# Refinishing & Touching Up Old Gun Stocks – The Lost Craftsmanship
# Especially Winchester Models from the Nineteenth
# And early Twentieth Century
# Using John Kay's Winchester Linseed Stock Oil Formula: Red-Brown

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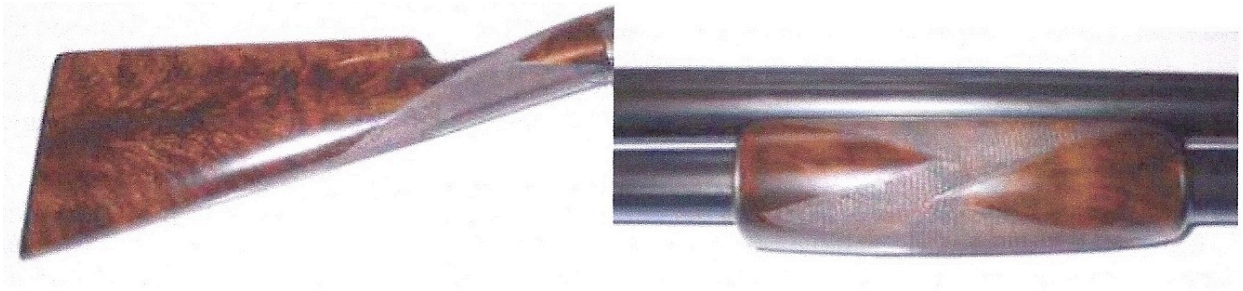

**Picutres above From John Kay's Shop**

**Contents (See Section 13 for Pricing Information)**



## 1. Why are these instructions so long?

Linseed Oil was used for refinishing wood during a time when few other products were available, when craftsmanship was at its peak and labor was cheap. Typically an individual would serve an apprenticeship for several years to learn the craft of refinishing. In order to reproduce the quality work these craftsmen learned over several years, we need to understand what they learned during their apprenticeship. This is a lost art and craft and it takes time, understanding and patience to do it correctly. There are two major mistakes individuals make: Try too rush the refinishing process. And, put on too thick of an oil coat during each application. Remember, this process was used when people went 3 miles/hour, not 70!

## 2. John Kay & the Winchester Linseed Oil Finish

John Kay was a master restorer of old Winchester guns and his company was Winchester Restorations. In 2008 he had to retire for health reasons and his Stock Oil was no longer available for sale. I arranged to make and sell it. This is John's oil formula, which is a 100% linseed oil-based formula and probably as close to the original Winchester oil formula as any available. John perfected a special walnut tint which is mixed with the oil to give that classic Winchester Red-Brown finish.

The 100% linseed oil is a special preparation and has curing agents added. It is made especially for wood refinishing and the walnut tint has been added as an integral part of the oil. It is made specifically for walnut stocks and forearms. This Pre-64 Red-Brown Walnut Stock Oil must be thinned as instructed below. This thinning is needed whether it is for touch-up or refinishing.

## 3. Types of Wood Finishes

Typically there are three types of finish used on wood: Oil, Varnish & Shellac. The Oil finishes include Linseed oil, Danish Oil and Tung Oil. Danish Oil & Tung Oil are commonly used now because they take less effort and have a faster drying time. (Some brands are actually mixtures of oil and varnish.) However, they do not give an original hand-rubbed satin type finish and usually look more like a gloss varnish finish. Varnish & shellac are coating on the surface of the wood, whereas oil finishes are absorbed by the wood. In addition, one must be careful in selecting a particular "linseed oil" brand product since most (all I have found) are mixtures of other products, such as adding a varnish to an oil to give a faster drying time. (See a later section on: Other Wood Finishes & Stains.)

## 4. Linseed Oil

For centuries linseed oil has been used as a finish for wood products and was the primary finish used on most guns during the 19th and early 20th century. In the early years it was called 'lintseed." It is made from flaxseed, and "lint" is the Scottish term for flaxseed.

Linseed Oil does not dry, it cures. The oil in contact with air oxidizes, i.e. the surface layer of oil interacts with the oxygen in the air to from a hard surface (a polymer). (I will skip the chemistry of this bonding process since we do not need to know it to do our craft.) If an individual applies a thick coat of oil, the surface oil layer hardens, then any oil under it will remain un-cured, i.e. oxygen cannot reach it to cure. This can produce a waxy surface. (More about this later.) The goal is to have a thin surface layer of oil so the complete surface hardens by oxidizing with the oxygen in the air. By mixing the oil with a thinner, like mineral spirits, a thin layer of surface oil is produced which can properly cure. Boiled Linseed Oil (BLO) is not really boiled any more; it is a combination of processed linseed oil, petroleum-based solvents and metallic dryers (catalysts to accelerate drying).

Thus, using un-thinned oil and/or thicker coats will prevent the oil from curing and slow down our work. With other types of products, thicker coats are often desirable. Initially a 1 to 2 mix of oil to mineral spirits works best. After a number of coats when the oil deep in the wood has cured, and under the best curing conditions (i.e. high temperature and low humidity) a 1 to 1 mix may be tried. High humidity and low temperatures increase the drying time. (More on this later.)

## 5. Wood Stains vs. Walnut Tints in Oil

There are many wood stains available and several are commonly used on gun stocks. A wood stain colors the surface of the wood and often mask the grain of the wood. Walnut wood has a beautiful grain and color that we want to enhance and show through the finish. It is typically a red-brown tint or a brown tint. Each walnut tree gives a slightly different tint and the tint varies from the heartwood to the sapwood on each tree, and from the part of the country where it grows. For this reason, using the same finishing product on two different pieces of wood often produces different tints. (More on this later.) We use a special red-brown walnut-tinting product that mixes with the linseed oil so the tint is a part of the stock oil. (This is not a wood stain!) This way the oil & tint go into the wood and enhance the grain of the wood, not mask or cover it. Because of differences in the walnut wood, the final color of the wood can vary from a golden-brown to a red-brown.

## 6. To refinish or not to refinish?

First, do not refinish the wood on an old gun unless it is absolutely necessary. Collectors prefer original finishes. However, some wood has already been refinished and/or sanded to the point of destroying any original finish value. If in doubt, do not refinish an old Winchester that has an acceptable finish. It should be cleaned of layers of wax and gunk, then examined to see if it is acceptable, or needs a "restorer" product applied, oil added, or a new finish is justified.

To preserve an old finish or protect a new finish there are some basics. Only apply a wax to a varnish or lacquer finish, not to an oil finish. Only apply an oil type protective product to an oil finish. Take care of the wood on fine rifles the same as you would fine furniture. If it has an original oil finish, then this oil should be used to restore it. If it has a varnish finish, then oil should not be used. (Post 64 Winchesters and those made after about 1950 typically have a varnish finish.)

**Other types of wood:** Some old Winchester Rifles have Gumwood for the stocks and forearms. A few may have some other type of wood. Using Kay's Oil on these may not give as red or red-brown of a tint as when used on Walnut. Some Gumwood stocks will have a duller finish when refinished. These can be rubbed with Gun Oil, or an oil based furniture polish, to give a satin finish. Kay's oil has to be tested on these other woods. Very light wood like Gumwood requires a special process to have the classic walnut color. (More on this later.)

## 7. Only need to clean an old finish & do a Touch Up of the finish

Old stocks that need cleaning fall into three groups. The first are the ones that have some surface gunk (old wax, hand oil, gun oil, etc.) with a good solid finish underneath. For these use mineral spirits and 0000 steel wool or a fine steel wool pad. Rub lightly with the wet steel wool, just enough to take off the old gunk. If you now have a solid finish, it can be touched up with this oil, varnish, wax or what ever is appropriate.

Next are the ones that have what may appear to be a good finish under the gunk, but as you take off the top layer, like above, what is left is still a soft finish. Go over it again, and possibly again. In the end you may find the finish had deteriorated all the way to the wood. Old stocks, when cleaned, vary from having a solid finished surface to having no finish with which to work. Thus for general surface cleaning, I only use mineral spirits and steel wool to cut the gunk. It will not cut a good cured oil surface or a varnish surface. If only a touch up is needed, then use this oil like you would apply the final finishes as described below. The third group includes those that are obviously bad, poorly refinished, no or worn finish, surface scratches and dings, etc.

## 8. Wood Preparation for Refinishing

For old stocks and forearms, I normally use Formby's Furniture Refinisher to strip the wood. I have used it for years on furniture and it does not damage the wood. Be sure to use good protective gloves, any stripper is bad for the skin. I use a store purchased pad that is rough and made for stripping furniture. It scrubs the surface, but does not cut the wood. After it dries for about an hour, I go over it again with Refinisher to remove any surface finish that may remain. Use a toothbrush to scrub out old finish from checkering and inletting. Be careful not to chip out parts of the checkering. After stripping the wood let it dry a day.

Warning: Do NOT sand the finish from old wood. It will destroy the stock and forearm!

Often, around the area where the stock touches the tang & receiver, or other areas where the wood meets the metal, the wood will be darker from gun oil that has soaked into the wood. You might apply a third application of the stripper to these; however, I typically leave it since old guns are expected to be darker where they contact the metal. (Some stocks have been "soaked" in gun oil and are very dark. There are ways to help these, but we will not deal with that here.)
If there are any small dents you can bath or soak the wood in mineral spirits or just hot water. This makes the wood swell and will cause small dents to disappear or not be as noticeable. You can also place a wet towel on the wood and then use a hot steam iron on the towel to steam out some dents. Be careful not to burn the wood. This only works for dents where the wood is bent, not places where the wood is missing or the grain is cut. Let it dry again for a day. Water will raise the grain, which

may need a light-light sanding with 320 sandpaper or 0000 steel wool. Do NOT sand the edges of the wood or it will not fit the metal properly! In the old days, finishers wet the wood to raise the grain before finishing. Then sanded it lightly to remove the raised grain. After this if the wood ever got wet, the grain would not swell, spoiling the finish.

Sometimes, after stripping, I will go over it lightly with 320 sandpaper to remove any remaining surface stuff and get a uniform color to the wood. However, normally on older guns you expect the edges to be darker than the rest of the surface and imperfections are expected. (There have been a couple of stocks on which someone carved their initials. I have sanded these out if they were not to deep, careful not to change the curvature of the surface or sand any of the edges.) It is important to leave the edges "proud" over the metal, that is, on most edges the wood is slightly higher than the metal. If the wood is below the metal, then you know it has been sanded. Never sand the edges where wood touches the metal.

Leaving "usage dings" is better than sanding them out. These just show the character of the rifle, helps tell its story. In general, it is best not to use any sandpaper on the wood except as described in these refinishing instructions. Also, I do not like to use wood filler on dents, I prefer to leave them.

When fitting an old rifle with new wood, I give the wood a final sanding with 220 sandpaper before starting the refinishing instructions below. Otherwise there is no difference in applying this stock oil to old or new wood. The fitting of new wood to a rifle is difficult to do correctly and should be left to a professional. (You can give it a try and become a professional.)

## 9. Refinishing Instructions

**Mixing:** The red-brown tint is in the oil, giving a deep penetrating non-fading color. The red-brown tint increases as more coats of oil are added. This Oil comes uncut, and has to be thinned, 1 part Oil to 2 parts 100% Mineral Spirits (MS). Use a small clean bottle to store the thinned oil. It needs to be sealed tight when not in use. Shake the bottle of un-thinned oil before using it each time. If only doing one rifle start with 2 teaspoons of oil mixed with 4 teaspoons of MS. Shake/stir it well and let it sit for a few hours before using. Store it in a small medicine pill bottle, or a baby food bottle, with a wide mouth and screw on lid, that can be sealed between each use. These should first be cleaned with MS. The mixed oil, if not used in a few weeks, will become cloudy and begins to cure and must be discarded. For later mixes, you will probably need to mix smaller amounts.

**NOTE**: Do not use the “green” “substitute” mineral spirits. It will not mix with the linseed oil.

**Hand Care:** Before you start, wash your hands and use some type of lotion to fill your skin pores. After each application give your hands a good soapy washing. When doing the wet sanding you may want to use some good protective gloves and use an artist small 3/8 in. paintbrush to apply the oil. Otherwise the oil will get under your nails and on your skin.

**Filling wood pores with wood flour:** This is the old method for producing a smooth surface. Get some 320 and 400 wet/dry sandpaper. This is black paper. Cut it into approximately one and one-half inch squares. Use your fingers (or small brush) to apply a sloppy wet coat of oil to the wood surface. Then wet one of your 320 sandpaper squares with oil, and start sanding lightly, with the wood grain, with fingertip pressure. The wet oil will act as a lubricant, and you will not be cutting much wood with this wet sanding. You will be making wood flour from your stocks wood, and using that wood flour to fill the pores. The wet sanding will force wood flour into the pores. This wet sanding will cause a black paste to form, from the sanding dust, the oil, and oxidation. By the time the paste forms, you will feel the paper wear out and it will quit making sanding flour. Get a fresh square of wet sandpaper and continue. As you sand, you will need to add more oil to keep the surface wet. When finished with the sanding, apply a wet coat of oil over the black paste, rub the flour across the grain to force it into the pores; let it set 20 to 30 minutes. Then wipe it off with a paper towel and clean cloth. Wipe across the grain so you do not remove this paste from the pores. Set it aside to cure. It will take time for the oil down in the pores to cure, two or three days. All of the surface sticky stuff should be removed.

Let it set two days or more to cure. Then repeat with another coat of 320 wet sanding, and let dry two days or more between coats. Put on three coats of this wet sanding with 320, then switch to 400 sandpaper and wet sand three or more coats. For the best curing time, if two days is good, three is better and four is best! Your stock will now be silky smooth, and the pores will begin to be filled. The better job you do filling the pores, the faster and easier the job will be to finish. Some individuals will use 600 and possibly 1200 sand paper to get a glass smooth surface. (Old Winchesters usually did not have the pores filled completely. It is your choice as to how filled you want them to be.) Higher humidity and or cooler weather require more drying time.

If your wood has checkering, apply the Oil Mix with a soft toothbrush in the checkered part. Then wipe the brush dry and clean any wet oil from the checkering with the dry brush. Since checkering has a lot of end-grain, it will soak up the oil and will not need to have many coats applied.

When you put on the first few coats of oil the wood will soak up a lot of oil and you may think it is dry and cured. Do not let this fool you! It is essential that you let these first coats of oil, and all coats, properly cure. After each of these early coats of oil, the wood will appear dull and you may think this process is not working. After the first 6 wet standings and a couple of more coats, you will see the walnut satin finish begin to show. Be patient.

**Note:** In general never leave a wet film of oil on the surface for more than 30 minutes! Wipe it off or you'll have a sticky mess. This is true for the first to the last application.

**The final coats and finish:** Now the job gets a lot easier, there is no more sanding. Put the stock aside for a few days or even a week, to make sure the oil has completely cured deep down in the pores. (A later note will advise what to do if you end up with a sticky-waxy surface during this process.)

After completing the 320/400 wet oil sanding process to fill the pores you start the hand-rubbed finish process. To get a hand-rubbed finish, you have to rub in the oil for several minutes on each oiling. When the wood will not accept any more oil, immediately wipe off the excess with a clean cloth and then rub the surface until it is nice and warm. This helps the oil to cure properly. Hand-rubbed means hand-rubbed! When you set it aside to cure each time, wipe it lightly again with a soft clean cloth. It should feel dry to the touch. A little dab, i.e. a few drops, of oil is all that is needed now. Just dip the tip of your finger in the oil mix and that should be enough oil to cover one side of the stock.

It takes 10 to 20 coats of rubbed/cured oil to give these old Winchesters the original look. I allow a minimum of 30 days and usually 60 days to complete a stock and forearm. Also, these have a satin finish when complete, not a gloss finish. I usually do not completely fill the wood pores. After all, looking at old original stocks and forearms, you will see they are not completely filled. This depends on what final look you want. For more gloss, just add more coats.

If you want a smoother finish, do what the old timers did. After a number of coats of oil are applied and cured, buff the wood lightly with 0000 steel wool. Buff just enough to give it a smoother surface. Apply two more coats and repeat the steel wool buffing. Do this three or four times and you can get a nice smooth shiner surface.

During cold weather, I sometimes heat the wood with a hair-dryer before applying the oil. This helps open the wood grain for the oil to penetrate and helps the curing time. Always work in a clean, dust free environment. Keep the original un-mixed oil in a sealed bottle with as little air as possible, and keep the mixed oil in a sealed bottle in a cool place.

**If you get a sticky surface:** I have had some stocks become sticky-waxy rather than curing to a dry-hard surface, by not letting them cure long enough between coats, or usually by applying too thick of a coat of oil, and not wiping it “dry” each time. When this happens more drying time will not help. Do one of the following: (1) give it a good mineral spirits bath using a fine steel wool pad to remove

the sticky layer, (2) do a light 320 or 400 wet sanding again, with plenty of oil, then wipe it very dry and let it set several days to a week, (3) or just use mineral spirits and 320/400 paper. Check it while drying and if any oil is felt wipe it with a clean cloth. This normally clears things up and you can continue. Be patient, let this sit 2 or 3 days before proceeding. Mineral Spirits & a 0000 steel wool pad are my preference for cleaning up this sticky mess.

## 10. The Results

The final finish depends on the number of coats of oil applied, how well the pores are filled, and ones patience. In addition, the color depends on the wood used. Normally Winchesters had American Walnut stocks and forearms. The sapwood and heartwood have different characteristics and will display more or less of the walnut red-brown color. To see what the natural color is, after stripping and before refinishing, wipe the wood with mineral spirits. Kay's oil formula will give walnut wood more of the traditional Winchester Walnut Red-Brown finish. Your wood may not look like much after the first few finishing coats, but the beauty will soon start to show. And your stock will get more beautiful with each coat. You will know when you are done. You will have a beautiful, soft, smooth as silk satin sheen.

## 11. The Original Winchester Wood Finish

The Summer 2010, edition of The Winchester Collector gives a good review of the three Winchester Stock Finishes of the Early Period 1866 – 1900: The Standard Oil Finish used on most guns and the High Gloss Oil Finish were both based on linseed oil and walnut hull oil stain. The High Gloss Finish just had more coats of hand rubbed oil applied. The Standard Finish was a satin finish and was the most durable of all of the finishes. The varnish finish was usually used on fancy grade woods.

One of the common mistakes made is to try to keep applying oil coats to make an oil finish a gloss when is should be a satin. Also, if you examine old Winchesters you will notice the grain is still somewhat open; it is not a completely smooth surface. You may not want to completely fill the wood pores.

An article in the book by Muerrle, *Winchester The Way It Really Was*, states: "Oil finishes were done with seven or eight coats of oil, which was hand rubbed. It was done with a very expensive Danish oil. In the past, it was done with linseed oil and Tung oil." This article was written by an individual that started work at Winchester in 1947 and indicated the change from linseed oil to other types of finishes that are not true oil finishes, dry faster, give a glossy finish and take less work. This transition took place over a number of years, mainly during the late 1930s and early 1940s.

## 12. Other Wood Finishes & Stains

I have used a number of products advertised as "Winchester" oil. I have not found any that are really 100% linseed oil-based formula, or they do not use any or use very little linseed oil. Most have a varnish type base. If a formula can be applied in 2 to 5 coats over a few days, then it is not a true linseed oil formula like the original.

I have used Formby's Tung Oil finish several times instead of Kay's, or after using Kay's put on a final coat or two of Tung Oil. I have used Tung Oil before on furniture; it cures faster and required fewer coats than linseed oil. However, it gives a gloss varnish looking finish that does not look original. It is faster, just looks like refinished wood. When using some other product, in order to get the red-brown traditional tint of old Winchester rifles, either a stain must be used first which mask the grain of the wood, or a few coats of Kay's oil must be applied first.

A wood stain is a product that colors the surface of the wood and tends to hide some of the grain of the wood. With the mixing of the walnut color with linseed oil, we have a product where the color and oil goes into the wood and allows the natural wood grain to stand out.

Minwax has a Gunstock #231 wood stain that gives about the same tint as Kay's. I have used it and then used Boiled Linseed Oil & Turpentine with a 1:1 mix, or 1:2. It appears to give about the same tint as Kay's Oil, but cures slower and the stain tends to hide the grain of the walnut wood. Olympic has a wood stain Special Walnut 41568 that gives a nice brown color, but not the red tint I like. Dark

walnut stains are too dark. After these stains you can use Tung oil or Danish oil for wood that will have a nice refinished gloss look. Birchwood Casey Tru-Oil gives much the same gloss finish as these. It is not a true linseed oil based product.

Herter's French Red Stock Filler and Stain gives a nice red tint and helps fill the wood pores. It is what some old timers used and can be covered with some of the finishes mentioned above. However, if you put on a thick coat as recommended, and let it dry you have to sand to get down to wood again. It tends to hide the wood grain similar to what a stain does.

A properly applied oil finish, whether its luster is low or high, is vastly more desirable and maintainable than the world's best varnish or one-step product. There's no comparison! When an oil finish does begin to degrade, you wipe/wash off the surface with mineral spirit and steel wool and rub in a bit more oil in the degraded areas to restore its original state. When varnish degrades, you have to strip the entire piece and refinish.

For non-walnut stocks and forearms, after you try Kay's Oil and it does not give the desired tint, you may want to try one of these other methods, or use a stain and then apply Kay's oil.

I have found no end to the types and ways to refinish old gun wood. After trying each alternative, I have always come back to John Kay's oil, even though it takes longer and requires more work. It gives an authentic, original looking finish that most of us expect on an old Winchester.

## 13. Common Questions

**How many stocks & forearms can be refinished by one 4 oz bottle?**
We usually mix only the quantity of oil and mineral spirits that can use during a two to three week period. Starting with 1 teaspoon of oil with 2 teaspoons of mineral spirits. Keep it in a small sealed bottle. Being conservative, I get at least 5 and up to 10 stocks and forearms from one 4-oz bottle.

**Finish: Is this the oil for regular wood or fancy wood?**
That is a very good question. I have done some research and find only hints of the secrets that Winchester and its subcontractors used to finish the wood. The following is clear. The early finishes were linseed oil, usually held in hot vats where the wood would be dipped before hand rubbing and hanging to cure. Before the oil was applied, the wood was rubbed in walnut hull powder mixed in an oil and burnished to give it the classic red-brown finish. (We have added just the right mix of the red-brown walnut color to the oil product so the wood does not need any pre-finish coloring.) Usually the higher gloss finish of fancy wood was obtained by applying more coats of oil and more hand rubbing. As years passed, especially into the late 1930s and 1940s, the type finish used changed to products that required less labor and time.

**How fine to sand the wood before starting?**
If it is an old stock that has been stripped, I usually do not sand it any. The first finishing steps start with 320 and then 400 wet sanding with the oil mix. As noted in the instructions, old finishes are NOT to be sanded off, they are removed using a quality-stripping product. In addition, after the 320/400 wet sands, there is no more sanding between coats. For new wood a final 220 sanding is needed before starting the refinishing process.

**How long does it take to refinish a stock & forearm?**
I allow 30 to 60 days to complete a stock and forearm. A Hot Box (see below) can speed this up.

**Humidity, does it affect the curing time?**
Yes! Although the oil cures rather than dries, a moderate to high humidity will increase the curing time. The water in the air keeps the oxygen from interacting with the oil to produce a solid surface. This is true for any linseed oil product. Every 10% increase in humidity probably doubles the curing time.

**Temperature, does it affect the curing time?**
Yes! Every drop of 10 degrees will double the time it takes linseed oil to cure. (The best work I ever did was in the summer of 2011, when we had 63 continuous days of over 100 degrees, and 6 months of no rain, and I did my work in a garage. I don't recommend that weather, but it allowed some very nice finishes in a relatively short time.)

**What is the drying time of this oil mix?**
The product we use has a stated time of 18 hours to cure. However, that is under ideal conditions. Allow at least 24 hours, usually 48. The first sanding coats need more time and the later coats need more time. When it appears cured, I wait one more day before applying the next coat.

**Temperature controlled Hot Box to speed curing:**
For those who refinish several Winchesters, the construction of a temperature controlled Hot Box should be considered. We have made one out of an old dishwasher by removing the insides and motor items underneath. A rack was made to hang the stocks and forearms. A small temperature controlled heater was placed inside. Normally a temperature of $100^0$F will allow a new oil coat to cure in 24 hrs. (One customer goes up to $120^0$F.)

**How many coats does it take?**
I usually do a minimum of 10 coats. Old finishing records indicate a minimum of 6 and up to 12 coats. The old timers "rule of thumb" for linseed oil finishes states: One coat a day for a week, one coat a week for a month, one coat a month for a year, and then one coat a year forever!

**Storage: How long does the linseed oil product last? Is there a way to preserve it?**
Good question. The un-mixed oil in a sealed bottle with little air and stored in a cool place may stay fresh for several years. Light also helps the oil to cure, so it should be kept in a bottle that does not let in light. After you start using the oil, you may notice the sides of the bottle collapsing. This happens because the oil is taking oxygen from the air to cure. To replace the air (oxygen) in the bottle so it will not cure, I use Argon gas, which is heaver than oxygen/air. See: www.bloxygen.com for details. The layer of Argon on top of the oil keeps it from the oxygen.

**Can I use something besides Mineral Spirits?**
I sometimes use turpentine instead of mineral spirits. It seems to dry a little faster and better. However, it is not low odor, you need good ventilation and hand protection. (Turpentine is an organic solvent. Its vapor can irritate the skin and eyes, damage the lungs and respiratory system, as well as the central nervous system when inhaled, and cause renal failure when ingested, among other things. Being combustible, it also poses a fire hazard.)

**NOTE Again**: Do not use the "green" "substitute" mineral spirits. It will not mix with the linseed oil.

**Can my Oily Rags Spontaneously Combust?**
Rags soaked with linseed oil stored in a pile are considered a fire hazard because they provide a large surface area for oxidation of the oil, and the oil oxidizes quickly and the temperature of the rags increases. When heat accumulation exceeds the rate of heat dissipation into the environment, the temperature increases and may eventually become hot enough to make the rags spontaneously combust. (For the few rags we use and the small amount of oil, this should not be a problem. Just be careful.)

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