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CLEANING PAD AND COMPOSITION THEREFOR

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This invention relates to new and useful improvements in a cleaning pad for metals, to the composition used to impregnate the pad and the method of preparing the pad.

It is common practice to clean and polish the surfaces of such metals as copper, brass, bronze, other copper alloys, stainless steel, chrome and the like metallic materials using a powder, paste or liquid applied with a moistened cloth and with considerable rubbing to remove the surface coating from the metal. The practice has been found objectionable because of the necessity of assembling the cloth and cleaning compound, the amount of rubbing required to clean the metallic surface and the messy cloth which results from the cleaning and polishing operation accompanied by soiling of the hands.

The present invention proposes an improved cleaning pad in which the cleaning and polishing compound is within the pad at all times ready for instant use by being maintained in a moistened condition by a humective material so that metallic surfaces of the type previously referred to can be quickly cleaned and polished by gently rubbing the surface with the pad, followed by rinsing with cold water or light buffing with a clean cloth to remove excess compound from the surface of the cleaned metal.

Another object of the present invention proposes the preparation of a cleaning and polishing pad which can also be used for removing the rust from the surface of iron and steel; however, somewhat more vigorous rubbing is required than is necessary to clean and polish the surfaces of the other metals.

A further object of the present invention proposes such a cleaning pad for metals which can be re-used a number of times thus eliminating the need for obtaining a fresh cloth each time the metals are to be cleaned and for disposing of the soiled cloth following each cleaning and polishing operation.

Still another object of the present invention proposes a metal cleaning and polishing pad consisting of a piece of absorbent material impregnated with a composition of matter having as its essential ingredients an acidic material having a pH below 4 in a one per cent aqueous concentration, an abrasive material, a humective material and water, in which the humective material functions to maintain the pad sufficiently moist at all times and ready for instantaneous use without further moistening.

The present invention further proposes a composition of matter for impregnating the cloth in which the acidic material is preferably sodium bisulfate, in which the abrasive material is crystalline silica and in which the humective material is glycerin or some similar agent in a manner to produce a cleaning pad having maximum cleaning and polishing effectiveness.

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A still further object of the present invention proposes a novel method of preparing the metal cleaning cloth of the present invention.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and the appended claims in which the various novel features of the invention are more particularly set forth.

The cleaning and polishing pad, according to the present invention, is characterized by a strip of material of an absorbent nature which is saturated with a composition of matter prepared in accordance with this disclosure. The pad is maintained in a moistened condition by the inclusion of a humective material in the composition of matter so that the pad will be ready for instantaneous use without the need of any further moistening. The pad prepared in accordance with the present invention is rubbed gently over the surface of metals such as copper, brass, bronze, other copper alloys, stainless steel, chrome and the like to remove the unsightly surface coatings and restore the original brilliance and lustre of the metals. The pad can also be used to remove the rust from the surface of iron and steel, if caught in the early stages, although somewhat more vigorous rubbing is required than when cleaning and polishing the surfaces of the metals previously referred to. It is appreciated that if the rusting of the iron and steel has advanced too far, the pad is then ineffective for such removal.

The cleaning and polishing pad can be re-used a number of times; however, it has been found that the life of the pad can be increased and the action of the humective material improved if the pad is stored in an airtight container—such as a capped glass jar—between uses.

The composition of material used for impregnating the absorbent material is prepared as a bath and has the following general formula:

Ingredient:	Per cent by weight
Acidic material having a pH below 4 in a 1% aqueous concentration	15 to 35
Abrasive material	15 to 35
Humective material	1 to 15
Water	33 to 67

When the preparation of the bath is completed, the absorbent material is passed through the bath and upon removal therefrom the excess liquid is removed and the material is cut up into pads of appropriate size and packaged in airtight enclosures—such as sealed cellophane wrappers or capped glass jars—for sale to the retail trade. If desired, the completed absorbent material can be packaged in bulk for use by commercial establishments where the strip will be cut in appropriate lengths as required.

The following is a specific example for carrying out the purposes of the present invention:

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A preferred bath is prepared in accordance with the following specific formula:

Ingredient:	Per cent by weight
Sodium bisulfate (NaHSO_4)	25
Crystalline silica (SiO_2), granular to pass a 400 mesh screen	23
Glycerin ($\text{C}_3\text{H}_8\text{O}_3$)	3
Water (H_2O)	49
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The bath is prepared by heating the required amount of water to near boiling (about 90 degrees centigrade) in a steam-jacketed kettle of acid-resistant construction. It is essential that the water be as hot as possible to speed the dissolving of the sodium bisulfate. When the water reaches the desired temperature, the glycerin is then added to the water with agitation to incorporate the glycerin in the water. To that hot mixture the required amount of sodium bisulfate is added and the mixture stirred until the acidic salt is completely dissolved in the solution. Finally, the crystalline silica is added to the solution with agitation so that the silica particles will become dispersed completely through the solution.

The bath is now ready to have the strip of absorbent material passed through the bath to absorb the composition of matter. For purposes of the present invention felt made of wool or wool and cotton mixture has been found to be the best for the pad because of its soft texture, good rubbing qualities and relative stability to acid.

The felt material is fed continuously through the bath which is maintained at a temperature between 60 and 65 degrees centigrade, with a uniform temperature of 63 degrees centigrade being most desirable. The temperature range set forth has been found critical for two reasons: First, a temperature below 60 degrees centigrade causes precipitation of the acidic material; and, secondly, a temperature above 65 degrees centigrade results in physical degradation of the pad by the action of the hot acid solution. During the entire time that the strip of felt is being passed through the bath it must be agitated to prevent the silica from settling to the bottom and thereby alter the silica content of successive lengths of the strip of felt.

The felt material is maintained in the solution a sufficient length of time to allow for complete saturation by the solution, which time varies in accordance with the temperature of the solution. With the solution at a temperature of 65 degrees centigrade a length of time between 30 seconds and one full minute has been found sufficient to obtain complete saturation. The felt material then passes from the bath and through rollers of acid-resistant material to squeeze out only the excess liquid. The squeezed out liquid can be returned to the tank containing the solution for re-use. Squeezing of the felt material is not carried out to damp dry the material but only so that the weight of the additive liquid is approximately $2\frac{1}{2}$ to 4 times the weight of the felt material.

The felt material is then cut up into separate pads of the desired size. The individual pads are then packaged within airtight containers—such as bags of cellophane or capped glass jars—and are ready for sale to the retail trade for use as previously described.

The following table sets forth specific varia-

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tions of the specific formula previously set forth which have been tried and found effective for the purposes of the present invention:

Table of formulas

	A	B	C	D	E	F	G	H	I	J
Sodium bisulfate	15	20	30	35	25	20	25	25	25	25
Silica	15	19	25	23	35	23	23	23	23	23
Glycerin	3	3	3	3	1	5	7	9	12	15
Water	67	58	42	33	51	40	45	43	40	37

All of the figures in the foregoing table denote percentages by weight.

The acid material is the active ingredient in the composition of material which functions to act upon and destroy the oxide films which cover the surfaces of the metals. Experiments have been conducted with various acids and acidic salts and it has been found that any acidic material having a pH of below 4 in a one per cent aqueous concentration is suitable for purposes of the present invention. It is appreciated, of course, the greater the acidity of the material, the more efficient the cleaning action; however, excessively acid materials have undesirable effects on the hands. Sodium bisulfate has been found desirable because of its high acidity, low cost, freedom from toxicity and its solubility in water. However, experiments have been conducted using the following materials and they have been found satisfactory:

Aluminum chloride (AlCl_3)
 Ammonium phosphate ($(\text{NH}_4)_2\text{HPO}_4$)
 Ammonium chloride (NH_4Cl)
 Antimonous chloride (SbCl_3)
 Potassium bisulfate (KHSO_4)
 Oxalic acid ($\text{C}_2\text{H}_2\text{O}_4$)
 Phosphoric acid (H_3PO_4)
 Tartaric acid ($\text{C}_4\text{H}_6\text{O}_6$)

The above acidic materials are by way of example only and others having a pH below 4 in a one per cent aqueous concentration can be selected.

The crystalline silica is the abrasive material which aids, by mechanical action, in the removal of surface dirt and metallic oxide from the surface. The abrasive used should be hard, of irregular surface area and of fine particle size. The particles should be of a size capable of passing a screen having a mesh of 300 to 600. However, experiments have shown that maximum cleaning effectiveness with the least surface scratching can be achieved if the crystalline silica is of a particle size to pass a 400 mesh screen, as previously indicated. Other materials which can be substituted for the crystalline silica as the abrasive material and produce an effective pad are granular tripoli (decomposed siliceous limestone), diatomaceous earth (kieselguhr) or one of the micaceous minerals; such as potassium aluminum orthosilicate



Glycerin functions as the humective material to maintain the pad at the desired moistened condition to be ready for instantaneous use. The following additional humective materials have been tested and found suitable for purposes of the present invention:

Diethylene glycol ($\text{C}_4\text{H}_{10}\text{O}_3$)
 Ethylene glycol (1,2-ethane-diol; $\text{C}_2\text{H}_6\text{O}_2$)
 Propylene glycol (propanediol; $\text{C}_3\text{H}_8\text{O}_2$)
 Sorbitol ($\text{C}_6\text{H}_{14}\text{O}_6$)

The water is used to bring the acidic material in solution in which the acidic material will effectively function to remove the metallic oxide and a very thin layer of the metal from the surface thereof.

The absorbent material functions as the vehicle by which the composition of matter of the present invention can be used for its intended purposes. Experiments have shown that any absorbent material which is relatively stable to acid can be utilized. Additional materials tested and found desirable were velour of cotton or wool, glass wool, Fiberglas, absorbent cotton and silk or rapon plush. While glass wool and Fiberglas are not true absorbent materials it has been found that sufficient solution is absorbed by the surface of those materials to make them effective for purposes of the present invention.

From the foregoing description, it is apparent that the present invention proposes novel cleaning and polishing pads which are ready for instantaneous use and which can be re-used any number of times before their effectiveness is completely destroyed. The pads function to restore the original brilliance and lustre to metallic surfaces with a minimum of effort, completely eliminate the need for having to obtain a fresh cloth for each cleaning and the need for having to dispose of the dirtied cloth following each cleaning and further function to prevent excessive dirtying of the hands.

In use, the metallic surface to be cleaned is rubbed with the pad until the natural brilliant lustre of the metal surface is restored. Excess material from the pad can then be flushed from the metal surface with clear water followed by wiping with a clean dry cloth or the excess material can be removed by wiping the surface with any desired clean soft absorbent cloth material.

It has been found that the humective material included in the impregnated cleaning cloth makes the cloth effective for the removal of grease from pots, metallic surfaces of brass and pipes.

While I have illustrated and described the preferred embodiments of my invention, it is to be understood that I do not limit myself to the precise examples herein disclosed and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent is:

1. A re-usable cloth for cleaning metals which is maintained moist by a humective material, said cloth being impregnated with a composition of matter having the following ingredients by weight: 15 to 35% of an acidic material having a pH below 4 in one per cent aqueous concentration, 15 to 35% of an abrasive material, 1 to 15% of a polyhydroxy alcohol and 33 to 67% of water.

2. A re-usable cloth for cleaning metals which is maintained moist by a humective material, said cloth being impregnated with a composition of matter having the following ingredients by weight: 15 to 35% of an acidic material having a pH below 4 in one per cent aqueous concentration, 15 to 35% of an abrasive material, 1 to 15% of a humective material and 33 to 67% of water, said humective material being glycerin.

3. A re-usable cloth for cleaning metals which is maintained moist by a humective material, said cloth being felt and impregnated with a composition of matter having a following ingredi-

ents by weight: 25% of sodium bisulfate, 23% of crystalline silica having a particle size capable of passing a 400 mesh screen, 3% glycerin, and 49% water.

4. A composition of matter for impregnating a metal cleaning and polishing cloth, which comprises 15 to 35% of an acidic material having a pH below 4 in one per cent aqueous concentration, 15 to 35% of an abrasive material, a polyhydroxy alcohol, and water, said acidic material being one of the group consisting of sodium bisulfate, ammonium chloride, potassium bisulfate, antimonous chloride, oxalic acid, tartaric acid, phosphoric acid, ammonium acid phosphate or aluminum chloride.

5. A composition of matter for impregnating a metal cleaning and polishing cloth, which comprises 15 to 35% of an acidic material having a pH below 4 in one per cent aqueous concentration, 15 to 35% of an abrasive material, a polyhydroxy alcohol, and water, said acidic material being one of the group consisting of sodium bisulfate, ammonium chloride, potassium bisulfate, antimonous chloride, oxalic acid, tartaric acid, phosphoric acid, ammonium acid phosphate or aluminum chloride; said abrasive material being one of the group consisting of crystalline silica, tripoli, diatomaceous earth or a micaceous mineral.

6. A composition of matter for impregnating a metal cleaning and polishing cloth, which comprises 15 to 35% of an acidic material having a pH below 4 in one per cent aqueous concentration, 15 to 35% of an abrasive material, a polyhydroxy alcohol, and water, said acidic material being one of the group consisting of sodium bisulfate, ammonium chloride, potassium bisulfate, antimonous chloride, oxalic acid, tartaric acid, phosphoric acid, ammonium acid phosphate or aluminum chloride; said abrasive material being one of the group consisting of crystalline silica, tripoli, diatomaceous earth or a micaceous mineral, said polyhydroxy alcohol being one of the group consisting of being glycerin, diethylene glycol, ethylene glycol, propylene glycol or sorbitol.

7. A composition of matter for impregnating a metal cleaning and polishing cloth, which comprises from 15 to 35% by weight of an acidic material having a pH below 4 in one per cent aqueous concentration, from 15 to 35% by weight of an abrasive material, from 1 to 15% by weight of a polyhydroxy alcohol, and from 33 to 67% by weight of water.

8. A composition of matter for impregnating a metal cleaning and polishing cloth, which comprises 25% by weight of sodium bisulfate, 23% by weight of crystalline silica having a particle size capable of passing through a 400 mesh screen, 3% by weight of glycerin, and 49% by weight of water.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,216,643	Yasuda	Feb. 20, 1917
1,489,573	Ferbeck	Apr. 8, 1924
2,027,931	Ray	Jan. 14, 1936
2,034,070	Weygandt	Mar. 17, 1936
2,093,824	Woronoff	Sept. 21, 1937
2,152,917	Quisling	Apr. 4, 1939
2,375,824	Saunders et al.	May 15, 1945
2,403,821	Morgan et al.	July 9, 1946
2,468,853	Williamson	May 3, 1949