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PROCESS OF BRIGHT DIPPING

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This invention relates to a deburring and bright-dipping or polishing process for metal objects and particularly to a novel bath composed of sodium dichromate, sodium bisulfate, and sodium nitrate and its use for treating objects manufactured from gilding-metal, brass, and like metals.

Prior to the use of applicants' novel process and bath, objects made from brass and like metals were deburred and/or bright-dipped by processes which included the placing of the objects for an undetermined length of time in a strongly acid bath composed of sulfuric acid, nitric acid, hydrochloric acid, and water, which was used at room temperature. Due to the strongly acid nature of this bath, the process was difficult to control and often caused severe etching of the objects and the consequent production of inferior objects. Furthermore, due to the strongly acid nature of the prior bath at room temperature, great care had to be taken in cleaning the objects after they were removed from the bath in order to insure that all the acid would be cleaned therefrom, so that there would be no appreciable acid residue on the objects which could cause damage to the object or to other material with which the treated object might come in contact.

Applicants avoid these difficulties with their novel bath and method of using it. The novel bath disclosed herein is a relatively weak acid bath at normal room temperature but, through a uniform increase in ionization, becomes more acid as the bath is heated; consequently, by controlling the temperature at which the bath is used, the effect of the bath on the objects can be controlled very closely, and severe etching and damage to the artic'es can be prevented. Since the bath is only slightly acid at room temperatures, any acid residue which might remain on the objects would not be sufficiently strong to affect or damage the objects or any material with which the treated objects might come in contact.

It is an ob'ect of the invention, therefore, to provide a novel process for removing burrs from and/or bright-dipping objects made of gilding-metal, brass, and the like metals.

Another object of the invention is to provide a novel solution to be used as a bath in a bright-dipping and deburring process for objects made of gilding-metal, brass, and the like metals.

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Another object of the invention is to provide a novel process for deburring and bright-dipping objects of gilding-metal, brass, and the like metals, in which process a bath is used and the effect of the bath on the objects can be readily controlled to prevent damage to the objects by unduly severe etching thereof.

A further object of the invention is to provide a novel process for deburring and bright-dipping objects made of gilding-metal, brass, and the like metals, in which process a bath is used which can be controlled as to its activity, through ionization, by controlling its temperature.

A further object of the invention is to provide a novel process for deburring and bright-dipping objects made of gilding-metal, brass, and the like metals, in which process a bath is used, the residue of which bath, if any remains on the objects after the completion of the process, will be ineffective to cause damage to the objects or to other material with which the objects may come in contact.

A further object of the invention is to provide a solution to be used in a process for treating objects made of gilding-metal, brass, and the like metals, which solution is of sufficiently weak acidity at normal room temperature to have substantially no effect on the objects but which solution increases in ionization at higher temperatures and becomes effective to act on the objects as a bright dip to polish them and to remove burrs or other undesirable marks therefrom.

Still further objects and novel features of the invention will be apparent from the appended claims and the following description, which sets forth one manner in which the process may be carried out.

The novel bath is composed of a solution of sodium dichromate, sodium nitrate, and sodium bisulfate in water, and the following proportions have been found to give excellent results:

	Ounces
Sodium dichromate (commercial grade)	27
Sodium nitrate (commercial grade)	27
Sodium bisulfate (commercial grade)	40
Water to make one gallon of solution	

The above proportions, which approximate three parts by weight of sodium dichromate, three parts by weight of sodium nitrate, and four parts by weight of sodium bisulfate, are merely given

as illustrative, and it is not intended to limit the invention to these particular proportions, as they may be varied without departing from the invention.

This bath, at room temperature, is of such weak acidity that objects of gilding-metal, brass, and the like metal to be treated will show no signs of being attacked thereby if left in the bath for periods as long as 24 hours. However, when heat is applied to the bath, the temperature of the bath rises, causing ionization of sodium bisulfate, which results in the formation of relatively small quantities of both free sulfuric acid and free nitric acid. At about 130 degrees Fahrenheit, the bath will begin to be effective to polish and remove burrs or other marks from the objects. Around 130 degrees, the action of the bath on the objects is rather slow, but, as the temperature increases above that point, the ionization of the bath increases, causing the action of the bath on the objects to become more rapid and the control of the process to become more critical. Consequently, by determining the desired degree of control and the speed of action of the bath on the particular objects to be treated, the process can be carried out under these desired conditions merely by controlling the temperature of the bath. It has been found that, with the bath between 145 degrees Fahrenheit and 155 degrees Fahrenheit, the process can be carried out almost as quickly as the prior processes, and with such improved control conditions that the possibility of severe etching and damage to the objects is avoided. When the temperature of the bath returns to normal room temperature, the solution is restored to its slightly acid nature. The novel bath should be used in stoneware jars or tanks or in properly lined steel tanks.

Broadly, the novel process consists in the steps of cleaning the objects to be treated; placing the cleaned objects in the novel bath, which is maintained at the temperature selected according to the speed and degree of control desired; leaving the objects in the bath until they have been deburred or have acquired the desired finish; and finally removing the objects from the bath and rinsing and drying them.

In carrying out the process, the manner in which the objects are cleaned, the operating temperature of the bath, and the length of time the objects remain in the bath can be varied to suit the particular objects being treated without departing from the invention. As a specific example of a sequence of operations which might be used in carrying out the process, it has been found that excellent results may be obtained with the process using the following sequence of operations:

1. The objects to be treated are placed in a perforated basket or container.

2. The objects are cleaned or degreased with trichlorethylene or other cleaner.

3. The cleaned objects are rinsed in running water.

4. The objects are placed in the novel bath, which is maintained at a temperature between 145 degrees and 155 degrees Fahrenheit, and allowed to remain in the bath for the time required to produce the desired finish on the objects.

5. The objects are again rinsed in running water.

6. The objects are rinsed in clean hot water.

7. As the final step, the objects are dried with warm or hot air.

For best results, the objects should be agitated while they are being cleaned, while they are in the bath, and while they are being dried.

The above conditions and sequence of operations are merely given to illustrate one manner in which the process may be carried out, and are not to be considered as limiting the novel process to these particular conditions and steps.

When the process is used with small objects or with objects having critical dimensions, the best and most consistent results are obtained by first checking the objects for critical dimensions, next placing them in the bath for approximately half the estimated time required for the deburring or polishing action, and then checking them again and, from the appearance and change in size, determining the remaining time the object must remain in the bath to produce the desired finish on the object.

Applicants, therefore, have provided a novel process for bright-dipping and deburring objects made of gilding-metal, brass, and like metals, in which process the rate of reaction in the bath used can be controlled as to its ionization of certain constituents by controlling its temperature. The control of the ionization of the bath enables the rate of the action of the bath on the objects to be regulated so that severe etching and damage to the objects can be avoided.

While the process herein set forth and described is admirably adapted to fulfill the objects primarily stated, it is to be understood that it is not intended to confine the invention to the particular steps enumerated or to the use of particular proportions or ingredients of the bath, or to the temperature range specified.

What is claimed is:

1. The process of bright-dipping and deburring objects of brass which includes the step of subjecting the objects to the action of a bath which is an aqueous solution consisting of, for each gallon of the solution, 27 ounces of sodium dichromate, 27 ounces of sodium nitrate, 40 ounces of sodium bisulfate, and the remainder water, and which is of sufficiently weak acidity at normal room temperature that it will not appreciably attack objects left therein for as long as 24 hours but which becomes more active through ionization upon increase of temperature until at about 130 degrees Fahrenheit it becomes effective as a bright-dip; and the step of maintaining the bath at a temperature selected between 130 degrees Fahrenheit and the boiling point of the bath, depending upon the desired ionization and rate of action of the bath on the object, whereby a high degree of control of the process is obtained and damage to the objects caused by unduly severe etching of the objects can be avoided.

2. The process of bright-dipping objects of brass which includes the step of subjecting the objects to the action of a bath which is an aqueous solution of sodium dichromate, sodium bisulfate, and sodium nitrate, in the proportion of approximately three parts by weight of sodium dichromate, four parts by weight of sodium bisulfate, and three parts by weight of sodium nitrate, the bath being ineffective as a bright-dip at normal room temperature but becoming more highly ionized as its temperature rises and being effective as a bright-dip when it is above 130 degrees Fahrenheit.

3. A bright-dip bath consisting of an aqueous solution of sodium dichromate, sodium bisulfate, and sodium nitrate, containing approximately

three parts by weight of sodium dichromate, four parts by weight of sodium bisulfate, and three parts by weight of sodium nitrate, and heated to a temperature above 130 degrees Fahrenheit.

4. A bright-dip for brass, composed of the following ingredients and proportions:

	Ounces
Sodium dichromate	27
Sodium nitrate	27
Sodium bisulfate	40
Water to make one gallon	

and heated to between 145 degrees and 155 degrees Fahrenheit.

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