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# UNITED STATES PATENT OFFICE.

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## FELT FABRIC.

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*To all whom it may concern:*

Be it known that I, REGINALD H. JOHNSON, a subject of the King of Norway, residing at Newark, in the county of Essex, State of New Jersey, have invented certain new and useful Improvements in Felt Fabrics; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in impregnated felt fabrics.

There is a demand for an improved inexpensive but durable floor covering having the general properties of a carpet and adapted for use in places where it is subjected to hard and rough usage, such for instance as runners in hotels and theatres, floor coverings for automobiles and the like. In order to be practical for such uses, a floor covering should be inexpensive to install and replace, should be strong and durable and if a binder or sizing is employed, it should be moisture proof and have strong resistance to any conditions which tend to deteriorate the binder.

One object of this invention is to provide an improved fabric which may be used as a floor covering and which will fulfill the above requirements.

Another object is to provide an improved inexpensive, impregnated cattle-hair felt which may be used for such purposes as floor coverings and the like.

Another object of the invention is to provide an inexpensive impregnated felt fabric which will be flexible, non-brittle, strong and moisture-resisting.

A further object is to provide a relatively thin impregnated felt fabric made from fibers of short staple, but possessing a high degree of tensile strength, flexibility and durability.

According to this invention animal hair, preferably that of cattle, is formed into felt sheets in the usual manner, either by the simple felting method, the needle-punching method or the fulling method. The thickness of the sheet thus produced will depend largely upon the use to which the finished product is placed. If the finished product is to be used as a floor covering of the kind mentioned above, the felt sheet should be made about ⅛ to $\frac{3}{16}$ of an inch thick. The felt sheet is then impregnated with a special binder prepared in the manner hereinafter described. The binder may be placed in a suitable trough and the felt drawn through it by means of rollers which also serve to squeeze out the excess binder. The impregnated felt is then dried in a suitable dryer until it is about 90 per cent dry, and is then passed through either a hot plate press or a hot roller press.

The inexpensive type of binders or adhesives now used in the felt industry for various purposes are not capable by themselves of producing a strong, flexible, non-brittle felt. If enough of the adhesive is used to impart high tensile strength to a relatively thin hair felt, then the resulting product will be too stiff and brittle. Furthermore, the adhesives now used soon deteriorate when exposed to atmospheric conditions.

The binder employed in accordance with this invention has as its chief constituent one of the above mentioned inexpensive types of adhesives now employed in the felt industry, but it is diluted with a small amount of latex. It has been found that the latex so modifies the adhesive as to add the necessary properties to the felt to make it flexible, non-brittle and moisture-proof. Other minor ingredients may be added, if desired, as indicated by the example given below. The adhesives employed is preferably a neutral tapioca adhesive commonly referred to in the felt industry as "tapioca gum," but various kinds of neutral starches and glues may be used. The improved binder may be made as follows:—About 4 pounds of the tapioca adhesives are dissolved in 3 gallons of water and then heated to a point where it becomes like jelly. This is cooled, and then ⅓ of a gallon of latex is added. It is also desirable to add about 6 ounces of 16° ammonia to prevent coagulation of the latex on the squeeze rolls and about 6 ounces of a penetrating oil such as "halo" oil, commonly used in the automobile tire industry for causing rubber to penetrate a fabric.

The above specific recital of the constituents used and the proportions mentioned are by way of example only. The important thing is that an inexpensive adhesive be diluted with latex. The proportions given are those which have been found satisfactory for floor coverings and the like, but it may be necessary to vary the proportions according

to the thickness of the finished product, and to the uses to which the finished felt is to be placed.

The tapioca gum constitutes an inexpensive and efficient adhesive proper and the latex imparts the necessary flexibility and moisture resisting properties to the finished felt.

The impregnated felt made in accordance with this invention may be used for numerous purposes other than floor coverings. However, it is particularly adapted for use as a floor covering where an inexpensive material that will withstand hard and rough usage is required and where it can be installed and replaced at a small cost. As above stated, runners for hotels and theatres and floor coverings for automobiles are good examples of such uses.

This invention also makes it possible for the first time to provide a very thin but strong felt from fibers of short staple, such as cattle hair. For instance, in accordance with this invention, a sheet of felt may be prepared from cattle hair having a thickness of about $\frac{1}{8}$ of an inch and then impregnated and treated as above described. The resulting product may be split to produce a felt of $\frac{1}{16}$ of an inch or even less. Even a felt this thin will possess very high tensile strength and will be flexible and non-brittle. It may be used for numerous purposes where a thin hair felt of this character is required.

Although I have referred to cattle hair as being the preferred material from which the felt is made, other fibers may be used if desired.

I claim:

1. An impregnated fabric comprising a sheet formed of felted fibres and a binder containing a major portion of adhesive and a minor portion of latex.

2. An improved fabric comprising a sheet formed of felted cattle hairs and a binder containing an adhesive and latex.

3. An improved fabric consisting of a sheet of felt made from cattle hair, impregnated with a binder containing as its major constituent an adhesive, a smaller proportion of latex and a penetrating oil.

4. An improved fabric consisting of a sheet of felt impregnated with a binder containing tapioca adhesive diluted with latex.

In testimony whereof I affix my signature.

REGINALD H. JOHNSON.