May 5, 1925. 1,536,569.

H. CRUSE

IMPREGNATION OF FIBERS BY ELECTROLYSIS

Filed Aug. 15, 1924

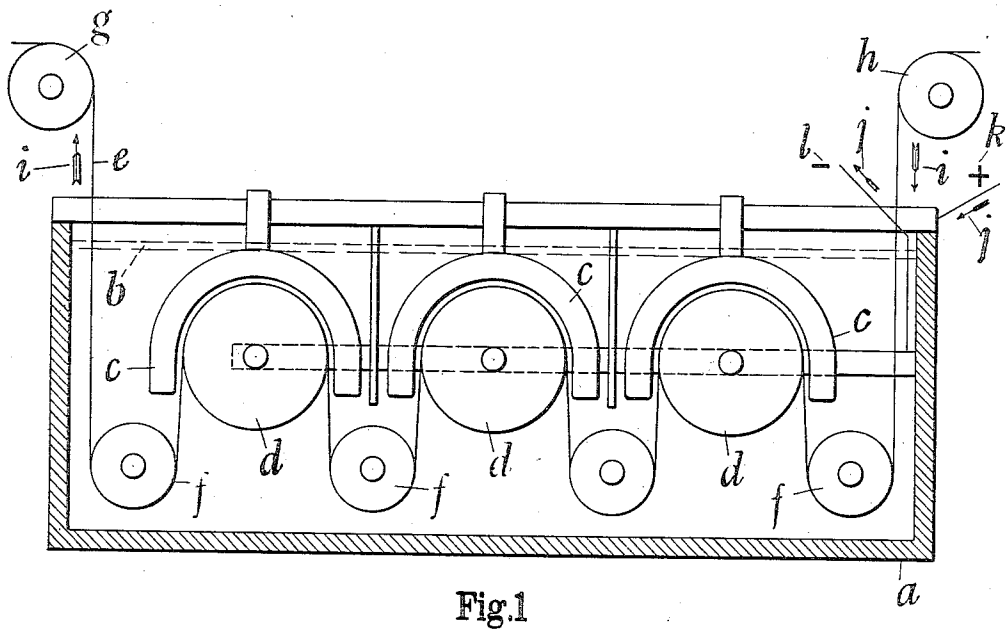

Fig.1

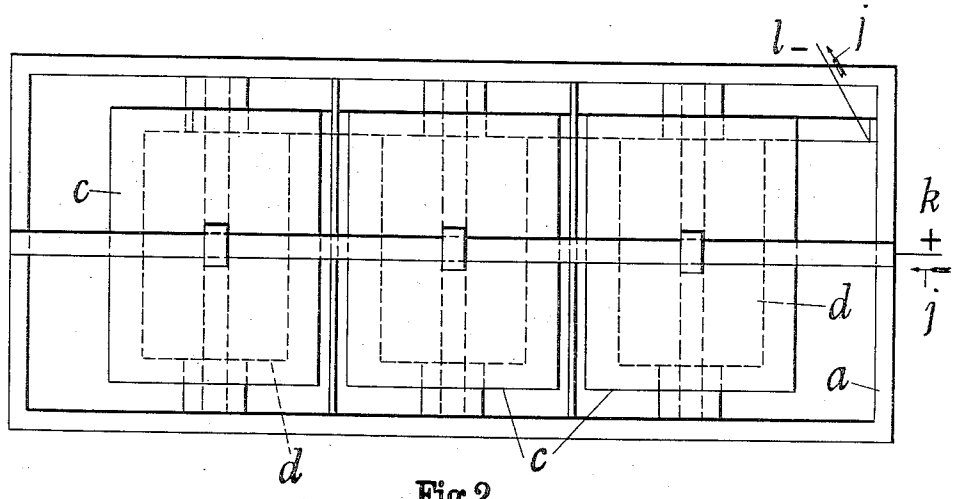

Fig.2

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UNITED STATES PATENT OFFICE.

HENRY CRUSE, OF HYDE, ENGLAND.

IMPREGNATION OF FIBERS BY ELECTROLYSIS.

Application filed August 15, 1924. Serial No. 732,318.

To all whom it may concern:

Be it known that I, HENRY CRUSE, a British subject, residing at 48 Stockport Road, Hyde, in the county of Chester, England, have invented certain new and useful Improvements Relating to the Impregnation of Fibers by Electrolysis, of which the following is a specification.

This invention relates to the impregnation of fibers with acetate of alumina or other salt or compound by electrolysis, and comprises an improved process and means for effecting said impregnation as hereinafter described.

According to this invention an electric current is caused simultaneously to produce the required compound or salt and impregnate with the same the yarn, cloth or other fibrous material for mordanting, dyeing, water proofing and other purposes.

The material to be impregnated is admitted to an electrolytic bath, whilst the electrolytic process is in operation therein for the production of the desired salt or compound, and is passed through the electrolyte and between the electrodes (the anode and cathodes) of said bath. If the material is to be impregnated with acetate of alumina the anodes are of aluminum and the electrolyte of the bath a solution of acetic acid. As the material travels between the electrodes the electric current employed for the electrolytic production of the acetate passes into and through the fibers of the material and causes the acetate to rapidly and thoroughly penetrate into the cells or interior of the fibers.

The electrolytic bath or chamber may be of any convenient form and construction and fitted with any desired number of electrodes; the latter may be in motion or stationary and the fibrous material under treatment may make contact with either the anodes or cathodes or with both.

The accompanying drawing illustrates in diagrammatic form one convenient type of apparatus suitable for use with my improved process of impregnating fibers, Figure 1 being a sectional elevation and Figure 2 a plan, some of the parts shown in Figure 1 being omitted in Figure 2 to avoid confusion.

The bath or receptacle *a* contains the liquid electrolyte *b* which has immersed therein the electrodes consisting of the anodes *c* and cathodes *d* arranged as shown. The fibers or fibrous material *e* to be impregnated is passed through the electrolyte and between the electrodes, the cathodes *d* acting as guide pulleys. Other guide pulleys as *f* are employed in the bath whilst above the latter are the driving pulleys *g* and *h* by which the material *e* is passed through the apparatus in the direction indicated by the arrows *i*. An electric current from any convenient source is passed through the apparatus in the direction indicated by the arrow *j*, entering at *k* and passing out at *l*; the electric circuit thus includes the anodes *c* and cathodes whilst the material *e* in passing between such electrodes crosses the electric circuit, so that the current must penetrate the said material.

If the material *e* is to be impregnated with acetate of alumina, the electrolyte *b* consists of a solution of acetic acid and the anodes *c* of aluminum.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:—

1. An apparatus for electrolytically impregnating fibers with a chemical compound, comprising an electrolyte including a metallic salt, electrodes arranged in the electrolyte for electrolytically producing a chemical impregnating compound, one of said electrodes being formed of metal, means for introducing an electric current into one of said electrodes and for discharging the same from the other one of said electrodes, and means for immersing the fibers in said electrolyte and between said electrodes, for causing the current to pass through the fibers and to electrolytically impregnate the fibers with said compound.

2. An apparatus for impregnating fibers with a chemical compound by electrolysis comprising an electrolyte including a metallic salt, electrodes extending into said electrolyte, one of said electrodes being formed of metal, means for introducing an electric current into one of said electrodes and for discharging the same from the other one of said electrodes, and means for passing fibers in a circuitous course through said electrolyte and between said electrodes.

3. Means for impregnating fibers with a chemical compound by electrolysis comprising an electrolyte including a metallic salt, electrodes extending into said electrolyte, means for feeding an electric current to one of said electrodes and for discharging the

same from the other one of said electrodes, one of said electrodes forming a guide, and means including said guide for causing fibers to pass in a circuitous course through said electrolyte, between said electrodes and across the section of the circuit between the electrodes.

4. An apparatus for electrolytically impregnating fibers including a tank containing an electrolyte of metallic salt, electrode guides arranged in the electrolyte, second electrodes arranged adjacent to the electrode guides, means for feeding an electric current to certain of said electrodes and for discharging the same from the other of said electrodes, and means for feeding fibers in a circuitous course through the electrolyte, about the electrode guides and between the first mentioned electrodes and the second electrodes.

In testimony whereof I have signed my name to this specification.

HENRY CRUSE.