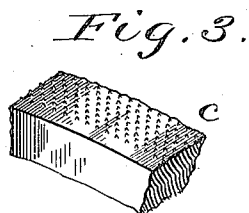
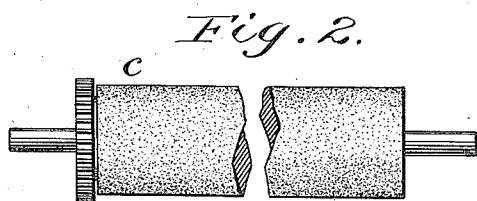
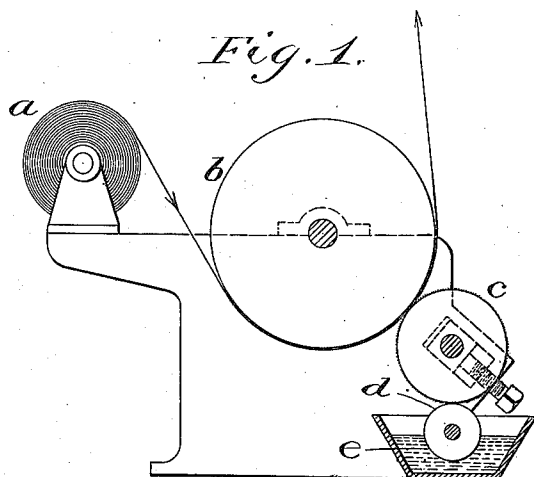


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MANUFACTURE OF METALLIC PAPER OR METAL FOIL SUBSTITUTE.
APPLICATION FILED DEC. 10, 1908.

1,060,098.

Patented Apr. 29, 1913.



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MANUFACTURE OF METALLIC PAPER OR METAL-FOIL SUBSTITUTE.

1,060,098.

Specification of Letters Patent.

Patented Apr. 29, 1913.

Application filed December 10, 1903. Serial No. 466,921.

To all whom it may concern:

Be it known that I, BERTHOLD KAUFMANN, a subject of the Emperor of Germany, residing at 29 Sandstrasse, Nuremberg, Bavaria, in the Empire of Germany, have invented certain new and useful Improvements in the Manufacture of Metallic Paper or Metal-Foil Substitute, of which the following is a specification.

The present invention relates to a novel method of manufacturing metallic paper or a substitute for tin or other metal foil. And the object of the invention is the production of a metallic paper of high quality in such a manner that a uniform coating of metal is had, with the smallest possible consumption of metal.

Processes, as hitherto known, for the manufacture of metallic paper, present several drawbacks. In one process in general use, the metal mixed with a suitable liquid is applied to the paper by means of a paper coating machine, which process has the drawback that the use of thin water-proof or grease-proof paper is almost impossible because such paper can not be suitably treated in an ordinary coating machine. Furthermore, this process requires a comparatively large consumption of metal. In the so-called Wickel process, the metal powder or dust is applied to paper treated with a suitable adhesive substance, and as this process necessitates three distinct operations, it is very complicated and uneconomical. The manufacture of metallic paper by galvanoplastic deposition is impracticable owing to the expense.

According to the present invention, in my new method or process which is simple but nevertheless exceedingly important, the metal is mixed with a liquid so as to form a suitable paste which is applied on a water-proof or grease-proof paper by means of a roller engraved as finely as possible. In the preparation of the metal paste, a fine metal dust obtained as hereinafter described is employed, this dust being considerably finer than bronze powder; it being distinctly understood that the use of bronze powder forms no part of the present invention as it is not possible to obtain bronze powder of a sufficient degree of fineness. To form the metal dust, I preferably employ tin of about 99½ per cent. purity; the tin is melted and when in the

molten state it is blown under high pressure through pipes containing exceedingly minute openings. The metal emerges from these openings in a dust-like condition, and this exceedingly fine powder is stirred into a suitable adhesive liquid in order to form a plastic paste or mass. The adhesive liquid which I employ is, preferably, a solution of shellac or tragacanth. The amount of liquid contained in the paste so produced, must be so small that after the application the metal will remain on the paper and will dry upon the same as soon as the paper leaves the machine. By a suitably fine engraving of the rollers it is possible to keep the consumption of metal extremely low. I preferably employ a roller upon which the engraving is as fine as very fine needle points in closest juxtaposition. This engraving must be so extremely fine that the spaces between the points on the engraved roller are hardly perceptible to the naked eye so that the minute particles of metal which have been applied to the paper will overlap at their mutual edges in such a manner that the entire paper is covered with metal.

An important advantage of the present invention is, that by the use of finely engraved rollers for applying the metal, a very thin coating of metal can be effected on the water-proof or grease-proof paper and in a very uniform manner. The extreme thinness of the metallic layer thus applied to the paper permits the paper to dry in a very few minutes. This feature of the invention by which such a thin layer of metal can be applied, insures practically no waste of metal.

The present method or process is the only successful one by which a metal paste or metal mixed with a liquid adhesive as described may be applied to water-proof and grease-proof paper with a minimum consumption of metal.

The improved method or process constituting my invention may be carried out by means of the apparatus shown in the accompanying drawing, in which:

Figure 1 is a diagrammatical elevation of a preferred arrangement of parts; Fig. 2 is an elevation of one of the rollers used for applying the metal to the paper; and Fig. 3 is a fragmental perspective view of said roller representing the needle-point en-

graving on the surface of the roller, it being distinctly understood that the distances between the needle points are enormously exaggerated for the purposes of illustration.

5 Referring more particularly to the drawings, *a* represents a roll of the paper which is to be covered with metal, from which the paper is drawn toward, and comes into contact with, the pressure cylinder *b*. The
10 roller *c* for applying metal to the paper is mounted so that it will frictionally engage the paper passing about the roller *b*. This roller is engraved to an exceeding degree of fineness, as is represented in Fig. 2. As will
15 be seen upon reference to Fig. 3, the surface of the roller consists of very fine needle points placed in close juxtaposition as before stated the distances between the fine needle points as illustrated in the drawing being greatly exaggerated. A metal-
20 feeding roller *d* is mounted beneath roller *c*, in such a manner as to come into contact with said roller, and to transfer metal to the engraved surface thereof. The roller
25 dips into the metal paste contained within a suitable trough *e*.

By the employment of the present method or process, the connection between

the metal and the paper is obtained in so thorough a manner that it is impossible to
30 remove the metal layer even by the most violent rubbing. By virtue of the metal being pressed into the paper by the fine points of the engraved roller, the firmest possible connection between the metal and
35 paper is obtained. The exceedingly close juxtaposition of the fine points enables a continuous layer of metal of the utmost thinness to be applied.

I claim:

40 A method for the manufacture of metallic paper, which consists in preparing a paste containing metal in finely divided form, transferring in a continuous operation said paste to a surface provided with a
45 plurality of microscopic projections and recesses, and moving water-proof paper relative to said surface and in pressure contact with said microscopic projections and recesses.
50

In testimony whereof I affix my signature in presence of two witnesses.

BERTHOLD KAUFMANN.

Witnesses:

GUSTAV BOEHM,
GOTTFRIED UNGER.