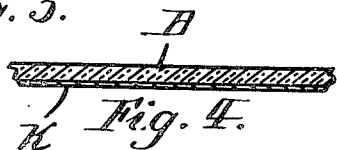
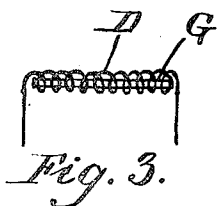
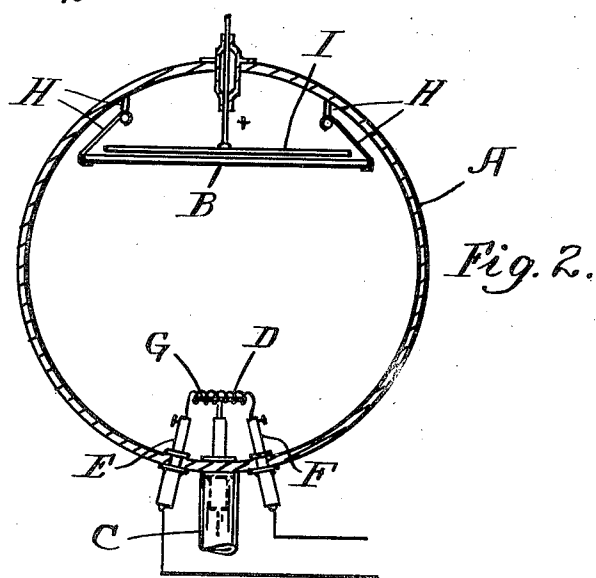
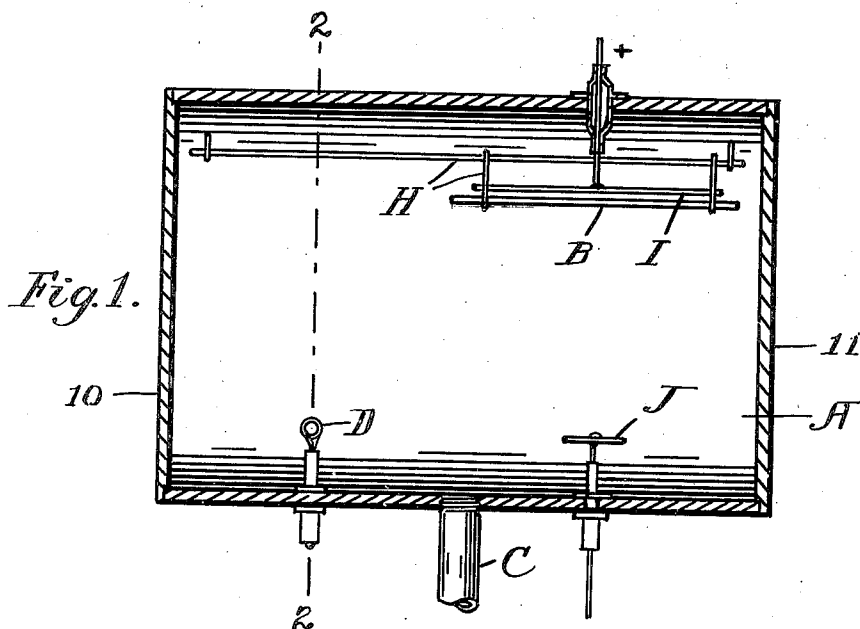


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H. W. EDWARDS  
MIRROR, PROCESS OF MAKING SAME, AND COMPOSITION  
OF REFLECTING ELEMENT THEREFOR  
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Inventor:  
Hiram W. Edwards  
by: S. Shadbury  
Attorney

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MIRROR, PROCESS OF MAKING SAME, AND  
COMPOSITION OF REFLECTING ELEMENT  
THEREFORHiram W. Edwards, Los Angeles, Calif., assignor  
to Don Baxter, Inc., Glendale, Calif., a corpo-  
ration of Nevada, as trustee

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7 Claims. (Cl. 91—70.1)

The primary object of this invention is the production of a mirror surface having a maximum and uniformity of substantially perfect reflection throughout the spectrum, thus enhancing the efficiency of various reflecting instruments to which my invention is applicable. A further object is to provide a medium of reflection which produces a whiter light because of the larger amount of blue light reflected than heretofore. The whiter light reflected is of great importance photographically because of the fact that films are much more sensitive to blue than red light rays. Among further objects is the production of a reflecting surface composed of hard and substantially untarnishable reflecting material, thus prolonging its life and efficiency. In seeking to produce a more perfect reflecting surface I have discovered a new alloy of certain metals which when properly applied to a surface of a suitable entity, serves to reflect a higher percentage and uniform amounts of light throughout the spectrum than any known medium, thus producing a reflecting surface which is capable of greater and more perfect reflecting power than produced. This alloy consists of substantially ninety seven percent of aluminum and three percent of magnesium. These proportions may be varied to produce less or better reflecting results within the spirit of my invention.

In preparing the alloy the two proportions of metals as stated are melted together at a temperature of substantially seven hundred degrees centigrade. During this process the metals absorb gas, which must be removed. To accomplish this purpose the alloy is heat treated. After cooling the alloy is ready for use.

The accompanying drawing forming part of this specification, illustrates my invention diagrammatically, in which Fig. 1 is a vertical longitudinal central section of the vacuum chamber in which the plate or body of glass or other suitable material is shown placed as when having its reflecting surface subjected to the process of condensing my improved alloy thereon; Fig. 2 is a section taken on line 2—2 of Fig. 1; Fig. 3 is a side elevation of the heater coil with my improved alloy in place to be condensed upon the mirror body; and Fig. 4 is an enlarged section of one form of my improved mirror or reflector.

The apparatus for the preparation of my improved reflector surface consists of a housing A made of any suitable material and may resemble a steel cylinder and be termed a vacuum chamber. This cylinder has a pair of end walls

10 and 11 which are removably secured to seal the cylinder ends. In this cylinder the mirror body B to be treated and any other appurtenances may be placed. Said chamber is connected by the tube C to suitable vacuum pumps (not shown) or other suitable air exhaust means for the purpose of reducing air pressure. These pumps must be very fast and capable of producing a vacuum in the chamber of about  $10^{-4}$  mm. pressure or better.

A heating element D composed of a spiral of preferably tungsten wire is enclosed in the lower portion of the vacuum chamber and is connected by sealed in leads E and F so that a suitable electric current may be passed through the spiral to heat the latter. A small piece of my improved alloy G is placed in the spiral and the temperature of the heating element raised sufficiently to vaporize said alloy in the vacuum chamber. The temperature of the heating element is raised slowly so that any absorbed gases in the alloy will be expelled. The construction of heating element described can be varied, any form which will vaporize my improved alloy being contemplated within the scope of my invention.

For the purpose of cleaning the surface of the mirror body of residual gases which might effect the condensation of the vapor from my improved alloy thereon, the mirror body B is supported in the field of an electrical discharge between the positive electrode I, immediately above and adjacent to the mirror body and the negative electrode J, located directly below in the lower portion of the vacuum chamber. These electrodes are suitably insulated from the cylinder wall of the vacuum chamber to protect against short circuiting and leakage from the circuit of high tension direct current with which said electrodes are connected. In practice I have used two thousand volts pressure but this may be varied to suit requirements. The electrical discharge in the vacuum chamber between the negative electrode below and the positive electrode above serves to subject the lower surface of the reflector body to a bombardment which cleans the surface of said body so that vapor from the alloy will condense more evenly upon and tenaciously adhere to said surface, thus assisting in producing a more perfect, uniform, durable and serviceable reflecting surface.

In carrying my improved method into practice, the mirror body of any suitable form or material is secured in place in the vacuum chamber below the upper electrode I by the supports H. A body of my improved alloy to be used is placed in the 55

heating coil D and the vacuum chamber closed and sealed. Air pressure in the vacuum chamber is reduced to about .02 mm. of mercury or less. Next the surface of the mirror body, such as B is subjected to bombardment by the discharge of electricity between the electrodes I and J to thoroughly clean the mirror surface and remove any residual gases. The pressure in the chamber is then reduced to .0001 mm. of mercury and metal vapor from the alloy in the heater coil is generated by operating the heater, while the vacuum chamber is maintained at said reduced pressure. The vapor thus produced condenses substantially uniformly over the surface of the mirror body to the desired thickness of deposit, whereupon the operation is completed and the vacuum chamber opened and the mirror body removed. In Fig. 4 the mirror body B is shown with the reflecting deposit K of my improved alloy thereon. Said body may be composed of any substance desired such as glass, crystal, metal or any other entity. During operation the evaporated metal radiates in direct lines from the heating element D and produces a substantially uniform deposit on the mirror body B, provided the pressure in the vacuum chamber is reduced sufficiently low. To enhance uniform deposit of the metal vapor upon a surface of large area as many heating elements and accompanying bodies of alloy may be employed as desired to produce effective results.

In accordance with the patent statutes, I have described the principles of operation of my invention, together with the composition employed, the method involved and apparatus by which the method can be carried into practice, but I desire to have it understood that the disclosure is only illustrative and that modifications thereof are contemplated within the spirit of the invention. I do not therefore wish to be understood as confining myself to the specific disclosure set forth, within the scope of the following claims.

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

1. The method of producing a mirror, including exposing an entity such as a reflector body in a vacuum chamber, subjecting the surface of said body to the action of an electrical discharge

while exposed in said chamber, and then condensing vapor from an alloy of aluminum and magnesium on said exposed surface in said chamber.

2. The method of producing a mirror, including exposing an entity such as a reflector body in a vacuum chamber, subjecting the surface of said body to the action of an electrical discharge while exposed in said chamber, and then condensing vapor from aluminum and magnesium on said exposed surface in said chamber.

3. The method of producing a reflecting surface on a reflector body, consisting of first exposing said surface in a vacuum chamber, second of subjecting the surface of said reflector body to the action of an electrical bombardment to clean said surface at a suitable vacuum pressure, and finally of vaporizing aluminum and magnesium in said chamber and condensing said vapor upon the surface of said body at a suitable vacuum pressure.

4. The method of producing a mirror, consisting of exposing a body in a vacuum chamber, of subjecting the surface of said body to the direct action of an electrical discharge while exposed in said chamber, and finally of condensing vapor from a metallic alloy on said exposed surface in said chamber.

5. The method of producing a mirror, consisting of exposing a body in a vacuum chamber, of subjecting a surface of said body to the direct action of an electrical discharge while exposed in said chamber, and finally of forming a reflector surface of metal on said exposed surface in said chamber.

6. The method of producing a mirror, consisting of exposing a body in a vacuum chamber, of subjecting a surface of said body to the direct action of an electrical discharge while exposed in said chamber, and finally of condensing vapor from a substantially pure alloy on said exposed surface in said chamber.

7. The method of producing a mirror consisting of exposing a body in a vacuum chamber, of subjecting a surface of said body to the direct action of an electrical discharge while exposed in said chamber, and finally of condensing vapor from an aluminum alloy upon said exposed surface in said chamber.

HIRAM W. EDWARDS.