

UNITED STATES PATENT OFFICE.

JOSEF ROSENTHAL, OF FÜRTH, GERMANY.

PROCESS OF COLORING METAL LEAVES.

SPECIFICATION forming part of Letters Patent No. 509,687, dated November 28, 1893.

Application filed July 19, 1893. Serial No. 480,948. (No specimens.) Patented in Germany March 22, 1892, No. 65,470.

To all whom it may concern:

Be it known that I, JOSEF ROSENTHAL, a subject of the Emperor of Germany, residing at Fürth, in the Province of Middle Franconia, and Kingdom of Bavaria, Germany, have invented a Process of Coloring Metal Leaves One-Colored or with Patterns, (for which I have received Letters Patent in Germany, No. 65,470, dated March 22, 1892;) and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to a process for coloring metal leaves in such manner that the color produced thereon will be homogeneous, whereas hitherto only variegations could be obtained on metal leaves by heating the same. The homogeneous color produced according to my invention can be made to uniformly extend over the entire surface of the metal leaf, or only over a predetermined portion of the same, whereby patterns of any kind desired can be obtained on the surface of the metal leaf.

The invention consists in subjecting the metal leaves to a uniformly distributed heat to cause the formation of a thin and homogeneous layer of oxide, whereby interference colors are produced on the leaves. The leaves are piled upon one another, and according to my invention leaves or plates of a suitable material are interposed at intervals between the metal leaves, and appropriate coloring or other substances may be applied on the said interposed leaves, whereby a thin and homogeneous coating of a coloring matter may be formed on the metal leaves. This coating may be produced either alone, or conjointly with the superficial oxide, by the same process of uniformly heating the metal leaves, as will be more fully described hereinafter.

To produce the even oxide—or other thin layers, the metal-leaves, singly or in packs are laid between leaves or plates of paper, glass, metal, cloth, mica, asbestos or similar material. Then these packs, alternatively with heat-conducting pieces, sheets or nets of metal are piled upon each other and brought to a certain even temperature. This can be

accomplished by placing the packs into a closed space through which a current of heated air is made to circulate, or any other means are provided by which the air can be heated at will to any degree. By this operation the even oxide-layer is formed. The colors which are produced in this manner vary according to the heat to which the leaves are exposed and to the duration of the process of heating but the coloring coating is always homogeneous, so that the metal leaf, or the portion of the same on which the coating is formed, will be uniformly colored. If the leaves or plates of paper, &c., are prepared prior to the heating, with suitable substances, for instance by printing them, impregnating them with solutions or applying pulverized material, these substances act on the metal-leaf, when evenly heated, in such a manner that either the leaves are covered with a thin layer, which produces interference-colors or the leaves are combined with a pigment on their surfaces. On applying these substances only at certain places, say in patterns, on the paper, glass, metal, cloth, mica, asbestos or similar material, the metal-leaves are differently colored at various places, but each of the said different colors is homogeneous, and the leaves are distinguished thereby from the well known variegated leaves and also by the fact that distinct patterns of a predetermined arrangement and association of colors are produced on the leaves.

I am aware that interference colors are produced on metal, for instance when tempering steel, but I am not aware that any process has been used or proposed by which a homogeneous color, or several such colors, could be obtained on metal leaves.

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The process of producing a homogeneous coloring on metal leaves, which consists in piling the leaves upon one another and arranging layers of a suitable material in contact with the metal leaves so as to form a part of the pile, said layers being of greater thickness than the metal leaves, and subjecting the leaves to a uniformly distributed heat, substantially as described.

2. The process of producing a homogeneous coloring coating on metal leaves, which consists in piling the leaves upon one another and arranging layers of a suitable material in
5 contact with the metal leaves so as to form a part of the pile, said layers being prepared with appropriate substances, and subjecting the leaves to a uniformly distributed heat, substantially as described.

10 3. The process of producing a homogeneous coloring coating on metal leaves, which consists in piling the leaves upon one another with the interposition of separating layers and pieces of a heat conducting material located
15 at intervals, and subjecting the leaves to a uniformly distributed heat, substantially as described.

4. The process of producing on metal leaves distinct patterns composed of differently col-

ored portions, which consists in piling the 20 leaves upon one another and arranging in contact therewith, so as to form a part of the pile, pieces of a suitable material on which patterns are produced, and heating the said metal leaves, substantially as described. 25

5. The process of producing on metal leaves distinct patterns composed of differently colored portions, which consists in piling the leaves upon one another and arranging in contact therewith, so as to form a part of the pile, 30 pieces of a suitable material on which patterns are produced by the application of suitable substances, and heating the said metal leaves, substantially as described.

JOSEF ROSENTHAL.

In presence of—

H. J. DUNLAP,
A. ENSLIN.