

UNITED STATES PATENT OFFICE.

GOODMAN CHARLES MANDLEBERG, OF MANCHESTER, ENGLAND,

METHOD OF MANUFACTURING WATERPROOF FABRICS.

SPECIFICATION forming part of Letters Patent No. 500,664, dated July 4, 1893.

Application filed August 15, 1892. Serial No. 443,161. (No specimens.) Patented in England December 22, 1891, No. 22,382.

To all whom it may concern:

Be it known that I, GOODMAN CHARLES MANDLEBERG, a subject of the Queen of Great Britain, residing at Manchester, in the county of Lancaster, England, have invented certain new and useful Improvements in the Method of Manufacturing Waterproof Fabrics, (for which I have obtained Letters Patent in England, dated December 22, 1891, No. 22,382;) 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.

My invention relates to the manufacture of waterproof fabrics, and more especially to the ornamentation of rubber proofed fabrics designed for ladies' garments, and it consists in a novel process whereby such fabrics may be tastefully ornamented without materially increasing the weight thereof over and above the weight of that class of fabrics known as single texture india rubber waterproofed fabrics, as will now be fully described.

In carrying out my invention any suitable and desired woven fabric is spread or coated with india rubber proofing in any ordinary or well known manner, and is then covered or partially covered, according to the design and effect it is intended to obtain or produce, with spun or twisted threads formed of any desired fiber, as silk, cotton, &c. These threads may be laid more or less closely to and parallel with one another in straight lines lengthwise of the fabric, or they may be arranged so as to form stripes, or undulating or zigzag lines, or in any other manner to produce the desired design or effect. The threads are made to adhere to the proofed face of the fabric by pressure, the threads being applied before the proofing has become too dry, to cause such threads to firmly adhere thereto. In case the proofing has become too dry it is or may be made sufficiently adhesive by having india rubber solvent applied to it in any desired or well known manner, as for instance by passing the rubber coated face of the fabric in contact with a roller that is made to revolve in india rubber solvent being an arrangement of the kind used for vulcanizing by the well known liquid or cold process. On the other hand, the threads to be applied to

the rubber coated face of the fabric may be made to firmly adhere thereto and become partly embedded therein by first passing such threads through or saturating the same with or otherwise applying to them an india rubber solvent, and then pressing the threads onto the proofed face of the fabric by passing the latter between pressure or calendering rolls, after which the fabric is rolled up tightly and left in this condition until the solvent has softened the proofing, when the fabric is again passed between pressure or calendering rolls to cause the threads to firmly adhere to, and become partly embedded in the proofing.

The threads when no solvent is applied, may be fed to the fabric by any desired or well known mechanical devices. They may for instance, be drawn from bobbins or warp beams and guided by a weaver's reed to the fabric in the spreading machine at a point where the proofing has been sufficiently dried, but has not become too dry, to prevent adhesion of the threads thereto, which are pressed onto it, and the proofed fabric with the threads adhering thereto may then be passed between calendering rolls to consolidate such threads with the proofing. India rubber solvent may be applied to the combined proofed fabric and threads if desired, by passing the proofed thread ornamented face in contact with a roller revolving in such solvent, as above described, and when the said solvent has sufficiently evaporated the fabric may again be passed between calender rolls.

Although the threads may, as above described, be applied to the proofed surface of the fabric in the spreading machine, that is to say in the machine where the proofing is applied to the fabric, I prefer to effect this after the fabric has had the proofing spread upon it, and while the proofing is still "tacky" or adhesive, by passing such fabric through a calendering machine provided with bearings for a beam or beams similar to the warp beams for looms, upon which beam or beams the threads are wound, and from which the threads are drawn through a loom reed, or other suitable appliance of desired pitch to keep the threads at the proper distance apart according to the design required, said reed being supported as near as possible to, without touching the lower calender roll, and in

practice friction may be applied to the thread beams to maintain the threads at the proper tension. Each thread may in some cases be drawn from a separate bobbin, and said threads after passing the reed or guide come in contact with the proofed face of the fabric as it passes around the lower calender roll, and between it and the upper calender roll, whereby such threads are caused to adhere to said rubber coated outer face of the fabric.

The proofed fabric is drawn from a roll on one side of the calendering rolls, under the lower roll over the latter and between it and the upper calender roll, and is then wound up, after the threads have been applied, on a roller with the proofed ornamented face outward or away from the axis of the winding roller.

When rubber solvent is to be applied to the threads before they come in contact with the proofed face of the fabric, the said threads coming from the beam or beams or bobbin or bobbins are caused to pass over a roller partly immersed and revolving in such solvent. In some cases, and to make every part of the threads adhere with certainty, the fabric ornamented by any of the methods above described, has rubber solvent applied to its proofed and ornamented outer face in any desired manner, such solvent being conveniently applied to the proofed and ornamented face of the fabric by a roller, the lower side of which revolves in rubber solvent as hereinbefore described, the said solvent acting to soften the proofing and allowing the threads to sink in and become more or less embedded in the proofing, and when the solvent has sufficiently evaporated or become sufficiently dry, the fabric is again calendered to cause the threads to firmly adhere to the rubber coating. The evaporation or drying of the solvent may be accelerated by passing the fabric, coated with the solvent, over steam heated boxes or rolls, as in the spreading machine.

In some cases the threads before being applied to the proofed face of the fabric may be coated with what is commonly termed a rubber solution, that is to say, a rubber solvent in which pure rubber has by preference been dissolved, or the proofed and thread ornamented fabric may be coated with one or more thin coats of proofing spread thereon in the usual manner in the spreading machine, but in this case, or when the threads are first

coated with a rubber solution, the luster of such threads as silk and the like is more or less destroyed or spoiled, and these latter processes are only advisable for inferior goods where the best ornamental effects are not required.

When the design is formed by wavy or undulating or zigzag lines, the thread guide (reed or the like) has the required motion imparted thereto by any well known or suitable mechanism.

The thread ornamented waterproofed fabrics are finished in the usual manner by having farina or similar material applied thereto, and are then vulcanized by any well known process. If vulcanized by the ordinary cold process by means of bi-sulphide of carbon and chloride of sulphur, the farina is or may be applied immediately after the vulcanizing liquid has been applied to the proofed face of the fabric.

By means of the described process beautiful designs in imitation of woven goods, and brilliant effects can be obtained without materially increasing the weight of the fabric.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. The method of manufacturing waterproof fabrics which consists in applying continuous spun or twisted threads to the proofed face of the fabric and causing said threads to adhere thereto throughout their length.

2. The method of manufacturing waterproof fabrics which consists in applying continuous spun or twisted threads to the proofed face of the fabric, causing said threads to adhere thereto throughout their length and finishing the fabric by treatment with farina.

3. As an article of manufacture, a waterproof fabric having continuous spun or twisted threads on and adhering throughout their length to the proofed face of such fabric.

4. As an article of manufacture, a waterproof farina finished fabric, having continuous spun or twisted threads on and adhering throughout their length to the proofed face of such fabric.

GOODMAN CHARLES MANDLEBERG.

Witnesses:

PETER J. LINSEY,

WILLIAM FAULKNER.