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IMPREGNATED FELT

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2 Claims. (Cl. 92-3)

This invention relates to felt and more particularly to felt adapted to be saturated with waterproofing compounds such as asphalt, coal tar, coal tar pitch or other bituminous waterproofing material, to form waterproof products for building, flooring, roofing and like purposes.

Heretofore the manufacture of felt intended to be saturated with waterproofing compounds, such as liquid bituminous materials has usually been accomplished by employing one or more of the following as raw materials:

- (1) Rags which contain substantially a mixture of cotton and wool;
- (2) Rags consisting substantially of cotton;
- (3) Rags which contain jute fiber in the form of waste bagging;
- (4) Rags which contain old carpets composed largely of jute with quantities of cotton and wool;
- (5) Rags which contain rag clippings of all grades with varying amounts of paper; and
- (6) Paper stock composed largely of waste paper.

These materials are partially disintegrated in rag cutters and thereafter, while in suspension in water, are beaten in paper mill beaters, then jordaned if desired and finally formed into a continuous sheet on Fourdrinier or cylinder paper-making machines.

Rags are a relatively expensive raw material and the use of substantial proportions of the same in the manufacture of felt results in a relatively expensive product.

Paper stock composed largely of waste paper is a less expensive raw material than rags, but the use of large quantities of this material in the manufacture of felt tends to harden or stiffen the felt sheets and produce a product of inferior quality for many purposes.

Wood fibers have been recognized as a low cost material and proposals have been made to substitute such fibers for a portion of the more expensive fibers hereinabove mentioned.

One object of this invention is to produce a low cost felt, of relatively great strength and having a relatively high capacity for absorbing waterproofing compounds, consisting substantially entirely of wood fibers. A further object of the invention is the production of felt by blending wood fibers whose principal function is to impart strength to the felt with other wood fibers of a character to impart a high capacity for absorption to form a felt having the desired strength and absorptive capacity.

Other objects and advantages of my invention

will appear from the following detailed description.

In accordance with this invention, wood fibers of relatively great strength are blended with other wood fibers of relatively open structure and having high absorptive capacity in suitable proportions to produce a felt having the desired strength and absorptive capacity.

As fibers in which strength is the predominant characteristic, I may employ unbleached sulfite pulp or kraft pulp.

The preparation of sulfite pulp is a process well known in the art. It is preferred that the fibers resulting from the subjection of wood to the sulfite process be employed in an unbleached condition since such fibers possess relatively greater strength than bleached fibers. Drastic or over bleaching, particularly with strong bleaching agents such as chlorine, should be avoided in case a felt of high strength is desired for the reason that such bleaching weakens the fibers and hence would result in an inferior felt as compared with a felt containing unbleached fibers or fibers which have been subjected to only a mild bleaching operation.

As strength fibers, the sulfite pulp may be partly or wholly replaced by wood fibers known generally in the paper making art as kraft (including waste kraft pulp).

Since the preparation of both sulfite pulp and kraft pulp is well known in the paper making art, and these materials are commercially available, further description of the processes for the preparation thereof is believed to be unnecessary.

Of the two classes of wood fibers, those to be employed principally for imparting high absorptive capacity to the felt may be prepared by cooking wood substances in an alkaline medium and disintegrating the fibers by mechanical treatment, for example, by treatment with edge runners or in beating engines or Jordan engines.

As an example of the preparation of absorptive fibers, wood substances such as spruce or hemlock may be treated at elevated temperatures in the presence of a solution of caustic soda having a strength of ten per cent or higher by weight. It is preferred to perform the cooking operation at temperatures of over 90° C. and I have found that fibers having a high absorptive capacity may be prepared by cooking spruce chips or shavings in the presence of a solution of caustic soda containing 5 to 10 percent caustic soda based on the weight of the fibers at a temperature of from 90 to 100° C. and subsequently washing the fibers and disintegrating them in a

beating engine. In lieu of caustic soda solution, a solution of other alkali may be employed as the cooking medium. It will be understood to those skilled in the art that the time for which the wood fibers are subjected to cooking or beating as hereinabove described will depend on many factors among which may be mentioned the temperature of the solution to which the fibers are subjected, the strength of the solution, the amount of the charge, etc., and that the treatment of the fibers is carried out until the fibers are disintegrated and rendered absorbent to the desired extent which may be determined by inspecting and testing the fibers in the cooking or beating engine as the case may be.

Absorptive fibers may also be formed by cooking wood substances, such as spruce or hemlock chips or shavings in a calcium pentasulfide solution as described in U. S. Patent No. 996,225 of June 27, 1911 to Viggo Drewsen, after which the fibers are disintegrated by treatment with edge runners or in the ordinary form of beating engine or Jordan engine. Instead of a solution of calcium pentasulfide, polysulfides of certain other alkali or alkaline earth materials, such as sodium pentasulfide, may be employed as the cooking medium.

Having produced the pulp containing fibers of relatively high strength and pulp containing fibers to be employed for imparting high absorptive capacity to the felt, the two types of fibers are blended in proportions of from 15 per cent to 45 per cent of strength fibers with from 55 per cent to 85 per cent of absorptive fibers and the resulting blend of fibers is formed into a felt sheet on Fourdrinier or cylinder felt-making machines. The percentages of the two types of fibers may be varied within the limits stated depending upon the type of felt desired to be produced. For example, for a felt of exceptionally great strength and in which it is not important that a large amount of saturant be absorbed, the proportion of strength fibers may be increased with a corresponding decrease in the proportion of absorptive fibers. On the other hand, if it is desired to produce a felt having relatively high saturating capacity, for example a felt capable of absorbing 150-170 per cent or more, e. g., more than 200 per cent by weight of bitumen, such as asphalt, the proportion of absorptive fibers may be increased with a corresponding decrease in the proportion of strength fibers. For example,

one felt suitable for manufacturing mineral surfaced roofing may consist of about 25 per cent of strength fibers and about 75 per cent of absorptive fibers. Such a felt having a thickness of 0.057 inch will have a tensile strength of 27 lbs. per inch of sheet width and will absorb about 180 per cent of its weight of asphalt.

It will be seen that the felt of the present invention consists substantially entirely of wood fibers and possesses advantageous properties of high strength and a high capacity for absorption of waterproofing compounds. The felt is made from low cost materials and therefore can be produced more cheaply than the usual felt products containing substantial percentages of relatively expensive fibers such as rag fibers. My felt is admirably adapted for employment as a fibrous base for water-proofed materials to be employed for building purposes such, for example, as siding and roofing.

This application is a division of my copending application Serial No. 86,098, filed February 4, 1926 which has issued as Patent No. 2,029,310, February 4, 1936.

It is to be understood that the above description is to be interpreted as illustrative and not in a limiting sense and that this invention is not restricted to the present disclosure otherwise than as defined by the appended claims.

I claim:

1. A flexible felt sheet consisting substantially entirely of wood fibers, said felt containing from 15 per cent to 45 per cent of fibers of relatively great strength from the group consisting of sulfite pulp and kraft pulp and from 55 per cent to 85 per cent of fibers having high absorptive capacity produced by cooking wood with a reagent of the group consisting of caustic alkali and alkaline sulfides, said felt being impregnated with waterproofing material.

2. A flexible felt sheet consisting substantially entirely of wood fibers, said felt containing from 15 per cent to 45 per cent of fibers of relatively great strength from the group consisting of sulfite pulp and kraft pulp and from 55 per cent to 85 per cent of fibers having high absorptive capacity produced by cooking wood with a reagent from the group consisting of caustic soda and polysulfides of alkali and alkali earth metals, said felt being impregnated with bituminous waterproofing material.

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