

K. E. OLSON.

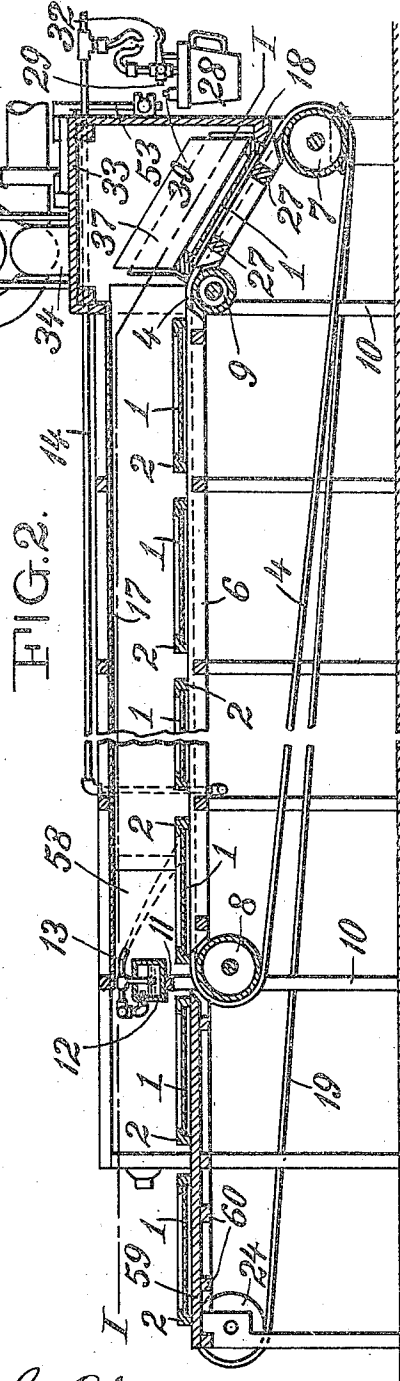
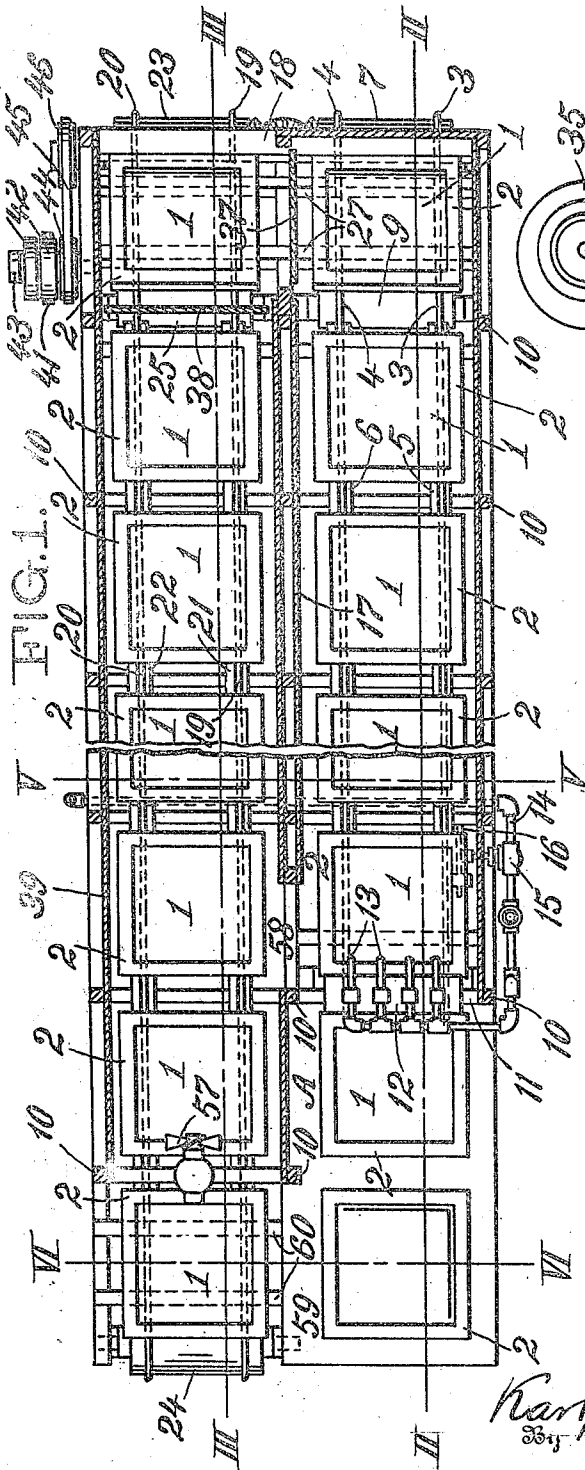
APPARATUS FOR THE MANUFACTURE OF IMITATION METAL FOIL OR LEAF.

APPLICATION FILED JULY 28, 1915.

Patented Dec. 28, 1915.

2 SHEETS—SHEET 1.

1,165,440.



Karl E. Olson Inventor
By H. S. Attorney
Seward Davis

K. E. OLSON.

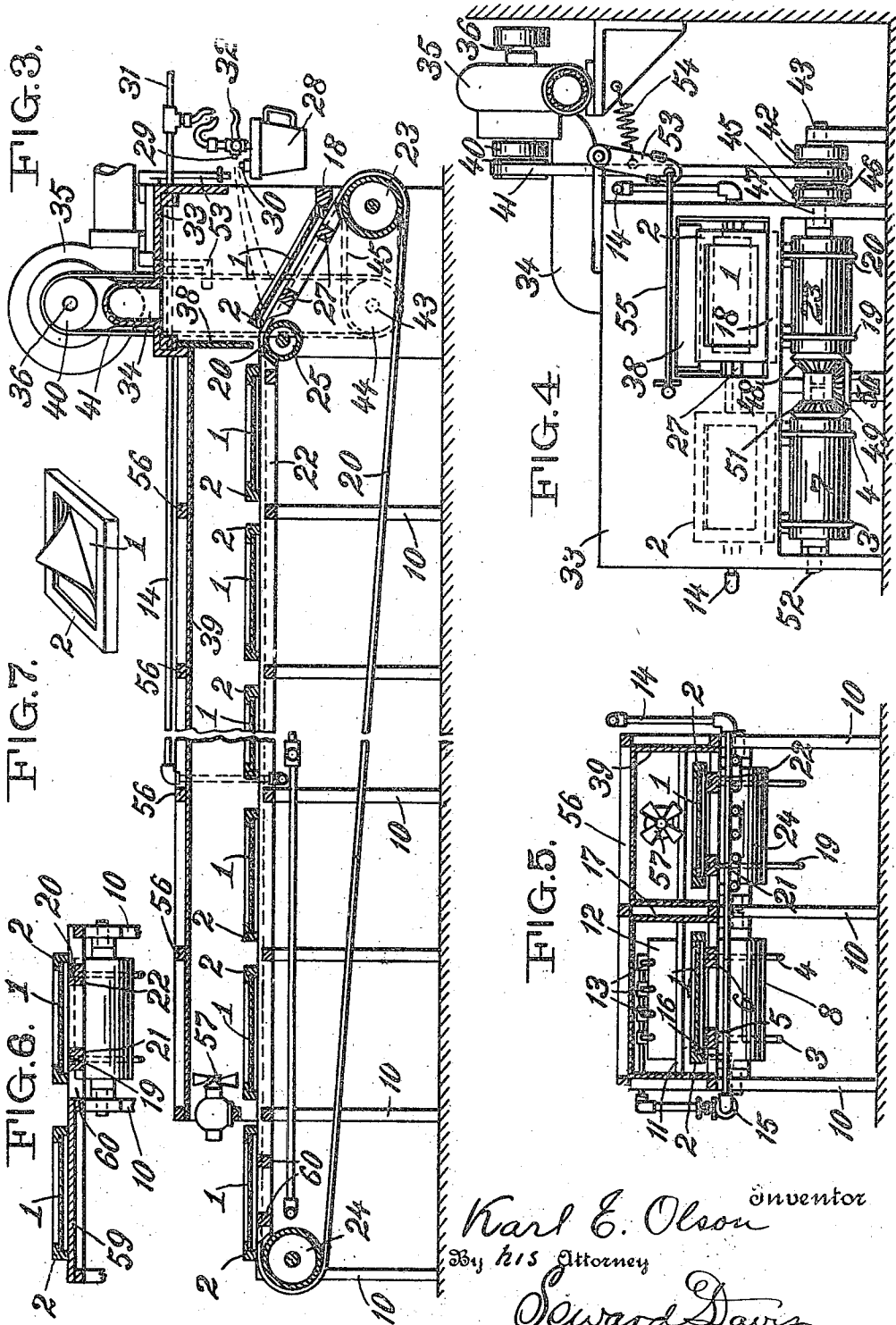
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Karl E. Olson *Inventor*
By *his Attorney*
Edward Davis

UNITED STATES PATENT OFFICE.

KARL E. OLSON, OF IRVINGTON, NEW JERSEY.

APPARATUS FOR THE MANUFACTURE OF IMITATION METAL FOIL OR LEAF

1,165,440.

Specification of Letters Patent.

Patented Dec. 28, 1915.

Original application filed March 2, 1915, Serial No. 11,635. Divided and this application filed July 28, 1915. Serial No. 42,284.

To all whom it may concern:

Be it known that I, KARL E. OLSON, a citizen of the United States, residing in the town of Irvington, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Apparatus for the Manufacture of Imitation Metal Foil or Leaf, of which the following is a specification.

This invention relates to apparatus for the production of an imitation gold or colored leaf.

One of the objects of the invention is to provide an apparatus which, while operating with only a few workmen, shall produce continuously a large number per hour of substantially perfect sheets.

Another object of the invention is to provide an apparatus of this type in which substantially all of the preliminary steps leading up to the formation of a film or leaf, as well as certain important steps thereafter, are carried on automatically.

Another object of the invention is to provide a simple, inexpensive apparatus of the kind described, which may be driven from a single source of power and which may be quickly and conveniently started by a single operative, or stopped, if necessary, for inspection of the leaf or other purposes.

Other objects will be in part obvious and in part pointed out hereinafter.

This application is a division of my co-pending application Serial Number 11635, filed March 2, 1915, and certain features described therein will here be omitted.

The invention comprises a hard leaf support, a device for preliminarily coating the leaf support, means for conveying the so-coated leaf support to a leaf-forming chamber, a device for forming the leaf on the leaf support, and means for conveying the support so treated through a drying chamber and bringing it first to a position for treatment with a stripping solution and thereafter into a position for stripping.

In carrying out the process of my invention in its preferred form, I employ an apparatus of which an embodiment is shown in the accompanying drawings.

Referring now to these drawings: Figure 1 represent a sectional plan view of the apparatus on the line I—I of Fig. 2; Fig. 2

represents a sectional elevation taken on the line II—II of Fig. 1; Fig. 3 represents a sectional elevation taken on the line III—III of Fig. 1; Fig. 4 represents a front elevation of the apparatus viewed from the right of Fig. 1; Fig. 5 is a cross-sectional elevation on the line V—V of Fig. 1; Fig. 6 is a partial cross-sectional elevation on the line VI—VI of Fig. 1; and Fig. 7 is a detail view showing the stripping of a leaf from a leaf support.

In the drawings a series of leaf supports is shown, each support comprising a sheet of plate or other hard glass 1 to receive the leaf, which is formed according to the formula set forth in my co-pending application, although it will of course be understood that the apparatus is capable of producing colored or imitation metallic leaves generally. A rectangular frame 2 of oblong shape surrounds the plate 1 to protect the glass and permit ready handling thereof. Glass or similar substance is chosen as the leaf support not only on account of its hardness, which gives to the leaf a brilliant surface, but also because in spraying, as hereinafter set forth, the density of the leaf as it is being formed may be noted, whereby the thickness of the resulting leaf may be determined. By noting the outline of the particles in the leaf as revealed by the light passing through the glass and through the leaf, the characteristics and action of the spray may be ascertained also.

The method of forming the leaf upon the leaf support, of preparing it for stripping therefrom, and ultimately executing the stripping action, may be generally stated as follows: The glass 1 is first treated with a solution containing a volatile solvent. The volatile solvent is then evaporated, leaving a hard substantially dry coating thereon. The glass is then brought in front of a spraying apparatus and the spraying mixture is projected thereupon by means of an atomizer. After the leaf is sprayed upon the leaf support, it is carried through a drying chamber, through which a current of air is circulating, and dried. It is then delivered upon a framework outside the drying chamber, treated for stripping and stripped.

Referring now in detail to the method mentioned and the apparatus used in carry-

ing it out: Having cleansed the glass of the support, it is placed in position to be carried along a rope conveyer consisting of two parallel ropes 3 and 4 which are supported upon longitudinal guide bars 5 and 6. The conveyance of plates 1 by the ropes 3 and 4 is effected by frictional engagement therebetween in this embodiment. These ropes are driven from a roller 7 over which they pass at one end and are guided by the roller 8 at the opposite end of the conveyer and the roller 9, which is situated near the driving roller 7, and which with the roller 7 provides a decided pitch therebetween. The guide bars are suitably supported by uprights 10. Assuming that one of these leaf supports is in the position designated A in Fig. 1, that is, that it is just about to be engaged by the rope conveyer for transmission thereby, the preliminary coating of the glass is accomplished by means of an automatically actuated sprayer apparatus positioned on a cross bar 11 held in place above the traveling leaf supports. This spraying apparatus consists of a reservoir 12 for the liquid to be sprayed, spray nozzles 13 arranged in a bank of four, the nozzles and the reservoir being supplied with air under pressure through a pipe 14 extending to an ordinary type of air compressor.

In the pipe 14 is inserted a rotatable valve 15 whose rotatable member is actuated by a weight-controlled arm 16. The weight is adapted to hold the valve in closed position, thus shutting off the air pressure from the reservoir. This weight-held arm, however, projects above the plane of the pathway which the leaf supports are caused to take when they rest upon the rope conveyer, and when the front edge of one of these leaf supports contacts with the projecting portion of the arm 16, it urges this arm downwardly against the weight and opens the valve 15, thereby admitting air to the reservoir and the spraying nozzles. The four nozzles, being directed downwardly to deliver a spray upon the plates, are actuated by this means and continue to spray the plates until the rear edge of the leaf support has passed over the arm 16, thereby releasing it and shutting off the spray until the next leaf support of the series contacts in a similar manner, and so on throughout the series.

The spraying liquid used in carrying out the preferred process is a solution of beeswax and gasoline, in the proportion of a half ounce of wax to a quart of gasoline, having a Baumé test of approximately 66.5 at 69 degrees Fahrenheit.

In order to evaporate the solvent these leaf supports are conducted immediately after spraying into a drying chamber 17, which is erected upon the guide bars 5 and 6, is preferably rectangular in form, and made of light cloth. The chamber is three-

sided, having a flat top and sides extending therefrom down to the guide bars. The bottom is open. The drying chamber receives air from a fan through an opening herein-after described. In passing through the drying chamber the gasoline is driven off and the remaining wax leaves a hard substantially transparent covering upon the glass 1. Toward the delivery end of the rope conveyer, as heretofore mentioned, there is a distinct pitch between the rollers 9 and 7, this pitch being provided in order that the leaf supports may assume the position which they occupy when they are sprayed to form the leaf thereon. After passing through the drying chamber which terminates at the beginning of this pitch, the plates incline and finally come to rest against a cross bar positioned above the roller 7. From this point the leaf support may be moved laterally with respect to the guide bars 5 and 6 and entirely out of the path of the rope conveyer to a position upon another rope conveyer consisting of the ropes 19 and 20 running along the guide bars 21 and 22 and over rollers 23 and 24 positioned at the opposite ends of the conveyer and a roller 25 positioned with respect to roller 23 as roller 9 is to roller 7, in order to give the same pitch to the conveyer at this point. In sliding across from the first conveyer to the second one, the leaf supports are supported by cross bar 18 and transverse bars 27 over which the ropes of both conveyers run and which are arranged with their upper faces at the same angle as the inclination of the ropes. The leaf supports having been placed in position upon the ropes 19 and 20 of the second conveyer, an ordinary type of air spraying apparatus comprising the reservoir 28 and spray nozzles 29 and 30 for air and liquid, respectively, is filled with the leaf-forming liquid mentioned in connection with the description of the leaf given in the first part of the specification. Air is supplied from an ordinary compressor apparatus and furnished to the air-spraying apparatus through a pipe 31, to which is also joined the pipe 14. When the finger 32 is lowered the air is forced through the nozzle 29 and the liquid is atomized as it issues from nozzle 30. The leaf support is allowed to move slowly upward with the ropes of the conveyer, and at the same time the glass 1 of the support is covered with a coating from the spray by moving the reservoir with its nozzle attached thereto slowly back and forth. When the plate has been sprayed it passes into a second drying chamber and another leaf support is brought over from the first conveyer-incline and placed in a position on the second conveyer, to be sprayed as heretofore related.

In carrying out the spraying a good deal

of volatile matter and bronze dust will of course be projected into the air above the face of the leaf support, and in order to avoid danger in connection with the liberation of these products, they are preferably sucked off through a hood 33, in the top of which is positioned a flue 34 leading to the blower 35, which is operated by the shaft 36 driven by any suitable means from an outside source of power.

The chamber 33 is provided with a curtain-covered slit 37 in its side wall, through which the leaf supports may be pushed from one conveyer to the other. The rear wall of the hood 33 is also provided with an opening closed by a curtain 38. After spraying the leaf support resting on the rope conveyer passes into the drying chamber 39. In order to stop the plate being sprayed on its way to the drying chamber, or in fact if it is desired to stop any or all of the plates at various points of the travel thereof, a stopping mechanism is employed which is operated from a position adjacent the hood. The stop mechanism controls the common driving means for the two rollers 7 and 23. This driving means consists of a pair of tight and loose pulleys 40 mounted on the shaft 36 of the blower connected by a belt 41 with a pair of tight and loose pulleys 42 mounted on a shaft 43 below shaft 36. Mounted on shaft 43 is a third pulley 44 which transmits motion by means of a belt 45 to a pulley 46 on shaft 47, on which is mounted roller 23. Shaft 47 is supported at the pulley end by one of the uprights of the frame, and at the other end is provided with a bevel gear 48 seated against the end of roller 23. This bevel gear 48 rests on a beveled annulus 49 which has a support 50. Gear 48 transmits motion to the annulus, which in turn transmits its motion to the roller 7 through the bevel gear 51 mounted on a suitably supported shaft 52 which supports the roller 7. To stop the rollers a belt-shifter 53 is employed mounted pivotally on the wall of the hood, to coact with the belt 41. The shifter is held by a spring 54, and in turn holds the belt in position to be driven. When the belt is thrown to the loose pulleys of the sets 40 and 42, the rollers 7 and 23, and thereby the rope conveyer systems, stop. The belt may be thrown by means of an arm 55 connected to the belt-shifter 53.

It will be noted according to the construction recited that the rollers 7 and 23 will rotate in opposite directions, thus driving the two rope conveyer systems in opposite directions, causing the leaves and leaf supports to go up one side and return the other, and thereby completing the cycle of operations.

The drying chamber 39, into which the leaf-covered leaf supports pass is similar in

shape and construction to the drying chamber 17, being rectangular and oblong in form. It is however slightly longer than the drying-chamber 17 and overlaps it consequently at the end opposite the curtain 38. This drying chamber is provided with walls of cloth and is supported by suitable framework comprising uprights and cross bars 56. Its sides extend downwardly as far as the guide bars 21 and 22. At the opposite end of the drying chamber and mounted on the framework therefor, at the extremity thereof, is a motor-driven fan 57, which serves to circulate air through the drying chamber 39, and also through the drying chamber 17 through the opening 58, which provides a communication between the two drying chambers.

Upon emergence from the drying chamber 39 the leaf support passes onto and comes to rest upon an L-shaped platform 59 formed by the extensions of the guide bars for the two drying chambers and cross bars 60 extending therebetween. When the leaf emerges upon this platform, it is substantially dry. It is then moved over to the opposite side of the platform from the drying chamber 39 and is prepared for stripping. This stripping is effected by the wetting of the plate with a solution which according to the preferred process contains the following ingredients in the proportions stated: gasolene, 7 fluid ounces, thinner solution containing amylacetate and other soluble cotton solvents, one ounce, wax, one-sixteenth ounce. The leaf having been thoroughly wet with this mixture by means of a camel's hair brush dipped into the mixture and then moved over the surface of the leaf, the latter is next cut on two sides. This having been accomplished, a sheet of absorbent paper is placed upon the face of the leaf, and the corner resulting from the cut is urged gently against the under-side of the paper. Then, by gently raising the paper, as shown in Fig. 7, the adhering leaf may be removed completely from the glass plate. The leaf is then put aside to dry and may subsequently be cut up into various sizes. The glass plate only requires to be scraped a little with a knife and may then be placed in position for conveyance by the first rope conveyer through the preliminary coating process, drying, etc.

The construction set forth, it will be noted, thus provides a closed circuitous path for the leaf-supports on the structure constituting the conveyers, spraying chamber, and stripping table.

The process outlined is thus conducted continuously and the series of leaf supports are preferably kept following as closely upon one another as is feasible for handling and conducting the various operations necessary.

The solvents used in the stripping solution penetrate the leaf and thus loosen it from the background upon which it rests. The wax used in the stripping solution serves not only to prevent the too rapid evaporation of the volatile solvents before they have accomplished their work, but it also acts as a size in itself. It further prevents the adhesion of the leaf to the dies when it is employed in stamping. The process is an exceedingly simple one and practically unskilled labor may be depended upon to carry it through. The handling of the leaf as it emerges from the drying chamber is an advantageous step, for the leaf at that time may be inspected, and if, as sometimes happens, there is cause for its rejection, it may then be thrown out. The process of spraying, drying, stripping, etc., may be carried on with great rapidity, and with the apparatus shown with great efficiency. The leaf produced, using the formula set forth in my co-pending application heretofore mentioned, is of exceptional luster and brilliancy, and has a relatively great adhesive property. The leaf may be handled before drying, or afterward, with no danger of its breaking up, and possesses generally, in a high degree, the desired characteristics set forth in my copending application hereinbefore mentioned. It will thus be seen that I have achieved among others the objects of my invention heretofore set forth.

Having thus described my invention, I claim:

1. In apparatus for the production of a thin film or leaf, in combination, a hard transparent support, spraying means for producing a leaf thereon, and means to move said support away from the leaf-producing position.

2. In apparatus for the production of a thin film or leaf, in combination, a glass plate, a sprayer for projecting a leaf thereon, and a conveyer means for conducting the plate toward and away from the leaf-receiving position.

3. In apparatus for the production of a thin film or leaf, in combination, a leaf supporting plate, a spraying hood, means to support said plate in an inclined position in said hood, and means to move said plate out of said hood.

4. In apparatus for the production of a thin film or leaf, in combination, a leaf support, a spraying hood, and a conveyer having an inclined way in said hood, said conveyer operating to move said support through said hood in an inclined position.

5. In apparatus for the production of a thin film or leaf, in combination, a leaf support, a spraying hood, and a conveyer for moving said support in an inclined position through said hood, said conveyer comprising

cable members, inclined guides therefor, and rollers positioned to provide a pitch to said cable members.

6. In apparatus for the production of a thin film or leaf, in combination, a support for a leaf, spraying means to project a leaf onto said support, a spraying hood, said spraying means being positioned to operate in said hood, and inclined conveyer members serving to move said leaf support under the sprayer means in an inclined position through said hood.

7. In apparatus for the production of a thin film or leaf, in combination, a glass plate adapted to receive a leaf, spraying means adapted to produce a leaf thereon, a drying chamber for drying the leaf produced, and controllable means to move said plate into the drying chamber.

8. In apparatus for the production of a thin film or leaf, in combination, a support, coating means for providing a preliminary coating on said support, means for producing a leaf on said support over said coating, and means to cause the circulation of a drying medium over the preliminary coating, said coating means being at a sufficient distance from the leaf-producing means to permit a drying of the coating under the action of the drying medium.

9. In apparatus for the production of a thin film or leaf, in combination, a support, spraying means for providing a preliminary coating on said support, means for producing a leaf on said support over said coating, and means to cause the circulation of a drying medium over the preliminary coating, said spraying means being at a sufficient distance from the leaf-producing means to permit a drying of the coating under the action of the drying medium.

10. In apparatus for the production of a thin film or leaf, in combination, a support for a leaf, a conveyer means for said support, and means adapted to provide a preliminary coating thereon comprising a spraying device and a member actuated by the said support for controlling the spraying device.

11. In apparatus for the production of a thin film or leaf, a support for a leaf, a guide for said support, conveyer means for urging said support along said guide, a spraying device positioned adjacent said guide, and an air supply for operating said spraying device, said air supply being provided with a valve member operating to control the spraying device, said valve member being positioned adjacent said guide and adapted to be acted upon by the passage of said support.

12. In apparatus for the production of a thin film or leaf, in combination, a series of leaf supports, means to produce leaves on said supports, a drying chamber, conveyer

means adapted to deliver the series of leaf supports to a position for spraying, and a second conveyer means for moving said leaf supports from the leaf-producing position through the drying chamber.

13. In apparatus for the production of a thin film or leaf, in combination, a series of leaf supports, spraying means for producing leaves thereon, a spraying chamber, a drying chamber communicating therewith, a conveyer means for conveying said leaf supports toward the spraying chamber, and a second conveyer means for moving said leaf supports through said spraying chamber and into said drying chamber.

14. In apparatus for the production of a thin film or leaf, in combination, a series of leaf supports, means for producing a preliminary coating upon said supports, means to produce leaves upon the so-coated supports, a drying chamber, a stripping table, and conveyer means for continuously moving the leaf supports toward the leaf-producing position and away from the leaf-producing position into the drying chamber to the stripping table.

15. In apparatus for the production of a thin film or leaf, in combination, a series of leaf supports, substantially parallel guide tables along which said supports travel, conveyer means for urging said supports along said tables, means to produce a preliminary coating upon said supports, said tables being pitched at one end, a spraying hood positioned over the pitch of one of the tables, a drying chamber adjacent said spraying hood, one of said conveying means being

adapted to move said supports through said spraying chamber and said drying chamber, and a stripping table positioned beyond the exit of said drying chamber and joining the ends of the tables opposite the spraying hood.

16. In apparatus for the production of a thin leaf or film, a frame constituting a circuitous path, leaf supports adapted to travel in succession therealong, conveyer means to cause said leaf supports to travel along said path, means for covering said supports with a film-forming material, and means to cause the circulation of a drying medium over the so-covered supports.

17. In apparatus for the production of a thin leaf or film, a frame constituting a circuitous path, leaf supports adapted to travel in succession therealong, means to coat each of said supports at one point in their travel with a film-forming material, and means to cause a circulation of air over said leaf supports.

18. In apparatus for the production of a thin leaf or film, a frame constituting a circuitous path, leaf supports adapted to travel in succession along said path, means to coat each of said supports with a preliminary coating, means remote from said first mentioned means adapted to cover said supports with a film-forming material, and means to cause the circulation of a drying medium over the supports after provision of the preliminary coating and after the covering of the supports with the film-forming material.

KARL E. OLSON.