

Jan. 5, 1937.

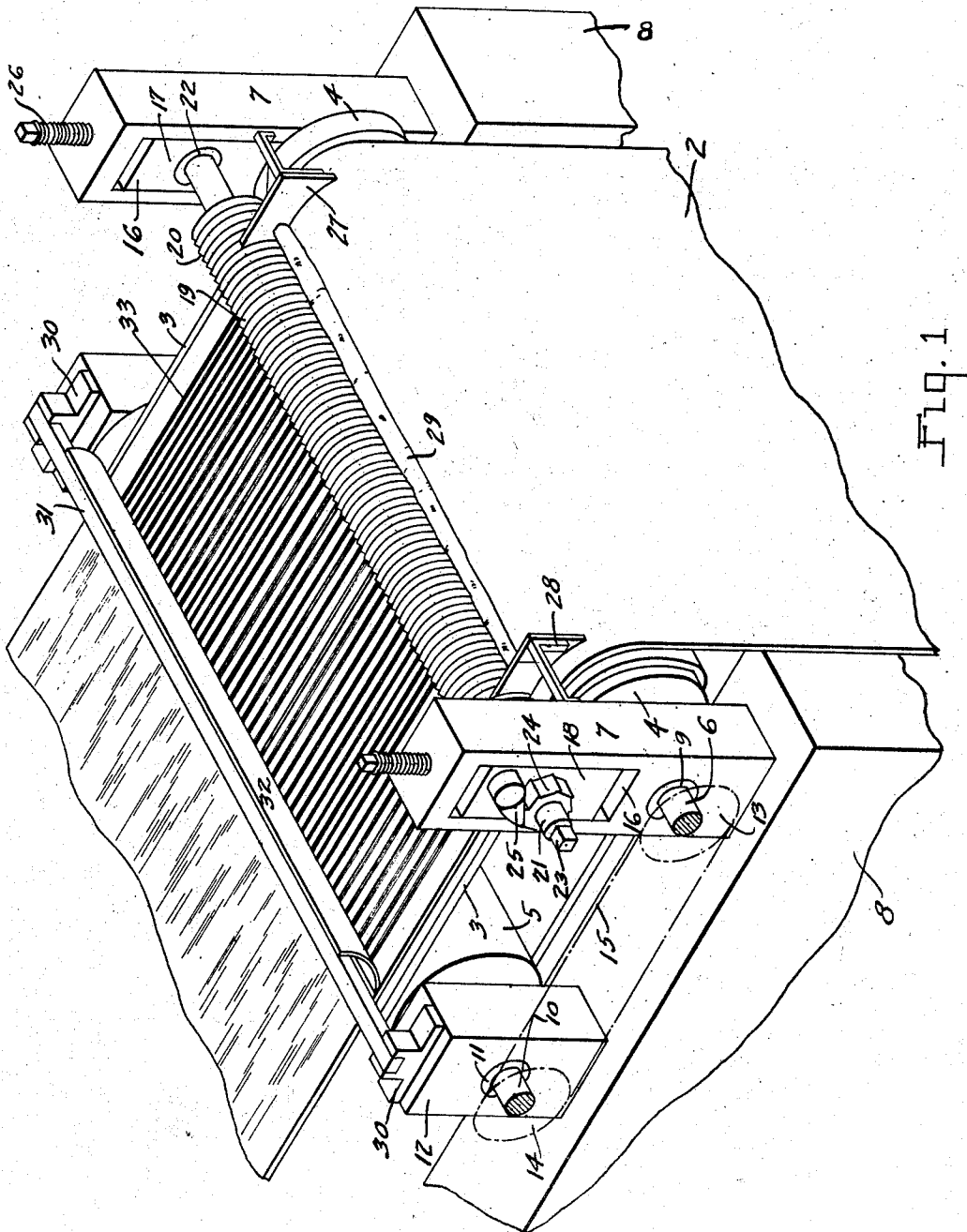
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2,066,780

APPARATUS FOR AND METHOD OF COATING FABRICS

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2 Sheets-Sheet 1



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2 Sheets-Sheet 2

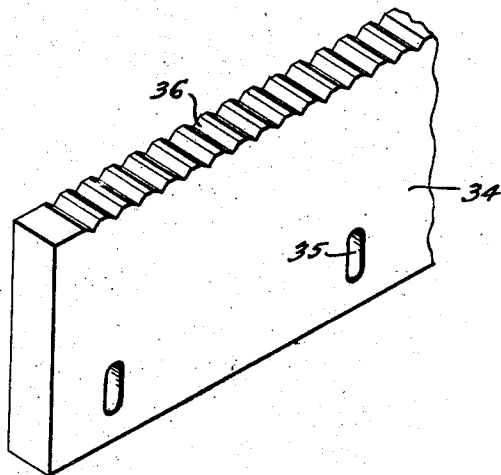


Fig. 2

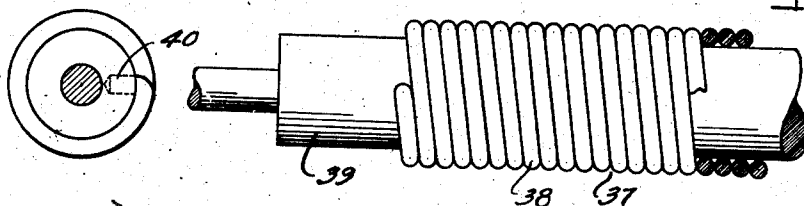


Fig. 3.

Fig. 4

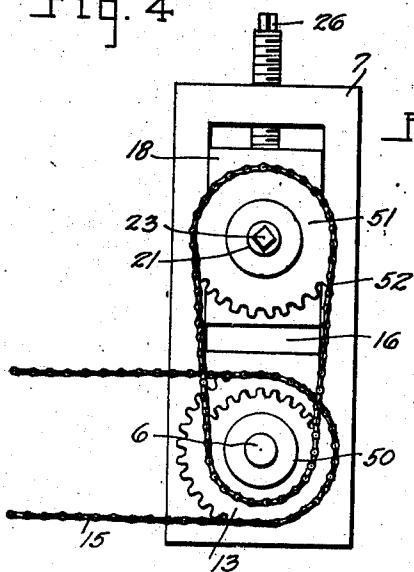


Fig. 5.

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UNITED STATES PATENT OFFICE

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APPARATUS FOR AND METHOD OF
COATING FABRICS

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11 Claims. (Cl. 91—18)

My invention relates to an apparatus for and method of coating fabrics. It has particular reference to the application of a coating of paint to a web of surface covering material. Surface covering material, such as felt base, is commonly covered with a more or less uniform base coat of paint of a suitable color before the decorative design is printed thereon.

The purpose of the base coat is two-fold. It serves to prevent the color of the surface covering material from showing through the decorative design and it furnishes a base upon which the design may be readily applied. The base coat is applied to the web of surface covering material by means of a doctor blade, and covers the entire top surface area of the web of surface covering material. The paint used to form the decorative design is applied over the base coat by means of conventional printing blocks. If desired, the decorative design may be applied over only predetermined portions of the base coat, so that the base coat itself constitutes part of the completed pattern appearing on the upper surface of the web of surface covering material.

The chief disadvantage in the prior art practices has been the lack of uniformity in the application of the base coat to the web of surface covering material. Stiff doctor blades have proved to be unsatisfactory because the unevenness of the felt base being coated resulted in thick applications of paint over the low spots and thin applications over the high spots. In many cases the paint would be entirely scraped off the high spots. Thin doctor blades are capable of following the contour of the material being coated, but have the disadvantage of lack of control over the amount of paint applied to the sheet. The amount of paint passing under the thin doctor blade will depend upon the pressure against the blade. As this pressure is a result of the bank of paint lying in front of the doctor blade it will be seen that the amount of paint allowed to pass under the doctor will depend upon the amount of paint in front of the doctor. Another factor which is particularly pertinent when a thin doctor blade is used is the condition of the paint being applied to the surface covering material. If the paint has lumps or is not of uniform consistency, one of the lumps may force the doctor blade up as it passes and allow an excess of paint to flow under the doctor.

It is an object of my invention to provide simple and economical means of regulating the application of a coating of paint to a fabric. It is a further object of my invention to provide means

for and a method of applying a uniform coating of paint over the surface area of a web of surface covering material. It is a further object of my invention to provide paint spreading means that will be inexpensive to manufacture and install and will be economical and efficient in use. Other objects of my invention will become apparent upon reading the annexed specification taken in connection with the accompanying drawings, in which,

Figure 1 is a perspective view of my apparatus,

Figure 2 is a fragmentary perspective view of a modified form of my doctor blade inverted and enlarged to illustrate its structural details,

Figure 3 is a fragmentary perspective view of another modified form of my doctor,

Figure 4 is an end view of Figure 3, and

Figure 5 is an end elevation of a driving mechanism for imparting rotation to the doctor roll of Figure 1.

In the drawings, the reference numeral 2 indicates a web of fabric, such as felt base, used to form a surface covering. The web of surface covering material is fed over a belt conveyor 3 mounted on the rolls 4 and 5. The conveyor 3 is formed of a thick rubber belt to provide a resilient base for the web 2. The roll 4 is provided with a shaft 6 which may be driven from any suitable motor (not shown). The shaft 6 is rotatably supported by the uprights 7 secured to the base 8 of the machine. The uprights 7 are provided with bearings 9 through which the shaft 6 extends. The roll 5 is provided with a shaft 10 mounted in bearings 11 in supporting members 12. The shafts 6 and 10 are provided with sprockets 13 and 14 connected by a chain 15, the sprockets and the chain being shown in dotted lines, so that both rolls 4 and 5 are driven at the same speed.

The uprights 7 are cut out as indicated at 16 to receive a pair of blocks 17 and 18 adapted to support a primary doctor 19. The doctor shown in Figure 1 is in the form of a roll, the surface of which is provided with a helical groove 20. If desired, a plurality of concentric circular grooves may be substituted for the helical groove 20. The doctor roll 19 is provided with a shaft 21 which is supported in bearings 22 secured in the blocks 17 and 18. One end of the shaft 21 is squared, as indicated at 23, to adapt it to receive a wrench. A ratchet 24 is secured to one end of the shaft 21 outside the block 18. The block 18 is provided with a pawl 25 adapted to prevent undesirable rotation of the doctor roll 19. The blocks 17 and 18 are adjustably secured

in the uprights 7 by means of the screw threaded bolts 26. The bolts 26 are provided with square heads so that they may be engaged by a wrench. A hand wheel may be secured to the top of the screw threaded bolts 26 if desired.

Guide plates 27 are secured to the uprights 7 by means of brackets 28. The guide plates 27 conform to the contour of the roll 4 and serve to retain a bank of paint 29 on the web of surface covering material so that it does not spread past the edges of the web. The roll 4 is mounted slightly higher than the roll 5 so that a pocket is formed in front of the doctor 19. The pocket is sufficiently large to maintain the bank of paint in front of the doctor.

The supporting members 12 have a pair of brackets 30 secured on their upper edge. The brackets 30 support a cross bar 31 to which a secondary doctor 32 is secured. The secondary doctor consists of a thin, flexible metal blade arranged at an angle to the web of surface covering material in flexed position with its exposed edge facing in the direction of travel of the web of surface covering material so that it spreads out the paint to form a coating of uniform thickness on the web as shown in Figure 1.

The operation of my coating apparatus is as follows: The paint to be applied to the web of surface covering material is placed directly in front of the primary doctor 19 and is confined by the guide plates 27 within limits defined by the edges of the web of surface covering material. As the web of material is fed under the primary doctor by the conveyor 3 a predetermined amount of paint is fed therewith through the grooves 20 in the surface of the doctor roll. The primary doctor 19 does not spread the paint over the web of surface covering material. Its only function is to regulate the amount of paint to be applied to the surface covering material.

The amount of paint applied to the web may be regulated by adjustment of the vertical position of the blocks 17 and 18 in which the shaft 21 of the doctor 19 is mounted. When any surface of the doctor roll 19 becomes worn the doctor may be rotated so as to present a new surface to the web of surface covering material. If desired, I may provide means connected to the motor for imparting a continuous rotary motion to the doctor. A suitable driving means for imparting rotation to the doctor roll 19 is shown in Figure 5 and comprises a sprocket 50 secured to shaft 6 and a similar sprocket 51 secured to shaft 21 upon which the doctor roll 19 is mounted. Sprockets 50 and 51 are connected by a chain 52 and motion is imparted to the roll 19 upon rotation of the shaft 6. Such rotation will prevent uneven wear on the surface of the doctor. The rate of rotation of the doctor will be relatively slow so as not to affect the distribution of the paint over the web of surface covering material.

The bank of paint lying in front of the doctor 19 wets the entire upper surface of the web of surface covering material. The doctor roll 19 fits so closely against the web of surface covering material passing over the conveyor belt 3 that no paint can pass between the doctor roll and the web of surface covering material except that which passes through the grooves 20. The ridges of the doctor roll scrape the paint off the portions of the surface covering material not directly under the grooves. This causes the formation of a plurality of continuous paint ridges 33 of uniform cross sectional area spaced

equi-distantly across the width of the web of surface covering material. The cross sectional areas of the ridges of paint are equivalent to the cross sectional area of the corresponding grooves in the primary doctor. The primary doctor insures a uniform quantity of paint, and uniform distribution of the paint in front of the secondary doctor, so that the only requirement of the secondary doctor is that it smoothes the paint which passes thereunder.

The secondary doctor 32 engages the paint ridges 33 and smooths them so as to form a smooth uniform base coat covering the entire upper surface of the web of surface covering material. This smoothing action is accomplished easily because even those areas of the surface covering material which lie between the ridges of paint have been previously wetted by the paint in front of the primary doctor. The primary doctor allows the paint to pass only through its grooves, but the portions of the web of surface covering material from which the paint is removed by the primary doctor retain the moisture imparted thereto by the paint. The presence of this small amount of moisture in the surface covering material facilitates the adherence of the paint to the entire upper surface of the web of surface covering material when the paint is spread and smoothed by the secondary doctor. The web of surface covering material is then capable of receiving any suitable decorative coating.

In Figure 2 I have shown a rigid doctor blade 34 in the form of a flat bar which may be substituted for my primary doctor 19. The doctor 34 contains a plurality of slots 35 so that it may be secured to a suitable cross bar. The slots are preferably elongated so that the position of the doctor blade may be adjusted with reference to the cross bar to which it is secured. The cross bar would be mounted in a pair of blocks similar to the blocks 17 and 18. The bottom surface of the doctor 34 is provided with a plurality of grooves 36.

In Figures 3 and 4 I have shown another modification of my doctor. In this case the grooves 37 for the passage of the paint are formed by adjacent convolutions of a wire 38 wrapped around the roll 39. The end of the wire 38 is secured to the roll 39 by having its ends bent into suitable openings 40.

Although I have described my invention in considerable detail, it will be understood that I do not desire to be restricted to the specific details of construction described except as limited by the appended claims.

I claim:

1. In the method of coating a web of uneven surfaced material, the steps consisting in wetting the entire surface of the material with a coating material, removing the coating material substantially completely from portions of the surface of the web while maintaining a predetermined amount of coating on other portions of the surface of the web, and spreading and distributing the applied coating material evenly over the surface of the material.

2. In the method of coating a web of uneven hard surfaced material, the steps consisting in maintaining a quantity of coating material in contact with the surface of the web, moving the web under said quantity of coating material, removing all but a predetermined amount of coating material from the surface of the moving web and leaving a plurality of spaced longitudinally ex-

tending stripes of coating on the surface, and applying a pressure conforming with the uneven surface of the web effective for uniformly distributing the applied coating over the surface thereof, without removing any substantial amount of applied coating material.

3. In a coating apparatus, a pair of doctors, one of said doctors having a discontinuous surface for engagement with a surface to be coated to apply a predetermined amount of coating material to the surface to be coated when the material to be coated is pressed into engagement therewith, and the other doctor being in the form of a flexed, thin, metallic blade and serving to evenly distribute over unevenly surfaced materials the coating material applied by the first mentioned doctor.

4. In an apparatus for applying coating material to an irregular surface of a flat web, the combination of a support for holding said web in substantially horizontal position, primary doctor means extending transversely of said web over said support and presenting a discontinuous surface for contact with said web for applying a predetermined amount of coating composition non-uniformly over said web, means for causing relative movement between said web and said primary doctor, guides for maintaining a pool of coating composition in the path of travel of said web, and a thin, flexible blade secured in stationary, flexed position with its exposed edge facing in the direction of travel of said web and having an extended, uninterrupted surface for contact with said coating composition, said blade being effective for uniformly distributing over the surface of the web all of the coating composition non-uniformly applied by the primary doctor.

5. In an apparatus for applying coating material to an irregular surface of a flat hard surfaced web, the combination of a yielding support for said web, rigid doctoring means extending transversely of said web over said yielding support and presenting a discontinuous surface for contact with said web, means for causing relative movement between said web and said primary doctor, guides cooperating with said doctor for maintaining a pool of coating composition in the path of travel of said web and in contact with said doctor and a thin, flexible, metallic doctor blade secured in stationary, flexed position with its exposed edge facing in the direction of travel of said web and having an extended, uninterrupted, flexed surface for contact with said web, said blade being effective for uniformly distributing over the surface of the web all of the coating composition non-uniformly applied by the rigid doctor.

6. In a coating apparatus, means retaining a quantity of coating material on a surface to be coated, means moving the surface to be coated beneath the quantity of coating material, a rigid doctor blade presenting a discontinuous surface for contact with the surface to be coated and acting to remove a portion only of the coating adhering to the moving surface to be coated and a thin, flexible blade secured in stationary, flexed position and conformable with the moving surface to be coated and acting to distribute the coating thereon evenly and uniformly over said surface.

7. The combination with a coating apparatus having a support for a web to be coated and means for moving the web, of a rigid doctor blade having a notched surface for engagement with the web and a thin, flexible blade secured in stationary, flexed position transversely of said support.

8. In a coating apparatus, a pair of rolls, a resilient band encircling said rolls and forming a support for a web to be decorated, a rigid, notched doctor extending transversely of said band, means for adjusting the position of said doctor with respect to said band, and a thin, flexible blade secured in stationary, flexed position transversely of said band and rearwardly of said doctor with respect to the direction of travel of the web.

9. The combination with a coating apparatus having a support for a web to be coated and means for moving the web, of a rigid doctor roll extending transversely of the support and having a discontinuous surface for engagement with the web and means for imparting rotative movement to said doctor roll.

10. The combination with a coating apparatus having a support for a web to be coated and means for moving the web, of a rigid doctor roll extending transversely of the support and having a discontinuous surface for engagement with the web and a thin, flexible blade secured in stationary, flexed position transversely of said support and adapted to evenly distribute over the surface of the web coating composition applied by the doctor roll.

11. The combination with a coating apparatus having a support for a web to be coated and means for imparting movement to said support, a rigid doctor roll extending transversely of the support and having a discontinuous surface for engagement with the web, means associated with the driving means for the support for imparting rotative movement to the doctor roll, and a thin, flexible, metallic blade extending transversely of the support and rearwardly of the doctor roll with respect to the direction of travel of the web, secured in stationary, flexed position.

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