Jan. 7, 1958 C. I. READ ET AL 2,818,824

ASBESTOS-CEMENT BOARD, SIDING AND SHINGLE

Filed Aug. 22, 1952 3 Sheets-Sheet 1

Fig. 1.

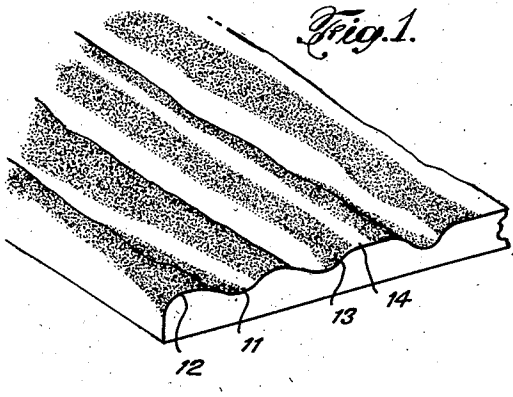


Fig. 2.

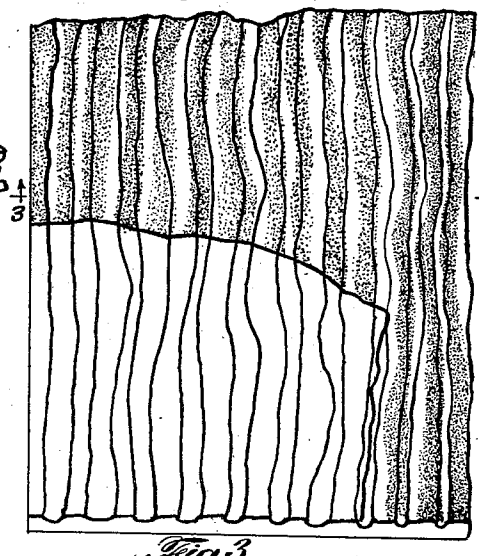


Fig. 3.

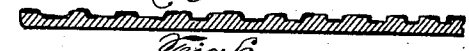


Fig. 4.

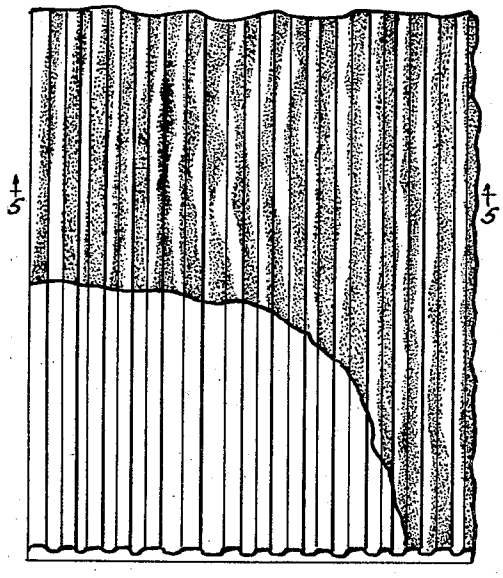


Fig. 5.



Fig. 6.

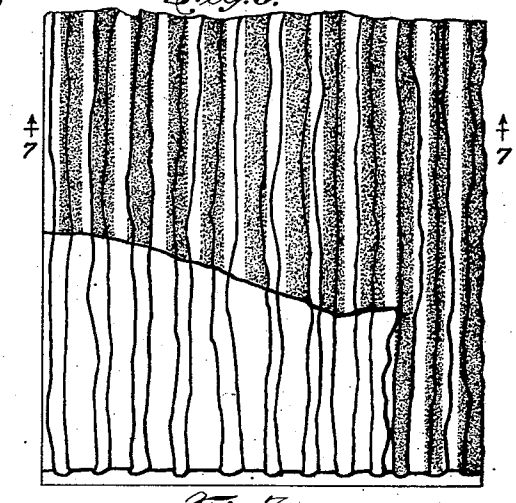
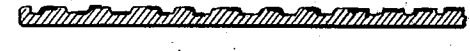


Fig. 7.



INVENTORS

CLINTON I. READ

FRANCIS H. REILLY

BY

Emery, Varney, Whittemore & Dix

ATTORNEYS

Published by AsbestosClaims.Law

asbestosclaims.law/library/21826/1

Jan. 7, 1958 C. I. READ ET AL 2,818,824

ASBESTOS-CEMENT BOARD, SIDING AND SHINGLE

Filed Aug. 22, 1952 3 Sheets-Sheet 2

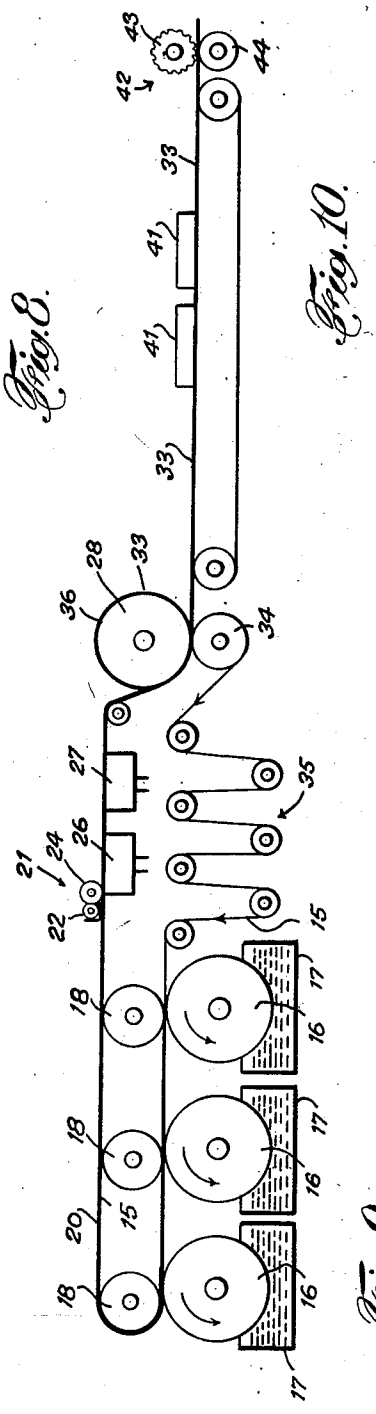


Fig. 8.

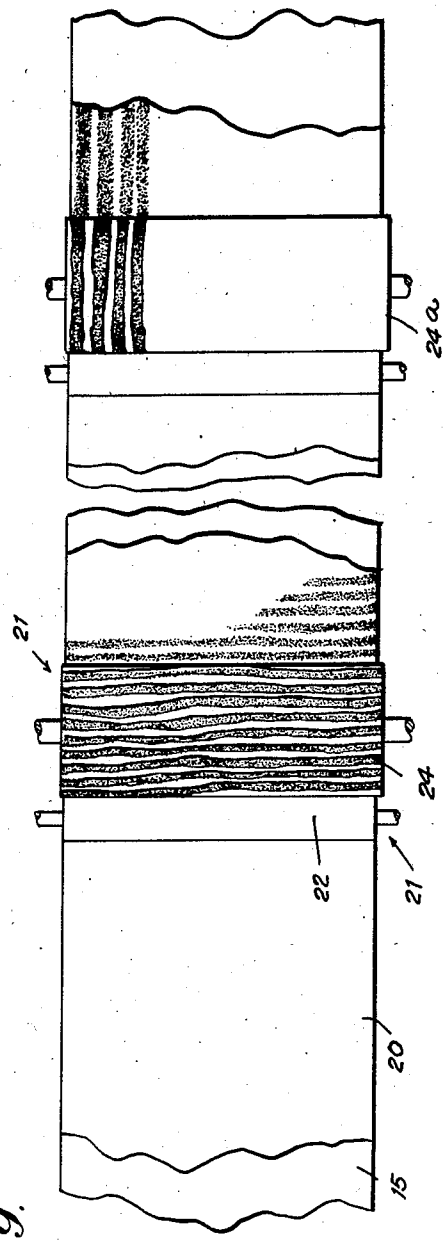


Fig. 10.

Fig. 9.

INVENTORS
CLINTON I. READ
FRANCIS H. REILLY

BY
Emery, Vanny, Whittemore & Dix
ATTORNEYS

Published by AsbestosClaims.Law
asbestosclaims.law/library/21826/2

Jan. 7, 1958 C. I. READ ET AL 2,818,824

ASBESTOS-CEMENT BOARD, SIDING AND SHINGLE

Filed Aug. 22, 1952 3 Sheets-Sheet 3

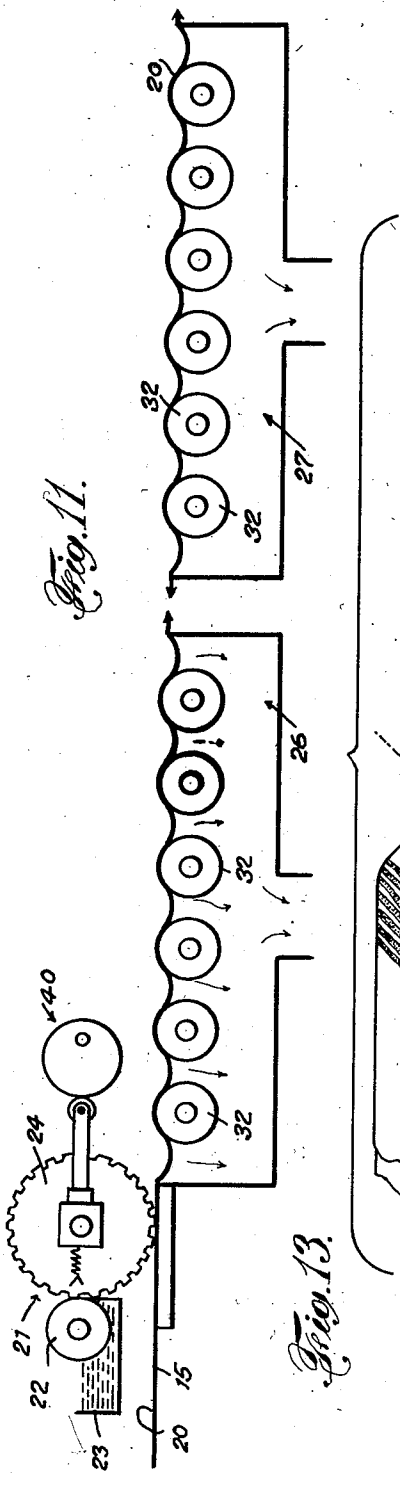


Fig. 11.

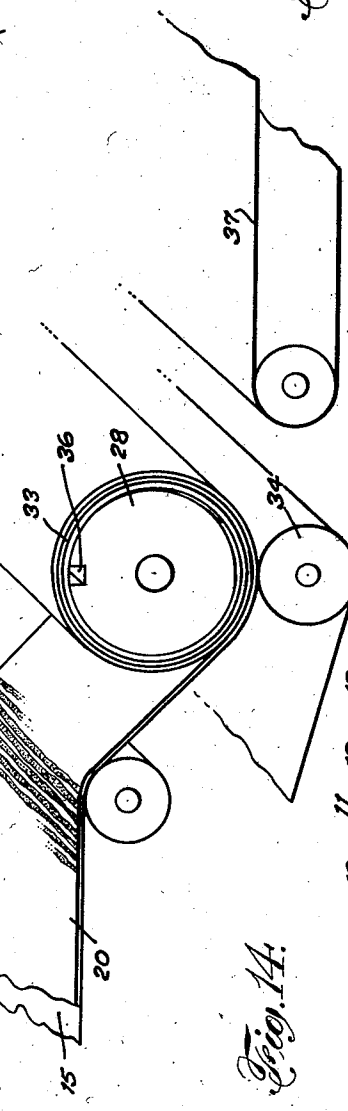


Fig. 13.

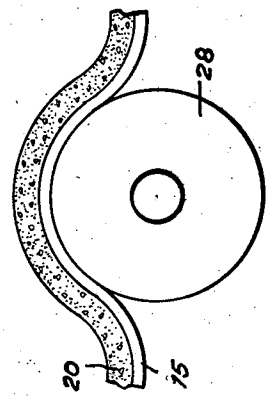


Fig. 12.

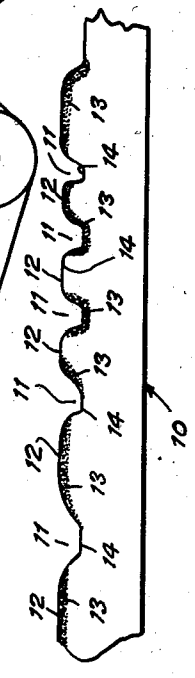


Fig. 14.

INVENTORS

CLINTON I. READ

FRANCIS H. REILLY

BY

Emery, Varney, Whittemore & Ely

ATTORNEYS

United States Patent Office

2,818,824

Patented Jan. 7, 1958

2,818,824

ASBESTOS-CEMENT BOARD, SIDING AND SHINGLE

Clinton I. Read, Trumbull, and Francis H. Reilly, Stratford, Conn., assignors to Tilo Roofing Company, Inc., Stratford, Conn., a corporation of Delaware

Application August 22, 1952, Serial No. 305,754

7 Claims. (Cl. 108—8)

This invention relates to a novel colored embossed board or covering particularly useful in the building industry. Such an improved board or covering is capable of being cut to varied sizes to form partitions in homes or houses, or to form sidings, or shingles, or the like, for the outside of houses, warehouses or other building structures, or for other purposes, some of which desire or require fireproof and waterproof structures.

The invention also pertains more in particular to an improved varied colored fibred-cementitious type of covering or siding or shingle that has the great advantage of showing its contrasting colors irrespective of whether it is viewed from directly in front, i. e., 90° to its front surface, or at an angle to that surface, say 15° or other angle to the front surface.

This advantage alone is very important as it is highly desirable to have a fireproof and waterproof cementitious type of siding or shingle represent a wooden type of siding or shingle no matter from what angle the siding or shingle is viewed.

For instance, when an observer approaches and moves past a building that is wooden shingle clad, he appreciates from any angle that the building is shingle clad, and that the appearance of the siding is pleasing. Heretofore, when an observer approached and moved past a building that was clad with the contrasting color type of cementitious covering or siding or shingle previously made, he could only appreciate the varied color effect when he was substantially directly in front of the building, i. e., when standing at approximately 90° to the full front surface of the building or shingle.

Gaining the advantages of having the interior or exterior walls of a house or building covered with fireproof and waterproof material covering and still having a pleasing contrasting color when viewed from any angle, like the regular type of wooden shingle, is a desire of long standing in the siding and roofing industry.

The improved product of the invention herein and the improved process for producing that product meets this desire.

This invention further pertains to an improved inside wall covering, or to an outside siding, or to a shingle of the asbestos-cementitious type that is produced to have its contrasting colors embedded in its body structure and not added to its surface as a coating and, therefore, subject to being washed off, or diluted over a period of time.

It is to be particularly noted that if the appearance of the interior walls or the outer siding of a home or manufacturing building, or the like, is not "striking" or attractive when viewed from any angle, that the observer's comments and desires are negative, even though fireproof and waterproof advantages have been gained.

It is, therefore, one of the main features of this invention to provide an improved fireproof and waterproof and attractive and "striking" wall, siding and roof covering when viewed from any angle.

Another main feature of this invention is to provide

sidings or shingles which have color contrasts observable from any angle, and which have the color design non-matching with the graining or embossing design.

Another feature of this invention is to provide a final product having embossed ridges and grooves or channels and to have the contrasting color design embedded in the product and generally extending along the same direction as the ridges and grooves but having the ridges of varied colors for portions of their lengths so that when viewed from the side and without the grooves being viewable, there will still be the observed color contrast along the ridges.

A further main feature of this invention is to provide a new and improved waterproof and fireproof wall covering usable in the building industry that has a color contrast noticeable at all times and from all positions, and to have any added color or colors fully embedded in the wall covering so that there will not be any wasting away, or dilution, or dissolving of the coloring pigment. With this improved product no binder is required to carry the color pigments. Such a colored wall covering may be obtained with or without being embossed.

It is a further preferred feature of this invention to provide an asbestos-cementitious wall covering, or siding, or shingle that is embossed and colored in different manners but always giving the color contrast and being usable for many purposes in the building industry.

Another feature of this improved invention is to provide a wall covering product that has many different relative positions and sizes of coloring bands to many positions and varying widths of embossed ridges and channels in the covering. Such an improved product will have at least a two-tone color contrast, and it may be multi-colored as desired.

It is also another main feature of this invention to provide an improved process for producing the improved and novel "striking" and attractive fireproof and waterproof building covering, as well as providing a novel machine or apparatus for producing this improved wall covering.

It has been proposed to make wall coverings, as for example, interior wall board, sidings, shingles, and the like, from asbestos fibers and cement, with a graining grid relief design in imitation of weather-worn wood shingles and with a graining grid color print design to produce at least a two-tone color effect, and to thus emphasize the graining appearance. In this preferred wall and siding cover there is provided alternate ridges and grooves with gentle undulations of varying widths, running generally linearly in somewhat parallel direction, and the covering is colored to present lighter shades or zones at portions or positions along the lands or crests or ridges of the embossed grain design and to have the lighter and darker shades extend into and through the valleys. The areas or zones of darker shades of color also extend along portions of the lands and in the valleys. The proper size formation and area or zones of the widths vary, and the melding of the colors is helpful and advantageous in creating the pleasing and attractive appearance.

This mixed coloring design located and arranged as described, will emphasize the lined graining effect and will be evident when viewed from directly in front, or at any angle to the face of the covering. However, when viewed from the side, the valleys will usually be concealed but the mixed coloring extending over and along portions of the ridges or crests will still give effectively the proper contrasting coloring effect herein developed.

Another feature or object of the present invention is to provide a new and improved outer wall covering for homes and buildings such as a siding, or shingle, or the like, of fibro-cementitious material having a color design formed by pigments embedded into the surface and blended with the ground color of the covering.

Published by AsbestosClaims.Law
asbestosclaims.law/library/21826/4

In accordance with certain features of this present invention, the improved sheet of fibro-cementitious material preferably will have a series of embossed alternate gently undulating grooves and ridges of varying widths extending in grid fashion to form a graining design in relief. The groove-grained surface of the sheet also has printed thereon in color a series of wavy lines or bands or zones or areas of varying width extending in grid fashion generally in the same direction of the grooves and ridges and of a shade different from that of the ground color of the sheet. The printed grain color bands or lines or areas are not in registry with the grooves or ridges of the relief graining figuration and do not correspond therewith in size and shape, so that a limited random relationship between these color lines and the grooves and ridges is created, causing the color lines to extend some times in and along the grooves, some times on the crests of the ridges and some times obliquely from the valleys to and over the crests of the ridges. The resulting product is unique in that a pleasing varying color effect is produced observable from any angle.

While the foregoing relationship of comments disclose that the relationship of color graining zones or bands are variable in widths and in positions in relation to the embossed ridges and valleys which are also of varying widths and positions, the improved invention also provides two other relationships between the color zones and the embossed ridges and valleys. One relationship is where each color graining band varies in its width throughout its length while the widths of the ridges and valleys or grooves each remain of substantial uniform width throughout its length. Also in this relation one ridge or groove may be of a different width than its adjacent ridge or groove. The other relationship is that of having each of the color graining zones of substantially uniform width throughout its length while the embossed ridges and valleys vary considerably in their widths throughout their lengths. It is also to be noted that each color zone or band may be of a different width than another color band when desired. In any of these relationships there is always the contrast of colors irrespective of what angle the covering or siding or shingle is viewed from. As another feature of the preferred present invention, the printed color graining lines or bands are applied in such a way that the pigment defining the lines or bands is not in the form of a superficial coating, but is inseparably embedded into the outer layer of the sheet and blended with the ground color of the sheet. The coloring pigments of this invention are not carried in a separate coating added to or applied to the surface of the covering, as heretofore has been the case, but are embedded in the surface of the covering during the process of producing the covering.

While the preferred form of invention produces a board, siding, or shingle that has the color contrast from any angle, and provides for the impregnation of the color in the web during its manufacture, it will also be appreciated that a final board, siding, or shingle will have a color contrast of the same scope even though the color pigment may be applied at any time during the manufacture of the product, and even after the web has been embossed. Also, the color contrasting pigments may be gained by employing colored granules separately or in conjunction with the type of the described printing application of the pigments.

Various other objects, features and advantages of the present invention are apparent from the following particular description and from an inspection of the accompanying drawings, in which:

Fig. 1 is a perspective view of a portion of an embossed covering having varying widths of ridges and valleys, and substantially continuous lines of color grain design, the widths of which vary and are in some of the

valleys and on top of some of the ridges for some distances;

Fig. 2 represents a front view of a covering partly in color showing different widths of color design, zones or bands overlying certain varying widths of ridges and valleys;

Fig. 3 is a sectional view taken on line **3—3** of Fig. 2 showing the varying positions of the color bands or zones in respect to the ridges and valleys;

Fig. 4 illustrates a front view of a covering partly in color having each ridge and groove of uniform width, and the color bands or zones being of varying widths and extending some times along and on the ridges and some times along and in the valleys;

Fig. 5 is a sectional view taken on the line **5—5** of Fig. 4 showing the various ridges and grooves or valleys and the positions of the color bands in respect to those ridges and grooves;

Fig. 6 represents a front view of a covering partly uncolored and illustrating the color bands or zones, each being of uniform width even though the width of one band or zone is different from that of the adjacent color zone or band, and shows the ridges and valleys being of varying widths;

Fig. 7 is a sectional view taken on the lines **7—7** of Fig. 6, showing the various positions of the color bands in respect to the ridges and valleys;

Fig. 8 is a diagram in side view illustrating the machine for making the improved grained sheet shown in Figs. 1 to 7;

Fig. 9 is a diagram in top plan view illustrating the step of printing a web with colored graining lines or bands in the process of making the improved product of the present invention and showing the graining colors extending across the web;

Fig. 10 is a diagram in top plan view illustrating the step of printing a web with color graining lines or bands running lengthwise of the web instead of across it;

Fig. 11 is a diagram in side view and on an enlarged scale of the part of the operation shown in Fig. 8, in which the web is printed with the grain design and at the same time is subjected to vacuum, to effect embedment of the printing lineating pigment into the body of the web, in the process of making the improved product of the present invention;

Fig. 12 is a diagram, enlarged, in end view showing the web carrying blanket and the thin web supported thereon, as they pass in superposition over one of the rolls in a suction box in the process of making the improved product of the present invention, the thickness of the blanket and the web being shown exaggerated in comparison with the roll;

Fig. 13 shows diagrammatically and in perspective an accumulator roll by which successive sections of a thin printed web are collected and formed into a composite sheet of the required thickness, in the process of making the improved product of the present invention; and

Fig. 14 is a side view on enlarged scale of the sheet grained in relief and in two-tone color and showing the embedment of the pigment firmly and inseparably into the outer layer of said sheet, to form the improved product of the present invention.

Referring to Figs. 1, 2, 4, 6 and 14 of the drawings, the improved product of the present invention comprises a sheet **10** of fibro-cementitious material, as for example, asbestos fibers and cement, cut to produce a wall covering for inside a house, or an outer building wall covering in the form of a board, siding, or shingle, or the like. The sheet **10** usually has a series of linear grooves **11** of varying widths and depths separated by linear ridges or crests or lands **12** running generally in the same direction but irregularly to define a graining grid relief design in imitation of a weathered wood shingle. The sheet **10** preferably has a ground color, which may be light brown

Published by AsbestosClaims.Law
asbestosclaims.law/library/21826/5

or of any other suitable color to give the impression of stained wood.

To enhance the attractiveness of the sheet design and to emphasize still further the graining effect presented, the sheet has a series of color lines or bands **13** of varying widths and sizes and of one or more colors or shades different from that of the ground color of the sheet. These lines or bands **13** or zones of color extend generally irregularly in the direction of the embossed grooves **11** and ridges **12**—Figs. 1 and 2—and are separated by irregular lines or bands **14** of ground color, thereby resulting in a two-tone color grain grid design. The color lines **13** are preferably of the same basic color and usually continuous but may be darker in shade, so that the two-tone effect presented will result in alternate light and dark lines or zones or areas over the length of the covering or siding. Where it is desired that the sheet **10** have a stained wood appearance, the lines or bands **13** might have a brown color darker in shade than the ground color of the sheet as it appears in the bands **14** or the bands **13** may be of various colors. With this non-coincidental or non-matching random relationship between the color graining design and the relief graining design, the varying tone effect will be observed at any angle, even though the angle of observation is such that the ridges **12** hide the grooves **11** and the observation is across the tops of the ridges.

While the above description discloses a preferable color contrast between two colors, it is to be understood that the color lines or bands or zones may be of different colors along the same zone, or band, or one zone may be of a single color and the adjacent band be of another color, or combination of colors. Any arrangements of colors may be made that would carry out the desired attractiveness of the product wherein the covering, siding, or shingle creates a color contrast irrespective of what angle the covering, or siding, or shingle may be viewed from.

In producing this type of covering, or siding, or shingle, it is preferable that the coloring grain zones or bands **13** shall have two features, i. e., be substantially continuous, and in most instances, be wavy as to widths of each band, as particularly shown in Figs. 1 and 2. Also in this preferred covering, it is desired that the ridges and grooves shall be wavy in their width throughout their lengths, also as shown in Figs. 1 and 2.

Modifications of the preferred form of coloring and embossing are illustrated in Figs. 4 and 6. In Fig. 4 the variation is produced by having each ridge and each groove of uniform width for substantially its full length. The width of any ridge or groove may be different than the width of any of the other ridges or grooves. Figs. 4 and 5 illustrate these uniform widths of ridges and grooves. These figures also represent the varying widths of the color bands or zones.

In Fig. 6 the modification is different in that the colored bands or zones are of substantially uniform width throughout their lengths. Likewise in this showing one color band or zone may be of a different width than an adjacent color band or zone. In this Fig. 6 the ridges and grooves are of varying widths throughout their lengths.

In the sectional view in Figs. 5 and 7, the uniform widths of the ridges and grooves are particularly noted in Fig. 5. This figure also shows that the coloring zones are sometimes on top of the ridges and sometimes in the valleys, and sometimes extending through the valleys to the next adjacent ridge. Fig. 7 shows the variations in the ridges and valleys, but maintains an equal width of color zones.

As another feature of the present invention, the pigment forming the graining lines or bands **13** is preferably deeply embedded into the outer layer of the sheet and blended with the ground coloring of the sheet, as shown in Fig. 14, instead of being layed on the sheet as a superficial coating. With the pigment for the graining lines or bands **13** so embedded, the colors in the sheet **10** graduate continuously in the transition from one color line or band or strip **13** to the adjoining ground line or band or strip **14**, thereby softening the contrast between the two or more colors of the sheet. The penetration of the pigments in the color lines or bands **13** into the body of the sheet renders the color lines or bands highly resistant to erasure or discoloration or dilution even under the most severe weathering conditions that may be encountered. In the instance where the coloring is applied after the embossing of the sheet, it has been found that this may readily be accomplished by producing the coloring results the same as the coloring is done on walnut shells.

The preferred process and apparatus for making the new and improved product of the present invention will now be described referring to Figs. 8 to 14.

For carrying out the process of producing this improved product in its preferred form and in providing a novel machine or apparatus for so doing, there is provided a pervious or porous conveyor blanket **15** on which the thin web adaptable for color graining is built in successive layers. This blanket **15**, in the form of an endless conveyor belt, passes in succession over a plurality of web formation cylinders **16** (three being shown), each partly immersed in a vat **17** usually containing a ground pigmented slurry or liquid mixture of fibers and cementitious materials. More especially, this slurry is a selected liquid pigmented mixture of asbestos fibers, unhydrated Portland cement and an inert filler. A thin lamina or web is formed on the periphery of each cylinder **16** and carried to the blanket **15** or to a lamina already thereon for adherence thereto. Each cylinder **16** on the bottom side of the conveyor blanket **15** cooperates with a roll **18** on the upper side of the blanket to thereby apply laminas to the underside of the blanket **15** or to an adhering lamina thereon by transfer action of said cylinder from the corresponding slurry bath. As a result, a thin wet delicate composite web **20** is built up on the pervious blanket **15**. Thus, this web consists of laminations held together in face to face contact. This web **20** is carried over the roll **18** above the last vat **17** and on the upper flight or run of the blanket **15** into the field of action of a printing device **21**, where the color graining figuration is applied.

The color printing device **21** is shown as preferably comprising a transfer roll **22** partially immersed in a reservoir **23** containing the ink or pigment, and a printing roll **24** in contact with the transfer roll during at least certain periods or cycles of operation. This printing roll bears the color pattern in relief. The printing roll **24**, which may be of wood or metal, has an intaglio lineated design for holding pigment for creating and printing a series of grain lines or bands, or strips **13** on the surface of the web—see Fig. 9. In the form shown, the relief or intaglio bands on the printing roll **24** extend generally parallel to the axis of the roll or along its length to impress the color lines or bands **13** of varying width across the web **20** in a direction transverse to its direction of travel. These color grain lines **13** are so positioned that when the final covering or siding or shingle is cut, these lines or bands extend in the same general direction as that of the ridges and grooves of the relief graining design subsequently applied or embossed therein.

While Fig. 8 shows the printing device **21** composed of the transfer roller **22** and the printing roll **24**, it will be understood the ordinary fountain type of color application to the roller **24** may be employed. As is known, the fountain type consists of two rollers, one of which will be in touch with the printing roller **24** and the other roller spaced a definite distance from the first fountain roller and the coloring solution is applied between the two rollers so that only a definite amount of color carried by the roller engagement with the printing roller **24** passes between the two fountain rollers.

If the shingle or siding is to be cut from the board sheet, so that the longer axis of the shingle or siding is along the direction of movement of the sheet, then the color lines **13** are so positioned that when the final covering or siding or shingle is cut, these lines or bands extend in the same general direction as that of the ridges and grooves of the relief grain design subsequently applied or embossed therein, see Fig. 10.

The thin printed web **20** which at this stage is composed of cement, asbestos fibers, insert filler and approximately 35% of water, is carried by the conveyor blanket **15** over two suction boxes **26** and **27** usually arranged in series and then is carried to an accumulator roll **28**, where the web **20** is wound a number of times, until a somewhat compressed rolled sheet having the desired thickness is formed. As will be explained hereinafter, it is only necessary to apply color to the first layer which is wound on the roll **28**, the following layers merely forming a backing for the facing layer.

Preferably the color graining design is imprinted through the operation of the printing device **21** upon the web **20** in the vicinity of the suction or vacuum boxes **26** and **27**. More specifically, this printing device **21** is located just before the web **20** reaches the first suction box **26**, as shown in Fig. 8 and 11, or directly over one of the suction boxes **26** and **27**. With this arrangement these suction boxes **26** and **27** serve the purposes of: (1) removing some of the water from the web **20**, so as to leave the web dry enough to roll up on the accumulator roll **28** into a series of superposed webs to form a composite sheet; and (2) drawing the pigment applied by the printing device **21** into the pores of the web, so that it becomes an integral and inseparable part thereof, capillary action also assists in embedding the color in the web **20**; and (3) holding the web from being carried away from the blanket **15** and around the printing roll **24**.

To carry the conveyor blanket **15** across the tops of the suction boxes **26** and **27** with minimum friction on the blanket and to insure desired color pigment absorption into the web, each of the suction boxes, as shown in Figs. 8, 11 and 12, has a series of small freely rotatable spaced rolls **32** over which the web **20** and the supporting blanket are bulged or formed into waves, as shown in Figs. 11 and 12. The section of the wet web **20** passing over each roll **32** is somewhat bulged convexly, so that the outer printed layer of said web is under some tension, and the pores thereof are temporarily increased in size, causing thereby a little more penetration of the pigment into this outer web layer by the action of the vacuum. The sections of the web **20** between rolls **32** sag concavely, causing the outer printed layer of the web to be compressed and the pigment therein to be squeezed somewhat and be mixed with the cementitious material. The alternate tensioning and compressing of the outer layer sections of the web **20** caused by the described undulating movement of the web results in the embedment of the pigment. The color pigments will also reach into the web **20** by reason of capillary action, even when there is no vacuum functioning.

With the arrangement described in which the printing is applied to the thin wet web **20** before or ahead of the accumulator and preferably in the presence or vicinity of a vacuum, no cement carrier or other bonding agent is necessary to be incorporated with the pigment.

The coloring matter may be a pigment of any type, such as the finely ground mineral oxide pigments, inorganic or organic pigments, phthalocyanine pulp pigments, dyes, lakes or other coloring matter, held in aqueous suspension or solution with or without use of dispersing agents. Whenever desired the coloring pigment may be applied in the dry state. Also, the fine colored particles may be used when in colloidal condition with a water mix and be drawn into the web **20**. With the inclusion of fibers in the web **20** the color pigments are caught among the fibers and are not pulled through the web in the same manner that water is pulled through the web by coming within the effectiveness of the vacuum.

When applying the color pigment by using the printing device **21** within the effectiveness of the vacuum, it has been possible, when desired, to have the inking roll create pressure, or be under pressure, against the web **20** thus transferring practically all of the color on the face of the roll **24** to the web **20**. However, the web **20** will not be picked up by the roll **24**, nor will it tend to follow the roll **24** to any great extent as the vacuum pulls the sheet tightly against the blanket **15**. With the availability of this pressure it is easier in some instances to employ dry coloring pigment.

When the color pigment is applied to sheet **20** when it is wet, a satisfactory color blending results. When the color pigment is applied when the web **20** is somewhat dry, as after some vacuum has been applied, then the color lines are somewhat sharper. In the event of using a fluted printing roll, it has been noted that often the color pigment is forced to the trailing edge of each flute, thus leaving the edge of the printed surface a little heavier in color, which very often gives a very pleasing blending of color tones.

By satisfactory application of the color pigment by vacuum, capillary action, sponging, brushing, dusting or the like, good effects of stippling, marblizing, splattering, and the like, may be obtained. If other special effects are to be obtained, the color grain may be at angles to the general direction of the embossed grooves and ridges. If desired, the angles may be at 90°. Such an adaptability or flexibility may be employed to simulate a clapboard type of siding.

After the thin web **20** has been printed with the graining design on the facing layer which engages the roll **28** and after this printed portion and the following unprinted portions of the web **20** have been partially dried through the action of the suction boxes **26** and **27**, the web is wound about the accumulator roll **28**, until a predetermined number of layers, for example four layers, have been superimposed and collected thereon to form a preliminary sheet **33** of the desired thickness.

This roll **28** preferably has a steel surface and is of considerable diameter. A smaller roll **34** is located beneath the accumulator roll **28** and exerts considerable pressure on the laminations being built up on the accumulator roll, thereby reducing the thickness of the laminations as they accumulate, and uniting the laminas together and further penetratively integrating the pigment with the body of the sheet. The conveyor blanket **15** passes over this pressure roll **34** and, after separation from the cementitious web, travels over a series of festooning rolls **35** for drying, and then returns to the first of the formation cylinders **16**.

To facilitate the slitting of the composite sheet **33** on the accumulator roll **28**, after the desired thickness of said sheet has been attained, there is provided a suitable slot **36** extending there along on its periphery. When the sheet **33** is to be removed, the operator inserts a cutter bar into the slot **36** and slits the wrapped web along the slot. The slitted sheet **33** then peels off the accumulator roll **28**, spreads out open, and advances onto a conveyor **37** in flat condition with the printed surface uppermost and exposed for subsequent operations to be described. Since only the initial section of each length of web **20** wrapped around the accumulator roll **28**, corresponding in extent to the circumference of the accumulator roll, will be exposed when the sheet is removed from the accumulator roll, it will not be necessary to print the graining design along the full extent of the web length before it reaches the accumulator roll. That is, experience has shown that only the first laminae need to have the coloring applied to it, the other or "backing up" laminae do not need to have the printing applied to them.

To economize in the use of pigment and to gain the foregoing desire, the printing device **21** may be rendered

Published by AsbestosClaims.Law
asbestosclaims.law/library/21826/7

inactive after the initial length of web necessary to form the first layer of a composite or preliminary sheet **33** on roll **28** has been printed with the necessary graining design. For that purpose, suitable means may be provided for separating the printing roll **24** and the pigment transfer roll **22** during the intervals when it is desired not to print on the web. In the specific and enlarged form shown in Fig. 11, a cam device **40** at each end of the shaft of the printing roll is shown for moving the printing roll toward the transfer roll **22** during the printing periods. A suitable spring or counter cam may be employed to retract the printing roll.

After the printed sheet **33** has been removed from the accumulator roll **28** and laid on the conveyor **37**, it is preferred to carry the sheet past one or two heating units **41**—Fig. 8—for the purpose of removing some of the remaining liquid in the sheet. Each sheet, still in plastic form, then passes into the field of action of an embossing device **42**, where the graining grooves **11** and ridges **12** are formed in the sheet.

This preferred embossing device **42** comprises an upper roller **43**, having an embossed surface for impressing the relief design **11** and **12** on the color printed surface of the sheet, and a lower roller **44** with a smooth surface for supporting the sheet as it is embossed by the upper roller. This upper roller **43** has its embossing ridges extending either lengthwise along the roller of circumferentially therearound, so as to parallel, generally, the direction of the printing lines or bands, or strips on the printing roll **24**. Where the color graining lines or bands **13** and **14** on the sheet **33** extend transverse to the direction of movement of the sheet, the embossing ridges on the embossing roller **43** will extend generally parallel to its axis but will vary in width and will be wavy in configuration. There is no exact correspondence between the location of the graining lines or bands **13** and **14**, and the linear regions where the graining grooves **11** and ridges **12** are impressed in the sheet **33** by the embossing roller **43**, so that the ultimate color design and relief design on the final sheet **10** have the random relationship described in connection with the product shown in Figs. 1 and 2.

After the embossing operation described, the sheet **33** is cut, if and when desired, and removed from the machine and stacked with other sheets to permit curing of its cement constituent over a period of days. Finally the cured or partially cured sheet or board is retained in its full size for coverings inside or outside the building, or is cut into smaller sizes to form the improved siding, shingle, or other wall covering element **10** shown in Figs. 1, 2, 4 and 6.

When it is desired to apply the pigment to the sheet after the sheet has passed under the embossing roll, instead of applying the pigments in the neighborhood of the couch rolls, it will be understood that the coloring may be applied in the same fashion as printing is done on walnut shells. Also, if instead of employing the color pigments as pigments, the same type of color contrast may be obtained by using colored granules and placing and embedding them in the sheet in desired zones and in desired locations.

Referring now particularly to Figs. 8, 11 and 13, the machine and apparatus for forming and producing the improved covering is disclosed, and the foregoing description has described this preferred apparatus and the cooperating functions of the parts thereof as applying to the sheet or board in its formation as it passes through the apparatus to have each part of the machine definitely act upon and produce the final desired product.

It will be noted from the foregoing description that an improved product is produced and has a color design that is non-matching with the graining or embossed design. Also, a preferred process and apparatus for producing this improved product have been set forth in detail.

It will be appreciated that the improved product with the contrasting colors observable from any angle may be produced in other ways so long as the embossed ridges and grooves do not coincide with the printed lines, strips, bands or zones desired for the preferred covering. For instance, the coloring pigments may be applied in suitable manner after the embossing roll has formed the ridges and grooves in the surface of the sheet as noted above.

While the preferred process provides for the application of the printing lines at a point just ahead of the first suction box, it will be understood that the color pigments may be applied, for purpose of good results, at any points after the web passes from the last roll **16** and before the web passes under the embossing roll as may be desired. However, the preferred process provides for the application of the normal pigments to the web at some point prior to the web being built upon the accumulator roll.

It will be further noted that with the preferred improved type of manufacturing machine that the color is embedded in the web by capillarity and mechanical suction.

It will further be noted with the improved process herein, that a final board or siding covering is of contrasting colors viewable from any position and is obtained by reason of the non-matching color design with the graining design, but that the color lines, zones or bands extend in the same general linear direction but normally over the length of the product a color strip will extend off from one ridge, preferably through an adjacent valley, and up onto a second ridge, thereby leaving some of the base color of the product showing on the first ridge until the color strip or set of lines return through the valley and back onto the first ridge. This type of coloring contrast produces a siding cover that is attractive, and "striking" while at the same time being waterproof and fireproof and the contrasting colors are appreciated when the observer stands at any angle to the front face of the board siding or shingle.

While the invention has been described with particular reference to a specific embodiment, it is to be understood that it is not to be limited thereto, but is to be construed broadly and restricted solely by the scope of the appended claims.

The invention claimed is:

1. A wall covering such as boards, sidings, shingles and the like, comprising a sheet of asbestos fibers and cement, said sheet having a series of alternating ridges and valleys embossed in one face of said sheet, said ridges and valleys extending continuously from one edge of said sheet to an opposite edge thereof, said sheet also having a series of spaced bands of pigmented material applied to the embossed face thereof, said bands extending continuously from one edge of said sheet to an opposite edge thereof and being so disposed with respect to said ridges and valleys that said bands follow the general direction of said ridges and valleys, but with single bands of pigmented material each lying partially within a given valley, lying partially on the crest of the next adjacent ridge, and lying partially on the slope between said valley and ridge.

2. A wall covering as claimed in claim 1 in which said bands of pigmented material are of non-uniform width throughout their length.

3. A wall covering as claimed in claim 1 in which said bands of pigmented material are of wavy contour throughout their length.

4. A wall covering as claimed in claim 1 in which said bands of pigmented material are of non-uniform width throughout their length and are of wavy contour throughout their length.

5. A wall covering as claimed in claim 1 in which said bands of pigmented material are of non-uniform width throughout their length, and in which said ridges and valleys are of wavy contour throughout their length.

6. A wall covering as claimed in claim 1 in which said bands of pigmented material are of wavy contour through-

out their length, and in which said ridges and valleys are of wavy contour throughout their length.

7. A wall covering as claimed in claim 1 in which said bands of pigmented material are of non-uniform width throughout their length and are of wavy contour throughout their length, and in which said ridges and valleys are of wavy contour throughout their length.

References Cited in the file of this patent

UNITED STATES PATENTS

1,434,332	Elvidge	Oct. 31, 1922
1,996,343	Miss	Apr. 2, 1935
1,997,136	Devereux	Apr. 9, 1935
2,015,084	McQuade	Sept. 24, 1935
2,183,965	Ledeboer	Dec. 19, 1939
2,200,269	Fischer	May 14, 1940
2,289,298	Voigt et al.	July 7, 1942
2,307,733	De Vault	Jan. 12, 1943
2,380,885	Wack	July 31, 1945

Published by AsbestosClaims.Law
asbestosclaims.law/library/21826/9