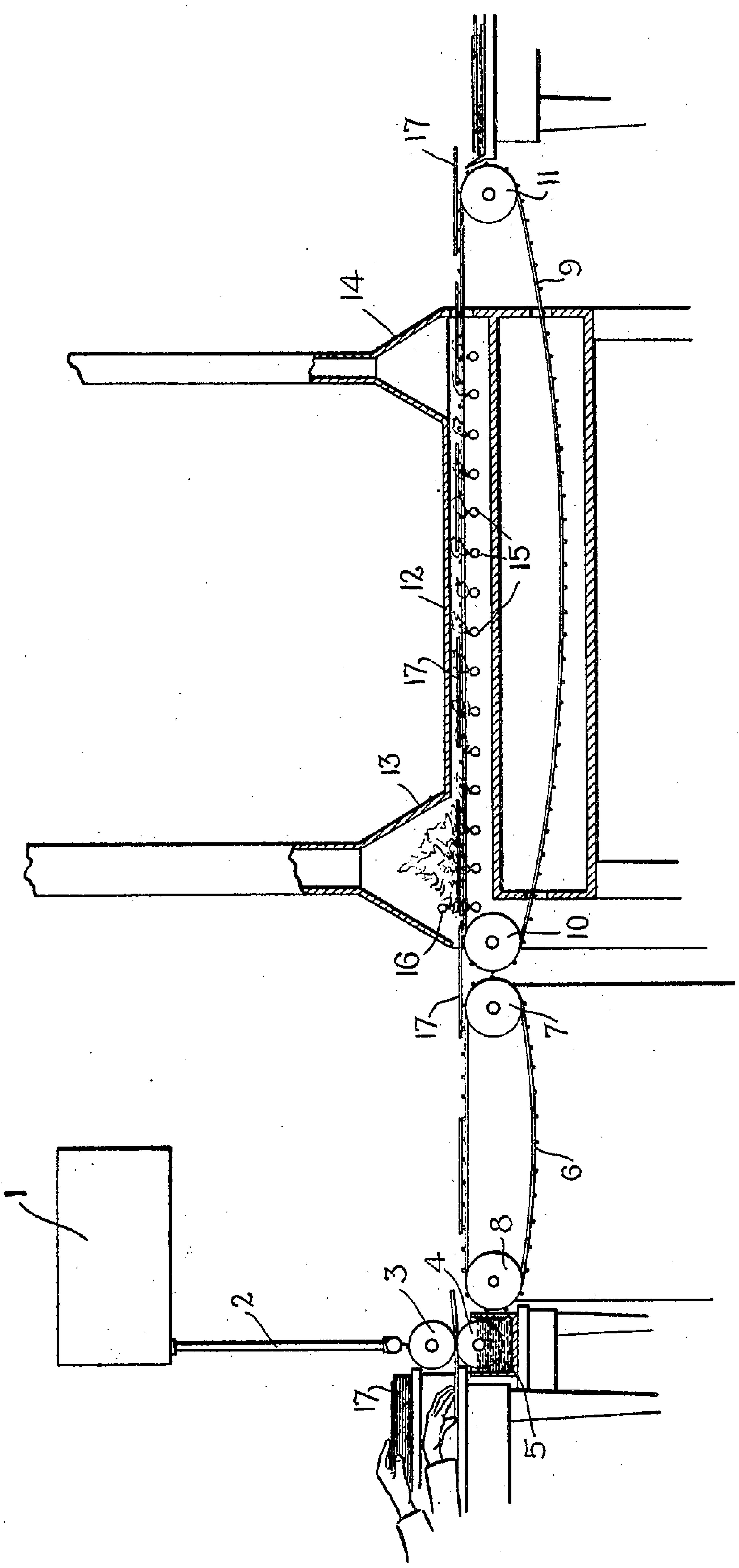
No. 798,365. PATENTED AUG. 29, 1905.

G. H. RUPLEY.

INSULATION OF ELECTRIC CONDUCTORS.

APPLICATION FILED JAN. 30, 1905.



Witnesses:

Inventor,

George H. Rupley.

By

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UNITED STATES PATENT OFFICE.

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INSULATION OF ELECTRIC CONDUCTORS.

No. 798,365. Specification of Letters Patent. Patented Aug. 29, 1905.

Application filed January 30, 1905. Serial No. 243,199.

To all whom it may concern:

Be it known that I, GEORGE H. RUPLEY, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Insulation of Electrical Conductors, of which the following is a specification.

This invention relates to the insulation of electrical conductors, and has for its object improvements in the process heretofore employed for insulating conductors, as plates or laminæ, by means of a film or enamel coating.

In my preceding application, Serial No. 135,372, filed December 16, 1902, I have disclosed a process of insulating an electrical conductor by passing it through a specially-prepared bath of a linseed-oil product and afterward hardening the coating by an application of heat. The process therein described contemplates the coating of a continuous conductor, as wire or ribbon, and for obvious reasons is not well adapted for use in connection with transformer-plates or flat surfaces of extended area.

In carrying out my invention I prepare the insulating-coating by subjecting a suitable quantity of raw linseed-oil to a protracted heating, producing a partial distillation which permits the subsequent hardening of the coating to be more easily and quickly effected, and as a consequence the more complete the distillation of the lighter hydrocarbons at this stage of the process the greater will be the speed of hardening when applied to the surface to be insulated. The oil is raised to a temperature of about 550° or 600° Fahrenheit, continuing the heating until the required degree of distillation has been effected and the mass becomes somewhat stiff and elastic at a normal temperature of about 78° Fahrenheit. This may be simply tested by removing a small quantity of the product and dropping it upon a cold surface. When a good degree of stiffness has been obtained, I add a sufficient percentage of some good volatile solvent, (from fifty to seventy-five per cent.,) as turpentine or coal-tar oil, preferably the latter, to give it a proper degree of fluidity for application to the surface. This solution is now fed to the plate to be insulated through rolls, preferably of printing-roll composition, to evenly distribute the film upon the plates. Both sides of the plates are coated in this way, placed upon a wire apron, and led to an oven. The entrance to this oven is so arranged that a flame is caused to impinge upon the plate as soon as it enters, and a hood-like structure is arranged over this flame, so that a generous quantity of air is supplied at this point and the products of combustion carried off. A like flame is arranged below the plate, and as a result as soon as the plate enters the oven the compound bursts into flame and the volatile matter immediately burns off. The plate is then carried on a conveyer through a long hot-air box heated by gas-jets, which completes the process of hardening the coating. This preliminary step—that of applying the flame directly to the plate or "flashing," as it is called—greatly shortens the hardening process by quickly heating the plate and driving off the volatile matter, leaving the process to be completed by the hot air. A most important feature of this flashing is the economy in time and fuel. The plate is quickly heated, and the burning gases raise the temperature within the oven to a great extent not only in the portion of the furnace where the flashing occurs but by transmitting the heat through the plates to the hot-air box in which the hardening process is completed. The volatile solvent therefore serves the double purpose of thinning the insulating substances, so that it will evenly distribute itself over the plate, and furnishing in a large measure its own heat for hardening. The result of this process is a smooth tough flexible coating of a residuum of an oil which firmly adheres to the plate and which may be glossy or dull, black or otherwise colored, depending upon the particular nature of the substances added to the mixture to give color or remove the gloss which will naturally result from the linseed-oil.

I do not limit myself to the particular process or method of making the base herein set forth, since many changes may be made therein without departing from the spirit of my invention, the gist of which is the treatment to which it is subjected subsequent to the formation of the base. For instance, it has been found that many other oils besides linseed-oil may be used, as cottonseed-oil, corn-oil, or even lard-oil, and in the preliminary treatment the addition of a small amount—say two per cent.—of certain oxids, as oxid of zinc and litharge, have been found to be of

great assistance in saponification and in breaking up the glycerids, and thus promoting subsequent ease in hardening the film. Moreover, I do not limit myself to the nature of the solvent used, since any good solvent which is sufficiently volatile and inflammable will come within the scope of my invention.

In the single figure of the drawing I have illustrated a very simple method whereby my process may be carried out.

Referring to the figure, 1 designates a tank or trough containing the insulating solution, from which tank it is fed through pipe 2 to roller 3, preferably of printing-roll composition, the adjacent roll of which, 4, is partially immersed in a tank 5 of the same solution, and conveyer 6 is arranged opposite to the adjacent portion of these rollers and is mounted upon rollers 7 8. Another conveyer 9, mounted upon rollers 10 and 11, is arranged in alinement with conveyer 6 and is preferably of wire or perforated metal. This conveyer is surrounded for the greater portion of its length by a casing 12, forming an oven at the entrance to which a hood 13 is arranged, so that a liberal supply of air may be furnished to this portion of the oven and to carry off products of combustion. A funnel 14 is likewise supplied to the rear of the oven. A series of flames 15, preferably gas-jets, are arranged within the oven and below the upper run of the conveyer 9, and a flame 16 is also placed above and in close proximity to the conveyer within the hood 13. The plates 17 are fed through the rollers, which coat them uniformly with the insulating solution, and they are carried by the conveyer 6 into the oven, where the flames 15 16 impinge upon them and ignite the volatile matter thereon. This flame lasts but an instant, but is of sufficient intensity to greatly heat it. The plate is then carried by the conveyer 8 through the oven, and the hardening process is completed. This treatment greatly expedites the hardening of the residuum film by causing about a fifty-per-cent. saving in time, the plates being under treatment only from forty seconds to one minute, depending somewhat upon the temperatures used.

It should be understood that the construction which I have shown and described is merely illustrative and for the purpose of explaining the process which is the subject of my invention.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The process of insulating electrical conductors which consists in dissolving an insulating substance in a volatile solvent, coating the conductor with the solution, heating the conductor by igniting the volatile matter thereon, and hardening the coating by a further application of heat.

2. The process of insulating electrical conductors which consists in dissolving the residuum of a distillate of oil in an easily-inflammable solvent, applying the solution to the conductor, raising the temperature of the conductor by burning the solvent therefrom, and hardening the coating by a further application of heat.

3. The process of insulating electrical conductors which consists in coating the conductor with an insulating substance containing inflammable volatile matter, heating said conductor by igniting the said matter, and hardening the coating by a further application of heat.

4. The process of insulating metallic plates which consists in dissolving a saponified oil in a volatile solvent, coating the plates with the solution, igniting the volatile matter, and hardening the coating by a further application of heat.

5. The process of insulating metallic plates which consists in dissolving a saponified vegetable oil in a volatile solvent, coating the plates with the solution, igniting the volatile matter, and hardening the coating by a further application of heat.

6. The process of insulating metallic plates which consists in dissolving saponified linseed-oil in a volatile solvent, coating the plates with the solution, igniting the volatile matter, and hardening the coating by a further application of heat.

7. The process of insulating electrical conductors which consists in dissolving a thickened oil in a volatile solvent, coating the conductor with said solution, heating said conductor by burning off the volatile matter, and further hardening by heat.

In witness whereof I have hereunto set my hand this 27th day of January, 1905.

GEORGE H. RUPLEY.

Witnesses:

BENJAMIN B. HULL,

HELEN ORFORD.