Feb. 9, 1943. J. F. SUMMERSGILL 2,310,495

METHOD OF MAKING VARIEGATED HARD SURFACE COVERINGS

Filed Dec. 18, 1940 2 Sheets-Sheet 1

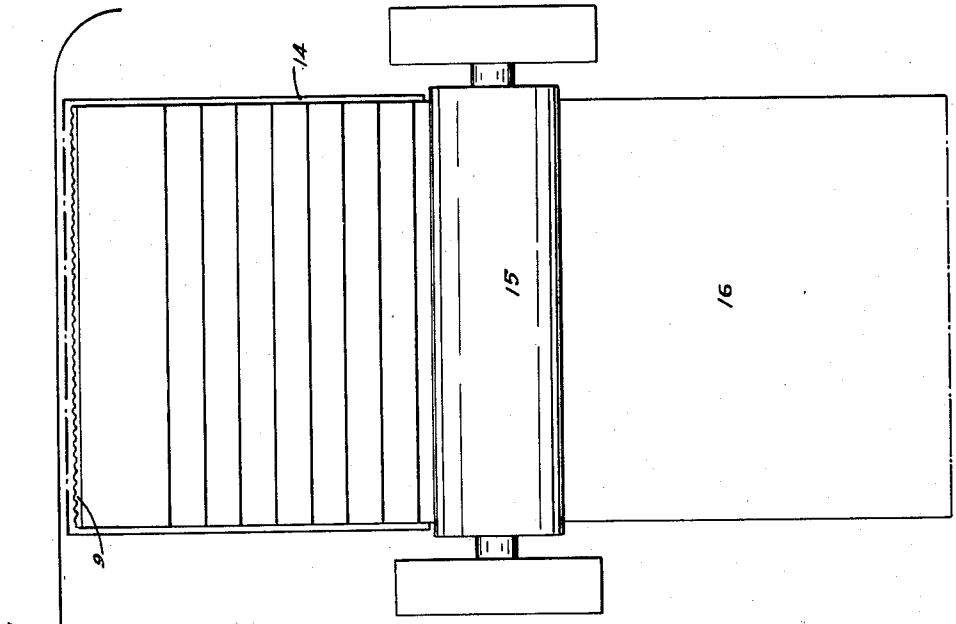
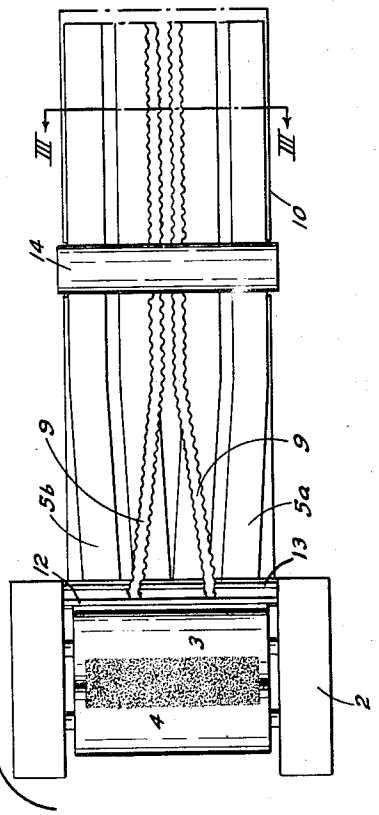


Fig. 1



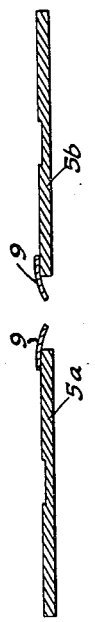


Fig. 3

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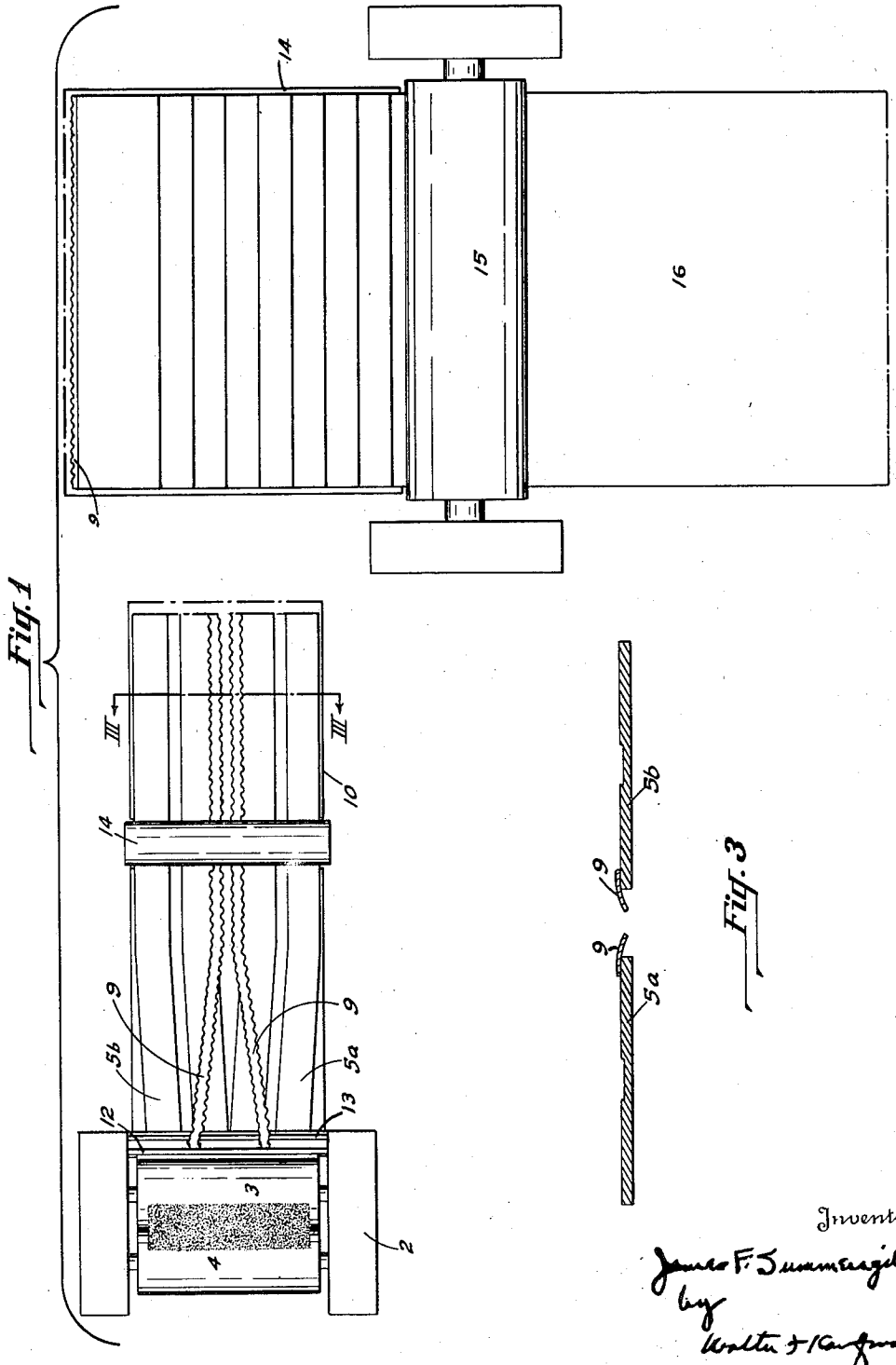


Fig. 1

Fig. 3

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UNITED STATES PATENT OFFICE

2,310,495

METHOD OF MAKING VARIEGATED HARD SURFACE COVERINGS

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15 Claims. (Cl. 18—56)

This invention relates to a method of making variegated hard surface coverings and, more particularly, to improvements in the method of making variegated linoleum by what is generally termed the "cross-rolling" process.

The cross-rolling process of making variegated linoleum as applied to the continuous production of linoleum on rotary inlaying machines of the Walton or Batten type contemplates the formation of a strip having a definite directional graining commonly called "jaspe," severing such strip transversely of its length into sheets, overlapping a plurality of such sheets and passing the overlapped sheets through a sheeting calender at right angles to the direction of graining and to the length of the original strip thus forming an integral web and shortening and spreading the jaspe graining to obtain the desired variegation, which is generally considered to resemble marble.

One of the chief problems present in such practice resides in the visible discontinuity of the graining in the web in the area where an overlapped or overlapping sheet merges into and becomes an integral portion of a following or preceding sheet. This phenomenon is termed "hook-on" in the industry and appears to be a visible distortion of face graining which is not compatible with the required variegation and presents and entirely different appearance at the sections where the overlapped sheets merge into one another. The cause of "hook-on" is not known with any degree of certainty but it is believed to be due almost entirely to the abrupt change in volume of material presented to the nip of the rolls at the overlapped portions of the sheets and the subsequent flow and surge of the plastic material resulting from the increased pressure. It may be due in part to the fact that in some cases the edge portions of the overlapped sheets presented to the calender rolls turn or fold over slightly when subjected to pressure and thus present the back surface of the sheet causing back graining to appear on the face of the finished web. In any event, this visible discontinuity is a serious distortion of face graining which is undesrable and which annually creates an enormous waste in the production of variegated linoleum on rotary inlaying machines.

The chief object of my invention is to provide improvements in the method of making variegated hard surface covering by the cross-rolling process designed to remove to a considerable extent the visible discontinuity present in those portions of the finished web where overlapped sections join. An object of my invention is to provide a method whereby a more satisfactory face variegation may be obtained in the cross-rolling process. Other objects will be readily perceived upon consideration of the following description of my invention.

This invention relates to a method of making a variegated hard surface covering, in which the steps comprise forming a vari-colored mass of differently colored compositions, subjecting said mass to pressure to form a sheet having a definite directional graining, disposing a ribbon of less thickness than said sheet and having a similar definite directional graining along the longitudinal edge of said sheet so that at least a portion thereof extends beyond such edge of the sheet, overlapping a plurality of similar sheets so that the ribbon on one sheet is disposed adjacent the face of a second sheet and the graining of the sheet and ribbon extend generally in the same direction, and calendering the overlapped sheets at an angle to the direction of graining to form a continuous sheet.

The attached drawings illustrate a preferred embodiment of my invention in which

Figure 1 is a diagrammatic plan view of a device for making variegated hard surface covering by the cross-rolling process;

Figure 2 is a diagrammatic view serving to illustrate the sheet and ribbon forming steps of my invention;

Figure 3 is a sectional view of sheet sections provided with edge ribbons taken on the line III—III of Figure 1;

Figure 4 is an isometric view of the notched doctor blade used in the practice of my invention; and

Figure 5 is a diagrammatic sectional view serving to illustrate the manner in which the sheets are overlapped for feeding to the cross-rolling calender.

Suitable mixing equipment is provided for forming two differently colored linoleum compositions. It will be appreciated suitable equipment may be provided for any desired number of differently colored compositions. The differently colored compositions are blended into a cohesive vari-colored mass which is fed to a two-roll sheeting calender 2 as shown in Figures 1 and 2. The face roll 3 of the calender 2 is maintained at a lower temperature than the back roll 4 in order to insure that a formed sheet will adhere thereto rather than to the back roll 4 and to assist in securing the desired graining. The roll 3 is rotated at the same or a slightly greater speed than the roll 4 which extrudes the granules and

elongates the differently colored granules to some extent thus forming what is known as a jaspe strip 5 which adheres to the colder roll 3 and in which the direction of graining extends generally along the length of the strip as formed.

The strip 5 is separated or split into two sections 5a and 5b by means of a rotary cutter 6 mounted adjacent the roll 3. The cutter 6 may have any desired contour so as to form straight or wavy edges in the separated sections. A doctor blade 7 is likewise disposed adjacent the roll 3 and serves to strip the sections 5a and 5b from the roll 3. The doctor 7 is provided with notched portions 8 which terminate in knife edges so that, as the sections 5a and 5b are removed from the roll 3, ribbons 9 of a width corresponding to the width of the notches 8 and less in thickness than the thickness of the formed strip are severed from the face or side thereof adjacent the roll 3 and temporarily remain adhered to the roll. In other words, while the doctor 7 functions to remove the severed strips from the roll, the notches 8 sever thin, narrow ribbons of composition from the body of the formed strip. Since the ribbons 9 are removed from the face of each section they possess a face graining having the same character as that of the face of the sections from which they are severed.

As discussed above, the ribbons 9 adhere to the roll 3 while the sections 5a and 5b are removed and placed on a conveyor 10 for a purpose hereinafter described. A plurality of cutters 11 of scalloped or wavy outline are disposed adjacent the roll 3 and serve to form sinuous or wavy edges on the longitudinal edges of the ribbons 9 as shown in Figure 1. The ribbons 9 are removed from the roll 3 by a doctor blade 12 and are led over an idler roll 13 (Figure 2) toward the sections 5a and 5b disposed on the conveyor 10. Any small particles of waste material created by the formation of sinuous edges on the ribbons 9 are removed from the roll 3 by the doctor blade 12 and fall into a small receptacle placed thereunder to receive them. The ribbons 9 are disposed on the faces of the sections 5a and 5b over the marginal edges thereof so that at least the sinuous edge of a ribbon 9 extends beyond the edge of the sheet as shown in Figure 3. Since the ribbons 9 are slightly tacky and cohesive they may be adhered in such position on the sections 5a and 5b by slight pressure applied by the roll 14. It will be appreciated, of course, any suitable means may be used to fix the ribbons in desired position on the sections. The ribbons 9 are less in thicknuess than the thickness of the sheet so that the extended edge of the sheet formed by the protruding portion of the ribbon 9 is thin and of less thickness than the body of the section (see Figure 3) which materially decreases the volume of material present in the nip of the rolls at the overlapped portions of the sheets, as hereinafter described.

The sections 5a and 5b carrying the ribbons 9 are carried by the conveyor 10 to a table 14 positioned adjacent the rolls of a cross-rolling calender 15. Such sections 5a and 5b while traveling on the conveyor 10 are subdivided, either manually or mechanically, into sheets of suitable size to be fed to the cross-rolling calendar 15. Each of the sheets so formed has an edge covered by a portion of the ribbon 9. As shown in Figures 1 and 5, the subdivided sheets are disposed in overlapping relation on the table 14 in such manner that the ribbon on one face is disposed adjacent the face of a second sheet, and the thin edge formed by the ribbon 9 is the rear edge. The portion of the sheet from which the ribbon was formed is, preferably, covered by the overlapped portion of the preceding sheets as shown in Figure 5. If it be desired to overlap the sheets face-up, the thin ribbon edge would be that edge of the sheet first fed to the cross-rolling calender. The overlapped sheets are fed to the rolls of the cross-rolling calendar 15 at right angles to the direction of graining and to the length of the original strip to form a continuous integral web 16 and to further shorten and spread the graining to form variegations on the face thereof which resemble marble.

The practice so outlined substantially or entirely eliminates the visible discontinuity between overlapped sheets. Distortion of face graining at the overlapped edges does not occur to any substantial extent and accordingly a continuous variegated linoleum sheet is produced in which the graining presents substantially the desired appearance over the face of the sheet. The enormous waste created by "hook-on" is entirely eliminated and a more desirable and decorative sheet is produced. The improvements in the cross-rolling process above described do not increase the cost involved in making the sheet but substantially reduce such costs by the elimination of waste.

While I have described and illustrated a preferred embodiment of my invention, it will be understood my invention is not so limited since it may be otherwise embodied within the scope of the following claims.

I claim:

1. In the method of making a variegated hard surface covering, the steps comprising forming a vari-colored mass of differently colored compositions, subjecting said mass to pressure to form a sheet having a definite directional graining, and superimposing a ribbon of less thickness than said sheet and having a similar definite directional graining over a portion of one face of said sheet so that at least a portion of said superimposed ribbon extends beyond the edge of the sheet.

2. In the method of making a variegated hard surface covering, the steps comprising forming a sheet having a definite directional graining on its face, and superimposing a ribbon of less thickness than said sheet and having a similar definite directional graining over a marginal portion of one face of the sheet so that at least a portion of said superimposed ribbon extends beyond the edge of the sheet.

3. In the method of making a variegated hard surface covering, the steps comprising forming a vari-colored mass of differently colored granular compositions, subjecting said mass to pressure to form a sheet having a definite directional graining, removing a ribbon from said sheet of less thickness than the thickness of the sheet, and disposing said ribbon along the edge of the sheet so that at least a portion thereof extends beyond the edge of the sheet.

4. In the method of making a variegated hard surface covering, the steps comprising forming a vari-colored mass of differently colored granular compositions, subjecting said mass to pressure to form a sheet having a definite directional graining, removing a ribbon from said sheet of less thickness than the thickness of the sheet, and disposing said ribbon along the marginal face of the sheet from which it was removed so that at

least a portion thereof extends beyond the edge of the sheet.

5. In the method of making a variegated hard surface covering, the steps comprising forming a vari-colored mass of differently colored granular compositions, calendering the mass between rolls having different temperatures to form a sheet having a definite directional graining which adheres to the colder roll, removing said sheet from the roll while forming a ribbon therefrom of less thickness than the thickness of the sheet, and disposing said ribbon along the edge of the sheet so that at least a portion thereof extends beyond the edge of the sheet.

6. In the method of making a variegated hard surface covering, the steps comprising forming a vari-colored mass of differently colored granular compositions, calendering the mass between rolls having different temperatures to form a sheet having a definite directional graining which adheres to the colder roll, removing said sheet from the roll while forming a ribbon therefrom of less thickness than the thickness of the sheet, and disposing said ribbon along the marginal face of the sheet from which it was formed so that at least a portion thereof extends beyond the edge of the sheet.

7. In the method of making a variegated hard surface covering, the steps comprising forming a vari-colored mass of differently colored granular compositions, calendering the mass between rolls having different temperatures to form a sheet having a definite directional graining which adheres to the colder roll, removing said sheet from the roll while forming a ribbon therefrom of less thickness than the thickness of the sheet, forming sinuous edges on said ribbon, and disposing said ribbon along the edge of the sheet so that at least a sinuous edge thereof extends beyond the edge of the sheet.

8. In the method of making a variegated hard surface covering, the steps comprising forming a vari-colored mass of differently colored granular compositions, subjecting said mass to pressure to form a sheet having a definite directional graining, disposing a ribbon of less thickness than said sheet and having a similar definite directional graining along the longitudinal edge of said sheet so that at least a portion thereof extends beyond such edge of the sheet, overlapping a plurality of similar sheets so that the ribbon on one sheet is disposed adjacent the face of a second sheet and the graining of the sheet and ribbon extend generally in the same direction, and calendering the overlapped sheets at an angle to the direction of graining to form a continuous web.

9. In the method of making a variegated hard surface covering, the steps comprising forming a sheet having a definite directional graining on its face, disposing a ribbon of less thickness than said sheet and having a similar definite directional graining along the marginal face of the sheet so that at least a portion thereof extends beyond the edge of the sheet, overlapping a plurality of similar sheets so that the ribbon on one sheet is disposed adjacent the face of a second sheet, and calendering the overlapped sheets at an angle to the direction of graining to form a continuous web.

10. In the method of making a variegated hard surface covering, the steps comprising forming a vari-colored mass of differently colored granular compositions, subjecting said mass to pressure to form a sheet having a definite directional graining, removing a ribbon from said sheet of less thickness than the thickness of the sheet, disposing said ribbon along the edge of the sheet so that at least a portion thereof extends beyond the edge of the sheet, overlapping a plurality of similar sheets so that the ribbon on one sheet is disposed adjacent the face of a second sheet, and calendering the overlapped sheets at an angle to the direction of graining to form a continuous web.

11. In the method of making a variegated hard surface covering, the steps comprising forming a vari-colored mass of differently colored granular compositions, calendering the mass between rolls having different temperatures to form a sheet having a definite directional graining which adheres to the colder roll, removing said sheet from the roll while forming a ribbon therefrom of less thickness than the thickness of the sheet, disposing said ribbon along the edge of the sheet so that at least a portion thereof extends beyond the edge of the sheet, overlapping a plurality of similar sheets so that the ribbon on one sheet is disposed adjacent the face of a second sheet, and calendering the overlapped sheets at an angle to the direction of graining to form a continuous web.

12. In the method of making a variegated hard surface covering, the steps comprising forming a vari-colored mass of differently colored granular compositions, calendering the mass between rolls having different temperatures to form a sheet having a definite directional graining which adheres to the colder roll, removing said sheet from the roll while forming a ribbon therefrom of less thickness than the thickness of the sheet, forming sinuous edges on said ribbon, disposing said ribbon along the edge of the sheet so that at least a sinuous edge thereof extends beyond the edge of the sheet, overlapping a plurality of similar sheets so that the ribbon on one sheet is disposed adjacent the face of a second sheet, and calendering the overlapped sheets at an angle to the direction of graining to form a continuous web.

13. In the method of making a variegated hard surface covering, the steps comprising forming a vari-colored mass of differently colored granular compositions, subjecting said mass to pressure to form a continuous sheet having a definite directional graining, severing said sheet longitudinally into sections, removing a ribbon from each section of less thickness than the thickness of the section, disposing said ribbon along the edge of the section, so that at least a portion thereof extends beyond the edge of the section severing each section into sheets each of which has an edge covered by said ribbon, overlapping a plurality of similar sheets so that the ribbon on one sheet is disposed adjacent the face of a second sheet, and calendering the overlapped sheets at an angle to the direction of graining to form a continuous web.

14. In the method of making a variegated hard surface covering, the steps comprising forming a vari-colored mass of differently colored granular compositions, calendering the mass between rolls having different temperatures to form a sheet having a definite directional graining which adheres to the colder roll, severing said sheet longitudinally into sections while it adheres to the roll, removing the sections from the roll while forming ribbons therefrom of less thickness than the thickness of the sections, disposing the ribbons along the edges of the sections so that at least a portion of each ribbon extends

beyond the section, severing each section into sheets each of which has an edge covered by the ribbon, overlapping a plurality of similar sheets so that the ribbon on one sheet is disposed adjacent the face of a second sheet, and calendering the overlapped sheets at an angle to the direction of graining to form a continuous web.

15. In the method of making a variegated hard surface covering, the steps comprising forming a vari-colored mass of differently colored granular compositions, calendering the mass between rolls having different temperatures to form a sheet having a definite directional graining which adheres to the colder roll, severing said sheet longitudinally into sections while it adheres to the roll, removing the sections from the roll while forming ribbons therefrom of less thickness than the thickness of the sections, said ribbons remaining adhered to the roll, forming sinuous edges on said ribbons, removing the ribbons from the roll, disposing the ribbons along the edges of the sections so that at least a sinuous edge of each ribbon extends beyond the section, severing each section into sheets each of which has an edge covered by the ribbon, overlapping a plurality of similar sheets so that the ribbon on one sheet is disposed adjacent the face of a second sheet, and calendering the overlapped sheets at an angle to the direction of graining to form a continuous web.

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