Japanning 103, Traditional Japanning, The Black Hole of Finishes

For a full discussion on various japanning mixes, quality of finish, durability and tips and techniques for success, refer to my earlier article, *Japanning, or The Art of Embracing the Arcane* at www.aPlaneLife.us. I highly recommend reading this article before beginning your project to understand the various mixtures and results. Having proper expectations goes a long way toward success.

At the request of some readers, this updated 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 a close approximation to original cast iron japanning preparations and results in a durable rich glossy finish closely matching original 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

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 protected 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
- Dishwashing soap or commercial degreaser (Purple Power from automotive supply houses)
- Nylon brushes for removing dirt, grease, and sawdust
- Bead Blaster, electrolysis equipment, Dremel type rotary tool, or lacquer stripper and wire brushes for removing old japanning. (see Step 2 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 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 70^0 f (23^0 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 74µm. Most paint filters only remove particles larger than 150µm, 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 µm 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 ½” 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. First remove all dust, grease, sawdust, etc. Washing the parts using dishwashing detergent or commercial parts degreaser will suffice. If you are not going to immediately begin removing the japanning, thoroughly dry the parts to prevent adding to existing rust.

Next remove any remaining old japanning. My preferred method for removing old japanning is bead blasting with 80grit glass beads at 20-60psi. This can be done with no effect on the cast iron if you pay attention. Walnut shell abrasive or corn cob abrasive will also work with less risk of damaging the cast iron but is considerably slower. 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. electrolysis is the

next best option. Lacquer thinner will quickly soften japanning allowing it to be scraped and brushed off using plastic and nylon tools. 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. Work in a room temperature, dust free environment. 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.

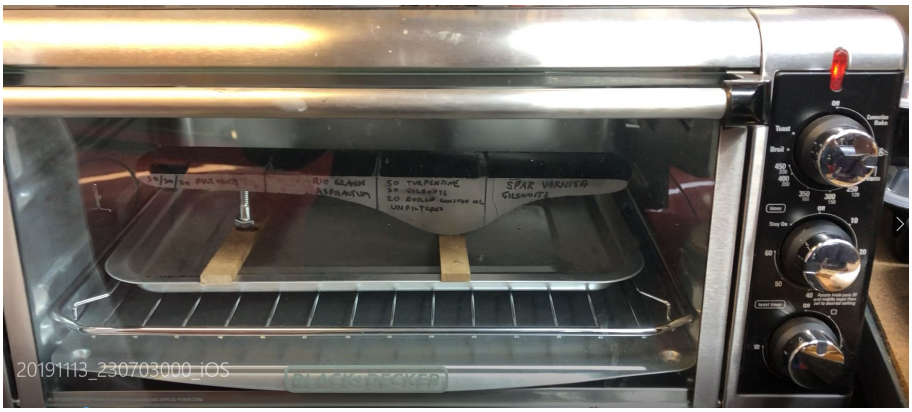
Step 5 Apply First Coat of Japanning

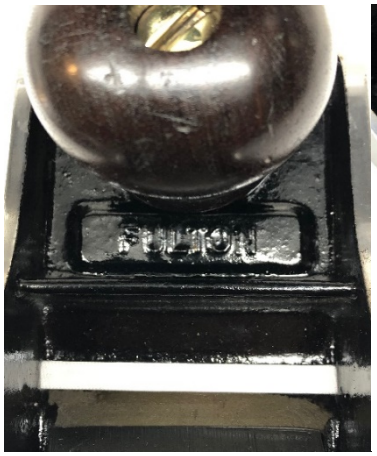
Your japanning mixture and hand plane should be at least 72^0F (23^0c) for the japanning to self-level. Warmer is better. While you shop may not be warm enough, you can store your japanning at the proper temperature and warm the plane to 80-90^0F (27^0-32^0c) prior to applying the japanning. Work in 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 30 minutes to one hour and 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. 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 supported by heat resistant non-metallic blocks if required. Heat the parts to 180^0-190^0f (83^0-88^0c and hold at temperature for 2 hours. Allow to cool completely in the oven. Repeat this heating process a second time, however once the initial temperature is reached, slowly increase the temperature over the course of 20 minutes to a final temperature of 350^0-400^0f (177^0-205^0c) 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. Add gilsonite, mix and let rest 72 hours. Reevaluate consistency.

- Mixture is too thick. If you have already added the boiled linseed oil, add turpentine, mix and let rest 72 hours. If you have not added the boiled linseed oil yet, thin carefully with turpentine, remember you want a molasses like consistency to the initial turpentine/gilsonite mixture.

- Finish has debris or bumps. Probably undissolved asphaltum or dust. Allow the product to sit undisturbed for additional time to settle or consider filtering it if you did not initially. Only dip brush in top of product when applying. Monitor your environment when applying and cooling plane to ensure it is dust free. It may be possible to lightly sand the japanning using 800-1000grit sandpaper after the initial heat cure cycle to minimize the bumps. Carefully wipe the japanning with a lint free cloth and a small amount of turpentine after sanding.

- Mixture has thickened while left on shelf for several months. Thin with turpentine and allow to rest 72 hours prior to use.

- Mixture has 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 dollar.

- Finish is still tacky, or soft enough to leave an impression with a fingernail. Repeat the final heat curing cycle, ensure your oven is reaching the recommended final curing temperature.

- 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. I have stripped (turpentine will make quick work of it) and started over when faced with this. I tried up to four heat cycles and still did not overcome an overly thick application. If the mixture is incorrect, strip the plane with turpentine, correct the mix and re-japan.

- Bubbling along the cheek/plane bed 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 skin before the turpentine as 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 and 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.