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STRAND OR YARN GUIDE

Filed July 11, 1960

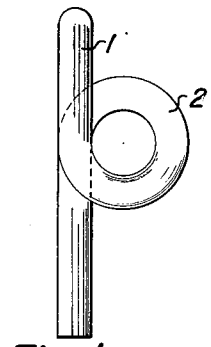


Fig. 1

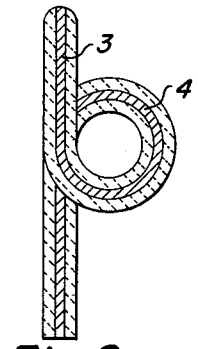


Fig. 2

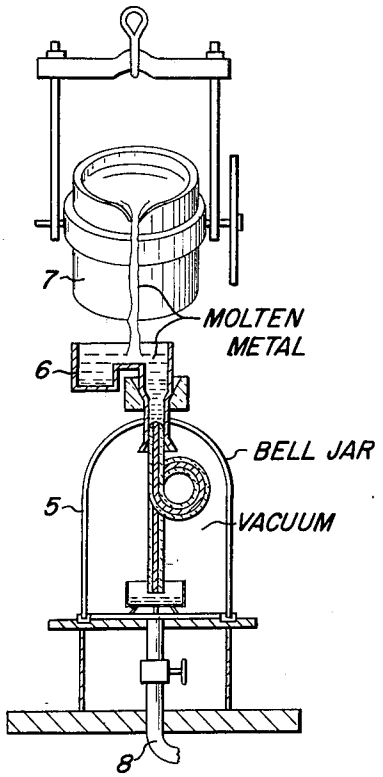


Fig. 3

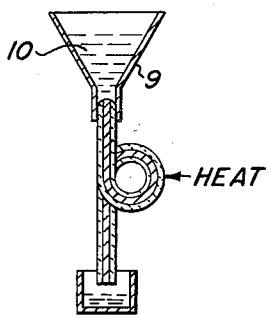


Fig. 4

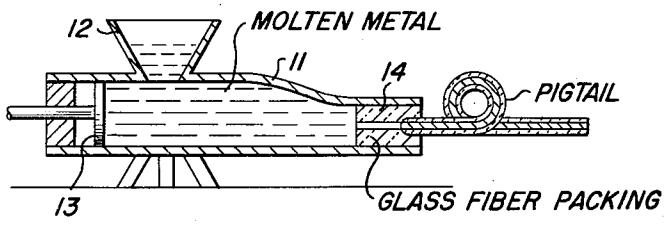


Fig. 5

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3,032,294

# STRAND OR YARN GUIDE

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This invention relates to certain improvements in a strand or yarn guide such as employed in yarn and strand handling machinery, with particular reference to the type of guide known commercially as a pigtail, and has for its purpose to afford a practical and low cost construction which shall be more durable and less subject to breakage than the guides now in use.

Strand guides of the pigtail type have generally been made of metal, and to overcome the objection of wear to a metal guide, it has been proposed to construct such guides of ceramic material, but these are subject to breakage when hit, and the present invention is designed to overcome this tendency to breakage.

With this objective in view, the invention consists in providing a pigtail guide of ceramic material with a reinforce or strengthening element extending endwise through the center of the guide. The pigtail includes a coiled portion and an opening extending centrally throughout the guide which is extruded to form the opening extending longitudinally of the ceramic body while in a plastic state.

After the usual heat treatment for hardening the refractory material of which the guide is formed, the reinforce or strengthening element is arranged within the opening of the guide and extending longitudinally throughout the refractory body in intimate contact with the wall surrounding or defining the opening, thereby constituting means effective to prevent fracture of the ceramic body if the same is accidentally struck at any time and affording substantially the same resistance to breakage or fracture that characterizes the body of a conventional metal guide.

This may be accomplished in various ways as by injecting a suitable metal in a molten state into the interior of the ceramic body after the latter is hardened, or by injecting metal or other material in powdered form into the interior of the ceramic body and subsequently heating the same to melt the powdered material and convert it into a hard reinforcing mass.

To these and other ends, the invention consists in the construction and procedure that will appear clearly from the following description, when read in conjunction with the accompanying drawings, the novel features being pointed out in the claims following the specification.

In the drawings:

FIG. 1 is a plan view of a pigtail type of strand or yard guide constructed in accordance with one embodiment of the invention;

FIG. 2 is a longitudinal sectional view of the same taken centrally;

FIG. 3 is a diagrammatic view illustrative of one method of providing a metal reinforce within the ceramic body of the guide, consisting in placing the latter in a bell-jar and employing a vacuum to draw molten metal into the interior of the pigtail;

FIG. 4 is a diagrammatic view illustrative of another possible procedure in which molten metal is fed by gravity to the interior of the ceramic body and heat applied thereto as the metal travels around the coiled portion of the guide, and

FIG. 5 is a diagrammatic view illustrative of another procedure in which the hollow ceramic body is connected to a chamber containing molten metal which is then forced under pressure into the ceramic body.

Referring more particularly to the drawings in which



like reference numerals refer to the same parts throughout the several views, 1 designates a pigtail type of strand or yarn guide of ceramic material including a coiled portion 2, while 3 is an opening extending longitudinally and centrally of the ceramic body and filled with an insert 4 of metal or other suitable reinforcing or strengthening material which lends resistance to the ceramic body and protects the same against fracture or breakage. The guide maintains a surface that contacts the strand or yarn as it is fed through the guide and is resistant to wear, such that a pigtail guide made in this fashion has an indefinite life and will function many times longer than a metal guide or than a ceramic guide having no reinforce.

The opening 4 in the guide is formed in the ceramic body while in a plastic state by an extrusion process, and after thus drawing the ceramic material with the central opening extending therethrough, it is bent into the required shape, to form the coiled portion 2, and after the usual heat treatment for baking, the metal reinforce is inserted within the ceramic body in any suitable or convenient fashion.

This can be accomplished in various ways, several of which are illustrated in the drawings. In FIG. 3 for instance, the ceramic guide with the central longitudinal opening formed therein is placed in a bell-jar 5 and one end connected to a conductor or container 6 for molten metal which is fed to the container from a suitable receptacle 7, and the bell-jar is connected by conductor 8 with a suitable source of vacuum which draws the molten metal into and through the ceramic guide until the interior of the latter is filled, and the metal within the guide is then permitted to harden.

FIG. 4 shows another possible method for introducing metal into the interior of the guide, and consisting of a hopper 9 which contains molten metal 10 that feeds by gravity into the ceramic guide while heat is applied to the guide and to the coiled portion thereof to retain the molten metal in a sufficiently molten state until the interior of the guide is entirely filled.

Another way in which to introduce molten metal into the ceramic guide consists of a cylinder 11, see FIG. 5, provided with a filling hopper 12 to receive the molten metal which fills the interior of the cylinder while a piston 13 is forced under pressure to eject the molten metal through an opening in a suitable glass fiber packing 14 into the interior of the ceramic guide.

Various metal alloys may be employed for the purpose, and materials other than metal may be used to fill the interior of the ceramic guide, and it is also possible to employ metal in powdered form that is forced under pressure into the interior opening of the ceramic guide and thereafter heated for melting, and while the invention has been described with relation to certain procedures for inserting a metal or other reinforcing body, these are not essential to the invention and other procedures may be adopted that will suffice to introduce a reinforcing element into a central longitudinally arranged opening in the ceramic guide.

While the invention has been described with reference to the particular structure shown, it is not confined to the details herein disclosed, and this appliaction is intended to cover such modifications or other adaptations of the invention as may come within the purposes of the improvement and the scope of the following claims.

I claim:

1. A pigtail strand guide consisting of a hardened tubular ceramic body including a coiled guide portion terminating in straight end portions, and reinforcing means permanently and fixedly located within the interior of said tubular ceramic body, said reinforcing means extending throughout the length of the ceramic body and

adhering throughout to the surrounding surface of the ceramic body.

2. A pigtail strand guide consisting of a hardened tubular ceramic body including a coiled guide portion terminating in straight end portions, and metal reinforcing means permanently and fixedly located within the interior of said tubular ceramic body, said reinforcing means extending throughout the length of the ceramic body and adhering throughout to the surrounding surface of the ceramic body.

3. A pigtail strand guide consisting of a hardened tubular ceramic body including a coiled guide portion terminating in straight end portions, and metal reinforcing means extending throughout and entirely filling the interior of said ceramic body, said reinforcing means adhering fixedly and permanently throughout to the surrounding surface of the ceramic body.



4. A pigtail strand guide consisting of a hardened tubular ceramic body including a coiled guide portion terminating in straight end portions, and metal reinforcing means entirely filling the interior of said ceramic body, said reinforcing means extending throughout the length of the ceramic body and adhering throughout to the surrounding surface of the ceramic body.

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