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FRICTION LINING AND PROCESS OF MAKING THE SAME

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Fig. 1.

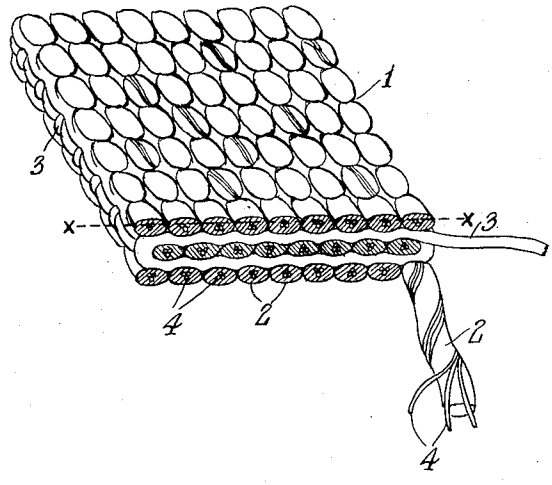
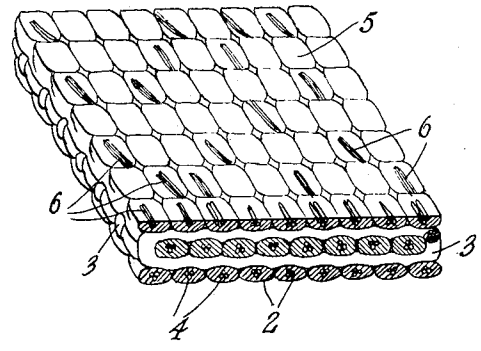


Fig. 2.



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FRICTION LINING AND PROCESS OF MAKING THE SAME.

Application filed December 2, 1926. Serial No. 152,132.

My invention consists in the novel features hereinafter described, reference being had to the accompanying drawing, which illustrates one embodiment of the same, selected by me for purposes of illustration, and the said invention is fully disclosed in the following description and claims.

Friction linings for brakes as now manufactured are usually produced by weaving, as a woven fabric, suitable material as asbestos, cotton, linen, jute, etc., or combinations thereof, with or without reinforcing metal wires interwoven in the fabric, in any usual manner, the fabric being a single ply fabric of desired thickness, or more usually a multi-ply fabric, or a plurality of layers of fabric suitably united. In any case the linings are usually treated with certain materials to render them waterproof and add to their durability, which treatment is usually the last step in the production of the lining. It is difficult, if not impossible, to produce these linings by processes now generally used of an exact thickness. The fabric tends to act somewhat like a filter with respect to the treating materials and a larger portion of the solid constituents thereof are deposited on the surface, then is carried into the interior, and the surface portions of the lining usually present a somewhat uneven surface, having high spots and hollows, so that the surface portions have a different coefficient of friction than the main body of the fabric. When the linings are applied and the brake is adjusted to operate properly with the new lining, the operations of the brake will for some time be more or less erratic and variable, until the surface impregnating material and un-uniform surface portions of the fabric lining are worn away and down to the proper plane and a wearing fit between it and the opposed metal surface is obtained. It frequently takes a considerable time to "wear in" the surface of a new lining, during which the high spots do most of the braking, and the hollows tend to fill up and frequently produce other high spots, so that only a fractional portion of the surface is brought into actual frictional contact with the drum reducing the efficiency of the brake, and frequently producing noise or "chattering". This initial "wearing in" of the lining also necessarily reduces its thickness of the lining, and readjustments of the brake must be made. The portion of the fabric so worn away does not add appreciably to the life of the lining, but its presence in the marketed fabric results in reduced efficiency and variations in the coefficient of friction and a general failure of the lining to perform its full and proper function in connection with the particular brake mechanism with which it is designed to be used, until it has been subjected to sufficient wear to remove the surface inequalities and excess of treating materials deposited on its surface and the coefficient of friction of its surface is brought to substantially that of the body of the fabric, after which it will wear substantially evenly and maintain a substantial uniformity of friction coefficient.

In carrying out my invention I take the friction lining and subject it on the wear side, and preferably on both sides, to an abrading or grinding action, for example, by the use of sand paper, emery paper, or grinding rolls, or surfaces covered therewith, or composed of abrasive material, so as to remove from the surface of the lining, the surface portions of the impregnating material, the protruding portions of the yarns, and all other projecting or protruding surfaces, and by abrasion bring the friction surface of the lining to a substantially uniform plane or surface having substantially the same coefficient of friction as the main body of the lining. In other words, I remove, by abrasion, the portion of the friction surface of the fabric which would be removed in "wearing in", and expose a surface for braking operations which will have substantially the coefficient of friction for which the body of the fabric was designed, and which will remain substantially constant throughout the remaining use of the fabric. I may treat one or both faces of the fabric in this manner, but it is ordinarily not necessary to so treat more than the one surface which is to frictionally engage the brake drum or other friction surface. The abrading or grinding of one surface of the lining will have the effect of bringing the fabric of the lining to a substantially uniform thickness within a tolerance of a few thousandths of an inch, but in some instances in which a lining is required to have a uniform thickness of greater accuracy, both surfaces may be

treated by the abrading or grinding action described. It follows necessarily that when my improved lining is applied to a brake, it is already in the "worn in" condition, no "wearing in" process results in use, and therefore, when the brake is adjusted, it will immediately give the coefficient of friction for which the body of the lining is designed, and its coefficient of friction will not materially vary at any time thereafter during the continued use of the material. The lining will, therefore, immediately operate with its maximum efficiency, and will continue to so operate during the life of the lining.

In the drawing, in which I have endeavored to illustrate my invention,

Fig. 1 represents a perspective view, partly in section, of a typical piece of brake lining before the abrasive surfacing thereof, the extent of the surface portions abrasively removed being indicated by dotted lines.

Fig. 2 represents a perspective view of the finished product made in accordance with my invention.

In Fig. 1, 1 represents a piece of belt lining composed of threads or yarns of asbestos, cotton, linen, or other suitable material, or combinations of these or other materials, the warps being indicated at 2, and the wefts or filling threads being indicated at 3. Either the warps or fillers, or both, may be combined with reinforcing metal wires. In the present instance I have shown the warp threads provided with cores of metal wire, as indicated at 4, but my invention is not limited to the particular material, or materials or the manner of weaving. The fabric is preferably subjected to pressure by rolling or otherwise, to bring it to an approximately uniform thickness, and compact it, and it is also preferably treated with suitable materials, to add to its density, increase its efficiency, render it unaffected by moisture, etc.

I then subject the face of the fabric subjected to wear, to an abrasive action, in the manner previously described, and abrade off the high points or projecting portions of the surface formed, for example, by the portions of the wefts, or fillers, or both, which form the highest points of the surface, and the surface deposit of the treating materials, and provide the fabric with a ground wearing surface which is substantially a uniform plane surface ready to give a coefficient of friction with the opposed metal surface which is uniform throughout substantially its entire extent, and which is substantially uniform with that of the body of the fabric, so that the coefficient of friction will continue to remain substantially constant throughout the life of the lining. As illustrated in the drawing, this removes the portions of the surface above the plane, indicated by the dotted line, x—x, in Fig. 1, and produces a uniform surface such as is indicated at 5, in Fig. 2. Where metal reinforcing wires are employed, the grinding, sanding or abrading of the surface may expose portions of the metal wires, as indicated at 6 in Fig. 2, but this is unimportant.

In the case of brake lining only one face of which is subjected to frictional contact, it is only necessary to abrade or grind the friction face of the material, although both may be abraded as described, to bring each into a single plane, where this is desirable.

It will be seen that by my invention I provide a new article, to wit, a friction brake lining having a ground or abraded friction surface or surfaces, having substantially the same coefficient of friction throughout, as the body of the fabric, and capable to give immediately the maximum braking efficiency, immediately upon its installation in the brake mechanism for which it is intended, and which will continue to give substantially the same efficiency during the life of the fabric.

What I claim and desire to secure by Letters Patent is:—

1. As a new article of manufacture, a friction lining comprising a woven fabric provided with an abraded friction face forming substantially a plane face, having a substantially uniform coefficient of friction throughout its entire extent, whereby said lining will give high and uniform braking efficiency immediately upon its installation.

2. As a new article of manufacture, a friction lining comprising a woven fabric provided with an abraded friction face forming substantially a plane face, having a coefficient of friction substantially uniform throughout its entire extent, and substantially uniform with that of the body of the fabric, whereby said lining will give immediately upon installation substantially the maximum braking efficiency, and will continue to give uniform braking efficiency during the life of the lining.

3. As a new article of manufacture, a friction lining having opposite abraded faces, substantially in parallel planes, at least one of said faces having a substantially uniform coefficient of friction throughout its extent, whereby a lining of accurate uniform thickness is provided which will give substantially its maximum efficiency immediately upon installation.

4. The herein described process of treating friction fabric lining, which consists in grinding or abrading the friction face thereof to remove inequalities and surface deposits, and bring all portions of said face substantially into a single plane, having a substantially uniform coefficient of friction throughout.

5. The herein described process of treating

friction fabric lining, which consists in grinding or abrading one face of the fabric after impregnation to provide a friction face in which all portions are in substantially the same plane, and having a coefficient of friction substantially uniform throughout, and then grinding or abrading the opposite face of said fabric to bring the fabric to an exact and uniform thickness.

6. As a new article of manufacture, a friction lining comprising an impregnated woven fabric provided with a friction face abraded to remove excess and surface portions of the impregnating material and portions of the surface threads of the fabric, and produce a substantially plane face having a substantially uniform coefficient of friction throughout.

7. The herein described process of treating impregnated friction woven fabric lining, which consists in abrading the friction face of said lining after impregnation to remove excess and surface impregnating material, and portions of the surface threads, and produce a surface having a uniform coefficient of friction, uniform with that of the body of the fabric.

In testimony whereof I affix my signature.

JOHN DONALD ROHRER.

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