

R. P. PERRY.
PROCESS FOR APPLYING WATERPROOFING TO MATERIALS AND THE PRODUCT THEREFROM.
APPLICATION FILED DEC. 8, 1917.

1,331,365.

Patented Feb. 17, 1920.

Fig. 1

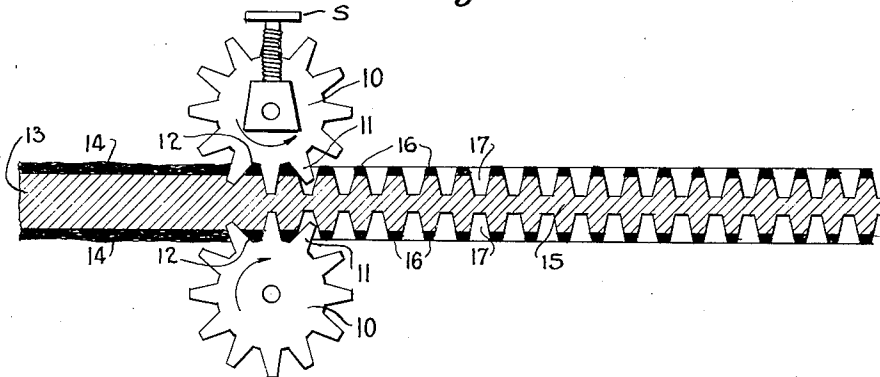


Fig. 2

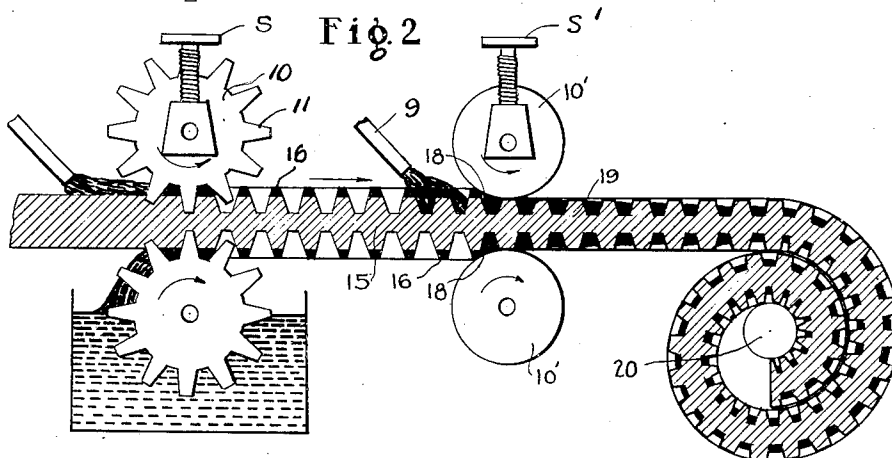


Fig. 3

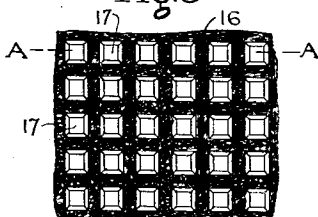


Fig. 4

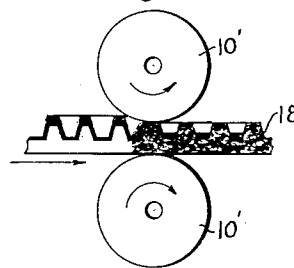


Fig. 5



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PROCESS FOR APPLYING WATERPROOFING TO MATERIALS AND THE PRODUCT THEREFROM.

1,331,365.

Specification of Letters Patent.

Patented Feb. 17, 1920.

Application filed December 8, 1917. Serial No. 206,316.

To all whom it may concern:

Be it known that I, RAY P. PERRY, a citizen of the United States, residing at Upper Montclair, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Processes for Applying Waterproofing to Materials and the Product Therefrom, of which the following is a specification.

10 My invention relates to an improved process of applying waterproofing material to felt, paper or other absorbent material. My invention also relates to an apparatus especially adapted to the use of such process and an intermediate product formed thereby.

In one form my invention produces an indented and substantially saturated sheet of felt or paper, such as is described in my copending application No. 195,655 filed October 9, 1917. In my previous application I have described a process of preparing dry or unsaturated felt or paper of an absorbent nature which is indented in such a manner as to have a number of depressions on at least one surface, said depressions being of substantially predetermined cubical content. I have also described a process of saturating such indented dry felt by supplying the surface of the sheet with liquid waterproofing material, of which a portion will fill the said depressions, and then leading the sheet through one or more pairs of compression rolls which serve to squeeze some of the waterproofing material into the sheet, while at the same time by proper spacing they remove surplus waterproofing material from the surface of the sheet but allow some of the waterproofing material to remain in the depressed portions of the sheet. Preferably the sheet is later wound into a roll where the waterproofing material in the depressions is substantially absorbed into the felt and it becomes ready for use or sale.

It will be noted that in my previous application above referred to, I indent the felt or paper previous to bringing it in contact with the liquid waterproofing material. In the present application I do the indenting simultaneously with or preferably subsequent to applying the waterproofing ma-

terial to the surface of a substantially plain or smooth sheet of felt or paper. By my present process it is not necessary to indent the material before saturating or coating the same. Whenever it is desirable to have the material indented, the indenting is accomplished simultaneously with the saturating or coating process, thus saving one step in the operation. My invention has other obvious advantages some of which will be specifically set forth hereinafter.

I will first describe my process with relation to its dry felt or paper and I will later indicate how it may be used in the coating of a sheet of felt, as for example, in coating to make the so-called "rubber roofing."

Figure 1 is a diagrammatic representation of the apparatus adapted to the use of my process, together with a cross-section of the intermediate product resulting from such process taken along the line A—A of the intermediate product, as shown in plan view in Fig. 3.

Fig. 2 is a similar view of a modification.

Fig. 3 is a plan view of the intermediate product produced by using the apparatus as shown in Fig. 1.

Fig. 4 is a view showing in more detail one feature of the operation of my process.

Fig. 5 is a cross-section of one form of the coated sheet made by my process.

Referring now to Fig. 1, 10 represents a pair of compression rolls provided with raised portions 11 and depressed portions 12. The rolls are provided with means (not shown) for being revolved in the direction indicated by the arrows and also with means S, shown conventionally, by which the distance between the rolls may be regulated and adjusted. 13 represents in cross-section a sheet of dry felt or paper or other absorbent material which has substantially smooth and parallel faces and, on at least one and preferably both faces, a supply of waterproofing material 14 in liquid or plastic form, such as tar or flux oil. Flux oil is a semi-liquid, asphaltic material. 15 represents the sheet after it has passed between the indenting compression rolls 10. 16 represents some of the waterproofing material which remains temporarily on the raised portions of the sheet 15.

In operation a sheet of dry felt or other material 13 is provided, preferably on both of its surfaces, with a supply of waterproofing material 14, such as liquid flux oil. This may be applied to the surface by passing the sheet submerged through a bath of the flux oil as is commonly done in saturating dry roofing felt, or the flux oil may be sprayed on the sheet or applied in any other convenient manner. The flux oil is ordinarily previously heated so as to make it penetrate more easily into the dry felt. The sheet of felt covered with the flux oil is now led through a pair of compression rolls 10, which are provided with raised portions 11 and depressed portions 12. These raised portions may be teeth preferably square in cross-section, constituting in effect truncated pyramids, as illustrated by the depressions 17, Fig. 3. or they may be of any other desirable or suitable shape and may even be ribs extending in an axial direction along the rolls 10, in which case the depressed portions 12 will be longitudinal grooves. In the form shown the depressed portions 12 are sets of longitudinal and circumferential grooves respectively, intersecting at right angles to each other. The longitudinal grooves produce the transverse raised portions on the material 15, while the circumferential grooves simultaneously produce the lengthwise raised portions on the material as clearly shown in Fig. 3. This specific form is shown in order to illustrate the preferable embodiment of my invention and is not intended to be restrictive.

The rolls are preferably spaced apart so that the raised portions produce substantial depressions in the felt, as indicated at 17. Only one roll may have the raised and depressed portions or both may be so provided. Preferably the rolls are set so that although they produce substantially depressed portions 17 in the felt they do not, however, prevent a substantially predetermined amount of flux oil from remaining on the raised portions of the sheet, as indicated at 16. The rolls, however, may be set so that they leave comparatively little or no flux oil on the raised portions and in such case a considerable portion of the flux oil is squeezed into the sheet by the action of the rolls.

The intermediate product produced is a sheet of partly saturated felt which is indented and has on the raised portions a substantial amount of flux oil, as shown at 16. The flux oil or other waterproofing material is in semi-liquid form but, as is well known in the art, such material has appreciable body and viscosity even when hot and may temporarily remain on the raised portions of the sheet. Later this is absorbed into the sheet as a result of winding the sheet into

a roll whereby the heat and pressure of the adjoining convolutions and the absorbent quality of the felt combine to make it gradually saturate the sheet.

In some cases it is desirable to pass the sheet 15 through a second pair of compression rolls, as indicated in Fig. 2. Preferably these second rolls are smooth rolls such as are now customarily used in roofing saturating machines. They may be made with embossed surfaces but ordinarily this is not desirable. The second pair of rolls 10' are also revolved in the direction indicated and the distance between them can be regulated by means S, shown conventionally. Their operation produces at least two effects. In the first place, as the sheet 15 carrying some waterproofing material 16 on the raised portions of the sheet is brought between the rolls 10', some of the waterproofing material is squeezed back into the adjoining depressions, as indicated at 18, while some of it is by the compression of the rolls squeezed into the raised portions of the sheet. In the second place, when the depressed sections carrying some liquid waterproofing material come between the rolls 10' the pressure serves to squeeze the material into the felt, as is diagrammatically indicated in Fig. 4 where the sheet leaving the rolls 10' is indicated as more fully saturated. In this Fig. 4 is shown as an alternative a sheet having depressions on one side only.

Fig. 3 shows a plan view of the sheet 15 as it leaves the rolls 10 in Fig. 1. Here again 17 represents the depressed portions of the sheet and 16 represents the waterproofing material on the raised portions of the sheet.

Referring again to Fig. 2, the sheet 19 is shown leaving the second pair of rolls 10' and may be wound in a roll as indicated at 20. Any waterproofing material still remaining on the surface of the sheet will be substantially absorbed after the roll is wound up. As shown in Fig. 2, the second set of compression rolls 10' may be set so that they actually reduce the over-all thickness of the sheet or they may be set so that after passing the rolls the natural elasticity of the sheet causes it to spring back to substantially the same thickness as before it entered the rolls.

If desired, a further supply of saturating material may be applied to one or both surfaces of the sheet after passing the first indenting compression rolls and this second supply may fill the depressions of the sheet entirely and be later absorbed into the sheet when wound into a roll or the sheet with the depressions filled and with saturant on the raised portions may be passed through the second compression rolls which are preferably smooth and then be wound in a roll.

In any of the processes there will generally be some of the waterproofing material left in the depressions and this ordinarily will be absorbed by the sheet when wound in a

roll and allowed to stand for some time, or the sheet may be led through a heated chamber or over hot surfaces to make the saturant more liquid and thereby assist the absorption process.

10 In using the term "saturating" in my specification and claims I refer to an impregnating or absorption process by which the waterproofing material is transferred from the outside of the sheet into the interstices between the fibers of the sheet and partly into the fibers themselves. Sheets of

15 varying absorbent power will take up different amounts of the waterproofing material and I do not intend to indicate any particular percentage of saturation or that complete saturation is obtained. By regulating the relative size of the depressions and raised portions of the sheet and regulating the spacing apart of the compression

20 rolls considerable control may be had of the percentage of saturation, assuming, of course, the sheet is sufficiently absorbent eventually to take up substantially any waterproofing material left on any portion

25 of the surface as it passes the last compression rolls.

Up to this time I have described my process with relation to its use in saturating dry felt, paper, or other absorbent material,

35 but it is also applicable to the coating of the same, as for example, in applying coating to a previously saturated plain sheet of felt to make coated sheets. When using my process for coating I ordinarily use two sets

40 of compression rolls arranged in general as shown in Fig. 2, but only one set may in some cases be employed. In general, the same principles are employed but here I use a more viscous and higher melting point

45 waterproofing material which is intended to remain substantially on the outside of the sheet although some may penetrate into the sheet. In this coating operation the material is, for example, a hot liquid asphalt

50 composition. The rolls are preferably adjusted so that considerable of the coating remains on the raised portions of the sheet. Before this cools and sets a portion of it is by the second set of compression rolls squeezed

55 into the depressed portions of the sheet. If a sufficient layer of coating is not obtained in this way a further supply of coating may be applied by means of supply pipe

60 9 to the embossed sheet before it reaches the second compression rolls or at that point. The coating may fill the depressed sections and also be thick enough to cover the raised portions of the sheet, as shown in Fig. 5, where 21 represents in cross-section a piece

of felt, preferably saturated with water-
proofing material and 22 represents the
coating which entirely fills the depressions
and extends above the top of the raised portions of the sheet of felt. 23 represents
coating on the other side of the sheet which
is here shown as flat and substantially
smooth but the sheet may be indented on
both sides.

It is obvious that the material 15, after having passed through the indenting rolls
10, is more compacted and dense at the depressed than at the raised portions. For this reason it is advantageous to apply the waterproofing material to the less dense, elevated portions where it will be the more
80 quickly absorbed. It is possible, however, to transfer some of the waterproofing material from the raised to the depressed portions of the sheet and by pressure force some of the same into the interior of the
85 sheet, as hereinbefore described.

What I claim is:

1. In the process of applying waterproofing material to absorbent sheets, the improvement which consists in applying said
90 material to at least one surface of a substantially plain sheet and indenting said sheet after said material is applied and before it is entirely absorbed.

2. The herein described process of treating
95 absorbent sheets which consists in applying liquid waterproofing material to at least one side of a sheet having substantially smooth surfaces, passing said sheet between a pair of compression rolls, of
100 which at least one is provided with raised and depressed portions, in such a manner as to indent the surface of the sheet.

3. The herein described process of saturating
105 substances with liquid waterproofing material, which consists in applying said material to at least one surface of a substantially plain sheet of said substance and afterward indenting said sheet while a portion of said material remains unabsorbed by
110 said substance.

4. The herein described process of saturating
felt, which consists in applying hot, liquid waterproofing material to at least one side of a sheet of felt having substantially
115 smooth surfaces, passing said sheet between a pair of compression rolls, of which at least one is provided with raised and depressed portions, in such a manner as to indent the surface of the sheet, allowing some of the
120 waterproofing material to remain on top of the raised portions of the sheet and later treating to cause this portion of the waterproofing material to be absorbed into said sheet.

5. The herein described process of saturating
125 felt, which consists in applying hot, liquid waterproofing material to at least one

side of a sheet of felt having substantially smooth surfaces, passing said sheet between a pair of compression rolls, of which at least one is provided with raised and depressed portions, in such a manner as to indent the surface of the sheet, allowing some of the waterproofing material to remain on top of the raised portions of the sheet and later treating to cause this waterproofing material to be substantially transferred to the depressed portions of the sheet.

6. The herein described process of saturating felt, which consists in applying hot, liquid waterproofing material to at least one side of a sheet of felt having substantially smooth surfaces, passing said sheet between a pair of compression rolls, of which at least one is provided with raised and depressed portions, in such a manner as to indent the surface of the sheet, allowing some of the waterproofing material to remain on top of the raised portions of the sheet and later passing between a second pair of plain compression rolls thereby causing a part of the waterproofing material remaining on the surface to be pressed into the sheet.

7. The herein described process of saturating felt, which consists in applying hot, liquid waterproofing material to at least one side of a sheet of felt having substantially smooth surfaces, passing said sheet between a pair of compression rolls, of which at least one is provided with raised and depressed portions, in such a manner as to indent the surface of the sheet, allowing some of the waterproofing material to remain on top of the raised portions of the sheet and later winding said sheet into a roll whereby the waterproofing material on the surface is substantially absorbed by said sheet.

8. The herein described process of apply-

ing absorbable waterproofing material to a sheet of dry felt and indenting said sheet before the said material is entirely absorbed.

9. The herein described intermediate product, comprising a sheet of felt having raised portions substantially uniform in height and depressed portions substantially uniform in depth on at least one surface and having liquid waterproofing material on and above the surface of said raised portions.

10. The herein described process of saturating substances with waterproofing material, which consists in applying said material to at least one surface of a body of said substance and indenting said body after said material is applied and before all of it is absorbed by said substance.

11. The step in the herein described process of saturating substances with waterproofing material, which consists in applying said material in predetermined quantities to an indented surface of said substance and subsequently forcing some of said material into said substance by pressure.

12. The step in the herein described process of saturating substances with waterproofing material which consists in applying said material to an indented surface of said substance and subsequently temporarily closing the outer ends of said indentations and simultaneously applying pressure to said material to force some of said material into said substance.

13. The herein described process of saturating a sheet of felt which comprises the step of indenting a surface of said sheet while it is covered with liquid waterproofing material.

In testimony whereof I affix my signature.

RAY P. PERRY.