

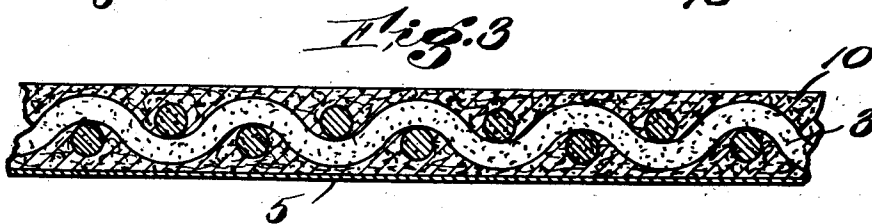
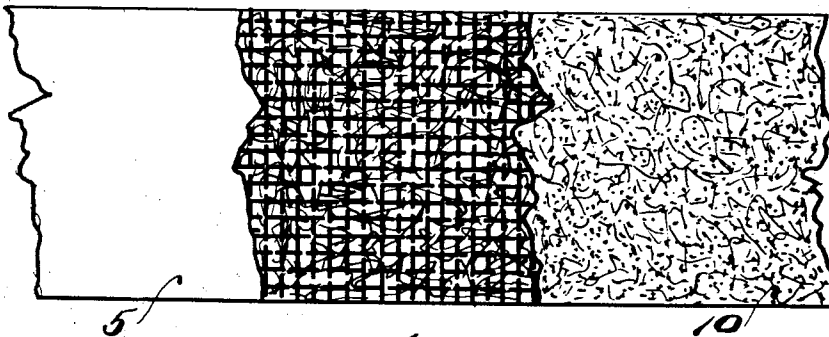
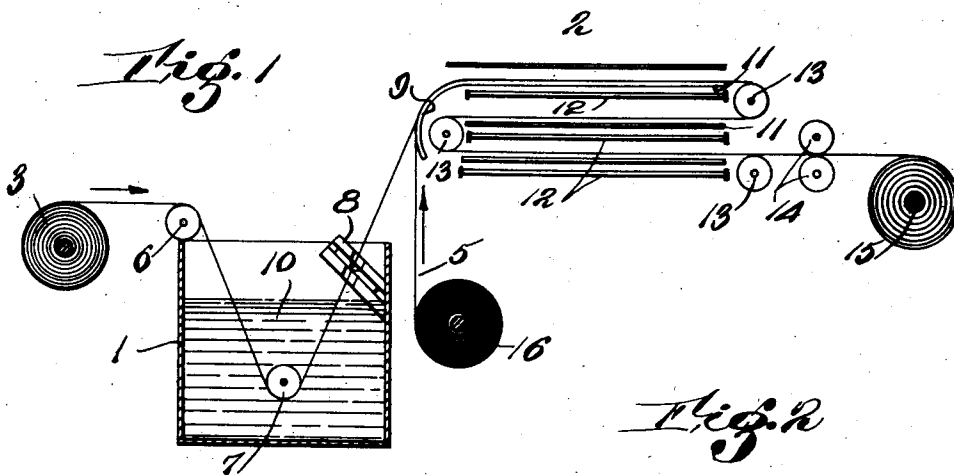
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H. M. EATON

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MOLDED ARTICLES

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*Inventor:*  
Horace M. Eaton,  
By Robert Robert Cushman  
Attys.

# UNITED STATES PATENT OFFICE.

HORACE M. EATON, OF DENNIS, MASSACHUSETTS, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO NORMAN EDMUNDS, OF SWAMPSCOTT, MASSACHUSETTS.

## MOLDED ARTICLES.

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This invention relates to that class of articles comprising a fibrous base such as fabric, felt, paper or the like, treated with a composition which renders the article form-sustaining and to a method of making same.

In the manufacture of various shaped articles from a fibrous base material impregnated with a fluid bonding or stiffening agent, the adhesive properties of the fluid introduce difficulties in the manipulation and shaping of the material and in the subsequent handling and use of the finished articles themselves.

It is accordingly an object of the present invention to provide a method for the preparation and shaping of such articles which shall avoid the present inconveniences and which shall result in a product of generally improved qualities in this respect.

The method comprises generally the aggregation of a base material, preferably of a more or less fibrous nature, with a fluid stiffening agent which may contain an additional adhesive constituent, applying a thin membrane in contact therewith and molding the material so produced into the shape desired, preferably with the outer surface of said membrane in contact with the molding elements employed.

The base material may be composed of vegetable or animal fibers and may or may not be woven into a fabric, depending upon the specific qualities desired in the molded article. For example, felted burlap is well suited for many purposes where the material is used in sheet form. The stiffening agent is conveniently prepared and gives satisfactory results when it contains a cellulosic compound of appropriate properties dissolved in a readily volatile solvent and the impregnation of the base material therewith is greatly facilitated by the addition of a comminuted solid having an absorptive attraction for the impregnating fluid. For example, a suitable stiffening agent may be prepared by dissolving celluloid in acetone or other suitable solvent and mixing therewith a finely comminuted absorptive substance (such as plaster of Paris, asbestos, or the like) until the consistency of the mixture approximates that of heavy cream.

A specific adaptation of the invention will be described in relation to the preparation of such material in the form of a sheet and the shaping of it into the ultimate product re-

quired, reference being made to the accompanying drawings, in which:—

Fig. 1 is a diagrammatic front elevation of the apparatus employed;

Fig. 2 is a view of the finished material in sheet form with successive layers broken away; and

Fig. 3 is an enlarged cross section of the finished sheet.

Referring to Fig. 1, the apparatus employed consists of an impregnating tank 1, a series of horizontal drying shelves 2, a sheet of the fibrous material to be treated which is in the form of a roll 3 and a roll of thin absorbent paper 5. The end of the fibrous sheet 3 is passed over a roller 6 mounted upon the edge of tank 1, beneath roller 7, positioned in the lower portion of the tank, thence upwardly between a pair of spaced scraping knives 8 and over a curved surface 9. From here the strip is passed alternately over a series of horizontal tables 11 and corresponding guide rollers 13. The horizontal tables are heated by steam coils 12 and are provided in sufficient number to effect partial or complete drying of the impregnated material. The roll of paper is mounted at 16, the end of which is drawn up over the curved surface 9 into contact with and beneath the strip of fibrous material 3 which it is caused to follow throughout the course described above. As the compound sheet leaves the last roller 13, it is drawn between compression rollers 14 and rolled up upon the driven roller 15.

The operation of the process will now be clear. The impregnating fluid is run into the tank 1 until a depth is reached which provides a sufficient path beneath the surface thereof to permit complete saturation of the fabric, upon its being drawn through the bath at the desired rate. An especially satisfactory fluid for this purpose has the following composition:

20 volumes alcohol or acetone solution of celluloid (20° Bé).	100
4 volumes powdered asbestos.	
2 volumes powdered plaster of Paris.	
1 volume powdered dextrine.	
14 volumes alcohol.	105

The fibrous sheet is drawn in the direction of the arrows by rotation of roller 15, assisted if necessary by positive rotation of rollers 13. The fabric passes through the impregnating bath 10 where it becomes thoroughly satu-

rated and picks up an appreciable superficial excess of the fluid. Upon leaving the bath, it passes between the scrapers 8 which remove a large part or all of the excess and reduce the treated sheet to a uniform thickness and leave smooth surfaces on both sides. At 9 it passes over the paper sheet 16 and, owing to the tension by which it is drawn through the apparatus, it is pressed firmly against the underlying paper sheet, which promotes an intimate contact therewith and effects a firm adhesion between the two sheets. At the same time very little or none of the impregnating fluid permeates the paper sheet. Its outer or under surface remains substantially non-adhesive thus permitting the sheet to slip freely over the surface 9 and the first of the horizontal tables 11. When the strip reaches the second horizontal table of the series the fabric side of the composite strip comes into contact therewith, but it will be found that by this time it is sufficiently dry not to adhere thereto and accordingly it will slide over this surface also without damage and without appreciable resistance.

The resulting sheet of treated material, which may be completely or only partially dried depending upon the duration and intensity of the drying operation, is in suitable condition for cutting or rolling in strips of desired size. If it is only slightly dried, so that it retains sufficient flexibility, the sheet may be directly molded or pressed by any of the well known methods for the shaping of plastic materials. If it is completely dried it may be formed into rolls or sheets and stored until required for use. It is then unrolled and soaked or dampened with a solvent of the cellulosic constituent such as alcohol or acetone, whereupon it is quickly softened and rendered pliable. It may then be shaped into the finished article in the same manner as the freshly prepared sheet after which it is allowed to dry and harden permanently. The adhesive surface will of course be placed in contact with the surfaces or materials to which it is intended to adhere while the mold or molding surfaces will bear against the paper.

Whether the sheet is freshly prepared or re-softened the surface of the treated fabric per se will be appreciably adhesive, owing to the adhesive properties of the cellulosic solution or other binding agent employed. While this characteristic is an essential and desirable feature of binding agents generally, it is detrimental to the immediate manipulation of the freshly impregnated sheet as pointed out above. However, in the present invention this difficulty is avoided in the first instance by bringing the sheet into contact with the membrane immediately after leaving the impregnating bath, while upon subsequent re-wetting with the solvent, the solvent will

freely permeate the paper covering but the adhesive elements of the stiffening agent will be substantially retained on its inner surface. If desirable, both surfaces of the base material may be so covered, but ordinarily it will be found advantageous to leave one surface free and tacky or sticky to facilitate incorporating it with other substances or applying it to other surfaces, and so on.

The adhesive property or tackiness of the stiffening agent is rapidly diminished by evaporation of the solvent, whereas for some purposes it may be especially desirable to increase or prolong this property in order to effect the proper adhesion of the base material to the membrane, to other layers or to other surfaces during the initial operation or during the subsequent steps of shaping the material. In order to correct this deficiency, it is found that the initial "tackiness" or the period during which this adhesiveness of the sheet is maintained may be greatly increased by adding to the impregnating fluid one of the polysaccharoses, such as dextrine. Nevertheless, when this addition is made the sheet may still be handled conveniently because the surface of the protective membrane will remain nonadhesive, while the surfaces to be joined or stuck one to another will be in a highly viscid or gummy state and thus facilitates the intimate contact and union therebetween.

When using comminuted asbestos as the absorptive material the resulting product is somewhat smoother and tougher due presumably to the fibrous character of the asbestos.

A suitable paper for use as the covering membrane is thin rough finished kraft paper. The aforesaid bonding may in some cases be supplemented to advantage by gumming the paper before it is applied to the base or by otherwise applying an adhesive in addition to that contained in the impregnated base. In any event the bonding should be so complete and continuous that the paper will not separate around the edges of a piece of the material even when the edges are skived.

I claim:

1. A stiffener for boots and shoes comprising a layer of fibrous material, a sheet of paper, and an impregnating mixture containing cellulosic material and a saccharose, said mixture permeating the fibrous material and binding said paper thereto.

2. A stiffener for boots and shoes comprising a layer of fibrous material, a sheet of paper, and an impregnating mixture containing celluloid comminuted filler material, and a saccharose, said mixture permeating the fibrous material and binding said paper thereto.

Signed by me as Boston, Massachusetts, this 5th day of March, 1924.

HORACE M. EATON.