

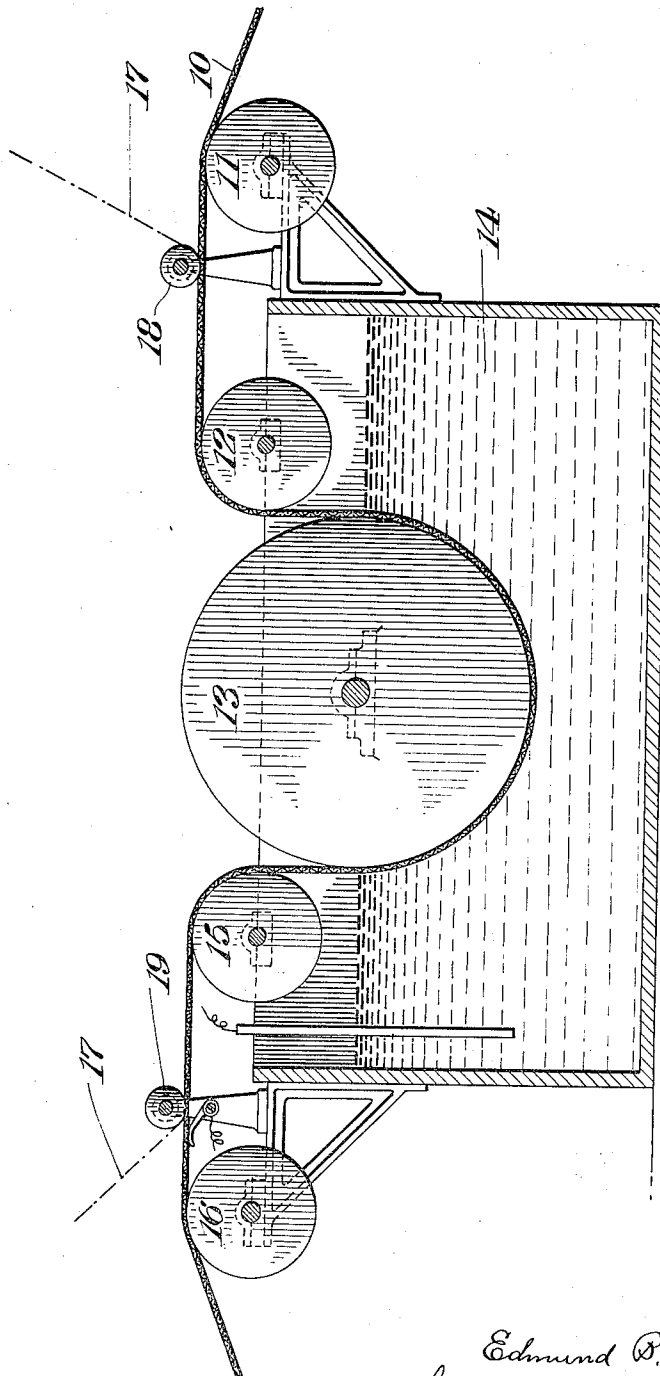
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ART OF MAKING METAL FABRICS

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UNITED STATES PATENT OFFICE

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ART OF MAKING METAL FABRICS

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My invention relates to improvements in the art of making metallic fabrics. My invention is intended especially to produce a light, strong, air-proof, flexible metal fabric, which is suitable for covering the fuselage, wings or other parts of an aeroplane, but which can be used for other purposes. For the purpose stated, it is imperative that the fabric be flexible, strong and air-proof, and it is also necessary that it be light in proportion to its strength, and that the outer surface or the surface which is exposed to the air be smooth so as not to offer any unnecessary air resistance.

Attempts have been made to produce a fabric of this kind from wire mesh, but these attempts have not been successful. If a conducting wire mesh, say copper wire mesh, is coated by electrolysis, the deposited metal builds up around the wires of the mesh and ultimately seals the openings therethrough. In accomplishing this rough surfaces are necessarily produced and the fabric becomes exceedingly heavy. By my improved method, I cover one side of the wire mesh with a conducting material on a carrier which moves with the wire mesh and expose the wire mesh and the part of the conducting material next to the mesh to the electrolytic bath and in this way the deposition of the metal, chromium, nickel, copper, or any preferred metal, is made through the pores of the mesh upon the conducting backing and upon the wires of the mesh, so that the openings through the mesh are sealed on the side next the conductor and a smooth coherent surface is produced on the conductor side, after which the conductor is removed and the light flexible airtight fabric is ready for use. The amount of the deposition and the thickness of the surface coating is, of course, dependent upon the time to which the mesh is subjected to the electrolytic action.

As a convenient means for carrying out the above result, I provide for passing the mesh over a submerged roller and through an electrolytic bath at a definite speed and apply a fabric coated with carbon, or other conductor, which passes between the wire mesh and the submerging roller, thus afford-

ing a backing for the mesh while deposition takes place. The result may be obtained in other ways, but I have shown an apparatus which is suitable for carrying out my improved process and producing the improved product.

The figure shown is a sectional elevation showing a means of carrying my invention into effect.

As here illustrated, the wire mesh 10 is fed to the electrolytic bath over guide rollers 11 and 12 and then passes beneath a submerging roller 13 into the bath 14, the fabric coming out over guide rollers 15 and 16. In order that the process may be continuous, rapid and satisfactory, a carrier preferably of fabric 17 which can be coated with a conductor, for example, carbon, is fed through the bath with the wire mesh, passing beneath a roller 18 over the roller 12 and beneath the roller 13, in which case it is held tightly behind the wire mesh 10, and affords a conducting back for the mesh. The fabric comes out over the roller 15 beneath the guide roller 17 and can then be rolled up or otherwise disposed of so as to leave the completed metal fabric clear.

It will be understood that these rollers 11, 12, 13, 15 and 16 can be timed so that the wire mesh and its backing 17 will move through the bath at a desired rate to permit the proper deposition of metal on the mesh. As the conducting backing lies behind the mesh and between the roller 13 and the bath it will be seen that the deposition which can be according to any usual or preferred electrolytic process will pass through the pores or mesh and deposit upon the conducting surface of the fabric 17 and upon the wires of the mesh, so that on the side next the fabric an exceedingly smooth coherent sheet will be formed which will be anchored firmly to the mesh because the deposition will also take place upon the metal of the mesh and the time is, of course, made so that the metal deposition will be built up to just the desired extent. As a result, I produce a metallic fabric having a mesh body reinforced by an electrolytic deposition and with a smooth surface on one side of the body. For use on

fuselage, wings or bodies it is often desirable to have a smooth comparatively ductile surface which will act as an air foil with a reinforcing or mesh of stiffer material. The mesh is more likely to stretch than is the sheet surface and its anchorage, and to compensate for this I can take a mesh of steel, for example, and make the deposition of copper so that the steel which would naturally be more stretchy because of its open or mesh construction will, by reason of its greater tensile strength, be fully as strong as the more ductile surface and will act to reinforce said surface. In other words, the greater rigidity of the mesh metal will compensate for its inherent weakness and will counterbalance the lesser strength of the surface metal. It will be seen, therefore, that such a structure has all the desirable qualities of lightness, strength, flexibility and air sealing. It will also be seen that by the method disclosed the product may be rapidly made and it will be suitable for the purpose for which it is intended.

Heretofore in attempts to make a fabric having a body of wire mesh and a deposition of metal thereon by electroplating, a conducting material has sometimes been applied as a backing for the wire mesh and various materials have been used to fill the pores or interstices of the mesh, but these attempts have not been entirely satisfactory for the reason that in practice of this kind, the interstices become clogged so as not to properly take the deposition from the electroplating bath and sometimes the backing or filling breaks away causing an imperfect coating. In either case there may be breaks in the deposited coating which will spoil the fabric, but where a soft carrier on which the conducting material is deposited is used as a backing and moves through the electroplating bath with the wire mesh, these incidents do not occur, the deposited coating is smooth, even and continuous and the fabric or carrier on which the conducting material is placed can be easily removed leaving the completed wire mesh fabric coherent and perfect.

I claim:

The improvement in the art of producing a metal fabric which comprises covering one side of a wire mesh with a fabric sheet having conducting material next to the mesh, passing the wire mesh and fabric sheet through an electroplating bath whereby the metal of the bath is deposited on the wire mesh and the conducting material of the fabric sheet, and then removing the fabric sheet.

In testimony whereof, I have signed my name to this specification this 4th day of March, 1927.

EDMUND B. CARNS.