and a number of smaller rollers (13a, 13b) for guiding the banding material 8, and of which some 13b may be translatable in the vertical direction 9 to regulate the tension in the banding material 8.

20 As schematically shown in figures 3 and 4, the guiding means 7 comprise a number of advancing conveyors 14 that are adapted to lead incoming banding material 8 around the loop formed by guiding parts (7a, 7b) in the closed position. When a complete loop of banding material has been formed around a part of a tire 2, preferably a radial part thereof (see figure 5), the opposite ends of the loop formed by the banding material 8  
25 are held at the neck of said loop by the action of a clamping and welding device 15 (not shown in detail). Welding device 15 preferably comprises a hot wire or hot beam that, when contacting the banding material 8 melts or softens this material to fuse the opposing ends of the banding material loop. After welding, a label 3 is formed around the radial section of the tire in the form of a closed loop of banding material 8, and the  
30 tire can be removed out of the loop formed by the guiding means 7 by a forward movement of the roller conveyor 4 and by an upward movement of part 7a of the guiding means 7 to open the loop.

As schematically shown in figures 7 and 8, another embodiment of the guiding means 7 comprises one guiding part 7a only, leaving a permanent gap 6 between the lower edge of guiding part 7a and the top surface of conveyor 4. The advancing conveyors 14 in the form of toothed belts for instance, transport the banding material 8 such that the

5 banding material 8 is made to adhere to the toothed belts by providing a vacuum pressure between the surface of the belt and the banding material. The banding material 8 is made to close the gap 6 after a tire has been introduced through the gap 6, as shown in figure 8. Please note that the tire is not shown in figure 8 for clarity. The stiffness of the banding material 8 should be high enough in order to be able to close the gap 6

10 freestanding. When a complete loop of banding material has thus been formed around a part of a tire 2, the other steps are performed as already described above in the context of the description of figures 3 and 4.

It is possible to tension a label after the label has been wrapped around the part of the

15 tire and before welding it, for instance by the action of the rollers (13a, 13b) of supply means 11, or by other tensioning means. A preferred embodiment comprises compressing the tire 2 in a transverse plane (a plane parallel to the plane of the guiding means 7) before actually wrapping the banding material 8 around the tire 2. After welding the banding material 8, the compression is released which tensions the banding

20 material 8 around the tire 2 in the transverse plane.

A tire 2, provided with an informative label 3 in accordance with the above described invention is shown in figure 5. The informative label 3 comprises banding material 8 wrapped in a loop around a radial section of the tire 2 and welded at the neck 30 of said

25 loop. As shown in figure 5, the label 3 may extend further than the neck 30 to comprise a protruded part 31 for easy handling or better visibility. The informative label 3 is essentially free of adhesives and the front (visible) side of the informative label 3 comprises information such as represented by a printed film 32. The label 3 may have a relatively loose fit in which embodiment it is easily turned around the tire 2 radial

30 section to bring a hidden part of the label 3 to the front side of the tire 2, as shown in the rightmost drawing of figure 5.

As shown in figure 6, the front side of the informative label 3 may also comprise a pocket 33 for receiving a printed information carrier 34, which carrier 34 may easily be

removed from the label 3 or interchanged with another information carrier 34, carrying different information.

**Claims**

1. Method for providing a tire with an informative label, the method comprising supporting a tire, supplying a banding material to the tire and wrapping it in a loop  
5 around a part of the tire, holding the banding material at the neck of said loop, and connecting opposed areas of the banding material at said neck.
2. Method according to claim 1, wherein the banding material is guided around the part of the tire by guiding it along a loop shaped guiding structure.  
10
3. Method according to claim 1 or 2, wherein the part of the tire to be wrapped is brought within the boundaries of the loop shaped guiding structure by opening the loop of the guiding structure and reclosing it.
- 15 4. Method according to any one of the preceding claims, wherein the loop of the guiding structure has a permanent opening through which a tire is introduced.
5. Method according to any one of the preceding claims, wherein the loop of the guiding structure defines a plane, the means for supporting the tire are planar, and the  
20 plane of the loop extends perpendicular to the plane of the means for supporting the tire.
6. Method according to any one of the preceding claims, wherein the tire is provided on its side to the means for supporting the tire.
- 25 7. Method according to any one of the preceding claims, wherein a label is tensioned around the part of the tire after the label has been wrapped around that part.
8. Method according to any one of preceding claims, wherein a label is tensioned around the part of the tire by compressing the tire in a transverse direction, wrapping the  
30 label around the tire in its compressed state, connecting the opposed areas of the banding material, and removing the compression.
9. Method according to any one of preceding claims, wherein the connecting is carried out by contacting the banding material with a hot wire or hot beam.

10. Method according to any one of the preceding claims, wherein the part of the tire comprises a radial section of the tire.

5 11. Apparatus for providing a tire with an informative label, the apparatus comprising means for supporting a tire, means for supplying a banding material to the tire and wrapping it in a loop around a part of the tire, clamps for holding the banding material at the neck of said loop, and a device for connecting opposed areas of the banding material at said neck.

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12. Apparatus according to claim 10, wherein the means for supplying a banding material to the tire and wrapping it in a loop around a part of the tire comprises a loop shaped guiding structure for the banding material.

15 13. Apparatus according to claim 12, wherein the guiding structure is adapted to open the loop thereof.

14. Apparatus according to claim 13, wherein the guiding structure comprises at least two parts that can be separated to open the loop.

20

15. Apparatus according to any one of claims 11-14, wherein the loop of the guiding structure defines a plane, the means for supporting the tire are planar, and the plane of the loop extends perpendicular to the plane of the means for supporting the tire.

25 16. Apparatus according to any one of claims 11-15, wherein the means for supporting the tire are adapted to support a tire on its side.

17. Apparatus according to any one of claims 11-16, comprising means for tensioning a label after the label has been wrapped around the part of the tire.

30

18. Apparatus according to any one of claims 11-16, comprising compression means for compressing the tire in a radial direction to obtain a smaller cross-sectional surface area.

19. Apparatus according to any one of claims 11-18, the connecting device thereof comprising a hot wire or hot beam.
20. Tire provided with an informative label, comprising a banding material wrapped  
5 in a loop around a part of the tire and connected at the neck of said loop.
21. Tire according to claim 20, wherein the informative label is essentially free of adhesives.
- 10 22. Tire according to claim 20 or 21, wherein the front side of the informative label comprises a printed film, preferably a printed polypropylene film.
23. Tire according to any one of claims 20-22, wherein the front side of the informative label comprises a pocket for receiving a printed information carrier.

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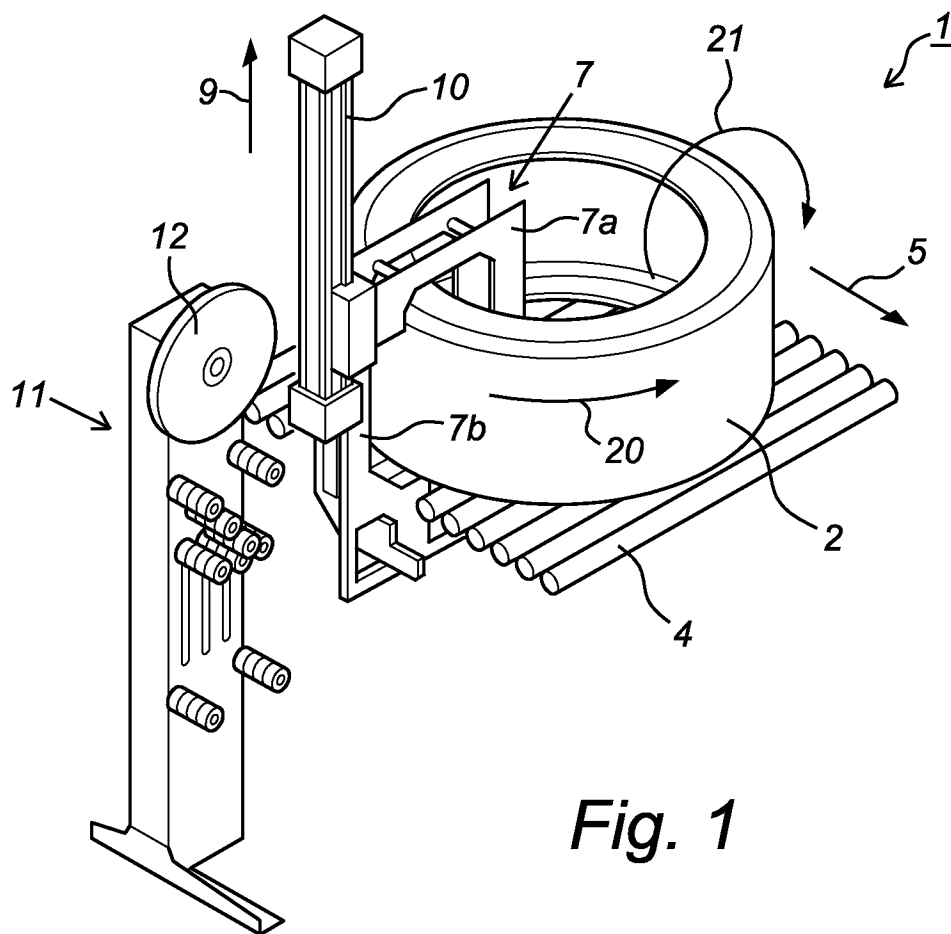


Fig. 1

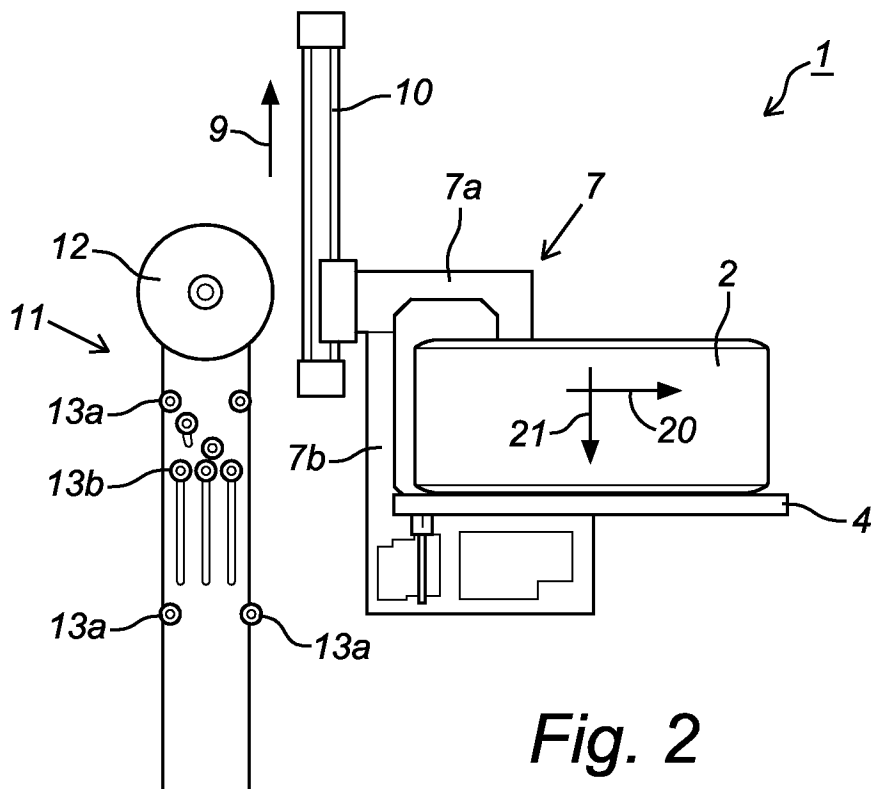
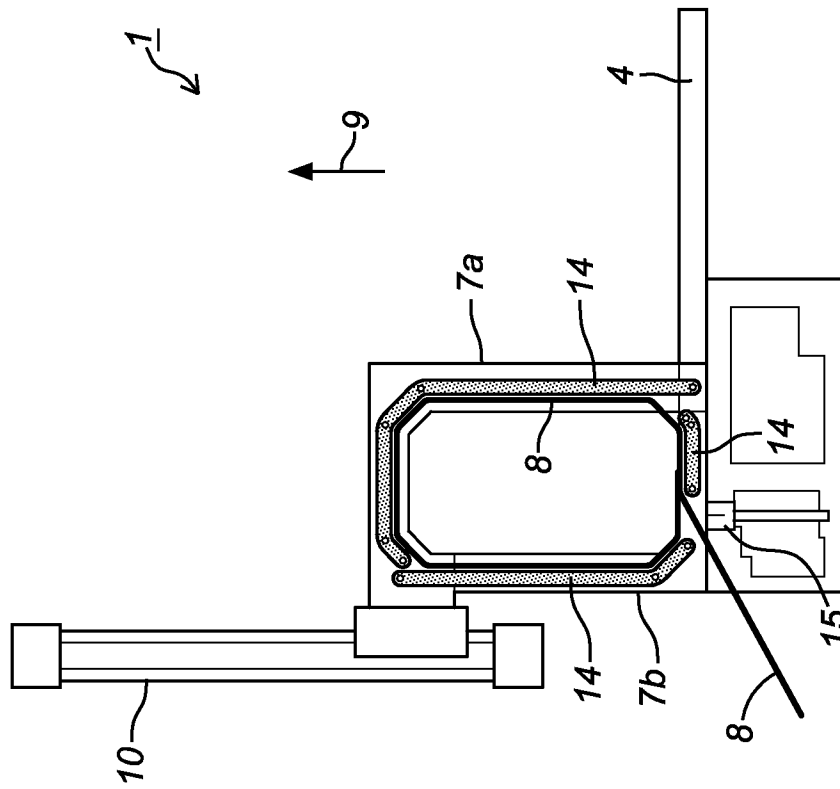
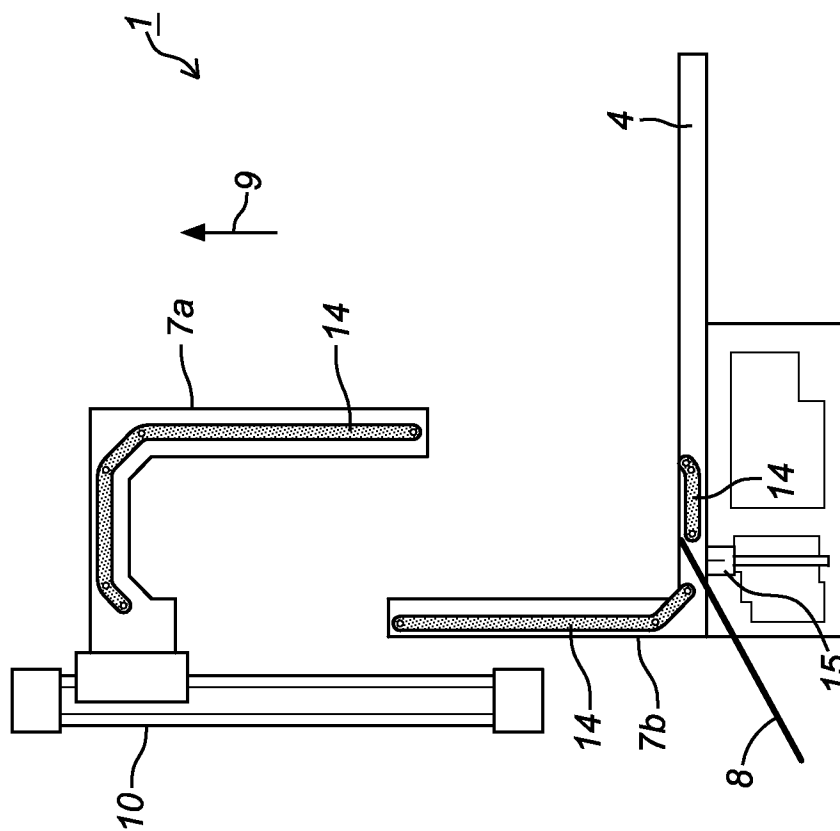


Fig. 2



**Fig. 4**



**Fig. 3**

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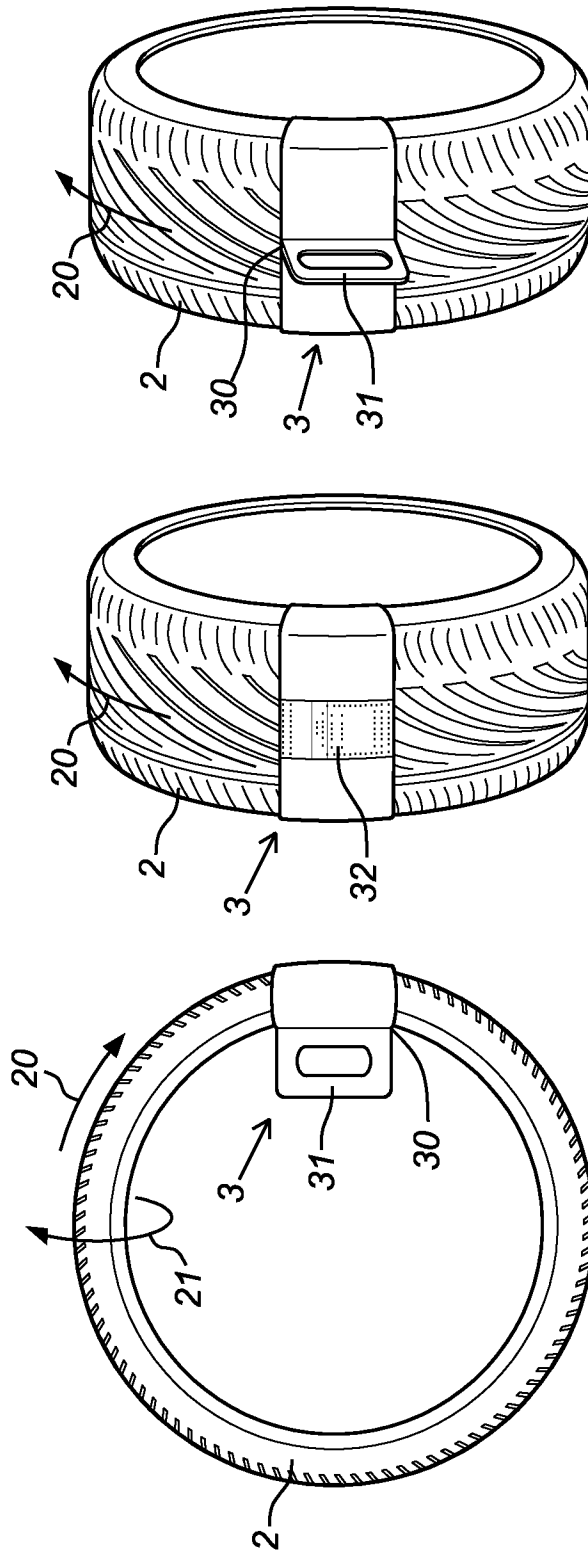


Fig. 5

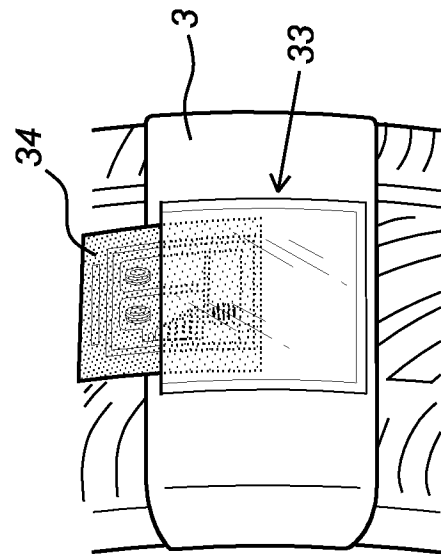


Fig. 6

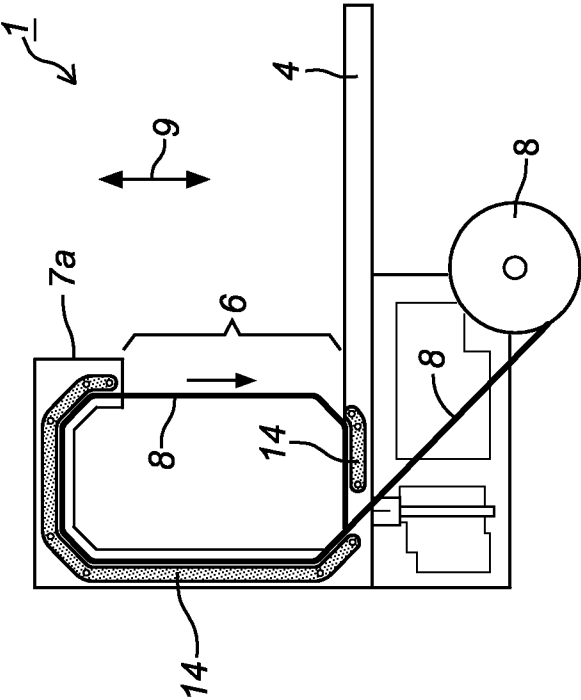


Fig. 8

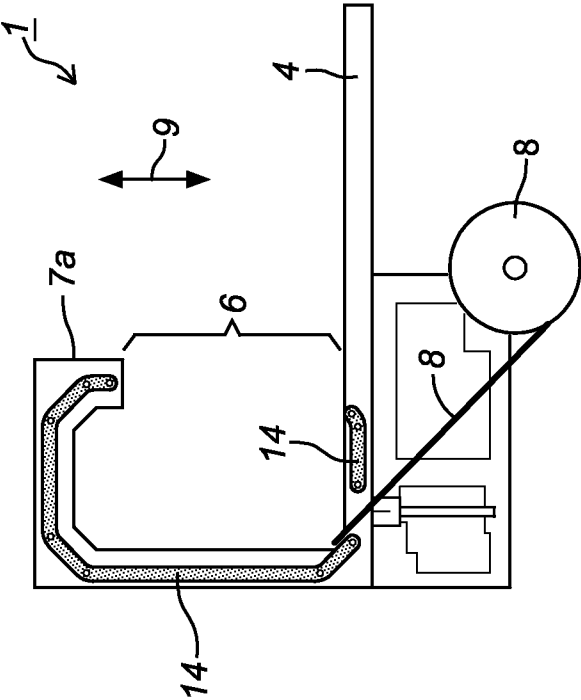


Fig. 7

# INTERNATIONAL SEARCH REPORT

International application No  
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## A. CLASSIFICATION OF SUBJECT MATTER

INV. G09F3/04 B65C3/00 G09F3/10 G09F3/02  
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)

G09F B65C

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)

EP0-Internal, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

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X A	JP H06 312604 A (BRIDGESTONE CORP) 8 November 1994 (1994-11-08) the whole document	1,7,10, 20-23 2-6,8,9, 11-19
X A	US 1 800 599 A (CAIN CHARLES B) 14 April 1931 (1931-04-14) the whole document	1,7,10, 20-23 2-6,8,9, 11-19
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Further documents are listed in the continuation of Box C.



See patent family annex.

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04/11/2013

Name and mailing address of the ISA/

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# INTERNATIONAL SEARCH REPORT

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