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FINISHING TREATMENT FOR ASBESTOS IRONER ROLL COVERS

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Fig. 1

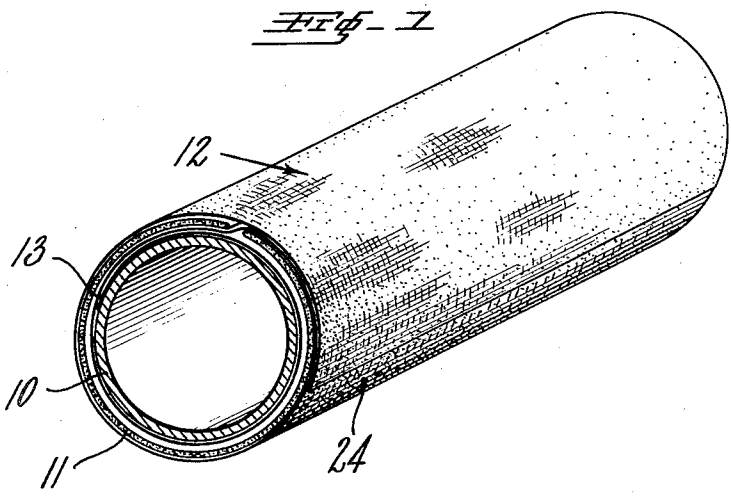
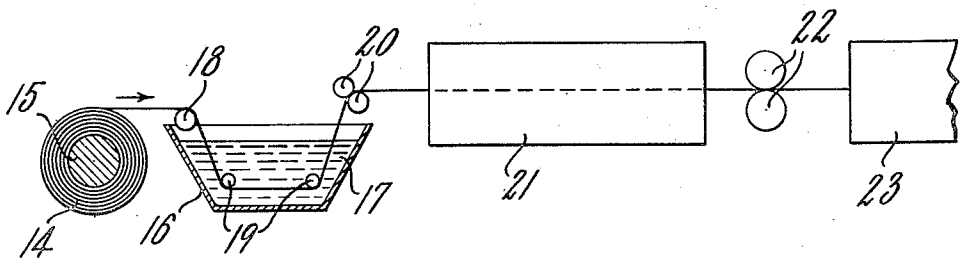


Fig. 2



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FINISHING TREATMENT FOR ASBESTOS IRONER ROLL COVERS

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1 Claim. (Cl. 117—126)

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This invention relates to a finishing treatment for woven asbestos fabric to condition the fabric for use to cover the rolls of flatwork ironers in commercial laundries, and to the method of treating such fabric.

Commercial laundries for flatwork employ what are called "flatwork ironers," consisting of four or more power-driven metal rolls each having associated therewith a curved steam-heated chest. These rolls are nearly a foot in diameter and nine or ten feet long. They are covered with padding to provide a yielding ironing surface, and over such padding is wound a fabric cover which engages the articles being ironed as they pass between the ironer roll and the concave surface of the heated chest. Since the roll cover comes in direct contact with the goods being ironed, it leaves the impression of its weave on the ironed goods. Therefore the weave of the fabric and finishing treatment for the fabric should both contribute to the smoothness of the outer surface of the ironer roll.

For many years the roll padding and the woven cover for the padding were made of cotton, but since these flatwork ironers are operated at a temperature from about 300° F. to 325° F., the cotton covers char quickly, and as a result these covers last only about a week or ten days of commercial use. To overcome this difficulty it has been proposed heretofore to employ woven asbestos covers in place of such cotton covers, but asbestos yarn is low in tensile strength and has a rough surface and produces a rough low-strength fabric.

Therefore in order to impart to such asbestos cover a smooth surface and good wearing properties it is necessary to coat or impregnate the fabric with a resinous coating material that will remain in place on the fabric at the above mentioned temperature for a long time.

The present invention relates to a novel treatment for such asbestos fabric to condition it for use to cover the rolls of flatwork ironers, and to impart to such fabric a smooth outer surface and good wearing properties.

It has been proposed heretofore to treat the woven asbestos cover for ironer rolls with a thermosetting resin such as a heat-hardened phenolic resin, but such a resin is relatively brittle and tends to flake off from the fabric.

The requirements of the finishing treatment imparted to the asbestos fabric are exacting, in that such treatment should serve to lay or anchor the fibers of the asbestos yarns forming the fabric, and should impart a smooth outer surface to the fabric without closing the apertures

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of the weave, so that the fabric will remain porous. Furthermore such finishing treatment should render the surface of the fabric smooth and flexible but not tacky at the ironing temperature above mentioned, and the treating material should not flake off or migrate, but should remain upon the surface of the yarns or fabric throughout months of use.

A smooth durable surface can be imparted to the woven asbestos fabric by treating the fabric with a thermosetting resin, but the fabric when so treated does not have the desired tear resisting properties. In order to overcome this difficulty the present invention contemplates a woven asbestos fabric cover for ironer rolls which is impregnated with a substantial amount of thermosetting resin to impart to the fabric the desired smoothness of surface, and which fabric is also treated with a smaller quantity of thermoplastic resin to increase its tear resisting properties. The thermoplastic resin however tends to render the surface of the fabric tacky, and to overcome this difficulty the present invention further contemplates the application to such fabric a small amount of wax having a relatively high melting point.

A further feature of the present invention resides in the method of treating the asbestos cover fabric simultaneously with the different materials by passing it through a water bath containing a suitable thermosetting resin in solution, and also a suitable thermoplastic resin and wax in emulsion so that the desired amount of thermosetting resin, thermoplastic resin, and wax are applied to the asbestos fabric by a single passage of such fabric through a water bath containing these materials. As the fabric leaves this bath it preferably is passed through a tenter-drier. It is then calendered, and finally cured by passing it through a relatively hot oven. Before the asbestos fabric is subjected to the treatments just mentioned, it is preferably prepared for such treatments by washing it in water containing soap or a detergent to clean and soften the fabric. It is then tenter-dried and calendered before it is subjected to the resinous treatment above described.

By introducing both resins into the same bath the small amount of thermoplastic resin serves to modify the properties of the larger amount of thermosetting resin, so that these intermingled resins when applied by a liquid carrier to the woven asbestos fabric will greatly improve the wear-resistance and tear-resistance of the cover fabric at elevated temperatures. These expressions wear-resistance and tear-resistance

as here used include resistance to abrasion, heat deterioration, flexing, tension fatigue, tearing forces, and other injurious actions.

The asbestos fabric that is to be treated as herein contemplated preferably contains 80% to 85% asbestos, and 15% to 20% cotton to add strength to the asbestos yarn, and the fabric preferably has a twill weave to increase the smoothness of its surface. Such a fabric that is well adapted for this treatment is disclosed and claimed in the Foster Patent No. 2,180,515.

The asbestos fabric in accordance with the present invention, is preferably so treated that it will contain about 10% to 40% of the weight of the untreated fabric of a thermosetting resin such as a melamine-formaldehyde, and about 1% to 5% of a thermoplastic resin such as acrylic resin, and several per cent of a high melting point wax such as paraffin, so that the treated fabric after it has been tenter-dried, calendered and cured will have a smooth durable surface and sufficient toughness and tear resistance to render months of active service in a commercial flatwork ironer.

The above and other features of the present invention will be further understood from the following description when read in connection with the accompanying drawing, wherein:

Fig. 1 is a sectional perspective view of an ironer roll covered with asbestos fabric that has been treated in accordance with the present invention; and

Fig. 2 is a schematic side elevation of apparatus which may be employed to subject a sheet of woven asbestos fabric to the finishing treatment contemplated by the present invention.

In the drawing, 10 designates a metal ironer roll of usual construction and having short bearing shafts, not shown, projecting from its opposite ends to rotatably support and turn the roll 10 throughout the ironing operation. About the metal roll 10 is wound a layer of padding 11, which may be wound once around the roll as shown in the drawing to provide a single layer of padding, or twice around such roll to provide two layers of such padding, as desired. Over the padding 11 is provided the woven asbestos cover 12 which extends around the drum between one and two complete turns.

Various means may be employed to secure the padding 11 and cover fabric 12 to the metal roll 10. This is accomplished in the construction shown in the drawing by adhesively securing the inner end of the fabric 12 directly to the surface of the roll 10 as indicated by 13, where this fabric is shown as contacting the surface of the roll for an angle of approximately 45°. It then passes outwardly between the slightly spaced edges of the padding 11 and is wound over the padding for more than one complete turn as shown. The outer end of this fabric 12 is free so that it can slip upon the underlying winding as it stretches and the padding 11 packs down. The direction in which the roll 10 is turned is such as to draw the padding and cover tightly about the roll.

The construction so far described by reference numerals is well known and has been in use for years. The cover fabric 12 herein disclosed is a woven asbestos fabric. That is, both the warp and weft yarns are formed primarily of asbestos fibers. Such yarns however contain about 20% cotton fibers to impart increased strength to the asbestos yarns, and both the warp and weft yarns are preferably plied yarns, each being formed of two single yarns plied or twisted together. The weave used in uniting the warp and weft yarns is preferably the broken twill, above mentioned, as this produces a smoother surface than the ordinary square weave.

Since asbestos yarns are of low strength and have a rough outer surface they produce a relatively rough low-strength fabric that does not make a good cover for ironer rolls unless it is treated with some type of plastic material that will strengthen the fabric and impart to the same a smooth outer surface, and since these ironer rolls are operated day in and day out at a temperature of from about 300° F. to 325° F. the resin used should not be adversely affected by its continuous exposure to this high temperature.

Having in mind the foregoing we have found that a very satisfactory finishing treatment for asbestos ironer roll covers is the following, in which the cover fabric 12 is treated with a thermosetting resin to give it the desired smooth ironing surface, and is treated with a thermoplastic resin to increase the tear resisting properties of the fabric, and is also treated with a wax to render the treated fabric non-tacky. In accordance with the present invention all three of these treating materials are preferably applied to the fabric 12 at the same time, but before the fabric is so treated it is preferably washed with any suitable soap or detergent that will clean and soften the fabric. Following such washing operation the fabric is preferably tenter-dried and then calendered, whereupon it is ready for the finishing treatment contemplated by the present invention.

Such finishing treatment can conveniently be carried out on conventional textile apparatus. One form of suitable apparatus is shown in Fig. 2, wherein the woven asbestos fabric which has been washed and calendered as above described is wound into a supply roll 14 upon a beam 15. The fabric supported by the beam 15 is rotatably mounted adjacent a treating tank 16. This tank contains a treating bath 17 which is made up of water, a thermosetting resin and suitable polymerization catalyst therefor in solution, and a thermoplastic resin and high melting wax both in emulsion. In the apparatus shown the arrangement is such that as the woven asbestos fabric is pulled forward from the let-off roll 14 it passes over a free running roller 18 and then downwardly into the bath 17 where it passes under the spaced free running rollers 19. It then passes upwardly between the squeeze rollers 20 which serve to remove the excess liquid that drops back into the tank 16. The wet fabric then passes through the tenter-drier casing 21, and upon leaving this casing in a substantially dry and laterally stretched condition, it passes between the calender rolls 22. It then passes through a curing chamber 23 where the thermosetting resin becomes cured in the presence of the catalyst.

The thermosetting resin within the bath 17 may be melamine-formaldehyde, urea-formaldehyde, a polyester resin, an alkyd resin, or styrene-maleic anhydride copolymer resin, the first of these being preferred. The thermoplastic resin may be an acrylic resin such as polymethyl methacrylate, or Kandar (isobutylene-acrylonitrile copolymer). It could also be polystyrene and polyvinyl butyral. The wax used serves to reduce the tackiness of the thermoplastic resin and may be a high melting natural or synthetic wax such as carnauba wax or paraffin.

The finishing treatment of the present invention is completed when the fabric 12 leaves the chamber 23 and the fabric so treated will be much stiffer than the untreated fabric upon the beam 15. The fabric will also be somewhat thinner and more compact with smooth outer surfaces. The resinous treatment of the present invention does not fill up the interstices of the fabric, and this is desirable, since better ironing results are secured if the covering fabric is pervious to steam and moisture. The resin deposited on the fabric 12 in accordance with the present invention is indicated in Fig. 1 by the stippling 24.

An examination of the treated fabric 12 under a magnifying glass shows that the single yarns, that are twisted together to form the plied warp and weft yarns, are coated to a large degree, and that these single yarns forming the ply are bonded together at spaced intervals along the ply. As a result these coated yarns will absorb water to a much less degree than would the same yarns in the untreated condition, and the resinous jacket thus formed upon the yarns strengthens and protects the yarns and imparts a smooth surface to the woven fabric, to thereby provide an asbestos ironer roll cover that is capable of giving good service for weeks of commercial use.

In order that the nature of the treating bath 17 used may be further understood the following table is given:

Table

	Percent
1. Melamine-formaldehyde resin (80% solution)	37.50
2. Acid acceptor [1] (urea)	15.00
3. Acidic catalyst (diammonium hydrogen phosphate)	1.13
4. Acrylic resin (emulsion polymerized methyl methacrylate 25% total solids)	4.00
5. High-melting wax (33⅓% emulsion)	7.50
6. Water	34.87
Total	100.00

[1] The purpose of the so-called "acid acceptor" is to lessen the deteriorating action of the acidic catalyst on the cotton fibers in the asbestos fabric.

The temperature of the bath 17 is variable within a wide range, but preferably about 70°–90° F. The fabric after impregnation with the solution 17 is squeezed by the rolls 20 so that it retains not more than about 100% solution pick-up. Therefore the percentages given in the table are based upon the weight of the fabric as it leaves the roll 14.

Asbestos ironer roll covers finished in accordance with the present invention are now being used commercially on flatwork ironers and are giving good service.

Having thus described our invention, what we claim and desire to protect by Letters Patent is:

A heat resistant porous fabric cover for ironer rolls, comprising a closely woven fabric formed of asbestos warp and weft yarns and the fabric being impregnated with an intermixture of between 10 and 40% of the weight of the untreated fabric of a melamine-formaldehyde thermosetting resin and between 1 and 5% of the weight of said untreated fabric of a polymerized methyl methacrylate thermoplastic resin, so that these intermingled resins give the fabric a smooth porous surface and good wear-resisting properties and also good tear-resisting properties.

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The following references are of record in the file of this patent:

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