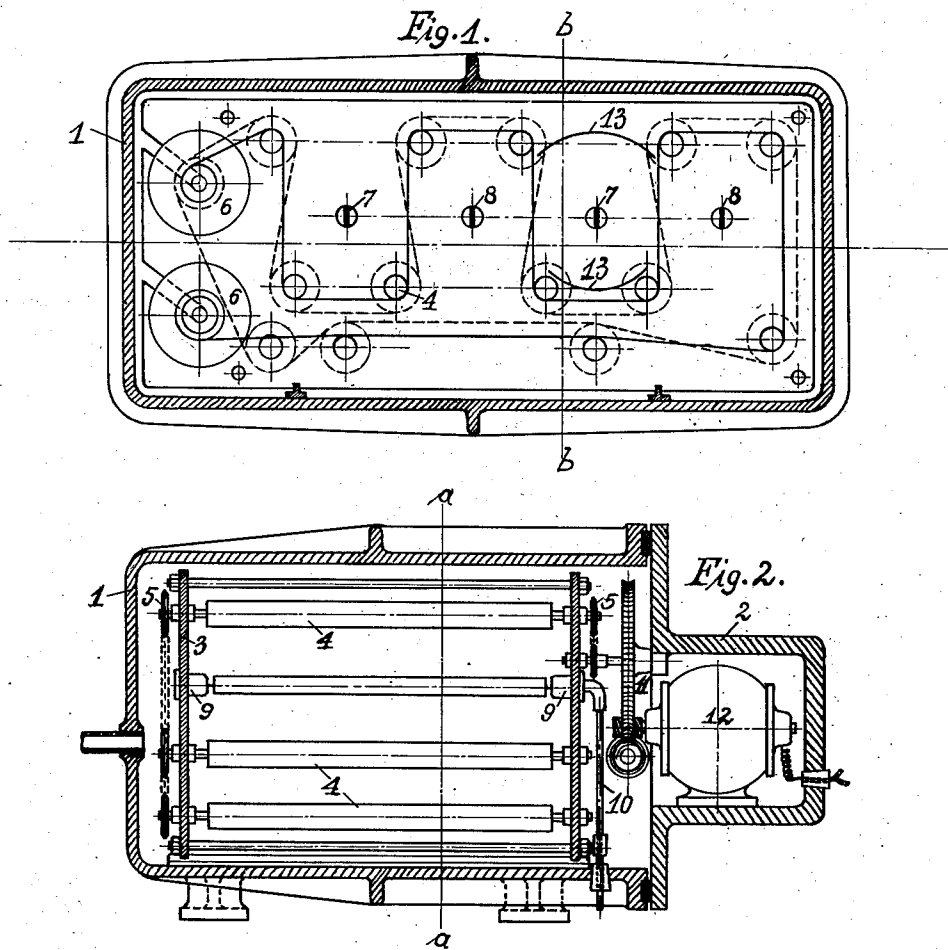


R. RAFN & G. E. SCHMIDMER.
COATING FLEXIBLE OBJECTS OF ORGANIC ORIGIN WITH METAL.
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Patented June 16, 1914.



Witnesses:
N. P. Leonard,
E. C. Tate.

Inventors,
Robert Rafn,
George E. Schmidmer,
By Bynes, Townsend & Buckenmeyer
Attys.

UNITED STATES PATENT OFFICE.

ROBERT RAFN AND GEORG E. SCHMIDMER, OF NUREMBERG, GERMANY.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, ROBERT RAFN and GEORG E. SCHMIDMER, subjects of Norway and of Germany, respectively, residing at 5 Nuremberg, Mittelfranken, Kingdom of Bavaria, Germany, have invented certain new and useful Improvements in Coating Flexible Objects of Organic Origin with Metal, of which the following is a specification.

10 This invention relates to the production of objects of flexible material of organic origin having a coating designed for adornment or durability and consists in an article of manufacture and commerce having a 15 coating of finely dissipated metal filling the pores or intercellular spaces in the superficial layers of the flexible organic material and in the production of such metallic coating.

20 The invention applies more particularly to the following and other objects of similar quality as raw material: yarn, thread, textile fabrics and hair of natural and artificial materials, wood, natural and artificial 25 feathers, leather, horn. The advantage of the invention if applied to objects of the said description resides especially in the preservation of their flexibility and softness as indispensable for instance embellishing 30 coatings of silky fabric and feathers such as ostrich feathers for ladies' hats.

35 In order to produce the coating before mentioned on objects of the kind in question said objects are passed in vacuum through an electric field of such intensity that the metal of one or more of the electrodes between which the current passes becomes dis- 40 integrated and deposited upon the objects to be coated. The coating produced in this way on said flexible material of organic origin and cellular structure possesses high brilliancy and adheres firmly to the objects even if bent, creased or puckered for the 45 reason that the disintegrated metal penetrates into the superficial pores of the materials under treatment. The special advantage of the process of producing said coating consists therein that every previous 50 treatment of the articles such as rendering them conductive or dipping same into baths is dispensed with.

55 In order to economically carry through the process it is advisable to effect the disintegrating of the metal to be deposited on

the objects in question by using a suitably calculated transformer.

The objects to be plated are preferably placed between two or more electrodes of the metals in question, or they are passed 60 at the proper rate between or by the electrodes by means of a suitable motor. In some cases it is advisable that the object be so covered by screens of glass, hard rubber, card board etc. that only the central or more 65 intensive part of the field is employed in covering the object. Metal that becomes deposited upon the screens or the walls of the vacuum chamber may be easily recovered if 70 desired.

For a full understanding of the invention, reference is made to the accompanying drawing which represents an apparatus for coating open fabrics, such as gauze, lace, etc.

75 In said drawing Figure 1 is a vertical section on line *a-a* of Fig. 2; and Fig. 2 is a vertical section on line *b-b* of Fig. 1.

In said drawing, 1 represents a vacuum chamber closed by the lid 2.

3 is a frame having mounted therein a 80 number of shafts or rolls adapted to be driven through chain-sprockets 5, 5, by a motor 12 situated in a recess of the cover 2, the driving being effected through a worm-gear 11. The metal electrodes 7 and 8, of 85 opposite polarity, are suspended between insulators 9, and are connected with the source of electricity by insulated conductors 10 which pass, properly sealed, through the wall of the vacuum chamber 1. The fabric 90 under treatment, which is wound upon reel 6, passes over feed rolls 4 and around and between the electrodes 7 and 8. In some cases it is advisable that the object to be coated be so covered by screens of glass, 95 hard rubber, cardboard, etc., that it is subjected only to the central or more intense part of the field, whereby a more nearly even coating is obtained. In the drawing, 13 indicates the position of these screens, 100 when used.

With electrodes, for instance of 25 square inches, at a distance apart of 6 inches in an air-vacuum of about two thousandths of one 105 inch of mercury column an alternating current of the frequency 50 of 1700 to 2500 volts and 0,025 ampere will suffice to cover an interposed object such as a silky fabric with gold in less than 10 minutes.

Metals that are especially suitable for this 110

process are gold, silver and copper, alloys of these with one another and with smaller amounts of other metals. In some cases alloys may be employed that cannot be deposited in the electrolytic bath.

5 It is characteristic of articles prepared in accordance with the present invention that they retain the surface character of the organic base, while presenting the proper color and the metallic luster of the coating metal. This is probably due, in part at least, to the discontinuous character of the metal film, as well as to its extreme tenuity. This probability is strengthened by the observed fact that the deposited films offer a decidedly higher electrical resistance than does a continuous film containing the same weight of metal distributed over the same area.

10 As illustrations of the above-mentioned preservation of the surface character of the organic base, it is noted that coated moiré silks, figured fabrics and the like exhibit their characteristic markings and that coated silk and cotton threads for example are easily distinguishable from each other.

What we claim is:

1. As a new article of manufacture, a base of organic origin and cellular structure, having applied thereto, by a process of electrical disintegration, an adherent, tenuous, metal-coating, said article exhibiting both the color and the luster of the metal and the surface character of the organic base.

2. As a new article of manufacture, a flexible base of organic origin and cellular structure, having applied thereto, by a process of electrical disintegration, an adherent, tenuous metal-coating, said article retaining its flexibility and exhibiting both the color

and the luster of the metal and the surface character of the organic base.

3. As a new article of manufacture, a fabric of organic origin and cellular structure, having applied thereto, by a process of electrical disintegration, an adherent, tenuous metal-coating, said fabric retaining its flexibility and exhibiting both the color and the luster of the metal and the surface character of the original fabric.

4. A process of producing durable coatings upon a flexible base of organic origin and cellular structure, which consists in passing the material to be coated, in a vacuum, in proximity to suitable metal electrodes, and maintaining an electrical field of such character as to deposit on said material a metal coating, the coated article exhibiting both the color and luster of the metal and the surface character of the organic base, and retaining the flexibility of said base.

5. A process of producing durable coatings upon a base of organic origin and cellular structure, which consists in passing the material to be coated, in a vacuum, in proximity to suitable metal electrodes, and maintaining an electrical field of such character as to deposit on said material a metal coating, the coated article exhibiting both the color and luster of the metal and the surface character of the organic base, said base being screened from the weaker peripheral portions of said field.

In testimony whereof, we affix our signatures in presence of two witnesses.

ROBERT RAFN.

GEORG E. SCHMIDMER.

Witnesses:

OSCAR BOCK,
A. WITTMANN.