Jan. 12, 1943. G. WALTERS 2,307,814

BRAKE LINING

Filed July 18, 1940

Fig. 1.

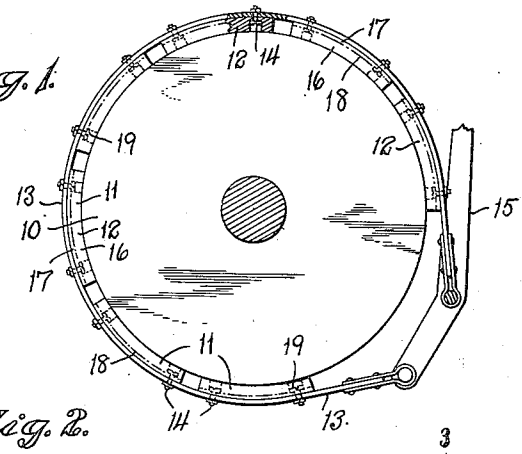


Fig. 2.

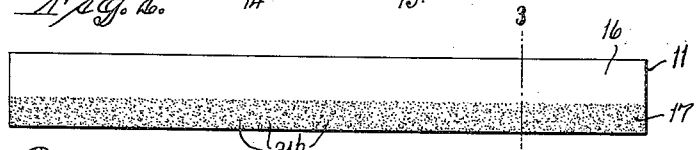
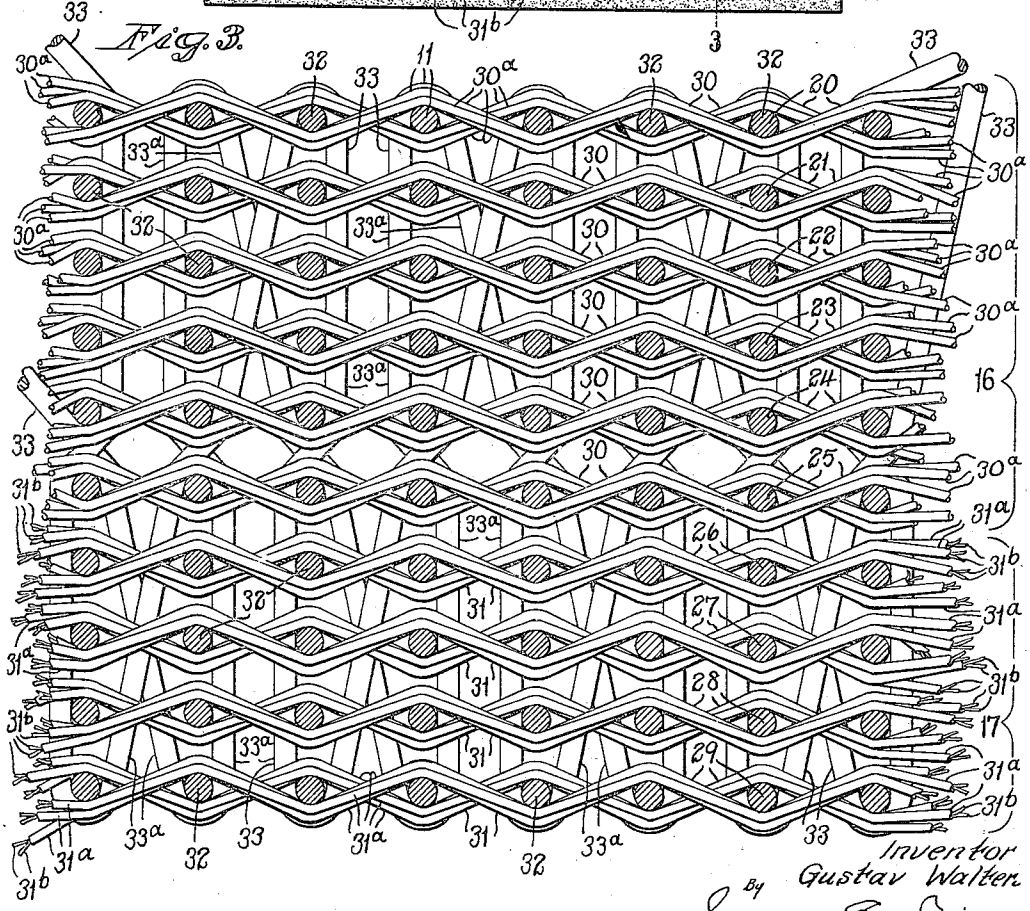


Fig. 3.



Inventor
Gustav Walters
By Seymour Earl & Michel
Attorneys

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BRAKE LINING

Gustav Walters, Middletown, Conn., assignor to The Russell Manufacturing Company, Middletown, Conn., a corporation of Connecticut

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3 Claims. (Cl. 139—409)

This invention relates to improvements in woven friction material, and more particularly to woven brake-lining.

One object of this invention is to provide improved woven brake-lining having its braking-surface portion substantially free of metal wire, and its backing-portion strengthened by weaving metal wire therein.

With the above and other objects in view, as will appear to those skilled in the art from the present disclosure, this invention includes all features in the said disclosure which are novel over the prior art.

In the accompanying drawing forming part of the present disclosure, in which one way of carrying out the invention is shown for illustrative purposes:

Fig. 1 is a broken side elevation of a brake employing brake-lining made in accordance with the present invention;

Fig. 2 is a diagrammatic end view of the brake-lining shown in Fig. 1; and

Fig. 3 is a diagrammatic sectional view on line 3—3 of Fig. 2, illustrating the weave construction of the brake-lining.

In the description and claims the various parts and steps are identified by specific names for convenience, but they are intended to be as generic in their application as the prior art will permit.

Referring to the drawing, the brake-drum 10 is engageable by the brake-lining 11 which, in the particular embodiment illustrated, consists of a plurality of separate brake-blocks 12. Each brake-block 12 is secured to the brake-band 13 by any suitable fastening means such as screws 14, the brake-band 13 being actuated to apply the brake in use by any suitable means such, for example, as the lever 15. Instead of having the brake-lining in separate pieces as brake-blocks, it may consist of one continuous piece, both of which modes of use are well known in the art.

The braking-surface or wearing-surface portion 16 of the brake-lining contains no metal wire, whereas the backing-portion 17 of the brake-lining contains metal wire in the form of reinforcing brass-wire strands which form the cores of the warp strands in the backing-portion 17. The broken line 18 (Fig. 1) indicates the line of division between the braking-surface portion 16 and the backing-portion 17. The heads 19 of the usual screws 14 or other fastening devices are anchored against the backing-portion 17 which contains the reinforcing brass wire.

By having the braking-surface portion 16 free of metal wire, the possibility of scoring the brake-drum or rim by metal wires is avoided, while at the same time, by having metal wires woven in the backing-portion 17, improved strength and rigidity is provided for mounting the brake-lining on the brake-band by the usual screws or rivets without the brake-lining working loose on the screws or rivets during the use of the brake.

The braking-surface portion 16 of the brake-lining preferably forms a major thickness of the brake-lining and the backing-portion 17 of the brake-lining forms a minor thickness of the brake-lining, in order that ample thickness of the braking-surface portion 16 may be available for wear without encountering the metal wires, or screws or the like which hold the brake-lining to the brake-band.

In the particular form of the invention illustrated in the drawing, the woven brake-lining consists of ten plies 20, 21, 22, 23, 24, 25, 26, 27, 28 and 29. The warp strands 30 of the six plies 20 to 25, inclusive, which form the braking-surface portion, are all alike. Each warp strand 30 is formed of three strands or ends 30*a* which contain no wire. The warp strands 31 of the four plies 26 to 29, inclusive, which form the backing-portion, are all alike. Each warp strand 31 is formed of three strands or ends 31*a*, each of which ends 31*a* contains a wire core formed of two brass wires 31*b*. In the particular construction shown each wire 31*b* is about .007 inch diameter, the ends of which wires are indicated in Fig. 2 by the stippling.

The weft or filling strands 32 are the same in all ten of the plies and without any wire therein. And the binder strands 33 are without any wire therein. The textile material used in all the warp, weft and binder strands preferably consists of about three-fourths asbestos and about one-fourth cotton.

The four plies 26 to 29, inclusive, which are the only ones having warp strands with wire cores, form the backing-portion 17 of the brake-lining while the six plies 20 to 25, inclusive, which are free of wire, form the braking-surface portion 16 of the brake-lining. It will thus be observed that the backing-portion of the brake-lining forms about 40% of the total thickness of the brake-lining. After the brake-lining is woven it is preferably impregnated with suitable friction material as is usual in the art.

Where such expressions as "majority plurality" and "minority plurality" are used in a claim, they respectively mean that of the total of more than four plies called for, a majority or more than half

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of the plies and consisting of a plurality of plies form one portion and a minority or less than half of the plies and consisting of a plurality of plies form another portion.

It will be noted by reference to the diagrammatic view shown in Fig. 3 that the weft strands of all ten plies are arranged in groups, the ten weft strands of each group being arranged in a single tier in vertically superposed relation in the plies, and each binder-strand portion 33*a* which extends entirely through the entire ten plies, has an approximate half-portion extending along one side of half of a group of superposed weft strands, then passes or crosses between the two most nearly central strands of such group of superposed weft strands, and then has another half-portion which extends along the other side of the remaining five strands of such superposed group of ten weft strands of the ten plies. This mode of passing or crossing the binder strands permits of producing a tighter, more compact weave construction.

The brake-lining shown and described is particularly useful in machinery for carrying out deep drilling in oil wells, but may be used as a friction material on brakes or clutches for any purpose for which it is suitable.

The invention may be carried out in other specific ways than those herein set forth without departing from the spirit and essential characteristics of the invention, and the present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, and all changes coming within the meaning and equivalency range of the appended claims are intended to be embraced therein.

I claim:

1. A woven brake-lining comprising: more than four plies each having interwoven warp and weft strands; the weft strands of the plies being arranged in successive groups, the weft strands of each said group being arranged in a single tier in superposed relation in the plies; and two sets of binder strands joining the plies together; one of said sets of binder strands extending around the opposite outer surfaces of the opposite outermost weft strands of each group of weft strands of alternate groups of weft strands, and the other of said sets of binder strands extending around the opposite outer surfaces of the opposite outermost weft strands of each group of weft strands of the intervening groups of weft strands; each of said sets of binder strands passing through each group of weft strands at a location which is a plurality of weft strands distant from the opposite outermost surfaces of the brake-lining.

2. A woven brake-lining comprising: more than four plies each having interwoven warp and weft strands; the weft strands of the plies being arranged in successive groups, the weft strands of each said group being arranged in a single tier in superposed relation in the plies; and two sets of binder strands extending transversely through the plies in a generally forward direction and joining the plies together; one of said sets of binder strands extending around the opposite outer surfaces of the opposite outermost weft strands of each group of weft strands of alternate groups of weft strands, and the other of said sets of binder strands extending around the opposite outer surfaces of the opposite outermost weft strands of each group of weft strands of the intervening groups of weft strands; each of said sets of binder strands passing in a rearward direction through alternate groups of weft strands and passing in a forward direction through the intervening groups of weft strands, each said passing being at a location which is a plurality of weft strands distant from the opposite outermost surfaces of the brake-lining.

3. A woven brake-lining comprising: more than four plies each having interwoven warp and weft strands; the weft strands of the plies being arranged in successive groups, the weft strands of each said group being arranged in a single tier in superposed relation in the plies; and two sets of binder strands extending transversely through the plies in a generally forward direction and joining the plies together; one of said sets of binder strands extending around the opposite outer surfaces of the opposite outermost weft strands of each group of weft strands of alternate groups of weft strands, and the other of said sets of binder strands extending around the opposite outer surfaces of the opposite outermost weft strands of each group of weft strands of the intervening groups of weft strands; each of said sets of binder strands passing in a rearward direction through alternate groups of weft strands and passing in a forward direction through the intervening groups of weft strands, each said passing being at a location which is a plurality of weft strands distant from the opposite outermost surfaces of the brake-lining, the passings of the two sets of binder strands through each group of weft strands being between the same two weft strands.

GUSTAV WALTERS.

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