UNITED STATES PATENT OFFICE.

SQUIRES RADCLIFFE, OF LITTLE FALLS, NEW JERSEY.

IMPROVEMENT IN NON-CONDUCTING FELT.

Specification forming part of Letters Patent No. **190,159**, dated May 1, 1877; application filed November 13, 1876.

To all whom it may concern:

Be it known that I, SQUIRES RADCLIFFE, of Little Falls, in the county of Passaic and State of New Jersey, have invented a certain Improvement in Non-Conducting Felt, of which the following is a specification:

The object of this invention is the production of a felt particularly adapted to be used as a non-conducting covering for steam-boilers, steam-pipes, and pipes for conveying superheated steam.

Said invention consists in a felt made of cows' hair, or equivalent material, and the fiber of *Typha latifolia*, or cat-tail flag, or equivalent material, but having a backing made entirely of hair, or its equivalent, or with a greater proportion of hair, or its equivalent, than that contained in the remaining portion of its thickness.

In making this non-conducting covering for steam-boilers, steam-pipes, &c., I thoroughly mix a quantity of the fiber from the heads (or "bobs," as they are sometimes called) of cat-tail flag with the requisite proportion of coarse hair, usually cows' hair, though similar hair from other cattle will answer the purpose. This may be very well done by putting them through a cotton-beater together.

The proportions which I prefer for the principal portion of the thickness of my felt, and for most of the uses for which my felt is designed, are from ten to twenty per cent. of hair to eighty or ninety per cent. of fiber of the cat-tail flag, though these proportions may be varied. For the backing a larger proportion of hair, say fifty per cent., may be used; or the backing may be made of hair alone.

The materials for both the principal portion of the thickness of the felt and the backing, having been thus thoroughly mixed, are then put through a regular bat-card, where they are formed into bats. The bat-card must be kept covered during the operation of forming the bat. This may be done by means of a tin jacket fitting over the workers and strippers. The bat which is designed to form the backing is then laid upon the bat designed to be exposed to heat, and which contains the greater proportion of the cat-tail flag, and both are steamed and felted together, so as to form a single felt.

The felt made and felted together as above described is then ready for use, and is particularly adapted and designed to be used as a non-conducting covering for steam-boilers, steam-pipes, and even pipes for conveying superheated steam, the fiber of cat-tail flag which it contains, and which predominates in that portion designed to be exposed to high heat, fitting it peculiarly for that purpose, and its cheapness reducing the cost of its use to a mere trifle.

If the entire thickness of the felt were made of the proportions of cat-tail flag and hair hereinbefore mentioned, for that portion directly exposed to the heat, it would be rather tender to handle, while on the other hand, if the entire thickness of the felt were made of the proportions necessary to give considerable strength, the amount of hair it would contain would cause it to be too much affected by the heat, and it is for those reasons that I propose to make one portion of its thickness with a greater proportion of hair than the other portion, or entirely of hair, as this invention allows that portion of the felt which is exposed to a high degree of heat to be made with the smallest proportion of hair which will hold it together, while the backing, which is made of a greater proportion of hair, or even hair alone, and which gives greater strength to the felt, is removed from the intense heat.

The very great non-conducting properties of the fiber of cat-tail flag, and its remarkable power to resist high degrees of heat, have long been recognized; but the great objection to its general employment for covering steam-boilers and steam-pipes has been owing to the great difficulty of placing and securing it in position, especially in its raw state, and has involved the necessity of expensive coverings to confine it to such surfaces.

My invention obviates these difficulties, and furnishes a felt which is loose or open on the side exposed to intense heat, and which is admirably adapted to these purposes, and at the same time furnishes it at a trifling cost, for though the fiber of cat-tail flag has no felting properties, a very small amount of

coarse hair is sufficient to bind together that portion which is to be exposed to high heat, while the backing made with a greater proportion of hair, or of hair alone, gives it the necessary strength, and the felt thus made is adapted to resist degrees of heat which would destroy ordinary felt.

In using the felt, of course that side of its thickness which contains the least proportion of hair should be placed next the heated surfaces, and this being done the backing will not be seriously affected by the limited amount of heat which may reach to the outer strata of the felt.

I claim as my invention—

The felt hereinbefore described, composed of the fiber of cat-tail flag and hair, and having a portion of its thickness made either of hair alone, or having a greater proportion of hair mixed with the fiber of cat-tail flag than that contained in the remainder of its thickness, substantially as hereinbefore set forth.

SQUIRES RADCLIFFE.

Witnesses:
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