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FLEXIBLE CONDUCTOR FOR PNEUMATICALLY PROPELLED YARN

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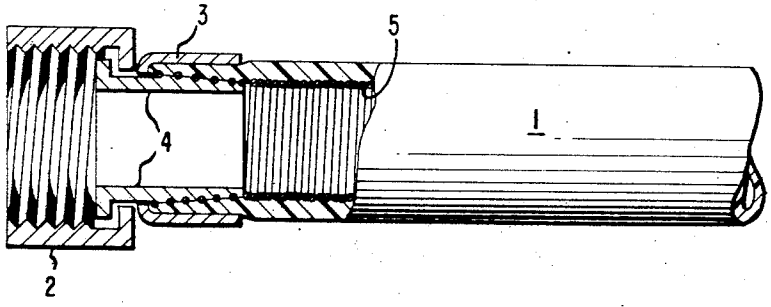

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FLEXIBLE CONDUCTOR FOR PNEUMATICALLY PROPELLED YARN

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ABSTRACT OF THE DISCLOSURE

A flexible conductor for pneumatically propelled yarn consisting of a hose, a closely-spaced spiral formed of smooth-surfaced, stainless-steel wire of 0.031 to 0.045-inch diameter lining the inside of the hose, and a hose-end coupling on each end comprising a nipple extending into the hose inside of the spiral to cover the wire end, a ferrule crimped about the outside of the hose to hold the nipple in place and a coupling member rotatably secured to the outer end of the nipple.

This invention concerns the handling of filamentary materials and, more specifically, flexible yarn conductors for pneumatically propelled filamentary yarn.

It is known in the art to employ a stream of gas to convey a continuously moving end of yarn, frequently serving the purpose of diverting it from its normal process path and into temporary storage. For convenience and portability, the gaseous stream containing the yarn is usually conducted through flexible tubing over at least a part of this path of travel. In this use, the tubular conductors usually develop on their interior surfaces an adherent layer of oils and other non-volatile constitutents of textile finishes which are generally applied as aqueous emulsions or oils to the yarn as produced. Such materials become tack as they dry out and serve to entrap filaments, leading to pluggage and the need for clean-out. It has also been found that finish ingredients are frequently capable of swelling the material of construction of the flexible conductor, also leading to a tacky surface, filament-entrapment and hose-pluggage.

This invention provides an improved flexible conductor for gas-propelled fibrous material. It further provides a lining for such flexible conductors which is unaffected by finish materials. Further advantages will be apparent as the description of invention proceeds.

The advantages of this invention are provided in a flexible hose lined with a closely-spaced spiral of non-corrodible wire having a diameter of 0.031 to 0.045 inch. It is important to the objects of this invention that the wire lining continue past the point where the coil meets the nipple of the hose-end coupling. By this means, filament snag-points are covered by the nipple.

Applicant's invention is more particularly defined as a flexible conductor for pneumatically propelled yarn consisting of a hose, a closely-spaced spiral formed of smooth-surfaced, stainless-steel wire of 0.031 to 0.045-inch diameter lining the inside of the hose, and a hose-end coupling on each end comprising a nipple extending into the hose inside of the spiral to cover the wire end, a ferrule crimped about the outside of the hose to hold the nipple in place and a coupling member rotatably secured to the outer end of the nipple.

The drawing shows a sectional view taken along the longitudinal axis of a portion of the hose.

In the single figure, which represents a preferred embodiment of this invention, hose **1** is a standard commercially available flexible conductor such as an acceptable

quality garden hose. Coupling **2** comprises an internally threaded, thin-walled cylinder rotatable with respect to crimped ferrule **3** and nipple **4**. Wire spring **5**, inserted throughout the length of hose **1** extends into the space between hose **1** and nipple **4**. Procedure for assembly of this device is as follows:

(1) Cut hose of a suitable type to the desired length.

(2) Select a steel rod of slightly greater length than that of the hose and of a diameter approximately ¼ inch less than the internal hose diameter and saw a diametrical slot in one end to a depth of about ¼ inch. Mount the rod in a pipe-threading machine leaving the slotted end free. Select a wire of a suitable type and having a diameter within the range of 0.031–0.045 inch; hook the free wire-end in the slot and wind the wire on the rod in a known manner, avoiding open spaces and being careful not to create yarn snag points on the wire by scratching it during winding. When the wire has been wound to the full length of the rod, hook the end of the wire in the pipe threading machine chuck and cut off the excess.

(3) Carefully insert the rod with the wire wound thereon into the hose. Unwind the spring by reversing the pipe threader until the spring snugly fits inside the hose. Remove the hose with the contained spring from the rod.

(4) Place a coupling ferrule over one end of the hose. Withdraw about ½ inch of the spring from this end; cut off and discard about one-half this length. Insert the coupling nipple in the exposed section of spring and force the nipple and spring assembly into the end of the hose. Crimp the ferrule in place by known means.

(5) Repeat operation 4 on the other end of the hose.

Substantial improvements in process continuity due to reduced down time for maintenance have been demonstrated with the device of this invention. The wire-lined hose fabricated as described herein is remarkably efficient in transportation of fibrous material without pluggage over a very long period of time. It has been found that use of wire having a diameter less than about 0.031 inch results in substantially more frequent pluggage, possibly due to the existence of "pinch points" for the yarn between adjacent convolutions of the wire. Such problems are not of substantial concern above the minimum diameter of 0.031 inch, and no further improvement is found in going beyond about 0.041 inch wire diameter. Further increases in diameter beyond 0.045 inch are undesirable. A wire diameter of about 0.041 inch provides an optimum balance between performance and hose weight.

Any smooth-surfaced wire which is non-corrodible in the intended application is suitable as the hose liner of this invention. Based on easy availability in a range of sizes and finishes, a stainless-steel, selected to have the desired chemical and abrasion resistance, is preferred.

It will be obvious to one skilled in the art that variations may be made beyond the scope of the specific disclosures without departing from the spirit and scope of this invention which, therefore, is limited only as set forth in the following claim.

I claim:

1. A flexible conductor for pneumatically propelled yarn consisting of a hose, a closely-spaced spiral formed of smooth-surfaced, stainless-steel wire of 0.031 to 0.045-inch diameter lining the inside of the hose, and a hose-end coupling on each end comprising a nipple extending into the hose inside of the spiral to cover the wire end, a ferrule crimped about the outside of the hose to hold the nipple in place and a coupling member rotatably secured to the outer end of the nipple, the outside of said nipple converging inwardly to provide a tapered nipple

having a thin leading edge, the portion of the wire spiral located between said tapered nipple and the hose being opened to provide substantial open spaces between the wires to allow the hose to be held in forceful contact with said tapered nipple by the crimped ferrule and to sandwich the opened wire spirals between the nipple and the hose.

References Cited

UNITED STATES PATENTS

2,025,427 12/1935 Weatherhead ----- 285—256 X

FOREIGN PATENTS

170,066	1/1952	Austria.
702,913	2/1941	Germany.
471,616	9/1937	Great Britain.
550,153	12/1942	Great Britain.

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