

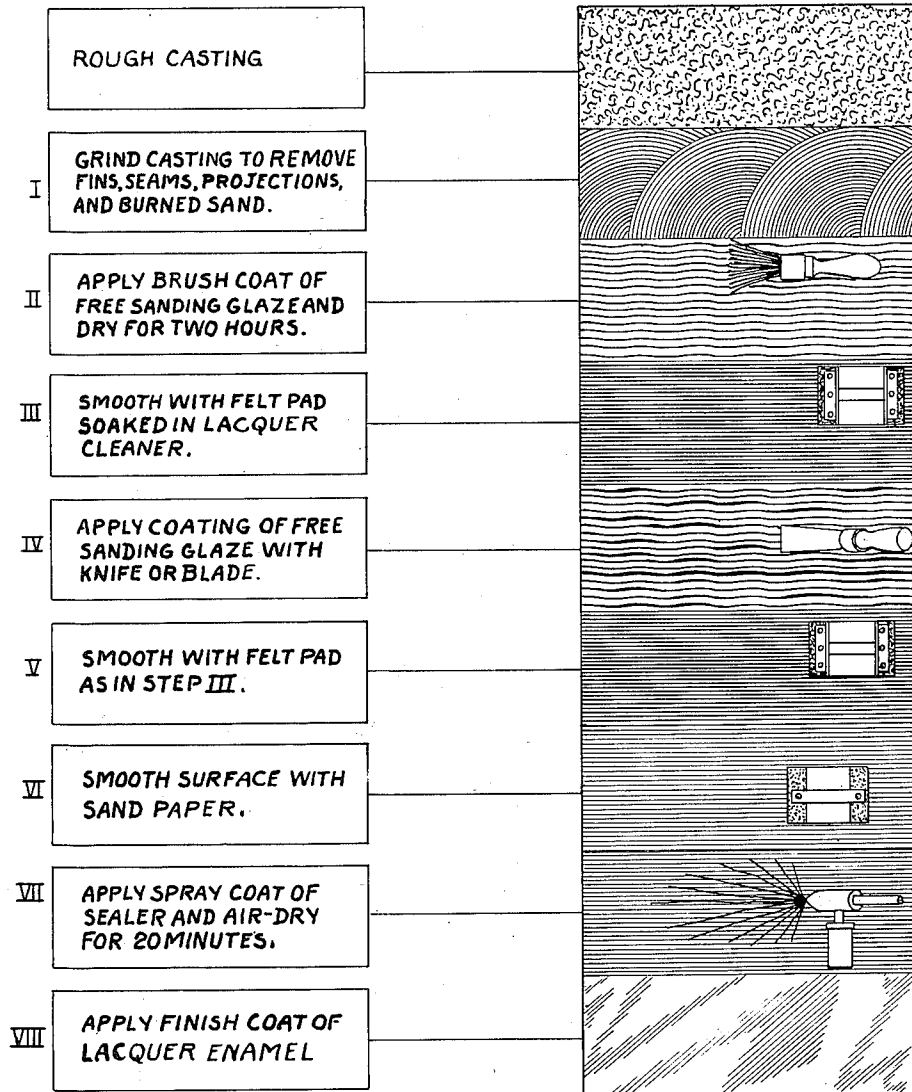
Feb. 11, 1941.

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2,231,233

PROCESS OF FINISHING MATERIALS

Filed July 14, 1939



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UNITED STATES PATENT OFFICE

2,231,233

PROCESS OF FINISHING MATERIALS

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Application July 14, 1939, Serial No. 284,520

2 Claims. (Cl. 91-68)

My invention relates to a process of finishing articles and more particularly to an improved process of finishing metal articles such as castings, press sheet metal parts, machine tools and similar materials having metal surfaces. While my process is especially adapted for the finishing of metal surfaces, it is to be understood that the process is also applicable to the finishing of wood, glass and the like articles.

It has heretofore been conventional practice to finish articles of this character with a lacquer or paint composition after the surface has been prepared by the application of primer and sanding surface coatings to provide a base coating which will tenaciously adhere to the metal surface and an intermediate coating which is adapted to present a smooth adherent film to which the finishing coat applied thereover will adhere.

In the prior processes, however, a great deal of time and labor are required in performing the sanding operations. Further, it is necessary to allow an appreciable lapse of time between the sanding operations in order to produce a satisfactory finish. Aside from this, heretofore no provision was made in the finishing methods for producing an oil-resistant intermediate surface coating so that if the coating at this stage comes in contact with oil, grease, perspiration, etc., the finishing lacquer coat will adhere satisfactorily. In the usual method of finishing articles with the conventional lacquer coating compositions the sanded under-coat surfaces will possess considerable porosity and readily absorb oleaginous substances and the like which have not been removed before the application of additional coatings or the final lacquer coat will result in producing a film having poor adhesion and consequently of unsatisfactory durability.

It is an object of this invention to provide an improved process of finishing materials wherein the sanding operations are substantially minimized producing a finish having improved adhesion properties and durability.

It is a further object of this invention to provide an improved process of finishing metal castings rapidly and efficiently.

Another object is to devise a process whereby articles comprising rough metal surfaces can be provided with a durable finish in much less time and at materially less labor cost as compared with prior finishing methods.

Another object is to provide a process of finishing machine parts so that the surface film of the built-up coatings is oil-resistant and exhibits less porosity.

A further object of this invention is to substantially eliminate the labor and time involved

in sanding the intermediate coatings in the finishing of articles.

Another object is to provide a method of treating the various coating film surfaces so that the outermost portion of the film surface is made to consolidate to produce a very hard, substantially non-porous, uniformly smooth surface which is oil-resistant.

The accompanying drawing illustrates diagrammatically the several steps of my process of finishing metal castings. I have illustrated the different steps in connection with the finishing of a metal casting. However, it will be appreciated that my process is applicable for finishing various types of articles which may be made of any suitable material such as wood, paper, metal, glass, ceramic material, etc.

As shown in the drawing the various steps to be performed in finishing a rough metal casting by my improved process comprise the following:

Step I.—The surface of the casting to be finished is ground to provide a smooth surface with a suitable grinding wheel or mechanism. In this manner all protuberances, fins, seams and burnt sand on the surface of the metal are removed.

Step II.—Over the ground surface of the casting is applied a free sanding glaze material which is allowed to air dry from one to two hours. This glaze coating may be of the brush or spray type and may be laid down in one or more coats. Preferably a brush coating is applied. Conventional sanding primer glazes may be employed in practicing my invention. As an example of a free sanding glaze composition the following typical formula is given:

Free sanding glaze

18 lbs. pigment ground paste comprising-----	95 lbs. whiting	40
	45 lbs. barytes	
	35 lbs. lithopone	
	1/4 lb. carbon black	
4 1/2 gals. raw castor oil	30 lbs. blown castor oil	45
	30 lbs. xylol	
15 gals. butanol		
20 gals. butyl acetate		
20 gals. toluol		
20 gals. dammar varnish-----	200 lbs. wax-free dammar	50
	3 gals. acetone	
	13 gals. benzol	
	12 gals. methanol	
40 gals. nitrocellulose mixture-----	150 lbs. 1/2-sec. nitrocellulose cotton comprising	55
	30% alcohol	
	19 gals. toluol	
	9 gals. butanol	
	17 gals. butyl acetate	
10 gals. shellac varnish--	100 lbs. dewaxed shellac	
	25 gals. butanol	

A suitable lacquer thinner applicable for mixing with the above glaze so as to vary the consistency as desired for application by brushing or spraying is as follows:

<i>Sanding glaze thinner</i>		Gallons
Toluol or xylol	-----	20
Butanol or alcohol	-----	10
Butyl acetate or amyl acetate	-----	18

Step III.—After the free sanding glaze coating has been applied and allowed to dry the coating surface is smoothed over with a felt pad, or suitable absorbent material, soaked in a special lacquer cleaner composition having the property of producing a hard, uniform, smooth film surface which is substantially resistant to oil, grease, finger marks and the like. The lacquer thinner employed in this instance is a composition that will function to slightly soften the outer film surface of the coating during its application but will evaporate before it has fully penetrated the coating film. In this way the outer film surface is made to flow together producing a denser surface film which dries to a hard, uniformly smooth non-porous, oil-resistant surface.

As an example of a lacquer thinner composition which may be employed for this purpose the following is given:

<i>LACQUER CLEANER</i>		
<i>Example 1</i>		Per cent
Acetone (by volume)	-----	90 to 95
Triphenyl phosphate (by volume)	-----	5 to 10

In some instances acetone may be used alone if the conditions of application are such that solvent will not evaporate too rapidly. In place of acetone other substances such as alcohol, ether, or similar lacquer solvents may be used. Likewise phenyl phosphate, tricresyl phosphate, dibutyl phthalate or equivalent materials may be optionally employed in place of triphenyl phosphate.

Another example of a suitable lacquer cleaner may comprise the following formula:

<i>LACQUER CLEANER</i>		
<i>Example 2</i>		Gallons
(V. M. P.) Petroleum naphtha or turpentine	-----	11
Toluol or xylol	-----	7
Denatured alcohol	-----	7
Acetone	-----	7

By the application of the lacquer thinner the resulting surface dries to a very hard and homogeneous film which requires substantially no sanding. If desired, however, it may be scuffed off with fine sandpaper.

Step IV.—Applied over the previous surface treated coating is a free sanding glaze coating in the form of a putty. This material comprises the unthinned free sanding glaze composition used in step II which in its natural state is of a consistency of putty. This glaze coating may be applied with a knife, blade or other suitable implement. In some instances the glaze may be applied in the form of a spray. Preferably, however, it is applied as a knife glaze. Since the glaze putty comprises only a small amount of solvent no drying time is necessary as it dries to a smooth surface immediately after application.

Step V.—After applying the glaze putty the

film surface is smoothed over with the felt pad soaked in lacquer thinner as in step III.

Step VI.—In this step the treated glaze surface is sanded smooth to remove any imperfections with sandpaper. For this purpose a fine grit sandpaper, on the order of 120 or finer, may be used.

Step VII.—When the surface has been sanded smooth in the previous operation the coating is then ready for the application of a sealer or surfacer, which may be of the air drying type, preparatory to the application of the finish lacquer or enamel coat. A typical example of the formulation of the lacquer surfacer which may be used is as follows:

<i>Lacquer surfacer</i>		
Lithopone	-----	lbs. 300
Slate flour pigment	-----	do. 300
Barytes	-----	do. 250
Carbon black	-----	do. 10
Bentonite	-----	do. 50
Raw castor oil	-----	gals. 14
Tricresyl phosphate	-----	do. 10
Ethyl acetate	-----	do. 10
Dewaxed dammar solution	-----	do. 14
Toluol	-----	do. 14

The above materials are suitably ground on a mill and incorporated with a nitrocellulose solution comprising:

½-sec. nitrocellulose cotton	-----	lbs. 200
20-sec. cellulose cotton	-----	do. 50
Toluol	-----	gals. 15
Butanol	-----	do. 5
Butyl acetate	-----	do. 15
Ethyl acetate	-----	do. 10

The above ingredients are mixed together to form a homogeneous lacquer surfacer composition which is sprayed onto the sanded surface coating and allowed to air dry for approximately twenty minutes. This surfacer composition forms a seal over the under-coating and provides a tooth base upon which the final lacquer coating composition may be applied so as to produce a thoroughly adherent coating.

Step VIII.—Over the surfacer is applied the finishing coat of lacquer enamel of any desired composition which will adhere to the surfacer and dry to a hard, smooth durable finish.

As an example of a finishing lacquer coating composition which is of gray color, the following is illustrative:

<i>Finishing lacquer</i>		
50 lbs. of a composition comprising	-----	705 lbs. lithopone 235 lbs. zinc oxide 150 lbs. blown castor oil 150 lbs. xylol or benzol 10 lbs. carbon black 50 lbs. dammar (dewaxed) gum
12 lbs. of a carbon black ground paste comprising	-----	37½ lbs. blown castor oil 37½ lbs. dibutyl phthalate 128 lbs. iron oxide
8 lbs. ground paste comprising	-----	55 lbs. blown castor oil 50 lbs. toluol or benzol 104 lbs. ½-sec. nitrocellulose cotton 76 lbs. 4-sec. nitrocellulose cotton
64 gals. of a nitrocellulose lacquer comprising	-----	35 lbs. dibutyl phthalate 13½ gals. toluol 5 gals. xylol 15 gals. butanol 6¼ gals. ethyl acetate 30½ gals. butyl acetate 14 gals. dewaxed dammar gum

5 48 lbs. $\frac{1}{2}$ -sec. nitrocellulose
cotton
60 lbs. 4-sec. nitrocellulose
cotton
22 gals. carbon black
ground paste, supra
12 gals. of a composition
comprising -----
10 4 $\frac{1}{2}$ gals. dammar gum (de-
waxed)
3 gals. of a mixture com-
prising 4 lbs. of ester
gum and 1 gal. toluol
1 $\frac{1}{2}$ gals. benzol
4 $\frac{3}{4}$ gals. ethyl acetate
11 $\frac{1}{4}$ gals. butyl acetate
20 $\frac{1}{2}$ gals. toluol
4 $\frac{3}{4}$ gals. butanol
15 3 $\frac{1}{8}$ gals. dibutyl phthalate

It will be understood that the above composi-
tions are merely illustrative of the type of coat-
ings to be used and it is to be understood that
the process is also adapted for use in connection
20 with oil type glazes, putties and surfacers as well
as nitrocellulose base compositions.

It is a particular feature of my invention that,
by finishing articles of the method herein de-
scribed, a satisfactory under-coating system may
25 be rapidly built up and a finishing lacquer coat
applied thereover so as to produce a finish that is
adherent, flexible and durable.

Further it is desired to be understood that
widely different embodiments of the compositions
30 may be made in following my improved process
without departing from the spirit and scope
thereof; and that this invention is not limited to
the specific details of the process and composi-
tions except as defined in the appended claims.

35 Having thus fully described my invention, what
I claim as new and desire to secure by Letters
Patent is:

1. The process of finishing rough metal cast-

ings consisting in the steps of (a) grinding off
the surface to remove foreign matter and pro-
tuberances thereon, (b) applying thereover a
coating consisting of a lacquer sanding glaze and
drying, (c) smoothing the surface film thereof 5
by rubbing only with a pad soaked in lacquer sol-
vent thinner which is a solvent for the film
former of the coating, (d) applying thereover
a lacquer sanding glaze composition in the form
of a putty, (e) smoothing the surface thereof by 10
rubbing only with a pad containing lacquer sol-
vent thinner, said lacquer solvent being a sol-
vent for the binder of said putty, and after evap-
oration of said lacquer solvent rubbing the sur-
face over with fine sandpaper, (f) applying 15
thereover a spray coating of lacquer surfacer
composition adapted to fill and seal the imper-
fections in the previous coating, and finally (g)
applying thereover a finishing coat of lacquer
enamel. 20

2. The process of finishing castings with lac-
quer coating compositions comprising the steps
of: (a) grinding off the surface to remove imper-
fections on the surface thereover, (b) applying a
lacquer sanding glaze coating over said ground 25
surface and drying, (c) smoothing the glaze sur-
face by rubbing only with a pad soaked in solvent
thinner which thinner slightly softens the outer
film surface of said glaze coating, (d) applying
thereover a coating of said sanding glaze having 30
a consistency of putty, and (e) smoothing the
surface thereof by rubbing only with a pad
soaked in solvent thinner which thinner softens
the outer film surface, (f) rubbing the surface
over with fine sand paper and applying a coating 35
thereover to seal the same, and (g) finally ap-
plying a finish coat of lacquer enamel.

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