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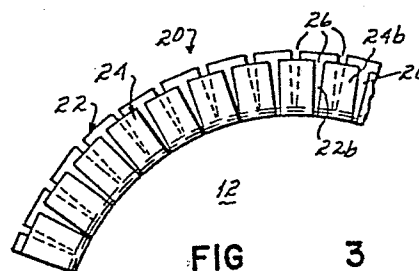
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54 Interior core protector for coiled material.

57 An interior core protector (20) for protecting the interior (12) of a coil of material (10), e.g., coiled sheet steel, from damage is disclosed. The core protector (20) includes a pair of overlapping formed angular paperboard members (22, 24) each having a series of spaced die cuts (26) in one leg (22b, 24b) thereof permitting the angular members to be bent to conform to the inner diameter of the coil (10). The cuts (26) in one leg (22b) are offset from the cuts in the other leg (24b) such that when the protector (20) is bent for placement in the interior core (12) of the coil (10) and the width of the cuts (26) increases, a paperboard segment of one member (24b) nevertheless overlies the cut (26) in the other (22b) to provide protection for the material about the full circumference of the interior core (12).



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"Interior core protector for coiled material"

This invention relates to an interior core protector and, more particularly, to the protection of the interior material in a roll of coiled material, for example, a coil of sheet steel.

5 It is well known that sheet steel, e.g., that which is used extensively in the automobile industry, is placed in large coils by the steel producer for shipment to the user. These coils weigh up to 15 tonnes and include a centre core
10 or opening therethrough. It is quite common in strapping of the coil, to prevent its uncoiling, to place steel straps through the centre core and about the outside of the coil. Typically, at least two and sometimes three or four of these straps
15 spaced about the coil are used. Furthermore, it is quite common in the transport of these heavy coils, particularly in their loading and unloading from trucks and railway cars, to use a C-hook which comes down and passes through the centre core and
20 is then raised to engage the interior surface of the material to lift the coil on and off the truck or railway car. In doing so, the C-hook often damages the metal particularly by bending of the edges of the material located at the centre of
25 the coil. That is, when the C-hook is placed through the coil and raised upwardly into engagement with the material, it is rare that the hook ever engages the material at both edges with equal pressure. Rather, the hook typically first engages one edge
30 and then the other. When this happens, the pressure of the hook on the material causes its bending. This bent material, of course, is not usable and must be scrapped. It is not uncommon for the user to have to scrap 10 to 15 metres or more of the
35 sheet metal because of such damage.

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In addition to damage by the C-hook in loading and unloading of the coil material, it is also quite common for the transporter to throw a chain through the interior core of the coil to secure
5 the coil on a truck or railway car. This likewise causes damage to the edges of the material causing waste and scrap of what would otherwise be usable material.

It has been suggested therefore to provide
10 some form of protection for the material about the interior core of the coil. However, prior attempts to provide such protection have not been wholly successful either economically or in terms of providing the protection needed.

15 It is an object of this invention to provide an interior core protector for positioning about the inner circumference of a coil of material having a core to protect the edge of material from damage which will alleviate or eliminate the drawbacks
20 of prior art protectors. To this end, the protector in accordance with the invention comprises a pair of overlapping angle members each of which has two legs one of which is provided with a plurality of cuts permitting bending of the member to conform
25 to the circumference of the core, wherein the cuts in the leg of one of the members are offset with respect to the cuts in the leg of the other of the members so that in use each cut in either leg is covered by a portion of the other leg so as
30 to provide protection around the entire circumference of the core.

In a preferred embodiment of the invention, the interior core protector includes a pair of overlapping formed angular paperboard members which
35 are manufactured in a flat, i.e., non-arcuate configuration. One leg of each of the members includes a series of cuts spaced along its length and extending from the free edge of the leg to the angle joining

the legs. These cuts permit bending of the core protector to conform to the inner diameter of the coil. The cuts in the legs of one of the members are offset with respect to the cuts in the other member such that when the protector is bent to conform to the inner diameter of the coil and the spacing along each cut correspondingly increases, i.e., the cut opens up when the protector is bent, there is nevertheless provided a section of paperboard material overlapping each cut. The core protector thus provides protection for the material about the complete circumference, i.e. 360° , of the inner core of the coil. Thus, when a chain is thrown through the core or a C-hook passing through the coil engages the material, the edges of the inner length of the material are protected from damage. No special locating or positioning of the C-hook, for example, is needed. Rather, since 360° protection to the edges of the material at the inner core is provided, the coil may be grasped at any location.

Among the many advantages of such an embodiment are the protection it provides the coiled material including protection to the edges of the inner length of material around the entire circumference of the inner core, the economy of the materials of construction in that the protector is preferably formed of relatively inexpensive paperboard, the economic use of this material in that there is very little waste in forming the protector, the rigidity of the formed angular members whereby when the protector is placed in the core the flanges closely conform to the material and do not fall down or tend to flatten out, the fact that the angular members once bent tend to want to straighten out and thus when placed in the core the protector tends to urge itself into engagement with the inner diameter of the coil, and the fact that the protector can be economically packaged and shipped merely

by stacking up a series of protectors one on another and shipping them in a straight or non-arcuate position. This results in full utilization of shipping capacity with no waste of space.

5 The invention also extends to a coil of material provided with interior core protectors in accordance with the invention.

 An embodiment of the invention will now be described by way of example and with reference
10 to the accompanying drawings, in which:-

 Fig. 1 is a perspective view showing an interior core protector in accordance with the present invention, positioned within a coil of sheet steel;

 Fig. 2 is a perspective view of the interior
15 core protector as manufactured and before bending;
 and

 Fig. 3 is a sectional view showing an arc of the core protector when positioned in use.

 Referring now to Fig. 1, there is shown a
20 coil of sheet material 10, for example, a large and heavy coil of sheet steel of the type typically used in the automobile industry, for purposes of illustrating the environment in which this embodiment of the invention finds particular applicability.
25 As shown in Fig. 1, the sheet material is coiled to form a large roll of material having a open centre, i.e. hollow, core 12. A series of steel bands 14 are placed through the core 12 and about the coiled material to keep the material from uncoiling.
30 As is common practice in the industry, paperboard angle protectors 16 are provided on the outer diameter of the coil 10 to keep the edges of the sheet steel from cutting the steel straps. An interior core protector 20 in accordance with the present invention
35 is placed about the inner core 12 of the coil 10 on both sides of the coil, i.e., two protectors are used for each coil. Thus, when the coil protectors 20 are positioned in the core 12 of the coil 10

as shown in Fig. 1, the protectors 20 form a protective barrier around both inner edges of the coiled material.

Referring to Fig. 2, the core protector 20 is formed of two like overlapping formed angular members 22 and 24. Each member 22 and 24 includes a pair of legs 22a and 22b and 24a and 24b, respectively, which are generally at right angles one to another. The protector 20 is preferably formed of a relatively inexpensive material such as paperboard. A presently preferred thickness of the protector is of the order of 0.30 cm, this being the total thickness of the protector or sum of the thicknesses of the two members 22 and 24. One leg 22b and 24b of each member is die cut to provide a series of generally equally spaced cuts 26 extending from the outer edges 28 and 30, respectively, of each leg 22b and 24b to the angles 32 and 34, respectively, at which the two legs 22a and 22b and 24a and 24b of each member meet. These die cuts 26 permit the protector to be bent into the generally circular configuration shown in Fig. 1. The two members may be joined by an adhesive placed between the overlapping uncut legs 22a and 24a of the angles 22 and 24.

In a presently preferred embodiment of the invention, the protector 20 is about 190 cm long to cover the circumference of a 60 cm diameter core and each leg is approximately 7.5 cm long. Thus, when the protector is bent to conform to the diameter of the core and is placed in use as shown in Fig. 1, an area of protective paperboard extends axially in the interior of the core 7.5 cm from the outer edge of the coil from both sides of the coil and radially outwardly 7.5 cm along the face of each side of the coil 10.

As shown in Fig. 2, the cuts 26 in one leg 22b of one member 22 are offset from the cuts 26 in the leg 24b of the other member 24. Thus, when

the protector 20 is bent into its generally circular configuration and the width of the cuts 26 correspondingly widens, as shown in Fig. 3, there nevertheless is maintained at each cut 26 a section of protective material which overlies the openings caused by the cuts. As shown in Fig. 3, a section 22b underlies the cut 26 in leg 24, and a section 24b overlies the cut 26 in leg 22. Thus, even though the cuts 26 open up on bending of the material, because of the overlapping legs 22b and 24b there is maintained protective paperboard material about the entire circumference of the coil.

It is important to note that legs 22b and 24b are not glued together prior to bending of the core protector since the sections between the cuts 26 must be free to slide over their overlying sections to permit bending of the protector. However, in some cases, particularly with lighter material, it may be desired to adhere the overlying sections together after bending so that the sections do not fall or extend outwardly where possibly they may be torn off during use. Both objectives may be accomplished by providing the surface of leg 22b facing leg 24b with a layer of pressure sensitive adhesive covered with a removable release paper. The release paper prevents the facing legs from adhering before bending. To form the core protector to the shape of the interior core of the coil, it is merely necessary to remove the release paper thereby exposing the pressure sensitive adhesive, bend the protector to its generally circular configuration, insert the protector in the coil, and then press the legs 22b and 24b together.

With the protectors 20 in place in the core 12, when the coil is grasped, for example, by a C-hook, or a hold down chain is thrown through the core, protection of the edges of the inner length of the coiled material is provided about the full

circumference of the inner core. Thus, the core protector 20 provides for complete protection along the entire 360° circumference of the core, and the C-hook can therefore enter the core from any position about the core.

One of the advantages of the present embodiment is that when the protector 20 is bent to conform to the diameter of the core 12 the resiliency or memory properties of the paperboard material from which the protector is made tends to want to straighten the material back to its flat or unbend condition. This is desirable since it causes the protector to expand outwardly and, as a result, to tightly engage the material about the inner core. Thus, there is no need for any special provision for either locating or holding the core protector in position before strapping of the coil. Secondly, since the core protector is made of a formed angular paperboard member, the angle between the legs is rigid and maintains itself in both the unbent and bent conditions of the core protector. Thus, the legs having the cuts 26 tend to lie flat against the surface of the coil as contrasted to falling down as would be the case if a flat material such as paper were only creased to lie against the face of the coil. Thirdly, in addition to being made of relatively inexpensive paperboard material, the core protector makes very economic use of this material. That is, there is no waste of material as would otherwise occur if the core protector were to be made as a annular piece. This would require cutting of an annulus out of a flat square sheet which would waste the core as well as the material lying outside the outer diameter of the annulus. Thus, a savings in material of the order 60% is realised with the core protector of the present embodiment.

Still further, in the preferred embodiment the core protector can be packaged, shipped and stored in its flat or straight, i.e. unbent, condition (as shown in Fig. 2) such that the core protector
5 must be bent by the user to fit it into the coil. This permits the protectors to be economically packaged and shipped merely by stacking them one on another. There is none of the wasted space which would be occasioned if annular protectors
10 were shipped.

Thus, at least in the preferred embodiment the core protector of the present invention provides not only excellent protection for the coiled material but is relatively economic to produce and to ship.
15 Since these core protectors are a disposable item, this is very important to the producers of the coiled material.

Although the preferred material is paperboard, other materials could be used.

CLAIMS

1. An interior core protector (20) for positioning about the inner circumference of a coil of material (10) having a core (12) to protect the material from damage, characterised by a pair of overlapping
5 angle members (22, 24) each of which has two legs (22a, 22b; 24a, 24b) one of which (22b, 24b) is provided with a plurality of cuts (26) permitting bending of the member (22, 24) to conform to the circumference of the core (12), wherein the cuts
10 (26) in the leg (22b) of one of the members (22) are offset with respect to the cuts (26) in the leg (24b) of the other of the members (24) so that in use each cut (26) in either leg (22b, 24b) is covered by a portion of the other leg (22b, 24b)
15 so as to provide protection around the entire circumference of the core (12).
2. An interior core protector as claimed in claim 1, characterised in that the angle members (22, 24) are formed from paperboard.
- 20 3. An interior core protector as claimed in claim 1 or 2, characterised in that the other legs (22a, 24a) of each angle member (22, 24) are joined together by means of adhesive.
4. An interior core protector as claimed in
25 claims 1, 2 or 3, characterised in that the thickness thereof is about 0.30 cm.
5. An interior core protector as claimed in any preceding claim characterised in that the length of each leg (22a, 22b, 24a, 24b) is about 7.5 cm.
- 30 6. An interior core protector as claimed in any preceding claim, characterised in that it is bent to conform to the circumference of the core (12) of the coil of material (10) with which it is to be used.
- 35 7. An interior core protector as claimed in claim 6, characterised in that the legs (22b, 24b) provided with the cuts (26) are joined together by means of adhesive.

8. An interior core protector as claimed in any of claims 1 to 5, characterised in that it is in an unbent condition for example for shipping or storage purposes.

5 9. An interior core protector as claimed in claim 8, characterised in that adhesive means are provided for joining together the legs (22b, 24b) provided with the cuts (26) after the protector is bent to conform to the circumference of the
10 core (12) of the coil of material (10) with which it is to be used.

10. A coil of material (10) having a central, hollow core (12) extending therethrough, there being a pair of protectors (20) for the edge of
15 the material around the circumference of the core (12) at each end thereof, characterised in that each protector (20) is as claimed in claim 6 or 7.

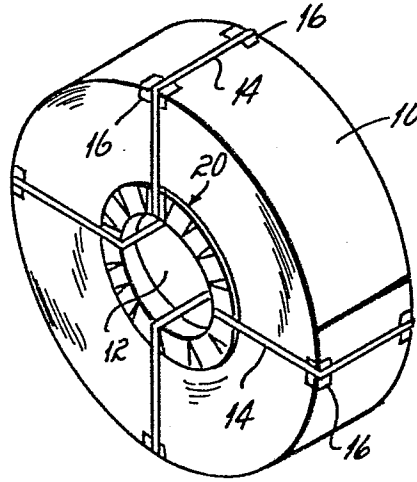


FIG 1

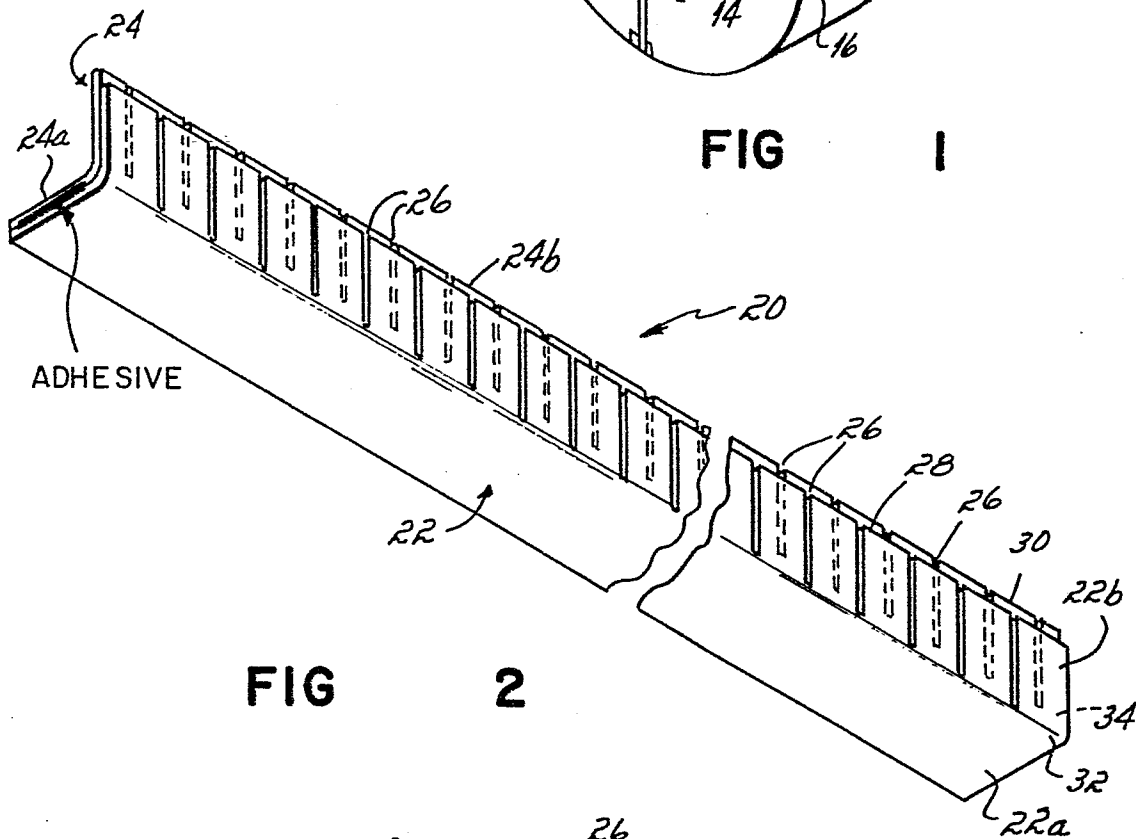


FIG 2

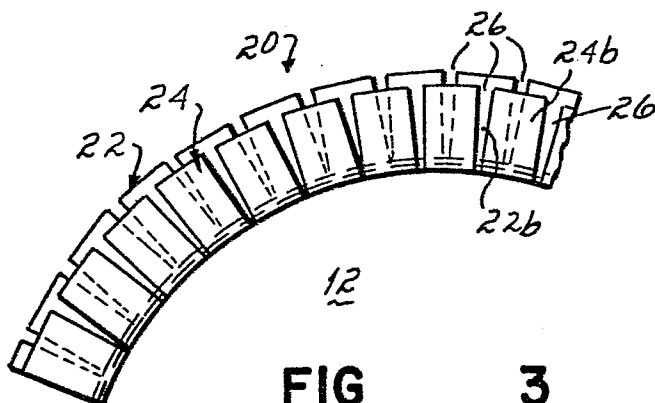


FIG 3