(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 283 399 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
10.03.2021 Bulletin 2021/10

(21) Application number: **16729611.0**

(22) Date of filing: **12.04.2016**

(51) Int Cl.:
B65D 85/66 *(2006.01)* ***B21C 47/24*** *(2006.01)*

(86) International application number:
PCT/GB2016/051016

(87) International publication number:
WO 2016/166518 (20.10.2016 Gazette 2016/42)

(54) **COIL PROTECTOR, METHOD AND KIT THEREWITH**

SPULENPROTEKTOR, VERFAHREN UND KIT DAMIT

DISPOSITIF DE PROTECTION DE BOBINE, PROCÉDÉ ET KIT DOTÉ DE CELUI-CI

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **12.04.2015 GB 201506166**

(43) Date of publication of application:
21.02.2018 Bulletin 2018/08

(73) Proprietor: **Pulse Plastics Ltd**
Blackwood NP12 2XF (GB)

(72) Inventor: **JONES, Ian**
Tredegar
Gwent NP22 4NB (GB)

(74) Representative: **Whitfield, Gillian Janette**
Astrum ElementOne Limited
Merlin House
Langstone
Newport NP18 2HJ (GB)

(56) References cited:
EP-A1- 1 889 795
WO-A1-01/44078
US-A- 5 236 087
US-S1- D 461 394

EP 3 283 399 B1

Description

[0001] The present invention relates to a steel coil guard for protecting a steel coil from damage, for example during post-delivery on-site handling. The present invention also provides a method of protecting a steel coil using a steel coil guard according to the present invention.

[0002] Steel coils are very heavy objects that are difficult to lift, handle and transport. Overhead cranes with large hooks, large fork lifts and other heavy duty lifting equipment is used to move the coils, both during delivery from supplier to customer and also during on-site movement of the coil post-delivery. Operators of such equipment are skilled in lifting, moving and positioning of heavy loads. However, despite considerable skill and attention, it is common for the surfaces and edges of the coils to suffer damage from contact with the equipment. In particular, the steel coil-eye and coil edges may suffer damage from the chains, hooks or forks passed through the coil during movement. Further damage to the coil may occur due to the coils be scraped or bumped whilst being handled. This may happen as a result of momentary inattention on the part of the lifting equipment operator, poor sight lines between the operator and the steel coil, or accidentally bringing the coil into contact with damaging surfaces such as walls etc. in the immediately vicinity where the steel coil is being handled. Such damage includes dents, impressions and abrasions to the surfaces of the steel coil, which may render the steel wholly or partially unusable, creating expensive waste materials and an associated loss of income.

[0003] Often, lifting of the coils involves the use of chains run through the coil-eye and secured tightly with binders. Alternatively, a lifting crane hook may swing out of control or swing wider than intended by the operator when approaching the coil to be moved, thereby scraping the top wall, upper edge and side wall surfaces of the coil before being properly located secured in place within the steel coil-eye or inner diameter. This can result in physical damage to the steel as well as deterioration in the appearance and quality of the steel and potentially rendering it unusable.

[0004] One solution to this is to package the steel coil prior to transportation. This is the usual practice when transporting coils from the supplier to the customer. For example, narrow edge protectors are often applied to the top edge of the coil and are held in place by wrapping the coil in plastic. However, these edge protectors are small in size and intended only to protect the coil from damage at the coil edge. They do not cover or protect the surfaces of the steel coil that may be impacted by unintentional contact with heavy duty machinery during handling. Furthermore, as they are held in place relative to the coil by the application of plastic wrapping, they are impractical for use once the coil is on-site and the wrapping removed. EP1889795 discloses an alternative protection device comprising edge protectors that slidably engage with one another along the coil face. However, such a device can still result in damage to the coil face during the slidable engagement process.

[0005] There is therefore a need for a device to protect the steel coil bore, edges and faces from damage during lifting, handling and movement, particularly on-site, post-delivery.

[0006] The present invention seeks to address the problems of the prior art.

[0007] Accordingly, a first aspect of the present invention provides a coil guard as set out in the accompanying claim 1.

[0008] In use, the first member is arranged to shield at least a portion of the coil bore, often referred to as the coil-eye. The main portion of the coil bore surface to protect is the upper surface of the coil bore. This is a part of the coil that is supported by chains passed through the coil bore or a crane hook or a forklift fork when the coil is being handled, and is therefore at significant risk of damage. The first member acts to shield the coil bore upper surface from damage resulting from chains, hooks or forks scraping or carelessly engaging with the coil bore during use. In addition, the first member acts to prevent damage to the surface of the coil bore that may be caused as a result of force applied to the bore surface by chains, hooks or forks under the weight of the coil when being lifted.

[0009] In use, the second member is arranged to shield at least a portion of the surface of the coil belly. The main portion of the coil belly surface to protect is the portion of the belly located at 10 o'clock to 2 o'clock i.e. the upper quarter quadrant of the coil. This is another part of the coil that is at significant risk of damage during handling. For example, when a crane hook is swung towards the coil it may accidentally impact the coil if the hook is swinging out of control or the line of sight is obscured between the coil and the crane operator. The second member acts to absorb any impact to the protected coil belly surface, thereby minimising or preventing consequential damage to the coil.

[0010] The first member comprises a coil bore guard for engagement with a coil bore and a coil face guard for engagement with a coil face. By extending over at least a portion of the coil face, the first member is protecting not only a portion of the upper surface of the coil bore, but also an adjacent portion of the surface of the coil face and the coil edge therebetween. The coil edge adjacent the coil bore is an area of the coil that can be damaged during the lifting process on insertion of chain, crane hook or fork-lift fork into the coil bore. Protection of the coil edge adjacent the coil bore by the first member will minimise or prevent impact damage to the coil edge as well as aesthetic scrape or dent damage to the surface of the coil face beneath the coil face guard.

[0011] The second member comprises a coil belly guard for engagement with the surface of a coil belly and a coil face guard for engagement with the surface of a coil face. By extending over at least a portion of the coil face surface, the second member is protecting not only

a portion of the coil belly surface, but also an adjacent portion of the coil face surface and the coil edge therebetween. The coil edge adjacent the coil belly surface is an area of the coil that is at significant risk of being damaged during the movement of the coil if the coil is accidentally bumped against any machinery or masonry during the lifting process. In addition, where the coil is suspended from chain during the lifting process, the chain can damage the coil edge adjacent the coil belly due to force applied to the coil edge by the chain under the weight of the coil itself.

[0012] The coil guard further comprises engagement means adapted to engage both the first and second members. In this way, the first and second members can be held spatially relative to one another and the coil. This facilitates ease of application of the protector to the coil, in use.

[0013] The engagement means comprises a first portion located adjacent the first member and a second portion located adjacent the second member, the first and second portions being adapted for complementary engagement with each other to secure the first member to the second member.

[0014] The first and second portions comprise complementary engagement portions adapted for reversible engagement with one another to retain the first and second members in place relative to one another. The engagement portions comprise a Velcro® material or similar inter-engaging hooks and loops.

[0015] The first and second portions of the engagement means are adhered to the first and second members respectively. In this way, contacting the first and second portions together will result in securing of the first and second members together.

[0016] In one embodiment, when the coil guard is in the closed configuration, one or both coil face guards of the first and second members, respectively, only extend across a part of the coil face surface.

[0017] According to the invention, one of the first and second engagement means comprises a plurality of hooks and the other of the first and second engagement means comprises a plurality of loops.

[0018] A second aspect of the present invention provides a method of protecting a steel coil from damage, the steel coil comprising a belly, a bore and a face located therebetween, the method comprising the steps of:

a. Providing a coil guard according to the first aspect of the present invention;
b. Locating the second member adjacent the surface of a coil belly; and
c. Locating the first member adjacent the surface of a coil bore such that the first and second members partially overlap with one another and the first engagement means is engaged with the second engagement means.

[0019] A further aspect of the present invention provides a coil guard kit comprising a coil guard according to the first aspect of the present invention, wherein the coil face guard of the second member extends from the coil belly guard for a distance X, and wherein the coil guard kit further comprises an additional second member having a coil face guard that extends from the coil belly guard for a distance X', wherein the distance X' is greater than the distance X.

[0020] An embodiment of the invention will now be described, by way of example only, and with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a steel coil provided with an embodiment of a coil protector in accordance with a first aspect of the present invention;
Figure 2 is a cross-sectional view through the steel coil and coil guard of figure 1;
Figure 3 is a cross-sectional view through a smaller steel coil provided with a second embodiment of a coil protector in accordance with a first aspect of the present invention;
Figures 4A, 4A' are perspective views of the second member of the coil guard of figure 2 and the coil guard of figure 3, respectively, from a first side, Figures 4B, 4B' are perspective views of the second member of the coil guard of figure 2 and the coil guard of figure 3, respectively, from a second opposing side; and
Figure 5A is a perspective view of the first member of the coil guard of figures 2 and 3, from a first side; and Figure 5B is a perspective view of the first member of the coil guard of figures 2 and 3, from a second opposing side.

[0021] Throughout the figures, the same reference numbers have been used to refer to the same features.

[0022] Figure 1 shows a steel coil 10 defining a coil bore 14 having a surface 16. Steel coil 10 further comprises a face 12 and a belly 18. A first core edge 15 is defined at the junction of coil bore surface 16 and coil face 12 and a second core edge 17 is defined at the junction of the surface of coil belly 18 and coil face 12.

[0023] Coil guard 20 comprises a first member 22 and a second member 32.

[0024] First member 22 is shown in more detail in figures 2, 3 and 4C. First member 22 comprises a coil core guard 24 for location adjacent a portion of the coil core surface 14 and a coil sidewall guard 26 for location adjacent a portion of the coil sidewall 12. Coil core guard 24 and coil sidewall guard 26 are substantially perpendicular to one another and define an edge guard 25 therebetween, such that, in use, edge guard 25 is located adjacent first core edge 15.

[0025] First member 22 further comprises Velcro® type loop pads 29 adhered to the surface of sidewall guard 26.

[0026] Figures 1, 2, 4A and 4B show a large version of the second member 32 and figures 3, 4A' and 4B' show

a smaller version - the selection of which version to use will depend on the diameter of the steel coil to be protected. Larger coils i.e. coils with larger diameters of, for example, 2.4 m (8 feet), will require the larger version of the second member in order that the second member may extend sufficiently across the sidewall 12 to still overlap with first member 22. However, the larger version will be too big to be a good fit on smaller coils i.e. coils with a smaller diameter of, for example, 0.61 m (2 feet), and so a smaller version of the second member 22 may be used instead. These two versions of second member 32 are intended for use on steel coils with a standard range of coil diameters. However, it is to be appreciated that first and second members 22, 32 may be of any suitable dimensions to allow their use with steel coils of various selected diameters.

[0027] Conventional steel coils are manufactured with standard coil bore sizes, with the coil bore diameter being 406 mm (16 inches), 508 mm (20 inches) or 610 mm (24 inches). These sizes correspond to the dimensions of the machinery etc. that handles the coils during on-site processing.

[0028] For example, the dimensions of the first member 22 that should be used will depend on the diameter of the coil bore i.e. the first member may correspond to a bore size of 406 mm, 508 mm or 610 mm, depending on the requirement of the customer and the dimensions of their coil handling/processing equipment. However, the dimension of the second member 32 selected for use is selected depending on the diameter of the coil - the second member 32 selected needs to extend sufficiently across the coil sidewall to allow overlap with the first member 22. However, it cannot be too big as it would interfere with the fitting of the second member 22 if it extended past the first core edge 15.

[0029] Second member 32 comprises a coil belly guard 34 for location adjacent a portion of the coil outer surface 16 and a coil sidewall guard 36 for location adjacent a portion of the coil sidewall 12. Coil belly guard 34 and coil sidewall guard 36 are substantially perpendicular to one another and define an edge guard 35 therebetween, such that, in use, edge guard 35 is located adjacent second core edge 17.

[0030] As can be seen in figures 4B, 4B', second member 32 is further provided with Velcro® style hook pads 40 adhered to the outer surface of coil face guard 36 i.e. on the opposite surface to that contacting the coil face 12, in use.

[0031] In use, second member 32 is positioned in place relative to coil 10, as shown in figures 2 and 3 such that coil belly guard 34 contacts coil belly 18, coil edge guard 35 contacts coil edge 17 and coil face guard 36 contact coil face 12, with Velcro like pads 40 facing away from coil 10. Second member 32 should be positioned on coil 10 in the upper quadrant, sometimes referred to as the 10-to-2 o'clock position (making reference to the time on an analogue clock face), as shown in figure 1. This quadrant of the coil 10 is the part of the coil 10 that is exposed to the greatest likelihood of damage during handling of the coil post-delivery. Once second member 32 is in place, first member 22 is positioned in place relative to coil 10, as shown in figures 2 and 3, such that coil bore guard 24 is located adjacent coil bore 14, coil edge guard 25 is located adjacent coil edge 15 and coil face guard 26 is located adjacent coil face 12. As can be seen from the figures, the first and second members 22, 32 partially overlap with one another such that engagement means (loop pads 29 and hook pads 40) are brought into contact with one another. Once in place, Velcro type loop pads 29 make contact with and engage with corresponding Velcro type hook pads 40 of second member 32, thereby securing first member 22 to second member 32, and securing both members in place relative to coil 10.

[0032] Once secured in place, the coil may be safely moved using conventional heavy duty lifting equipment. The coil guard 20 protects the coil belly 18, coil face 12 and coil bore 14 from damage from chain, crane hook or fork-lift fork impact, or impact of the coil 10 against any surrounding surfaces during the handling process.

[0033] Once the coil 10 has been moved to the desired location and the heavy duty lifting equipment removed from the coil bore 14, the coil guard 20 may be easily removed from the coil 10 by applying force to the first member 22 to loosen the attachment between loop pads 29 of first member 22 and hook pads 40 of second member 32, thereby allowing first member 22 to be disengaged from second member 32 and removal from coil 10. Second member 32 can then be simply lifted away from coil 10, leaving the coil in an undamaged state and available for onward processing, while the coil guard 20 may be easily reused to protect another coil 10 requiring handling.

[0034] Thus, the coil guard 20 has a closed configuration in which the first and second members 22, 32 partially overlap with one another and the first engagement means 29 is engaged with the second engagement means 40. Further, the coil guard 20 has an open configuration in which the first and second members 22, 32 are separated from one another such that the first engagement means 29 is not engaged with the second engagement means 40.

[0035] When the coil guard 20 is in the closed configuration, one or both of the coil face guards of the first and second members 22, 32, respectively, only extend across a part of the coil face surface.

[0036] Plastic is not normally used as a material for protecting coils as it is often not strong enough to bear the weight and stresses is would be exposed to during the coil handling process. However, as can be seen from the figures, first and second members 22, 32 of coil guard 20 are provided with ribs. These ribs 60 serve to strengthen the structure of the first and second members such that they are strong enough to use to protect the coil 10 during the handling process without cracking or disintegrating under the applied stresses. This allows a relatively light weight two part plastic coil guard to be used

during the handling process that is easily lifted and manipulated into place by a single operator, without strain to the operator.

[0037] Coil guard 20 may comprise any suitable plastic, including, but not limited to high density polyethylene (HDPE) or polypropylene (PP).

[0038] In addition, the ease with which the second member 32 and, subsequently, the first member 22 may be accurately fitted to the coil 10 during use makes the process of preparing a coil 10 for handling efficient and straightforward. Further, the use of large hook and loop pads to connect the first and second members to one another to secure them in place relative to the coil allows for adjustment of the engagement between the first and second members 22, 32 to accommodate variation in the diameters of the coils 10 being handled. It will be appreciated that the first and second members 22, 32 may be engaged such that the distance between coil bore guard 24 and coil belly guard 34 may differ depending on the level of overlap between loop pads 29 and hook pads 40 on engagement of the first and second members 22, 32.

[0039] A well-known problem experience in the prior art when using any type of plastic protector adjacent the coil face 12 is that any rubbing of the plastic against the coil face 12 during handling of the coil 10 can result in a layer of plastic rubbing off on the edges of the coil 10. This is particularly undesirable contamination of the steel of the coil 10, is detrimental to the ongoing processing of the steel and can render the coil unusable, thereby leading to expensive wastage of steel.

[0040] However, in the case of the present application, lifting of the coil 10 with a fitted coil guard 20 only serves to solidly secure the first member 22 in place relative to the second member 32 and to securely retain the coil guard 20 in place relative to the coil 10 due to the weight of the coil 10 on the coil bore guard 24 of first member 22 during lifting of the coil 10. This means that there is no rubbing between the coil face guards 26, 36 of first and second members 22, 32, respectively, and therefore no undesirable deposition of plastic residue on the coil face 12 during handling of the coil 10 when coil guard 20 is in place.

[0041] Although aspects of the invention have been described with reference to the embodiment shown in the accompanying drawings, it is to be understood that the invention is not limited to the precise embodiment shown and that various changes and modifications may be effected within the scope of the appended claims. For example, it will be appreciated that where the coil is lifted using a fork-lift fork, a coil guard need only be fitted to one side of the coil i.e. the side of the coil from which the fork approaches the coil bore. However, if a chain is fed through the coil bore for lifting or a crane hook is inserted through the coil bore then it may be desirable to fit a coil guard according to the present invention to each side of the coil in order to protect the edges, belly and faces of the coil on both sides from damage during handling.

Claims

1. A coil guard (20) for protecting a steel coil having a belly, a bore and a face located therebetween, the coil guard (20) comprising: a first member (22) having a coil bore guard (24) adapted for engagement with a surface of the coil bore and a coil face guard (26) adapted for engagement with a surface of the coil face; and a second member (32) having a coil belly guard (34) adapted for engagement with a surface of the coil belly and a coil face guard (36) adapted for engagement with a surface of the coil face, wherein the first and second members (22), (32) include first and second engagement means (29), (40) respectively, the first engagement means (29) being releasably engageable with the second engagement means (40), and wherein the coil guard (20) has a closed configuration in which the first and second members (22), (32) partially overlap with one another and the first engagement means (29) is engaged with the second engagement means (40) and the first and second engagement means (29), (40) are located between the coil face guard (26) of the first member (22) and the coil face guard (36) of the second member (32), and an open configuration in which the first and second members (22), (32) are separated from one another such that the first engagement means (29) is not engaged with the second engagement means (40),
characterised in that
one of the first and second engagement means (29), (40) comprises a plurality of hooks and the other of the first and second engagement means (29), (40) comprises a plurality of loops, and wherein the first and second engagement means (29), (40) are adhered to the first and second members (22), (32).

2. A coil guard (20) according to claim 1, wherein when the coil guard (20) is in the closed configuration, one or both coil face guards (26), (36) of the first and second members (22), (32), respectively, only extend across a part of the coil face surface.

3. A method of protecting a steel coil from damage, the steel coil comprising a belly, a bore and a face located therebetween, the method comprising the steps of:

   a. Providing a coil guard (20) according to claim 1 or claim 2;
   b. Locating the second member (32) adjacent the surface of the coil belly; and
   c. Locating the first member (22) adjacent the surface of the coil bore such that the first and second members (22),(32) partially overlap with one another and the first engagement means (29) is engaged with the second engagement means (40).

4. A coil guard kit comprising a coil guard (20) according to claim 1 or claim 2,
wherein the coil face guard (36) of the second member (32) extends from the coil belly guard (34) for a distance X, and wherein the coil guard kit further comprises an additional second member (32) having a coil face guard (36) that extends from the coil belly guard (34) for a distance X', wherein the distance X' is greater than the distance X.

Patentansprüche

1. Coil-Schutzvorrichtung (20) zum Schutz eines Stahlcoils mit einer Umfangsseite, einer Bohrung und einer dazwischen angeordneten Stirnfläche, wobei die Coil-Schutzvorrichtung (20) Folgendes aufweist: ein erstes Element (22) mit einer Coilbohrungs-Schutzvorrichtung (24), die zum Angreifen an einer Oberfläche der Coilbohrung ausgestaltet ist; und einer Coil-Stirnflächen-Schutzvorrichtung (26), die zum Angreifen an einer Oberfläche der Coil-Stirnfläche ausgestaltet ist; und ein zweites Element (32) mit einer Coil-Umfangsseiten-Schutzvorrichtung (34), die zum Angreifen an einer Oberfläche der Coil-Umfangsseite ausgestaltet ist, und einer Coil-Stirnflächen-Schutzvorrichtung (36), die zum Angreifen an einer Oberfläche der Coil-Stirnfläche ausgestaltet ist, wobei das erste und das zweite Element (22), (32) ein erstes bzw. ein zweites Eingriffsmittel (29), (40) aufweisen, wobei das erste Eingriffsmittel (29) lösbar mit dem zweiten Eingriffsmittel (40) in Eingriff gebracht werden kann, und wobei die Coil-Schutzvorrichtung (20) eine geschlossene Konfiguration, in der das erste und das zweite Element (22), (32) einander teilweise überlappen und das erste Eingriffsmittel (29) mit dem zweiten Eingriffsmittel (40) in Eingriff steht und das erste und das zweite Eingriffsmittel (29), (40) zwischen der Coil-Stirnflächen-Schutzvorrichtung (26) des ersten Elements (22) und der Coil-Stirnflächen-Schutzvorrichtung (36) des zweiten Elements (32) angeordnet sind, und eine offene Konfiguration aufweist, in der das erste und das zweite Element (22), (32) voneinander getrennt sind, so dass das erste Eingriffsmittel (29) nicht mit dem zweiten Eingriffsmittel (40) in Eingriff steht, **dadurch gekennzeichnet, dass** jeweils eines des ersten und des zweiten Eingriffsmittels (29), (40) eine Vielzahl von Haken aufweist und das jeweils andere des ersten und des zweiten Eingriffsmittels (29), (40) eine Vielzahl von Schlaufen aufweist, und wobei das erste und das zweite Eingriffsmittel (29), (40) an dem ersten bzw. dem zweiten Element (22), (32) anhaftet.

2. Coil-Schutzvorrichtung (20) gemäß Anspruch 1, wobei, wenn die Coil-Schutzvorrichtung (20) in der geschlossenen Konfiguration vorliegt, sich eine oder beide Coil-Stirnflächen-Schutzvorrichtungen (26), (36) des ersten bzw. des zweiten Elements (22), (32) nur über einen Teil der Coil-Stirnflächenoberflächen erstrecken.

3. Verfahren zum Schutz eines Stahlcoils vor Beschädigung, wobei das Stahlcoil eine Umfangsseite, eine Bohrung und eine dazwischen angeordnete Stirnfläche aufweist, wobei das Verfahren die folgenden Schritte umfasst:

a) Bereitstellen einer Coil-Schutzvorrichtung (20) gemäß Anspruch 1 oder Anspruch 2;
b) Anordnen des zweiten Elements (32) angrenzend an die Oberfläche der Coil-Umfangsseite; und
c) Anordnen des ersten Elements (22) angrenzend an die Oberfläche der Coilbohrung derart, dass das erste und das zweite Element (22), (32) einander teilweise überlappen und das erste Eingriffsmittel (29) mit dem zweiten Eingriffsmittel (40) in Eingriff steht.

4. Coil-Schutzvorrichtungs-Bausatz (20) mit einer Coil-Schutzvorrichtung (20) gemäß Anspruch 1 oder Anspruch 2, wobei sich die Coil-Stirnflächen-Schutzvorrichtung (36) des zweiten Elements (32) ausgehend von der Coil-Umfangsseiten-Schutzvorrichtung (34) über einen Abstand X erstreckt, und wobei der Coil-Schutzvorrichtungs-Bausatz ferner ein zusätzliches zweites Element (32) mit einer Coil-Stirnflächen-Schutzvorrichtung (36) aufweist, die sich ausgehend von der Coil-Umfangsseiten-Schutzvorrichtung (34) über einen Abstand X' erstreckt, wobei der Abstand X' größer als der Abstand X ist.

Revendications

1. Protection de bobine (20) pour protéger une bobine en acier ayant un ventre, un alésage et une face située entre eux, la protection de bobine (20) comprenant : un premier élément (22) ayant une protection d'alésage de bobine (24) conçue pour venir en prise avec une surface de l'alésage de bobine et une protection de face de bobine (26) conçue pour venir en prise avec une surface de la face de bobine ; et un second élément (32) ayant une protection de ventre de bobine (34) conçue pour venir en prise avec une surface du ventre de bobine et une protection de face de bobine (36) conçue pour venir en prise avec une surface de la face de bobine, dans laquelle les premier et second éléments (22), (32) comportent respectivement des premier et second moyens de mise en prise (29), (40), le premier moyen de mise en prise (29) pouvant venir en prise de manière amovible avec le second moyen de mise en prise (40), et dans laquelle la protection de bobine (20) a une configuration fermée dans laquelle les

premier et second éléments (22), (32) se chevauchent partiellement l'un avec l'autre et le premier moyen de mise en prise (29) vient en prise avec le second moyen de mise en prise (40) et les premier et second moyens de mise en prise (29), (40) sont situés entre la protection de face de bobine (26) du premier élément (22) et la protection de face de bobine (36) du second élément (32), et une configuration ouverte dans laquelle les premier et second éléments (22), (32) sont séparés l'un de l'autre de sorte que le premier moyen de mise en prise (29) n'est pas en prise avec le second moyen de mise en prise (40),

caractérisée en ce que

l'un des premier et second moyens de mise en prise (29), (40) comprend une pluralité de crochets et l'autre des premier et second moyens de mise en prise (29), (40) comprend une pluralité de boucles, et dans laquelle les premier et second moyens de mise en prise (29), (40) sont collés aux premier et second éléments (22), (32).

2. Protection de bobine (20) selon la revendication 1, dans laquelle, lorsque la protection de bobine (20) est dans la configuration fermée, une ou les deux protections de face de bobine (26), (36) des premier et second éléments (22), (32), respectivement, ne s'étendent que sur une partie de la surface de face de bobine.

3. Procédé de protection d'une bobine en acier contre les dommages, la bobine en acier comprenant un ventre, un alésage et une face située entre eux, le procédé comprenant les étapes de :

a. fourniture d'une protection de bobine (20) selon la revendication 1 ou la revendication 2 ;
b. positionnement du second élément (32) adjacent à la surface du ventre de bobine ; et
c. positionnement du premier élément (22) adjacent à la surface de l'alésage de bobine de sorte que les premier et second éléments (22), (32) se chevauchent partiellement l'un avec l'autre et que le premier moyen de mise en prise (29) vient en prise avec le second moyen de mise en prise (40).

4. Kit de protection de bobine comprenant une protection de bobine (20) selon la revendication 1 ou la revendication 2,

dans lequel la protection de face de bobine (36) du second élément (32) s'étend depuis la protection de ventre de bobine (34) sur une distance X, et dans lequel le kit de protection de bobine comprend en outre un second élément supplémentaire (32) ayant une protection de face de bobine (36) qui s'étend depuis la protection de ventre de bobine (34) sur une distance X', dans lequel la distance X' est supérieure à la distance X.

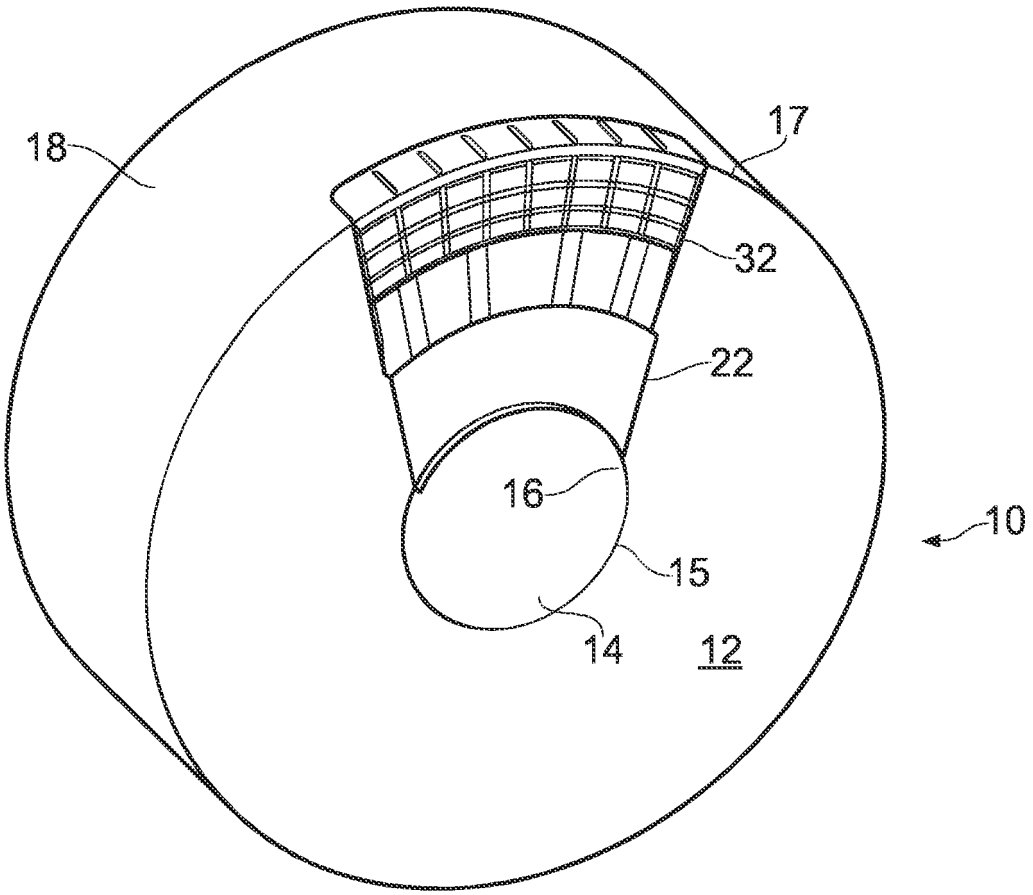

FIG. 1

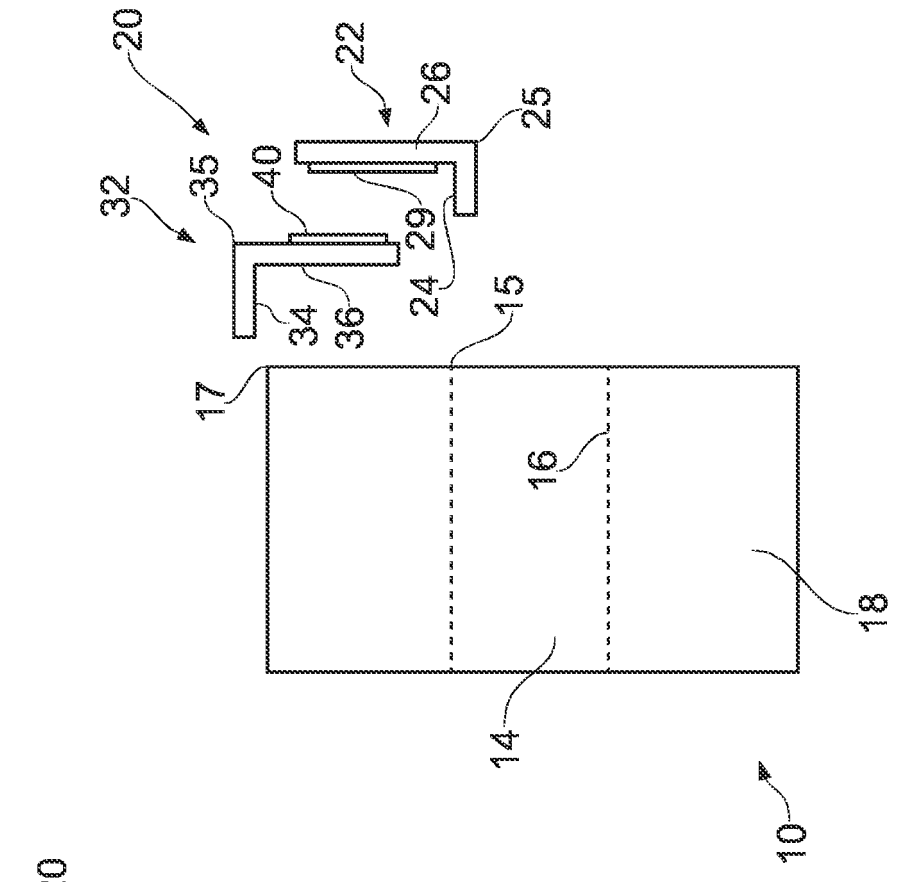
20
22
26
25
40
35
32
29
24
34
36
15
17
16
18
14
10

FIG. 3

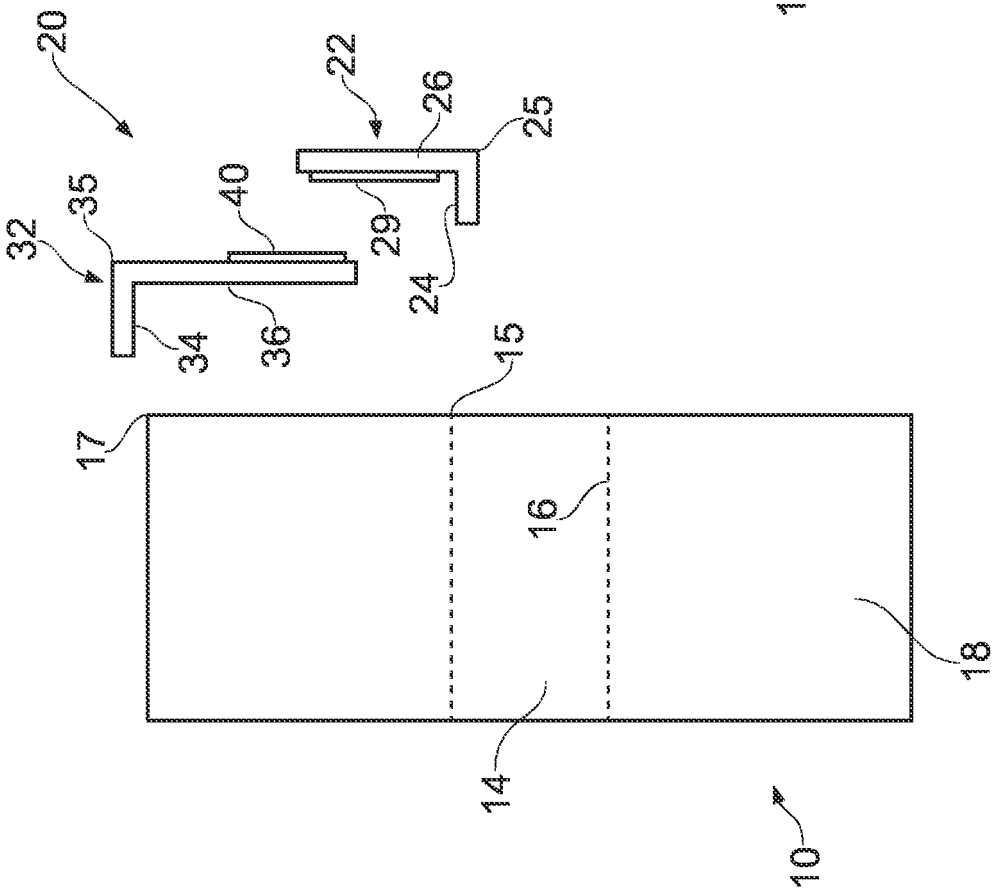
20
22
26
25
40
35
32
29
24
34
36
15
17
16
18
14
10

FIG. 2

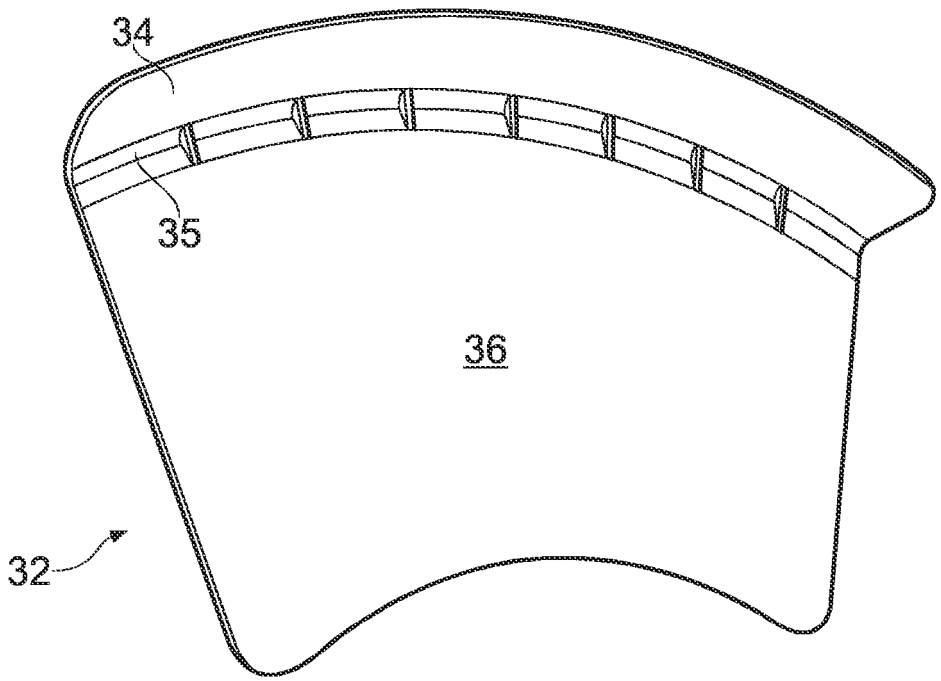

FIG. 4A

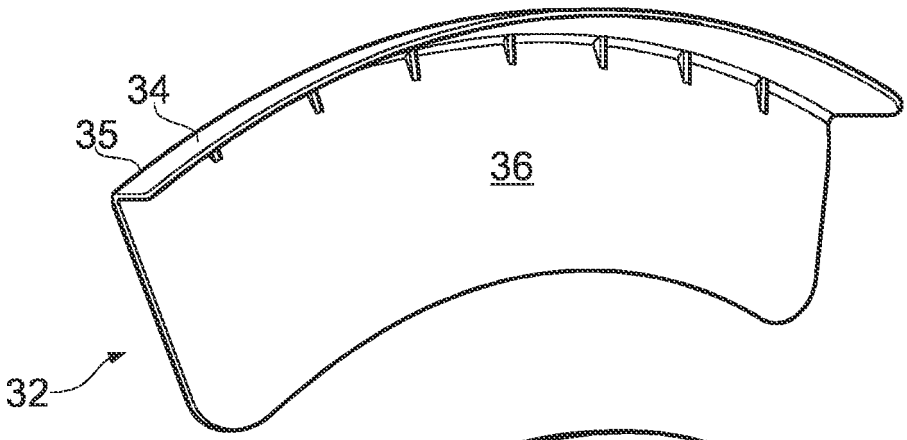

FIG. 4A'

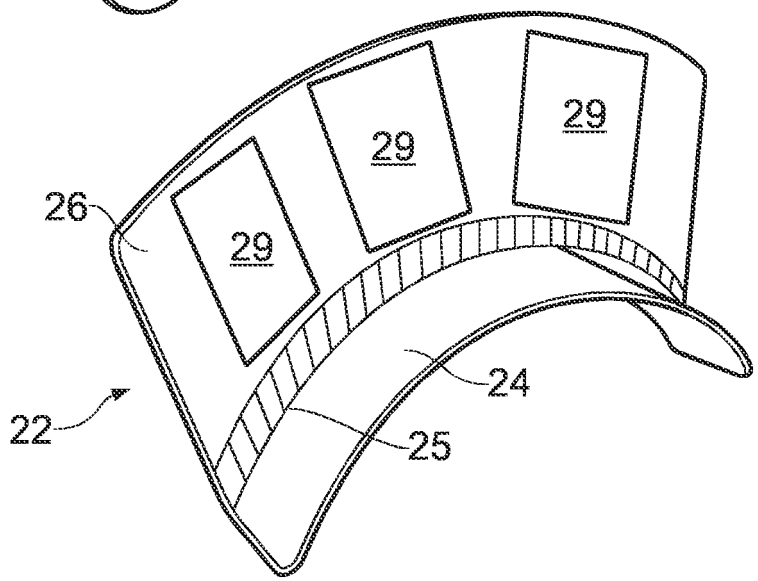

FIG. 5A

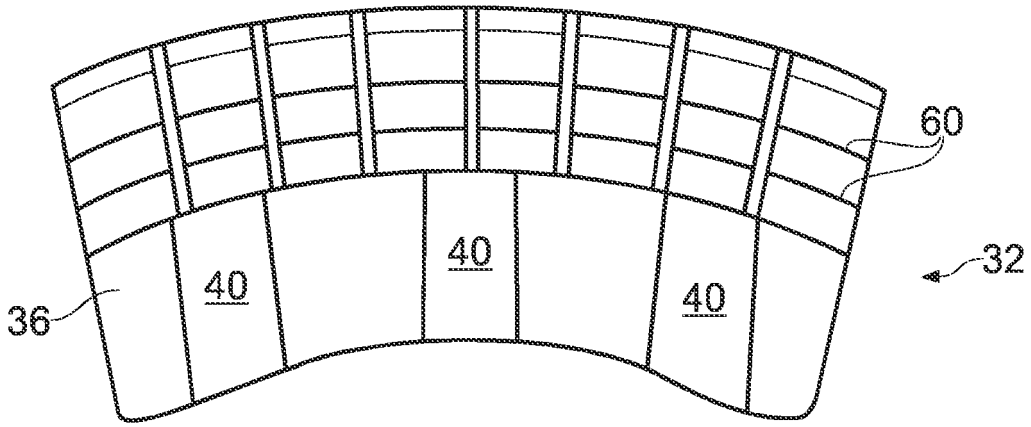

FIG. 4B

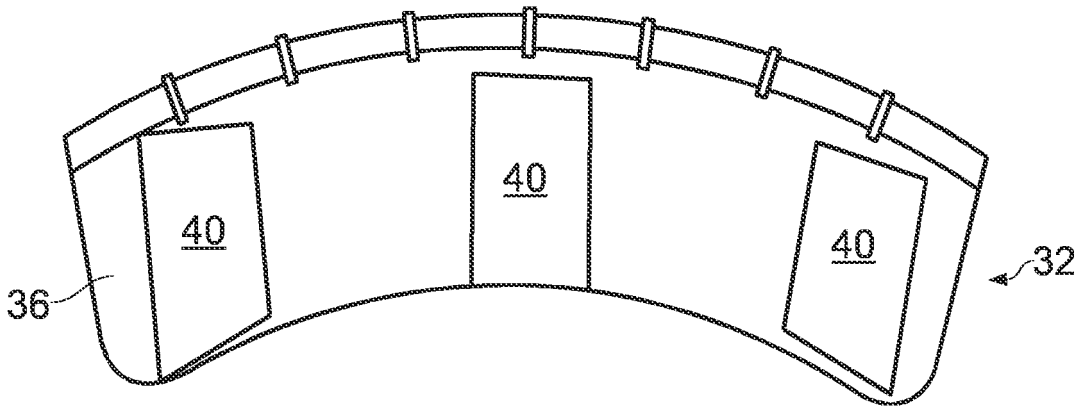

FIG. 4B'

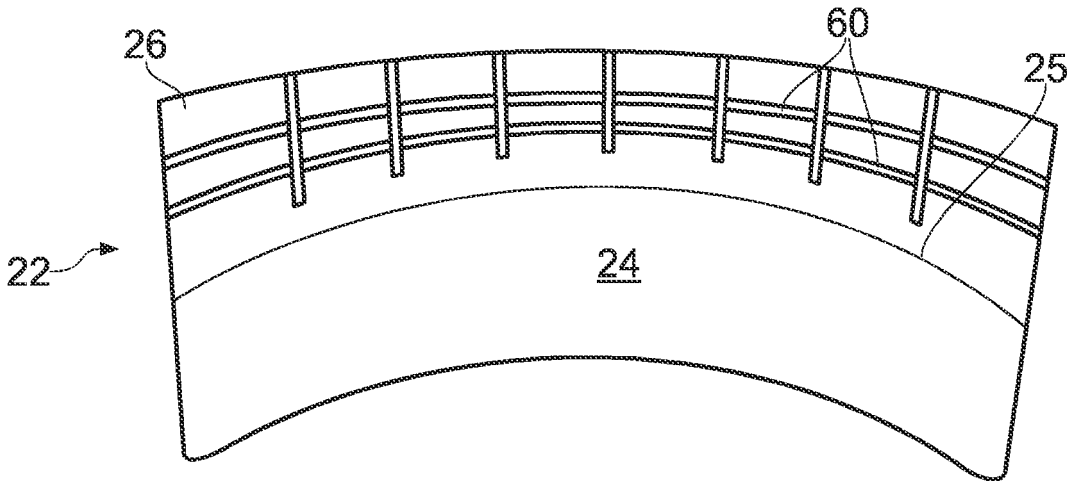

FIG. 5B

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 1889795 A **[0004]**