Aug. 30, 1927. 1,640,679

A. S. SPEER

METHOD OF PRINTING DESIGNS

Original Filed Feb. 9, 1921 2 Sheets-Sheet 1

Fig. 1.

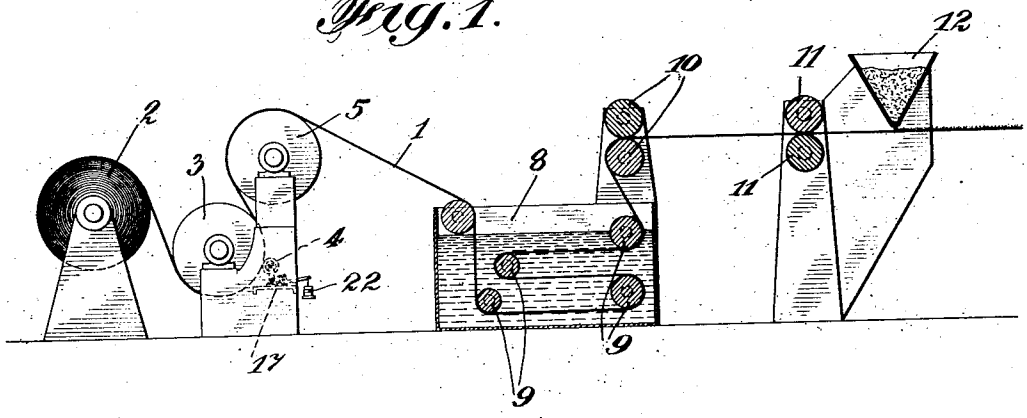


Fig. 2.

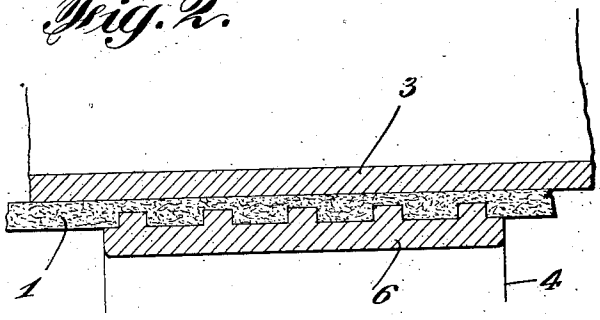
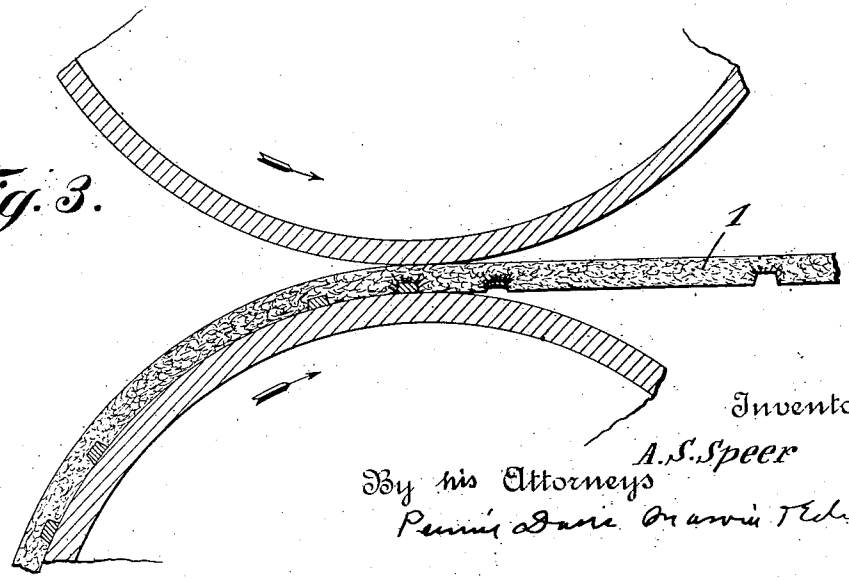


Fig. 3.



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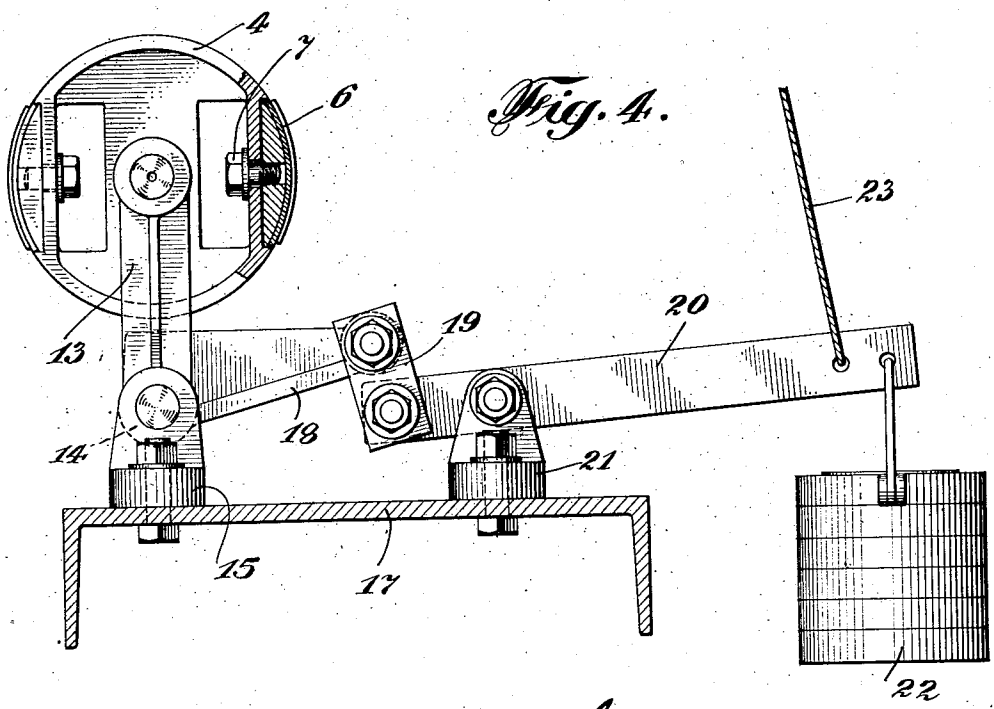

Fig. 4.

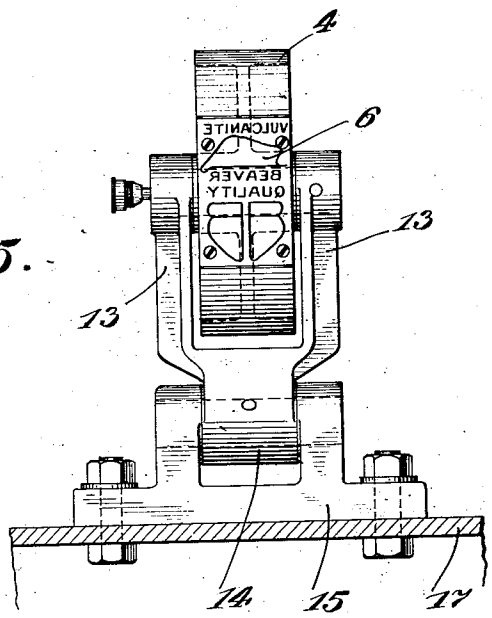

Fig. 5.

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UNITED STATES PATENT OFFICE.

ALEXANDER S. SPEER, OF BUFFALO, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO CENTRAL TRUST COMPANY OF ILLINOIS, A CORPORATION OF ILLINOIS, AND AKSEL K. BODHOLDT, OF EVANSTON, ILLINOIS.

METHOD OF PRINTING DESIGNS.

Application filed February 9, 1921, Serial No. 443,514. Renewed July 9, 1923.

My invention is an improvement in methods of printing designs, and relates especially to the formation of impressed trademark designs on prepared roofing and the like.

An object of the invention is to form clearly impressed designs, in materials such as are used with one face exposed, on that face of the material which will be hidden in use, and in such manner that there will be no visible indication of the design upon the other or exposed face.

Another object is to form such designs upon materials having a base or body of felt-like material, saturated with a waterproofing material, and coated with a protective layer on one face, before the base or body is saturated and coated, and in such manner that the designs will be clearly visible on the reverse face, after saturation and coating.

The nature of the invention may be best understood by reference to one illustrative method and apparatus embodying the invention and illustrated in the accompanying drawings.

Reference is made to my copending application Serial No. 443,513, in which I claim apparatus for making the article by the method herein disclosed.

In the drawings:

Figure 1 is a diagrammatic side view of a machine for carrying out the method,

Figure 2 is a sectional view of one of the dies,

Figure 3 is an enlarged partial section at the compression rollers,

Figure 4 is a side view of the printing roll, with a part in section,

Figure 5 is a front view of the same.

I shall explain this invention in connection with one embodiment thereof suitable for use in the manufacture of prepared or asphalt roofing. It will be understood that the invention is not, however, limited thereto or to similar methods of manufacture, but may be employed independently thereof.

In the manufacture of prepared roofing, which in the usual practice, consists of an absorbent base or body of fibrous or felt-like material, saturated with a waterproofing material, and coated on one face with a protective facing, it is desirable that the web or sheet be provided with trademark designs at suitable intervals. The arrangement of the designs with respect to the web or sheet, depends upon the ultimate disposal of said web or sheet. As for instance when the web is divided into individual shingles, it is desirable that the designs be so arranged on the web that they will appear upon the individual shingles. It is also desirable that such designs be upon the reverse or hidden side of the roofing, that is upon that side which is not exposed to the weather, and which in the usual practice has no protective coating. I have found it extremely difficult to form these designs in the finished web and on the reverse side, without some indication appearing upon the weather side. Such marks may be almost invisible, but they destroy the uniformity of color and surface of the roofing.

In the present embodiment of the invention, I form the designs on one face of the body or base of the material, while said body or base is yet dry, and before it has been waterproofed by saturating it in asphalt and before it has been provided with the protective facing. With this object in view I pass the web of felt between a pair of rollers, one of which is a smooth or platen roller, and the other a printing roller carrying embossing dies. The printing roller will carry a series of dies, arranged with respect to the roller, as the design should appear upon the roofing, and the characters of each of these dies have flat faces. That is the characters are so made that they do not cut into the felt, but compress the same, making an indentation having a plane bottom with substantially parallel side walls. During the making of each impression, the opposite face of the felt is supported firmly

and throughout the extent of the material which is receiving the impression, so that there can be no offsetting or lateral movement of the material.

After the base or body has been impressed with the design as above set forth, it is passed through the saturating tank, containing the waterproofing or preserving material. The base or body is then passed between a pair of rollers, which squeeze out from the felt the surplus waterproofing compound. While the base or body is passing between the compression rollers, a portion of the compound, which is a thick heavy liquid is driven into the indentations, deepening the same. Afterwards the waterproofed base is passed through the coating machine, which places upon one face thereof the protective coating.

It might be thought that the impressed designs would disappear under the pressure of the compression rollers. Such however is not the case. Instead of lessening the depth of the impressions, they are deepened. Each design is in itself relatively small as compared with the total surface of the web or sheet, and they are filled with the thick heavy waterproofing solution to the level of the outer face of the waterproof coating. This liquid which fills the indentations, is subjected also to the pressure of the compression rollers, but, being incompressible, its presence results in deepening the impression. In other words, this liquid acts similarly to hard solid material in the impressions and concentrates the pressure of the rollers upon the indented portions of the sheet. After the saturated base or body leaves the compression rollers, the fibers of the body which encircle the indentations absorb the saturating liquid from the indentations, acting in the same manner as blotting paper. The waterproofing liquid preferably has certain properties which fix or set the fibers of the sheet so as to preserve the impressions. For example, an asphalt waterproofing liquid is sufficiently adhesive to cement the fibers or material of the sheet and prevent the same from gradually resuming its initial condition and thus obliterating the impressions. Designs so made are clearly visible on one face of the completed sheet or web, but there is no trace of them upon the other face. It will be understood that the impressions are always made on that face of the sheet which is to be hidden in use, so that no mark appears upon the weather face of the material.

In practice, the base or body 1 of felt or the like is supplied from a reel 2 suitably supported, and the web 1 passes between a roller 3 and a printing roller 4. This printing roller has oppositely arranged peripheral recesses, within which are held dies 6, the dies being held to the roller by means of screws 7. The outer faces of the dies are shaped to form with the peripheral outline of the roller, and they have printing characters which extend beyond the peripheral outline of the roller. These characters have flat faces, as shown, so that they compress the fibers of the base or body without cutting the same. The web passes beneath the roller 3, which is a platen roller and over a roller 5 to a saturating tank 8 which contains a composition of waterproofing material, as for instance liquid asphalt. The web is guided in the tank, by means of direction elements 9, which are so arranged that the web will be passed backwards and forwards in the solution, to thoroughly saturate the same. After leaving the tank, the web passes between a pair of compression rollers 10 which remove the excess asphalt, squeezing the web between the rollers. After the web passes the rollers 10 it is customary, though not necessary, to apply a protective coating or surfacing such as heavy asphalt to the wearing side of the material. This coating may be of any desired thickness, governed by the space between the rollers 11 at which point the coating is applied. Ordinarily no coating is placed on the opposite side of the web. Since the waterproofing or preserving compound and the heavy asphalt coating are of an adhesive character, it is desirable to apply a surfacing of powdered or crushed mineral to the surfaces of the web so that the material may be handled without danger of sticking together. If desired, a wearing surface of crushed stone or the like may be placed upon the heavy asphalt coating not only to stabilize this coating but to give to the material a pleasing and less monotonous appearance than that of the asphalt itself. This crushed material may be suitably applied to the web from the hopper 12. It is understood that the asphalt coating and the crushed stone or the like applied to the surface of the web are applied to the surface opposite that bearing the impressed designs.

The printing roller is yieldingly pressed toward the platen roller, in such manner that it may yield away from the platen roller, to compensate for the differences in thickness of the web, and to permit the passage of obstructions. The roller is journaled between the arms 13 of a yoke, whose body 14 is pivoted between the arms of a substantially U shaped bracket 15, which is secured on a suitable supporting frame 17. The yoke body has a laterally extending arm 18, which is connected by a link 19 with one end of a lever 20. The lever is pivoted intermediate its ends to a substantially U shaped bracket 21 on the supporting frame 17, and a number of weights 22 is connected to that end of the lever remote from the roller. These weights are detachable, so that

the pressure of the printing roller against the platen roller may be varied. A cable 23 is connected with that end of the lever adjacent to the counterweight, and by means of the cable, the lever may be swung to move the printing roller away from the platen roller. The compression rollers 10 are arranged directly above the tank 8, so that the surplus waterproofing material is returned directly to the tank.

Referring to Figure 3 it will be noticed that as the web passes between the compression rollers, the indentations are filled with the thick heavy waterproofing liquid. There is also a coating of this liquid on the opposite faces of the felt of considerable depth. When an indentation passes between the rollers, the lower roller will seal that side of the indentation which is remote from the printing roll, it being understood that the impressions are made on the under face of the web. At its forward edge each indentation is sealed by the surplus waterproofing material which is being squeezed from the felt. Hence the waterproofing solution which is in the indentations cannot escape either forwardly or rearwardly, and, being incompressible, the pressure thereon is concentrated in the indentations. This prevents the obliteration of the impressions under the pressure of the rolls, and in fact tends to deepen them. After the indentations pass from between the compression rollers, the fibers of the felt absorb the solution from the indentations.

The improved method is adapted for use in any connection where it is desired to impress trademark designs on material including a waterproofed absorbent base or body, in such manner that the impression will not appear upon the exposed face, but only upon the hidden or reverse face. While preferably the designs are impressed on the web before it is saturated, they may also be impressed upon the web after it is saturated. In either case the fibers which are displaced by the raised characters of the dies are cemented together by the saturating solution, and are held in such displaced position. When the solution dries, these fibers are closely cemented so that they do not tend to return to their original position. That solution which remains in the indentations after the web has been squeezed by the compression rollers assists in this cementing action, such solution being absorbed by the adjacent fibers, and making such fibers more thoroughly saturated than those farther from the indentations, and as a consequence more closely cemented. The impressing of the designs before saturating the web is carried out more easily, because of the fact that at this time the web is dry, and there is no solution to gum the printing roller. The essential step in the method is the forming of the design impressions without marring or discoloring the wearing or outer surface of the material.

Obviously the invention is not limited to any specific method or sequence of steps and the details of the illustrative method and apparatus for performing the same may be variously modified. Moreover, it is clear that the invention may be employed in different relationships than that herein illustrated. Furthermore, it is not indispensable that all features of the invention be used conjointly inasmuch as they may be employed advantageously in various different combinations and sub-combinations.

I claim:

1. A method of forming designs upon one face of materials having a base or body of waterproofed absorbent material and a protective coating on the other face, in such manner that the design is visible only on the face of the material on which it is imprinted, which consists in impressing the design on the base or body before it has been waterproofed, waterproofing the material and passing it between compression rollers, and applying the protective coating on the opposite face from the designs.

2. The method of placing permanent designs or identifying data upon a sheet of relatively soft fibrous material which comprises impressing the designs or data into one face of the sheet, applying a liquid upon the impressions and subjecting said sheet to pressure, and at the same time confining the liquid in the impressions in order to deepen the same.

3. The method of placing permanent designs or identifying data upon a sheet of relatively soft fibrous material which comprises impressing the designs or data into one face of the sheet, applying a liquid preserving compound to the impressed face of said sheet, and then applying pressure to said sheet and at the same time confining some of said liquid in the impressions in said sheet, thereby deepening the impressions therein.

4. The method of placing permanent designs or identifying data upon a sheet of relatively soft fibrous material which comprises impressing the designs or data into one face of the sheet, applying an adhesive preserving liquid to the impressed face of said sheet, then applying pressure to said sheet to express excess liquid and at the same time confining some liquid in the impressions of said sheet to retain the depth of the impressions.

5. The method of applying marks or designs to materials of the character described which consists in impressing the mark or design in one face of said material before the same is otherwise treated and then waterproofing said material and subjecting

it to pressure without obliterating the impressions.

6. The method of placing permanent designs or identifying data upon a sheet of fibrous roofing felt or the like, which is characterized by compressing the felt in areas to form the design and then treating the sheet to fix the compressed fibers of the felt to retain the impressed design.

7. The method of placing permanent designs or identifying data upon a sheet of fibrous roofing felt or the like, which is characterized by compressing the felt in areas to form the design and then applying a compound for cementing and setting the compressed fibers of the sheet to retain the imprint of the design.

In testimony whereof I affix my signature.

ALEXANDER S. SPEER.