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MANUFACTURE OF ARTIFICIAL LEAVES AND FLOWERS

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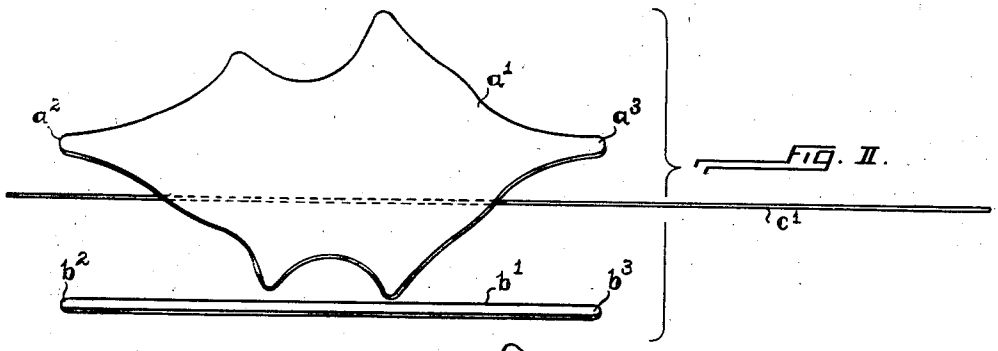


FIG. II.

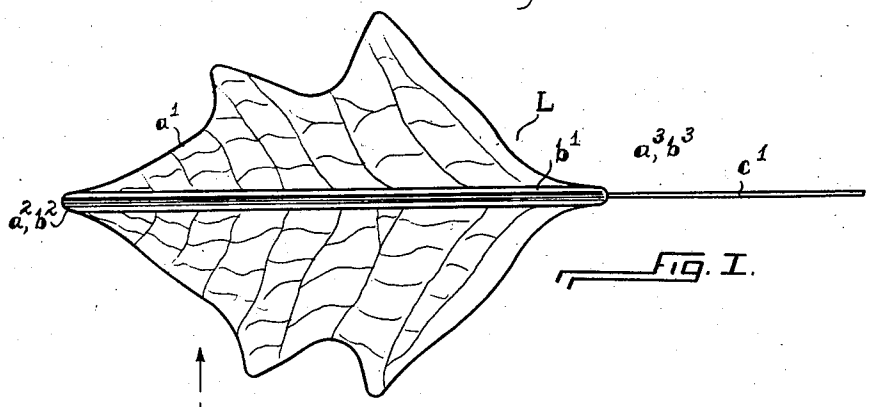


FIG. I.

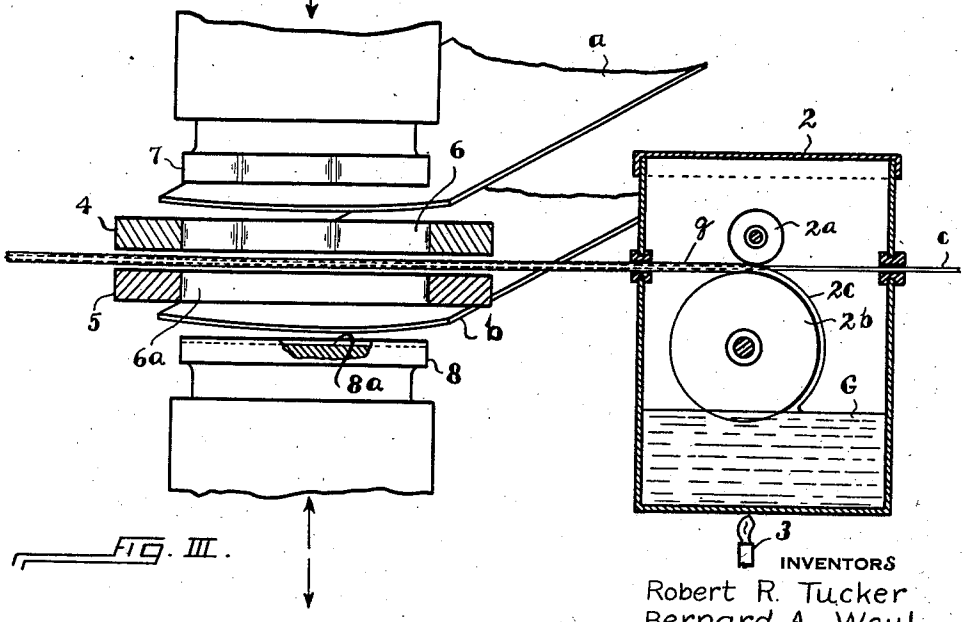


FIG. III.

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MANUFACTURE OF ARTIFICIAL LEAVES AND FLOWERS

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3 Claims. (Cl. 41—13)

Our invention relates to the production of artificial flowers and foliage, and consists in refinements in method, by virtue of which the product may, with greatest economy and superiority in quality, be manufactured in automatic machinery.

The improved method of the invention is particularly, though not exclusively, adapted for the manufacture of artificial leaves, and in exemplary way we shall so describe it.

In the accompanying drawing,

Fig. I is a view in plan of an artificial leaf which is typical of the leaves that may be produced in accordance with our invention;

Fig. II is an "exploded" view, showing in perspective the component parts of the leaf of Fig. I, and

Fig. III is a fragmentary, diagrammatic view, showing partly in side elevation and partly in vertical section apparatus that may be used in the practice of the invention.

Referring to Figs. I and II of the drawing, the leaf L is formed of two sections or laminae a^1 and b^1 united to a stem-forming strand c^1. The leaf-forming laminae a^1 and b^1 are formed of sheet material, such as paper, paper-backed metal foil, Cellophane, or other suitable sheet material, and the stem-forming strand is formed of metal wire, the term "wire" being inclusive of strands of any other material than metal that is suitable. The lamina a^1 comprises a leaf cut to the pattern of the natural leaf that is to be simulated, and the lamina b^1 comprises a narrow band cut to the length of the leaf-shaped lamina a^1. At its opposite ends b^2 and b^3 the band b^1 is of the precise form of the tips a^2 and a^3 of the leaf portion a^1. The leaf portion a^1 is united or bonded, on its longitudinal center-line, to the wire c^1, by means of a suitable adhesive or glue, while the band portion b^1, assembled upon the reach of the wire that would otherwise be exposed on the body of leaf portion a^1, is bonded both to the wire and to said patterned leaf portion a^1, with exact registry of the nicely fashioned ends b^2, b^3 of the band portion with the tips a^2 and a^3 of the leaf portion. The so-assembled band portion b^1 increases the security of union of the leaf portion a^1 with the wire, and serves to enclose the leaf-engaging reach of the wire c^1 within the body of the leaf, screening such reach of the wire from view and providing a leaf of more natural and pleasing appearance. Thus, in leaf whose body is formed of a single pattern leaf portion, we gain the effect of a laminated leaf (a leaf whose body is formed of two patterned leaf portions), with corresponding savings in the cost of materials.

In proceeding in accordance with our present invention, a film of adhesive, typically a quick-drying liquid glue or cement, is applied to the stem-forming wire; the ends of two strips of sheet material are projected into positions on opposite sides of the wire while the coating of glue is still in moist and adhesive condition; shearing dies are caused to cut the patterned leaf portion a^1 from the end of one strip and the band portion b^1 from the end of the other strip; and under pressure of the shearing dies the two leaf-forming portions a^1 and b^1 are assembled upon the interposed wire. The coating of glue applied to the wire is a heavy or thick film—a film containing glue in excess of the quantity required to effect the bonding of a single leaf portion to the wire. Under the pressure applied by the shearing dies the excess glue is squeezed from the body of the wire and spread between the meeting surfaces of the two leaf-forming portions a^1 and b^1. The so-distributed glue quickly sets or solidifies, and effects the integration of the three leaf-forming elements. It will be understood that the applied film of glue serves to effect not only the bonding of each leaf-forming portion to the wire, but also the bonding of the two leaf-forming portions to each other over the entire area of mutual contact of such portions. By virtue of our procedure it becomes feasible to manufacture the leaf mechanically, with substantial savings in labor and cost, and superiority in quality.

In an earlier application for United States Letters Patent, Serial No. 352,278, filed August 12, 1940, we have illustrated and described a leaf-manufacturing machine in which the method of our present invention may be performed. Such machine includes a pair of shear-plates rigidly mounted in spaced-apart, parallel relation, and each shear-plate includes an orifice in the pattern of the leaf to be produced. Organized with the two shear-plates severally are two shearing dies; the shearing dies are arranged on opposite sides of the pair of shear-plates; the dies are reciprocable in unison, first towards and then away from the pair of shear-plates between them—the dies thus reciprocating between a position in which they are closed in shearing engagement with the shear-plates severally, and a position in which they are removed from such engagement with the shear-plates. The machine includes means for advancing a strand of adhesive-coated wire step by step and in taut condition between the spaced-apart shear-plates, and in each in-

terval of rest between the successive advances of the wire, the reciprocating dies close from opposite sides upon the paired shear-plates and severally cut two leaf-forming laminae from the ends of two strips of adhesive-coated sheet material. The dies, pushing the two leaf-forming laminae before them, move through the orifices in the shear-plates and bring the two laminae together upon the interposed wire, and under the pressure of the dies, the adhesive-coated laminae are bonded to the wire and to each other. Thereupon, the movement of the continuously reciprocating dies reverses; the dies recede from the leaf assembled upon the wire, and move outwardly through the orifices in the shear-plates.

As the outwardly moving dies clear the shear-plates, the strips of sheet material are advanced, presenting to the dies new areas of sheet material from which to cut the patterned laminae for a second leaf, and simultaneously the wire is advanced, with the effect that the leaf bonded to the wire is carried from position between the shear-plates, and a succeeding reach of the wire is moved into position between the plates, to receive the second leaf. And so the machine operates, repeatedly to cut patterned leaf-forming laminae from the strips of sheet material and to assemble the laminae at uniformly spaced points upon the intermittently advanced wire. In the line of travel of the wire from the shearing dies, the machine is provided with one or more sets of auxiliary dies, such as a set of dies to refine the peripheral outline of the leaves applied to the wire, and a set of dies to impress veins in the bodies of the leaves. And at the delivery end the machine means are provided for cutting the wire at the tip of each leaf assembled thereon, thereby separating the leaves from each other, while leaving a portion of the wire extending from each, to simulate the stem of a natural leaf.

In Fig. III of the drawing, we illustrate diagrammatically, at **4** and **5**, the two shear-plates of the machine of our earlier application. The shear-plates extend in spaced-apart horizontal planes, as indicated; the shearing orifice **6** of the upper plate is formed to the pattern of the leaf portion a^1, while the orifice **6***a* of the plate **5** is formed (in modification of the showing of said earleir application) to the pattern of the narrow band b^1. Vertically reciprocating shearing dies **7** and **8** are arranged to co-operate severally with the shear-plates **4** and **5**, to cut leaf-forming portions a^1 and b^1, respectively, from the ends of two strips *a* and *b* of sheet material, in this case heavy crepe paper.

In the practice of our present invention, the stem-forming wire, *c*, need not be coated with adhesive before it enters the machine. The wire *c*, drawn from a supply coil (not shown) in uncoated condition, is led between a pair of wheels **2***a* and **2***b* in a glue-pot **2**, and from the glue-pot the wire extends between the shear-plates to the wire-advancing and wire-cutting mechanisms of the machine. Such mechanisms are not illustrated herein, neither is the mechanism for reciprocating the dies **7** and **8**, nor the mechanism for projecting the ends of the strips *a* and *b* to the shearing dies, since our earlier application will afford a clear understanding of such parts of the machine. Suffice it to say that the machine of said earlier application is adapted to perform the steps of the method herein specifically described.

In the practice of our method, the wire *c*, maintained in taut condition, is advanced step by step through the glue-pot **2** and between the shear-plates **4** and **5**. In the advance of the wire through the glue-pot, the wheel **2***b*, dipping at the lower limb of its periphery into a bath G of thermo-plastic glue held in liquid state by a burning jet **3** of gas, rotates under the effect of the tangential drag of the wire. As the wheel so rotates, it is caused to carry glue on its rim, as at **2***c*, from the bath G and to apply the glue in the form of a heavy film or coat to the wire. As already described, the applied coat or film contains glue in excess of the amount required to bond a leaf of sheet material to the wire. While the wire is at rest between its successive advances, and when the continuously reciprocating dies **7** and **8** are in the positions shown in Fig. III, the strips *a* and *b* of sheet material (led from supply coils, not shown) are advanced, in such manner that the ends of the strips are projected between the dies and the shear-plates into positions on opposite sides (above and below in this case) of the adhesive-coated wire. As the continuously reciprocated dies close upon the shear-plates, a leaf portion a^1 is punched from the end of the strip *a*, and a band portion b^1 from the end of the strip *b*. Such movement of the dies is continued beyond shearing position, carrying the leaf-forming portions punched from the strips inward through the orifices **6** and **6***a* in the shear-plates and into contact with the adhesive-coated wire. The dies are caused to press the two leaf-forming portions together, and under such pressure the excess glue, still liquid in the coating on the wire, is squeezed from the wire and spread between the meeting surfaces of the leaf portion a^1 and the band portion b^1, and the bonding of the two leaf-forming portions to the wire and to each other is effected, it being noted that the glue thus spread over the meeting surfaces of the leaf-forming portions quickly dries or solidifies. Then, in the sequential operations of the machine, the movement of the dies is reversed; the dies move outward to the positions in which they are shown in Fig. III; the strips *a* and *b* are advanced to present at their projecting ends new areas of sheet material to the dies; and the wire is advanced in right-to-left direction, carrying the leaf applied to the wire from position between the shear-plates, and bringing a succeeding reach of glue-coated wire into position to receive a leaf. The operations described are repeated, and in such manner artificial leaves are cut to pattern and assembled upon the wire *c*.

It will be perceived that the die **8** includes a groove **8***a*, in order that a clearance shall be provided for body of the wire upon which the members a^1 and b^1 are assembled. When the dies enter fully closed position, the engaged portion of the wire is pressed into the groove **8***a*, carrying with it the wire-contacting body portion of the band b^1, whereby on its center-line such band is caused snugly to engage the cylindrical surface of the wire, while at the two sides of the wire the band lies flat against the surface of the leaf portion a^1 to which it is bonded. In the course of advance of the wire from the leaf-shearing dies **4**, **7** and **5**, **8** to the wire-cutting mechanism (cf. our earlier application), the leaves may be presented to auxiliary dies, and veins impressed therein, as indicated in Fig. I. In such method of producing artificial leaves, we gain advantages of nature mentioned.

It will be understood that, by virtue of cutting or punching the leaf-forming elements a^1 and b^1 immediately from the ends of the strips *a* and *b*,

substantially all of the sheet material forming the strips is used, and waste or scrap is reduced to a minimum. It is through economies of the sort herein described that producers in this country may successfully face the labor conditions now prevailing in other parts of the world.

We claim as our invention:

1. The method herein described of producing artificial foliage that comprises projecting the ends of two strips of sheet material severally into positions on opposite sides of a stem-forming wire, shearing in pattern a leaf from the end of one strip and a relatively narrow band from the end of the other strip, and then uniting the leaf and the band, under pressure exerted by the shearing instrumentalities, upon the interposed wire.

2. The method herein described of producing artificial foliage that comprises applying a film of adhesive upon a wire and projecting the ends of two strips of sheet material severally into positions on opposite sides of said wire, shearing in pattern a leaf from the end of one strip and a relatively narrow band from the end of the other strip, assembling under pressure the leaf and the band upon the interposed wire, and under such pressure effecting the spreading of adhesive from the wire to the meeting surfaces of the leaf and the band, with the effect that the leaf and the band are bonded to the interposed wire and to each other.

3. The method herein described of producing artificial foliage that comprises projecting the ends of two strips of sheet material into position on opposite sides of a stem-forming strand, shearing severally from such projecting ends a patterned leaf and a relatively narrow band, and uniting such leaf and band, while they are in position between the shearing instrumentalities, with the interposed strand and with each other.

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