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N. C. WARD

2,011,130

BURNPROOF MATERIAL

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Fig. 1

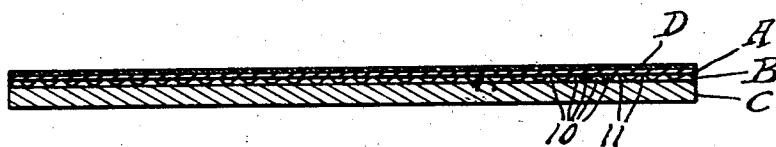
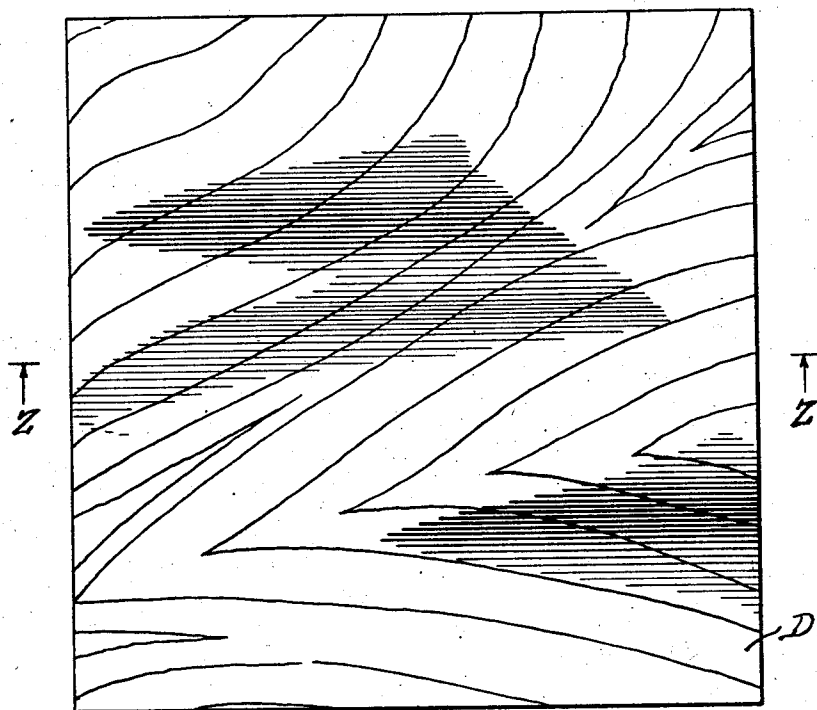


Fig. 2

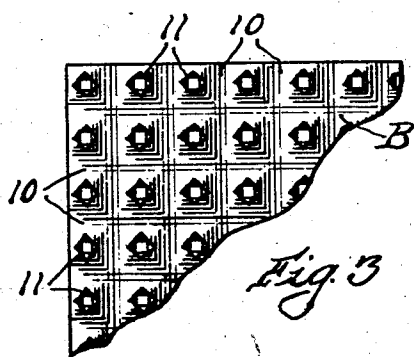


Fig. 3

Inventor:

Neil C. Ward
By [Signature]
Attorney

UNITED STATES PATENT OFFICE

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BURNPROOF MATERIAL

Neil C. Ward, Chicago, Ill.

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4 Claims. (Cl. 20—91)

The present invention relates to a composite material which is particularly useful for furniture, like card tables, desks and other household and office devices. It has a pronounced peculiarity in that it successfully prevents charring or burning of polished or other exterior surfaces when cigarettes, cigars, lighted matches, curling irons or even flat irons are laid thereon.

One of the trials and tribulations of every housewife is the damage to her furniture from carelessly laid down cigarettes which burn toward and upon articles of furniture producing scorch. Sometimes actual burning of wooden furniture occurs. In innumerable instances, these accidents destroy the finish upon valuable articles. In an office, an examination of the desks will generally disclose a plurality of cigarette and match burns or other damage to the finish due to the heat of burning cigarettes, cigars or matches.

Hotels have resorted to plate glass tops for protection to articles of furniture which will permit of the use of glass. While glass is quite effective to prevent burning of the top surfaces of pieces of furniture, the bills for fractured glass due to the heat of cigarettes, cigars, matches, curling irons, and flat irons laid upon the glass are enormous. Upon metallic furniture, the finish is generally forever destroyed by the heat of the items listed. It is to avoid this large and unnecessary damage to furniture surfaces that the present invention was primarily devised.

Among the objects of the present invention are the following:

A new and unique finish for furniture or the like.

An improved sheet material suited for use in facing furniture or the like.

New and improved means whereby heat may be rapidly dissipated from a surface to prevent scorching, burning or scarring.

A unique laminated structure for various uses where protection from localized heat is needed, such heats generally being from lighted cigarettes, cigars or matches, or from curling irons or flat irons.

These objects, and such other objects as may hereinafter appear, are obtained by the unique combination, improved structure, and novel arrangement of the several elements which constitute the several forms of the invention as hereinafter illustrated and described, and in which:

Figure 1 is a plan view of a card table top made from material embodying the subject matter of the present invention;

Figure 2 is a transverse section taken on the line 2—2 of Figure 1; and

Figure 3 is an enlarged perspective of a metallic core which may be employed in Figures 1 and 2.

Like reference characters are used to designate similar parts in the drawing and in the description of the invention hereinafter given.

For convenience, the principal materials of which an embodiment of the invention are formed, are represented by the reference characters A, B, and C. "A" in the drawing and in the description which follows comprises an outer or top part of a laminated sheet hereinafter more particularly described. "B" comprises a metallic core or lamination, the functions of which are later to be described. "C" comprises a core or base upon which the metallic sheet B and the exposed sheet A may be disposed when not self sustaining. The part C comprises the main body of the laminated material forming the subject matter of the present invention in many instances.

The core or body C, when used, may be of any suitable material. It may be omitted. It is primarily a support. When used, generally it is not exposed to view, and may be of inexpensive material. Preferably, it is of a compressible material like wood. It is of suitable strength for the purpose in hand. It is immaterial whether it is a solid block or board, or laminations or veneers. It may be fabricated in any suitable manner and of any selected material.

The metallic sheet B may comprise aluminum, copper, or any other suitable metal. For metal, other heat conductive products may be substituted. Aluminum preferably is employed at the present time because, in relation to its weight, it has a heat conductivity substantially equivalent to or greater than that of copper which normally would appear to be the most useful material for heat conductivity.

The thickness of the sheet of aluminum or copper or other material comprising lamination B is determined by the heat capacity and conductivity desired. As the function of sheet B is to rapidly conduct heat away from an affected area and to aid in the dissipation thereof, the thickness should be sufficient to compensate for any probable heat strain to which the sheet A may be subjected. In use, sheets from .006 to .02 of an inch of aluminum have proved satisfactory.

The top sheet A preferably is very thin. The material thereof may be a compressible and combustible material. A compressible and combusti-

ble material like wood is preferred. Sheet A should take readily to a finish or polish and it also may respond readily to impregnation with heat hardened adhesives, or resinous materials such as phenol condensation products. For some purposes, and in order to insure firm adhesion between the top sheet A and the metallic sheet B, as well as between the metallic sheet B and the core C, when the latter is used, wood fibers may be employed. Wood fibers are obtained by treating wood, generally previously soaked or steamed, to the destructive action of wire brushes or the like whereby the wood is disintegrated into short strips comprising its fibrous parts.

The adhesive which is employed preferably is glue possessing high conductivity for heat. These may be urea condensation products, glyptol or other thallic anhydrides, or casein glues. Phenol condensation products may be substituted for such adhesives. In order to make sure that the sheet B is firmly attached to the core C and the sheet A, it is usual to treat the sheet B so that its appearance, upon either of its flat surfaces, is similar to a nutmeg grater or the like. One form of treatment is shown in Figure 3. By placing the sheet B between plates and applying pressure thereto, first, with plates having corrugations running in one direction and next, with plates having corrugations running in a normal direction, a roughened surface like that illustrated in Figure 3 is obtained. By such treatment, grooves and tongues, barbs or points are obtained. The metal may be punctured and tongues or barbs turned normal to the face thereof when desired.

For the purpose of fabrication, the metallic sheet B may be treated on both sides with a suitable adhesive or with a phenol condensation product, heretofore mentioned. To either of these, when desired, wood fibers may be added. Such wood fibers have been found advantageous over wood flour which may be substituted for the wood fibers. The top veneer A generally is treated with the adhesive or phenol condensation product in order that it may become impregnated therewith. The adhesive may be of a type adapted to harden and become solid upon being heated and concurrently be capable of producing or taking a fine finish or high polish.

The three elements, A, B, and C, after being assembled, are placed in a press, heated, and pressure applied thereto. A pressure of less than two hundred pounds per square inch is not desirable but is permissive. The pressures may be increased far above such amount to obtain an effective union between the parts and to compress the parts A and C. Between the pressure upon and the impregnation of the top veneer with the adhesive, the top sheet A is reduced to a relatively thin sheet held in intimate contact with the metallic sheet. In fact, the metallic sheet B, if its edges are not coextensive with the edges of the core C and of the sheet A may be imbedded in one or the other by such pressure.

The barbs on the metallic sheet B penetrate into the veneer A as they do into the wood core C. The corrugations in the metallic sheet B running, as they do, in two directions, render such sheet somewhat elastic to expansion and contraction and capable of compensating within itself for changes in structure due to changes in the temperature thereof. Thus, heating of the metal sheet does not tend to warp or injure the thin wood veneer or other covering thereover and does not injure the core therebelow.

After the laminated sheet has been compressed, or concurrently with such compression, a suitable finish D may be applied to the exterior surface of ply A. The metallic core B preferably extends to the edges of the composite sheet. The reason for this is that metal at the edge of the composite sheet prevents edge charring or burning of the sheet A which might otherwise occur.

The fabricated sheet may be preformed into a selected shape or configuration. If it is formed without particular reference to its future use, it is generally in sheet form and is cut and formed to meet requirements. In use, the sheet is impervious to cigarette or cigar burns, and will stand the heat tension or strain of a burning match. Likewise, it will resist scorching from a flat or curling iron. A match, a cigar, a cigarette, or iron when laid upon the outer surface of lamination A radiates heat. Before such heat may accumulate in sufficient quantity or become of the necessary intensity to damage the compressed or impregnated outer veneer A, the conductivity of the sheet A or (and) of the adhesive or impregnating material therein, causes the heat applied to sheet A to be conducted to the metallic sheet B therebeneath. The capacity of the sheet B to absorb heat is large and its conductivity is very high.

The heat from the match, cigarette, cigar, or iron thus is conducted to the metallic sheet, distributed over a large area thereof because of its high conductivity, and rapidly dissipated in the material of veneer A and (or) core C, removed from the source of heat. The result is that the cigarette, cigar or match burns out or the heat of the iron dies out before the metal core B may be heated to a sufficiently high temperature to permit of the charring or burning of the contiguous veneer A.

Whatever expansion in the metal may be due to the absorption of the heat thereby is compensated for in the metal B by the normally arranged corrugations therein plus the barbs which penetrate into the body of the veneer and the body of the core as heretofore explained. Plain sheet metal may be used when desired or perforated sheets of metal may be employed in place of corrugated material.

Wood is not the only material which may be used for the face A. In place thereof, there may be used leather, cloth, paper, and various compounds which are now substituted for leather and for paper. Other materials have utility. These substances are rendered more effective heat conductors by impregnation with a heat conducting adhesive or glue of the character heretofore described. When impregnated with a phenol condensation product, they have a toughened, hard-to-damage surface.

Whatever the original finish may be upon the wood or other material which is used for the lamination A, such surface is thoroughly protected from localized heat damage by the arrangement herein described.

Another method of applying the metal part is by spraying it onto the core C or onto the top sheet A. Such metal, when sprayed, is just barely molten and is not highly heated. When it strikes the core or top sheet, it is distributed thereover in a slightly porous layer, making the exposed surface of the metal almost ideal for the reception of an adhesive by which the uncoated section is secured. Powdered metal may be used for convenience in manufacture in the same way as sprayed metal, either with or without a backing of sheet metal.

The finished article, when used for hotel furniture, may have a heavier metal core B than for household purposes. In hotel furniture, the metal may be called upon to dissipate the heat of a curling iron or of a flat iron which a guest may leave upon a dresser or the like while her attention is directed for the time being to some other matter.

High compression is advisable in assembly of the three main elements of the combination. This is particularly true in respect to top material A. The material of top A should lend itself to fabrication concurrently with the application of a finish thereto and particularly to an insulating layer D of suitable material. For a finishing coat or layer, a cellulose acetate or other fire resisting varnish may be supplied. A urea condensation product is useful notwithstanding its tendency to become slightly opaque.

The compression of section A, particularly when it is of wood, to a fraction of its original thickness, multiplies its heat conductivity many times and also adds materially to its wearing qualities of its exterior surface as just pointed out. When impregnated with one of the adhesives heretofore described or with a phenol condensation product, the heat conductivity of this lamination is greatly augmented. By damming the adhesive or phenol condensation product against end escape during the cover pressing operation, a superior top sheet is obtained, the excess of adhesive or resin converting the sheet into a material of very high heat conductivity.

The top layer A preferably is a good conductor. Over its exposed surface, the insulating finish D or insulator may be applied to retard the flow of heat to the part A. Any suitable insulating and preferably transparent material or finish than those named may be employed. When heat penetrates the insulator or finish coating D, which may be very thin, the heat is rapidly conducted by the compressed top sheet A to the metal B and by the latter dissipated in the manner hereinabove described.

The applicant is aware that metal sheets have been placed in laminated wood structures. The purpose of these sheets has been to render the whole structure fire proof or fire resisting without regard to damage to the exterior surface. Protection of the exterior surface of the outer sheet against localized heat was not in the mind of earlier patentees. The present invention is for the protection of an exterior surface and finish against localized heat and not to render the whole of the structure fire resisting.

When desired, a solder having a relatively low melting point may be used to secure the metal sheet B to the veneer A. When this is done, the solder is applied therebetween. When the sheets A and B are pressed together, a low heat may be applied so that the solder will melt causing the veneer and metal to firmly unite, the solder penetrating the pores of the veneer to insure cohesion.

What is claimed as new and is desired to be secured by Letters Patent of the United States is:

1. As a new article of manufacture, a composite sheet of material having a scorch-proof surface and comprising a supporting body, a metal sheet of high heat conductivity, and a thin veneer of combustible material contiguous to said metal sheet to provide such scorch-proof surface, said veneer being impregnated with a heat conducting material and said metal sheet being secured to said body and to said veneer by compression and by a heat conducting adhesive.

2. As a new article of manufacture, a composite sheet of material having a scorch-proof surface and comprising a supporting body of wood, a sheet of aluminum, and a thin veneer of wood contiguous to said metal sheet to provide such scorch-proof surface, said veneer being impregnated with a heat conducting material comprising a phenol condensation product, said metal sheet being secured to said body and to said veneer by compression and by a heat conducting adhesive.

3. As a new article of manufacture, a composite sheet of material having a scorch-proof surface and comprising a supporting body of wood, a sheet of aluminum, and a thin veneer of wood contiguous to said aluminum sheet to provide such scorch-proof surface, said veneer being impregnated with a heat conducting material comprising a phenol condensation product, said metal sheet being secured to said body and to said veneer by compression and by a heat conducting adhesive comprising a casein glue.

4. As a new article of manufacture, a composite sheet of material having a scorch-proof surface and comprising a supporting body of wood, a sheet of aluminum, and a thin veneer of wood contiguous to said metal sheet to provide such scorch-proof surface, said veneer being impregnated with a heat conducting material comprising a phenol condensation product, said metal sheet being secured to said body and to said veneer by compression and by a heat conducting adhesive comprising a casein glue with wood fibers mixed therein.

NEIL C. WARD.