

(No Model.)

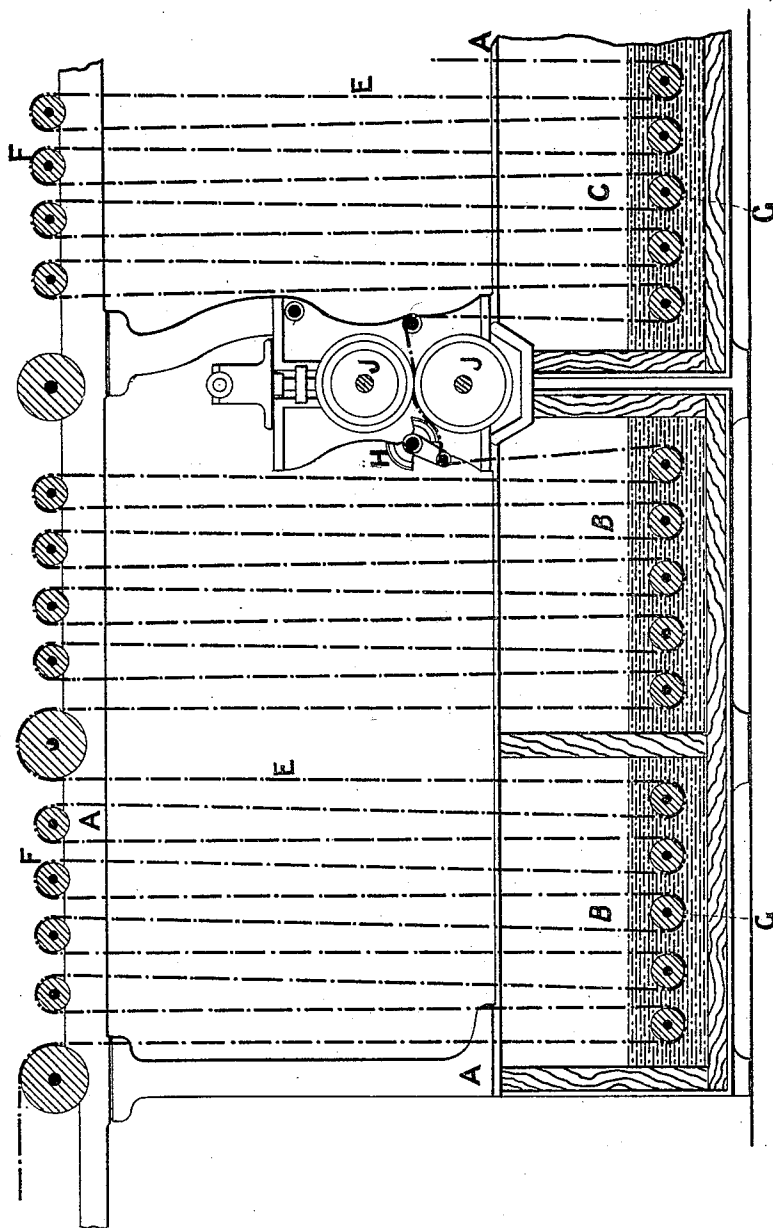
5 Sheets—Sheet 1.

JOHN MILLER, Sr. & JOHN MILLER, Jr.
PROCESS OF WATERPROOFING FABRICS.

No. 511,707.

Patented Dec. 26, 1893.

FIG. 1.



Witnessed
Abraham Reed
John B. Walsh

Inventors
John Miller Sr.
John Miller Jr.

(No Model.)

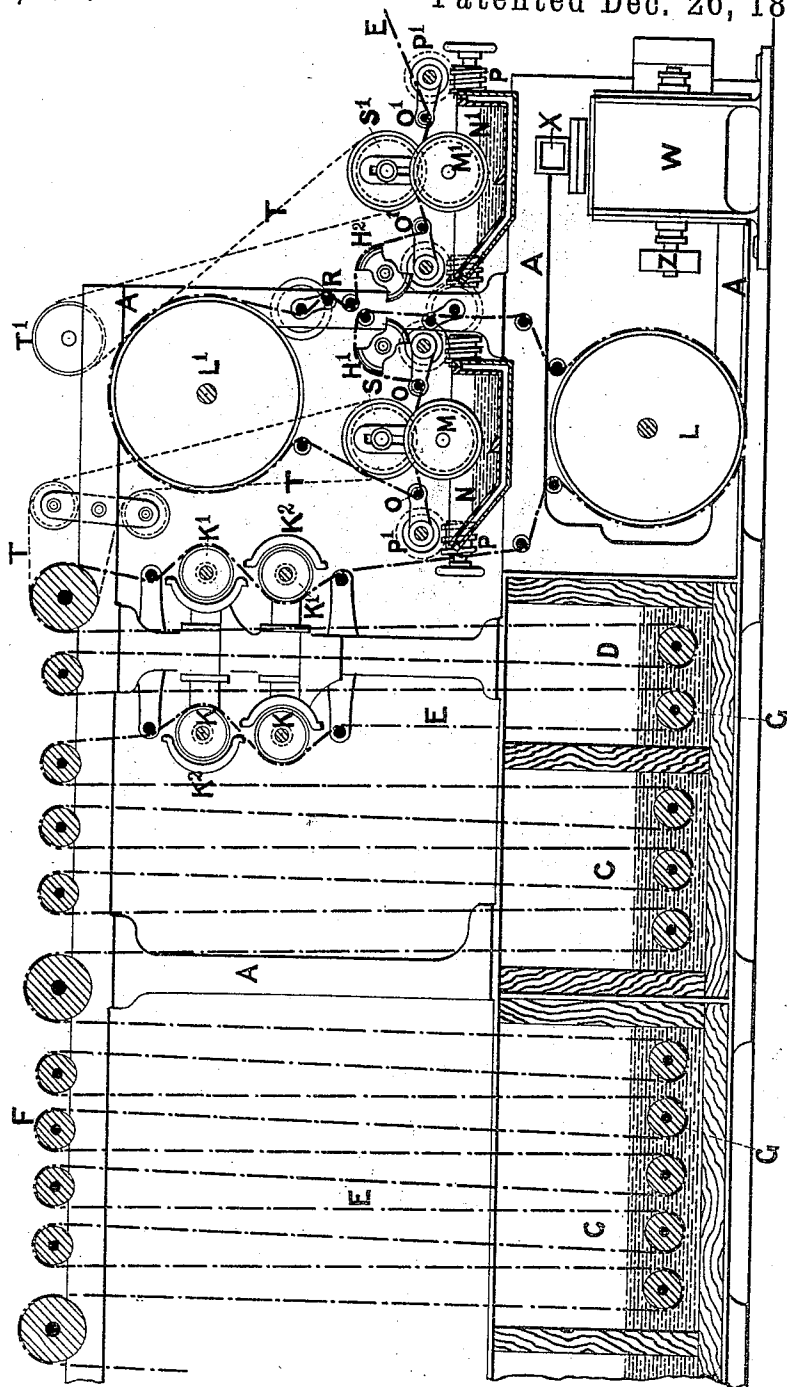
5 Sheets—Sheet 2.

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FIG. 1^a.



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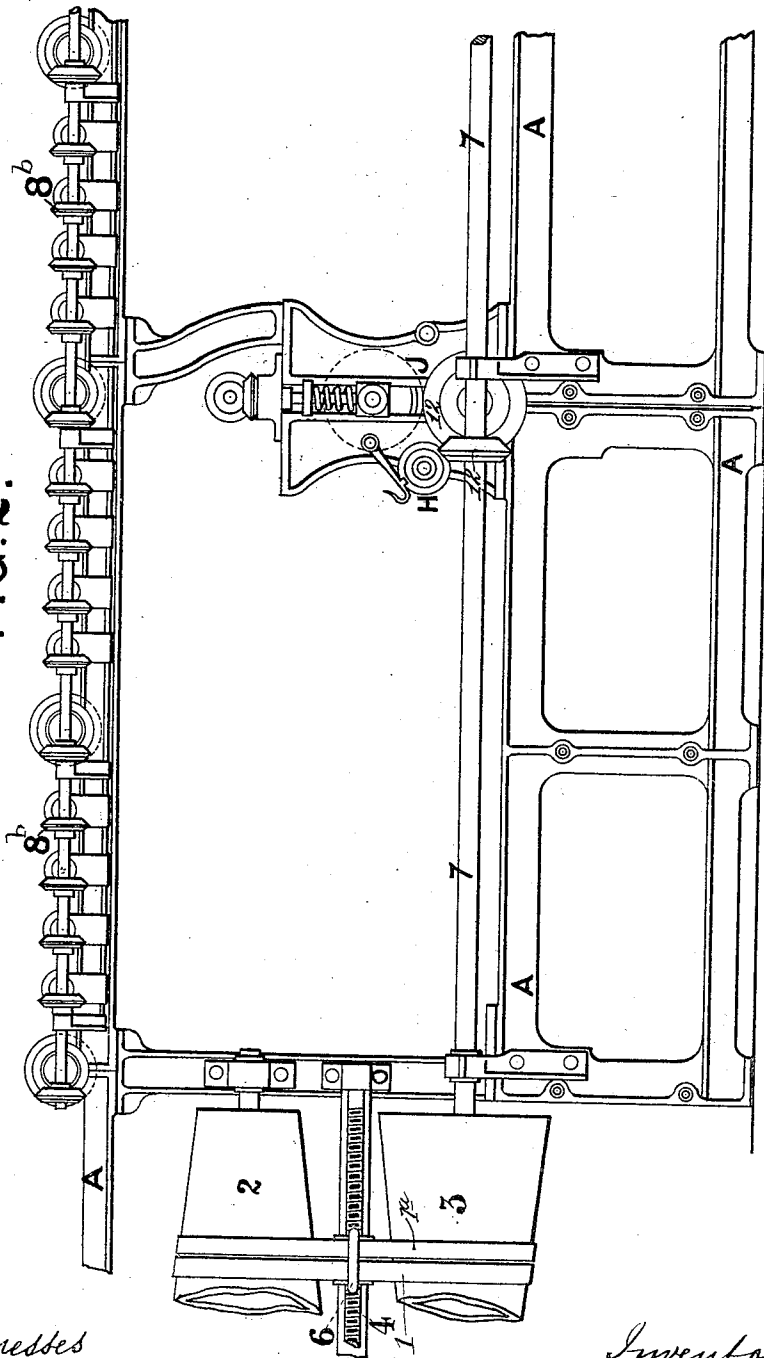
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FIG. 2.



Witnesses
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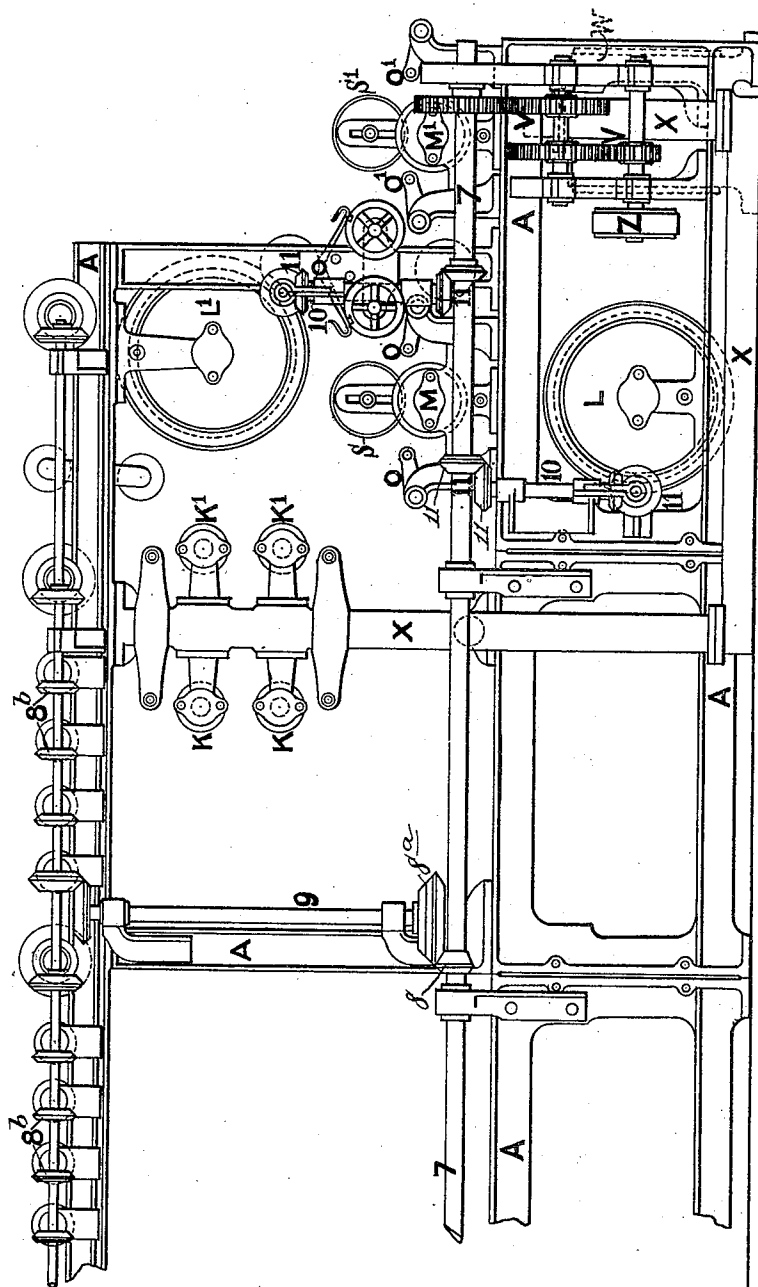
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FIG. 2^a.



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FIG. 3.

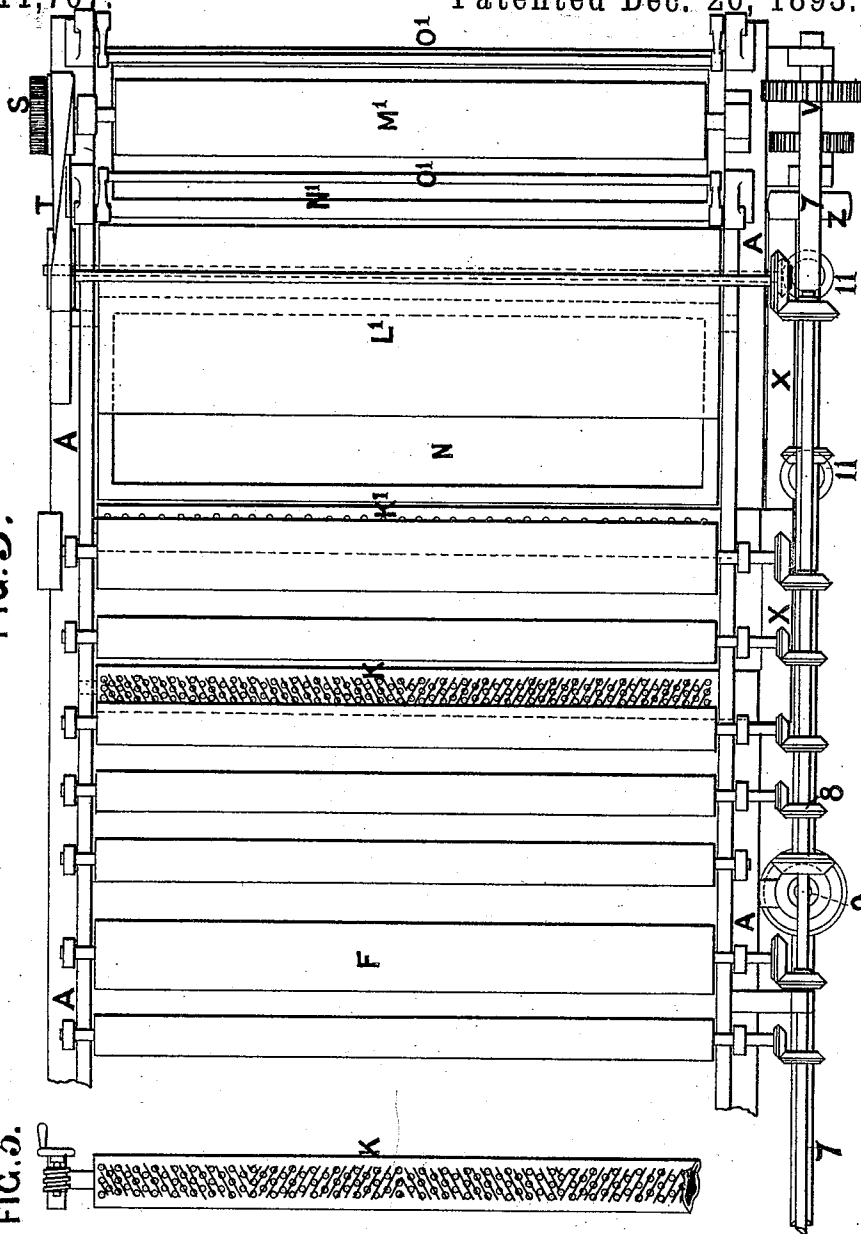


FIG. 5.

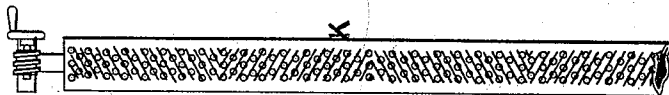
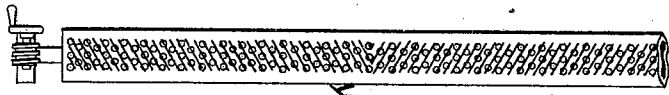


FIG. 4.



Witnesses
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Inventors
John Miller Sr.
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UNITED STATES PATENT OFFICE.

JOHN MILLER, SR., AND JOHN MILLER, JR., OF BRADFORD, ENGLAND.

PROCESS OF WATERPROOFING FABRICS.

SPECIFICATION forming part of Letters Patent No. 511,707, dated December 26, 1893.

Application filed December 1, 1891. Serial No. 413,747. (No specimens.) Patented in England June 23, 1890, No. 9,711.

To all whom it may concern:

Be it known that we, JOHN MILLER, Sr., and JOHN MILLER, Jr., subjects of the Queen of Great Britain, residing at 14 Cunliffe Villas, Manningham, Bradford, in the county of York, England, have invented new and useful Improvements in Processes of Waterproofing Fabrics, (for which we have obtained a patent in Great Britain, No. 9,711, bearing date June 23, 1890,) of which the following is a specification.

This invention relates to a new and useful process for rendering textile fabrics waterproof, and it consists in the novel procedure hereinafter described and claimed.

In the accompanying drawings we have illustrated one form of apparatus suitable for carrying our novel process into effect, and in which—

Figures 1 and 1^a taken together present a longitudinal vertical sectional view of our apparatus. Figs. 2 and 2^a together present a front elevation of the same, and Fig. 3, is a plan view of that portion of the apparatus illustrated in Fig. 1^a. Figs. 4 and 5, are details of expanding suction tubes.

In the said drawings A represents the machine frame, having compartments B, in which the material to be treated may be washed if requisite, and provided also with compartments C, containing the hereinafter described ingredients soluble in water and a compartment D containing any suitable matter for washing off from the surface of the material treated any superfluous ingredients which may adhere thereto after it has been passed through the compartments C.

Above the compartments B, C and D, is arranged a suitable supporting frame in which are journaled rollers F, rollers G, being journaled in the said compartments B, C, and D. The rollers F are driven from any suitable source of power and over said rollers F and G the material to be treated travels.

Between the washing compartments B and the compartments C, is located a suitable support in which are journaled nipping rollers J driven at the same surface speed as the rollers F and G, and in front of the bite of said rollers J, is supported a stretching device H, which engages the material to be

treated and from which it passes under tension to the nipping rollers J.

Above the washing compartment D, is arranged a suitable support in which are journaled two separate pairs of perforated fluted suction tubes K, K, and K', K'. 55

The reference letter L, indicates a heated cylinder which is driven at a slightly higher speed than the rollers F, and above the same is supported a stretching device H', between which and the cylinder L is located a steam or otherwise heated trough N containing the hereinafter described ingredients insoluble in water, and in which revolves a cylinder M. On each side of the cylinder M is arranged a guide arm O, which is raised and lowered by means of a worm P and worm-wheel P', connected therewith for the purpose of lowering the material upon or raising it from the surface of the cylinder M. 60 65 70

L', represents a heated cylinder in all respects like the cylinder L, and located above the trough N and cylinder M, and adjacent to said cylinder L', are tension or guide rods R, in proximity to which is a stretching device H', and near said stretching device is located a second steam heated trough N' also containing the hereinafter described solution insoluble in water, in which revolves a second cylinder M', in operative connection with which are arranged guide arms O', O', operated by worm P and worm wheel P' in all respects like those described in connection with the cylinder M. If desired, however, only one steam heated trough and cylinder need be used. The cylinders M and M' are suitably speeded by wheels S and S' and belts T, trained over said wheels S, S' and pulleys T' as shown in Fig. 1^a. 75 80 85 90

The apparatus is driven from any suitable power (not shown), which drives the shaft carrying the elongated cone-pulley 2. Said cone-pulley 2, through the medium of belts 1 and 1^a, drives the cone pulley 3. The speed of the pulley 3 may be regulated by means of screwed rod 4, hand wheel 5, and fork 6. The pulley 3 drives a horizontal shaft 7 traversing the whole length of the machine, this shaft by means of bevel gears 8 and 8^a, vertical shaft 9, and bevel gearing 8^b gives motion to the top rollers F; it also operates by means of 95 100

vertical shafts 10, and bevel wheels 11, the cylinders L and L', before described; the nipping rollers J also receive their motion from shaft 7.

- 5 The perforated suction tubes K, K, and K', K', are fluted diagonally upon one side to suit one piece in breadth, see Fig. 4, and upon the other side fluted for two pieces in breadth, see Fig. 5, and may be reversed by worm and worm
10 wheel as required, the rollers being perforated upon their peripheries and having covers K² to cover up the perforations not in contact with the cloth; these rollers are connected with a fan, exhaust, pump or blower W, by
15 pipes X or other connections, such blowers, fan, exhaust or pump being operated through gear wheels V pulleys Z by the horizontal shaft 7. The stretching devices H, H' and H² are also fluted and reversible in a manner
20 similar to the suction tubes before described.

- In practicing our improved process in connection with the apparatus described, the fabric E to be waterproofed passes over the rollers F and G the latter of which are located
25 in the washing compartments B, whereby the fabric is cleansed. Thence it passes over the stretching device H, through the nipping rollers J. It is then fed into the compartment C, by means of the rollers F and G, where it is
30 impregnated with a solution, (preferably the one hereinafter described,) soluble in water which may be comparatively cold. After being impregnated with said solution in these compartments it is passed over the perforated
35 suction tubes, K, K, whence it goes to the compartment D, where any superfluous ingredients are washed from the surface of the fabric. From this compartment it is carried over the suction tubes K', K', then under the heated
40 cylinder L, which is driven at a slightly higher speed than the rollers F so as to take up the slack of the cloth, then over the stretching device H' and cylinder M which revolves in the steam heated trough N, containing ingredi-
45 ents (preferably those hereinafter described) insoluble in water, whereby the cloth is coated with the solution insoluble in water, thence over the cylinder L', guide rods R, stretching device H² and in contact with the second cylinder M', whereby it is coated upon its oppo-
50 site side with the solution insoluble in water.

- The waterproofing ingredients soluble in water hereinbefore referred to and their relative proportions in a dry condition which we
55 prefer to employ are as follows: acetate of alumina, made from alumina sulphate, twenty-four parts, or fifty per cent.; zinc acetate, twelve parts, or twenty-five per cent.; calcium acetate, eight parts, or sixteen and two-thirds
60 per cent.; albumen, four parts, or six and one-third per cent.

- The manner of preparing these ingredients is as follows:—We preferably dissolve twenty-four pounds of alumina sulphate in twenty-four gallons of hot water and dissolve separately about forty-four pounds of lead acetate in twenty-four gallons of hot water, and

add to the dissolved alumina sulphate the requisite amount of lead acetate to make the solution neutral by test with litmus or other
70 known means, then add three ounces alumina sulphate dissolved as described to insure thorough precipitation of the lead sulphate, which may be roasted (when done with) to recover the lead or sold to paint manufac-
75 turers. The clear liquor containing the acetate of alumina may be filtered free from the lead sulphate and with the addition of the filtered washings, made up to fifty gallons. We dissolve twelve pounds of zinc acetate in
80 twenty-five gallons of hot water, also dissolve eight pounds of calcic acetate in sixteen and two-thirds gallons of hot water; we also dissolve four pounds of albumen (preferably egg) in eight and one-third gallons of water filtered
85 if desired. The above solutions consisting of one hundred gallons, are preferably mixed together with three hundred gallons of water or like proportion in the various compartments of the water-proofing machine, but one
90 or more of them may be used in separate compartments, and a greater or less proportion of water added to suit the various fabrics.

The waterproof ingredients insoluble in water and proportions thereof preferably em-
95 ployed are:—paraffine wax, sixty-five parts, or sixty-five per cent.; Japanese wax, twenty-five parts, or twenty-five per cent.; beeswax, ten parts, or ten per cent. These are melted together in the above or similar proportions
100 in the steam heated trough or troughs of the waterproofing machine until one or more inches of the cylinder are immersed in the liquid.

The ingredients preferably employed for
105 filling or stiffening the fabric are albumen, isinglass and apparatin, which ingredients are soluble in water and may be used together or separately with the waterproofing ingredients soluble in water in the various
110 compartments of the apparatus, and in the proportions requisite to meet the requirements of the fabric being treated, but we preferably use the apparatin in a starch mangle placed in front of and working in combina-
115 tion with the waterproofing machine.

The apparatin is made as follows: sixteen parts farina or other starch are mixed with seventy-six parts of water and eight parts of caustic soda at 25° Baumé is added by de-
120 grees, stirring all the while, then neutralized with sulphuric acid 10° Baumé till litmus paper shows no change.

We do not confine ourselves to the before mentioned waterproofing ingredients or pro-
125 portions soluble or insoluble in water nor to the ingredients for filling or stiffening the fabrics as described, but may use one or more of such ingredients in each classification, substitute or omit others or we may use
130 similar analogous ingredients in either of the classifications to suit the different fabrics and to produce similar results.

By our improved process the fabrics are

impregnated and coated in one treatment whereby they are made more thoroughly and permanently impervious to water, and in much less time and with less injury than heretofore, and at the same time retain their durability, porousness, and healthfulness to wear while in the same treatment the fabric may be filled or stiffened without detriment to its water repellent qualities.

10 Having thus described our invention, what we claim is—

15 The herein described continuous process of waterproofing fabrics, which consists in passing the fabric into and impregnating it with a solution consisting of ingredients soluble in water, conveying the same out of said solu-

tion and washing the surplus solution from the fabric, subjecting the fabric to suction, heating it, immediately passing it into contact and coating one side of it with a solution of ingredients insoluble in water, heating it again, and immediately passing the other side of said fabric into contact and coating it with a solution of ingredients insoluble in water, substantially as described.

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Both of Halifax.