

(12)                                      **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
09.10.2002    Bulletin 2002/41

(51) Int Cl.7:    **B65D 63/14**

(21) Application number: **02252250.2**

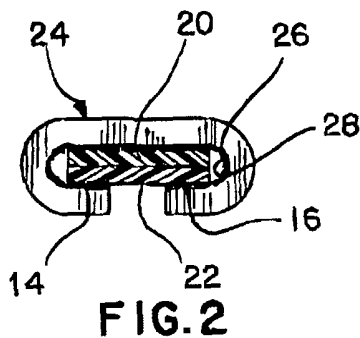
(22) Date of filing: **27.03.2002**

<div>(84) Designated Contracting States:  <b>AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR</b>            Designated Extension States:  <b>AL LT LV MK RO SI</b> </div> <div>(30) Priority:    <b>04.04.2001    US 825594</b></div> <div>(71) Applicant: <b>ILLINOIS TOOL WORKS INC.</b>  <b>Glenview, Illinois 60025-5811 (US)</b></div>	<div>(72) Inventor: <b>Angarola, Barry R.</b>  <b>Schaumburg, Illinois 60193 (US)</b></div> <div>(74) Representative: <b>Rackham, Stephen Neil</b>  <b>GILL JENNINGS &amp; EVERY,</b>  <b>Broadgate House,</b>  <b>7 Eldon Street</b>  <b>London EC2M 7LH (GB)</b></div>
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(54)      **Anti-slip joining element for superposed strap-ends**

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A coated grit seal (10) for forming a joint between overlapping strap ends (20,22) includes a layer of grit particle material (26) disposed on an inner surface (18) of the seal (10) and at least one layer of a coating (28) applied over the grit particle material (26). The coating (28) prevents loosening of the grit (26). A method for preventing the loosening of the grit particle material (26) includes applying at least one layer of a coating (28) over the grit particle material (26).



## Description

**[0001]** In an effort to ensure the stability of cargo and large bundles, during both intermediary and extended transport, a ligature or wrapping of some sort, such as steel strapping, is routinely placed around the load. Contained within a secure wrapping, such as steel strapping, the load is more likely to remain in position during transport to a desired location. Typically, to facilitate the transport and lifting of large bundles, the strapping is made of fabric, wire, metal or plastic and secured by metal seals. These seals join the opposing overlapping ends of the strapping together, and become crimped or flattened forming joints in the seal used to secure and prevent movement of the load.

**[0002]** Typically, inside the joints of the metal seal is a layer of hard, small grit particles, preferably at least layered in the marginal edge areas or the overlapped end portions of the strapping and between the adjacent surfaces of the strapping end portions so that when the overlapped end portions are secured together, the particles embed into the adjacent face of the strapping ends and held the ends against relative longitudinal movement. Generally, the particles provide a raised texture, which enables the seal to maintain a stronger hold on the straps. Before the implementation of the hard small grit particles on the inside surface of the seal, the strap ends could slide or slip with respect to each other and with respect to the seal, causing the strap to separate and become unsecured.

**[0003]** Exemplary strap seal is disclosed in US-A-3,089,233, and US-A-3,237,256.

**[0004]** The problem, however arises when the grit particles in the seal, used in joining and securing the strapping from movement, are jointed by a crimping or flattening tool and the small hard particles become loosened and release into the mechanism of the tool itself. Understandably, the release of these particles can interfere with the internal components of the tool, such as the hydraulic or pneumatic actuators, mechanical linkages, and bearings, resulting in increased wear, and premature failure of these crimping devices. These tools are expensive and therefore the operating cost associated with replacing these tools due to rapid wear is not cost effective.

**[0005]** Over the years different strategies have been employed to achieve joining devices that secure the straps in place during lifting and transport without the need to expend more money into replacement of jointing or crimping tools.

**[0006]** Accordingly, there is a need for a seal that provides the cost effective results of the grit-type seal, and that reduces the release of the attached grit particles from the seal. Desirably, such a seal prevents the relative movement of the end portions of the strapping, while maintaining secure bundling of the cargo and maintaining its strength during transport and lifting.

**[0007]** Particularly, the invention includes the intro-

duction of a metal seal that is coated to prevent the release of particle grit from the inner surface of the seal. Advantageously, the present coated grit seal prevents the grit from contaminating and possibly damaging tools used to secure the seal to the strap to form a joint.

**[0008]** The seal includes a seal body having inner and outer surfaces, at least one layer of grit particle material disposed on the inner surface of the seal body, and at least one layer of coating material over the grit particle material. The grit particle material can be disposed on the entire inner surface of the seal.

**[0009]** Alternately, the inner surface of the seal can define marginal end areas on which the grit material and coating material are disposed. That is, the seal defines flanges on opposing lateral sides of the seal and the grit particle material is disposed on the flanges of the seal.

**[0010]** The coating material can be lacquer, shellac, paint or glue. The coating material can be pigmented or clear. Two layers of the coating material can be applied over the grit particle material. The grit particle material can be about 40-120 mesh. Preferably, the grit material is about 60-100 mesh.

**[0011]** A method of preventing grit particles from loosening from the seal includes the step of coating the grit particle material with at least one layer of coating material. The method includes selecting the coating material from lacquer, shellac, paint or glue. The coating material can be pigmented prior to coating.

**[0012]** The method can include grit particle material being disposed on the entire inner surface of the seal. Alternately, the method can include providing a seal that defines flanges on opposing lateral sides of the seal, and having the grit particle material disposed on the flanges of the seal.

**[0013]** The method can further include the step of coating the grit particle material with two coats of the coating material.

**[0014]** Particular embodiments in accordance with this invention will now be described with reference to the accompanying drawings; in which:-

Fig. 1 is a perspective view of a strap and the jointed seal, illustrating the overlapping ends of the strapping material and the seal joint embodying the principles of the present invention in which the grit particle material is secured to the strap contacting faces of the seal;

Fig. 2 is cross-sectional view of the seal and overlapping end portions of the ligatures or straps;

Fig. 3 is a perspective view of the inner surface of the seal showing the grit particle material disposed thereon;

Fig. 4 illustrates an alternate seal in which the inner surface of the seal similar, at the center portion of the seal wall, is uncovered in grit particle material; and

Fig. 5 is an enlarged cross-sectional view of the seal having grit particles disposed thereon and coating

applied thereto.

**[0015]** Referring now to the figures and in particular to Fig. 1, there is shown an improved inner coated grit seal 10 that eliminates the release of grit particles. Advantageously, the seal 10 maintains its strength and effectively secures strapping portions to one another. The seal 10 is provided with an inner seal surface 18 with at least one coated gripping surface. When crimped, the seal 10 distorts the overlapping strap end 20,22 and prevents the ends of the strap from becoming unsecured from the seal 10.

**[0016]** In an effort to ensure the stability of cargo and large load bundles that, for example, need to be transported and lifted, such cargo is typically secured by one or more straps. These straps facilitate transport, prevent sifting of the cargo and enable lifting of the cargo from one area to another.

**[0017]** While smaller (e.g., narrower and lighter gauge) strapping may be sealed to itself in a "seal-less" arrangement; heavier gauge strapping typically require that a seal, formed from a piece of material encircling the strap and crimped thereon, is applied. To this end, the overlapping ends 20,22 of the strapping material are joined together by the seal 10 to prevent relative movement of the end portions 20,22 from one another. The seal 10 is preferably a metal member, e.g., steel, however it can be formed from of any material that can withstand crimping and still effectively secure the joined strapping ends 20,22 in place during lifting and transport.

**[0018]** With regard to the strapping material, there are several different varieties available that are currently in commercial use. The strapping material for which the present coated grit seal 10 can be used, includes, without limitation: steel, aluminum, fabric and/or plastic. Furthermore, typically the straps can be either treated or untreated, coated, painted, waxed, heat treated and a like.

**[0019]** A joint 24 is formed by the seal 10 and the overlapped end portions 20,22 of the strap. The joint is formed by the seal 10 being pressed (e.g., crimped) firmly into engagement with the strap end 20,22, such that the strap becomes deformed. The above-noted patents disclose such a deformed strap configuration.

**[0020]** To prevent the ends 20,22 of the strap from separating, the inner surface 18 of the seal 10 which comes in contact with the strapping end 20,22 has an irregular configuration or character. Typically, the seal inner surface 18 that contacts the strap 20,22 has affixed thereto granules of a hard material, referred to as grit 26.

**[0021]** The grit 26 is affixed to the inner surface 18 which provides a high friction environment at the joint 24, securing and preventing the movement of the overlapping strapping ends 20,22. The grit particles 26 can be disposed on the entire seal inner surface 18 (FIG. 3). Alternately, the seal 10 can define marginal end areas

or flanges 14, 16 at lateral opposing sides of the seal 10, and the particles 26 can be applied to the flanges 14,16 (FIG. 4), allowing the center 12 to be free of grit particles. To this end, when the flanges 14,16 are secured over the overlapped ends (20,22) the particles 26 embed into the adjacent faces of the overlapped strapping ends to hold the ends against relative longitudinal movement.

**[0022]** The grit material 26 is secured to the seal 10 to create a positive gripping of the strap end 20,22 without tearing the strap, which is essential to the integrity of the joint 24. However, as set forth above, the grit 26 tends to loosen from the seal inner surface 18. This loosened grit can, if introduced into seal-forming tools (e.g., crimping tools), cause excessive wear and possibly failure of the tools.

**[0023]** A seal 10 in accordance with the present invention greatly reduces and can eliminate the loose grit problem. In the present seal 10, the grit particles 26 are preserved or coated with one or more thin layers of coating, as indicated at 28, over the grit particles 26. The layers of coating 28 may vary from one to as many as five layers, depending on the type of coating used. Preferably, the grit 26 is coated with one or two layers of coating 28.

**[0024]** The coating 28 over the grit particles 26 can include lacquer, shellac, paint and/or glue, which is preserved over the attached grit particles 26 on the seal inner surface 18. The coating 28 may be clear or pigmented, and may vary in thickness. While it will be recognized that a heavier coating 28 over the grit 26 can effect the penetration and joint efficiency of the seal 10 itself in cases where a heavier coating 28 is used, a larger grit particle 26 size can eliminate the reduction in joint efficiency and penetration of the seal.

**[0025]** The grit particle material 26 varies in size. The particle 26 size used in the present invention is one that can be sufficiently preserved to the seal inner surface 18 to prevent the release of the particles 26, while still maintaining the effectiveness of the grit 26 in securing the strapping ends 20,22 from movement. Preferably, the grit 26 is aluminum oxide having a particle size of about 40 to 120 mesh, and more preferably from about 60 to 100 mesh.

**[0026]** In a present embodiment, the grit 26 is coated 28 with one or two coats or layers of lacquer. Those skilled in the art will recognize that while the coating 28 "covers" the grit 26, the grit 26 nevertheless "bites" or is forced into the strapping end 20,22 by the force applied during crimping.

## Claims

1. A seal (10) for forming a joint between a pair of overlapping strap ends (20,22) comprising;

a seal body, the seal body having an inner sur-

face (18) and an outer surface; and,  
at least one layer of grit particle material (26)  
disposed on the inner surface (18) of the seal  
body;

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**characterised in that** the seal (10) also in-  
cludes at least one layer of coating material (28)  
over the grit particle material (26).

2. A seal according to claim 1, wherein the grit particle material (26) is disposed over the entire inner surface (18) of the seal (10). 10

3. A seal according to claim 1, wherein the seal (10) includes flanges (14,16) on opposing lateral sides and wherein the grit particle material (26) is only disposed on the inner surface (18) of the flanges (14, 16). 15

4. A method of preventing grit particles from loosening from a seal (10) for forming a joint between a pair of strap ends (20,22), the seal having an inner surface (18) and an outer surface and at least one layer of grit particle material (26) disposed on the inner surface (18), 20  
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**characterised by** the step of: coating the grit particle material (26) with at least one layer of coating material (28).

5. A seal or a method according to any one of the preceding claims, wherein the coating material (28) is lacquer, shellac, paint or glue. 30

6. A seal or a method according to any one of the preceding claims, wherein the coating material (28) is pigmented. 35

7. A seal or a method according to any one of the preceding claims, wherein the coating material (28) is clear. 40

8. A seal or a method according to any one of the preceding claims, wherein the grit particle material (26) as a size in a range of about 40-120 mesh. 45

9. A seal or a method according to claim 8, wherein the grit material has a size in a range about 60-100 mesh.

10. A seal or a method according to any one of the preceding claims, wherein two layers of the coating material (28) are applied over the grit particle material (26). 50

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