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ELECTROLYTIC PROCESS FOR REMOVING MACHINING BURRS FROM METAL ARTICLES

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Fig. 1

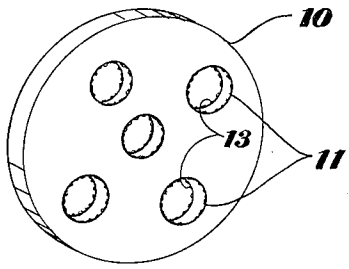


Fig. 3

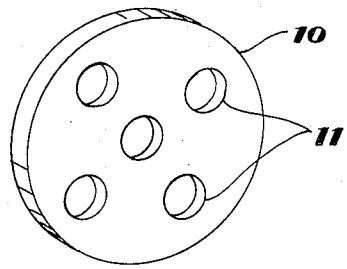
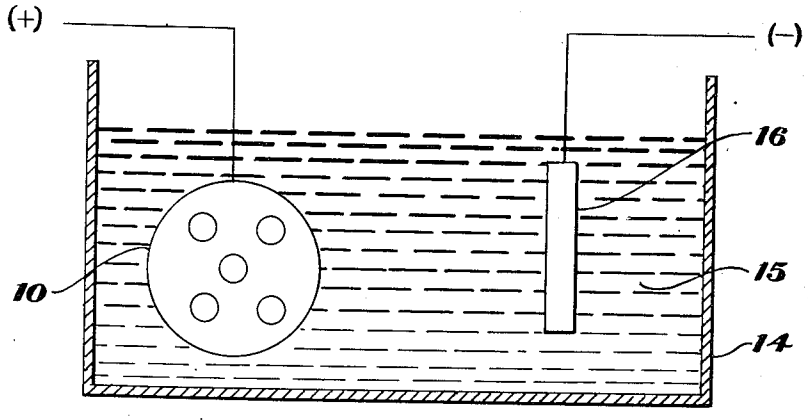


Fig. 2



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ELECTROLYTIC PROCESS FOR REMOVING MACHINING BURRS FROM METAL ARTICLES

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4 Claims. (Cl. 204—143)

This invention relates to a process for removing machining burrs from the edges of apertures which have been formed in metal plates, or the like, by stamping or drilling, and more particularly to an electrolytic process for removing such burrs from apertures in non-ferrous metal alloys such as brass, bronze and nickel alloys, without otherwise changing the desired dimensions of such apertures.

In stamping or drilling various shaped holes through brass plates, such machining operations leave burrs around the edges of the holes. In cases where the brass plate is assembled so that a pin or rod must be free to turn in the hole, or conversely in cases where the brass plate engages a pin or rod and must freely turn therearound, it is necessary that these burrs be removed and without, of course, changing the diameter or other dimension of the hole.

This removal of these metal burrs has previously been done by hand, thereby greatly increasing the cost of manufacturing.

An object of the present invention is therefore to provide a method for electrolytically removing burrs from apertures in non-ferrous metal articles without changing the desired dimensions of the aperture.

Another object is to provide an electrolytic solution which is adapted for use in my process.

Other objects will appear hereinafter.

In accordance with the present invention, these and other objects are attained by employing my novel electrolytic process and electrolytic solution in the following manner. The non-ferrous article from whose apertures burrs are to be removed is made the anode in an unbalanced electrolytic solution comprising a saturated sodium chloride solution or a dilute phosphoric acid solution and containing a soluble resinous material. A current of 20 amp. to 40 amp. per sq. foot of anode area may be advantageously applied between the article and a metal cathode. The temperature of the bath may be effectively maintained within a range of 70–75° F. The current is applied until the burrs are removed, usually this time will be within a range of 10 minutes to two hours depending on the size of the burrs being removed. Because the solution is unbalanced the burrs will be completely removed without any substantial attack on the metal body. Hence, the dimension of the apertures from which the burrs are removed will remain within the desired limits.

The invention is further illustrated in the following examples and in the drawings, in which:

Fig. 1 is a perspective view of a non-ferrous metal plate having a plurality of round apertures therein and having burrs on the edges defining the apertures.

Fig. 2 is a schematic view of a plating bath showing the metal plate to be treated immersed in an electrolytic solution and connected to the positive side of the electrical source.

Fig. 3 is a perspective view of the plate after the burrs have been removed.

Referring to Fig. 1, a non-ferrous plate such as a brass plate **10** is shown in which five apertures **11** have been drilled thereby leaving a plurality of burrs **13** on the metal surfaces defining the apertures **11**.

In accordance with the features of my invention and as shown in Fig. 2, I provide a plating bath containing an electrolyte **15** and a metal cathode **16**, which may be brass, and a source of current, not shown, from which a negative terminal is attached to the cathode **16** and a positive terminal is provided to be attached to the plate **10** which is to be processed. The plate **10** as shown in Fig. 2 therefore becomes in effect the anode.

As above stated, the electrolyte may be composed of a saturated solution of sodium chloride or a dilute solution of phosphoric acid.

The following electrolyte may be effectively employed:

Example 1

Phosphoric acid, 18% sp. gr. 1.100
Cellulose gum ½ oz./gal.
Temperature of operation 70–75° F.

The plate **10** to be treated is immersed in the electrolyte and attached to the positive terminal. A current of 25 amperes per square foot of anode is applied to the cell and in 25 minutes the burrs are electrolytically removed from the apertures by current flowing to the cathode without disturbing the other surfaces of the plate **10**.

Example 2

An electrolyte composition of

Sodium chloride (saturated solution)
Cellulose gum ½ oz./gal.

was employed and the apertured plate **10** having burrs thereon to be treated was attached to the positive terminal and immersed in the electrolyte. A current of 30 amperes per square foot of anode is applied to the cell and in 40 minutes the burrs are removed by electrolysis without changing the dimensions of the apertures.

While the process for purposes of illustration is shown in Fig. 2 being carried out on a single plate **10**, I have found that with small plates such as those having dimensions of ⅛ inch thick and two inches in diameter my process can be effectively carried out in a common plating barrel with loads up to 3000 plates.

In place of cellulose gum equivalent amounts of methyl cellulose, sodium cellulose sulfate, gum tragacanth and gum dextrine may be advantageously employed.

By employing my process and unbalanced electrolyte, burrs can be removed from apertures in brass, bronze and other non-ferrous metals and alloys at a very rapid and efficient rate, thereby considerably lessening the cost of producing such articles.

I claim:

1. The method of removing burrs from apertures in a non-ferrous metal article which comprises making said article the anode in an electrolyte containing a saturated sodium chloride solution and ½ ounce per gallon of methyl cellulose, maintaining the temperature of said electrolyte at 70–75° F., providing a cathode of a non-ferrous metal, and maintaining a current density of from 20 to 40 amperes per square foot of anode area for a period of at least 20 minutes.

2. The method of removing burrs from apertures in a non-ferrous metal article which comprises making said article the anode in an electrolyte containing a saturated sodium chloride solution and ½ ounce per gallon of sodium cellulose sulfate, maintaining the temperature of said electrolyte at 70–75° F., providing a cathode of a non-ferrous metal, and maintaining a current density of from 20 to 40 amperes per square foot of anode area for a period of at least 20 minutes.

3. The method of removing burrs from apertures in a non-ferrous metal article which comprises making said article the anode in an electrolyte containing a saturated sodium chloride solution and ½ ounce per gallon of gum tragacanth, maintaining the temperature of said electrolyte at 70–75° F., providing a cathode of a non-ferrous metal, and maintaining a current density of from 20 to 40 amperes per square foot of anode area for a period of at least 20 minutes.

4. The method of removing burrs from apertures in a non-ferrous metal article which comprises making said article the anode in an electrolyte containing a saturated sodium chloride solution and ½ ounce per gallon of gum dextrine, maintaining the temperature of said electrolyte at 70–75° F., providing a cathode of a non-ferrous metal, and maintaining a current density of from 20 to 40 amperes per square foot of anode area for a period of at least 20 minutes.

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