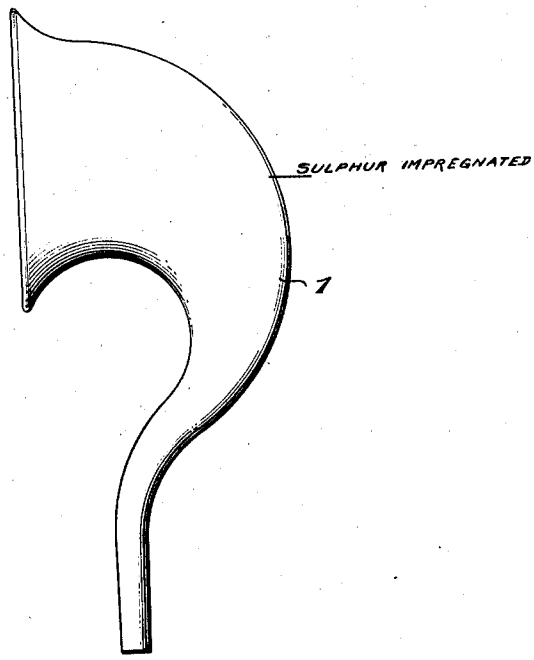
Dec. 31, 1929. W. H. KOBBÉ 1,742,145

ARTICLE MADE OF FABRIC

Original Filed Dec. 14, 1925

Fig. 1.



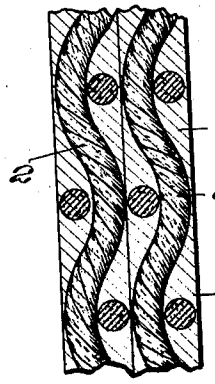


Fig. 2.

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1,742,145

UNITED STATES PATENT OFFICE

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ARTICLE MADE OF FABRIC

Original application filed December 14, 1925, Serial No. 75,437. Divided and this application filed August 13, 1926. Serial No. 129,086.

This invention relates to articles made of fabric and has for its object the provision of certain improvements in the methods of making articles in part at least of fabric. More particularly the invention aims to provide an improved method of making articles comprising a fabric impregnated with molten sulphur.

This application is a division of my co-pending application Serial No. 75,437. The invention is based on my discovery that the association of sulfur with fabrics, preferably by impregnation of the fabrics with surfur, imparts such a degree of strength and/or rigidity to the resulting product as to render it admirably adapted for making numerous rigid articles, particularly of irregular contour. The invention thus contemplates the provision of new articles of manufacture made in whole or in part of sulfur-containing or sulfur-impregnated fabric, and methods of making the same.

By "fabric" I mean to include any pliable fibrous material such as the various textiles, felts and other clothlike materials, made of either organic or inorganic fibre. In particular, I means to include fabrics made from asbestos or other mineral fibres as well as fabrics made of wool, silk, hair, cotton, jute, hemp, flax, and other animal and vegetable fibres. More especially, I mean to include burlap, canvas, cotton flannel, linen, and in fact all classes of fabrics and/or textile products.

In carrying out the present invention, I treat the fabric with sulfur so as to effect an association with the fabric of an appropriate amount of sulfur in such form as to impart to the fabric a desired degree of strength or rigidity. The desired association between the fabric and sulfur may be brought about in various ways, as, for example, by impregnating the fabric with sulfur through immersion of the fabric in molten sulfur. The association of the sulfur with the fabric may also be accomplished by passing the fabric over rolls carrying molten sulfur, as well as by including solid sulfur in the fabric in any appropriate way and subsequently fusing the sulfur in contact with the fabric by the application of heat.

The degree of impregnation or treatment of the fabric with sulfur can be closely controlled. For certain articles of manufacture a very light or partial penetration of the sulfur into the fabric is sufficient, while in other cases the maximum absorption of sulfur by the fabric is most desirable.

Heretofore, the manufacture of objects of peculiar or irregular shape has been attended with many difficulties. For example, a goose-neck radio horn, a doll's body, as well as numerous other objects of peculiar or odd shape, have heretofore been customarily made up in sections or otherwise built up or fabricated. Paper and paper products are readily shaped into regular geometric forms, such as tubes, cones, and rectangular receptacles, but cannot be shaped into peculiarly curved surfaces such as are presented in goose-neck radio horns, doll's bodies and the like. Articles or objects of irregular contour have heretofore been frequently made of metal castings, but such castings are heavy, complicated and expensive. Wood pulp has also been cast on screens in order to produce odd shapes, as, for example, in making toys, but this process is slow, expensive, and otherwise unsatisfactory.

Fabric, on the other hand, because of its great pliability, is ideally suited for shaping into any peculiar or irregular form. The use of fabric in making articles or objects of irregular shape or contour has not heretofore been practicable, because of the absence of a cheap and effective method of permanently retaining the desired shape or form of the fabric.

I have discovered that fabric appropriately treated with sulfur can be made to permanently retain or hold any desired shape into which the fabric is formed. Thus, in fabric and sulfur I have found the two necessary elements for cheaply and conveniently forming articles or objects of irregular shape, first, the forming of any desired shape or contour, and second, the fixing or "freezing" of this shape into permanent form. The sulfur enters the interstices and pores

of the fabric and there solidifies in crystalline form.

Shrinkage is usually an incident of the impregnation of the fabric with sulfur, and this imparts great strength and rigidity to the finished article or object. In this respect, sulfur behaves differently than water which, upon freezing, expands and disrupts the material containing it. The inclusion of molten sulfur in the interstices and pores of the fabric and its subsequent crystallization therein is somewhat analogous to the shrinking of a metal tire on a wheel.

Many fabrics, and in particular cotton flannel, serve as ideal vehicles or mediums for sulfur, in the practice of the present invention. Fabric and sulfur are thereby made available for many purposes not heretofore possible.

In the accompanying drawings one article made in accordance with the present invention is disclosed. In these drawings,

Figure 1 is a view of a radio horn made from my improved fabric, and

Fig. 2 is an enlarged cross sectional view of a portion of the fabric.

As an example of the invention, I will describe a goose-neck radio horn made of sulfur-impregnated fabric. The desired shape or contour of the horn is made by stretching an appropriately shaped "stocking" of cotton flannel over a light form. The form and "stocking" are then immersed in a bath of molten sulfur until the fabric has become fully saturated with sulfur. When saturated, the fabric may contain from 80 to 90% by weight of sulfur, depending upon the porosity of the fabric and other factors. The form and sulfur-impregnated "stocking" are then removed from the bath, whereupon the sulfur in the interstices and pores of the fabric rapidly cools and solidifies. The form is then disassembled and removed, leaving a rigid horn of sulfur-impregnated fabric. The ease and rapidity with which this cycle of operations may be carried out is of great practical advantage, and the horn itself possesses certain advantageous sound-producing qualities.

A modification in the procedure just described consists in using one or more "stockings" of cotton flannel, or other suitable fabric, and employing a temporary stiffening or sizing agent, thereby dispensing with the necessity of inserting the form in the bath of molten sulfur. In this modified procedure I stretch a suitably shaped piece of fabric over a metal form and apply a thin coat of plaster of Paris or the like, to the fabric. I then stretch a second similarly shaped piece of fabric over the plaster coating and allow the plaster to set. The metal form can then be disassembled and removed, and the fabric immersed in the bath of molten sulfur.

The quantity of sulfur absorbed by various fabrics varies within wide limits, but generally speaking is not less than 5% by weight, and more frequently as high as 80 to 90% by weight, based upon the weight of the sulfur-containing product.

The new articles of manufacture which may be made of sulfur-treated fabric in accordance with this invention are very numerous. Thus, the invention is of particular advantage in its application to burlap and cotton sacks, to make substantially impervious sacks and thereby prevent sifting. The invention may be advantageously applied to tarpaulins, awnings, hatch covers and other protective agencies exposed to the weather.

By passing a strip of cotton flannel or other appropriate fabric through a sulfur bath and then winding in an appropriate manner while hot onto an iron pipe or other cylindrical object, I can build up a monolithic, impervious, sulfur-coating of any desired thickness, since the various plies bond not only with each other, but with the surface being covered. I may use the same general method for lining an acid tank or for applying a sulfur coating to metal or other material. Sulfur alone cannot be applied as a coating on account of its contraction upon cooling, subsequent brittleness and especially its tendency to spall off and crack under changes of temperature. When the sulfur is carried in the fabric as a vehicle, however, the result is entirely different.

By appropriately shaping the fabric to conform to the shape of the article, the invention may be applied to the making of sulfur-impregnated fabric covers or coatings for acid or other carboys, and other fragile articles. The invention is, moreover, applicable to the making of hydrofluoric acid bottles, electrolytic tanks, forming tanks, acid dip receptacles, storage battery boxes, and receptacles for corrosive materials which sulfur resists. As previously stated, however, the invention is especially applicable to odd or irregularly shaped articles and objects such as acid funnels, toys, doll's bodies, canvas buckets, acid measures, horns for the radio and talking-machine industries, etc.

Where the fabric is treated with sulfur by immersion in a bath of molten sulfur, I prefer to maintain the sulfur bath at a temperature just slightly above the melting temperature of sulfur, say, for example, at about 125° C. The length of time that the fabric should remain immersed in the sulfur bath depends in large measure upon the characteristics of the fabric and the degree of impregnation desired. In practice, the duration of immersion will rarely be more than a few minutes.

In the drawings, the numeral 1 designates a radio horn made from my improved sulfur-impregnated fabric such as is shown in Fig. 2, wherein 2 and 3 represent separate layers of

fabric which have been secured together by means of the sulfur 4 which, during the impregnation of the fabric, is passed into the interstices thereof.

I claim:

1. The method of making an article composed in part, at lease, of sulphur-impregnated fabric which comprises immersing fabric in a bath of molten sulphur to effect impregnation, wrapping the fabric, after immersion and while the sulphur contained therein is molten, about a form, and cooling the resulting product to solidify the sulphur.

2. The method of making multi-ply fabric which comprises impregnating at least two layers of sheet material substantially entirely therethrough with sulfur, causing said layers to contact with each other while the sulfur contained therein is in a molten state and maintaining said impregnated sheets in contact with each other until the sulfur contained therein solidifies and crystallizes.

3. An improved fabric comprising a plurality of layers of sheet material bonded together by means of crystallized sulfur, at least one of said layers having crystallized sulfur extending substantially entirely therethrough with crystals thereof interpenetrating with the crystals of the sulfur which binds the adjacent layer of sheet material.

4. An improved fabric comprising a plurality of layers of sheet material, at least two layers of said material having crystallized sulfur extending substantially entirely therethrough with crystals of each layer interpenetrating with crystals of the other layer to bind said two layers together.

In testimony whereof I affix my signature.

WILLIAM HOFFMAN KOBBÉ.