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PROTECTIVE SLIDE FOR ROVING CANS

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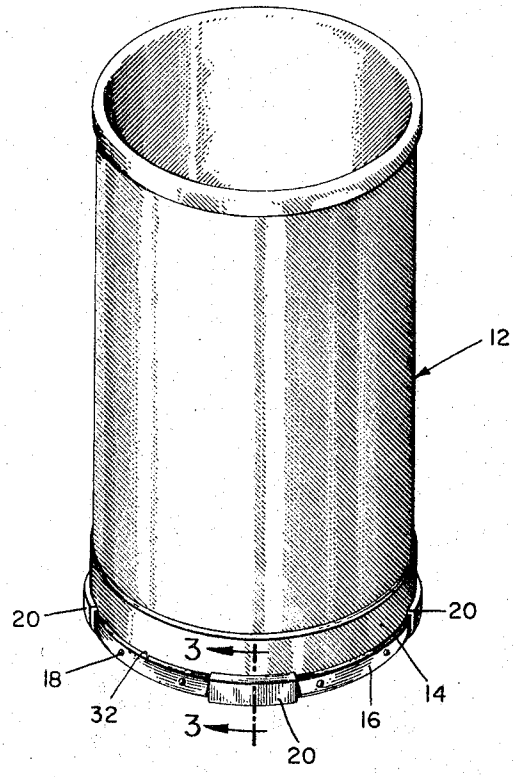


Fig. 1

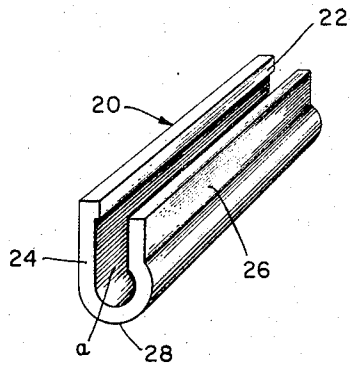


Fig. 2

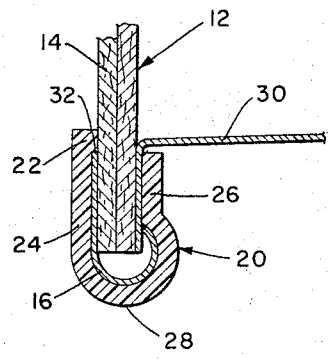


Fig. 3

INVENTOR.
WILLIAM L. GRAVES
BY Thomas L. Davenport
ATTORNEY

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PROTECTIVE SLIDE FOR ROVING CANS

William L. Graves, Newark, Del., assignor to The Budd Company, Philadelphia, Pa., a corporation of Pennsylvania

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This invention relates to an article for protecting wooden floors from damage caused by metallic rimmed receptacles. More particularly, it concerns plastic protective slides for metallic bottom rims of the cylindrical containers commonly called "roving cans."

Roving cans are used in textile mills to receive and hold the product of the carding machines. The majority of the roving cans used in textile mills are comprised of a vulcanized fiber shell, a metallic bottom and a metallic rim. The roving cans are slid across the floors of textile mills from the carding machines to the other processing equipment. It has been found that the metallic bottom rims of the roving cans scratch and dig into wooden floors. The floors of a textile mill must be maintained in a smooth, highly polished condition to prevent lint, dust and oil from collecting on the floors and contaminating the yarn being processed. Accordingly, a major maintenance cost in textile mills is keeping the floors in a satisfactory condition and repairing the damage caused by the metal rims of the roving cans.

It was proposed in the prior art to cover the metallic rims to protect the floors but the articles and methods provided were not satisfactory. The sheathing should be relatively inexpensive. It must be capable of being applied without having to remove the roving can from production for substantial amounts of time. Furthermore, the sheathing should be of such a construction as to be easily applied and removed by semi-skilled production personnel. The sheathing must be resistant to wear and deformation in use, and remain in a predetermined position about the rim of the can when the roving can is moved.

The most notable prior art article for protecting the rim was a full cap formed of a thermal plastic material The cap was supplied with an inside diameter slightly smaller than the outside diameter of the rim. This cap had to be heated in boiling water to expand the cap. The heated and expanded cap was forced over the rim of the can and the cap was permitted to cool and shrink fit onto the rim.

It can be seen from the above steps that the roving can had to be removed for a substantial amount of time from production and a considerable amount of man hours were required to install the cap. Furthermore, the caps were expensive and difficult to remove when worn out.

To lower the cost, attempts were made to use a plurality of fitted spaced slides about the rim. These prior art slides were not successful in that as the can was slid across the floor the slides tended to move and gather on one side tilting the can and concentrating the weight on the unprotected metal edge. This caused the metal edge to dig into the floors to an even greater degree than the completely unprotected rims. Attempts to glue or rivet such slides to the rim of the roving can were not commercially successful in that the slides were difficult to install and even more difficult to remove.

Accordingly, it is a general object of this invention to provide protective slides for metallic rims of roving cans that are easy to install and remove, will remain in a predetermined position about the rim during use, and are relatively inexpensive.

Other objects and advantages of this invention will become further apparent hereinafter and in the drawings in which:

FIG. 1 is a perspective view of a typical roving can with a plurality of protective slides positioned about the bottom rim.

FIG. 2 is a perspective view of a slide formed in accordance to the teachings of this invention.

FIG. 3 is a view in section taken as indicated by the line 3—3 which appears in FIG. 1.

Briefly, the objects of this invention are obtained by forming the slide in substantially linear configuration from a plastic material having a relatively high flexual modulus whereby when said slide is forced over the rim of the roving can and the slide is distorted, a rotational locking means is provided.

In describing the preferred embodiment of this invention illustrated in the drawings, specific terminology will be resorted to for the sake of clarity. However, it is not intended to be limited to the specific terms so selected, and it is to be understood that each specific term includes all technical equivalents which operate in a similar manner to accomplish a similar purpose.

FIG. 1 is an illustration of a typical roving can comprised of a vulcanized fiber shell **12**, a vulcanized fiber kick band **14**, a metallic bottom plate **30** which can be seen in FIG. 3 and a metallic rim **16**. The aforementioned parts of the roving can are held together by means of rivets **18** which extend through the rim **16**, kick band **14**, shell **12** and bottom plate **30**.

As illustrated in FIG. 1, there are a plurality of plastic slides **20** locked onto the rim **16** in predetermined substantially equidistant intervals about the rim.

In FIG. 2, details of the slide **20**, formed according to the teachings of this invention , are illustrated. The slide is comprised of a locking lip **22** which is horizontally oriented and adapted to fit over the external edge **32** of the roving can rim **16** preventing vertical movement of the slide **20**.

The upstanding external wall **24** and the upstanding internal wall **26** are spacially related and substantially parallel in one embodiment of this invention, and separated by a distance equivalent to the composite width of the shell **12**, kick band **14**, bottom plate **28**, and rim **16**.

Alternatively, the walls may converge toward each other away from the base to provide a spring locking action when the walls are separated by being forced over the rim. The walls **24** and **26** are integrally attached to the arcuate base **28**.

Locking lip **22**, external wall **24**, internal wall **26** and the arcuate base **28** define an internal slit *a* having a substantially mating cross-sectional configuration with respect to the cross-section of the bottom rim of the roving can.

The slide is formed in a substantially rectilinear configuration. Rims of roving cans are circular. Therefore, when the slides are forced over the rims they are distorted from a substantially linear configuration to a curved configuration. With the slide formed of a plastic material having a relatively high flexual modulus, the slide will be stressed when so distorted and internal restoring forces will urge its return to the "at rest" straight configuration. This spring biasing toward the straight configuration provides the advantageous rotational locking means.

The further cooperative locking relationship of the lip **22** and the upper edge **32** of the rim **16** is shown in FIG. 3. Lip **22** extends over the upper edge **32** of the rim **16** and prevents downward vertical movement of the slide. The arcuate base **28** prevents upward vertical movement and cushions against vertical shocks. Internal wall **26**, in combination with the internal portion of the arcuate base **28** restricts the slide from rotating about the rim.

According to this invention, slides are formed of specific materials having defined characteristics. The slide

material must not be harder than the floors on which the can is to be used to avoid floor damage, and must be sufficiently hard to maintain structural integrity under the weight of a fully loaded can and not wear excessively when in sliding contact with the floors. It has been found that a material having a hardness of greater than D–50 (Shore) (ASTEM–D785) resists both wear and deformation, the upper limit of hardness being determined by the hardness of the floor on which the can will be used. The plastic hardness should be slightly lower than the hardness of the floor.

The above-mentioned rotational locking means is a result of resistance to deformation and elasticity of the slide which provides unique biasing action toward the "at rest" substantially rectilinear configuration.

It has been found that a material having a flexural modulus (ASTM D–790) in excess of 60,000 p.s.i. will impart a sufficient rotational locking function to the slide. The flexual modulus may be higher but it must be within the range where the slides can be relatively easily deformed over the rim, this value being dependent on the relative thickness of the slide. In any event the flexual modulus should be at least in excess of the aforementioned 60,000 p.s.i.

The specific plastic materials employed according to this invention include nylon, polyethylene and polypropylene. However, unique advantages are obtained using high density polyethylene. It has a hardness in excess of D–50 (Shore) and flexual modulus in excess of 60,000 p.s.i., is relatively inexpensive and easily formed into slides of a configuration according to the teachings of this invention.

Slides can be formed by injection molding, machining from a blank, or by extrusion. Unique advantages, however, flow from extrusion in that the stresses of the extruded part are oriented along the long axis of the part and contribute to the rotational locking of the slide.

The preferred method for use of the slides of this invention contemplates the installation of a plurality of slides about the rim of the container at substantially equidistant intervals. Three or more slides must be installed per can in order to achieve balanced loading. It was found necessary for the individual slides to have a length equal to at least one-tenth the radius of the container to achieve sufficient rotational locking. If the slides are shorter, the rotational locking action achieved by the high flexural modulus plastic is ineffective due to the short length over which it is exerted.

Slides, according to the teachings of this invention, may be installed as follows. A corner of the slide is set over the rim and the slide is struck with a hammer forcing it to spread and advance over the rim, snap around the arcuate base with the locking lip **22** and over the upper lip **32** of the rim **16**.

It is to be understood that the form of the invention herewithin shown and described is to be taken as the preferred embodiment. Various changes may be made in the size and shape of the article without departing from the scope of this invention. For example, an indentation may be made in the slit side of the slide walls to provide a further locking means cooperating with the rivets of the can and adding additional rotational locking action about the rim.

Having thus described my invention, I claim:

An extrusion molded protective slide for a given cylindrical container, of the type having a metallic bottom rim, said slide being integrally formed of a high density polyethylene plastic material and comprising a horizontally oriented locking lip portion; a vertical external wall portion; a vertical internal wall portion parallel with said vertical extrusion wall portion; and an arcuate base portion, said lip portion being integrally attached to an upper edge of said external wall portion, said external and internal wall portions being spacially related and having their respective lower edges integrally attached to said base said external and internal walls converging toward each and away from said base to provide a spring locking action, said external and internal walls, lip and base defining a slit having a cross sectional configuration approximating a cross section of said rim, said slide being formed in an elongated substantially rectilinear configuration and having a length greater than $\frac{1}{10}$ and less than $\frac{1}{3}$ of the radius of the given cylindrical container, said plastic slide exhibiting a hardness less than that which hardwood floors will mark but greater than D–50 (Shore), said slide having a flexual modulus in excess of 60,000 p.s.i providing a spring locking action whereby when said slide is forced over said rim of said container, the slide is urged to return to its substantially rectilinear configuration providing rotational locking and, with said locking lip extending over an upper edge of said rim, providing vertical locking to hold said slide in a predetermined position on said rim.

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JOSEPH R. LECLAIR, *Primary Examiner.*

FRANKLIN T. GARRETT, *Examiner.*

D. T. MOORHEAD, *Assistant Examiner.*