

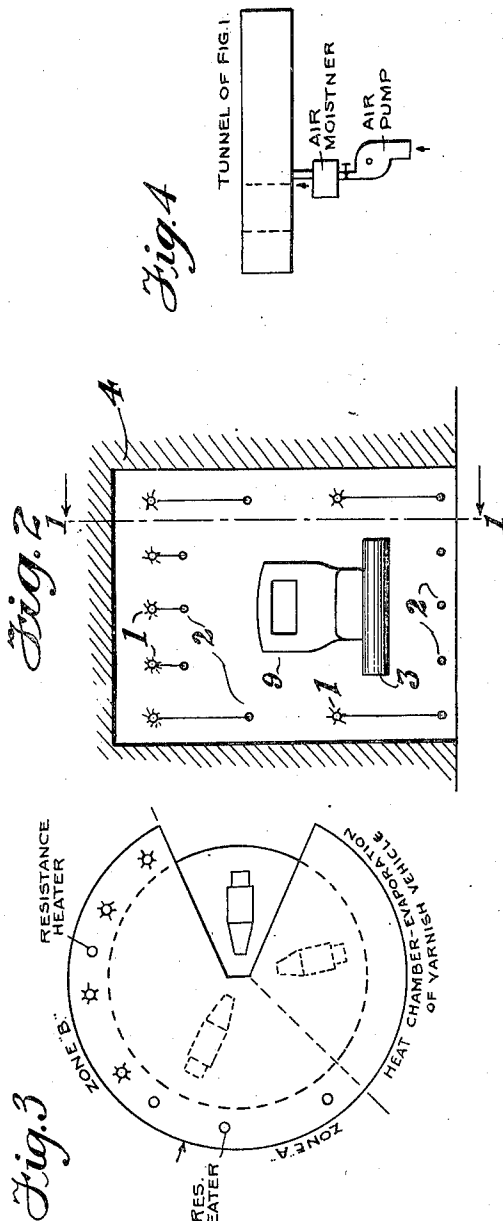
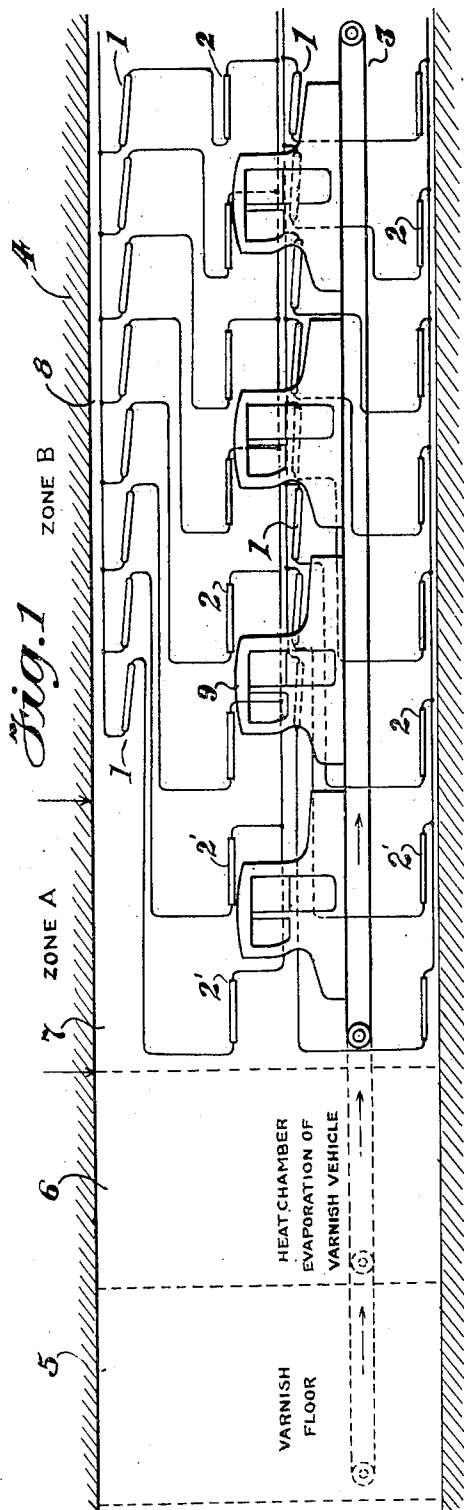
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METHOD OF AND APPARATUS FOR APPLYING AND TREATING VARNISH

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METHOD OF AND APPARATUS FOR APPLYING AND TREATING VARNISH.

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My invention relates to a method and apparatus for the handling of automobile bodies and the like during the varnishing thereof for the purpose of facilitating the drying of the varnish.

It is well known in the art that ultra-violet light, to a marked degree, influences the drying of varnishes and oils. And the greater the intensity of the ultra-violet light the greater the catalytic influence which it exerts in its drying effect. In sunlight fresh varnishes and oils are dried through the influence of both the heat and light from the sun, and of the light rays thereof the ultra-violet rays are the most efficient in point of time in their drying effect. Artificial heat is often used alone for the drying process but, above certain limits of temperature, the speed of drying cannot be accelerated because at about certain temperatures for given varnishes changes other than mere drying are brought about in the varnish which greatly shorten the life of the dried varnish. This shortening of the life of the varnish under excessive heat may even amount, for all practical purposes, to a complete destruction of the varnish. But the intensity of the ultra-violet rays may be considerably increased with an accompanying increase in speed of drying without any harmful effects to the varnish or oil. The general means of producing and supplying ultra-violet rays of greater intensities than are available from sunlight is the fused quartz tube mercury vapor arc lamp.

I have discovered that by combining the application of heat and of ultra-violet light either together, in sequence, or in combination speedier results can be obtained than from the use of intense ultra-violet light alone.

In the drawing Fig. 1 is a longitudinal section view taken along the line 1—1 of Fig. 2 of a tunnel oven with light sources, heat sources, and article conveying means shown therein.

Fig. 2 is a cross sectional view of the tunnel oven of the other figure showing substantially the same part.

Fig. 3 is a plan view of apparatus similar to that of Fig. 1 but in which the conveyor thereof is in the form of a turntable, and

Fig. 4 is a diagrammatic representation

of the tunnel chamber of Fig. 1 having an air moistener connected therewith and means for forcing air therethrough into the tunnel.

The object of my invention, then, is to provide methods of subjecting varnished or oiled surfaces to the influence of heat and of high intensity ultra-violet light.

It is also the object of my invention to provide means for subjecting varnished or oiled surfaces to the influence of heat and of intense ultra-violet light.

The accompanying drawing shows in plan and section a varnish house of an automobile factory in which varnish is applied to prepared automobile bodies and dried thereon. Herein is shown an embodiment of my invention for handling these bodies in a manner according to my discovery of a method for their treatment for the drying of the varnish.

The tunnel or pocket type oven, 4, comprises two parts, the heating part, 7, or zone A, and the light and heat treating part 8, or zone B. In connection with the tunnel are the varnishing floor 5 and the varnish vehicle drying chamber 6 from which the varnished articles are passed to the varnish drying oven 4. In the oven is the conveyor 3 which carries the varnished articles through the oven and light treating chamber 4. This conveyor in some cases is made to extend through both the evaporation chamber 6 and the chamber 4. In other cases it is made to extend through the varnish floor, the evaporation chamber, and the chamber 4. In such cases the length of the varnishing floor and evaporation chamber along the conveyor are made to suit the time required for the application of the varnish and the evaporation of the varnished vehicle, respectively, as well as the speed of the conveyor as determined by the dimension of and conditions in the drying chamber 4.

In chamber 4 heat is supplied for the drying process from the electric resistance heaters 2 and 2'. These heaters serve also as stabilizing resistances for the mercury vapor or arc lamps 1. In the rear end 7 (zone A) of the chamber 4 resistance 2' alone is situated, while in the forward end (zone B) are situated both the resistors 2 and the mercury vapor arc lamps 1. The

glass in lamps 1 is of fused quartz or silica which allows the ultra-violet light produced in the lamp to pass therethrough for the purpose of drying or aiding in the drying of the varnish 2. As shown in the drawing each lamp 1 has a resistor 2 or 2' in series with it which serves also as a heater. The endless conveyor, 3, running from the entrance to the chamber 4 to the exit therefrom carries the varnished articles through the chambers and by regulating the speed of its travel the time during which the varnished articles are subjected to the influence of the heat and the ultra-violet can be controlled.

My device consists of a system of conveyors, fused quartz mercury vapor arc lamps, heaters, ovens, etc., for the treatment of varnished objects. These are arranged to convey the varnished objects from the varnishing floor through an oven or series of ovens where under the influence of heat and ultra-violet light they are dried. The articles are conveyed through a varnishing room where the varnish is sprayed on horizontal surfaces and flowed on perpendicular surfaces, from the varnish room they are conveyed to and through an evaporating room where they are subjected to heat for the purpose of evaporating the varnish vehicle or solvent. Up to this point my process is the same as is ordinarily employed for this purpose. But after the evaporating step instead of being subjected to heat for long periods of time for the purpose of drying the varnish the varnished articles are in my process and apparatus subjected to the influence of heat and light rich in ultra-violet rays. In my apparatus heat is supplied from electric heaters and for this purpose I use the resistances necessary in the circuit of the mercury-arc lamps used as the source of the ultra-violet light. In the oven the heaters are arranged so that the varnished articles would be subjected to the drying effect of heat before being subjected to the ultra-violet light. Some of the heaters are arranged to supply heat at the point at which ultra-violet light is applied to the varnished objects. By preheating the varnish before subjecting it to the influence of ultra-violet light it is set and so kept from running. By doing this the drying is well advanced before the varnish is subjected to the influence of heat and light together. The temperature in the light zone may be the same as or different from the varnish setting zone. The completion of the drying is then effected in a very short time. In fact I find that in this manner varnished articles can be dried in about one fourth, or less, of the time usually required in the use of heat alone. I also find that my arrangement of the lamp resistors as heaters results in a saving of considerable energy and also

of apparatus due to the multiplying of the uses of the resistors.

In another form of the apparatus of my invention a turntable is used to carry the varnished articles through the drying chamber (see Fig. 3). In this case the light and heat sources are arranged about the conveyor to properly subject the articles to the influence of both. For some purposes the use of the turntable conveyors results in considerable saving in space and time of handling as well as the utilization of practically all of the light from some of the lamps without the use of reflectors.

As is now well known in the art, these ovens of the pocket or the tunnel type in the cold seasons of the year operate efficiently. In the warmer seasons it will be found desirable to use air conditioning devices for reproducing in the ovens the desired drying conditions.

It is well known, too, that ultra-violet light sources generate quantities of ozone and in some instances it may be found desirable to withdraw the ozone or to modify the effect of an excess thereof by the introduction of a very slight amount of moisture which will be determined to be less than that found in practice to interfere with the drying operation. This, of course, will be taken care of through the conditioning apparatus during any season of the year. Such an arrangement is illustrated in the diagram of Fig. 4 in which the tunnel of Fig. 1 is shown diagrammatically as having an air moistener discharging into the tunnel chamber.

I claim as my invention:

1. In a varnish drying oven having heat sources and ultra violet light sources, in combination, a tunnel chamber, a conveyor therein, and varnish drying means arranged in two sections one following the other, the first including a heat source and the other including a heat source and a source of light rich in ultra violet rays.

2. In a varnish drying tunnel oven having a heat source and ultra-violet light source, in combination, an endless conveyor extending lengthwise of said tunnel oven, and varnish drying means arranged in two zones one following the other, the first including a heat source and the other including a heat source and a source of light rich in ultra violet light.

3. In a varnish drying oven having a heat applying zone and a heat and ultra-violet light applying zone, in combination, in the heat applying zone electric resistance heaters, in the heat and ultra-violet light applying zone ultra-violet lamps and electric resistance heaters, and connections between said resistance heaters and said lamps, whereby the heaters act both as heaters and as ballast resistances for the lamps.

4. In a varnish drying oven having heat and ultra-violet light sources, in combination, a tunnel chamber, a conveyor therein for carrying varnished articles past the said heat and light sources, and two varnished drying units arranged one after the other in the course of the varnished articles in the oven, the first including a heat source and the other including both a heat source and a source of light rich in ultra-violet light.

5. In a varnish drying oven having heat and ultra-violet light sources, in combination, electric supply mains, electric resistance heaters, ultra-violet light sources in the form of mercury arc lamps, and connections between said mains, heaters and lamps whereby said heaters act as ballasting resistances for said lamps.

6. In a varnish drying oven having both a varnish vehicle evaporating zone in which is a source of heat supply and a varnish drying zone, in combination, electric heaters for supplying heat to said zones, electrical sources of light rich in ultra-violet rays, and electrical connection between said heaters and said light sources whereby said heaters act both as heaters and ballasting resistances for said light sources.

7. The method of applying and drying

varnish on automobile bodies and the like which comprises applying varnish coatings to said bodies passing the bodies through a heated atmosphere to evaporate the varnish vehicle and to set the varnish, and then subjecting said bodies to the influence of light rich in ultra-violet rays until the varnish is sufficiently dried for use.

8. In apparatus using light and heat for drying varnish and the like, and in which a varnish drying electric light source requiring a ballasting resistance is used, in combination, an electrical resistance heater for supplying heat to the material being treated, and electrical connections between said source of light and said heater whereby said heater serves as a ballast for said light.

9. In apparatus adapted to use heat and light for treating varnish and the like, a source of varnish drying light comprising a vapor arc lamp, an electrical resistance for supplying heat, and electrical connections between said resistance and said lamp whereby the resistance serves as a ballast for the lamp.

Signed at Hoboken in the county of Hudson and State of New Jersey this 16th day of July A. D. 1923.

GEORGE RICHARD CLOVER.