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PROCESS OF METALLIZING FABRICS.

APPLICATION FILED JULY 20, 1901.

Fig. 1.

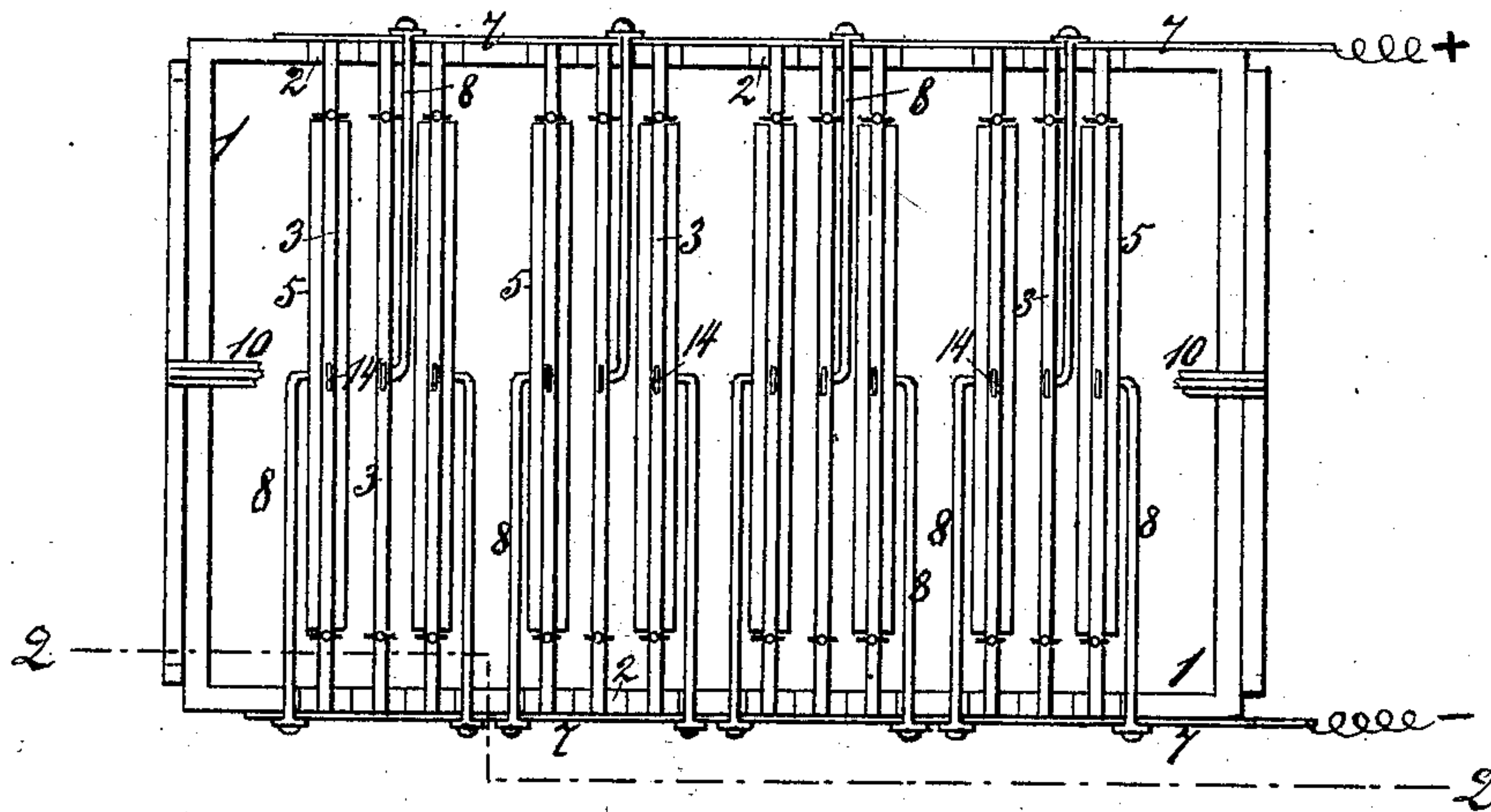
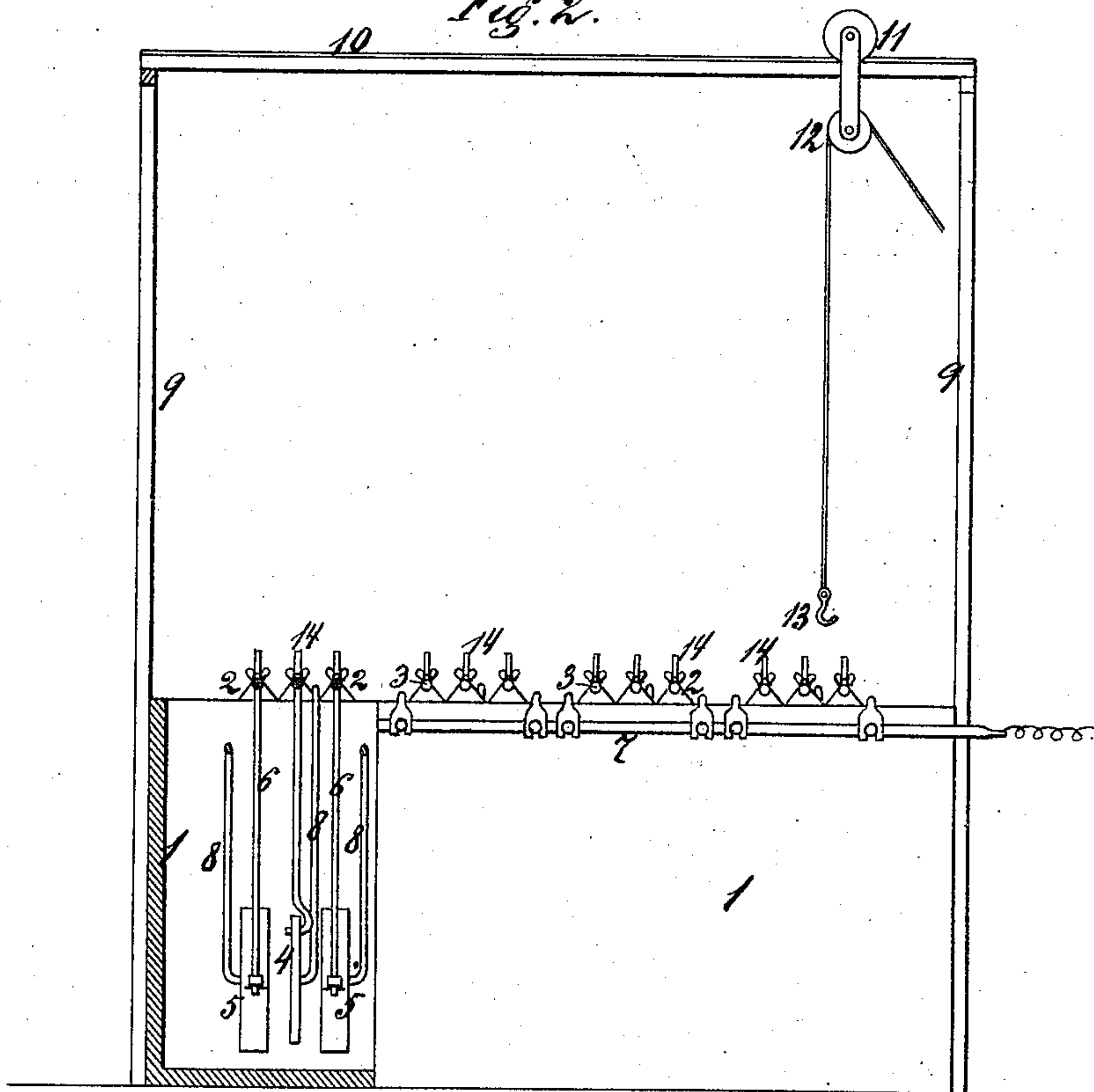


Fig. 2.



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CONSTANTIN DANILEVSKY AND STEPHAN TOURCHANINOFF, OF
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PROCESS OF METALLIZING FABRICS.

SPECIFICATION forming part of Letters Patent No. 785,541, dated March 21, 1905.

Application filed July 20, 1901. Serial No. 69,060.

To all whom it may concern:

Be it known that we, CONSTANTIN DANILEVSKY and STEPHAN TOURCHANINOFF, subjects of the Emperor of Russia, and residents of Gorokhowaya 11, St. Petersburg, Russia, have invented certain new and useful Improvements in Processes of Metallizing Fabrics, of which the following is a specification.

Our invention relates to a process for the deposition of metal by electrolysis through the whole thickness of fabrics, which are porous and pervious to liquids, and whether of animal, vegetable, or mineral materials. The metal being precipitated by the action of electrolysis is deposited in the interstices between the filaments of the fabric and fills its pores. Among the many fabrics which are capable of being thus metallized in a homogeneous manner may be mentioned leather and its substitutes, asbestos, and fabrics made of linen, wool, cotton, and wood. All metals which can be deposited from solutions of their salts under the action of electrolysis can be used in this process of metallization.

The process may be carried out in electrolytical vessels of any convenient form.

The annexed drawings show an apparatus preferably employed by us.

Figure 1 is a plan view, and Fig. 2 is a side view, partly in section on the line 2 2, of the apparatus.

1 is a wooden vessel covered inside with pitch or made otherwise impermeable for the electrolytic liquid. The upper side borders of the vessel 1 are provided with triangular projections 2 2, with seats for metallic rods 3 3 placed across the vessel 1. To these rods copper plates (positive electrodes) 4 and frames 5, containing the fabric to be metallized, are attached by means of strings 6 or otherwise. At both sides of the vessel 1 are fixed the metallic rods 7 7 for conducting the current to the plates 4 and frames 5 separately by means of the flexible conductors 8 8. Over the vessel 1 is arranged on stays 9 9 a fixed rail 10, on which a roller 11 travels, having a lifting device 12, which enables the lifting of the rods 3 by means of the hook 13 and

loops 14, with plates 4 and frames 5, out of the vessel 1 separately.

The fabric to be metallized is subjected to a preliminary treatment having for its object to cleanse its pores and eliminate therefrom various mineral, organic, or fatty foreign matters or impurities or to free the pores of certain constituent portions from the tissue which might obstruct them. To this end the fabric is macerated or boiled in a suitable acid or alkaline liquid, according to the nature of the fabric and the character of the materials to be eliminated and contained in its pores.

Before immersing the fabric in the electrolytic bath we prepare an adherent foundation or backing and apply it to one of the faces of the fabric. This backing, which serves as a negative pole, may be formed, first, of a copper-wire fabric or of a metal plate; second, by covering one of the faces of the fabric to be treated with plumbago or finely-pulverized metal; third, by covering one of the faces of the fabric with a conducting layer. The fabric thus prepared is immersed in an electrolytic bath, the electrolyte of which consists of a solution of a suitable metallic salt.

The electrolytic bath may be analogous to those employed in the galvanoplastic art for sulfates, cyanids, lactates, and other metallic salts. For example, for a citrate-of-copper bath we take citrate of copper, ten to twenty grams, and boroglyceric acid, two to six grams, to one liter of water; for a lactate-of-copper bath we take nitrate of copper, ten to twenty grams, and lactate of ammonium, five to ten grams, to one liter of water, and for a borate-of-copper bath we take borate of copper, five to fifteen grams, and boroglyceric acid, two to six grams, to one liter of water. Baths of other metals can be prepared in a similar manner.

The fabric prepared as described is immersed in the bath. Then the metal backing or foundation constituting the cathode is connected to the negative pole of a source of electric energy, while the anode, consisting of a plate of the same metal which enters into the constitution of the bath, is placed above the

fabric (on the opposite side) in intimate contact with the latter or at a certain distance therefrom.

5 The backing consists, preferably, of thin wire-gauze and is rubbed with graphite, so that it can be easily separated from the metallized fabric. This backing is simply stretched together with the fabric in an appropriate stretching-frame.

10 To deposit the metal, an electric current is caused to pass of such a strength and such a tension as may be suitable for obtaining the metal in a crystalline form. The tension and the strength of the current may vary for each
15 particular case, according to the thickness and the degree of porosity of the fabric and according to the degree of conductivity of the solution of the bath, &c. When the metallization has been completed, the fabric is washed
20 and placed in an aqueous solution of chlorid of tin and cyanid of potassium, in order to cover with tin the metallic particles electrolyt-

ically deposited in the thickness and on the surface of the fabric. Certain fabrics can be subjected to an after treatment. For example, 25 they can be impregnated with fatty oils, (siccativ or not,) with resins, gums, &c. This treatment can be finished by pressing and rolling the metallized fabrics.

We claim as our invention— 30

The process of metallizing fabric which consists in first impregnating the fabric by the deposition of metal by electrolysis, and after the metallization has been completed, washing the fabric and subjecting it to the action of 35 an aqueous solution of chlorid of tin and cyanid of potassium.

In witness whereof we have hereunto set our hands in presence of two witnesses.

CONSTANTIN DANILEVSKY.
STEPHAN TOURCHANINOFF.

Witnesses:

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