C. SCHUSTER.

COMPOUND CELLULOID PRODUCT AND METHOD OF MAKING SAME.

APPLICATION FILED JAN. 14, 1922.

1,434,157. Patented Oct. 31, 1922.

2 SHEETS—SHEET 1.

Fig. 1.

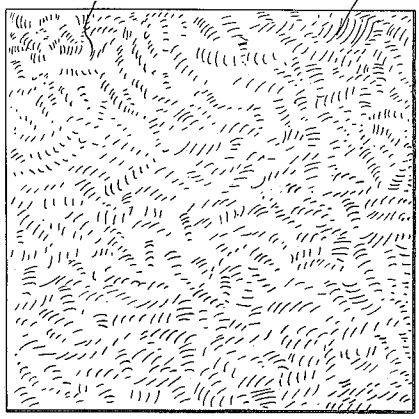


Fig. 2.

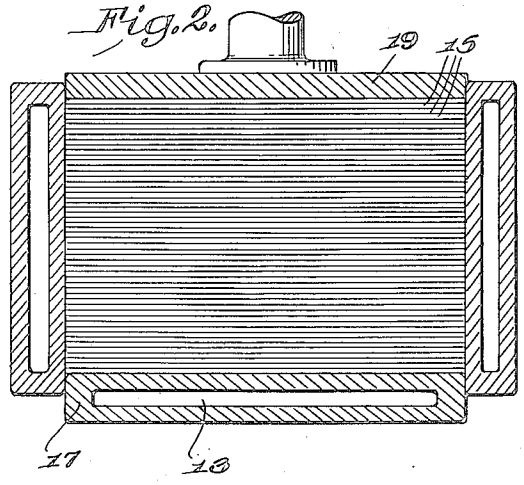


Fig. 3.

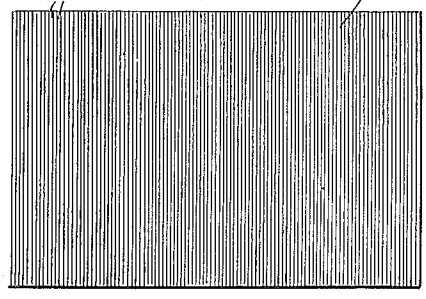


Fig. 4.

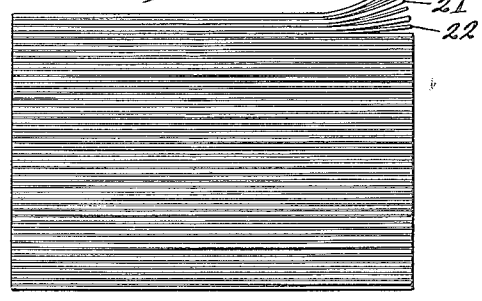
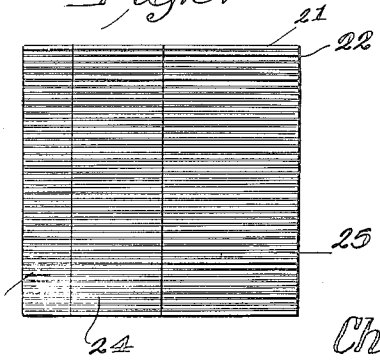


Fig. 5.



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2 SHEETS—SHEET 2.

Fig. 6.

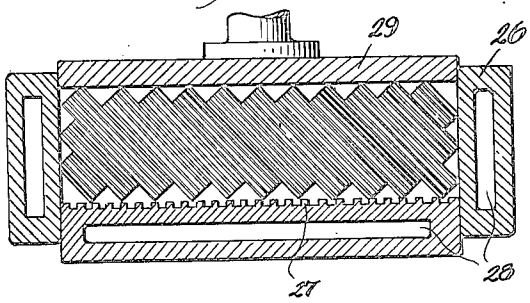


Fig. 7.

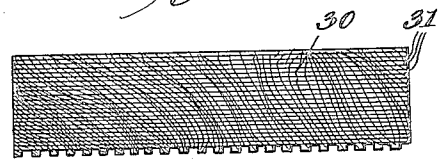


Fig. 8.

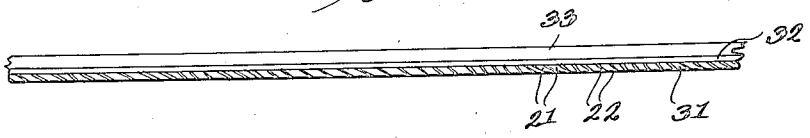


Fig. 9.

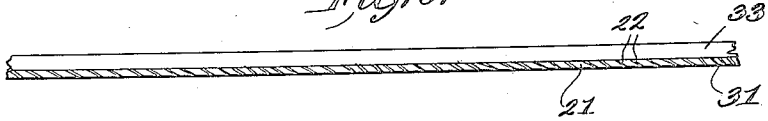
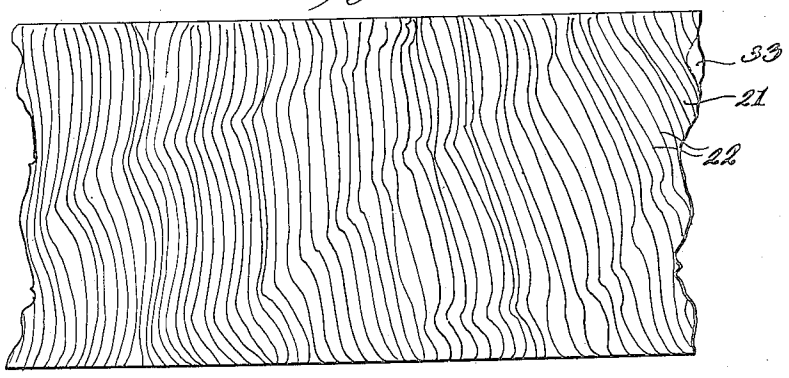


Fig. 10.



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UNITED STATES PATENT OFFICE.

CHARLES SCHUSTER, OF PERTH AMBOY, NEW JERSEY, ASSIGNOR TO NIXON NITRATION WORKS, OF NIXON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

COMPOUND CELLULOID PRODUCT AND METHOD OF MAKING SAME.

Application filed January 14, 1922. Serial No. 529,196.

To all whom it may concern:

Be it known that I, CHARLES SCHUSTER, a citizen of the United States, residing at Perth Amboy, in the county of Middlesex and State of New Jersey, have invented certain new and useful Improvements in Compound Celluloid Products and Methods of Making Same; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to a combined celluloid product, and method of making the same.

An object of this invention is to provide a structural leaf or sheet which simulates mother of pearl, silver pearl, abalone, and other variegated and stratified shell structures.

Another object of the invention is to provide a structural leaf or sheet of this character which is composed of celluloid or like transparent material, pigments and foil, such as tin foil, gold foil and colored foil; and to provide a novel method of treating and assembling these materials to produce a product which is not brittle, which is commercially practical, which may be easily handled, and which is adapted to various ornamental uses, such as in making special designs and effects in combination with celluloid.

Heretofore, no means or method has been known to successfully make sheets of material like celluloid stick together when pieces of even a thin metal material are placed between the sheets, and the present method embodies certain novel steps and treatment of the materials which overcome this disadvantage.

More specifically, the invention provides a composite sheet of celluloid and foil which is presented to the surface of the sheet in substantially edgewise relation to obtain an edge grain effect of the composite article, and to unite and secure together such materials beneath a continuous uninterrupted smooth surface layer of transparent material.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claims appended hereto.

In the drawings, wherein like symbols refer to like or corresponding parts throughout the several views,

Fig. 1 is a plan view of a sheet of celluloid with color pigment pressed into its surface.

Fig. 2 is a sectional view of a jacketed press, illustrating the manner of laying up a plurality of the sheets in the press to form a block.

Fig. 3 is a side elevation of the block produced, showing, on an enlarged scale, the sheeting of the block to produce edge grain sheets.

Fig. 4 is a side elevation of a stack of the edge grain sheets having superposed sheets of tinfoil therebetween.

Fig. 5 is an end view of the stack, illustrating the cutting of the same into sections for molding.

Fig. 6 is a sectional view of a press, showing the sections of the stack arranged therein.

Fig. 7 is a side elevation of a block molded from said superposed sheets, and showing the same sheeted for final treatment.

Fig. 8 is a fragmentary enlarged section through one of the final sheets with a coating of cement and a transparent surface sheet applied thereto.

Fig. 9 is a similar view after compression, and

Fig. 10 is a face view of a finished sheet.

Referring to the drawings, wherein is disclosed not only the article, but also certain apparatus used in the production of the article, and various composite stacks of superposed sheets formed in the method, 15 designated a sheet of transparent material, such as celluloid, which may be formed in any well known commercial manner, and colors or pigment 16 are ground into the celluloid while the same is soft on the rolls and the excess solvent is worked off so that the sheet 15 will not be too soft for subsequent molding. The pigment 11 may be applied by brush coating, and is adapted to impart a variegated coloring effect to the surface of the celluloid sheet 15. It is found essential in making pearl to leave about twelve to fifteen percent more alcohol in the mixture than usual, and is accomplished by carefully gauging the weights when the material is put on and taken off the rolls. These celluloid sheets 15 are arranged in superposed or stacked relation in a press or mold 17, the

same having a water jacket 18 in the walls thereof, and provided with a plunger 19 which may be operated in any suitable manner. The stack of sheets 15 is adapted to be placed under considerable pressure while alternate changes of hot and cold water, or other suitable fluid, is circulated through the jacket 18 for the purpose of working the mass by expansion and contraction into a homogeneous block.

The pressed and molded block is shown at 20 in Fig. 3, and the block is then submitted to the operation of a sheeter or cutter which is adapted to sheet a block into a plurality of sheets 21 of approximately ten one-thousandth of an inch in thickness.

As shown in Fig. 4, the sheets 21 are then laid up in superposed or stack form, but have interposed between them sheets or layers of foil 22 which is made relatively thin, and which approximates three one-thousandths of an inch in thickness. It may here be stated that the use of a relatively thin foil of approximately the above stated thickness is one of the essential features or characteristics of the invention, because it is found that should a double thickness of foil be accidentally interposed between the celluloid layers, the entire heat is ruined, and to offset this accident, the thin sheets of foil at the time of their manufacture are separated with interposed layers of tissue paper to prevent such mistakes.

The stack of superposed and alternately arranged sheets of celluloid 21 and foil 22 is placed under a large paper cutter and is lengthwise cut vertically, or at right angles to the planes of the sheets in the manner indicated in Fig. 5, to divide the stack of sheets into separate narrow stacks 23, 24 and 25 of different widths which may be approximately; the stack 23, one inch in width, the stack 24 inches two inches in width, and the stack 25 three inches in width. Of course, these widths are only approximate as the number of vertical cuts and the widths will depend largely upon the dimensions of the stack and the dimensions of the subsequently used mold or press.

These narrow stacks, 23, 24 and 25 divided up into suitable heights or thicknesses and placed in a second press or mold 26 which is provided with a serrated bottom wall 27, the serrations of which project inwardly and form ridges or rests upon which the lower edges of the stack portions are held

The portions of the narrow stacks 23, 24 and 25, are placed diagonally in the press 26, or are inclined in overlapping relation from end to end of the press, as shown in Fig. 6. The press 26 is also provided with a water jacket 28 by means of which the press may be subjected to relatively hot and cold temperatures for working the mass during operation. And the plunger 29 of the press 26 is forced into the press or mold, the tilted stacks of sheets are forced together, and by virtue of the temperature changes are caused to adhere or coalesce into a unitary block with the grain of the block extending obliquely from top to bottom. In this manner the superposed sheets of celluloid and foil are pressed into slightly overlapping relation and at the same time present the edge grain of the composite mass to either horizontal or vertical plane cuts. This produces the shell effect and the variegated colors which are so essential to the simulation of abalone and other shell structures.

The superposed sheets of celluloid 21 and foil 22 arranged diagonally in the mold or press 26 are subjected to approximately a five hours' heat under pressure, instead of a three hours' heat such as is common in the handling and molding of celluloid masses. This additional or prolonged heat is also found essential to effect the desired cohesion of the celluloid and foil. The result of this treatment is that a composite cake or block 30, shown in Fig. 7, is produced which, as above described, has a block or diagonal drain.

The matter of block 30 is then subjected to a sheeter or cutter, and divided into final sheets of ten one-thousandths of an inch in thickness, as indicated at 31 in Fig. 7, and each sheet 31 presents the edge grain of the composition to its opposite faces to impart the necessary shell effect. The sheets are then individually suspended in a dry room for approximately twenty-four hours. Each sheet is then coated with a suitable cement as indicated in Fig. 8 at 32, the cement being of any suitable material or composition, such as amyl acetate or acetone, or some other solvent. A surface transparent sheet 33 is then placed over the coating 32, and the sheets 31 and 33 with the coating 32 therebetween are placed in a suitable press and subjected to pressure so that they will stick fast together. The composite sheets are removed from the press and are then seasoned for another twenty-four hours to remove the softening effect which the cement produces, and are finally replaced in the press between two nickel plates, and are given a final pressure under heat to produce the desired polish or finish to the product.

The above described process effects the commercial practical adhesion between the celluloid and the foil and this is chiefly effected by rolling the initial celluloid sheets softer than is usual, cutting the sheets to a width of ten one-thousandths of an inch, and vaporizing the excess solvent therefrom and laying in the relatively thin sheets of foil. Further, the sheeting of the molded

celluloid and foil sheets to a thicknesss of ten one-thousandths of an inch, and laying the same up alternately with two supporting sheets of transparent celluloid cut to twenty-one-thousandths, giving a total of three heats for finishing the product. This treatment produces a perfect weld with the use of tin foil and a relatively cheap and economical material which may be readily handled in various subsequent uses of making pearl and other shell designs in combination with celluloid.

It is apparent that the various steps of the method may be substituted, modified, and even some of the steps may be omitted to produce various shell effects, and to meet conditions of manufacture and use of the product without departing from the spirit of this invention.

What is claimed is:

1. A compound celluloid product comprising a plurality of superposed celluloid and foil particles compressed into over-lapping relation, and a surface layer of transparent material pressed into intimate contact with one side of the over-lapping particles, substantially as described.

2. A compound celluloid product comprising a transparent surface sheet, and over-lapping layers of foil and transparent material pressed to the under side of said sheet for exposing the edges of the over-lapping material through the transparent sheet, substantially as described.

3. A compound celluloid product comprising a transparent surface sheet, and a plurality of alternately arranged over-lapping sections of celluloid and foil pressed to the under side of said sheet, the layers of celluloid having a pigment therein to present colors to the transparent sheet, substantially as described.

4. A compound celluloid product comprising a surface sheet, and inclined over-lapping layers secured against the under side of the sheet and ultimately composed of celluloid and foil compressed into a homogeneous mass with the surface sheet, substantially as described.

5. A compound celluloid product comprising superposed layers of homogeneous celluloid and foil cut transversely to expose the edge grain of the product, substantially as described.

6. A compound celluloid product comprising strips of celluloid and foil arranged alternately and compressed into over-lapping relation to form a homogeneous sheet, substantially as described.

7. A compound celluloid product comprising superposed layers of celluloid and foil compressed into over-lapping relation to provide a homogeneous sheet, the celluloid particles having a pigment worked into the surfaces thereof to present variegated coloring effects in the completed sheet, substantially as described.

8. That method of making a combined celluloid product, which consists in treating surfaces of celluloid sheets with a pigment, laying up said sheets in a press and subjecting the same to pressure under temperature changes, sheeting the block formed in the press, interposing foil between the sheets, subjecting the superposed sheets of foil and celluloid to heat and pressure to form a homogeneous composition block, and sheeting the block to expose the edge grain thereof, substantially as described.

9. That method of making a compound celluloid product, which consists in alternately superposing sheets of celluloid and foil into stack form, subjecting the stack to heat and pressure for homogenizing the sheets into integral block form, and sheeting the block to expose the edge grain thereof.

10. That method of making a compound celluloid product, which consists in superposing alternate layers of celluloid and foil, securing said layers together into a homogeneous mass, and sheeting the mass to expose the edge grain thereof, substantially as described.

11. The method of making a compound celluloid product, which comprises the alternate superposing of celluloid and foil sheets, causing said sheets to coalesce into a unitary block, sheeting the block to expose the grain thereof, and securing a surface layer of transparent material over the sheets cut from the block.

12. That method of making a compound celluloid product, which consists in alternately superposing sheets of celluloid and foil into a homogeneous block, sheeting the block to expose the grain thereof in the formed sheets, treating the surfaces of the sheets with a solvent, and applying a surface layer of transparent material to the treated surfaces of the sheets, substantially as described.

13. That method of making a compound celluloid product, which consists in forming a block of superposed celluloid and foil sheets, cutting the block to form sheets with the edge grain exposed, treating the sheets with an adhesive solvent, and compressing a surface layer of celluloid against the treated surfaces of the sheets, substantially as described.

14. That method of making a compound celluloid product, which consists in molding a plurality of sheets of celluloid treated with a pigment into block form, sheeting said block into sheets of approximately ten one-thousandth of an inch in thickness, interposing sheets of foil of approximately three one-thousandth of an inch in thickness between the celluloid sheets, molding the superposed celluloid and foil sheets into block

form, sheeting the second block across the grain thereof to expose the edge portions of the foil to the surface of the sheet for simulating strata, and affixing the last named sheets to a transparent surface layer.

15. That method of making a compound celluloid product, which comprises the grinding of colors into soft celluloid sheets from the roll, evaporating the solvent from the sheets, compressing the sheets under temperature changes to form a block of celluloid with a pigment therein, sheeting the block, interposing foils between the sheets of the block, subjecting the interposed sheets to pressure under temperature changes to form a homogeneous composite foil and sliding block, sheeting the composite block across the grain thereof to expose the edges of the foil to the surfaces of the sheets, and securing the sheets formed of a transparent surface covering.

16. That method of making a compound celluloid product, which consists in superposing sheets of celluloid and foil, subjecting said superposed sheets to pressure in the presence of temperature changes to form a block, and with the sheets inclined in overlapping relation to form a diagonal grain in the block, sheeting the block to form stratified sheets, and securing the stratified sheets of a transparent surface layer.

17. That method of making a compound celluloid product, which consists in superposing sheets of celluloid and foil in inclined overlapping relation, subjecting such superposed sheets to pressure and temperature changes, sheeting the compressed block to form stratified sheets, treating the surfaces of the stratified sheets with an adhesive solvent, pressing a transparent surface sheet to the solvent for securing the surface sheet to the stratified sheet, seasoning the superposed sheets, and projecting the seasoned superposed sheets to pressure between smooth plates for polishing the final product.

18. That method of making a compound celluloid product, which comprises compressing superposed celluloid and foil sheets into block form under temperature changes, and with the sheets in inclined overlapping relation to impart a diagonal grain in the formed block, sheeting the block to form stratified sheets, seasoning the stratified sheets, applying a surface coating of adhesive solvent to the stratified sheets, applying a transparent surface sheet to the adhesive coating, compressing the superposed sheets under heat to cause the same to adhere, pressing the composite structure between highly polished plates to impart a smooth surface finish to opposite sides of the product.

CHARLES SCHUSTER.

In presence of—

WILLIAM JOS. KORBONITS.