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METHOD AND APPARATUS FOR TREATING COATED ROOFING MATERIALS.

APPLICATION FILED DEC. 6, 1917.

1,289,507. Patented Dec. 31, 1918.

Fig. 1

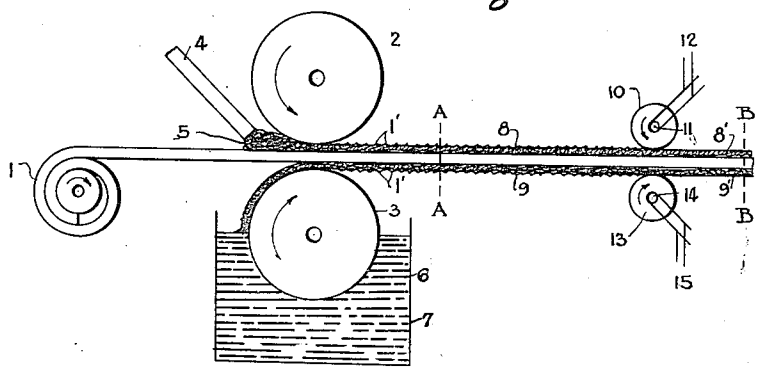



Fig. 2

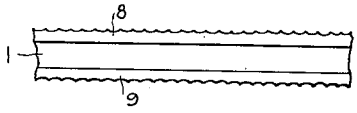
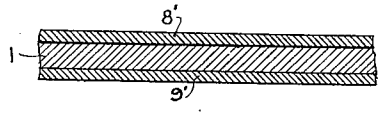



Fig. 3

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## METHOD AND APPARATUS FOR TREATING COATED ROOFING MATERIALS.

1,289,507. Specification of Letters Patent. Patented Dec. 31, 1918.

Application filed December 6, 1917. Serial No. 205,821.

*To all whom it may concern:*

Be it known that I, LENNOX S. MASON, a citizen of the United States, residing at 251 South 44th street, Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Methods and Apparatus for Treating Coated Roofing Materials, of which the following is a specification.

My invention relates to an improved method and apparatus for providing a sheet of construction material, such as the saturated felts used for building and similar purposes, with a smooth, unridged coating of waterproof material on one or both sides thereof. In the ordinary and customary method of providing a sheet of construction material, such as saturated felt, with a coating of waterproof material on one or both sides thereof, it has been customary to apply the coating material to such sheet by means of coating rolls located in proximity to the source of supply of the coating material. The coating material is generally in a liquid condition approaching a semi-plastic state, and in practice it is found that as a result of the slight adhesion of the coating material to the coating rolls at the point where the coated sheet leaves the coating rolls, the coatings are not, as might be expected, smooth and unridged, but have a rough ridged surface known to the trade by the name of "alligator finish."

For many purposes it is highly desirable to have a coated construction material, such as the so-called "rubber" roofings of commerce, the outer surfaces of which are substantially smooth and unridged. In order to provide the coated material with such smooth surfaces it has been suggested in the art to make the ridged surfaces known by the trade name of "alligator finish" smooth by removing the ridges by abrasives. The disadvantages of this mode of procedure are that the process is laborious and expensive, resulting often in injury to the sheet, and in any case a substantial amount of the coating material is removed with consequent loss in weight of the finished product. It has also been proposed to remove the ridges by applying great pressure to the coated sheet with the result that the ridges are smoothed or flattened out. The disadvantages of this mode of procedure are that the application of great pressure to the coated sheet often results in considerable injury to the felt base to which the coating material is applied, with the result that the life of the finished product is often materially lessened.

It has always been known in the art to render the ridged surfaces smooth by passing the sheet, after one or both sides of the same have received the coating material, in its rough, ridged form, over or under one or between two pipes through which steam is passed. The action of the steam is to soften the ridges and the pressure exerted by the pipes against the coated surfaces causes the softened ridges to be more or less flattened out into the rest of the coated surfaces, thus rendering the sheet smoother in appearance than it otherwise would be. The limitations of this mode of procedure are that, especially when dealing with coating materials having a melting point considerably higher than the temperature of steam, the softening action of the steam-heated pipes becomes negligible and the sheet does not attain the smooth appearance desired. Furthermore, in order to obtain this smoothing action, it is necessary that the steam-heated tubes be either stationary or that by any suitable arrangement the coated sheet and the steam-heated tubes have a motion relative to each other. Where, as is usually the practice, the steam heated tubes are stationary, that is, do not revolve, it is found that as the sheet passes between the tubes, the coating material is often caught by the tubes with the result that an effect similar to that which produces the original "alligator finish" is produced and the resulting product is imperfect and does not possess the smoothness desired to be obtained.

By my invention I am enabled to obtain a product having the desired degree of smoothness in a way that is at once simple and effective, and avoids the difficulties referred to above. By my invention, I heat the smoothing tubes to a temperature substantially above the temperature of the melting point of the coating material. This temperature will, of course, vary for the particular coating material being employed. In any case, however, it is essential that the temperature of the smoothing tubes be say 20° F. above the temperature of the melting point of the coating material. A smoothing tube heated to such a temperature does not

merely soften the ridges on the coatings of the sheet of construction material, but actually locally, and substantially instantaneously, fuses the ridges and renders them substantially liquid. This fusing action renders the coated surfaces substantially smooth and unridged. Furthermore, the high temperature to which the smoothing tubes are heated prevents the coating material from being caught by the heating tubes as is the case where the tubes are heated by steam, which has a temperature generally below that of the melting point of the coating material.

As a result of the above mode of procedure the product is provided with the desired smooth surfaces with a minimum of difficulty and expenditure of time. Since the smoothing tubes are highly heated as above set forth, the pressing action of the smoothing tubes may be considerably reduced so that there is less liability of injury to the felt base or to the waterproof coating. As a source of heat for the heated smoothing tubes I prefer to use electrical heating units since by this means the temperature of the heated tubes may be readily regulated to obtain the desired effect.

Referring to the drawing, wherein I have illustrated an apparatus for practising the process of my invention,

Figure 1 is a diagrammatic view in end elevation of the apparatus of my invention;

Fig. 2 is a cross-section of the coated sheet along the line A—A of Fig. 1 when the coated sheet has the "alligator finish;" and

Fig. 3 is a cross-section along the line B—B of Fig. 1 showing the sheet when the coatings are in a substantially smooth, unridged condition.

1 indicates the sheet of construction material which is to receive the coating material on one or both sides of the same and which travels continuously in the direction indicated by the large arrows of Fig. 1, the sheet being advanced by any suitable or desirable means. This sheet consists, for example, of a sheet of saturated felt such as that used in the manufacture of the so-called "rubber" roofings of commerce. The sheet passes between the rotating coating rolls 2 and 3. Adjacent the coating roll 2 is the source of supply 4 of the coating material 5. The coating roll 3 rotates within the receptacle 7 containing the coating material 6. The coating material is in a liquid condition approaching a semi-plastic state, and consists of fusible waterproofing material, generally of a bituminous nature, such as pitch or asphalt rendered molten, if necessary, by the application of heat. The action of the coating rolls provides the sheet 1 with the coatings 8 and 9. Due to the fact that the coating material adheres to the coating rolls 2 and 3, the coated sheet as it leaves the coating rolls 2 and 3 is not in a smooth, unridged condition but is provided with the ridged portions 1'.

In order to render the surfaces of the coatings substantially smooth and unridged, I provide the heated smoothing means 10 and 13. It is essential for the proper smoothing action that these tubes be heated to a temperature substantially above that of the melting point of the coating material. I obtain the desired effect by providing the smoothing tubes 10 and 13 with the electrical heating units 11 and 14, respectively, which are supplied with current from the lead wires 12, 12, and 15, 15, respectively. It is also essential, in order to obtain the desired smoothing effect, that the sheet and the smoothing rolls have a substantial motion relative to each other. That is, where the tubes, as may sometimes be desirable, are rotated, the surface velocity of the same should be substantially greater or substantially less, but not equal to the longitudinal velocity of the moving sheet. This necessary relation may be obtained either, in the simplest case, by maintaining the tubes 10 and 13 fixed and non-rotating, or else by giving such tubes a slight angular velocity, care being taken, however, that the surface velocity of the rotating tubes shall be substantially less than the velocity of the moving sheet. The advantage of rotating the tubes slightly, as just described, is that in this way foreign particles or other bodies which may collect on that side of the tubes nearer the coating rolls will be moved on and gradually removed by the moving sheet, which would not be the case if the tubes were stationary. In the latter case the foreign bodies would collect and might render the sheet imperfect.

The sheet 1, provided with the coatings 8 and 9, having the "alligator finish," after passing the highly heated tubes 10 and 13, is rendered substantially smooth and unridged in the manner previously described.

By the process and apparatus of my invention I am enabled to provide the sheet with smooth, unridged surfaces in a simple and effective manner.

What I claim is:

1. The method which comprises the steps of applying, by means of a coating roll, a quantity of coating material consisting of fusible waterproofing material, in a semi-plastic condition, to at least one side of the sheet of construction material, thereby providing the said side with a coating having a ridged surface, and thereafter applying to the ridged surface a body having a portion in pressing contact with the ridged surface and heated to a temperature substantially above the melting point of the coating material, the body and the coated sheet having a substantial motion relative to each other

in a direction along the line of travel of the sheet and substantially transverse to the portion of the body which is in contact with the ridged surface.

2. The method which comprises the steps of applying, by means of a coating roll, a quantity of coating material consisting of bituminous material, in a semi-plastic condition, to at least one side of the sheet of construction material, thereby providing the said side with a coating having a ridged surface, and thereafter applying to the ridged surface a body having a portion in pressing contact with the ridged surface and heated to a temperature substantially above the melting point of the coating material, the body and the coated sheet having a substantial motion relative to each other in a direction along the line of travel of the sheet and substantially transverse to the portion of the body which is in contact with the ridged surface.

3. The method which comprises the step of applying to the surface of the fusible waterproofing coating on a sheet of construction material a heated body with a portion in pressing contact with the surface of the coating, the said body and the coated sheet having a difference in velocity relative to each other in a direction along the line of travel of the sheet and substantially transversely to the portion of the body which is in contact with the surface of the coating.

4. The method which comprises the step of applying to the surface of the fusible waterproofing coating on a sheet of construction material a body heated to a temperature substantially above the melting point of the coating material with a portion in pressing contact with the surface of the coating, the said body and the coated sheet having a difference in velocity relative to each other in a direction along the line of travel of the sheet and substantially transversely to the portion of the body which is in contact with the surface of the coating.

5. The method of providing a sheet of construction material with a smooth unridged coating of fusible waterproofing material, comprising the steps of applying, by means of a coating roll, a quantity of coating material consisting of fusible waterproofing material, in a semi-plastic condition, to at least one side of the sheet of construction material, thereby providing the said side with a coating having a ridged surface, and thereafter applying to the ridged surface a body having a portion in pressing contact with the ridged surface and heated to a temperature substantially above the melting point of the coating material, the body and the coated sheet having a substantial motion relative to each other in a direction along the line of travel of the sheet and substantially transverse to the portion of the body which is in contact with the ridged surface, whereby the heated body fuses by a localized heating action the outer portions of the ridges on the coating and renders the surface of the coating substantially smooth and unridged.

6. The method of providing a sheet of construction material with a smooth, unridged coating of asphaltic material, comprising the steps of applying, by means of a coating roll, a quantity of coating material consisting of asphaltic material, in a semi-plastic condition, to at least one side of the sheet of construction material, thereby providing the said side with a coating having a ridged surface, and thereafter applying to the ridged surface a body having a portion in pressing contact with the ridged surface and heated to a temperature substantially above the melting point of the coating material, the body and the coated sheet having a substantial motion relative to each other in a direction along the line of travel of the sheet and substantially transverse to the portion of the body which is in contact with the ridged surface, whereby the heated body fuses by a localized heating action the outer portions of the ridges on the coating and renders the surface of the coating substantially smooth and unridged.

7. In an apparatus for providing a sheet of construction material with a smooth, unridged coating of fusible waterproofing material, a source of supply of fusible waterproofing material in semi-plastic condition, means for progressively advancing the sheet to be coated past the supply of fusible waterproofing material, whereby the sheet receives a predetermined amount of such material on the surface which is to be coated, a coating roll for spreading the coating material over the surface of the sheet to be coated, and means located in pressing contact with the coated surface and substantially transversely to the line of travel of the sheet, said last mentioned means being heated to a temperature substantially higher than the melting point of the coating material, the said sheet having a substantial motion relative to the said last mentioned means for rendering the surface of the coating substantially smooth and unridged.

8. In an apparatus for providing a sheet of construction material with a smooth, unridged coating of fusible waterproofing material, a source of supply of fusible waterproofing material in semi-plastic condition, means for progressively advancing the sheet to be coated past the supply of fusible waterproofing material, whereby the sheet receives a predetermined amount of such material on the surface which is to be coated, a coating roll for spreading the coating material over the surface of the sheet to be coated, and elongated, electrically heated means located in pressing contact with the coated surface

and substantially transversely to the line of travel of the sheet, said last mentioned means being heated to a temperature substantially higher than the melting point of the coating material, the said sheet having a substantial motion relative to the said last mentioned means for rendering the surface of the coating substantially smooth and unridged.

9. In an apparatus for providing a sheet of construction material with a smooth, unridged coating of fusible waterproofing material, comprising a source of supply of fusible waterproofing material in semi-plastic condition for each side of the sheet, means for progressively advancing the sheet to be coated past the supply of fusible waterproofing material, whereby the sheet receives a predetermined amount of such material on each surface thereof, a plurality of coating rolls for spreading the coating material over each side of the sheet, and a plurality of means located in pressing contact with the coated surfaces of the sheet and substantially transversely to the line of travel of the same, the said last mentioned means being heated to a temperature substantially higher than the melting point of the coating material, the said sheet having a substantial motion relative to the said last mentioned means for rendering the surfaces of the coatings smooth and unridged.

10. In an apparatus for providing a sheet of construction material with a smooth, unridged coating of fusible waterproofing material, a source of supply of fusible waterproofing material in semi-plastic condition, means for progressively advancing the sheet to be coated past the supply of fusible waterproofing material, whereby the sheet receives a predetermined amount of such material on the surface which is to be coated, a coating roll for spreading the coating material over the surface of the sheet to be coated, a smoothing roll located in pressing contact with the coated surface and substantially transversely to the line of travel of the sheet, means for heating said smoothing roll to a temperature substantially higher than the melting point of the coating material, and means for rotating the smoothing roll, the said sheet having a substantial motion relative to the smoothing roll for rendering the surface of the coating substantially smooth and unridged.

In testimony whereof I affix my signature.

LENNOX S. MASON.