March 17, 1964 R. M. KUTS 3,125,465

SHEET DUSTER

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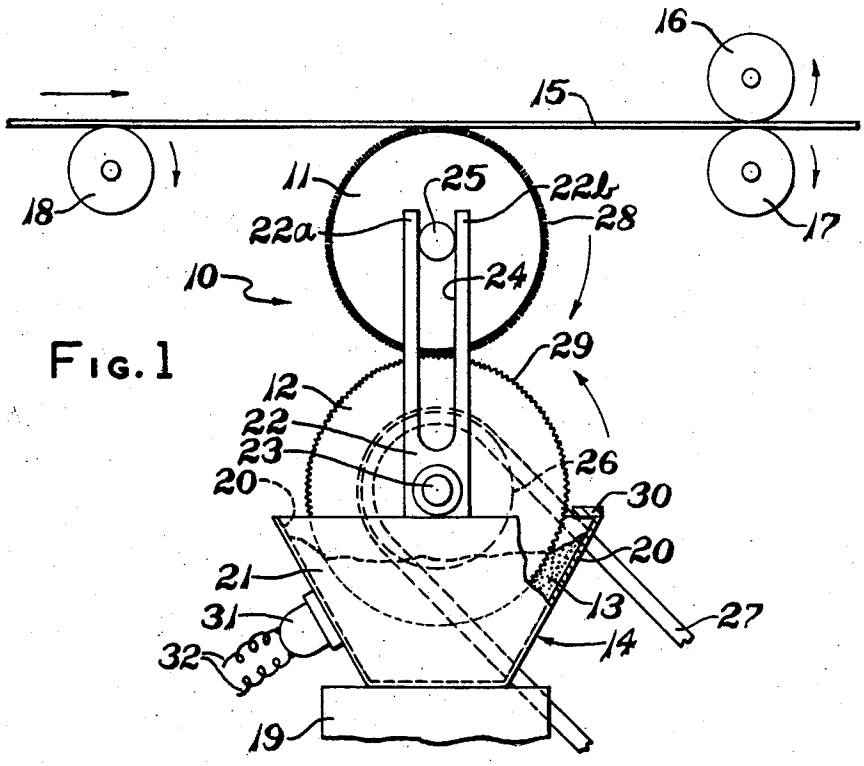


FIG. 1

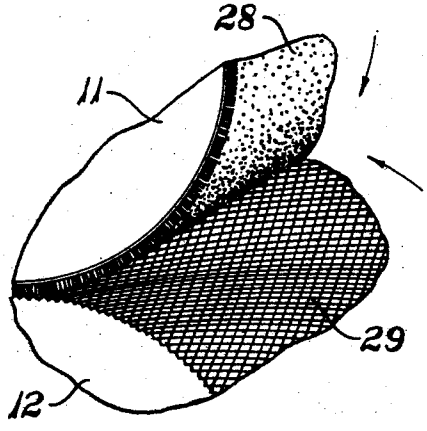


FIG. 2

INVENTOR.
RICHARD M. KUTS
BY
ATTY.

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SHEET DUSTER

Richard M. Kuts, Akron, Ohio, assignor to The B. F. Goodrich Company, New York, N.Y., a corporation of New York

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This invention pertains to the distribution of pulverized material on the surface of sheet material, and, more particularly, to the deposition of powdered lubricants on the surface of elastomeric sheet material.

In the rubber industry in which articles are constructed from unvulcanized elastomeric materials which are subequently vulcanized under heat and pressure, it is necessary to provide these materials in convenient and easy to handle form. This is especially true where long lengths of sheeted elastomeric material must be supplied to the article builder in rolled form. When winding such sheeted material it may be wound upon itself as it comes from the extruder, roller die or calender used to form it, or it may be wound in a cloth or plastic liner. In any event, the warm, tacky surface of the material must be treated in such a way that adjacent layers of the material do not stick to one another, or so that the elastomeric material does not stick to the liner in which it is wound when the builder of the article attempts to remove a portion of the material from the roll. This is accomplished by dusting the surface of the sheeted material with commonly known rubber dusting lubricants, such as zinc stearate, which, in small quantities, do not interfere with subsequent vulcanization or adhesion of the elastomeric material.

Various attempts have been made to apply such lubricants to sheeted elastomeric materials; but, at best, these have all been beset with problems not easily or economically surmounted. Simple hand dusting of the material as it moved in the direction of its length resulted in extremely poor distribution of the lubricant with some portions receiving no lubricant while others received such quantities that adhesion of the sheet in the article of its end use was greatly impaired or totally destroyed. It was then felt that by mounting a brush roller in such a position to uniformly brush the excess lubricant over the sheet so as to cover those spots receiving no lubricant, the difficulties of simple hand dusting would be eliminated. It was found, however, that the roller brush threw the lubricant dust in all directions creating an ambient dust problem which could only be eliminated through the use of an expensive vacuum dust removal system.

Applicant conceived of an apparatus which not only solved the ambient dust problems associated with prior attempts at solution, thus overcoming the necessity for expensive dust removal systems which occupy valuable manufacturing space, but which was capable of applying a minimum amount of lubricant dust to sheet material with great uniformity.

It is an object of this invention therefore, to provide an apparatus for uniformly applying lubricants in powder or dust form to sheet material as said material moves in the direction of its length.

It is another object of this invention to provide an apparatus for uniformly and lightly covering the surface of elastomeric sheet material with lubricant powder or dust, wherein said lubricant is applied to said surface by a roller member having a surface speed greater than the speed of said material as it is moved in the direction of its length.

It is a further object of the present invention to provide an apparatus as described in the preceding paragraph wherein a transfer roll member is provided to transfer said lubricant to said roller member from a supply of said lubricant.

Further objects and advantages to be gained through the use of the applicant's invention will be apparent to those skilled in the art to which it pertains from the following detailed description of a presently preferred embodiment of the invention, and from the drawings forming a part of the invention in which:

FIG. 1 is a schematic, front-elevational view of the apparatus with portions partially cut away for simplicity of illustration; and

FIG. 2 is a fragmentary perspective view of a portion of the transfer roll and the lubricant applicator roll.

As seen in FIG. 1, the apparatus **10** comprises an applicator roll **11**, and a transfer roll **12** which transfers a powdered lubricant **13** from a supply bin **14** to the applicator roll **11**. The applicator roll **11** uniformly deposits the lubricant **13** onto the sheet material **15** which is being moved in the direction of its length by means of drive rolls **16**, **17**, driven by means not shown, while supported by idler rolls, such as roll **18**.

The bin **14** is mounted on a base **19** and comprises inclined side panels **20** and vertical end panels **21** which contain the lubricant **13**. Vertically mounted on each of the panels **21**, at the front and rear of the apparatus **10**, is a bifurcated shaft support member **22**. Rotatably journalled in and between members **22** is a horizontal shaft **23** on which the transfer roll **12** is coaxially mounted. Furcations *22a*, *22b* of each member **22** form a guideway **24** in which a shaft **25** is rotatably confined in generally axially parallel relationship to shaft **23**. Applicator roll **11** is mounted on shaft **25** and is held in contact with transfer roll **12** by the force of gravity.

Mounted on one end of shaft **23** is a sheave **26** which is rotatably connected to a source of power, not shown, by means of a power transmission belt **27**. Thus, as transfer roll **12** is rotated in one direction by movement of belt **27**, applicator roll **11** is rotated in the opposite direction.

As best seen in FIG. 2, roll **11** is peripherally covered with a fabric covering **28**, which is preferably mohair, having tufts which project radially from roll **11**. Transfer roll **12** has a knurled peripheral surface **29**. The knurling is preferably to a radial depth of $\frac{1}{64}$ inch in the roll **12**. As the transfer roll's surface **29** passes through bin **14** the lubricant **13** fills the knurling indentations for transfer to the mohair covering **28** of applicator roll **11**.

In the use of the apparatus **10**, the sheet material **15** to be dusted with lubricant is trained over idler roll **18** and applicator roll **11**, to the bight of drawing rolls **16**, **17** which move the material **15** in the direction of its length at a preferred speed of approximately 75 feet per minute. At the same time the power source, not shown, for belt **27** is energized to rotate transfer roll **12**, which, in turn, drives applicator roll **11**. The lineal speed of belt **27** is controlled to impart a preferred surface speed to roll **11** of approximately 150 feet per minute. As roll **12** is rotated through the lubricant **13** a portion of the lubricant is picked up by the knurling **29**. Excess lubricant is tangentially discharged from roll **12** and against a horizontal baffle **30** mounted on one of the bin sides **20**. As the transfer roll **12** continues rotation the mohair covering **28** of roll **11** is pressed into the knurled surface **29** to uniformly remove a portion of the lubricant **13** from surface **29**. This lubricant is then carried to the sheet material **15** on which it is uniformly distributed. Uniformity of distribution of lubricant **13** on sheet **15** is facilitated by

the wiping action which results from the difference in the surface speeds of roll **11** and sheet **15**.

As with many powdered forms of lubricants, they tend to settle and agglomerate. To overcome this tendency, an electrical vibrator **31**, connected by wires **32** to a source of electrical power not shown, is mounted on one side panel **20** of the hopper **14**.

Additional uses and changes of the structure of the apparatus of the invention which are within the scope of the invention as defined in the appended claims of this application will occur to those skilled in the art to which it pertains.

I claim:

1. Apparatus for applying a lubricant dust on a surface of sheet material as said material is moved in the direction of its length, comprising a lubricant dust storage means, a first cylindrical means, means rotatably mounting said first cylindrical means adjacent said storage means for partial peripheral containment thereof by said storage means, a uniform lubricant dust retaining impression formed in the periphery of said cylindrical means, a second cylindrical means, means movably mounting said second cylindrical means axially parallel to said first cylindrical means and allowing said second cylindrical means to be urged towards said first cylindrical means, lubricant distribution means mounted on said second cylindrical means for contact with said impression and said surface whereby lubricant dust retained by said impression is removed therefrom and distributed on said surface as said second cylindrical means is rotated, said first and second cylindrical means being located above said storage means and means to rotate said first and second cylindrical means.

2. Apparatus for uniformly applying a lubricant dust on a surface of sheet material as said material is moved in the direction of its length, comprising a storage means to contain a supply of said dust, a first roll member having an intagliated peripheral surface, means rotatably mounting said first roll member above said storage means and for passage of said peripheral surface through said dust contained by said storage means, means to rotate said first roll member, a second roll member, a fabric having tufts perpendicularly projecting from the plane thereof circumferentially mounted on and around said second roll member, means movably mounting said second roll member above said first roll member whereby said second roll member is normally urged under the force of gravity toward said first roll member for contact of said tufts with said intagliated surface and said second roll member may be rotated in response to rotation of said first roll member, means to train said sheet material over and in contact with said fabric surface, and means to move said sheet material in the direction of its length at a speed less than that of the surface speed of said fabric.

3. Apparatus for uniformly applying a lubricant dust on a surface of sheet material, comprising a storage bin to hold a supply of said lubricant dust, a dust transfer roller having an intagliated circumferential surface, means axially horizontally mounting said transfer roller above said storage bin for partial circumferential contact of said intagliated surface with lubricant dust held by said storage bin, an applicator roller, a fabric having tufts circumferentially covering said applicator roller for radial projection of said tufts therefrom, means mounting said applicator roller axially parallel to said transfer roller for contact of said tufts with said intagliated surface and for rotation of said applicator roller in response to rotation of said transfer roller, means to move said sheet material in the direction of its length at a speed less than the surface speed of said applicator roller, and means in alignment with said means to move said sheet material to maintain the surface of said sheet material in contact with said fabric as said sheet material is moved in the direction of its length.

4. Apparatus as defined in claim 3, wherein said fabric is mohair.

5. Apparatus as defined in claim 3, wherein said storage bin further comprises a baffle member mounted thereon closely adjacent said intagliated surface whereby lubricant dust discharged from said intagliated surface as said transfer roller rotates may be retained within said bin.

6. An apparatus for applying a lubricant dust onto a moving surface of sheet material, comprising a storage means containing a lubricant dust, conveying means for moving such sheet material at a predetermined speed along a first direction, first cylindrical means, means for rotatably mounting said first cylindrical means above said storage means with said first cylindrical means adjacent said storage means for partial peripheral containment thereof, said first cylindrical means having a knurled surface having contiguous portions successively moving through said storage means, a second cylindrical means having a circumferential mohair covering and an axis spaced parallel to and above the axis of said first cylindrical means, said first and second cylindrical means being in surface rolling contacting relationship whereby said first cylindrical means drives said second cylindrical means, roller guide means mounted on said apparatus cooperative with said conveying means for guiding the surface of sheet material into contacting relationship with the upper portion of said second cylindrical means, means for rotating said first cylindrical means to impart a surface speed to said second cylindrical means a surface speed greater than the surface speed of said roller guide means, and said means for rotating operative to rotate said second cylindrical means in the same advancing sense as said roller guide means such as to operate on the moving sheet material in a common direction.

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