

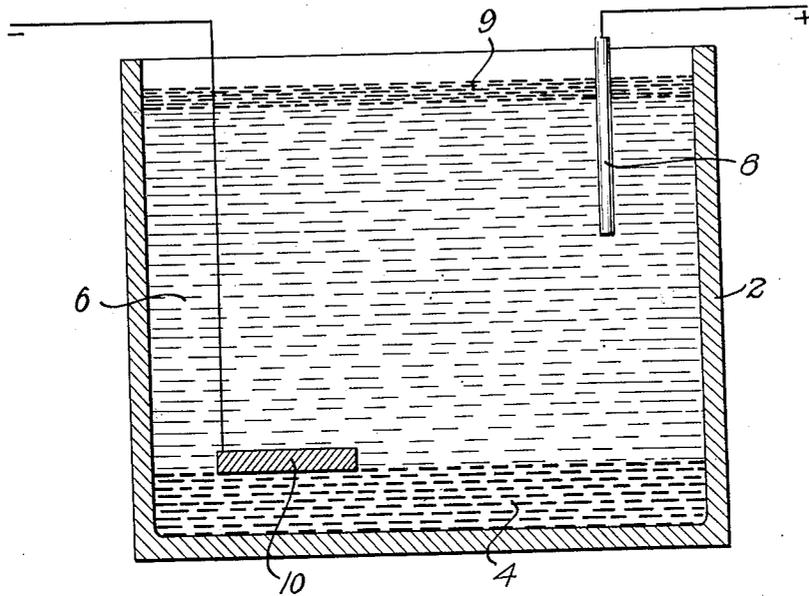
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PROCESS FOR FORMING AN AMALGAM AND PRODUCT THEREOF

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## PROCESS FOR FORMING AN AMALGAM AND PRODUCT THEREOF

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This invention is an electro-chemical process and apparatus for amalgamating or alloying various metals with mercury.

According to this process, the hard metal forms the cathode, while there is an intermediate anode of mercury. The current appears to pick up the mercury ions and carry them entirely into and through the hard metal, such as copper, iron or the like, and to deposit the mercury entirely throughout the harder metal, thus forming a homogeneous alloy or amalgam, the mercurial content of which can be varied by varying the current, time of treatment, etc.

The process may be carried out as illustrated in the accompanying drawing, where a vessel 2, has a layer of mercury 4 on the bottom. Above the mercury is an acid electrolyte 6 containing preferably hydrochloric and sulphuric acids in approximately these proportions:—

	Parts
Strong HCl.....	1
Strong H <sub>2</sub> SO <sub>4</sub> .....	1
H <sub>2</sub> O.....	2

The electrolyte also contains an amount of magnesium powder or magnesium ribbon, and iron oxide sufficient in proportion to the acid, to change the color of the liquid to white.

The current enters the electrolyte by an anode 8 which may be of carbon, or of the same metal as that forming the cathode 10. The surface of the acid bath is covered with a protecting film 9, such as rosin oil. The anode 8 is placed substantially at the surface of the acid bath, and may be of carbon, or of the same material as the cathode 10.

The cathode 10 is formed by the piece of hard metal being amalgamated, such as copper, iron, iron alloy, nickel, tungsten steel alloy, etc., and is preferably floated on the mercury as shown. The negative terminal is indicated at 12.

The current enters through the anode 8, passes into the mercury, which can be considered as forming an intermediate anode, and then into the cathode 10 carrying with it into the cathode the ions of mercury, and forming the desired amalgam. The amount

of mercury alloyed or amalgamated with the cathode 10 depends on the strength and voltage of the current, the time the current is on, and the nature of the cathode. A relatively high voltage, such as 150 volts, D. C., is preferred.

I claim as my invention:—

1. A process of forming an amalgam, comprising passing a current from a mercury anode into a metallic cathode.
2. A process of forming an amalgam, comprising passing a current from a mercury anode into a metallic cathode, both of which are immersed in an acid bath.
3. A process of forming an amalgam, comprising immersing a hard metal cathode in an acid bath containing metallic mercury, and passing a current from the mercury into the hard metal.
4. A process of forming an amalgam, comprising floating a metal cathode on mercury, and driving the mercury into the cathode to make an amalgam with it, by passing a current from the mercury into the cathode.
5. A process of forming an amalgam, comprising floating a hard metal cathode on mercury, in an acid bath, and passing a current from the mercury into the cathode.
6. A process of forming an amalgam, comprising floating a hard metal cathode on mercury, in an acid bath in the presence of magnesium, and passing a current from the mercury into the cathode.
7. A process of forming an amalgam, comprising the steps of placing a hard metal in contact with a mercury bath, passing a current into and through the mercury and thence into the hard metal, whereby the mercury is carried into and through the hard metal to form an amalgam therewith.
8. A process of forming an amalgam, comprising the steps of placing a hard metal in contact with a mercury bath, in the presence of an electrolyte, and passing a current from the mercury, which serves as an anode, into the hard metal, which serves as a cathode.
9. A process of forming an amalgam, comprising the steps of placing a hard metal in contact with a mercury bath in the presence of an electrolyte, and passing a current from

the electrolyte into the mercury and thence into the hard metal.

5 10. A process of forming an amalgam, comprising the steps of placing a hard metal in contact with a mercury bath in the presence of an electrolyte and magnesium, and passing a current from the mercury, which serves as an anode, into the hard metal, which serves as a cathode.

10 11. A process of forming an amalgam, comprising the steps of placing a hard metal in contact with a mercury bath in the presence of an electrolyte and iron oxide, and passing a current from the mercury, which serves as an anode, into the hard metal, which serves as a cathode.

15 12. A process of forming an amalgam, comprising the steps of placing a hard metal in contact with a mercury bath in the presence of an electrolyte and magnesium and iron oxide, and passing a current from the mercury, which serves as an anode, into the hard metal, which serves as a cathode.

20 13. As a new product, a hard metal of substantial thickness impregnated throughout with electrically deposited mercury.

25 In testimony whereof he affixes his signature.

HERBERT S. POLIN.

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