UNITED STATES PATENT OFFICE.

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HEAT-INSULATING PAPER OR PAPER-BOARD.

1,164,941. Specification of Letters Patent. Patented Dec. 21, 1915.

No Drawing. Application filed December 5, 1911. Serial No. 664,092.

To all whom it may concern:

Be it known that I, FRANC J. JEWETT, a citizen of the United States of America, residing at New York city, borough of Brooklyn, county of Kings, State of New York, have invented certain new and useful Improvements in Heat-Insulating Paper or Paper-Board, of which the following is a specification.

My invention relates to materials for heat insulation. The most efficient fabrics for this purpose are those containing the greatest number of air cells, that is to say fabrics of a porous structure. Heretofore fabrics for this purpose have been built up by mixing fibrous and other materials by dry felting, by mixing dry or in plastic masses.

I have discovered that ordinary cattle's hair,—which in the familiar form of a dry, hand made or machine made felt has long been recognized as a most efficient non-conductor—can be advantageously used in the ordinary paper making process with asbestos, or other paper stock, and produces a light, porous sheet full of air cells and a most efficient non-conductor of heat.

Heretofore it has not been proposed to use hair in the making of paper or paper board for the reason that its smooth surface gives no felting action and its stiffness and hardness prevents its combining with other paper stock or filler to form a smooth and homogeneous fabric, but for my purposes, that of forming sheets of light, porous nature, where strength is not important and density is disadvantageous, I have discovered that hair has unexpected advantages.

In carrying out my invention I take cattle's hair of ordinary kind, though the shorter, cheaper hairs are best adapted for the purpose, and put the same, with asbestos paper stock, or other paper stock in the Hollander or beating engine with the usual quantity of water and the "mix" so produced is run through stuff chests to a wet or cylinder paper machine of the usual type in the usual manner. A single thickness of the web so produced may be run off from the machine and when dried by the usual apparatus produces a soft, porous, paper which is an excellent non-conductor of heat, and consequently an efficient insulator against heat and cold. The asbestos makes the product practically fireproof. When the product is to be used for cold insulation in ice plants, etc., rag stock or wood pulp stock may be substituted for asbestos fiber. If a still higher degree of lightness and porosity is desired, a quantity of shredded sponge may be used with the hair and paper stock.

If a thicker structure than that produced by a single thickness of web is desired, the web may be wound up on the press roll of the cylinder machine to any desired thickness, and then cut off and the sheet so formed flattened out to form paper board, in the usual way.

A certain amount of ordinary sizing or filler may be used in some cases, but the best results, *i. e.*, the lightest and most porous structures, are obtained when the fibers alone are used with a small proportion of size, just sufficient to aid in holding the fibers together. I find that 75 pounds of starch to one ton of fiber gives good results.

As an example of good practice in working my invention I would suggest a mix containing by weight 40 per cent. of hair and 60 per cent. of asbestos, or other paper stock. When sponge is employed the proportions I use are, by weight, 25 per cent. hair, 15 per cent. sponge, and 60 per cent. asbestos.

Having, therefore, described my invention, I claim:

A light, porous felt comprising asbestos paper stock, shredded sponge, a minimum of size and 25 to 40 per cent. of cattle's hair.

FRANC J. JEWETT.

Witnesses:
ANTHONY LA SALTUTO,
CHARLES KOTHE.