CONTAINER AND SYSTEM FOR CONSTRaining AND PAYING OUT COILED STEEL RULE OR THE LIKE

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ABSTRACT
A container for a coil of steel rule and a roller apparatus are disclosed. The container is square, and the sides are arranged so as to restrain steel rule coil in its coiled configuration and to resist rule coil unwinding forces. The roller apparatus engages the coil through apertures in the box bottom. One set of rollers directly supports the wake of the coil, and another set of rollers resists rule coil unwinding forces.
Fig. 5
CONTAINER AND SYSTEM FOR CONSTRAINING AND PAYING OUT COILED STEEL RULE OR THE LIKE


[0002] The manufacture of cardboard boxes traditionally involves the preliminary manufacture of a cardboard sheet or blank, and the subsequent cutting of that blank to a particular desired shape. The blank is then folded and assembled into the completed box structure. This folding and assembly can occur at the box factory or it can be accomplished at the point where the box is to be filled and used.

[0003] Cutting the cardboard box blank into the requisite shape is traditionally accomplished by hardened steel workpieces, such as cutting rules or knife blades. These cutting rules can have complex shapes so as to properly shape the box blank handle cutouts, flaps and other box features.

[0004] The manufacture of a box cutting rule is often accomplished by bending and forming a length of steel rule. Machines such as benders, notchers, cutters, miter machines, and die making accessories are used to form the length of steel rule into a slicing implement which will provide a box blank of a desired shape.

[0005] The steel rule which is to be made into the box cutter is usually provided to the cutter manufacturer in coiled form. The coiled rule is pulled or drawn off into the various bending, notching and other machinery for formation into the final-shaped cutter.

[0006] When in its coiled configuration, the steel rule has considerable expansive force. If left unconstrained, the nested coils will tend to fly apart from one another into a straightened configuration; this coil expansion can occur with almost explosive force and velocity. Injury to persons handling the steel rule coil can occur. Accordingly, to prevent these injuries and to prevent tangling or damage to the steel rule itself, the coils are usually constrained by binding straps which encircled the coil or by placing the steel rule coils in boxes or other containers which are shaped to closely surround and restrain the steel rule coils.

[0007] But when the steel coil is to be fed into a bending or other machine for manufacture into the finished cutter, the binding straps must be removed from the coil, on the box must be opened and the coil mounted upon a spool, or the coil must be otherwise freed from its constraints. Injury to personnel or damage to the coil can occur as the coil is freed from its constraints.

[0008] It is accordingly a general object of the invention to provide a container and system for safely and inexpensively constraining, transporting, handling and paying out a coil of material such as steel rule which has a substantial radially directed expansion unwinding force inherent within it.

[0009] It is another object of the invention to provide a container which completely encloses a coil of steel rule or the like but which can be partially opened to permit the steel rule to be directly mounted on rollers or like supports to permit the rule to be progressively drawn out of the container without freeing the material still within the container from its constraints.

[0100] It is yet another object of the invention to provide an inexpensive yet effective mounting and draw-off or payout system for a coil of steel rule or the like which will prevent the coil from flying apart.

[0111] Other objects and advantages of the invention will become apparent upon reading the following detailed description and upon reference to the drawings. Throughout the drawings, like reference numerals refer to like parts.

BRIEF DESCRIPTION OF THE DRAWINGS

[0102] FIG. 1 is a bottom plan view of a box adapted to contain a coil of steel rule or like material.

[0103] FIG. 2 is a top plan view of the box shown in FIG. 1.

[0104] FIG. 3 is a bottom plan view similar to FIG. 1 but showing the box with certain cutout material removed and configured to have the contained steel rule drawn from it.

[0105] FIG. 4 is an exploded view showing, in schematic form, the box, the contained coil of steel rule material, and a roller support system for supporting, constraining and guiding the steel rule as it is drawn from the box.

[0106] FIG. 5 is a top plan view showing the box in its open configuration and showing in further detail the rollers located below and partially within the bottom of the box and the steel rule coil as the coil appears when it is located within the box and supported and constraining by the rollers.

[0107] FIG. 6 is an isometric view of the box as it appears when it is mounted atop the roller system.

[0108] FIG. 7 is a top plan view of the roller system.

[0109] FIG. 8 is a fragmentary sectional view taken substantially in the plane of line 8-8 in FIG. 5.

DETAILED DESCRIPTION

[0200] While the invention will be described in connection with a preferred embodiment and procedure, it will be understood that it is not intended to limit the invention to this embodiment and procedure. On the contrary, it is intended to cover all alternatives, modifications and equivalents as may be included within the spirit and scope of the invention as defined by the appended claims.

[0201] Turning first to FIGS. 1-5, there is shown a coil 10 of steel rule 11 that is enclosed and constrained within a novel container box 20. It is a characteristic of the steel rule 11 that the rule 11 has a cross section shape and is otherwise formed so that it exerts considerable radial expansion force upon itself and upon adjacent objects; and it tends to spring into a straight, unwound configuration. To counteract this force and to retain the coil in its wound configuration as illustrated in FIG. 4, the container 20 has an opposed top 21 and bottom 22 as shown in FIGS. 1 and 2. Four opposed sides 23, 24, 25 and 26 (FIG. 5) of equal length extend between the top 21 and the bottom 22 so as to form the box 20, which is of substantially square shape. The sides 23-26 separate the top 21 and bottom 22 from one another with a container interior depth only slightly greater than the width or thickness of the restrained steel rule 11. When the box is so sized and shaped, no interior strapping around the coil 10 is required and yet the container 20 resists the rule coil 10 radial expansion unwinding force, in accordance with the
invention. As shown in FIGS. 1 and 2, exterior strapping 18 can be provided, if desired, to secure the box in a closed configuration for shipment. A slit or opening 19 is provided at one corner of the box 20 to permit the rule 11 to be drawn from the box and into a bending or other machine (not shown) for fabrication of the cutter. In carrying out the invention, the container is formed of any suitable material such as paperboard, preferably corrugated paper, which is selected to be strong enough to resist the coil radial expansion unwinding force.

[0022] In accordance with another aspect of the invention, the bottom 22 of the container 20 is formed with score or perforations 27 so that bottom material 28 can be removed and thus define one or more openings 29 to permit rollers to selectively engage the coil 10 within the container 20, suggested particularly in FIGS. 1, 3 and 4.

[0023] In further accordance with the invention, a roller assembly 30 is provided to support the coil 10 and further constrain it against unwinding as the rule 11 is drawn out of the box 20. In the embodiment illustrated here, this roller assembly 30 takes the form of four roller subassemblies 31. Each subassembly has a roller 33 positioned to have its axis in a first. Here that plane is horizontal, but the roller assembly could be oriented vertically or in any other position. These rollers are sized, are mounted upon journals 34, and are positioned so that the upper surface of each roller 33 extends into the interior of the box 20 through an opening 29. Each roller 33 engages the coil 10 so as to support the weight of the coil and slightly lift the coil 10 away from engagement with the box bottom 22, as suggested particularly in FIG. 8.

[0024] To inhibit radial expansion of the coil 10 in accordance with the invention, the roller apparatus also includes rollers 36 having their axes oriented in planes which are perpendicular to the plane of the axes of the rollers 33. These rollers 36 are positioned to extend into the box through the openings 29 and are positioned to engage the outermost winding of the coil 10.

[0025] This roller assembly 30 can be mounted upon any suitable substructure such as a plate 40. To inhibit the box 20 from rotating about the roller assemblies 30 and the mounting plate 40, the mounting plate 40 can be provided with box-engaging angles or corner extension members 42, as suggested in FIGS. 6 and 7.

1. A container for a coil of steel rule, the rule having substantial intrinsic radial expansion unwinding force,

the container having opposed sides of substantially square shape in length and width and a plurality of ends connected between the sides to provide a container interior depth only slightly greater than the width of the contained steel rule so as to restrain the steel rule coil in its coiled configuration, the container being constructed so as to resist the rule coil unwinding force,

at least one side of the container being formed to so as to permit side material of a predefined shape and size to be removed to define an opening in the side to permit rollers to selectively engage the steel rule within the container.

2. A container according to claim 1 wherein said container is formed of paperboard.

3. A container according to claim 2 wherein said container is formed of corrugated paper.

4. A roller apparatus for the removal of a coil of steel rule from a container, the steel rule having substantial intrinsic radial expansion unwinding force,

the roller apparatus having at least one first roller having an axis in a first plane and at least one second roller having an axis in a second plane substantially perpendicular to said first plane, one of the rollers being adapted to support the weight of the coil and another of the rollers being adapted to inhibit radial expansion of the coil.

5. A roller apparatus according to claim 4 wherein said roller apparatus comprises two rollers in a first plane and one roller in a second plane.

6. A method for removing a coil of steel rule from a container, the steel rule having substantial intrinsic radial expansion unwinding force, comprising, in combination,

storing the coil of steel rule in a container having opposed sides of substantially square shape and a plurality of ends connected to the sides to provide a container interior depth only slightly greater than the width of the contained steel rule so as to restrain the steel rule coil in its coiled configuration, the container being constructed so as to resist the rule coil radial expansion unwinding force, wherein at least one side of the container is formed to define an opening on the side to permit a roller apparatus to selectively engage the steel rule within the container,

engaging the steel rule coil within the container by a roller apparatus through said container side opening, the roller apparatus including at least one roller being adapted to support the weight of the coil and at least another roller being adapted to inhibit radial expansion of the coil.

7. The combination of a container and a roller apparatus for unwinding a coil of steel rule, the rule having substantial intrinsic radial expansion unwinding force,

the container having opposed sides of substantially square shape and a plurality of ends connected to the sides to provide a container interior depth only slightly greater than the width of the contained steel rule so as to restrain the steel rule coil in its coiled configuration, the container being constructed so as to resist the rule coil radial expansion unwinding force, and

at least one side of the container being formed to so as to permit side material of a predefined shape and size to be removed so as to define an opening on the side to permit a roller apparatus to engage the rule coil,

the roller apparatus having at least a first roller in a first plane and at least a second roller in a second plane substantially perpendicular to said first plane, the rollers being arranged and adapted to engage the rule coil.

8. A container according to claim 7 wherein said container is formed of paperboard.

9. A container according to claim 7 wherein said container is formed of corrugated paper.
10. A container according to claim 7 wherein said roller apparatus comprises two rollers in the first plane and one roller in the second plane substantially perpendicular to said first plane.

11. A container according to claim 10 wherein the container comprises a plurality of openings radially located on said side.

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