

[54] COINAGE MATERIALS
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[22] Filed: Dec. 22, 1971
[21] Appl. No.: 210,656
[52] U.S. Cl. 29/199
[51] Int. Cl. B23p 3/00, B23p 3/06
[58] Field of Search 29/199, 194

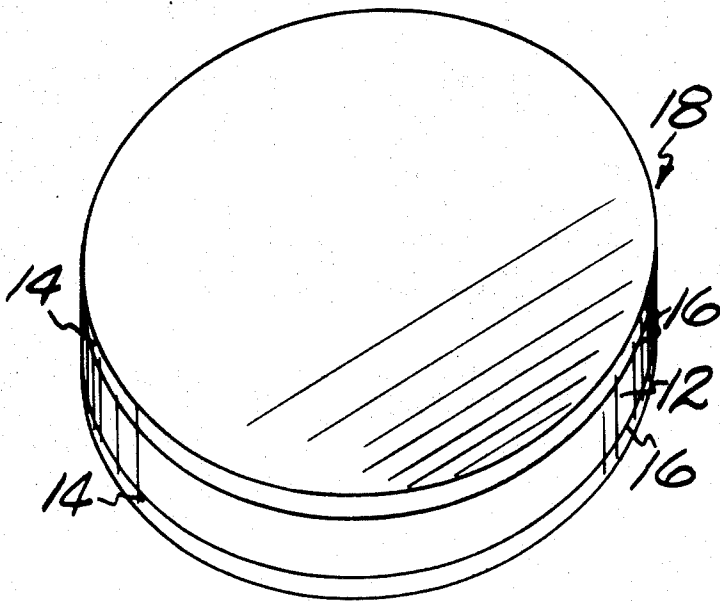
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[57] ABSTRACT
Novel and advantageous metal laminates of low cost, nonmagnetic materials, and coins made from the laminates, comprise outer cladding layers of coin silver or cupronickel metallurgically bonded to opposite sides of a core layer of nickel silver to provide substantially uniform color along the edges of the laminates and coins and to provide the coins with properties useful in coinage discrimination.

10 Claims, 2 Drawing Figures



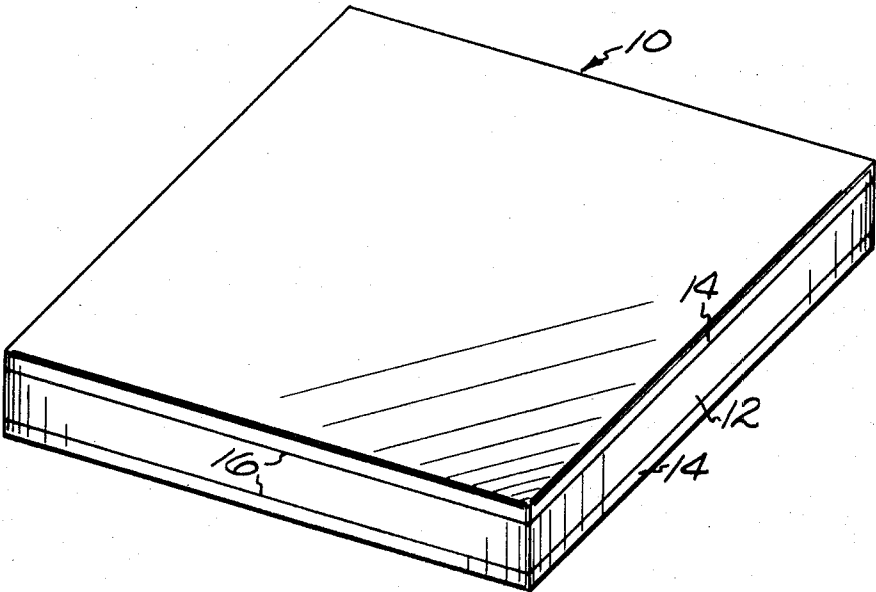


Fig. 1.

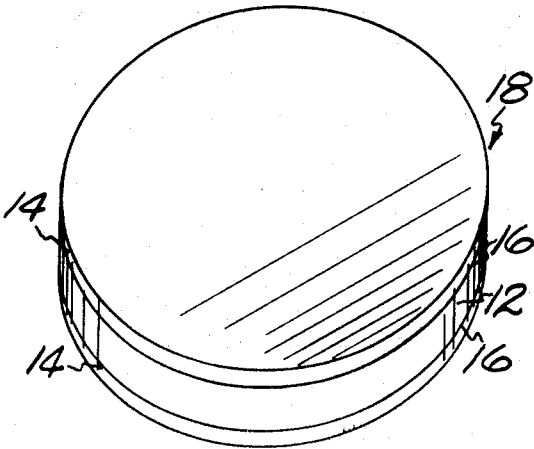


Fig. 2.

COINAGE MATERIALS

Composite coinage materials presently proposed or in use include cupronickel-clad copper-cored materials, cupronickel or nickel-clad steel-cored materials, and the like. However, these known coinage materials are each subject to one or more deficiencies particularly when considered for use in the coinage of smaller nations. For example, many of the known coinage composites utilize core materials which differ markedly in color from the materials used in the cladding of the composite, this color differential tending to degrade the appearance of coins and to lower public acceptance of coins made from the composite, particularly in the case of the coinage of smaller nations where the coinage is more likely to be seen in comparison with coinage of neighboring countries. Others of the known coinage composites utilize core materials which are galvanically less anodic than the cladding materials used in the composite so that coins made from these composites tend to lose their surface brightness during use. Many of the composite coinage materials now in use are not adapted for discrimination of the coins in the types of vending machines most commonly used. And other known coinage composites utilize relatively expensive core and cladding materials and therefore significantly reduce the seigniorage available to the smaller nations on issuance of coins made from the composites.

It is an object of this invention to provide novel composite metal laminate materials which are particularly attractive in appearance but which are characterized by low cost; to provide such laminate materials which tend to retain their surface brightness during use; to provide such laminate materials which display properties permitting discrimination of coins made from the materials in vending machines of the types now in widespread use; to provide coins made from such laminate materials; and to provide such laminate materials and coins which are easily manufactured.

Other objects, advantages and details of the composite metal laminate materials and of the coins provided by this invention appear in the following detailed description of preferred embodiments of the inventions, the detailed description referring to the drawings in which:

FIG. 1 is a perspective view of a metal laminate material provided by this invention; and

FIG. 2 is a perspective view of a coin made from the material illustrated in FIG. 1.

Referring to the drawings, 10 in FIG. 1 indicates a preferred embodiment of the novel and improved composite metal laminate material of this invention which is shown to include a metal core layer 12 of nickel silver material having a metal cladding layer 14 of cupronickel material on either side of the core layer, the cladding layers being metallurgically bonded to the core layer substantially throughout the interfaces 16 between the cladding and core layers. The claddings 14 are metallurgically bonded to the core layer by any conventional roll-bonding techniques or the like, the noted layer materials being well-suited for such bonding as will be understood. Referring to FIG. 2 of the drawings, 18 in FIG. 2 illustrates a conventional coin or coin blank cut from the laminate material 10.

In accordance with this invention, the core layer 12 of the laminate material 10 and of the coin 18 are preferably formed of a nickel silver material having a nomi-

nal composition, by weight, of 66 percent copper, 24 percent zinc, and 10 percent nickel, the core layer having a thickness comprising from about 80 to 98 percent of the total thickness of the composite material. Preferably the core layer has a thickness comprising about 90 percent of the total composite material thickness. However, other nickel silver materials are also used in the core layer 14 within the scope of this invention. For example, the core layer is alternately formed of a nickel silver alloy having a nominal composition, by weight, of 65 percent copper, 18 percent zinc, and 17 percent nickel; of a nickel silver alloy having a nominal composition, by weight, of 65 percent copper, 23 percent zinc, and 12 percent nickel; or of a nickel silver alloy having a nominal composition, by weight, of 55 percent copper, 27 percent zinc, and 18 percent nickel. All of these nickel silver alloys are of white color, are readily available from commercial sources, and, because of their substantial zinc contents and relatively low nickel contents, are available at relatively low costs.

In accordance with this invention, the cladding layers 14 of the laminate material 10 and of the coin 18 are preferably formed of cupronickel, the alloy customarily used in coinage materials which has a nominal composition, by weight, of 75 percent copper and 25 percent nickel being preferred. However, other cupronickel alloys such as the common alloy having a nominal composition, by weight, of 70 percent copper and 30 percent nickel, are also used within the scope of this invention. In other alternate embodiments of this invention, the cladding layers 14 of the laminate 10 and of the coin 18 are also formed of coin silver embodying at least about 80 percent, by weight, of silver and the balance copper. All of these cladding materials also display a white color and are readily available from commercial sources. Preferably the cladding layers 14 are each of a thickness in the range from about 1 to 10 percent of the total thickness of the composite material within the scope of this invention. Preferably each cladding layer has a thickness comprising about 5 percent of the total thickness of the composite material.

In these arrangements of the core and cladding materials in the laminate 10 and in the coin 18, numerous advantages are obtained. First, all layers of the composite material are of white color so that the coins made of the composite material have an attractive appearance, the edges of the coins not tending to indicate that the coins are not of solid material and not displaying the different core color commonly associated with use of many previously known composite coins. Note that where the composite nature of the coin is not apparent the coin is more difficult to counterfeit than where the presence and material of the core layer can be identified by observation. Note also that such appearance factors are important as is indicated by the many efforts that have been made to develop mechanical processes for concealing the edges of the core layer where the core layer is of a color different from the cladding material.

The outer surfaces of the coins are also hard and are readily mintable to provide a sharp wear-resistant imprint on the coin surfaces, and the core and cladding materials both display sufficient strength so that the coins do not become easily bent during use. The core materials are galvanically a little more anodic (less noble) than the cladding materials described above so that any slight material corrosion which may occur in

the coins during use will occur preferentially at the edge of the core, whereby any minor dulling of the composite resulting from such slight corrosion is confined to the edge of the coins where the dulling is not apparent and permits the broad surfaces of the coins to retain their brightness during use. Both the cladding and core materials have sufficient density to provide the coins with enough heft to be attractive in the coin, and both core and cladding materials are adapted to provide a pleasing coinage ring.

Most important, it is found that the noted laminate materials and coins are nonmagnetic permitting the coins to be used in vending machines in widespread use which are customarily adapted to reject magnetic materials such as steel slugs. Further, the noted coins are adapted to display desirable resistivity-density properties which permit the coins to be discriminated from coins of other common coinage materials in the eddy current discriminators used to a wide extent in coin-operated vending machines. For example, where the core layer 12 of the coin is formed of a preferred nickel silver alloy embodying 66 percent copper, 24 percent zinc, and 10 percent nickel and the cladding layers 14 of the coin are formed of the preferred cladding material embodying 75 percent copper and 25 percent nickel, and where the cladding layers 14 of the coin each comprise about 5 percent of the total thickness of the coin, the coin displays a resistivity-density factor of about 185 microhm-grams per square centimeter which permits ready discrimination of the coin from solid cupronickel coins (usually about 210 microhm-grams per square centimeter) and from many other coinage materials in use which display resistivity-density factors below about 150 microhm-grams per square centimeter.

In addition, the laminate and coin materials of this invention are also adapted to permit ready recovery of the composite metal scrap material which is generated in striking blanks for the coins from composite metal strip material of this invention. That is, where the laminate and coin materials have cupronickel claddings and nickel silver cores, the scrap material is recoverable merely by melting the scrap with addition of zinc to reproduce a nickel silver alloy. Alternately, where a coin silver cladding is used, the silver material is readily separable from the scrap materials by conventional techniques leaving the remaining materials to be processed for reproducing nickel silver materials.

It should be understood that although particular embodiments of the laminate materials and coins of this invention have been described by way of illustrations, this invention includes all modifications and equiva-

lents of the described embodiments falling within the scope of the appended claims.

I claim:

1. A composite metal laminate material useful in making coins comprising a core layer of nickel silver having a cladding layer of metallurgically bonded to opposite sides of said core layer, said cladding layers embodying a metal selected from the group consisting of cupronickel alloys and coin silver alloys.

2. A composite material as set forth in claim 1 wherein said core layer has a thickness comprising from about 80 to 98 percent of the total thickness of said composite material and each of said cladding layers has a thickness comprising from about 1 to 10 percent of the total thickness of said composite material.

3. A composite material as set forth in claim 2 wherein one layer is formed of a nickel silver alloy having a nominal composition, by weight, of from 55 to 66 percent copper, from 18 to 27 percent zinc, and from 10 to 18 percent nickel.

4. A composite material as set forth in claim 3 wherein said cladding layers embody a white metal selected from the group consisting of a cupronickel alloy having a nominal composition, by weight, of 75 percent copper and 25 percent nickel, a cupronickel alloy having a nominal composition, by weight, of 70 percent copper and 30 percent nickel, and a coin silver alloy having a nominal composition, by weight, of at least 80 percent silver and the balance copper.

5. A composite metal laminate material useful in making coins comprising a core layer of nickel silver alloy having a nominal composition, by weight, of 66 percent copper, 24 percent zinc, and 10 percent nickel, and a cladding layer of cupronickel alloy metallurgically bonded to opposite sides of said core layer, said cupronickel alloy having a nominal composition, by weight, of 75 percent copper and 25 percent nickel, each of said cladding layers having a thickness comprising about 5 percent of the total thickness of the composite material.

6. A coin made from the composite material set forth in claim 1.

7. A coin made from the composite material set forth in claim 2.

8. A coin made from the composite material set forth in claim 3.

9. A coin made from the composite material set forth in claim 4.

10. A coin made from the composite material set forth in claim 5.

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