

Jan. 31, 1967

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3,301,725

SCULPTURING OF ART FIGURES

Filed Sept. 25, 1963

2 Sheets-Sheet 1

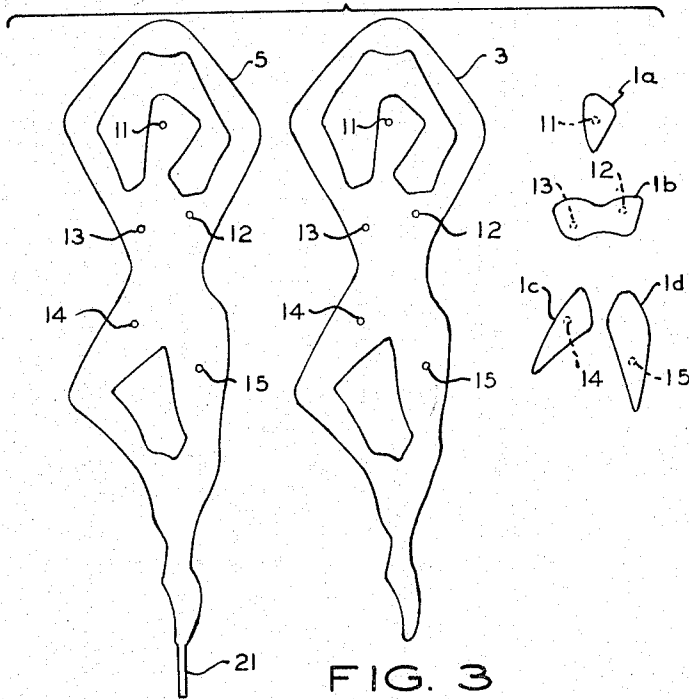


FIG. 3

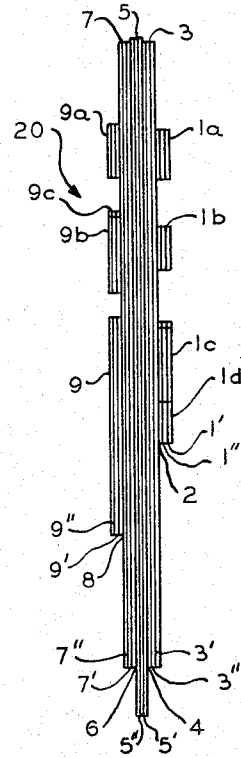


FIG. 4

FIG. 1

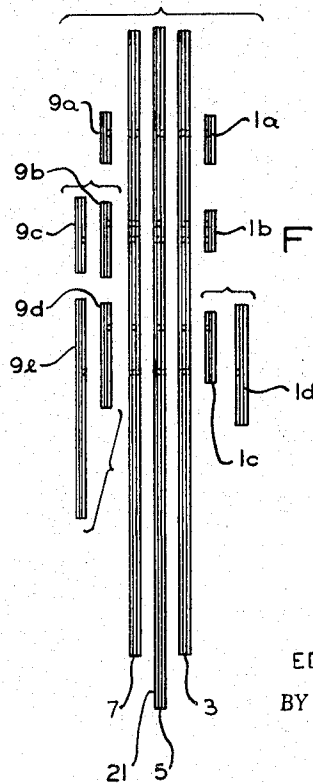
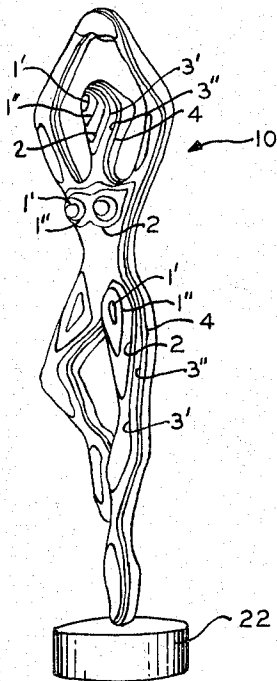


FIG. 2

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SCULPTURING OF ART FIGURES

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FIG. 5

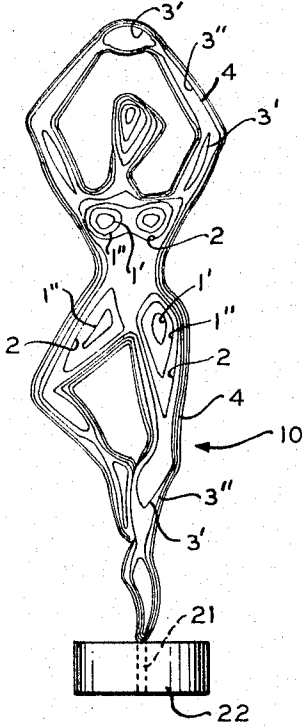


FIG. 6

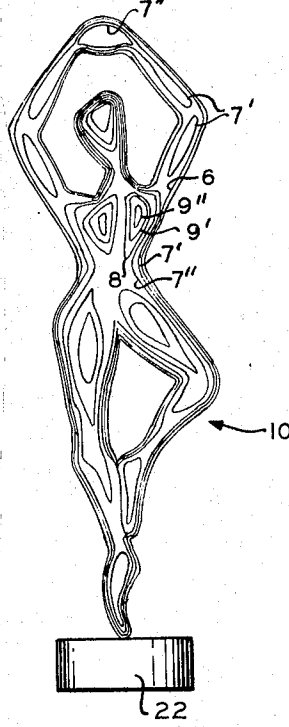


FIG. 7

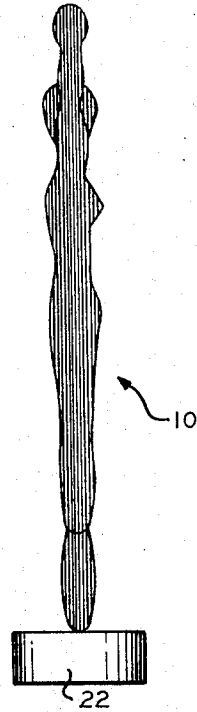


FIG. 8

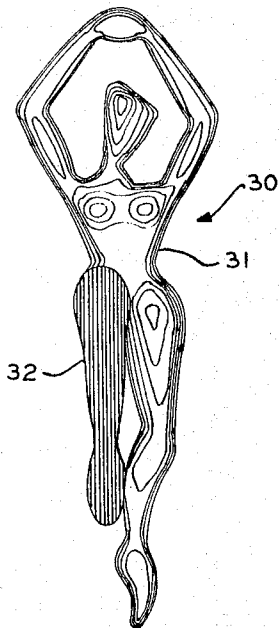
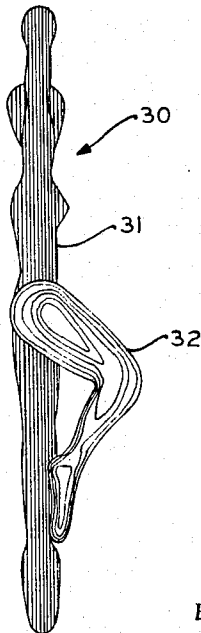


FIG. 9



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**SCULPTURING OF ART FIGURES**

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11 Claims. (Cl. 156-59)

This invention relates to the Sculpturing of Art Figures. It has especial reference to the sculpturing of any three-dimensional figure of art or portion thereof which presents an elevational view of major interest in which the figure area at least largely coincides with the area occupied by the figure along some substantially vertical plane and which extends from that plane, in the direction from which that view is had only to distances small relative to the linear extent of that occupied area. The elemental material from which it is contemplated that the figure will be made may typically be wood or other easily cut or abraded substance though no unexpressed limitation in this respect is intended. While the circumstances of the sculpturing may be any, there is particularly contemplated the circumstance of its being done or at least completed by an amateur under the guidance of a set of simple instructions.

I have observed that if a figure such as referred to above be made up of a number of sequential slices (thinner than the maximum of said distances) within one of which the plane mentioned above is contained and which are joined together in face-to-face relationship, then the lines formed by the interfaces of the slices at the figure surface seen in the view of major interest act as contour-defining lines which augment the impression of the three-dimensional shape of the figure, and even as sensed in simple elevation constitute "graining" meaningfully related to the outline of the figure and therefore artistically very useful. The task itself of the sculpturing is at the same time greatly simplified, and made more facile and dependable for performance by an amateur, by the use of the multi-slice construction, as will hereinafter more fully appear.

Thus each slice may be pre-formed as a slab of outline approximating but fully embracing the maximum extent of the figure within that slice; then when the slices are suitably assembled together there results a blank approximating but protruding beyond the volume of the final figure. The selective removal of material from the blank by abrading or cutting which is characteristic of sculpturing will then expose to view from the stated direction a three-dimensionally shaped figure surface interspersed by the artistically useful contour-defining lines referred to above. There may typically be more than one view of major interest, for example in the case of a figure which is a replica of a person, a front view and a back view, and the selective removal will of course then be effected for each of those views.

The removal of material may not only serve to effect the three-dimensional shaping but may also correct for extents to which the outline-shaping of a slice has left one or more local areal excesses over what need have been provided (a tolerance to such excesses frequently having served greatly to simplify the task of outline-shaping that slice). In such a case the shift of the contour-defining line formed, at the surface of the figure undergoing the material removal, by the interface of that slice with the adjacent and locally larger slice provides a most excellent and effective guide to the removal of just the proper amount of material at each locality—that proper amount being that which causes that particular line, as seen elevationally in the view of major interest, just to match the corresponding line shown in a plane representation comprised in appropriate instructional data.

The invention further contemplates the optional and preferred pre-forming of each slice as a slab comprising a plurality of plies or laminations already secured together. It further optionally contemplates the pre-forming of each slice by outline-cutting from sheet material—in the multi-ply case just mentioned, from multi-ply sheet material, such for example as a suitable grade of plywood—which material itself has the advantages of a favorable propensity to flatness and of a ruggedness facilitating the outline-cutting without marginal defects. The use of the multi-ply slices has the advantage of providing several times (depending on the number of plies) as many contour-defining lines as would be provided by equally thick single-ply material. My comparison on the other hand to the use of a greater number of individual slices each of the same thickness as an individual one of the plies, the use of the multi-ply slices does result in a substantially greater total amount of material to be removed—and especially for amateurs the chances for error in the removal of the greater amount of material would at first blush appear to be seriously increased. I have found, however, that the relatively large number of contour-defining lines provides so excellent a guide to proper amounts of material removal at all localities that there is no such increased chance whatever.

It is broadly known (having for example been disclosed along with other subject matter in U.S. Patent No. 1,894,171 to Green) to expose for aesthetic purposes lines formed at the surface of an object by the interfaces between plies of specially affixed veneering. This has not, however, made any contribution whatever to the impression of the object's three-dimensional shape, of which it has been wholly independent; furthermore the "graining" it has provided has had no meaningful relation at all to the elevational outline of the object. On the other hand it is broadly known (having been disclosed in U.S. Patent No. 2,242,631 to Stillman) to make up a figure of art (specifically a bas-relief) from a large number of previously-outline-shaped sequential slices to form an approximation of the figure and then to smooth away the slight irregularities of the surface. But the slices have been formed transversely to any substantially vertical plane through the figure corresponding to the view of major interest, and in turn the lines formed at the surface of the figure by the interfaces between the slices have been mere parallel lines across that view, and in no sense contour-defining lines; they have in no way at all contributed to any three-dimensional impression, nor have they had any meaningful relation whatever to the elevational outline of the figure; indeed, their utter lack of any artistic function whatever is well attested by their being proposed invariably to be covered with paint. Very importantly, those parallel lines have provided during fabrication no guidance whatever to the correctness of execution of any step.

Pursuant to the foregoing brief description it will be understood that one important objective of the invention is to sculpture such a figure as introductorily described in a laminar form in such a manner that the lines formed at the figure's surface by the interfaces between the laminations (a word here used to refer to the smallest discrete component thickness) become contour-defining lines, which among other things perform artistically useful functions particularly related to that figure including the augmentation of impression of the figure's three-dimensional shape and the provision of "graining" which even as sensed in simple elevation is meaningfully related to the figure's outline.

Another important objective is to provide a simplified method of such sculpturing, and one which is readily capable of being effectively practiced by amateurs in reliance on a set of simple instructions. An allied and

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very important objective is to utilize the contour-defining lines as an effective guide to the removal of proper amounts of material at the various localities of the figure. Other objectives have appeared in the foregoing brief description or will become apparent from the following detailed description and the appended claims.

In the detailed description reference is had to the accompanying drawings, in which:

FIGURE 1 is a perspective view of a purely typical figure of art to be made in accordance with the invention;

FIGURE 2 is an elevational side view of a group of slices of that figure of art pre-formed from sheet material;

FIGURE 3 is an elevational front view of the more forward ones of those slices;

FIGURE 4 is a side elevational view of a blank formed by securing together the slices of the group;

FIGURE 5 is a front elevational representation of the figure to be sculptured;

FIGURE 6 is a corresponding rear elevational representation, and FIGURE 7 a side elevational view; and

FIGURES 8 and 9 are respectively front and side elevational views of a modified figure made in accordance with the invention.

Attention first being adirected to FIGURE 1, there will be seen in perspective a figure of art in the form of a statuette depicting a dancing girl. This is a figure in which full detail of face and similarly finely-shaped portions (such as hands) is not undertaken, and in which various other departures—typically dimensional exaggerations or diminutions for the sake of artistic emphasis—are made from slavish depiction, but without attempt to carry the figure into any really abstract realm. It will be understood, however, that a figure with this modified-realistic motif has been chosen simply for ready illustration, and that the applicability of the invention extends from completely realistic to wholly abstract subject matter, and from only suggestive and coarse to relatively fine treatment of detail. Of the figure of art of FIGURE 1, the front view is inherently a view of major interest; the area of the figure in this view wholly coincides with the cross section of the figure on a side-to-side elevational plane (i.e. one corresponding to the front view) through the figure about mid-way between its most forward and most rearward points; and the figure extends from that plane forwardly (i.e. in the direction from which the front view is had) only to distances small relative to the extent of that area.

The lines appearing on the statuette of FIGURE 1 may at this juncture be ignored (other than to the extent that they suggest the intended perspective nature of the figure); they will be later referred to.

In sculpturing the figure of art of FIGURE 1 I pre-form sequential slices of the figure, in one of which slices the plane mentioned above is contained (the word "contained" being used to denote that the plane either lies between the two surfaces of the one slice, as in the illustrated case, or at the limit coincides with one or the other of those surfaces). I pre-form the slices as slabs each of thickness smaller than the maximum of the distances by which the figure extends from the above plane and each of outline approximating but fully embracing the maximum elevational extent of the figure within the respective slice. Optionally and preferably I pre-form the slices as respective slabs each of a plurality of plies already secured together, and this preference has been observed in the illustration. By way of specific preferred procedure I may pre-form the slices as respective slabs simply by outline-cutting from sheet material, as by sawing at right angles to the material's surfaces (or in suitable cases by blanking out with appropriate dies); for the preferred multiply nature of each slice the sheet material may be a multi-ply one such for example as three-ply wood.

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FIGURE 2 shows in side elevation the group of slices pre-formed for the figure of art of FIGURE 1. The slice which contains the plane mentioned above is designated as 5 and the next more forward slice as 3; the succeeding more forward slice (in this case the most forward), because of the shape of the particular involved, subdivides into four discrete parts which are designated as 1a, 1b, 1c and 1d respectively. Proceeding rearwardly from the slice 5, the next slice is designated as 7; the succeeding more rearward slice (in this case the most rearward) subdivides into five discrete parts which are designated as 9a, 9b, 9c, 9d and 9e respectively.

In FIGURE 3 there are shown in front elevation the preformed slices 5 and 3 and slice subdivisions 1a through 1d. For simplicity of illustration there are not shown the elevational contours of the pre-formed slice 7 and slice subdivisions 9a through 9e, but their approximate contours will be readily understood from later figures.

Having thus pre-formed the slices I secure them together in appropriate sequential face-to-face relationship—the appropriate relationship being that which results in a unitary blank embracing but having shoulder-like protrusions beyond the volume of the final figure. This securing is preferably effected with the aid of a suitable glue or cement applied throughout the areas where the surfaces of the slices contact each other. The resulting blank appears as 20 in side elevation in FIGURE 4; the front elevation is not shown, being simply a superimposition of the contours shown side-by-side in FIGURE 3 which can be readily visualized therefrom.

To insure proper elevational alignment of the slices in the blank 20 the slices are preferably previously indexed in some suitable manner. This may for example be done by the provision of holes such as 11, 12, 13, 14 and 15 passing through the slices 3, 5 and 7 and preferably passing only partially into the slice subdivisions 1a through 1d and 9a through 9e (from the surface of each slice subdivision which is to be secured against an adjacent slice), and by the use during assembly of suitable hole-fitting pins which are passed through those respective holes and may of course be left in place, without harm to the final appearance of the figure if the passage into the slice subdivisions has been partial only.

For further reference it is convenient in FIGURE 4 to identify as 4 the surface throughout which slices 3 and 5 are secured against each other, to identify as 6 the surface throughout which slices 7 and 5 are secured against each other, to identify as 2 the subdivided surface throughout which slice subdivisions 1a through 1d are secured against slice 3, and to identify as 8 the subdivided surface throughout which slice subdivisions 9a through 9e are secured against slice 7; these are really limited surfaces are most aptly termed inter-slice interfaces. It is further convenient in FIGURE 4 to identify as 1' and 1'' respectively the front and rear ones of the two interfaces formed within slice 1 between its successive three laminations (i.e. the two intra-slice inter-ply interfaces inside of the slice 1), to identify as 3' and 3'' respectively the front and rear ones of the two intra-slice inter-ply interfaces of slice 3, etc.

The final step in the sculpturing proper of the figure (as distinguished from any final finishing such as fine sanding, varnishing or the like) is the selective removal of the excess material of the blank to expose a three-dimensionally shaped figure surface interspersed by contour-defining lines formed at the interfaces between the slices and, when as illustrated the slices are multi-ply, at the interfaces within the slices between the plies. The removal may at the same time correct for any extent to which the original outline-shaping of a slice has left one or more local excesses—i.e. has caused one or more of the inter-slice interfaces 2, 4, 6 and 8 to be locally larger than it or they should be.

In respect of mode of its accomplishment, this removal

may be effected as may be most convenient under the circumstances of the sculpturing. While it may for example be done by cutting, as with knife or chisel, it is frequently preferable, in order to avoid the possibility of chipping when working across the grain if wood has been used as the elemental material, to do it by abrading, as by file or coarse sandpaper or power-driven tool. A combination of those and/or other modes, using those and/or other tools, may also be used.

While the mode of removal is not critical, the degree of removal is highly critical. Indeed, this criticality as to degree of removal is inherent in sculpturing; with that fact there has heretofore gone hand in hand an extreme difficulty of providing guidance for the degree of removal other than the usually inconvenient guidance of a three-dimensional model, and such guidance, even if provided, has had serious shortcomings for the unskilled amateur. In the removal of material my invention makes use of the contour-defining lines formed by the several interfaces at the figure's surface to make possible a guidance, as to degree of removal, by plane (i.e. two-dimensional) representations of the final figure and a guidance which at the same time has proven to be ample to enable even an unskilled amateur to achieve a thoroughly satisfactory result.

Thus with respect to the front of the illustrated figure there may be provided the plane representation constituted by FIGURE 5 of the drawing. Herein the proper position of the edge of the inter-slice interface 4 is designated by the line 4, just within the outline of the figure as seen in this front view. The intra-slice interface 5', which in this figure will actually intervene in front elevation between the line 4 and the figure's outline, is quite unnecessary to show, since it almost coincides with that outline. On the other hand the proper position of the edge of each of the interfaces 3'', 3', 2, 1'' and 1' is shown by a respectively numbered line. It is of course to be appreciated that each of these lines is inherently of "loop" nature (using that term to denote that, wherever considered to start and however it may proceed from that start, there is an eventual return to that start), and that each line may be made up of a number of loops in different elevational regions. The latter is the case with respect to the more forward interface edges 1', 1'', 2 and 3' because of the fact that the forward extent of the figure at such regions as the wrists, shoulders and ankles is only to a little beyond the interface 3''; it is also the case with respect to that more rearward interface edge 3'' and the interface edge 4 as well because of the open spaces between the joined hands and between the joined legs.

The selective removal of material from the front of the blank will be so carried out as to cause the contour-defining lines on the figure surface to form, together with the outline of the figure as viewed from the front, a pattern conforming to that formed with the outline of FIGURE 5 by the contour-representing lines 4, 3'', 3', 2, 1'' and 1' appearing therein.

It is an important fact that FIGURE 5, although only a plane representation, nevertheless actually contains all the instruction required for the sculpturing of the front portion of the blank 20 into an extremely close approximation of the front portion of the intended figure, including such sculpturing by an amateur. Such subtle respects (confined to the contouring or shaping within a single one of the plies within a slice) as are not reached by FIGURE 5 are so second-order that even the unskilled can be relied on to deal with them without significant detriment to the final product. Indeed, the fact that there is some remnant aspect in which the amateur can express himself—so long as it is, as here, sufficiently restricted—is of frequent psychological advantage.

The plane representation of FIGURE 6, in which the interface edges are again designated by the numbers of the respective interfaces, performs for the rear portion

of the figure the same function as does FIGURE 5 for the front. The selective material removal from the back of the blank 20 will be carried out, under the guidance of FIGURE 6, in a manner so analogous to that described for the front that description peculiar to FIGURE 6 is not necessary.

A single representation of the figure transverse to its slices has been included as the side elevation of FIGURE 7. For instructional purposes with respect to a figure of art of the relatively simple, though thoroughly pleasing, nature of that of FIGURE 1 this is a relatively unimportant addition to FIGURES 5 and 6; on the other hand for really intricate figures, for example involving local reverse shaping or undercutting, one or more transverse representations, which might include a sectional one or ones, might be used supplementarily. Even in the use of those the ready cross-identification between their parallel interface-representing lines and the actual figure interfaces would be subordinately useful.

Upon the completion of the sculpturing proper the figure may be subjected to any desired final finishing, which may typically include the fine sanding of the figure and its treatment with varnish, clear lacquer, wax or the like, with or without stain, depending on the finish desired. Although not previously mentioned, the most downwardly-extending slice—in the illustrated figure, the slice 5—may have been extended on downwardly for a distance below the figure proper to form a mounting-foot 21, which may for example be inset into a suitable base 22, of any desired construction and finish, for the support of the figure.

FIGURE 1, initially referred to as a perspective illustration of the figure of art to be sculptured, may now be considered as a perspective illustration of the sculptured figure. It will now, however, be understood that the lines appearing within the outline of the figure are the edges of the interfaces 4, 3'', 3', 2, 1'' and 1'. It may be mentioned that on the left side of the dancer (i.e. right side in the drawing), as well as on the inner sides of the dancer's righthand arm and leg, there would in fact appear additional interface edges such as 5' and 5''; these would become so cramped in FIGURE 1 that they have been omitted therefrom.

While FIGURE 1 has been referred to as showing the figure of art to be sculptured and FIGURES 5, 6 and 7 as instructional, it will be understood that they also constitute illustrations of the final figure, which in each of them is designated as 10.

It is impossible either in orthographic or in perspective illustration to convey an adequate visualization of the finished statuette. In either full front or full back view the lines constituted by the interface edges serve strongly to augment the impression of the three-dimensional contour or shape of the figure, even though the front-to-back dimension may have been (as in the case of the illustrated figure) deliberately minimized for artistic reasons. In diagonal front or back view up to say about 75° deviation from full, the more and more rearward interface edges which are visible still remain amply far from visual parallelism to avoid any inartistic effect (and by their number serve to suggest a somewhat greater depth than may in fact have been provided). Only within a few degrees or so of full side view does the effect of simple parallel lines intrude on the viewer's consciousness. Even without regard to three-dimensional considerations the lines constituted by the interface edges provide the effect of graining (over and above graining which may be present in the laminations individually) meaningfully related to the outline of the figure and therefore artistically useful.

The degree of discernibility of the lines constituted by the interface edges is of course under some degree of control by the color of the adhesive used at the interfaces. In general, there will be used a multi-ply material in which this color is satisfactory, and an inter-slice ad-

hesive which yields a corresponding color. The range of this variation is not in practice so large, however, that this matter becomes a critical problem.

It will be appreciated that the invention is not limited to figures wherein there is 100% coincidence of the elevational outline in the view of major interest with the area occupied by the figure along some substantially vertical plane; the advantages of the invention will, however, be best exploited when there is a large degree of such coincidence. Again, it will be appreciated that the invention is not limited to cases wherein there are two views (such as front and back) of major interest; obviously by the omission from the illustrated figure of the slices 9 and 7 (and optionally of 5 or a part of its thickness) there may be formed a very artistic bas-relief.

It will further be appreciated that the invention is not limited to the making of an entire figure of art; it may be employed for example for the major portion of such a figure, the remainder being independently formed, either by a separate practice of the invention or otherwise. This has been illustrated in FIGURES 8 and 9, showing a statuette 30 which depicts a dancer with right-hand knee bent up forwardly (rather than rightwardly as in FIGURE 1). Herein the principal portion of the statuette is designated as 31 and comprises the statuette of earlier figures other than for its right leg, which is omitted. The right leg 32 of the statuette 39 is separately formed, desirably in accordance with the invention, and is then secured to the portion 31 in any convenient manner. (In this particular instance the visual parallelism of the interface edges in the leg 32 may be considered an artistic shortcoming in or within a few degrees of full front view, but no such shortcoming afflicts the view at any angle from a little off full front to a little off full side.)

The figure of art of FIGURES 1 through 7 is shown and has been described as formed of five slices each of three plies previously secured together, or a total of fifteen discrete laminations. It will of course be understood that alternatively it might be formed of other permutations of number of slices and number of plies (typically of thickness unchanged) per splice, for example of three slices each of five plies (at the cost of more required material removal), or of eight slices each of two plies (with the opposite effect), or even of fifteen single-ply slices, without detriment to the instructional accuracy described above. Alternatively the number of discrete laminations might be reduced, but in this case there would indeed result a loss of some accuracy.

It is contemplated that one manner of making the subject matter of the invention available for widespread use would be the supply of kits each comprising the pre-formed slices and simple two-dimensional instructional data.

While I have shown and described my invention in terms of particular embodiments and procedures, it will be understood that I intend thereby no unnecessary limitations. Modifications in many respects will be suggested by my disclosure to those skilled in the art, and such modifications will not necessarily constitute departures from the spirit of the invention or from its scope, which I undertake to define in the following claims.

I claim:

1. A method of sculpturing, under the guidance of an only-two-dimensional representation thereof, a figure of art or portion of such a figure which presents from a particular direction an elevational view of major interest

wherein the outline of the figure at least largely coincides with the boundary of the area occupied by the figure along some substantially vertical plane, comprising (1) pre-forming sequential slices of the figure, within one of which said plane is contained, as respective slabs each of outline embracing the maximum extent of the figure within the respective slice, (2) joining the pre-formed slices together in sequential face-to-face relationship thereby to form a unitary blank embracing but protruding beyond the volume of the figure, with a substance interposed, at the inter-slice interfaces, of thinness and color such as to render the edges of those interfaces discernible as lines, and (3) selectively removing material from said blank until there is exposed to view from said direction a three-dimensionally shaped figure surface interspersed by contour-defining lines, comprising the edges of said interfaces, which with the outline of the figure form a pattern conforming to that formed with the outline of said two-dimensional representation by contour-representing lines provided therein.

2. The subject matter claimed in claim 1 wherein said figure of art or portion thereof extends from said plane in said direction only to distances small relative to the linear extent of said occupied area.

3. The subject matter claimed in claim 2 wherein each of the slabs referred to in step (1) is of thickness substantially smaller than the maximum of said distances.

4. The subject matter claimed in claim 1 wherein each of the slabs referred to in step (1) is of outline approximating the maximum extent of the figure within the respective slice.

5. The subject matter claimed in claim 1 in step (1) of which said slices are pre-formed by outline-cutting said slabs from previously formed sheet material.

6. The subject matter claimed in claim 1 in step (1) of which the slice pre-forming includes indexing the several slices, and wherein step (2) is performed under the control of such indexing.

7. The subject matter claimed in claim 1 wherein the substance referred to the step (2) is an adhesive by which the joining referred to in that step is effected.

8. The subject matter claimed in claim 1 in step (1) of which said slices are pre-formed as respective slabs each of a plurality of plies secured together.

9. The subject matter claimed in claim 8 in step (1) of which said slices are pre-formed by outline-cutting said slabs from previously formed multi-ply sheet material.

10. The subject matter claimed in claim 8 wherein the plies within each of said said slabs are secured together with a substance interposed, at the inter-ply interfaces, of thinness and color such as to render the edges of those inter-ply interfaces discernible as lines, and wherein the contour-defining lines referred to in step (3) further comprise the edges of those inter-ply interfaces.

11. The subject matter claimed in claim 1 wherein the slabs referred to in step (1) are of wood.

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