

PATENT SPECIFICATION



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COMPLETE SPECIFICATION.

Improvements in Methods of Working Upon Surfaces of Ebonite and other Vulcanized Rubber Articles.

I, RYOSUKE NAMIKI, a subject of the Emperor of Japan, of No. 1693, Miyashita, Sugamo-Machi, Kitatoyoshimagun, Tokyo Prefecture, Empire of Japan, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

My invention relates to methods of working upon surfaces of articles of ebonite or other vulcanised rubber compositions and particularly to methods for producing patterns or figures upon surfaces of said articles.

One of the objects of my invention is to obtain ebonite articles the surfaces of which are positively kept of deep black colour without any of the appreciable fading which is usual for ordinary ebonite articles.

Another object of my invention is to obtain ebonite articles having surfaces on which any desired patterns or figures are put on with substantially permanent durability both in shape and colour.

A further object of my invention is to provide a method for producing patterns or figures on surfaces of articles of ebonite or other vulcanised rubber compositions simple in operation and positive in effect.

A still further object is to provide a method for converting the skin portion of ebonite articles into another substance which is different from ebonite both in quality and nature.

As to articles made of ebonite, such as for example fountain pen barrels or castings, or electrical insulators, it has long been complained that the surface or skin portions can not be made durable against the external air which causes colour fading and insulation defects, and patterns or figures put thereon have a

tendency of gradual disappearance, not by reason of wearing.

As is well known ebonite is a substance produced by mixing and grinding together rubber and sulphur and heating the same. It has a tendency of absorbing moisture in the external air, and consequently its electrical insulating power is gradually depreciated. Moreover, the humidity absorbed in skin portions of ebonite articles effloresce the latter by aid of external light or heat and thereby the proper deep black colour of ebonite gradually fades in a relatively short course of time, resulting in a brownish black.

According to my experiments it is impossible to get rid of such numerous undesirable effects of the air, unless the ebonite proper is protected by a substantial and strong covering of permanent air tightness from the encroaching of moisture in the air. On the other hand, for putting patterns or figures on ebonite surfaces, it is the well known art to apply moulds on the surface, before the ebonite has become rigid and the desired patterns or figures are impressed thereon. After it has been cooled the impressed patterns or figures are kept in shape under a certain degree of mechanical stress. It will be then a natural result that the pressed portion of ebonite has a tendency to recover its initial shape or form and the said tendency is present on every occasion when the ebonite articles are subjected to some degree of heating, even by the heat of the human hand grasping it, or by absorption of sun-light.

The patterns or figures then gradually disappear automatically and not by reason of wear.

According to my invention I convert skin portions of ebonite into another substance different from ebonite proper both in nature and composition, which sub-

[Price 1/-]

stance I propose to call "Laccanite". The laccanite is substantial, strong and hard in nature, and extremely durable against efflorescence.

5 Many attempts have already been made to cover ebonite surfaces with another material, but partly due to the covering material selected and partly due to im-
10 proper method of applying the same, such as by mere painting, none of them have shown any successful result.

According to my invention I use a

25	Water	-	-	-	-
	Urushiol (Urushic or Japanic acid)	-	-	-	-
	Gummy substances	-	-	-	-
30	Nitrogenous substances	-	-	-	-
	Oil	-	-	-	-

An ebonite article such as a rod to be worked on is, whilst in a cold condition, rotated about its longitudinal axis or reciprocated at a high speed. These
35 movements may be effected by any suitable means. To the moving surface of the ebonite article there is applied a piece of felt having the varnish adhered there-
40 to, and which felt is applied to the article with a certain amount of pressure. As the movement proceeds the varnish is gradually forced into the surface of the ebonite, or in other words the surface portion is impregnated with the varnish.
45 The impregnation is facilitated by the heat generated by friction of the felt.

By the above process the surface portion of the ebonite is converted into a substance which is substantial, strong and
50 hard in nature and non-hygroscopic and durable against the air.

It is assumed that during such treatment, free sulphur contained in the rubber and an acid proper in the var-
55 nish, forms a kind of sulphide which has the nature above disclosed.

For the sake of convenience the above process or treatment is referred to as the "laccanite process" in the present
60 description.

To facilitate the laccanite process there may be initially mixed with the ebonite material a small amount of ferrous sulphide and Japanese lacquer. With this
65 modification the ferrous sulphide, together with tannic acid contained in the japanic acid in the lacquer results in a skin part of a deep black colour, and on the other hand the lacquer within the
70 ebonite combines with the lacquer applied thereto through the laccanite process, resulting in a strong and hard covering on the ebonite proper.

For finishing additional coats of the varnish on the skin may be applied.

75 These coats firmly combine with the free Japanese lacquer within the lac-

varnish which was formerly peculiar to Japan and known as Japanese lacquer.

The varnish or Japanese lacquer is
15 made from the juice of a tree known as the "rhus vernicifera". Its composition is not quite definite but varies according to the soil and climate, as well
20 as method of cultivation and other conditions.

Analytical examination of three typical examples gives the following results:—

	Sample I.	Sample II.	Sample III.
	10.94	17.81	25.46
	84.53	77.63	65.48
	3.25	2.62	6.98
	1.28	1.94	1.55
			0.52

canite skin and constitute a second layer or covering.

For articles, on the surfaces of which
80 patterns or figures are to be produced, the above process cannot be directly applied. In this case the ebonite article to be worked on is first prepared through the
85 usual process or patterning, that is to say its surface is marked with a pattern or figure which is a negative of the desired pattern, by means of a pressing mould before it has been cooled. The article
90 is then cooled and subjected to the laccanite process as previously disclosed.

By this treatment the article, having a negative pattern or figure on its surface, is covered by a continuous or plane
95 layer of laccanite as the surface portion is uniformly subjected to the laccanite process, irrespective of the concave and convex portions of the negative pattern. In other words the concave parts of the
100 pattern are filled up by laccanite and the convex parts are covered by a thinner layer of laccanite than the former. The article is then dried and finished.

The article is subjected to heating at a temperature of about 70° C. to 80° C.,
105 for example by means of hot water or air. Upon heating the impressed pattern or figure, or in other words the concave portion of the surface of ebonite proper reappears by reason of the mechanical
110 stress initiated by the pressing and consequently the finished plane surface or layer of laccanite projects at the parts corresponding to the said concave portions thus producing upon the surface the
115 desired pattern or figure.

The resulting pattern or figure is formed by the laccanite only and consequently is strong and hard, durable
120 against any humidity and heating, and has not the tendency to gradually disappear, as in ordinary ebonite, except by wear.

Having now particularly described and

- ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—
- 5 1. A method of working upon the surface of ebonite or like vulcanised rubber compositions, consisting in forcing Japanese lacquer into the skin portion of said substance.
- 10 2. A method as set forth in Claim 1 characterised by the fact that to the rubber compound these is initially added ferrous sulphide and Japanese lacquer.
- 15 3. A method of working upon the surface of ebonite or like rubber compositions as set forth in Claims 1 or 2 characterised by the fact that the surface of said substance is initially patterned or figured negatively by pressing whilst in a soft condition, cooling the same to hardness, forcing Japanese lacquer into the skin portion thereof until there is produced a substantially continuous surface,
- subjecting the same to heat so as to cause the pressed-in parts of the substance proper to recover their initial disposition, thus resulting in a pattern or figure produced upon the finished surface of said different substance, and then cooling the same.
- 30 4. A method as set forth in the foregoing claim, for patterning or figuring on the surface of an ebonite rod, characterised by the fact that said rod is subjected to a rotating movement about its longitudinal axis, and to the rotating surface thereof is applied under pressure a piece of felt having an amount of Japanese lacquer adhering thereto, in order to force the lacquer into the skin portion of said rod and then heating the rod at a temperature of 70° C. to 80° C., before the final cooling.
- 35 40 45
- Dated this 22nd day of April, 1925.
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