

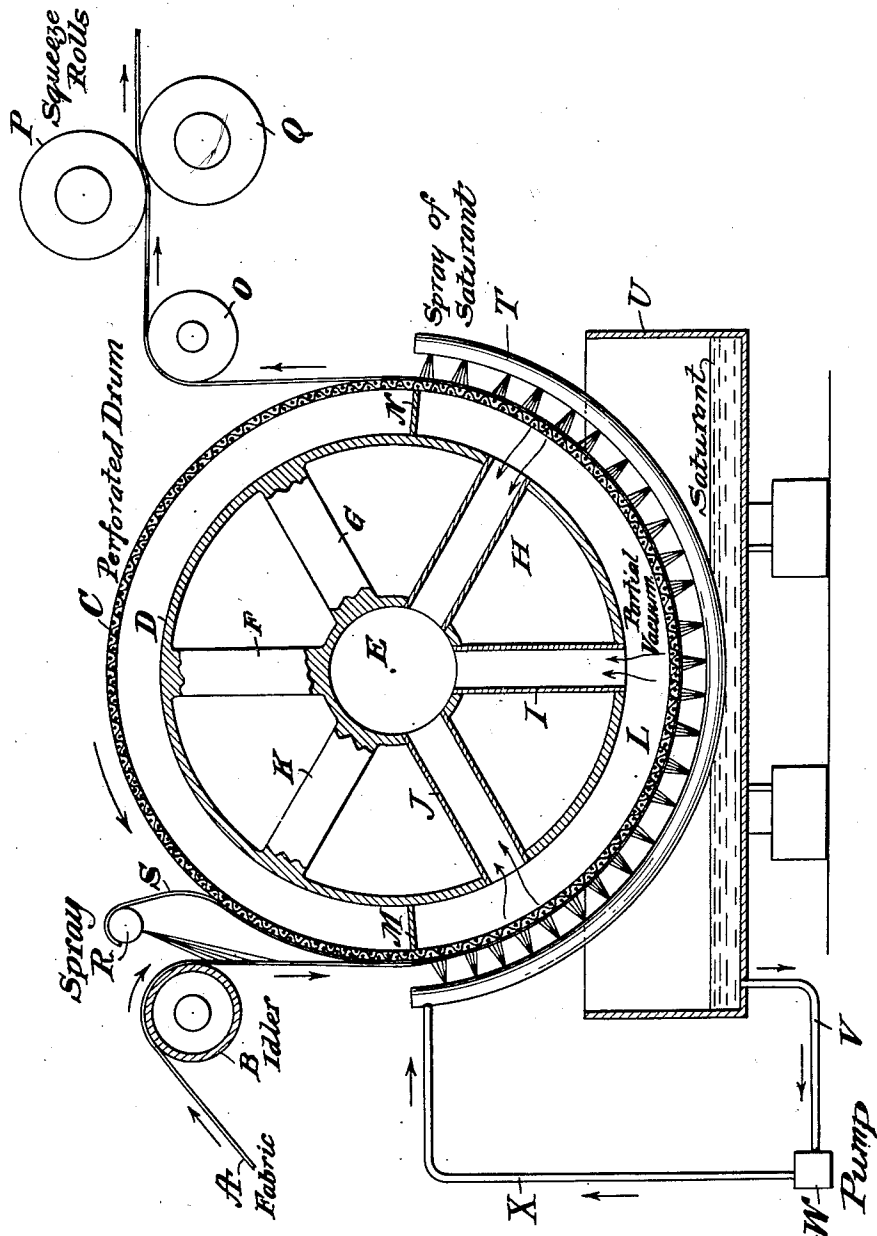
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J. ZAVERTNIK, JR

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IMPREGNATING PROCESS

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INVENTOR:
Joseph Zaverznik, Jr.
BY *Forbes Sibley*
his ATTORNEY.

UNITED STATES PATENT OFFICE

JOSEPH ZAVERTNIK, JR., OF HARRINGTON PARK, NEW JERSEY, ASSIGNOR TO THE
BARRETT CO., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

IMPREGNATING PROCESS

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My invention relates to a process for the impregnation of porous fabrics such as paper, felt, strawboard, cloth or the like. More particularly my invention pertains to the production of roofing paper, artificial shingles and similar materials by the impregnation of porous fabric with hot tar or asphalt, but it is generally applicable to the impregnation of porous fabrics with any saturant in fluid condition.

In the production of roofing paper or artificial shingles, a continuous impregnation process is usually employed. A roll of felt or other suitable fabric is unwound by machinery and the moving felt is passed through a bath of a fluid saturant after which it travels out of the bath and moves in the air for a sufficient time to permit the hot fluid saturant to harden. Squeeze rolls are employed to express the excess saturant and to give any desired surface appearance to the product.

My invention is particularly useful in the continuous type of saturation process described though it is also applicable to a batch process in which only one piece of fabric is treated at a time.

One of the advantages of my process is that the fabric need not be immersed in the saturant. This feature permits a close control of the amount of saturant employed and a similar control of the degree of saturation attained. Another advantage of my process lies in the use of a partial vacuum to promote saturation. The saturant may be delivered with considerable penetrating force to one side of the fabric and this penetration may be assisted by maintaining a partial vacuum on the reverse side of the fabric. Other advantages will become apparent.

My invention may best be understood by reference to the appended drawing in which letters and legends are used to describe the process as applied to the saturation of a roll of felt or other porous fabric by means of a suitable apparatus which is shown in cross section.

In the drawing (A) is a sheet of fabric undergoing treatment and (B) is an idler roll, preferably steam heated, over which it passes. After leaving the idler (B), the fabric (A)

passes downward as indicated by the arrow and contacts with a revolving drum (C). As shown in the drawing this drum has a perforated or foraminous surface. The drum (C) is rotated, in the direction indicated by the arrows, by a gearing or other suitable means. Concentrically positioned within drum (C) is stationary drum (D) which is supported by a hollow axle (E) and radial spokes (F), (G), (H), (I), (J), and (K). The drum (C) is equipped with suitable heads which are not shown in the cross-sectional drawing. The supporting axle (E) of drum (D) penetrates these heads. The perforated or foraminous surface of drum (C) is preferably of such a width that the fabric (A) will completely cover the perforations.

A partial vacuum is maintained in that portion of the annular space (L) between drums (C) and (D) that is shown between baffles (M) and (N). This partial vacuum is maintained by a suction on the space inside axle (E) and is transmitted to space (L) by the hollow radial spokes (H), (I), and (J). As the drum (C) revolves, the partial vacuum is maintained in space (L) by means of the baffles (M) and (N) which closely fit against the inside surface of drum (C). The ends of this annular space are sealed by baffles fastened to drum (D) and extending from (M) to (N) at each end of drum (D). The semi-circular outward edges of these baffles fit closely against the inside of revolving drum (C). The fabric (A), after passing around the drum (C), rises and passes over idler roll (O) and through wringer rolls (P) and (Q) which act to squeeze out excess saturant.

In the operation of the process, the fabric (A) passes over idler (B) and its top (drum-side) surface is coated with saturant by spray pipe (R) at a rate sufficient to effectively cover the surface of the fabric which later comes into contact with the drum (C). An apron (S) extends downward from spray pipe (R) and rests on the center line of the drum at a point opposite the baffle (M). The purpose of the apron is to prevent any saturant from spray (R) from entering the drum (C) with-

out having previously contacted with the fabric (A).

The effect of the saturant placed on the drum side of fabric (A) by spray pipe (R) is to render the fabric pliable and to cause it to adjust itself to the surface of the drum (C). Since the fabric thus coated with saturant travels at the same speed as the periphery of the drum, it forms a complete and permanent seal between the atmosphere and that portion of the perforated or foraminous drum (C) that includes space (L) between baffles (M) and (N).

As the drum (C) rotates, carrying the fabric (A) with it, the under side of the fabric is sprayed with saturant by means of spray pipe (T) which is shown in the drawing as following the general contour of the drum. Spray pipe (T) is supplied with saturant from tank (U) by means of pipe (V), pump (W) (diagrammatically shown) and pipe (X). Excess saturant from spray pipe (T) falls back into tank (U). Spray pipe (R) may be supplied with saturant from the same, or from another source.

The saturant is delivered to the bottom side of the fabric on drum (C) with considerable force which causes it to penetrate the fabric. The partial vacuum maintained in space (L) between drums (C) and (D) creates a differential pressure between the inner and outer surfaces of the fabric so that a sucking action is set up which promotes saturation.

The advantages of my invention thus described, are believed to be obvious. The penetration of the fabric by the saturant is aided not only by the penetrating force of the spray but by the differential pressure created, whereby the spray-applied saturant is drawn into the fabric. My process thus permits a rapid and uniform saturation with a minimum wastage of excess saturant.

In the specific form of my invention shown in the drawing the fabric (A) is saturated while passing around the lower half of the drum (C). It is obvious, however, that the movement of the drum might be reversed and the upper half used for saturating purposes, appropriate changes being made in the position of the inner drum (D) and the sprays (R) and (T). While only one spray pipe (T) is shown in the drawing it will of course be understood that any number of such pipes may be used across the width of the fabric. While I have shown the maintenance of a partial vacuum in the appropriate section of drum (C) by means of an inner, stationary, drum equipped with hollow radial spokes, other means may be employed to produce the partial vacuum used in my process.

When my invention is employed for the purpose of saturating fabric with a bituminous material such as tar, asphalt, or pitch, the saturant must be used while hot since it

tends to solidify at normal temperatures. In such a case, the saturant may be readily maintained in a fluid condition by means of heat applied in any convenient manner to tank (U) or its contents. It should be noted, however, that my invention is equally applicable to the saturation of fabric at room temperature with substances that remain fluid at such temperatures.

No claim is made in this application for the broad feature of rendering fabric pliable and adapted to fit closely to a vacuum cylinder during impregnation since this is the joint invention of myself and another and is the subject of co-pending application Serial 391,854 filed Sept. 11, 1929.

Now having described my invention, I claim:—

1. The process of saturating fabrics which comprises supporting the fabric to be saturated with one surface of the fabric in contact with a supporting member and the other surface exposed, and spraying excess saturant onto the exposed surface of the fabric from a point therebeneath while subjecting the supported surface of the fabric to a reduced pressure as compared with that on the exposed surface, the excess saturant supplied to the fabric draining off by gravity from the exposed surface of the fabric and the penetration of the remaining saturant sprayed onto the fabric being aided by the differential pressure, whereby the degree of saturation of the fabric is controlled.

2. The process of saturating felt with a bituminous saturant, which comprises continuously passing the felt with one side thereof in contact with the base portion of a rotating foraminous support while leaving the other side exposed, spraying excess saturant onto the exposed side of the felt from a point therebeneath while maintaining suction on the supported side of the felt, the saturant being supplied under pressure sufficient to penetrate the exposed side of the felt, the excess saturant draining off by gravity from the exposed side of the felt, the penetration of the remaining saturant sprayed onto the felt being aided by the suction on the supported side of the felt, whereby the degree of saturation of the felt is controlled.

3. The process of saturating fabrics which comprises supporting the fabric to be saturated with one surface thereof in contact with a foraminous supporting member and the other surface exposed, spraying excess saturant onto the exposed surface of the fabric while subjecting the supported surface of the fabric to a reduced pressure as compared with that on the exposed surface, excess saturant being removed from the exposed surface throughout the area thereof subjected to differential pressure, and the penetration of the remaining saturant sprayed onto the fabric being aided by the differential

pressure, whereby the degree of saturation of the fabric is controlled.

4. A process for impregnating fabric which comprises coating one side of said fabric with a fluid saturant, passing said coated side in
5 contact with a perforated supporting surface, and maintaining a partial vacuum on said coated side while spraying a fluid saturant onto the other side of said fabric.

10 5. A process for impregnating felt which comprises coating one side of said felt with a fluid tarry saturant, passing said coated side in contact with a perforated supporting surface, and maintaining a partial vacuum on
15 said coated side while spraying said fluid tarry saturant onto the other side of said felt.

JOSEPH ZAVERTNIK, JR.

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