July 27, 1965 D. R. ADAMS 3,197,294

PROCESS OF FORMING MANICURE IMPLEMENTS

Filed Aug. 14, 1962 2 Sheets-Sheet 1

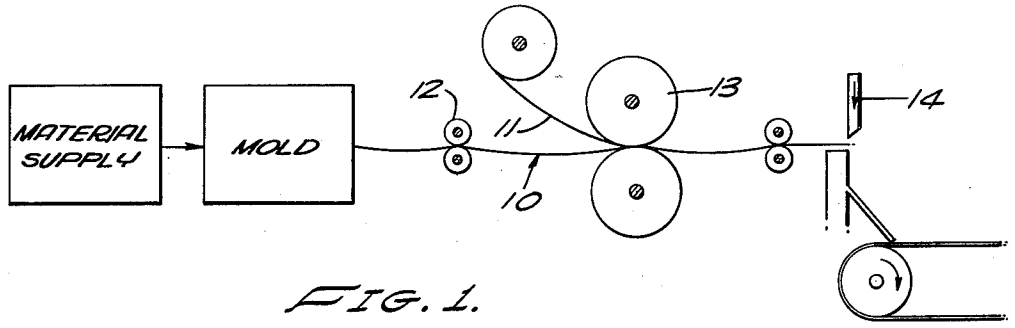


FIG. 1.

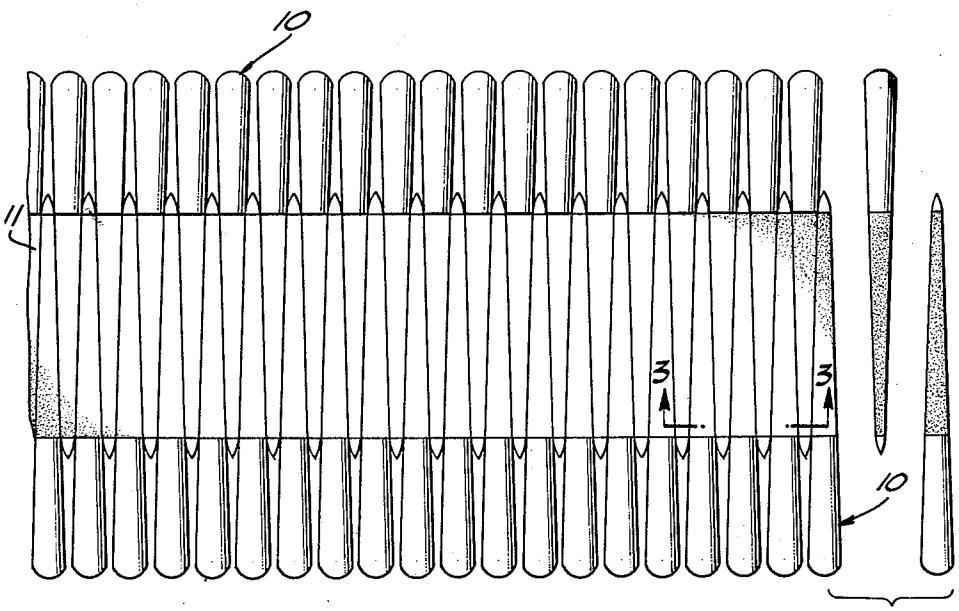


FIG. 2.

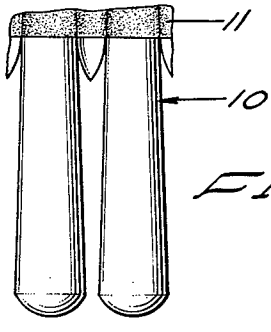


FIG. 4.



FIG. 3.

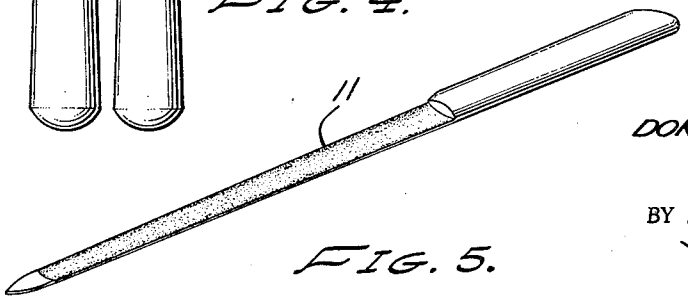


FIG. 5.

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PROCESS OF FORMING MANICURE IMPLEMENTS

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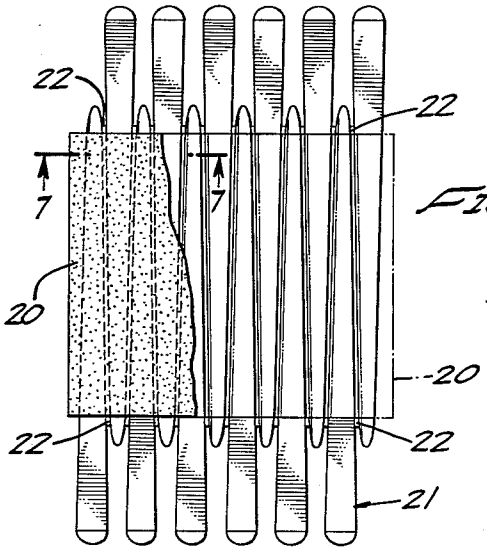


FIG. 6.

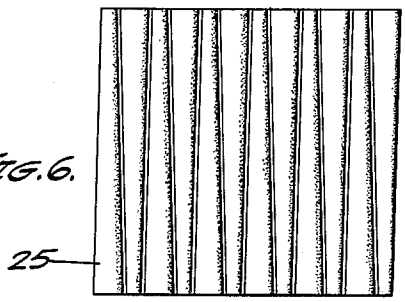


FIG. 8

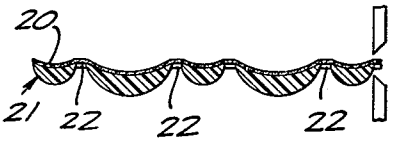


FIG. 9.

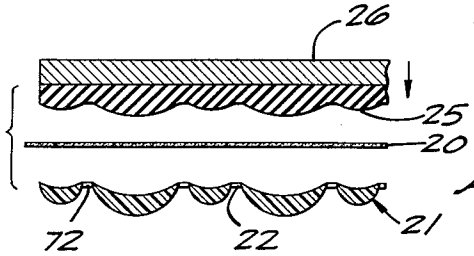


FIG. 7.

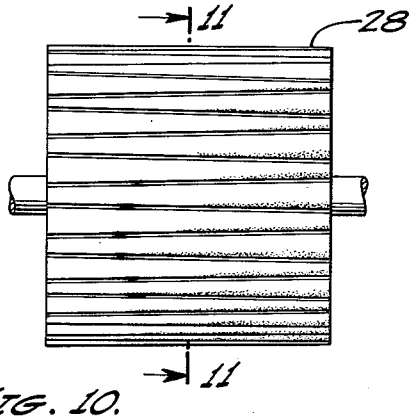


FIG. 10.

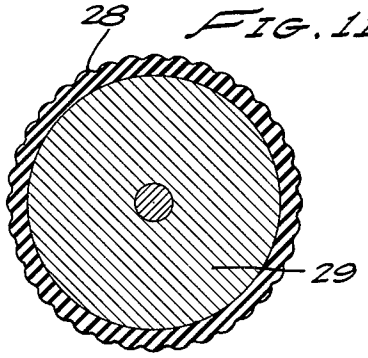


FIG. 11.

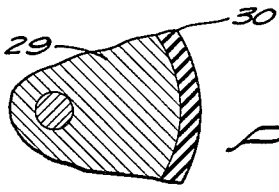


FIG. 12.

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3,197,294

PROCESS OF FORMING MANICURE IMPLEMENTS

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6 Claims. (Cl. 51—293)

The invention relates to the forming of manicure implements, and more particularly to abrasive devices for trimming, shaping and cleaning nails.

Nail files commonly fall into two classes: those made of metal in which a filing edge is obtained by upsetting the flat surface of the metal, as in an ordinary machinist's file; and those formed of a suitable base material, such as metal, plastic, wood, fiberboard and the like, to at least a portion of which an abrasive coating is applied. The present invention relates to an improved method of making devices of the latter category and especially to devices having tapered concave abrasive portions, of the type described for example in my co-pending application Serial No. 216,923; filed of even date herewith, viz, August 14, 1962 entitled "Manicure Implement."

In devices of the type under consideration, a base member is provided of suitable material capable of being formed by molding, pressing, swaging and the like, such as soft metals such as aluminum and magnesium and especially alloys thereof, but more importantly plastics.

As will be appreciated, nail files represent an item which must necessarily be manufactured at a relatively low price and yet which must be mechanically unexceptionable, so that they may be used effectively and yet without injury to the tips and sides of the fingers and the like. These circumstances have brought about much developmental effort in this field, although an ideal solution has not been heretofore obtained.

An object of the present invention is to provide a process for the manufacture of abrasive-coated nail files of the type described, in which quantity production is facilitated with relatively simple equipment and yet with mechanically desirable results.

Another object of the invention is to provide a process for the incorporation of coated sheet abrasives to nail files having a tapered concave abrasive surface.

Other objects of the invention will become apparent as the description thereof proceeds.

In the drawings:

FIGURE 1 is a largely schematic flow sheet showing an exemplary inventive process of manufacturing nail files.

FIGURE 2 is a plan view of a portion of a continuous array of nail files with an overlaid sheet of coated abrasive and showing two individual files cut therefrom.

FIGURE 3 is a cross-section taken as shown by the arrows in FIGURE 2.

FIGURE 4 is a detail view of a portion of FIGURE 2.

FIGURE 5 is a perspective view of an individual nail file corresponding to one of those shown in FIGURE 2.

FIGURE 6 shows an alternative array of nail files prior to the overlay of sheet material.

FIGURE 7 shows an exploded cross-section of a portion of the array of FIGURE 6, with the associated coated abrasive sheet and, in section, the forming tool used for applying the sheet to the array.

FIGURE 8 is a plan view of the working surface of the forming tool shown in section in FIGURE 7.

FIGURE 9 is a sectional view showing the action of cutting apart individual nail files from the array of FIGURE 7 subsequent to the application of the coated abrasive sheet to the array.

FIGURE 10 is a plan view of a corrugated roll used in pressing the abrasive coated sheet into the array;

FIGURE 11 is a cross-sectional view thereof; and

FIGURE 12 is a fragmentary cross-sectional view of an alternative embodiment of the roll, in which the outer surface is smooth.

Generally speaking, and in accordance with an illustrative embodiment of my invention I provide a plurality of base members for nail files or what may be termed abrasive-coated manicure implements in which the said implements have tapered concave abrasive portions, and I provide a plurality of such base members in a parallel array with alternating tapers for each successive base members in the array. That is, as shown in the drawings, the more sharply pointed ends alternate in direction. Each successive base member is joined to its partners on either side by what may be termed a continuum of the material comprising the base member. This continuum or web may extend for a considerable portion of the length of each of the implements, as shown in the implement of FIGURES 2 and 3; or it may extend for only relatively short sections of the length of the base members, as shown in the implement of FIGURES 6 and 7. Which method of joining the base members together is used is a matter of mechanical choice, and it will be found that some methods of forming the array cause one type of joining to be preferable, while other methods of forming cause the alternative method of joining to be most suitable.

Having provided an array of the type described (and I may say that this may be continuously produced over an indefinite length and therefore an indefinitely large number of base members as shown particularly in FIGURE 1; and it may consist of a number, for example, one to three dozen, of individual base members in a finite array as shown for example in FIGURE 6) I next provide a piece of coated abrasive sheeting having a width that of the length of the abrasive portion of each of the implements and any desired length although most convenient as long as the array to be worked upon, and I then provide an adhesive intermediate between the bottom of the coated abrasive sheet and the top of the implements to be coated with the sheet, and I then press the coated abrasive sheet into the alternately tapering concave depressions in the implements, commencing with one end of the array and proceeding with the pressing operation down the length of the array. The pressing or forming device is essentially a counterpart of the abrasive-coated portion of the array and most suitably may consist of a solid rubber layer attached to a backing plane of metal or dense wood, as shown in FIGURE 7, with alternating tapered corrugations as shown in FIGURES 7 and 8 to match the concave depressions in the array of manicure implements. While the forming tool of FIGURE 7 and 8 is shown in FIGURE 7 in connection with the array of FIGURE 6, it will be evident that it may likewise be used in connection with an array of the types shown in FIGURES 2 and 3. For continuous operation, the forming tool may conveniently consist of a series of alternately tapered corrugations of the type described on a roller as shown in FIGURE 10, a cross-section of which is shown in FIGURE 11. The roller of FIGURES 10 and 11 may of course form roller 13 shown in FIGURE 1.

The abrasive-coated sheet having been applied to the array of manicure implements in the fashion described, the individual implements are then cut off from the array by a cutting device, such as for example a knife blade or shear blade, as shown in FIGURES 1 and 9. The knife blade is so arranged, and the coated array is so set in, that the base members are cut apart so that the longitudinal edge of each abrasive sheet portion is left coinciding with the corresponding longitudinal edge of the base member.

As disclosed in my copending application Serial No. 216,923, already referred to hereinabove, the base mem-

ber may be made of commercial poly(methyl methacrylate). The abrasive portion may be formed of a piece of coated abrasive sheeting, in which the abrasive be 120 mesh alumina on a poly(ethylene glycol terephthalate) sheet of 2 mils thickness, this being a standard article of commerce readily obtainable in the United States, the adhesive whereby the abrasive coated sheeting is added to the base member being a 30% by weight solution of poly (ethylene glycol terephthalate) in 10% weight of a solvent consisting of equal parts by weight of methyl ethyl ketone and dioxane.

It will be seen that this manner of procedure provides a very fast method of forming a large number of abrasive-coated nail files, and it is adapted to rapid production. It is to be noted that from the standpoint of geometric topology the system described is conformal, in view of the fact that the deforming of a portion of the originally plane sheet of coated abrasive into a given tapered concave depression is exactly offset by the deforming of the adjacent sheet into the adjacent oppositely tapered depression. It will be evident that the actual length of abrasive sheeting for a given number of manicure implements is greater than the end-to-end length of the said implements when present in the array, in view of the fact that an arc is longer than its chord. It is for this reason that I proceed in accordance with my invention to press or form abrasive sheeting into each of the manicure implement depressions in turn. In the rotary system shown in FIGURE 1 this is automatically taken care of from the mechanical nature of the operation; and in the embodiment whereby a finite number of implements in a single array has been pushed into place.
scribed in connection with FIGURE 7 to start at one end and by pressing the forming tool against one end member of the array and then to apply downward pressure successively until all of the abrasive sheeting for the particular array has been pushed into place.

An alternative embodiment is shown in FIGURE 12, wherein a sponge rubber facing is shown for the surface of the roll of FIGURES 10 and 11; this also effects proper emplacement of the abrasive sheeting.

In the drawings, 10 designates a continuous array of base members, while 11 is a band of coated abrasive sheeting, as has been described. In the diagrammatic depiction of FIGURE 1, 12 designates a roll for supplying adhesive to the top of the array, and 13 designates a roll of the type described for pushing the abrasive sheeting into the concavities. 14 is a knife means for cutting and separating the implements. In FIGURE 6, the piece of abrasive sheeting 20 to be applied to the collection of base members 21 is shown before such application in FIGURES 6 and 7 and subsequent to such application in FIGURE 9. The webs or runners 22 which join the base members prior to separation appear in FIGURES 6, 7 and 9. A plan view of the corrugated rubber surface 25 appears in FIGURE 8, and a section thereof in FIGURE 7, where it is shown attached to a backing plate 26. For roll application, FIGURE 10 shows corrugated rubber surface facing 28 on a drum base 29, and FIGURE 12 shows an alternative smooth sponge rubber facing 30.

While my inventive process has been described with the aid of numerous illustrative examples, it will be evident that many variations in detail, alternative procedures, materials, and the like are contemplated within the broad scope of the invention, as set forth in the claims which follow.

Having described the invention, I claim:

1. The method of forming abrasive-coated manicure implements having tapered concave abrasive portions which comprises; forming a plurality of base members in a parallel array with alternating tapers for each successive base member in said array, with each successive hose member joined to its partners on either side by a continuum of the material comprising said base member, and with said base member in said array presenting said tapered concave portions in an essentially co-planar array; emplacing an abrasive coated sheet together with a layer of adhesive intermediate between said sheet and said array over said array of base members; pressing said sheet against said base member array so as to force said sheet in bonding contact with said concave portions; and thereafter cutting said base members apart with a cutting action that leaves the longitudinal edge of each said abrasive sheet portion coinciding with the corresponding longitudinal edge of each of said base members.

2. The method in accordance with claim 1 wherein said adhesive is applied to said concave portions.

3. The method in accordance with claim 1 wherein said adhesive is applied to said abrasive coated sheet.

4. The method of forming abrasive-coated manicure implements having tapered concave abrasive portions which comprise: forming a plurality of base members in a parallel array with alternating tapers for each successive base member in said array, with each successive base member joined to its partners on either side by a continuum of the material comprising said base member, and with said base member in said array presenting said tapered concave portions in an essentially co-planar array; embracing an abrasive coated sheet together with a layer of adhesive intermediate between said sheet and said array over said array of base members; pressing said sheet against said each base member in turn so as to force said sheet in bonding contact with said concave portions; and thereafter cutting said base members apart with a cutting action that leaves the longitudinal edge of each said abrasive sheet portion, coinciding with the corresponding longitudinal edge of each of said base members.

5. The method in accordance with claim 4 wherein said adhesive is applied to said concave portions.

6. The method in accordance with claim 4 wherein said adhesive is applied to said abrasive coated sheet.

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