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GASOLINE-RESISTANT WOOD FILLER

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1

The invention relates to a composition and method of treatment of wooden containers, such as barrels, kegs, casks, and the like, for rendering the same impervious to gasoline, certain acids, and other fluids, to make such containers available for storing, shipping, and handling gasoline, petroleum, and various other liquids, such as acids, alcohol, etc., and also to enable said containers to be substituted for metal containers for use not only in shipping, storing, and handling said liquids but also to be advantageously employed in the construction of bombs and various other devices where metal containers are now employed.

It is also an object of the invention to enable such composition to be applied to said containers in a rapid and satisfactory manner at an exceedingly low cost.

At the present time, there is a wide felt need for a filler substance for wooden containers having the power to resist the cutting forces of gasoline, petroleum, and other liquids such as acids, alcohol, etc., to make them available for substitution for metal containers now necessarily employed for said purposes.

After extensive and painstaking experiments, I have discovered that animal fats, fish oils, and the like, have gasoline-cut resisting powers and experiments soon developed the fact that hog fat, pure lard, possesses marked advantages over other animal fats including mutton and beef tallow.

Further, it was discovered that in treating wooden containers all animal fats or oils require a stabilizing element, otherwise under the effect of high climatic temperatures, such fats and oils liquefy and soak through the walls of wooden containers and, in addition, will cause gasoline contained in such containers to become foul. Also, internal expansion pressure is sufficient to force such fats and oils through pores and faulty spots in the wood of containers and cause leakage unless means are provided for preventing such results.

After trying a number of elements to obtain this stabilizing effect, I found concentrated lye to be excellent, although a considerable amount of experimentation was required to secure the proper balance or proportion between the two elements, fat and lye, for adequate stabilizing and pressure resisting results.

A mixture of fat and lye, on first trial, seemingly promised success but a few days after six wooden kegs were treated, it was found that four out of the six kegs were seeping at one or more points. Examination shows that softened parts of the composition were being forced by internal pressure of gasoline through faulty portions of the walls of the containers, as was distinctly revealed by spots on the outer surface of the kegs that were leaking. It was discovered upon opening one of the kegs that the liner composition had

2

softened under the influence of the gasoline contents. The remaining five kegs were allowed to stand for a few days and later it was found that these containers were holding without the slightest seepage and further examination showed that the filler composition had become hard and effectively resistant.

The problem of making a wooden container hold gasoline has heretofore been attempted at considerable expense and has succeeded only to the point that so long as the containers remain in a cool, shady place they were leak proof but, upon handling, developed leaks. Therefore, the barrels treated with fat and lye were placed in an open yard and subjected to all kinds of weather conditions and temperature changes ranging from nearly zero to above 100° F. and it was found that they held satisfactorily.

However, when they were subjected to shipping tests which consisted in rolling the loaded kegs or barrels repeatedly down a loading ramp, across a rough yard, and against a backstop, some of the containers began to leak and this time the leakage did not desist but steadily increased. An examination of the containers disclosed the fact that the liner composition had so hardened that the rough handling in the shipping tests caused it to crack and, in places, to break away from the walls of the containers in spots of various sizes. Therefore, I found myself confronted with two opposite conditions, the original softening and a later hardening effect of the composition under the influence of the gasoline placed in the containers.

After unsuccessfully attempting to remedy these defects by re-balancing the animal fat and the lye, it was realized that a third element was required and that it was necessary to have a product of animal fat or something of that nature which would neither soak through the wood nor crack, so I experimented with various other substances, such as butter and cheese containing animal fat and also substances not containing animal fat, such as pure white shellac, but I failed to get the desired results. Then it occurred to me that as glycerine is a product of animal fat it might answer. It was tried and resulted in most remarkable results. It cured the tendency of the fat and lye to become too hard and more or less brittle under the effects of the gasoline and it made the composition considerably tougher and more elastic and prevented leaks which otherwise would have occurred.

Further tests showed that the glycerine did not prevent the composition from becoming soft for a time when exposed to gasoline. After finding that the composition, in this softened condition, would leak if there were knots, flaws, or decayed portions in the wood of the container, I found it necessary, in order to obtain a com-

pletely satisfactory wooden container, to counteract this softening of the composition under the action of gasoline. I believed that if gasoline caused a temporary but harmful softening effect on the filler composition in use, perhaps a gasoline bath of the material in the preparation of the composition might bring about the softening effect during such preparation of the ingredients of the composition and effectually pass that stage before the filler composition was applied to the containers.

A little experimentation soon gave the technique of properly mixing the gasoline with other ingredients. A large boiler affording a reserve capacity was employed and the liquid ingredients were allowed to cool as much as possible to approximately 60° F. and still remain liquid. The gasoline was then added slowly while stirring vigorously. With the resulting mixture several kegs were treated and no leaks or seepage of any character developed.

In order to treat more effectively the wooden containers and enable the composition to penetrate and fill the pores of the wood, it is deemed advisable, as the pores contain an element of sugar, also some acids, alkali, etc., to remove such substances as have hardened in the pores of seasoned wood. To accomplish this result and at the same time to expedite the application of the composition to the containers by causing the composition to dry quickly, alcohol is added to the composition, wood alcohol being preferable for this use.

In the preparation of the filler composition, I prefer to use the ingredients in approximately the following proportions—viz., 8 pounds (1 gallon) pure lard, 24 ounces concentrated lye, 5 ounces of alcohol, 1 pint of glycerine, and four ounces of gasoline.

The composition is prepared in the following manner:

Heat the lard until thoroughly liquefied. Dissolve lye in two and one-half quarts of cool, not hot nor cold, water. Stir the lye in the water until thoroughly dissolved. When the lard and lye mixtures have cooled to room temperature or about 70° F., pour the lye water slowly into the lard while it is being gently but thoroughly stirred. If either of the elements are too hot or the stirring too vigorous, a separation of the ingredients is likely to result. After all the lye mixture has been added to the lard, continue stirring gently until the resultant mixture becomes ropy; then add the alcohol, stirring the mixture gently; then return to the fire and continue stirring until the mixture comes to a boil. After the mixture comes to a boil, add the glycerine; boil and stir vigorously for about fifteen minutes and remove the receptacle from the fire and continue stirring until the mixture has cooled to about 60° F. Then add the gasoline, pouring it in slowly. Check pouring temporarily if too much ebullition is caused and continue to stir vigorously, adding all the gasoline to the mixture as expeditiously as possible. After the gasoline has been added, the boiler should be closed by a substantially air tight cover and the composition permitted to cool slowly. In cold weather, the composition is preferably prepared in a heated room. The closed container, thus protected, should be left undisturbed for a period of from twelve to twenty four hours, the longer the better, after which the contents will be found to have become a firm, flexible mass, almost snow white.

The composition is applied by impregnation of

the wood through boiling the container in the composition in the following manner:

First, prepare the wooden container as follows:

See that the container is in a thoroughly dry condition. Reset the hoops as tightly as possible and drill two extra bung-holes, one in each head of the container on opposite side of the same from the regulation bung-hole. The additional bung-holes should not be closer than one-half inch from the head of the staves or any joint-line of the separate pieces of the heads of the container. Use a sharp bit without applying sufficient pressure to split off slivers at the inner surfaces of the heads of the container. Provide cork bungs for closing the drilled holes after treatment of the container. Boil the cork bungs for about thirty minutes in the filler composition. They will shrink greatly under the effects of the boiling and therefore should be considerably oversized.

If open boiler is desired, provide a boiler of ample size to accommodate the container to be treated and to allow space for the boiling composition. The receptacle should be approximately half full to prevent boiling over and there should be sufficient amount of the liquid composition to fill and completely cover the wooden container being treated.

To prepare the filler composition for boiling, place in the boiler one-half gallon of water and apply heat. After the water comes to a vigorous boil, cut or slice the filler composition into small thin portions and add slowly to the boiling water, stirring constantly and adding more of the filler composition as the material dissolves, and continue until all of the composition is added and dissolved in the boiling liquid. The amount of water placed in the boiler is in proportion to the amount of composition obtained from the proportion of the ingredients hereinbefore stated and should be increased in proportion to any increase in the amount of the composition necessary to obtain sufficient liquid composition to fill entirely and cover the containers being treated.

The composition may be used repeatedly and indefinitely if dissolved each time a container is boiled. Should the material become too thick or stiff more water should be added.

The wooden containers should not be permitted to come in contact with the bottom or walls of the boiler and this may be conveniently accomplished by placing wooden frame bars in the bottom of the boiler which will prevent burning the keg or other wooden container. Place the wooden container in the boiler and press down slowly until it is completely filled with the boiling composition which will flow into the wooden container through the bung-holes when it is submerged in the boiling liquid. Then place a weight on the wooden container to keep it submerged in the boiling liquid but any other suitable means may, of course, be employed for this purpose. If an open boiler is used, allow the container to remain in the boiling liquid from forty five minutes to one hour. When the container has been thus treated, lift it out of the liquid and hold it above the boiler until it has drained thoroughly. Then clean the outer surface with a coarse heavy cloth or brush. After thorough cleaning in this manner, it should be thoroughly and vigorously rubbed and polished with wadded waxed paper. This not only completes the cleansing but properly prepares the container for painting.

Immediately after draining the container and

after the two head bungs have been carefully inserted so that they may be easily removed, pour a quantity of gasoline into the treated container. Then insert the regulation bung and vigorously rinse the container in order to wash out any particles of the filler composition which may not have drained from the container. This is very important and necessary and should be done as soon after the draining as possible to prevent fouling the contents later. When the rinsing gasoline is poured from the barrel it may be used many times over for the same purpose if it be strained to remove impurities from it.

Again it is very important that the container be painted as quickly and thoroughly as possible in order to prevent shrinking of the wood. The paint should be a flat synthetic enamel paint such as is used to paint iron or steel surfaces. Ordinary wood paints should not be used. Previous to painting, insert the prepared cork bungs so that they may be easily removed; this is to prevent any paint from getting inside the treated container. Painting with a gun or by dipping is preferable.

After application of the first coat of paint, immediately remove the three bungs and place the treated container in a current of cool, dry air with one end of the barrel turned towards the current for air circulation through the container. A large power driven fan has been found satisfactory for this purpose. When the first coat of paint is thoroughly dry, which should be within seven or eight hours, drive in the two head bungs, tapping them in lightly until the outer surface of the bungs is level and flush with the outer surface of the heads of the container. Then insert the regulation bung lightly and apply a second coat of paint. When the second coat of paint is dry, then apply a third coat of paint in the same manner in which the other two coats have been applied and dried. Sufficient paint must be applied to exclude the air entirely from the outer surface of the treated container as shrinkage is the worst enemy of a container thus treated and its best and least expensive protection is paint.

The treated container is now ready for service but in loading, it should never be filled to more than nine-tenths of its capacity, to prevent bursting from internal pressure. This is most important and does not apply only to wooden containers.

I have stated that in an open vat from forty-five minutes to one hour, depending upon the thickness of the walls of the container, is the time required to effectively boil the container and impregnate the same and fill the pores with the composition, providing the container is boiled vigorously. However, in mass production, other methods of boiling may be employed and will be found less expensive and will give superior results in from five to ten minutes per container. The principle of the steam pressure cooker may be utilized and for this purpose boilers will have to have sufficient strength to withstand fifty to sixty pounds pressure and afford a good safety margin. Also, the principle of the vacuum high-pressure method used in creosoting railroad ties, piling and timbers for other purposes may be advantageously used.

What is claimed is:

1. A composition for treating wooden containers for rendering the walls thereof impervious to gasoline and other liquids, consisting of and substantially in the proportion of 8 pounds animal

fat, 24 ounces concentrated lye, 1 pint glycerine, and 4 ounces gasoline.

2. A composition for treating wooden containers for rendering the walls thereof impervious to gasoline and other liquids, consisting of and substantially in the proportion of 8 pounds animal fat, 24 ounces concentrated lye, 5 ounces alcohol, 1 pint glycerine, and 4 ounces gasoline.

3. A composition for treating wooden containers for rendering the walls thereof impervious to gasoline and other liquids, consisting of and substantially in the proportion of 8 pounds pure lard, 24 ounces concentrated lye, five ounces of alcohol, 1 pint of glycerine, and four ounces of gasoline.

4. The herein described process of treating wooden containers for rendering the walls thereof impervious to gasoline and other liquids, consisting in treating the walls with a composition composed of and substantially in the proportion of 8 pounds animal fat, 24 ounces concentrated lye, 1 pint glycerine, and 4 ounces gasoline.

5. The herein described process of treating wooden containers for rendering the walls thereof impervious to gasoline and other liquids, consisting in treating the walls with a composition composed of and substantially in the proportion of 8 pounds animal fat, 24 ounces concentrated lye, 5 ounces alcohol, 1 pint glycerine, and 1 pint gasoline.

6. The herein described method of treating wooden containers for rendering the walls thereof impervious to gasoline and other liquids, consisting in boiling the wooden containers in a composition composed of and substantially in the proportion of 8 pounds animal fat, 24 ounces concentrated lye, 1 pint glycerine, and 4 ounces gasoline.

7. The herein described method of treating wooden containers for rendering the walls thereof impervious to gasoline and other liquids, consisting in boiling the wooden containers in a composition composed of and substantially in the proportion of 8 pounds animal fat, 24 ounces concentrated lye, 5 ounces alcohol, 1 pint glycerine, and 4 ounces gasoline.

8. The herein described method of treating wooden containers for rendering the walls thereof impervious to gasoline and other liquids, consisting in boiling the wooden containers in a composition composed of and substantially in the proportion of 8 pounds animal fat, 24 ounces concentrated lye, 5 ounces alcohol, 1 pint glycerine, and 4 ounces gasoline, drying the containers in a current of cool air, and coating the containers exteriorly to exclude air from the exterior surfaces of the containers.

9. The herein described method of treating wooden containers for rendering the walls thereof impervious to gasoline and other liquids, consisting in boiling the wooden containers in a composition composed of and substantially in the proportion of 8 pounds animal fat, 24 ounces concentrated lye, 5 ounces alcohol, 1 pint glycerine, and 4 ounces gasoline, drying the containers in a current of cool air, and painting the containers exteriorly to exclude air from the exterior surfaces of the containers.

10. A wooden container having its walls impregnated with a composition of substantially the proportion of 8 pounds of animal fat, 24 ounces of concentrated lye and one pint of glycerine, whereby the walls of the container are rendered impervious to gasoline and other liquids.

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