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NONCORRODIBLE METALLIC WOOL

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This invention pertains to non-corrodible and rust-resistant metallic scouring wool, and more particularly to the method of obtaining same.

Metallic wool or metallic gauze and the like, fabricated from ferro-metals, copper and copper alloys are widely used to obtain clean, bright surfaces. Metallic wool is also extensively used in upholstering, sound proofing, and in air filters. One of the serious problems connected with its use is a tendency for the metallic abrasive to readily corrode, tarnish or rust. This is particularly true when cleaning and polishing is done in the presence of water and/or soap solutions.

The object of my invention is to provide a corrosion resistant scouring wool. Another object of the invention is to provide a scouring wool resistant to corrosion and rusting in the presence of water and soap solutions. Another object of my invention is to provide a method of treating metallic wool with a corrosion resistant substance which assures complete protection of all the fibers.

Still another object of my invention is to provide a rust resistant steel wool substantially free from substances which interfere with its effective use. Other objects of the invention will become apparent from the following description thereof.

In an effort to prevent the corrosion and rusting, attempts have been made to treat metallic wools with oils, but there are several objections to this procedure. To be effectively protected by oil every fibre of the scouring wool must be substantially completely covered, which requires that an excess of oil must be employed. Direct oiling results in poor distribution throughout the mass of the scouring wool, leaving large areas of the metallic fibres unprotected. Also, because of the difficulty of removing excess oil, the wool has been left in a very oily condition, making its subsequent use for many purposes unsatisfactory.

I have found that I can effectively prevent the corrosion and rusting of metallic wool by submitting the wool to a treatment with an emulsion of oil and water. To obtain satisfactory dispersion of the oil in the water, I prefer to add the emulsifying agent to the oil. Although any suitable emulsifier may be used, I have found that I can obtain superior results by employing an oil soluble soap, and more particularly the sodium soap of preferentially oil soluble sulfonic acids obtained from the acid treatment of mineral lubricating oils of varying viscosities from 80 to 2500 seconds Saybolt at 100° F. These sulfonic soaps are extracted from the treated oil with a suitable solvent, preferably 50–70% alcohol, and the solvent subsequently removed therefrom. The extracted soaps containing about 20% oil may be so used, or they may be further thinned or diluted with additional oil and it is the oil soap mixture which I hereinafter term "mahogany soap". In order to prevent the mahogany soap from separating from the oil, and also to stabilize the emulsion, other materials such as oleic acid and alcohol may be added to the soap-oil solution.

Preparations made in the above manner I hereinafter term "dispersing oils".

The preferred dispersing oil which I employ for treating the scouring wool has the following formula:

50% mahogany soap
40% mineral lubricating oil
4% oleic acid
3% water
3% alcohol

The oil may be any suitable oil, but I have found that an oil of 100–400 seconds Saybolt viscosity at 100° F. is the most satisfactory oil to use. It is to be understood that the above formula is given only as an example of the type of dispersing oil which can be used in my invention, and is not to be taken as limiting the scope of the invention. Thus I may vary the amount of sulfonic soap from 20–60% and I may vary the other ingredients accordingly.

In carrying out my invention I dilute the dispersing oil with water in any suitable proportion, depending upon the film thickness it is desired to have remaining on the fibres of the wool. I have found that the most satisfactory results are obtained by diluting one part of the dispersing oil with ten parts of water. The emulsified oil is placed in a vat at ordinary or room temperatures, and the scouring wool, at the same temperature of the emulsified oil or at higher temperatures is dipped or immersed thereinto. I prefer to heat the wool to a temperature of about 150–450° F. before introducing it into the emulsified oil bath. By heating the wool to the higher temperatures I obtain a coating of oxide on the metallic fibres which apparently reacts or combines with the free fatty acids and/or soaps in the dispersing oil to form a highly corrosion resistant film when the heated metallic wool is quenched in the emulsified dispersing oil. The quenching operation also provides a method of hardening and tempering the steel fibres of the wool, making it a more effective abrasive when used as a scouring material on hard surfaces. Also at the higher temperatures

better drainage is obtained and a shorter time is required for drying. The metallic wool may be immersed into the bath in large bundles and then cut to size or it may be cut to size before dipping.

After immersion in the emulsified oil bath the wool is withdrawn and the excess emulsified oil removed either by draining or centrifuging. The water in the emulsified oil is then evaporated therefrom by any suitable means, for example, by gentle heating in a current of air.

Although this treatment leaves the fibres coated with only a very thin protective film of the oil and sulfonic soap, the adherence is such that substantially complete protection is obtained against corrosion and rusting. By treating the scouring wool in the manner above described the oil is made to penetrate to the innermost fibers and the oil effectively dispersed on each fiber so that there is substantially no area left uncovered with a protective film after the evaporation of the water from the emulsified oil.

Metallic scouring wool treated in accordance with my invention does not possess the disadvantages of metallic wool saturated with oil. When the former is used there is substantially no oil left on the cleaned surface as the very thin protective film is not removed from the wool. However, when oil soaked metallic wool is used the cleaned surfaces are left with a substantial film of oil which must be removed by oil solvents or thoroughly scrubbed with a detergent. This is a particularly serious disadvantage where the wool is used as an abrasive in preparing surfaces for varnishing, lacquering or painting.

I have found that scouring wool treated in the manner above described is not only resistant to corrosion and rust in storage but also continues to maintain this resisting property even while being used in the presence of water and soap solutions. This I attribute to the fact that the mahogany soap which I employ is an emulsifying agent of the invert type and bonds the oil to the extensive surfaces of the fiber. Metallic wools which have been treated with water soluble soaps, corrode and rust very readily because the soap is removed by the water leaving the fibers exposed to the water and moisture. Scouring wools treated with my emulsified oils as described are not so affected, since after such use the water absorbed by the oil soap film evaporates, and there is still left on the fibers the necessary protective film.

While I have disclosed in detail a preferred embodiment of my invention, I do not limit myself thereto except as defined by the following claims.

I claim:

1. The method of making a new article of manufacture, a steel wool scouring pad for cleansing and scouring cooking utensils, which comprises heating the steel wool pad to a temperature of about 150° F. to 450° F., dipping the heated pad into an emulsion comprising a small amount of dispersing oil containing a preferentially oil soluble petroleum sulfonic soap, and a large amount of water, draining the excess emulsified dispersing oil from the steel wool pad and evaporating the water from the emulsified dispersing oil remaining on the steel wool pad, whereby the fibers of the steel wool pad are made rust resistant and the efficiency of the steel wool scouring pad thereby increased.

2. The method of making a new article of manufacture, a metallic wool scouring pad for cleansing and scouring cooking utensils, which comprises heating the metallic wool scouring pad to a temperature of about 150° F. to 450° F., dipping the heated pad into an emulsion comprising a small amount of dispersing oil containing a preferentially oil soluble petroleum sulfonic soap, and a large amount of water, draining the excess emulsified dispersing oil from the metallic wool scouring pad and evaporating the water from the emulsified dispersing oil remaining on the metallic pad, whereby the fibers of the metallic wool pad are made rust resistant.

3. As a new article of manufacture a steel wool scouring pad, comprising steel wool fibers coated with a film consisting of mineral oil, mahogany soap and oleic acid, whereby the fibers are made rust resistant after exposure to aqueous soap solutions.

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