

Aug. 2, 1938.

M. M. MERRITT

2,125,457

ART OF DECORATING SHEET MATERIAL

Filed Nov. 22, 1935

3 Sheets-Sheet 1

Fig. 1.

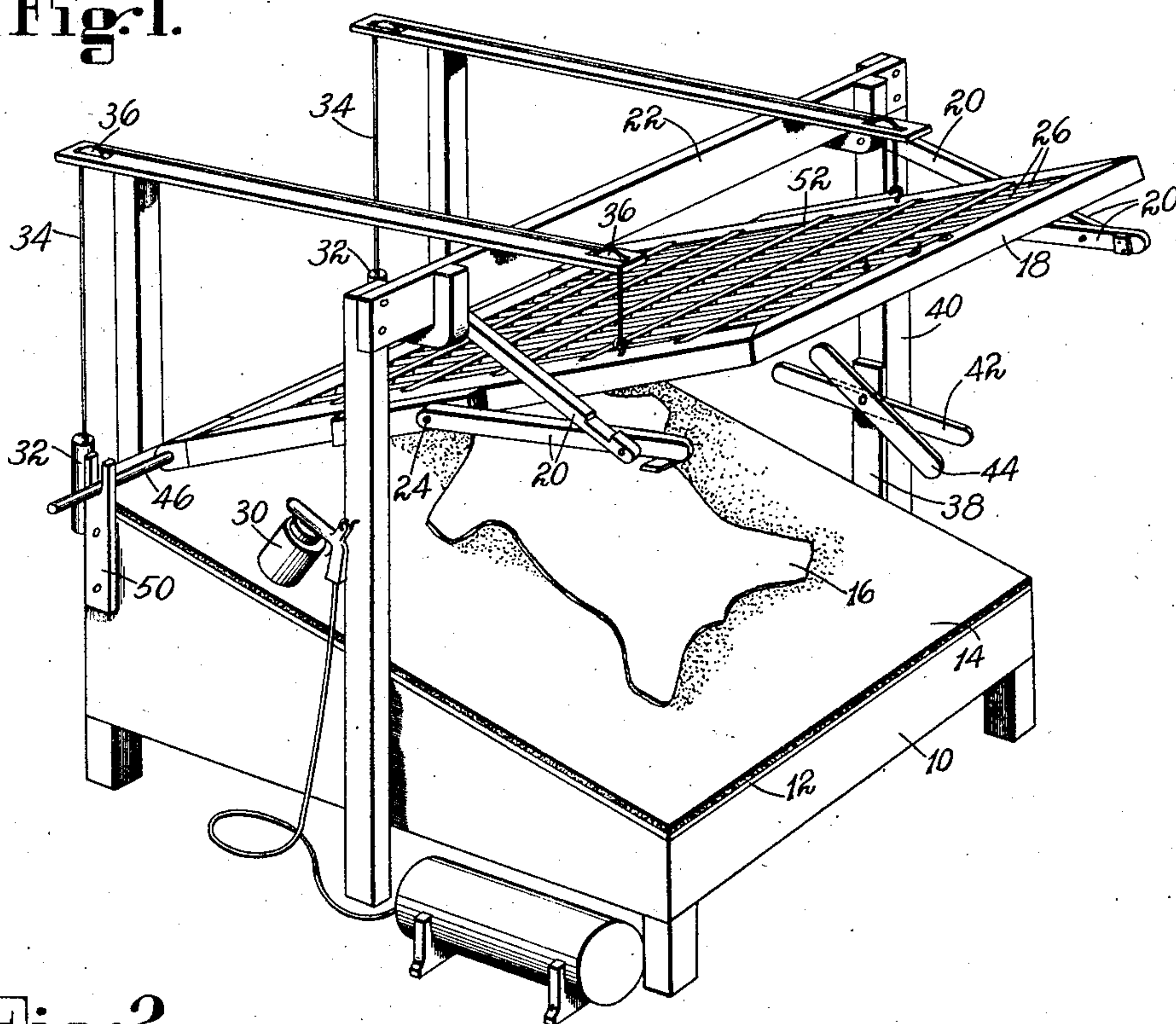
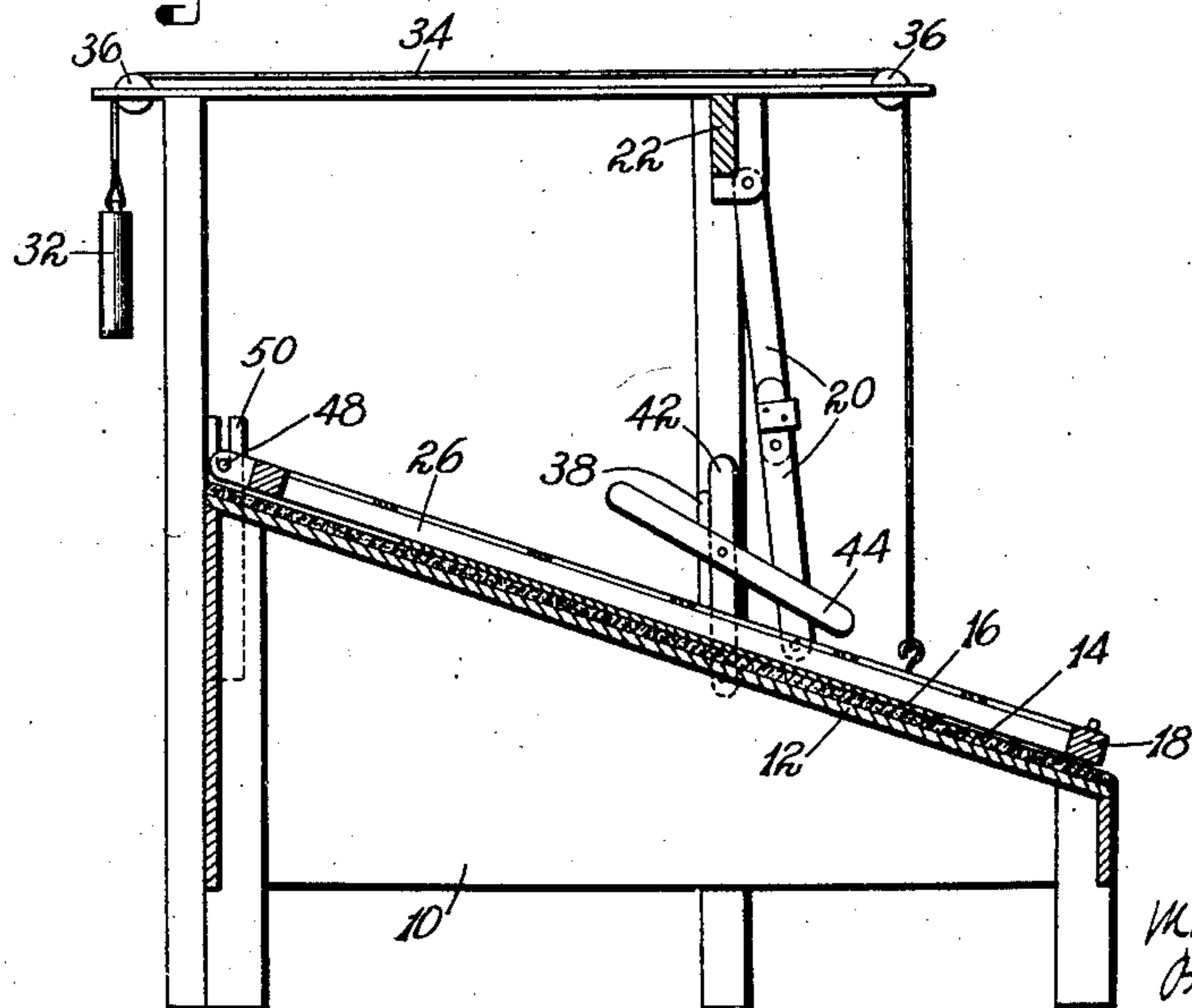


Fig. 2.



INVENTOR
Matthew M. Merritt
By his attorney
Victor Cobb

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3 Sheets-Sheet 2

Fig. 3.

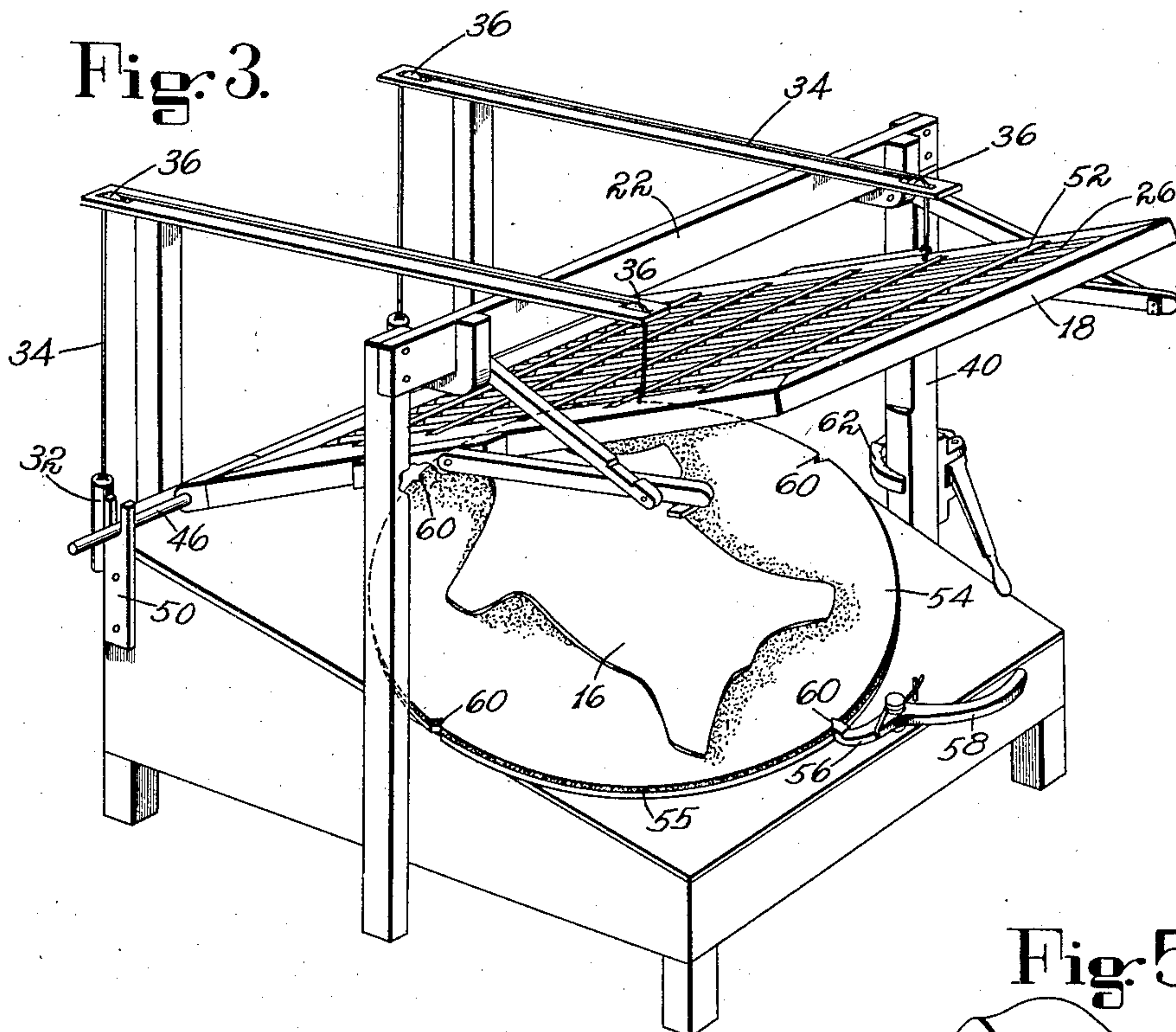


Fig. 4.

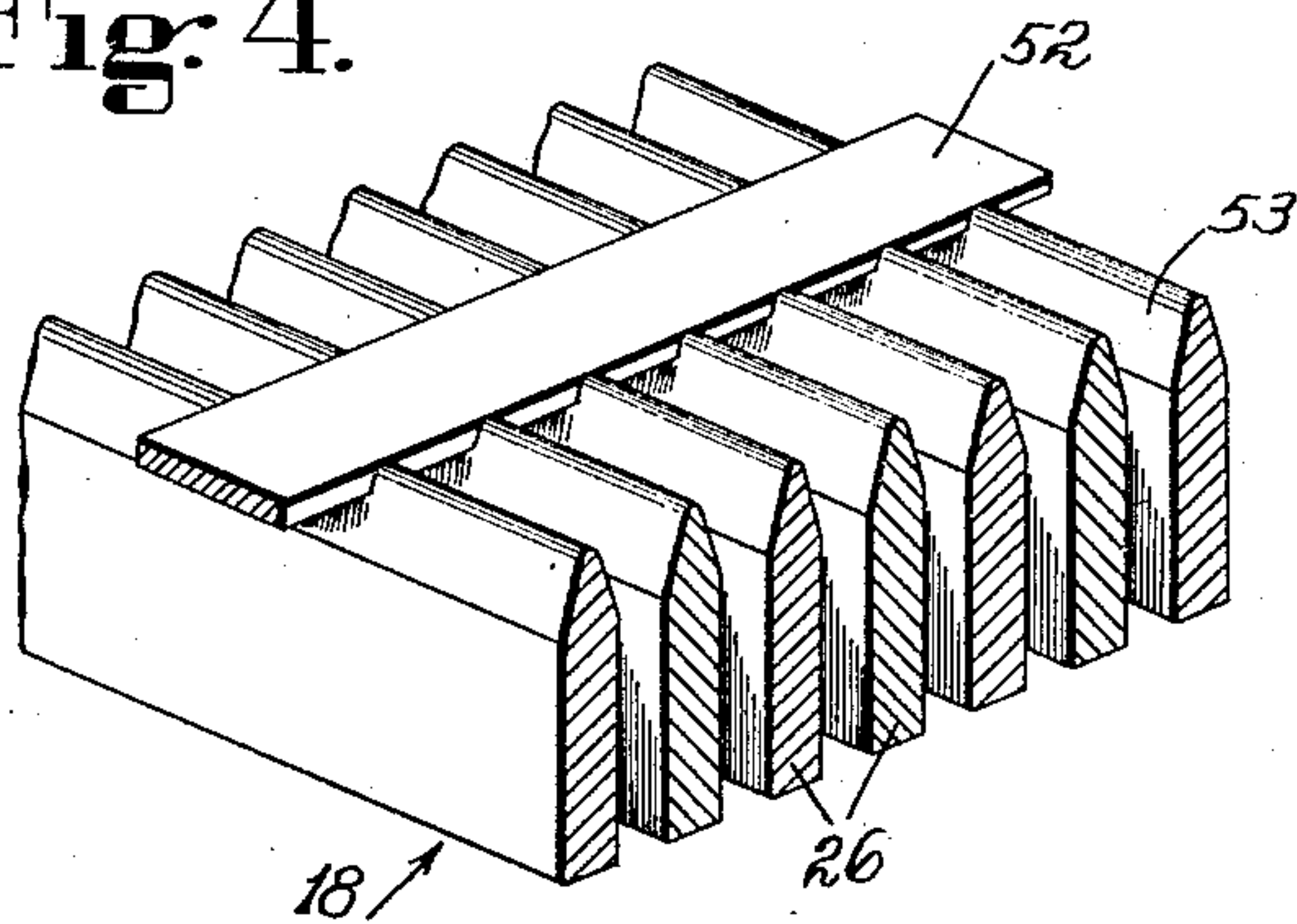
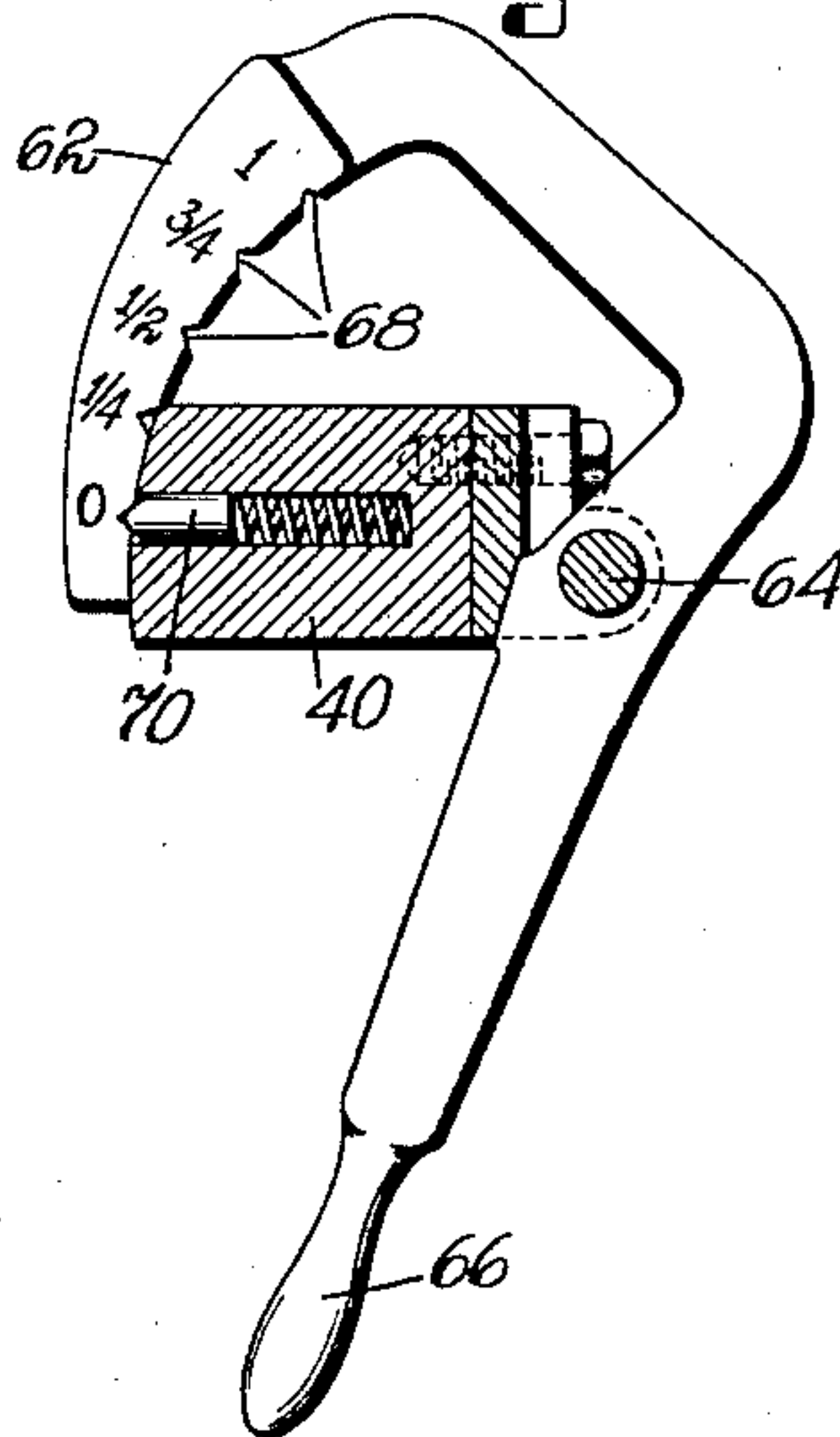


Fig. 5.



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Matthew M. Merritt
By his attorney
Victor Cobb

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3 Sheets-Sheet 3

Fig. 6

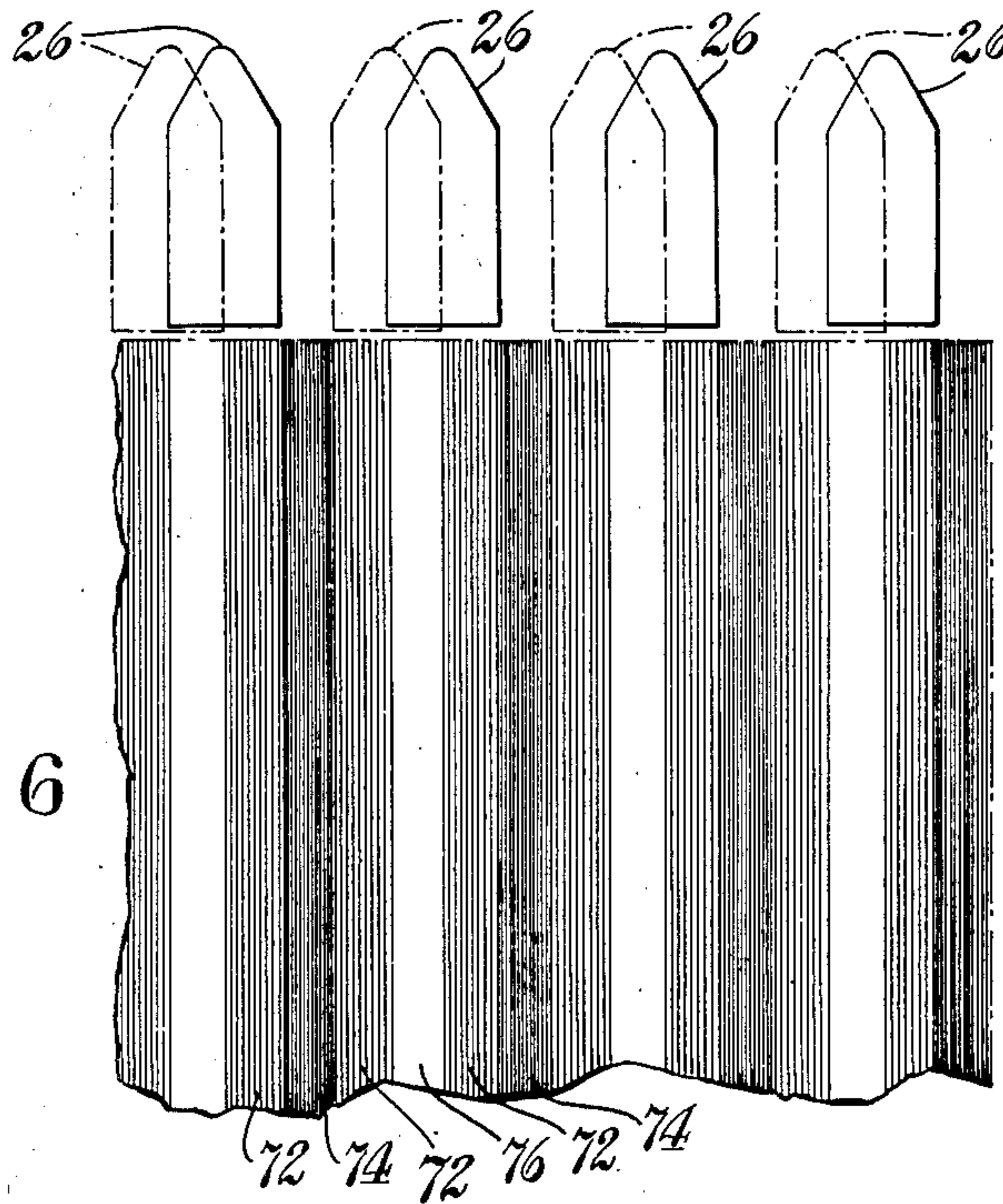
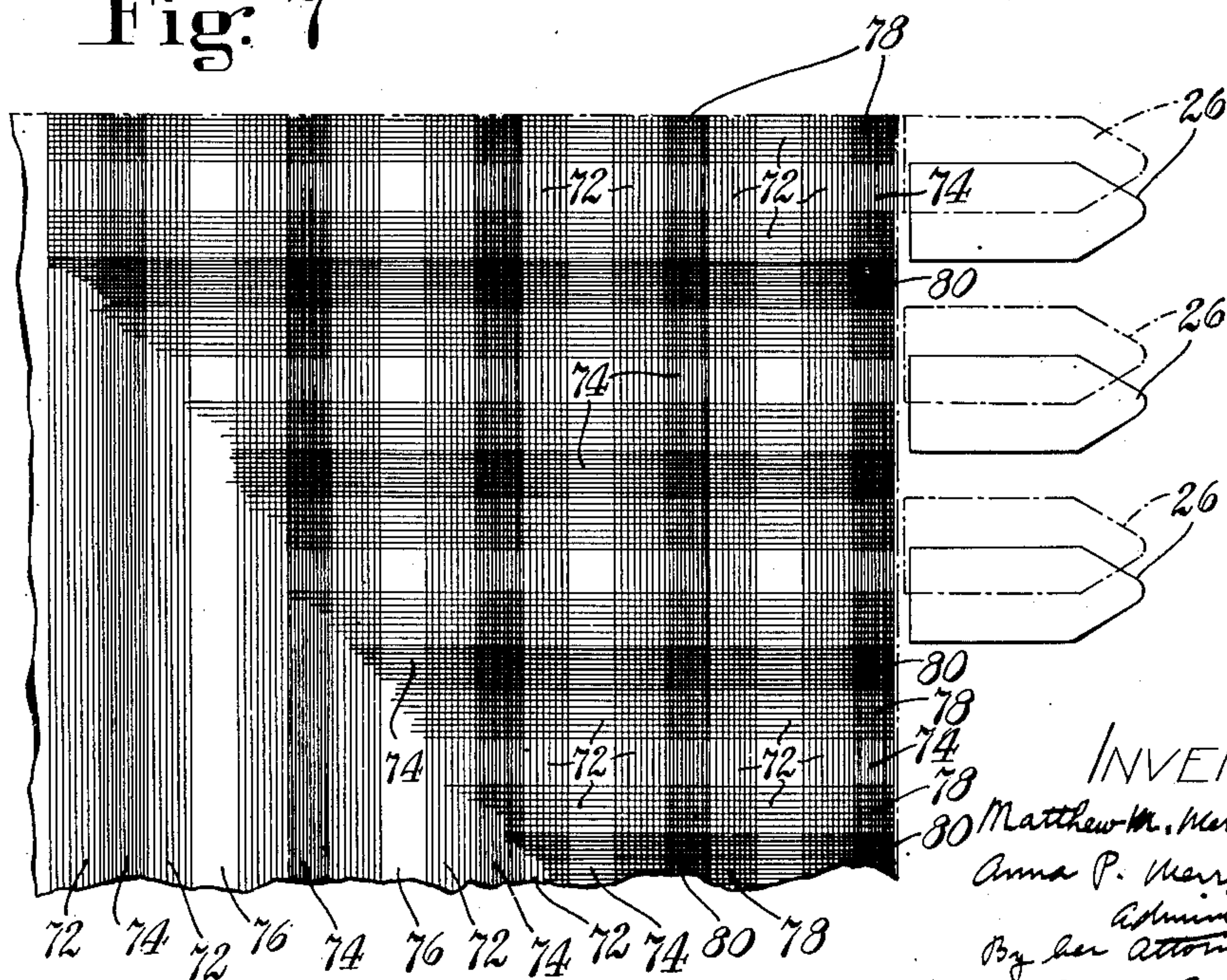


Fig. 7



INVENTOR:
Matthew M. Merritt, Dec'd
Anna P. Merritt
Administratrix
By her Attorney
Victor C. Cobb

UNITED STATES PATENT OFFICE

2,125,457

ART OF DECORATING SHEET MATERIAL

Matthew M. Merritt, Middleton, Mass., assignor
to The Tanning Process Company, Boston,
Mass., a corporation of Massachusetts

Application November 22, 1935, Serial No. 51,112

10 Claims. (Cl. 101—129)

This invention relates to the art of coloring and decorating sheet material such as fabrics and leather. While the invention is illustrated by reference to the application of patterns in one or more colors to leather by means of an improved stencil, it will be understood that the invention and various characteristics and features thereof may have other applications and uses.

Commonly decorative effects upon leather are produced by such expensive methods as that involved in embossing operations with specially prepared plates or rolls, each plate or roll being capable of producing a single pattern upon the work. Since these plates or rolls are engraved metal surfaces they are relatively expensive. Hence, an establishment equipped to ornament leather by embossing the same usually has a substantial amount of capital invested in embossing plates, in spite of the fact that styles may and do change frequently and almost without warning, thus rendering this expensive equipment obsolete with little opportunity to recoup the loss incurred.

In accordance with another commonly practiced method of decorating leather surfaces, sheets of paper carrying various transferable patterns are first assembled with the leather to be ornamented and then passed through a press by which the pattern is caused to adhere to the leather surface through the application of heat and pressure, as in the well-known decalcomania system. While both of the methods of ornamenting leather briefly described above produce excellent results, they are relatively expensive either in means which must be employed or in the number of workers necessary to handle the material.

Only a slightly less expensive equipment than that in either of the methods described above is required to practice the well-known stencil method of decorating leather by which patterns may be readily produced on leather surfaces through the application thereto of the corresponding stencils, after which a color material is applied to the exposed portions of the leather. However, this system requires a stencil for each pattern to be produced on the leather and the applicability of the stencil system, as heretofore employed in securing decorative effects on leather, has been very limited indeed.

Still another method sometimes used in ornamenting leather is that generally referred to as printing on leather. Here again the equipment is expensive and the operations slow and laborious. Moreover, the dyes must be specially

prepared with thickeners, and before fixation of the dye the leather is commonly treated with hot steam.

It is an object of the invention to provide an especially simple, inexpensive, and rapid method of decorating sheet material. It is a further object of the invention to provide a method by which a multiplicity of patterns may be produced very simply through proper manipulation of an improved stencil of a simple and durable construction.

In one of its aspects the invention resides in a method of ornamenting sheet material of a given ground color according to which stripes of the same or different colors may be disposed in partially superposed or overlapping relation to produce additional stripes, readily variable in width, in simple patterns wherein the stripes extend in parallel relation to each other. More complex patterns are produced by a plurality of stripes in overlapping relation extending in parallel and in crosswise relations to each other, variations in the patterns being secured by varying the width of some or of all of the stripes and by selecting various combinations of colors. In practicing the method, the color stripes are applied by spraying dyes, dissolved in alcohol, acetone or other readily vaporizable solvent, upon portions of sheet material exposed through a stencil of special construction adapted to be manipulated to provide a multiplicity of patterns on the surface of the sheet material, the described spirit dyes contributing to the success of the method from the economic standpoint because of the fact that the sprayed material is thus deposited on the work piece in such manner as to permit blending of colors through overlapping of the color stripes and without any delay between successive spraying operations.

For practicing the method there is provided, as heretofore stated, a stencil of special construction. In its simplest form, the improved stencil comprises a frame-work made up of a multiplicity of ribs arranged in spaced parallel relation to provide long narrow spaces each of a predetermined width between adjacent ribs, each rib having a substantial dimension in a direction at right angles to its length and to the surface of the piece of work undergoing treatment, the purpose being to provide a considerable surface on the ribs to collect any spray material which does not strike the surface of the work-piece, so as to insure that the solvent of the spray material will evaporate from the surfaces of the ribs and thus prevent any liquid

spray material from dripping or running on the work. The results thus secured are far superior to those obtained in hand controlled spraying operations in connection with the well-known stencils constructed of thin sheet material, since in the latter case it is practically impossible to secure uniform results and sharp lines within time limits that are economical. Conveniently, the ribs of the stencil are made of strips of wood since this material is readily wetted by the spray material with the result that the latter spreads over the surface and adheres thereto sufficiently to insure evaporation of the spray material before it can reach the surface of the work. It will be understood, however, that the ribs may be made of other suitable material such as metal or Bakelite, coated or otherwise treated with absorbent material. With this improved stencil there is provided a positioning member together with a plurality of gages to locate the stencil selectively with relation to the work-piece thereby making possible the production of stripes of a variety of widths and in various overlapping relations with respect to each other. Since the various positions of the improved stencil with relation to the subjacent surface of the work piece may be definitely predetermined by proper use of the positioning member and gages, any pattern with respect to which accurate records have been kept may be reproduced with precision.

These and other important features and characteristics of the invention will now be described in detail in the specification and then pointed out more particularly in the appended claims.

In the drawings,

Fig. 1 is a view in perspective of an apparatus for practicing the improved method of ornamenting sheet material;

Fig. 2 is a vertical sectional view of the apparatus shown in Fig. 1;

Fig. 3 is a view similar to Fig. 1 showing another embodiment of a work support and gage mechanism;

Fig. 4 is an enlarged perspective view of a portion of the stencil frame;

Fig. 5 is a detail view of the gage mechanism shown in Fig. 3; and

Figs. 6 and 7 are line representations of patterns produced by color stripes applied according to my improved method.

In the illustrated apparatus, which is designed particularly for use in the spraying of dye materials upon tanned skins in the practice of the method of my invention, there is provided a work support 10 having an inclined bed member 12 upon which is placed a cushion or pad 14 which, as shown, is a relatively thick sheet of soft rubber. It will be understood, of course, that yielding work supporting means other than the pad 14 may be employed such, for instance, as a pneumatic pad of substantially the same size as the pad 14 which serves as the immediate support for the sheet material to be colored and ornamented. Such a yielding work supporting surface is especially necessary where the work piece is a skin such as that shown at 16, since the latter varies somewhat in thickness in various portions thereof and since no two skins are exactly alike in thickness. With the skin 16 in place on the pad 14, a stencil member 18 is lowered upon the skin and is pressed firmly against the skin and locked in such position by suitable means which, in the illustrated construction, comprises toggle devices 20. As

shown, there are two such devices, one at each side of the stencil frame 18, the upper link of which is pivoted to a cross piece 22 of the frame of the machine while the lower link is pivoted at 24 to the stencil frame 18. Upon straightening the toggle devices 20, the stencil frame 18 is pressed firmly against the skin 16 thereby holding the latter against the rubber pad 14, said pad serving to insure that all portions of the skin 16 will be held against ribs 26 of the stencil frame 18 so that upon spraying a vaporizable color substance through the spaces between the ribs 26 of the stencil frame, sharp lines will be formed at the junction of the edges of the ribs and the exposed surface portions of the skin.

With the stencil frame 18 in the position shown in Fig. 2, the first spraying operation is performed, the operator using for the purpose a commercial type of spray gun such as that indicated at 30. At the end of the first spraying operation, the toggle devices are operated manually to release pressure upon the stencil frame 18 and the latter is swung upwardly by hand, this operation being facilitated through the provision of weights 32 connected to cables 34 passing over pulleys 36 and attached to the stencil frame 18 toward the front end thereof. While the stencil frame 18 was resting upon the skin 16 in the first spraying operation, the stencil frame was positioned by being pressed firmly against a gage or positioning member 38 carried by the post 40 of the frame work. The next time that the stencil frame 18 is brought down upon the work, it is pressed against a gage member 42 interposed between the stencil frame 18 and the positioning member 38, it being understood that the thickness of the gage member 42 bears a predetermined relation to the width of the space between two adjacent ribs 26 of the stencil frame 18. Ordinarily the arrangement is such that, when the second spraying operation is performed, the color stripe produced by the spraying operation will overlap the color stripe produced in the first spraying operation due to the lateral shifting of the stencil frame. The described manipulation of the stencil frame 18 is facilitated by reason of the fact that its pivot pins 46, 48 are received in the forked upper ends of two journal members 50. Hence the stencil frame 18 may be readily adjusted or shifted to various positions in accordance with the employment of the positioning member 38 and of the gage member 42 or of the two gage members 42, 44 together. Furthermore, the stencil frame may be readily removed and replaced by another having either wider or narrower or differently shaped spaces between the ribs thereof.

As illustrated, the stencil member 18, including its ribs 26, is made of suitable strips of wood, the ribs 26 being made of relatively thin strips uniformly spaced from each other. Conveniently, buckling or other distortion of the ribs 26 is prevented by light cross pieces 52 secured to the upper edges of the ribs and to the side frame pieces of the stencil member 18. Each rib 26 is reduced in thickness along its upper edge, as indicated at 53 (Fig. 4), so as to provide a wider entrance to each slot between adjacent ribs, thus facilitating ingress of the sprayed material into the slot. As clearly indicated in Fig. 4, the ribs 26 have a substantial depth dimension, that is, in a direction normal to the surface of the piece of work upon which the stencil is resting, the depth dimension of each rib, in the illustrated

stencil, being about five times the width dimension thereof. The purpose is to provide a considerable surface which is readily wetted by the liquid spray material, the extent of the rib surface being such that the sprayed material does not reach the surface of the work piece by dripping or running from the rib surface since it has time to evaporate while spreading over said surface of each rib. While, as stated, the ribs 26 are made of wood in the illustrated construction, it is to be understood that they may be made of other suitable material such as metal or Bakelite, both of the latter having the advantage of being moldable into various shapes and of being more resistant to distortion than ribs made of wood. However, when made of metal or bakelite the exposed surfaces of the ribs will be coated or otherwise treated with a substance readily wetted by the liquid spray material.

In a preferred embodiment of the invention the work piece 16 is placed upon a rotary table 54 having a soft rubber work supporting layer 55 and supported in a well-known manner, for instance, by rollers (not shown) operative to facilitate rotation of the table by hand while at the same time affording a firm support for the table. For holding the table 54 in selected position there is provided a latch member 56 pivoted upon the adjacent frame of the machine and having a handle portion 58 extending out in position to be pressed by the knee of the operator, thus leaving the hands free to turn the table to the required position. As shown, the latch co-operates selectively with any one of four notches 60 ninety degrees from each other in the periphery of the table 54.

To obtain a wider range of adjustment of the stencil frame 18 than that disclosed in connection with the gage members 42 and 44, there is conveniently provided a single gage member 62 (Figs. 3 and 5) pivoted at 64 to the standard 40 of the machine frame and having a handle portion 66 by which the gage may be readily manipulated to secure the desired adjustment. Conveniently, the gage member is provided with a plurality of notches 68 adapted to be selectively engaged by a spring pressed latching member 70 to hold the gage member yieldingly in its adjusted position. It will be understood that the distance from zero to one on the gage member 62 corresponds to the space between any two adjacent ribs 26 of the stencil frame 18. Hence, by proper adjustment of the gage member 62 the stencil frame 18 may be so positioned as to cover a quarter, a half or three-quarters of the space between the stripes applied to the surface of the work piece in the first spraying operation, in accordance with the selection made by the operator in reproducing any given pattern.

In accordance with the method of decorating sheet material as herein described, the second spraying operation with the same or a different colored dye material, will result in an overlapping of two color stripes. I am using the word "overlapping" in its usual restricted sense to mean—extending over from the outside and covering a part of. Hence, if the color of the dye material is the same in these first two spraying operations, there will be found, at the end of these two operations, two similar color stripes 72 separated by a stripe 74 of the same color in a darker shade. If two different colors be used in the first two spraying operations there will, of course, be two distinct color stripes on the surface of the work piece separated by a color

stripe produced by a blending of the said two color stripes. In addition there will be a color stripe 76 of the ground color of the skin, it being understood that in most cases the ground color of the skin will be either a light gray or a light brown although, obviously, it may be of another color obtained, for example, by spraying a ground color uniformly over all portions of the surface of the skin. Alternatively, there may be several bands of ground color which of course will have a certain effect upon the finished pattern. After the second or other subsequent spraying operation, as above described, the stencil frame 18 is again lifted to the position shown in Fig. 1 to permit repositioning of the skin 16 to secure a pattern other than that provided by parallel color stripes upon the surface of the work piece. For instance, the skin 16 may now be turned through an angle of 90° by which operation the color stripes thereon will be positioned at a right angle to the ribs of the stencil frame when the latter is lowered in position on the work piece. Since this positioning of the work piece, in using the apparatus of Fig. 1, depends for its accuracy upon the eye of the operator, it is preferable in most cases to utilize the rotary table 54 in place of the stationary table 10, in which case the latch 56 will position and hold the rotary table temporarily in one of two positions 90° from each other. With the skin in its new position relatively to the stencil frame 18, the latter is lowered again upon the skin with the stencil frame pressed against the positioning member 38, as in the first spraying operation. Another spraying operation is now performed with the result that the color stripes 72 now made upon the skin 16 will be found to extend at right angles to the color stripes 72 and 74 formed as a result of the earlier spraying operations. Following this spraying operation, the stencil frame 18 is again lifted and immediately lowered into place on the skin 16 with one or both of the gage members 42, 44, or alternatively the gage member 62, in place to position the stencil frame laterally of the position that it held for the immediately preceding spraying operation. The next spraying operation is now performed, with the result that the color stripe 72 now produced upon the work overlaps that color stripe 72 made by the next preceding spraying operation to produce a color stripe 74 similar in all respects to the first-mentioned stripe 74 but at a right angle thereto as illustrated in Fig. 7. This ends the spraying operations. As a result it will be found that a checkered pattern or a pattern in quadrilateral figures is formed upon the work piece. If only one color be utilized in the spraying operations, there will be four different shades of this color present in the completed pattern, viz. 72, 74, 78, and 80. If two different colors were used in the dye material sprayed upon the surface of the work piece, it will be found that these colors are present in the finished pattern together with six other colors formed by blending of the two colors, due to the overlapping first in longitudinal directions and, secondly, in transverse or crosswise directions.

Through the use of what may be termed spirit dyes, that is, dye solutions made with the aid of alcohol, acetone, and other readily vaporizable solvents, the dye material dries so promptly that the various operations involved in manipulating the stencil frame and in spraying color stripes upon the work piece may be car-

ried out as rapidly as the operator can perform the various operations. Furthermore, by changing the thickness of the gage members 42 and 44, or by providing a gage member like 62 with a different range of adjustments, variations in the widths of the overlapped or blended color stripes may be readily produced. Again, by changing the stencil frame to provide differences in the widths of the ribs themselves, and of the spaces therebetween, and of the shapes of said spaces, very considerable variations in patterns may be secured. By making suitable records as to the gages used, together with the dye colors employed, for a given pattern the latter may be exactly reproduced upon order.

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. That improvement in methods of ornamenting the surface of sheet material which comprises applying to the said surface stripes of the same or of different colors disposed in parallel overlapping relation to each other in such manner as to leave a stripe of the ground color of the surface showing between groups of the applied stripes, thereby providing also a third color stripe in the overlapping portions of two applied color stripes, and then applying a pattern of similarly arranged parallel stripes at an angle to the first group of stripes whereby there is produced a pattern in quadrilateral figures.

2. That improvement in methods of ornamenting the surface of sheet material which comprises providing the surface to be decorated with a ground color, applying to said surface stripes of two or more different colors in parallel overlapping relation in such manner as to leave a stripe of the ground color showing between the groups of the applied stripes, thereby providing also a third color stripe in the overlapping portions of two applied color stripes, and then applying similarly arranged groups of color stripes crosswise at predetermined angles to the first group of color stripes thereby to produce a pattern of eight or more colors in quadrilateral figures in addition to the ground color.

3. That improvement in methods of ornamenting the surface of sheet material which comprises providing the surface to be decorated with two or more bands of ground colors, applying to said surface stripes of different colors disposed in parallel overlapping relation to each other in such manner as to leave a stripe of a ground color showing between each group of applied color stripes, thereby providing also a third color stripe in the overlapping portions of two applied color stripes, and then applying similar groups of color stripes crosswise at an angle to the first groups of color stripes whereby there is produced a many-colored pattern in quadrilateral figures.

4. That improvement in methods of ornamenting the surface of sheet material which comprises placing on the surface to be ornamented a stencil having spaced parallel ribs or bars of a length to extend across one dimension of the said sheet material, spraying upon the exposed portions of the sheet material within the borders of said stencil a color substance in a readily vaporizable solvent, retaining the excess sprayed material on the stencil to prevent such excess material reaching the material to be ornamented, thereby producing stripes of color uniform in appearance

upon said sheet material, shifting the stencil and the sheet material relatively to each other a distance less than the width of a given color stripe and in a direction at right angles to the length of the color stripes just produced on the sheet material, and repeating the spraying operation whereby some or all of the color stripes thus produced overlap color stripes produced by the first spraying operation, the result being that in addition to color stripes corresponding to the ground color of the sheet material and to color stripes corresponding to the sprayed color substance or substances there are produced color stripes formed as a result of the described overlapping of said color stripes.

5. That improvement in methods of ornamenting the surface of sheet material which comprises placing on the surface to be ornamented a stencil having spaced parallel ribs or bars of a length to extend across one dimension of the said sheet material, spraying upon the exposed portions of the sheet material within the borders of said stencil a color substance in a readily vaporizable solvent, retaining the excess sprayed material on the stencil to prevent such excess material reaching the material to be ornamented, thereby producing stripes of color uniform in appearance upon said sheet material, shifting the stencil and the sheet material relatively to each other a distance less than the width of a given color stripe and in a direction at right angles to the length of the color stripes just produced on the sheet material, repeating the spraying operation with another color substance whereby some or all of the color stripes thus produced overlap color stripes produced by the first spraying operation, the result being that in addition to color stripes corresponding to the ground color of the sheet material and to color stripes corresponding to the sprayed color substance or substances there are produced blended color stripes formed as a result of the described overlapping of said color stripes, rotatively shifting the stencil and the sheet material relatively to each other to cause the ribs of the stencil to extend crosswise of said color stripes on the sheet material, spraying a color substance as before upon the portions of the sheet material exposed between the ribs of the stencil, shifting the stencil and the sheet material relatively to each other a distance less than the width of a color stripe just produced by the last spraying operation and in a direction at right angles to said color stripe, and finally repeating the spraying operation with a suitable color substance with the result that this last color stripe will overlap the next preceding color stripe to produce still another color stripe in the described overlapped portions, the pattern produced by the foregoing operations being of a checkered type with at least six colors produced by the blending of two color substances in the spray material.

6. A stencil comprising a frame work having a pattern formed therein providing spaces through which color material may be sprayed upon exposed portions of a work piece below the stencil, the walls of the spaces having a dimension normal to the surface of the work substantial in extent and provided with surfaces treated or coated with absorbent material so that the solvent of the color material which strikes the walls may have time to evaporate therefrom without dripping or running on the work.

7. A stencil comprising a frame work of ribs arranged to provide relatively narrow spaces through which color material may be sprayed

upon exposed portions of a work piece below the stencil, each of the ribs having a dimension in a direction normal to the work piece several times greater in extent than the width dimension thereof and being of a material that is readily wetted by the solvent of the color material so that all of the color material that strikes the ribs remains thereon or evaporates therefrom and does not reach the surface of the work to mar the latter.

8. A stencil comprising a frame work of ribs arranged to provide relatively narrow spaces through which color material may be sprayed upon exposed portions of a work piece below the stencil, each of the ribs having relatively sharp upwardly facing edges to direct the spray material into said spaces and having a dimension normal to the surface of the work substantial in extent and constructed to retard movement of liquid spray material downwardly toward the work piece under the force of gravity so that the solvent of the color material may evaporate without dripping or running on the work piece.

9. A stencil comprising a frame work of ribs arranged parallel to each other to provide long

narrow spaces through which color material may be sprayed upon a work piece below the stencil, each of the ribs having a depth dimension about five times the extent of the width dimension thereof and being of a material that is readily wetted by the solvent of the color material so that all of the color material that strikes the ribs remains thereon or evaporates therefrom and does not reach the surface of the work to mar the latter.

10. A stencil comprising a frame work of ribs arranged parallel to each other to provide long narrow spaces through which color material dissolved in a vaporizable solvent may be sprayed upon a work piece below the stencil, each of the ribs having a dimension normal to the surface of the work substantial in extent to provide a relatively large evaporation surface for the solvent on the vertical wall of the rib, said surface being also absorbent so that the solvent of the color material which strikes the ribs may have time to evaporate therefrom without dripping or running on the work.

MATTHEW M. MERRITT.