

How To Series: Traditional Japanning, The Black Hole of Finishes



This article serves as a bench-guide, “how-to” for japanning an antique cast iron hand plane using traditional japanning products and mixtures. This japanning mixture is what was traditionally used for cast iron japanning preparations and results in the durable rich glossy finish of factory japanning. The procedures described here are a conservative approach to japanning.

It is possible to mix japanning in larger quantities in less time, to apply fewer coats, and to heat cure more rapidly, however, each of these increases the risk of failure for the inexperienced. The goal of this article is to help you be successful in your first attempt at japanning an antique cast iron hand plane. This article is an excellent guide for use with the japanning videos found at: <https://aplanelife.us/videos>

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Japanning is the name applied to a type of finish that originated in Europe as an imitation of Asian lacquer work intended for use on furniture. It is not a product of Japan, nor is it comprised of the same ingredients. The European finish was later used on cast iron to prevent rust. The European japanning technique was adopted to bicycles and early automobiles. The Ford Model T metal was japanned, which explains the comment, “You can have it in any color, as long as it is black.” Much of the external wood on the Model T was also japanned to protect it from moisture. By the 1930s enamel paint as a metal finish began to largely replace japanning and shortly after WWII began was becoming widely used on hand planes. In this article, “Traditional Japanning” or “Japanning” refers to the European and American asphaltum based finish developed for metal work.

Having tested commercially available japanning products along with other non-traditional antique hand plane finishes, “cold-cure” japanning, and enamel paint, the mixture and methods described here result in the best representation of original U.S. made antique finishes in appearance and durability. While initial mixture preparation is more difficult than other japanning methods, the application and heat curing of this traditional japanning is more forgiving.

Japanning cast iron is 49% product and 51% technique. You will have to develop techniques that help you achieve success. This article will provide a starting point for success by providing the tips and techniques that have worked for me.



Materials List

- Powdered asphaltum (Gilsonite, available on eBay or
- oiled linseed oil
- Turpentine
- Nylon brushes for removing dirt, grease, and sawdust
- Bead Blaster, Dremel type rotary tool, or lacquer stripper and wire brushes for removing old japanning. (see Step 4 Preparation for discussion on methods for removing the old japanning)
- Acetone for surface prep
- High quality ¼" to ½" wide, ½" long or shorter artist's brush
- Toaster oven/wall oven/BBQ for heat curing

Step 1 Purchase the Ingredients for Your Japanning Mixture

I recommend obtaining and mixing the traditional japanning prior to beginning any other procedures for refinishing your plane. Japanning mixtures require extra time for insoluble minerals in the asphaltum to settle out prior to use. Otherwise, undissolved asphaltum particles will end up in your finish producing an undesirable pebbly texture. Allow your mixture to sit at least 48 hours at room temperature prior to use, longer at cooler temperatures. For asphaltum I recommend gilsonite. In the USA, Gilsonite is available in eBay or from <https://aplanelife.us/> in smaller quantities. One pound of Gilsonite is an enormous amount. It will produce over a quart of japanning which is enough to cover well over 100 hand planes. Use caution as Gilsonite is like copier toner, it gets everywhere! Boiled linseed oil and turpentine from your local hardware store should suffice. I am not aware of appreciable quality differences in these products. I do not recommend raw linseed oil. It was not used in traditional mixtures and can prevent curing. It is a good idea to collect your other materials prior to beginning your project. Materials for removing old japanning (see step 2 Preparation), high quality ¼' to ½" wide ½' long or shorter artist's brush, turpentine for cleaning up, and a toaster oven for heat curing.

Step 2 Mix the Japanning

The biggest challenge in preparing the japanning mixture is to limit the appearance of undissolved minerals in the finish. The method here focuses on dissolving the gilsonite in the turpentine prior to the addition of boiled linseed oil and filtering the japanning to further reduce undissolved material. You can bypass filtering the japanning by increasing the time for the mix to settle out. If not filtering, I recommend allowing the mix to settle for at least 48 hours, preferably a week prior to use. If filtering, 24 hours to settle is fine.

The general ratio of ingredients by volume is 40% turpentine, 40% asphaltum and 20% boiled linseed oil. Do not use this ratio if measuring by weight as you will have too much asphaltum. The exact ratio varies based on the purity of the asphaltum and the solubility of your turpentine. For this reason, the technique I provide is designed to allow you to approach the current final product ratio without potentially having an unusable mixture you are trying to salvage. An airtight resealable container is necessary to store the japanning. I recommend ¼ pint paint can (120cc) or a small mason jar. A ¼ pint of japanning will cover at least 10 size 4 hand planes. This quantity is easy to mix and allows enough room to dip your brush without contacting any undissolved asphaltum at the bottom of the container.

The thickness or consistency of the final japanning mixture is especially important to success. All the descriptions here refer to mixtures at room temperature in the mid 70^o f (23^o c). the mixture will be notably thicker at cooler temperatures. For this reason, when mixing the japanning, try to keep all ingredients and interim mixtures in this temperature range.

Starting by measuring out your asphaltum. I find there is less undissolved asphaltum by mixing the turpentine and asphaltum initially without the boiled linseed oil. For ¼ pint of japanning, begin with 4 tablespoons (60cc) of asphaltum. Next add slightly less turpentine, 3 ½-3 ¾ tablespoons (50cc) of turpentine. Stir thoroughly for at least 2 minutes. At this point the mixture will be extremely watery. Do not worry! The mixture will thicken over the next 4-12 hours. The asphaltum dissolves slowly in the turpentine. Seal and set the mixture aside for at least 4 hours. After at least 4 hours you can stir the mixture scraping the undissolved asphaltum from the bottom of the container. Mix for several minutes. Repeat this mixing and resting until you find you have very little undissolved asphaltum at the bottom of the container (less than ½ teaspoon). The mixture should be overly thick now, the consistency of cold honey or molasses. At this point you are ready to adjust the thickness and add the boiled linseed oil.

The Boiled Linseed Oil (BLO) will thin your mixture slightly, for this reason, you want to adjust your asphaltum/turpentine mixture from the very thick current state to the constancy of cool honey or molasses. If your mixture is too thick to stir, but only clumps to the stir stick, then stir in a few drops of turpentine until you have the consistency of cool honey or molasses. Repeat until you have the cool honey or molasses consistency. There is no need to allow the mixture to rest at this point.

Add 2 tablespoons (30cc) of boiled linseed oil and stir thoroughly. You want to ensure the mixture is completely mixed. Slightly thicker is better as you can always thin it later, but an overly thin mixture will require additional asphaltum and restart the stir/rest/stir cycle. Adjust the thickness of the mixture until you have the consistency of maple syrup or warm honey. Unlike before, where thicker is better, for

your final product it is better to be slightly thin than too thick. Overly thick japanning will not self-level and leave a very uneven finish on the tool.

You have completed mixing the japanning. Prior to use the japanning needs to be stored at room temperature and left undisturbed for at least 48 hours, preferable one week prior to use. This allows the insoluble minerals in the asphaltum time to settle to the bottom of the container. Do not stir, shake, or tip the japanning! If this occurs, allow the product to settle again prior to use. Filtering the japanning mixture shortens the time require for settling and may allow the mixture to be used immediately.

Step 3 Filtering Japanning (optional)

Filtering your japanning mixture is not required but does allow more immediate use of the product and may help to limit contaminants in the finish. Paint filters are not useful for filtering japanning. Gilsonite, is typically screened through a 200-mesh screen. This removed particles larger than 74 microns or 74 μ m. Most paint filters only remove particles larger than 150 μ m, thus the paint filter will not remove any of the insoluble contaminants. Finer paint filters prevent the japanning mixture from flowing through the finer mesh. To filter japanning, the mixture must be forced through, under pressure, the filter media. 400 count cotton (typical bedding) will generally filter out particles as small as 40 μ m making this an effective and easy to obtain filter media. I recommend viewing the video on filtering japanning found at: <https://aplanelife.us/videos> as describing the process is less clear.

Wearing rubber gloves, take a 12" x 12" square of 400 thread count cotton fabric, and line a 4" funnel. Pour your mixture into the filter allowing it to settle into the neck of the upright funnel. Scrape all the japanning into the filter. Gather the corners of the cloth together forming a ball of japanning at the bottom. Place the mixture into a plastic sandwich bag that you have previously cut the corner off leaving a 1/2" opening. Just as a baker uses an icing piping bag, trap the ball of japanning in the cloth with one hand, twist the cloth forcing the ball to tighten. The japanning will begin to flow through the cloth and out the hole cut in sandwich bag into your clean container. Continue to twist the cloth until all the mixture has been filtered and you are left with a marble size amount of undissolved material in the cloth. Dispose of safely as oil-soaked cotton can self-ignite.

You can immediately use this mixture with generally good results. Allow it to settle at room temperature for 24 hours for a more conservative approach.

Step 4 Preparation

All parts being japanned must be completely cleaned of rust, old japanning, and any dirt, oil, or other contaminants. Remove any remaining old japanning. My preferred method for removing old japanning is bead blasting with 70-90 grit glass beads at 80psi or less. This can be done with no effect on the cast iron if you pay attention. If that is not an option, a Dremel rotary type tool with an assortment of wire wheels and cups is effective. Wear safety glasses as the japanning will flake off as will the wire from the wheels. Lacquer thinner will soften japanning allowing it to be scraped and brushed more easily. Soak the parts overnight in the lacquer thinner then scrape off the loose and softened japanning. When done with some care these methods will not harm the cast iron.

After removing the old japanning the parts should be cleaned with turpentine, then wiped down with acetone just prior to application of japanning. Use care not to touch any surface with your bare hands that will be japanned as the oil from your hands can disrupt the japanning. Wear latex or nitrile gloves to protect the casting. Work at room temperature, 72°F or warmer, any cooler and the japanning will not self-level as well and leave a poor finish. Ensure the area is dust free. Uncured japanning is very sticky, and any debris will adhere to the surface like flypaper. Once baked in, the pieces of sawdust, eyelashes and brush fibers are a permanent part of your restored hand plane.

Step 5 Apply First Coat of Japanning

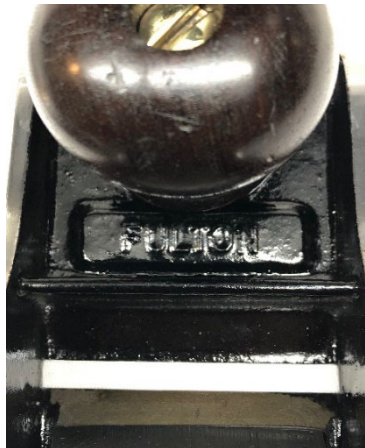
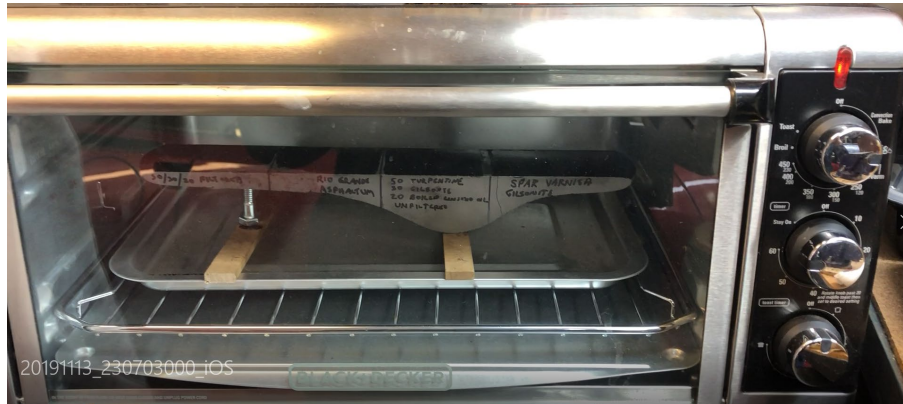
Your japanning mixture and hand plane should be at least 72°F (23°C) for the japanning to self-level. Warmer is better. While your shop may not be warm enough, you can store your japanning at the proper temperature and warm the plane to 80-90°F (27°-32°C) prior to applying the japanning. Work in a dust free environment! Any dust or foreign material that lands on your uncured japanning will become a permanent part of your plane. Avoid the heartache and avoid any dusty area when japanning.

Using a quality ¼' to ½" wide ½' long or shorter artist's brush, apply a thin layer to all horizontal and vertical surfaces you want japanned in one application. If japanning a block plane lever cap, you will have to do japan the underside first, complete the entire japanning process on the underside, then begin the side that will be displayed. The first coat of japanning should appear somewhat brown, not black. If your application is black, it may be too thick and could sag during curing. Simply continue to brush it out until you have a brown, somewhat translucent covering. For the first coat it is better to apply too thin rather than too thick resulting in runs and sags. After application of the first coat, allow the parts to sit for 20-30 minutes allowing the japanning will self-level to a uniform smooth finish at room temperature.



Step 6 Heat Curing

Heat curing is required before adding additional coats of japanning or the japanning will become difficult to cure. While a thermostat controlled electric oven is recommended, I have successfully cured japanning in a propane BBQ grill using a quality digital thermometer to ensure correct temperatures. Always begin with a cold oven. I suggest using an oven safe digital thermometer to monitor your oven temperature. Place the japanned parts in the cold oven. Heat the parts to 180^o-190^of (83^o-88^oc) and hold at temperature for 2 hours then slowly increase the temperature over the course of 10-15 minutes to a final temperature of 350^o-400^of (177^o-205^oc) and cure for 2 hours at this temperature. Allow to cool completely in the oven. Remove and apply an additional coat of japanning as desired and heat treat as before. Repeat this process until the desired depth of japanning and color are achieved.



Trouble Shooting

As far as troubleshooting your finish, here are some of the issues I have encountered and what I believe are the underlying causes and solutions:

- Mixture is too thin. If the boiled linseed oil has not been added, then add asphaltum, mix and let rest 2 hours or more. Reevaluate consistency. If the boiled linseed oil has already been added, this is more difficult. You will need to dissolve asphaltum in turpentine separately creating as thick of a mixture as possible without creating undissolved asphaltum. Add this mixture to your japanning mix, then add additional boiled linseed oil equaling $\frac{1}{2}$ of the amount of turpentine/asphaltum you added, by volume. If you add asphaltum directly to the completed japanning without dissolving in turpentine first, most of it will not dissolve as the turpentine solvent properties have been exhausted with the existing asphaltum and boiled linseed oil. You will end up with considerable undissolved asphaltum in the mixture. You can wait for this to settle out or filter it out.
- Mixture is too thick. If you have already added the boiled linseed oil, add a mixture of 2-parts turpentine:1-part boiled linseed oil to the japanning, mix and let rest 72 hours. If you have not added the boiled linseed oil yet, thin carefully with turpentine, remember you want a honey like consistency to the initial turpentine/asphaltum mixture.
- Finish has debris or bumps. There are several possible problems:
 - Most commonly undissolved asphaltum in the japanning or dust that settled on the wet japanning. Allow your japanning mixture to sit undisturbed for additional time at room temperature to settle or consider filtering it. Only dip brush in top of product when applying. Monitor your environment when applying and cooling plane to ensure it is dust free. To salvage the finish on the plane, lightly sand the japanning using 800-1000grit sandpaper after the heat cure cycle to minimize the bumps. Carefully wipe the japanning with a lint free cloth and a small amount of turpentine after sanding. Apply the next coat.
 - Rough casting texture is showing through the japanned finish. Japanning makes an excellent sandable primer. You can sand between coats with 800-1000grit sandpaper to smooth the surface, in some cases, sanding back to the casting and leaving the first coat or two of japanning in the pores of the rough casting as filler. After sanding, carefully wipe the japanning with a lint free cloth and a small amount of turpentine. Apply additional coats as necessary to achieve the finish you want.
- Mixture has thickened or hardened in container. I suggest mixing fresh japanning. The ingredients are inexpensive and the time you will spend trying to thin old hardened japanning, then stripping it off when you are disappointed in the performance is not worth trying to save a few dollars. In the future, keep your container of japanning topped off and tightly sealed. As you use up the japanning in the container you can add clean marbles to keep the level near the top and limit the amount of oxygen that is in the container. You can also use canned wine

preserver argon gas, available on Amazon, to displace the oxygen in the container and extend the shelf life of your japanning mixture.

- After completing the heat cycles, finish is still tacky, or soft enough to leave an impression with a fingernail. This is generally a sign the mixture does not have enough boiled linseed oil in it. Repeat the final heat curing cycle, ensure your oven is reaching the recommended final curing temperature. You can lengthen the final heat cycle and/or raise the temperature as high as 400^of and this may overcome the issue. Consider adding a of boiled linseed oil at the rate of 5% of the total volume of your japanning to your mix, stirring and let settle prior to next use. For example, if you have ¼ pint of japanning, add between 1-2 teaspoons to the mix.
- Mixture does not harden after multiple final heat cycles. Either the boiled linseed oil was omitted from the mixture, the ratio of BLO was incorrect, raw linseed oil was used or, the mixture was applied too thick. If the mixture was correct, you can add additional baking cycles and may, eventually get a cure. If this does not work, turpentine will quickly strip uncured japanning and you can correct your mixture then start over finishing the plane. This is not a major error as the stripping process will be very quick. If one or two additional heat cycles does not fully cure the japanning, the mixture is incorrect, strip the plane with turpentine, correct the mix and re-japan.
- The finish has large lumps or a wavy appearance. The japanning was too thick to properly self-level prior to curing. Verify your mixture has a pancake syrup like viscosity at room temperature. Ensure both the japanning mixture, the casting, and the location the plane will sit to allow self-leveling prior to heat curing are all at 72^of or higher. Allow the plane to sit at least 15-30 minutes prior to beginning the heat cycle. This condition can be overcome by sanding the cured finish flat using 800-1000 grit sandpaper. After sanding, carefully wipe the japanning with a lint free cloth and a small amount of turpentine. Apply additional coats as necessary to achieve the finish you want.
- Bubbling along the cheek/plane bed joint or in general on the surface. The japanning was either applied too thick, or the plane was heated too quickly to too high of a temperature. Bubbles or blisters are caused by the japanning forming a cured surface before the turpentine has escaped from the underlying material. The trapped volatile organic compounds will cause blistering as they try to escape from the uncured japanning underneath. This is a fatal flaw as the japanning will not have a good bond to the casting under the blisters and will fail prematurely. The plane must be stripped and re-japanned. Apply multiple thinner coats.

Please share your experiences, successes, failures, improvements, alternatives and, most of all, pictures, with me at aPlaneLife@comcast.net. I look forward to hearing from you and seeing your restored planes.