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METHOD OF CONDITIONING REGENERATED CELLULOSE FOR USE IN THE ARTS

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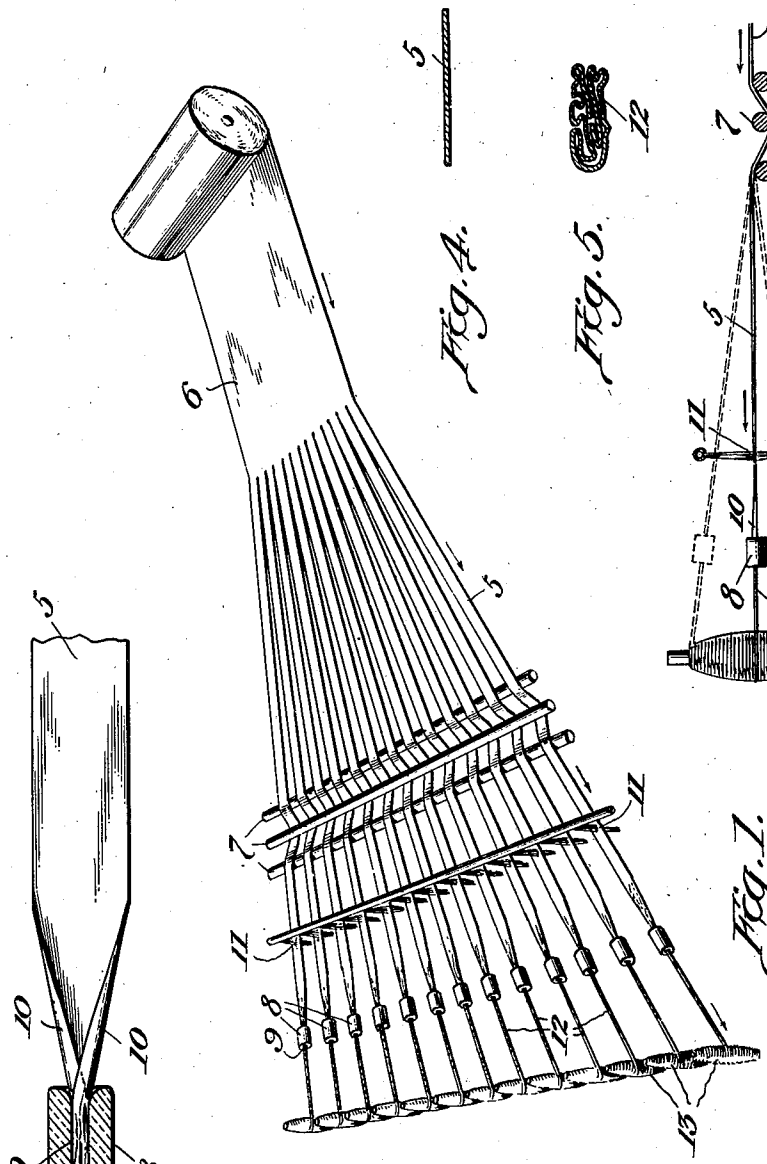

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

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METHOD OF CONDITIONING REGENERATED CELLULOSE FOR USE IN THE ARTS

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2 Claims. (Cl. 28—1)

Fabrics formed of strips cut from a web of regenerated cellulose find their chief utility in the trimming of hats and shoes and to a large extent they are knit fabrics. Their individual strips or strands lack tensile strength and flexibility and it has been necessary to treat them with reagents of the softener type to relieve the stiffness to the point where the fabric is usable in a limited field.

Regenerated cellulose in the web is expensive, the current price being sixty cents a pound, and present methods of making it into fabrics add to the expense as well because of their use of reagents as of their very prodigality or wastefulness of the stock. This is particularly true of woven regenerated cellulose, as heretofore proposed, which requires sixteen to twenty ounces of the material to the square yard, such fabrics being embodied of hard twisted webs or strands.

There is little or no demand for the hard twisted fabric on account of its pronounced stiffness even when the weave is modified with conventional filling or reinforcing threads in an effort to overcome inherent stiffness and to reduce the cost.

The principal objects of the present invention are to condition strips of regenerated cellulose so that they will possess great tensile strength and pliancy or flexibility in contradistinction to their inherent stiffness, and thus be admirably adapted for weaving and other purposes where a lustrous and sparkling or scintillating stock is desirable; to provide for such conditioning without resort to solvents or softening agents and in such way that less stock is required per square yard and to produce a fabric far superior to fabrics produced from hard twisted strands or strips.

The nature of my invention consists in mechanically treating flat strips of regenerated cellulose so that they will be transformed from a state of hardness and unyielding quality, in which state they are susceptible to splitting and tearing, to a state of pliancy and flexibility and, for all practical purposes, free from splitting or tearing tendency. Referring to the accompanying drawing which illustrate, in principle and substance, one way of practicing the invention,—

Figure 1 is a schematic or diagrammatic view of the method and means of my invention.

Fig. 2 is a detail illustrative of the lateral traverse of the die.

Fig. 3 is a detail, on an enlarged scale, illustrative of the crushing or involuting action of the die.

Figs. 4 and 5, respectively, are sectional views of the strip before and after being acted upon by the die.

According to my practice, flat strips 5, of desired width, are cut from a web 6 of regenerated cellulose. In this state the strips are relatively hard and inelastic and possessed of undesirable stiffness and a low order of tensile strength. In order to remedy these conditions I modify the starting product by first plicating it, as it were, in a lengthwise direction and then squeeze or crush it upon itself to provide a uniformly soft and pliable strand or ribbon possessed of relatively great tensile strength and which in cross-section is distinguished by its labyrinthian structure. In the accomplishment of this result various means may be availed of but under preferred practice the strips 5, under proper tension, as by the use of rolls 7, are drawn through dies 8 which are elements with restricted axial cylindrical bores 9.

The purpose and effect of the described mechanical treatment is to reinforce the hard, inelastic strip or starting product by first turning its longitudinal margins 10 and then involuting the mass with contemporaneous squeezing, crushing or crinkling which reduces it to a more or less densified and compact state manifested by a cellular or labyrinthian structure, Fig. 5, which accounts for its increased tensile strength and its pronounced softness and pliancy and its added sparkle. It will be manifest to those skilled in the art that the mechanical treatment of my invention is not to be confounded with the well-known and conventional practices of spiral winding or twisting of one or more threads.

Before the relatively hard and inelastic flat strips of commerce are delivered to the dies, I prefer to dust or spray them, as at 11, with a lubricant such as paraffin or other wax. This treatment helps to ease the stock through the die and also operates to reduce friction of the parts as they pass over from the flat phase to the labyrinthian or involuted phase.

The soft and pliant strands or ribbons 12 as they pass from the dies are wound upon spools or bobbins 13. The latter are disposed relatively close to the dies to preclude any opening up of the strip such as might possibly occur were the strips allowed to run free or be delivered to the bobbins a remote distance from the dies. In this connection there also is merit in providing for lateral traverse of the dies as indicated in dotted lines in Fig. 2.

From the foregoing it will be manifest that

the effect of crushing or compacting the strips is greatly to increase their tensile strength and substantially to obviate any tendency towards splitting or tearing, and, of equal importance, to reduce the original hard abrasive strip to a condition of marked pliancy, softness, and flexibility, whereby it is particularly adapted for weaving. And in connection with weaving it may here be remarked that another merit of the invention is that it conditions the ordinary stock without such prodigality thereof as occurs, for example, in hard twisting or similar densifying operations. Hence, in the weaving of fabrics a pound of regenerated cellulose will go much further under my practice than under the old practices.

What is claimed as new:—

1. The method of conditioning hard surfaced regenerated cellulose to adapt it to weaving, which consists in providing relatively narrow ribbons of that material, waxing a surface or surfaces of the ribbons while maintaining them in flat state, destroying the surface hardness of the ribbons without the application of twist by lapping the ribbons upon themselves thereby reversing their longitudinal edges, and immediately winding the lapped strands on individual bobbins.

2. The method set forth in claim 1, wherein the bobbins are disposed relatively close to the instrumentalities for destroying the surface hardness of the ribbons and such instrumentalities are oscillated.

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